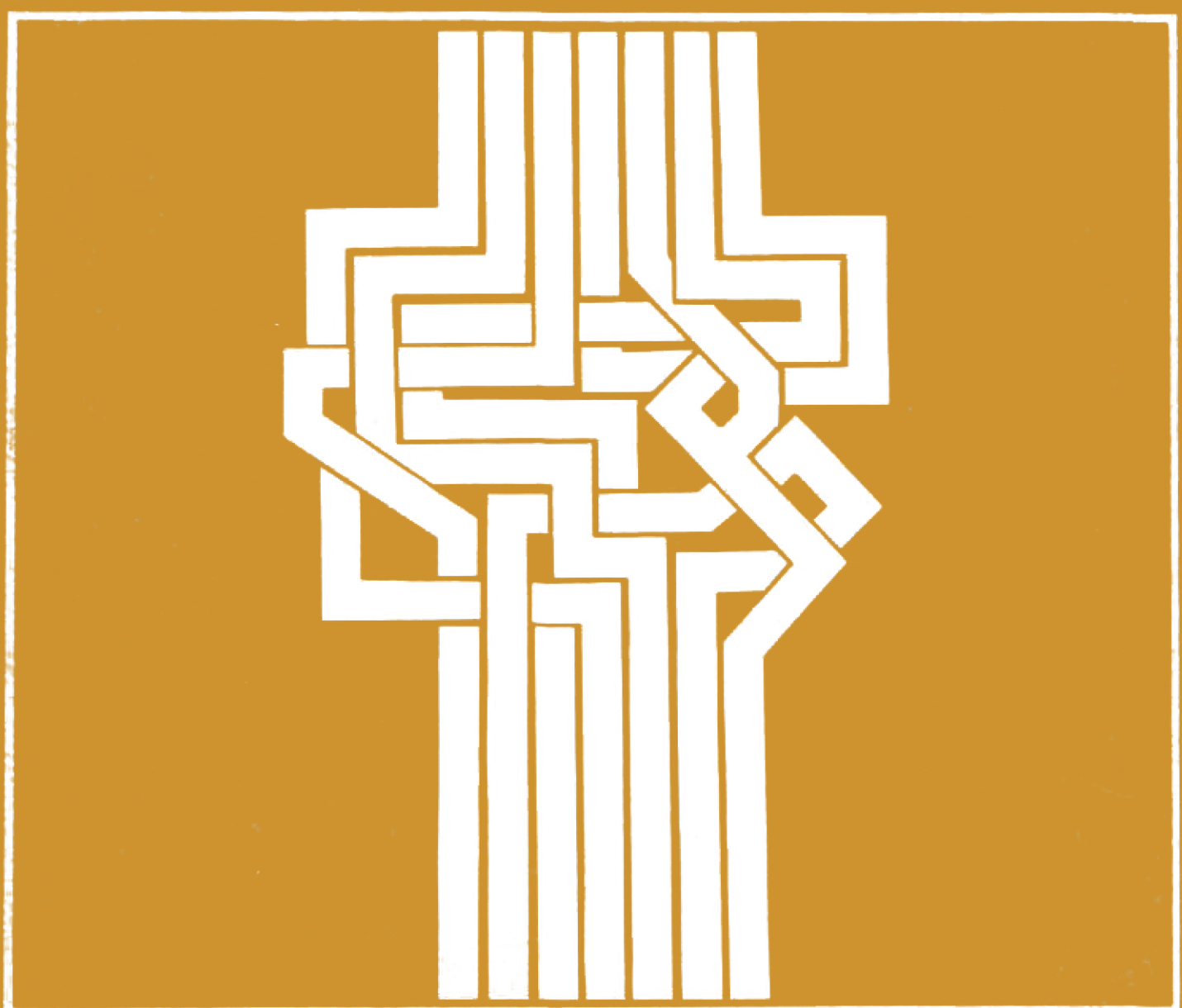
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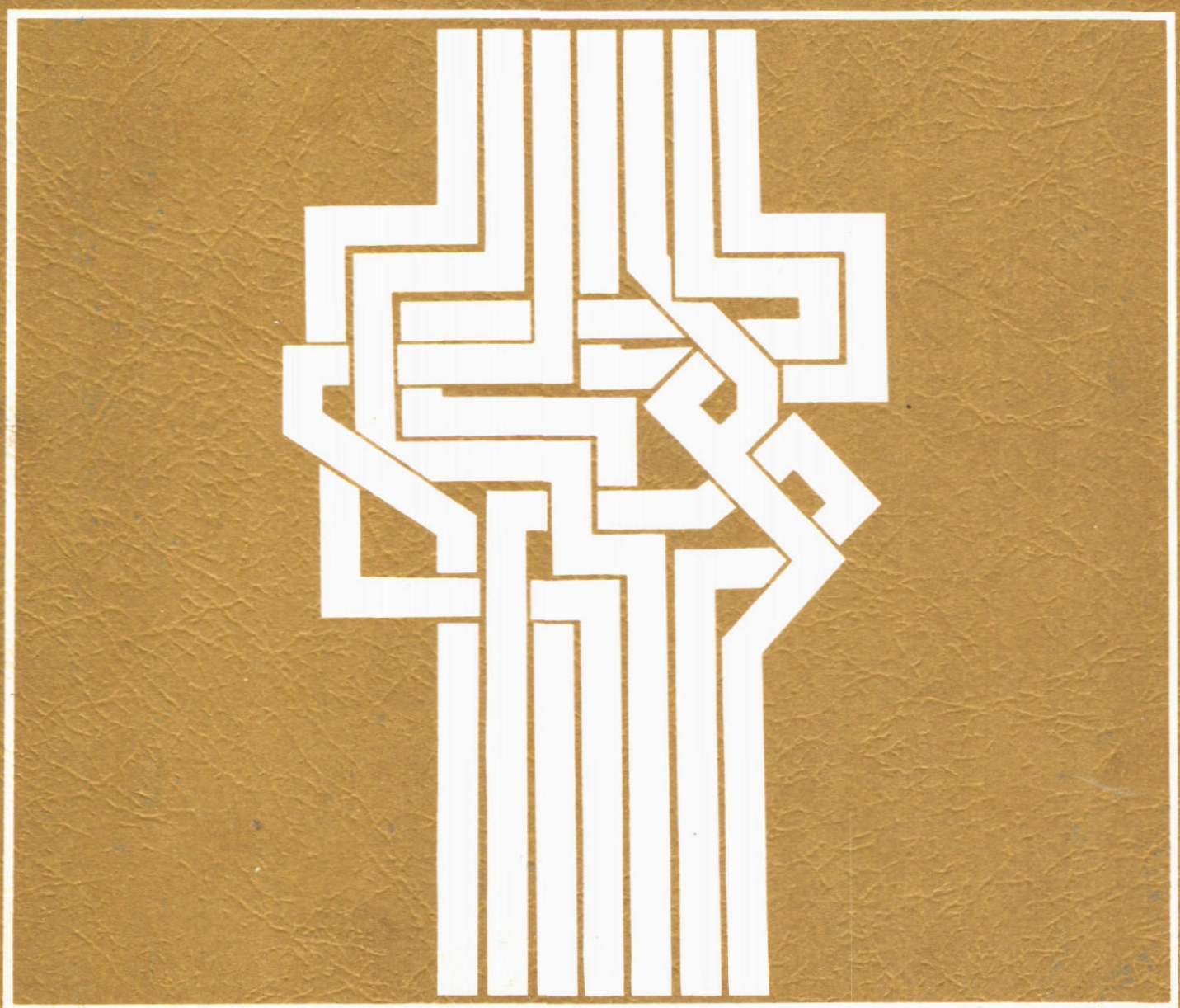
1978 Car Shop Manual

Volume 3, 4, & 5
Electrical, Body, & Maintenance



Ford
75TH ANNIVERSARY

1978 Car Shop Manual Volume 3 Electrical



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foreword...

This 1978 Car Shop Manual has been prepared to provide information covering normal service repairs and maintenance for 1978 Ford Passenger Cars manufactured in the United States and Canada. It is divided into five volumes, each covering a specific major area:

Volume 1 – Chassis
Volume 2 – Engine
Volume 3 – Electrical
Volume 4 – Body
Volume 5 – Maintenance and Lubrication.

Information in each volume is divided into Groups covering a general system. The table of contents on the cover of each volume indicates the Group title, number, and volume in which each Group is located.

For 1978, the basic part number for components covered in the Groups is also included in parenthesis after the Group number.

Example: Cooling System (General System Covered in Group) Group 27 (Group Number) (8000) (Basic Part Number for Cooling System Components)

Some components covered within a Group do not have the same basic part number. In these cases, more than one part number will appear on the Group index.

Example: Gasoline Engines (General System Covered in Group) Group 21 (6000 (Basic Part Number for Gasoline Engine Components) & 9000) (Intake and Exhaust Manifold Basic Part Number Only)

For easy reference, information in each Group has been divided into smaller units or Parts. There is one Part for each component in the system, as well as a General Service Part in some Groups to cover procedures common to several components within the Group. In general, each Part contains the Description, Operation, Diagnosis and Testing, Removal and Installation and Disassembly and Assembly procedures for the component covered in the Part. Diagnosis Charts are also included in some Parts to help you systematically locate and service conditions encountered. In most cases, specifications are included at the end of each Part.

To aid in locating specific items in this manual, the index at the front of each volume provides an alphabetical listing, with page number, for all Parts in the volume. The tab locator on the right side of this index will help you find the first page of each Group.

On the first page of each Group there is an index listing the Part title and Part number for each component covered within the Group. The first page of each Part contains an index to locate service operations covered in that Part. This Group-Part breakdown is also indicated in the page number located at the top of each page.

Example: 11-02-21 = (Group) 11 – (Part) 02 – (Page) 21

Metric conversion tables have been included at the back of each volume to aid in converting specifications in this manual to the metric equivalent.

The descriptions and specifications in this manual were in effect at the time this manual was approved for printing. Ford Motor Company reserves the right to discontinue models at any time, or change specifications or design without notice and without incurring obligation.

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DETROIT IRON

IDENTIFICATION CODES

GROUP 30

Car Identification Codes

PART 30-01

GENERAL DESCRIPTION

OFFICIAL VEHICLE IDENTIFICATION NUMBER

The official Vehicle Identification Number (VIN) (Fig. 1) for title and registration purposes is stamped on a metal tab that is fastened to the instrument panel close to the windshield on the driver's side of the car and is visible from outside.

VEHICLE CERTIFICATION LABEL

The Vehicle Certification Label (V.C. Label) (Fig. 1) is affixed on the left front door lock face panel or door pillar. The upper half of the label contains the name of manufacturer, month and year of manufacture, Gross Vehicle Weight Rating (GVWR), Gross Axle Weight Rating (GAWR), and the certification statement.

The V.C. label also contains the Vehicle Identification Number. This number is also used for warranty identification of the vehicle. The first number indicates the model year. The letter following the model year number indicates the manufacturing assembly plant. The next two numbers designate the Body Serial Code followed by a letter expressing the Engine Code.

The last six digits of the Vehicle Identification Number indicate the Consecutive Unit Number of each unit built at each assembly plant. The Consecutive Unit Numbers begin as follows:

100,001—Ford, LTD II, Ranchero, Mustang II, Thunderbird, Granada, Fairmont and Pinto.

500,001—Mercury, Cougar, Zephyr, Monarch and Mercury Bobcat.

800,001—Lincoln Continental and Continental Mark V.

The remaining information on the V.C. Label consists of the following vehicle identification codes:

The BODY code is two numerals and a letter identifying the body style.

The COL (color) code is a number and letter indicating the exterior paint color code and vinyl roof type and color (if equipped).

The TRIM code consists of a two-letter or a letter-number combination designating the interior trim.

The AXLE code is a number or letter indicating the rear axle ratio and standard or locking type axles.

The TRNS. code is a number or letter indicating the type of transmission.

The DSO code, consisting of two numbers, designates the district in which the car was ordered and may appear in conjunction with a Domestic Special Order or Foreign Special Order number when applicable. Ford of Canada DSO codes consist of a letter and number.

The following charts provide the various codes and their respective identification:

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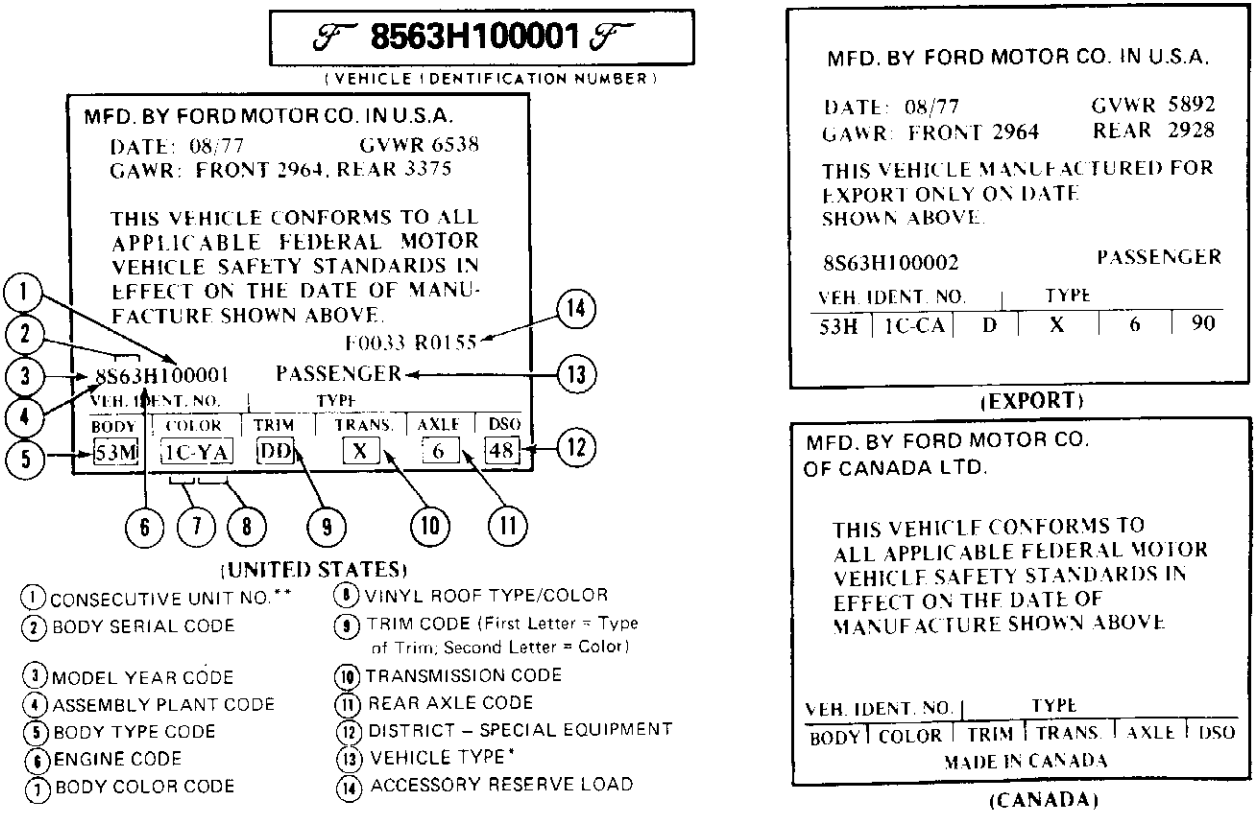


FIG. 1 Vehicle Identification and Certification Labels

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IDENTIFICATION CODES

ASSEMBLY PLANT CODES

Code Letter	District
A	Atlanta
B	Oakville (Canada)
E	Mahwah
F	Dearborn
G	Chicago
H	Lorain
J	Los Angeles
K	Kansas City
P	Twin Cities
R	San Jose
S	Allen Park (Pilot)
T	Metuchen
U	Louisville
W	Wayne
X	St. Thomas
Y	Wixom
Z	St. Louis

ENGINE CODES

Codes	No. of Cyls.	Displacement Litres	CID
A	8	7.5	460-4V
C	8	7.5	460-4V (Police Interceptor)
F	8	5.0	302-2V
H	8	5.8	351-2V
L	6	4.1	250-1V
S	8	6.6	400-2V
T	6	3.3	200-1V
Y	4	2.3	139-2V (2.3L)
Z	6	2.8	169-2V (2.8L)

TRANSMISSION CODES

Codes	Type
	MANUAL
1	3 Speed
5	4 Speed Overdrive
6	4 Speed @
7	4 Speed (b)
	AUTOMATIC
V	XP (C-3)
W	XP (C-4)
X	FMX)
U	XPL (C-6)
Z	XPL (Special)

@ Borg-Warner (b) Hummer

DISTRICT CODES LINCOLN-MERCURY

Code	District
00	Special
11	Boston
15	New York
16	Philadelphia
17	Washington
21	Atlanta
22	Dallas
23	Jacksonville
26	Memphis
31	Buffalo
32	Cincinnati
33	Cleveland
34	Detroit
41	Chicago
42	St. Louis
46	Twin Cities
51	Denver
52	Los Angeles
53	Oakland
54	Seattle
84	Home Off. Reserve
90's	Export

FORD OF CANADA

Mercury Code	Region	Ford Code
A1	Central	B1
A2	Eastern	B2
A3	Atlantic	B3
A4	Midwestern	B4
A6	Western	B6
A7	Pacific	B7
12	Export	12

REAR AXLE RATIO CODES

Conventional Lock		Ratio
Y		3.08
B		2.47
1	J	2.50
8		2.73
2		2.75
3		2.79
6	Ø	3.00
4		3.18
7		3.40

DISTRICT CODES FORD

Code	District
00	Special
11	Boston
12	Buffalo
13	New York
14	Pittsburgh
15	Newark
16	Philadelphia
17	Washington
21	Atlanta
22	Charlotte
23	Memphis
24	Jacksonville
25	Richmond
26	New Orleans
28	Louisville
41	Chicago
42	Cleveland
43	Milwaukee
45	Lansing
46	Indianapolis
47	Cincinnati
48	Detroit
52	Dallas
53	Kansas City
54	Omaha
55	St. Louis
56	Davenport
57	Houston
58	Twin Cities
71	Los Angeles
72	San Jose
73	Salt Lake City
74	Seattle
75	Phoenix
76	Denver
83	Government
84	Home Off. Reserve
85	American Red Cross
86	Recreational Veh. Pool
87	Body Company
89	Transportation Services
90's	Export

EXTERIOR PAINT COLOR CODES

Code	Ref. #	Color
1C	1724	Black
1G	5299	Silver Met.
1N	5476	Dove Gray
1P	5523	Med. Gray Met.(Tie Tone only)
1Q	5527	Med. Silver Met.
2M	3413	Dark Red
2R	5440	Brt. Red
2U	5455	Lipstick Red
3G	5094	Brt. Dk. Blue Met.
3U	5467	Lt. Blue
31	5499	Midnight Blue
34	5041	Med. Blue
46	5328	Dk. Jade Met.
47	5404	Lt. Green
4V	5233	Dk. Yellow Green Met.
5Q	5477	Dk. Brown Met.
6E	5080	Brt. Yellow
6P	5406	Cream
6U	5441	Lt. Tan
7Q	5479	Lt. Aqua Mt.
7S	5489	Dk. Emerald Met.
8G	5466	Vista Orange
8H	5470	Tan
8K	5486	Brt. Saddle Met.
8N	5496	Dk. Cordovan Met.
8P	5471	Lt. Cordovan
8Y	5494	Champagne Met.
83	5524	Chamois
84	5525	Dk. Cordovan
9D	5418	White

(RPO) UNIQUE COLORS (NON POLISH) "D"

2Y	5492	Rose Met.
3V	5480	Brt. Blue Met.
6V	5298	Tan Met.
	5460	Med. Gold Met.
7H	5482	Brt. Aqua Met.
7L	5483	Lt. Jade Met.
7T	5490	Med. Emerald Met.
8J	5484	Med. Tan Met.
8W	5491	Chamois Met.

(RPO) DIAMOND BRIGHT (POLISH) "W"

2S	5444	Dk. Red Met.
2G	5070	Med. Red Met.
32	5511	Med. Blue Met.
8V	5495	Med. Ember Met.
8Z	5510	Med. Nectarine Met.
1R	5512	Lt. Silver Met.

(RPO) DIAMOND FLARE (POLISH) "G"

1J	5411	Silver Met.
1L	5472	Black Met.
2T	5462	Rose Met.
6Y	5461	Brt. Yellow Gold Met.
7B	5463	Crystal Jade Met.

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BODY SERIAL AND STYLE CODES

Vehicle	Body Serial Code	Body Style Code	Body Type	Model
PINTO	10	62B	2-Dr. Sedan	Base
	11	64B	3-Dr. Sedan	Base
	12	73B	Wagon	Base
BOBCAT	20	64H	3-Dr. Sedan	U.S.A. & Canada
	22	73H	Wagon	U.S.A. & Canada
	23	62B	2-Dr. Sedan	Canada Only
	24	64B	3-Dr. Sedan	Canada Only
	25	73B	Wagon	Canada Only
MUSTANG II	02	60F	2-Dr.	Base
	03	69F	3-Dr.	Base
	04	60H	2-Dr.	Ghia
	05	69R	3-Dr.	Mach I
GRANADA	82	54H	4-Dr. Sedan	Base
	81	66H	2-Dr. Sedan	Base
MONARCH	34	54H	4-Dr. Sedan	Base
	33	66H	2-Dr. Sedan	Base
VERSAILLES	84	54M	4-Dr. Sedan	Base
LTD II	25	65B	2-Dr. Hardtop	LTD II S
	27	53B	4-Dr. Pillar Hardtop	LTD II S
	30	65D	2-Dr. Hardtop	LTD II
	31	53D	4-Dr. Pillar Hardtop	LTD II
	43	71K	LTD II Squire	Wagon
	47	97D	500	LTD II
	48	97R	GT	Ranchero
	49	97K	Squire	
FAIRMONT	92	54B	4-Dr. Sedan	Base
	91	66B	2-Dr. Sedan	Base
	93	66R	2-Dr. Sedan	Sport Coupe
	94	74B	Wagon	

Vehicle	Body Serial Code	Body Style Code	Body Type	Model
COUGAR	92	53D	4-Dr. Pillar Hardtop	Cougar
	91	65D	2-Dr. Hardtop	Cougar
	93	65L	2-Dr. Hardtop	Cougar XR-7
THUNDERBIRD	87	60H	2-Dr. Pillar Hardtop	Base
FORD	52	60D*	2-Dr. Pillar Hardtop	Custom 500
	53	53D	4-Dr. Pillar Hardtop	Custom 500
	62	60H	2-Dr. Pillar Hardtop	LTD
	63	53H	4-Dr. Pillar Hardtop	LTD
	64	53L	4-Dr. Pillar Hardtop	LTD Landau
	65	60L	2-Dr. Pillar Hardtop	LTD Landau
	72	71D	Custom 500/LTD II	Wagon
	74	71H	LTD	Wagon
MERCURY	62	53H	4-Dr. Pillar Hardtop	Marquis (FLD)
	61	65H	2-Dr. Hardtop	Canada Only
	66	53L	4-Dr. Pillar Hardtop	Grand Marquis
	65	65L	2-Dr. Hardtop	Grand Marquis
	64	53K	4-Dr. Pillar Hardtop	Marquis Brougham
	63	65K	2-Dr. Hardtop	Marquis Brougham
	74	71K	Marquis**	Wagon
CONTINENTAL MARK V	89	65D	2-Dr. Hardtop	Base
LINCOLN CONTINENTAL	81	60B	2-Dr. Pillar Hardtop	Base
	82	53B	4-Dr. Pillar Hardtop	Base
ZEPHYR	32	54D	4-Dr. Sedan	Base
	31	66D	2-Dr. Sedan	Base
	35	36R	2-Dr. Sedan	Sport Coupe
	36	74D	Wagon	

CY1615-2E

VINYL ROOF TYPE AND COLOR IDENTIFICATION

Code	Vinyl Type	Code	Vinyl Type
W	Lugano Full	Z	Valino Front Half
X	Lugano Half	T	Valino Coach
K	Lugano Front Half	B	Crosshatch Full
M	Lugano Coach	R	Crosshatch Half
D	Milano Full	S	Levant Full
E	Milano Half	E	Levant Half Rear (Mustang Dev.)
F	Milano Halo		
Q	Cayman Full	G	Odense Full
U	Cayman Half	N	Odense Half
V	Valino Full	A	Odense Front Half
Y	Valino Half		

Code	Vinyl Color	Code	Vinyl Color
A	Black	F	Cordovan
B	Blue, Medium	K	Cordovan, Light
S	Blue, Midnight		Gold, Galveston
5	Blue, Wedgewood	E	Gray, Dove
T	Brown, Dark	R	Jade, Dark
V	Camel, Lt.	M	Jade, Light
Y	Camel, Medium	4	Jade, Medium
U	Chamois	3	Jade, Wedgewood
6	Champagne, Light	D	Red/Russet
J	Champagne, Midnight	P	Silver
		W	White

When a Vinyl Roof is installed the type and color codes will be reflected after the two digit Exterior Paint Color Code.
Example: Code – 1CYA = 1C–Black Car, YA–Valino Black Half Roof.

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DETROIT IRON

CHARGING SYSTEM

GROUP 31

PART TITLE	PART NO.
Alternator Electro-Mechanical Regulator	31-40
Alternator Electronic Regulator	31-43
Alternator Transistorized Regulator	31-42
Batteries	31-02
Charging System General Service	31-01
EED Rear Terminal Alternator	31-10
EED Side Terminal Alternator	31-12

Charging System General Service

PART 31-01

Applies to All Models

SUBJECT	PAGE
DESCRIPTION AND OPERATION	
Charging System	01-1
Fuse Link	01-1
DIAGNOSIS	01-3
TESTING	
Bench Tests	01-8
Fuse Link Continuity Test	01-9
On-Vehicle Tests	01-5
REMOVAL AND INSTALLATION	
Fuse Link Replacement	01-9
REPAIR PROCEDURES	
Fuse Link General Repairs	01-10

DESCRIPTION AND OPERATION

CHARGING SYSTEM

The alternator charging system is a negative ground system, and consists of an alternator, regulator, charge indicator, storage battery, fuse link and associated wiring. Refer to the Wiring Diagram Manual, Form 7795P-78 for schematics and locations of wiring harnesses.

FUSE LINK

The fuse link is a short length of insulated wire integral with the engine compartment wiring harness. It is several wire gages smaller than the circuit which it protects. Production fuse links are the color of the circuit being supplied by the fuse link. Service fuse links are green or black depending on usage. All fuse links have a flag moulded on the wire or on the terminal insulator. Color identification of the flag or connector is Red—18 Ga. wire, Orange—16 Ga. wire, or Green—14 Ga. wire. Fig. 1 shows fuse link installations.

When heavy current flows, such as when a booster battery is connected incorrectly or when a short to ground occurs in the wiring harness, the fuse link burns out and protects the alternator or wiring.

A burned out link may have bare wire ends protruding from the insulation, or it may only have expanded or bubbled insulation with illegible identification. When it is hard to determine if the link is burned out, perform a continuity test.

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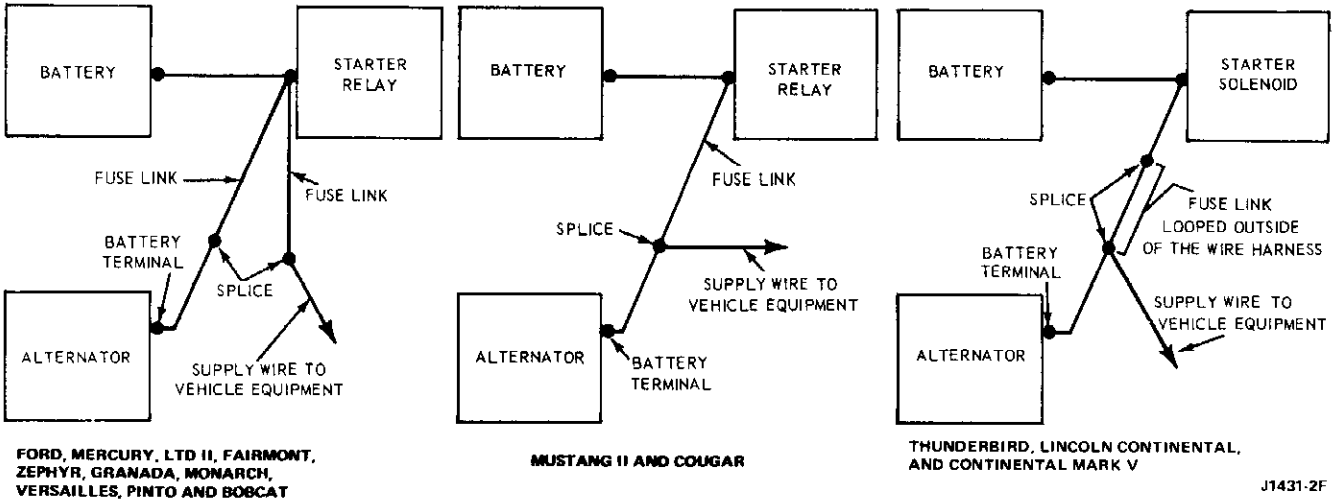


FIG. 1 Fuse Link Installation

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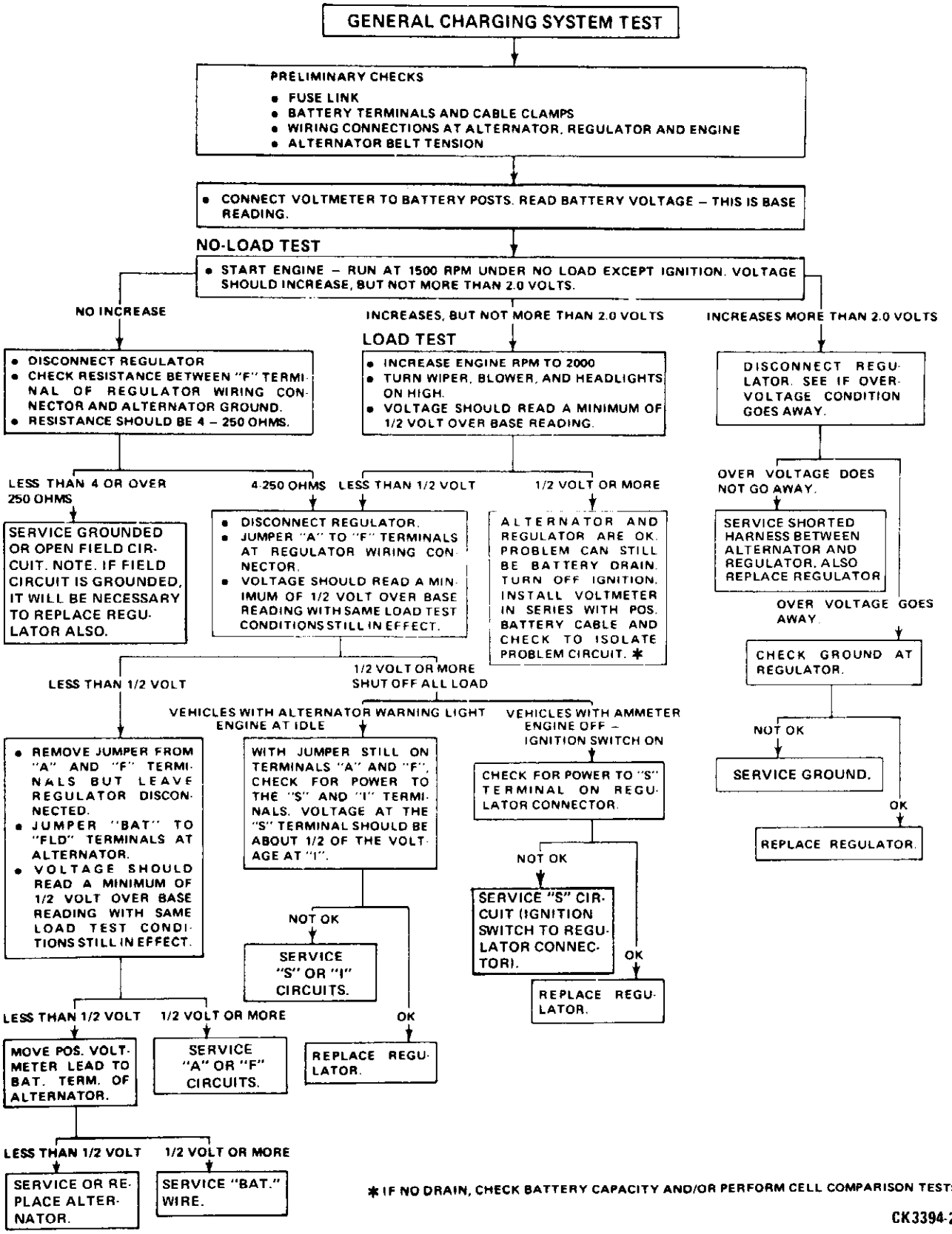
DETROIT IRON

DIAGNOSIS

CHARGING SYSTEM DIAGNOSIS		
CONDITION	**POSSIBLE CAUSE**	**RESOLUTION**
• Battery does not stay charged – engine starts OK	• Battery • Loose or worn alternator belt • Damaged wiring or cables • Alternator • Regulator • Other vehicle electrical systems	• Test battery, replace if necessary • Adjust or replace belt • Service as required • Test, repair or replace as required • Test, replace if necessary • Check other systems for current draw. Repair as required
• Alternator noisy	• Loose or worn alternator belt • Bent pulley flanges • Alternator	• Adjust or replace belt • Replace pulley • Service or replace alternator
• Battery uses excessive water – lights and/or fuses burn out frequently	• Damaged wiring • Alternator regulator • Battery	• Service as required • Replace if necessary • Test, replace if necessary
• Charge indicator light stays on after engine starts	• Loose or worn alternator belt • Alternator • Regulator	• Adjust or replace • Service or replace • Replace
• Charge indicator lights flickers while vehicle is being driven	• Loose or worn alternator belt • Loose or improper wiring connections • Alternator • Regulator	• Adjust or replace belt • Service as required • Service or replace • Service or replace
• Charge indicator gauge shows discharge. (If constant high reading, see "Battery uses excessive water").	• Loose or worn alternator belt • Damaged wiring (Battery to alternator for ground or open) • Alternator • Regulator • Charge indicator gauge wiring and connections • Damaged gauge • Other vehicle electrical systems malfunction	• Adjust or replace belt • Service or replace wiring • Service or replace • Replace • Service as required • Replace gauge • Service as required

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DETROIT IRON

TESTING

A voltmeter (0 to 20 volt scale), ohmmeter, jumper wire and a test light (12 volt) are the only tools required to perform an accurate check of the complete charging system. The meters should be calibrated once a year and the date of calibration stamped on the meter face. It is recommended that this practice be followed by all technicians to maintain their meters at acceptable accuracy.

The tests are divided into On Vehicle and On Bench Test procedures.

Troubleshooting or diagnosis is required before actual repairs can be made in the electrical system. Even where an obvious fault makes the replacement of a unit necessary, find out why the unit failed. When a trouble is diagnosed correctly, unnecessary repairs are prevented, the time the vehicle is out of service will be decreased, and the repairs that are made will be permanent.

ON VEHICLE TESTS

Before performing charging system tests on the vehicle, note the complaint such as: slow cranking; battery dead or using an excessive amount of water; top of battery wet; ammeter shows charge at all times or no charge; alternator warning lamp does not come on or never goes out. This information will aid in isolating the part of the system causing the problem.

Visual Inspection

1. Check the fuse link (Fig. 1) located between the starter relay and the alternator. If burned, determine cause, repair system and replace fuse link.
2. The battery must be in proper state of charge (at least 1.200 specific gravity). Check the battery posts and battery cable terminals for clean and tight connections. Remove the battery cables (if corroded), clean and install them securely.
3. Check for clean and tight wiring connections at the alternator, regulator and engine.
4. Check the alternator belt tension and tighten to specification (if necessary).

Battery Drain Test

1. Connect a 12-volt test light in-series with the positive terminal of the battery. Test with all switches OFF. Do not be misled by clock-winding current. Touch cable clamp to terminal to wind clock.
2. If light glows, pull fuses, one at a time, and check each circuit for short. Repair wiring harnesses or components as required.

Indicator Light Test

Normal Charge Indication—Charge Indicator (Alternator)

With Ignition switch **off** —Charge indicator (Alternator) lamp is **off.**

With ignition switch **on** (engine not running)—Charge indicator (Alternator) lamp is **on.**

With ignition switch **on** (engine running) charge indicator—(Alternator) lamp is **off.**

1. If the charge indicator lamp does not come on with the ignition key in the on position and the engine not running, check the I wiring circuit (ignition switch to regulator I terminal), for an open circuit or burned out charge indicator lamp.
2. If the charge indicator light does not come on, disconnect the wiring plug connector at the regulator and connect a jumper wire from the I terminal of the regulator wiring plug to the negative battery post cable clamp.
3. The charge indicator lamp should go on with the ignition key turned to the on position.
4. If the charge indicator bulb does not go on, check the bulb for continuity and replace (if burned out).
5. For models without the new electronic regulator, if the bulb is not burned out, an open circuit exists between the ignition switch and the regulator.

   Electro Mechanical and Transistorized Regulators.

   A good indication of a problem in the I wiring circuit (ignition switch to regulator I terminal) will show when the charge indicator light goes out only when engine RPM is high. This is caused by an open circuit in the 15 ohm resistor wire (connected in parallel with the indicator light) generally at the terminal point (either end of the resistor wire).
6. For models with the new electronic regulator, there is a 500-ohm resistor across the charge indicator lamp on Fairmont, Zephyr, Lincoln Continental and Continental Mark V. On Mustang, there is an ammeter and a resistor is not needed.

Ammeter Test

Normal Charge Indication

With ignition switch **off** and no electrical load—Ammeter should show **0** or center scale.

With ignition switch **on** and engine running (fully charged battery).—Needle deflects toward charge and returns toward center scale in time.

With ignition switch **off** and headlamps on—Ammeter should show a discharge. If ammeter does not register a discharge, check for loose connections at the ammeter prior to replacing gauge.

General Charging System Tests

When performing charging system tests with a voltmeter, turn OFF all lights and electrical components. Place the transmission in neutral and apply the parking brake.

Base Voltage Test

1. Connect the negative lead of the voltmeter to the negative battery cable clamp.
2. Connect the positive lead of the voltmeter to the positive battery cable clamp.
3. Record the battery voltage reading shown on the voltmeter scale (base voltage).
4. Connect tachometer to the engine.

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No Load Test

1. Then, start the engine and increase speed to approximately 1500 rpm. With no other electrical load (foot off brake pedal and car doors closed), the voltmeter pointer should move upward (increase) but not more than 2 volts above the base voltage; the first recorded battery voltage reading. The reading should be taken when the voltmeter pointer stops rising. It may take a few minutes to reach this point. If not, make over-voltage or low-voltage tests below.

Load Test

1. With the engine running, turn the heater or air conditioner blower motor on (high speed) and headlights on (high beam).
2. Increase the engine speed to 2000 rpm. The voltmeter should indicate a minimum of 0.5 volt above the base voltage. If not, make the low voltage test below.

If the above tests indicate proper voltage readings, the charging system is operating normally. Use test light and check for battery drain.

Over-Voltage Tests

1. If the voltmeter reading indicates more than 2.0 volts above base battery voltage, connect a jumper wire between regulator base and alternator frame. Repeat No Load Test. This will check the ground connections between the regulator and alternator and/or regulator to engine if over voltage condition disappears. Clean and tighten connections securely.
2. **If over voltage condition still exists,** disconnect the regulator wiring plug from the regulator and repeat the No Load Test.
3. **If over voltage condition disappears** (voltmeter reads base voltage), replace voltage regulator.
4. **If over voltage** still exists with the regulator wiring plug disconnected, repair the short in the wiring harness between the alternator and regulator. Then, replace the regulator and connect the regulator wiring plug to the regulator.

Under Voltage Tests

1. If the voltmeter does not indicate more than 1/2 volt above base voltage. Disconnect wiring plug from regulator and connect an ohmmeter from "F" terminal of plug to ground. Meter should indicate more than 3 ohms. If less than 3 ohms is indicated repair grounded field circuit and repeat Load Test. Refer to Fig. 2.
2. If ohmmeter indicates more than 3 ohms connect a jumper wire from the A to F terminals of the plug (Fig. 3) and repeat the Load Test. If voltmeter now indicates more than 1/2 volt above base voltage, the regulator or wiring is defective. Make the regulator I and S circuits Tests.
3. If the voltmeter still indicates a problem of under voltage, remove the jumper wire from the regulator plug and leave the plug disconnected from the regulator. Then, connect a jumper wire to the FLD and BAT terminals on the alternator (Fig. 4) and repeat the Load Test.
4. If the voltmeter now indicates 1/2 volt or more increase above base voltage, repair the wiring harness from the alternator to the regulator.
5. If voltmeter still indicates under voltage, stop engine and move positive voltmeters lead to "bat" terminal of alternator.
6. If voltmeter now indicates base volts, repair alternator. If voltmeter indicates zero volts, repair "bat" wire (circuit 38).

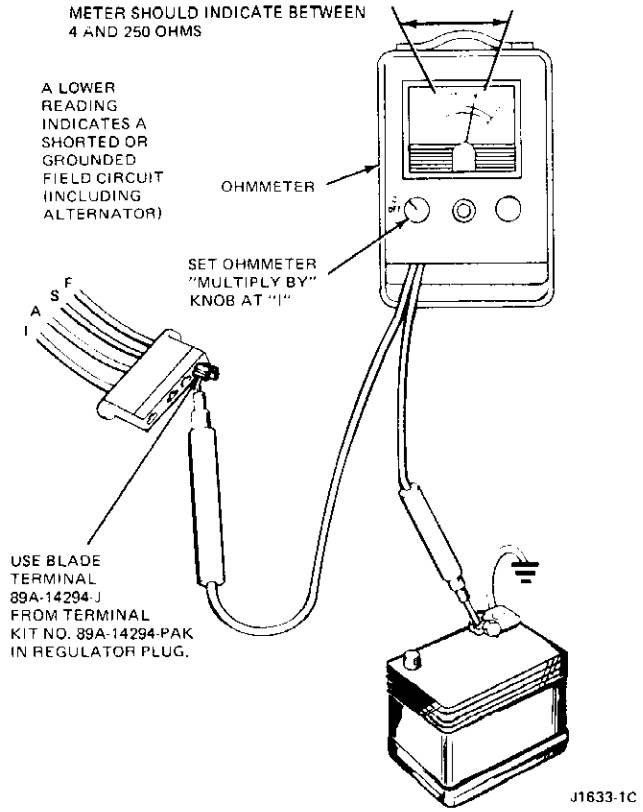


FIG. 2 Field Circuit Test

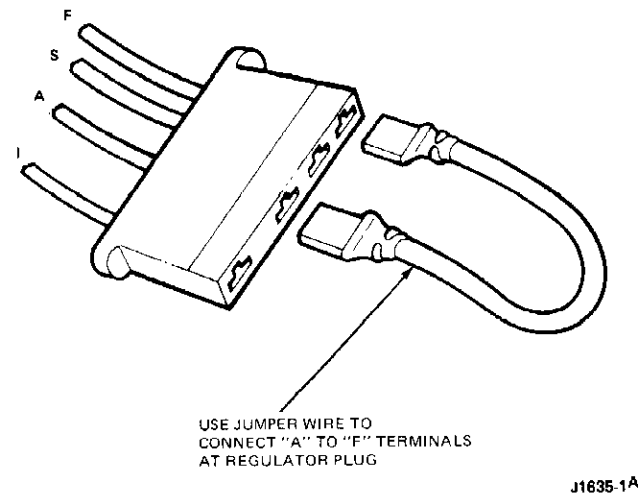


FIG. 3 Regulator Plug Jumper Wire Connections

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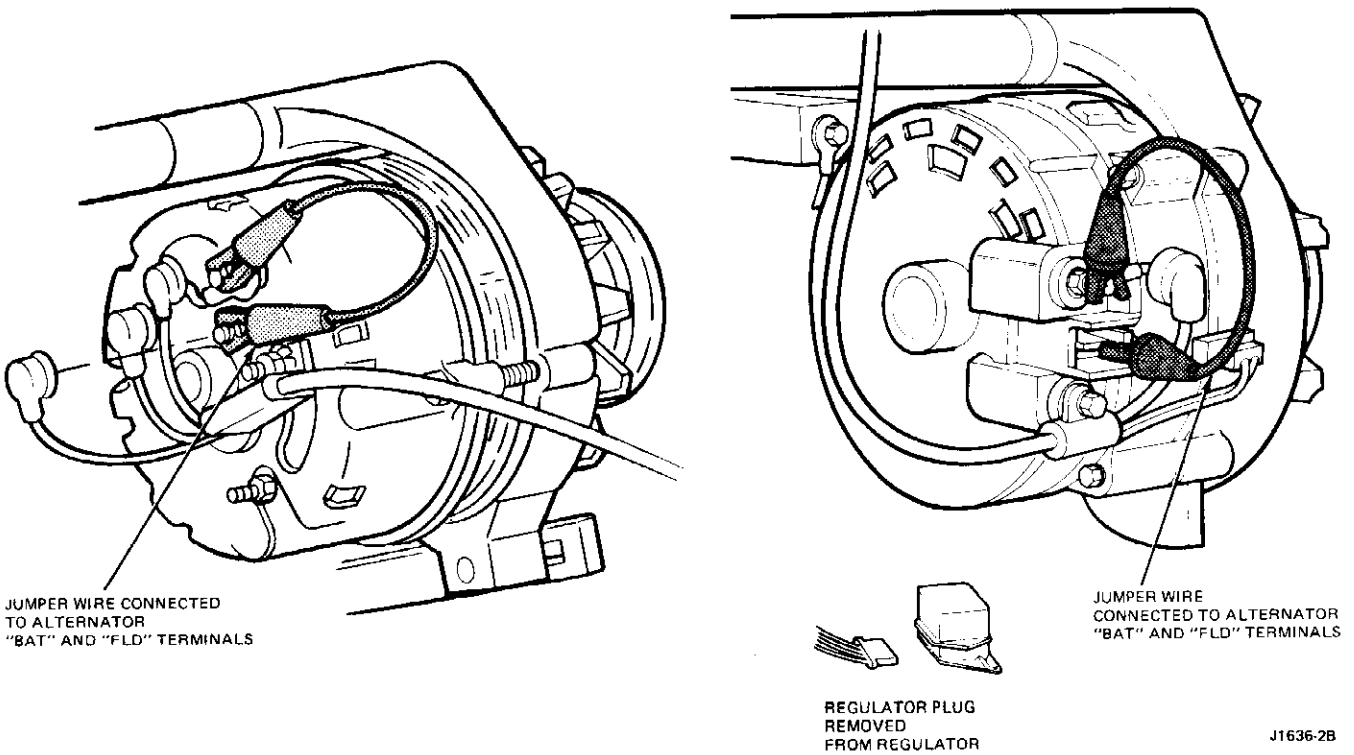


FIG. 4 Jumper Wire Connections

Regulator I and S Circuit Tests

S Circuit With Ammeter

1. Connect the positive lead of the voltmeter to the S terminal of the regulator wiring plug. Then, turn the ignition switch to the **ON** position. **Do not start the engine.**
2. The voltmeter should indicate battery voltage.
3. If there is **no** voltage reading, repair the S wire lead from the ignition switch to the regulator wiring plug.
4. Connect the positive voltmeter lead to the positive battery cable terminal, connect the regulator wiring plug to the regulator, and repeat the Load Test.

S and I Circuit—With Indicator Light

1. Disconnect the regulator wiring plug and install a jumper wire between the A and F terminals (Fig. 3).
2. With the engine idling, connect the positive lead of the voltmeter to the S terminal and then to the I terminal of the regulator wiring plug The voltage of the S circuit should read approximately 1/2 of the I circuit.
3. If no voltage is present, repair the wiring circuit at fault. Reconnect the positive voltmeter lead to the positive battery cable terminal.
4. If the above circuit tests are satisfactory, install a new regulator.
5. Then, remove the jumper wire from the regulator wiring plug and connect the wiring plug to the regulator. Repeat the Load Test.

Diode Test—On Vehicle

1. Disconnect the electric choke.
2. Disconnect voltage regulator wiring plug.
3. Connect a jumper between A and F terminal of voltage regulator wiring plug.
4. Connect voltmeter to battery cable clamps.
5. Start engine—let engine run at idle.
6. Read and record system voltage.
7. Move positive voltmeter lead to S terminal of alternator.
8. Note voltmeter reading.
9. Run engine as described under Voltmeter Test Procedure.

Test Results

1. If voltmeter reads 1/2 of system voltage, diodes are OK.
2. If voltmeter reads approximately 1.5 volts, alternator has shorted **negative** diode, or a grounded stator winding.
3. If voltmeter reads approximately 1.5 volts less than system voltage, alternator has shorted **positive** diode.
4. If voltmeter reads about 1.5 volts less than 1/2 battery voltage, alternator has an **open positive** diode.
5. If voltmeter reads about 1.0 to 1.5 volts more than 1/2 battery voltage, alternator has an **open negative** diode.
6. Connect the electric choke into the circuit after the test is completed.

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BENCH TESTS

Rectifier Short or Grounded and Stator Grounded Test

These tests are performed with an 02-0364 tester or equivalent. Set the "Multiply By" knob at 10, and calibrate the ohmmeter as directed inside the instrument cover.

1. Contact one ohmeter probe to the alternator BAT terminal (Fig. 5) and the other probe to the STA terminal (rear blade terminal). Then, reverse the ohmmeter probes and repeat the test. A reading of about 60 ohms should be obtained in one direction and no needle movement with the probes reversed. A reading in both directions indicates a bad positive diode, a grounded positive diode plate or a grounded BAT terminal.

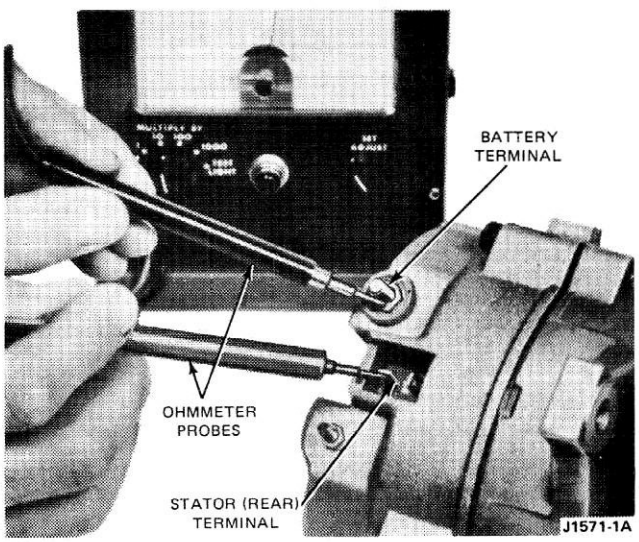


FIG. 5 Rectifier Short or Grounded and Stator Grounded Test

2. Perform the same test using the STA and GND (ground) terminals of the alternator. A reading in both directions indicates either a bad negative diode, a grounded stator winding, a grounded stator terminal, a grounded positive diode plate, or a grounded BAT terminal.
3. Infinite readings (no needle movement) in all four probe positions in the preceeding tests indicates an open STA terminal lead connection inside the alternator.

Field Open or Short Circuit Test

This test is performed with an ohmmeter (Tool 02-0364) or equivalent. Set the ohmmeter "Multiply By" knob at 1 and calibrate the ohmmeter as directed inside the instrument cover.

1. Contact the alternator field terminal with one probe and the ground terminal with the other probe (Fig. 6). Then, spin the alternator pulley. The ohmmeter reading should be between 2.4 and 25.0 ohms, and should fluctuate while the pulley is turning.
2. An infinite reading (no meter movement) indicates an open brush lead, worn or stuck brushes, or a bad rotor assembly.

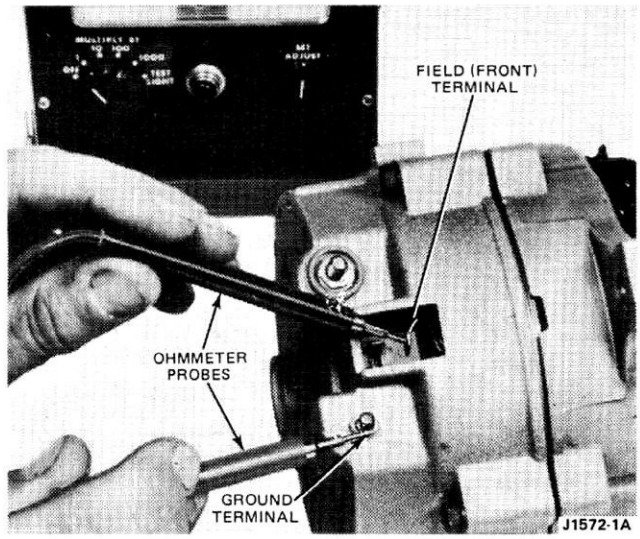


FIG. 6 Field Open or Short Circuit Test

3. An ohmeter reading less than 2.4 ohms indicates a grounded brush assembly, a grounded field terminal or a bad rotor.

Diode Test

Remove the rectifier assembly from the alternator as outlined in Section 5. Set the ohmmeter Multiply By knob at 10 and calibrate the meter as directed inside the cover.

1. To test one set of diodes, contact one probe to the terminal bolt as shown in Figs. 7 and 8 and contact each of the three stator lead terminals with the other probe. Reverse the probes and repeat the test. All diodes should show a low reading of about 60 ohms in one direction, and an infinite reading (no needle movement) with the probes reversed.
2. Repeat the preceeding tests for the other set of diodes except that the other terminal screw is used.
3. If the meter readings are not as specified, replace the rectifier assembly.

Stator Coil Open or Grounded Test

These tests are made to determine if the stator coil is operating properly. Disassemble the stator from the alternator as outlined under Disassembly in Part 31-10 or Part 31-12.

Set the 02-0364 ohmmeter or equivalent "Multiply By" knob at 1000.

1. Connect the ohmmeter probes to one of the stator leads and to the stator laminated core. Be sure that the probe makes a good electrical connection with the stator core. The meter should show an infinite reading (no meter movement).
2. If the meter does not indicate an infinite reading (needle moves), the stator winding is shorted to the core and must be replaced.
3. Repeat this test for each of the stator leads. **Do not touch the metal probes or stator leads with the hands. Such contact will result in an incorrect reading.**

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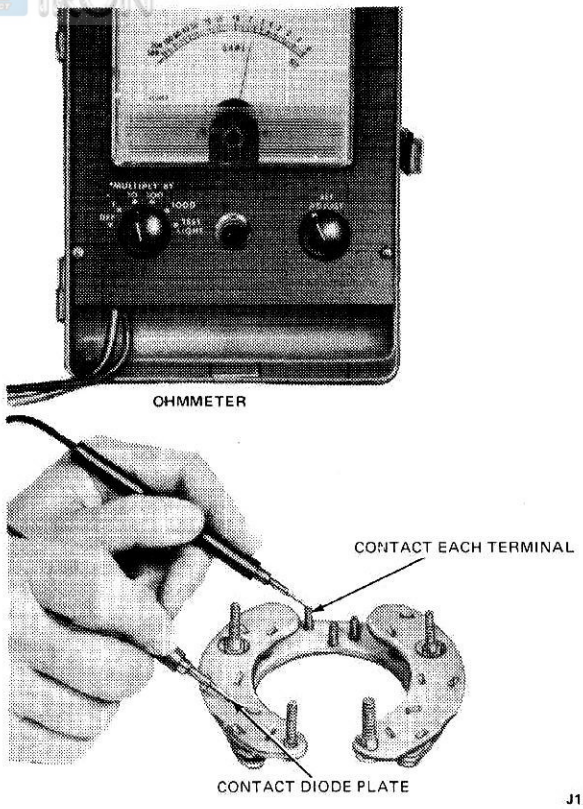


FIG. 7 Diode Test—Rear Terminal Alternator Except 61-Ampere

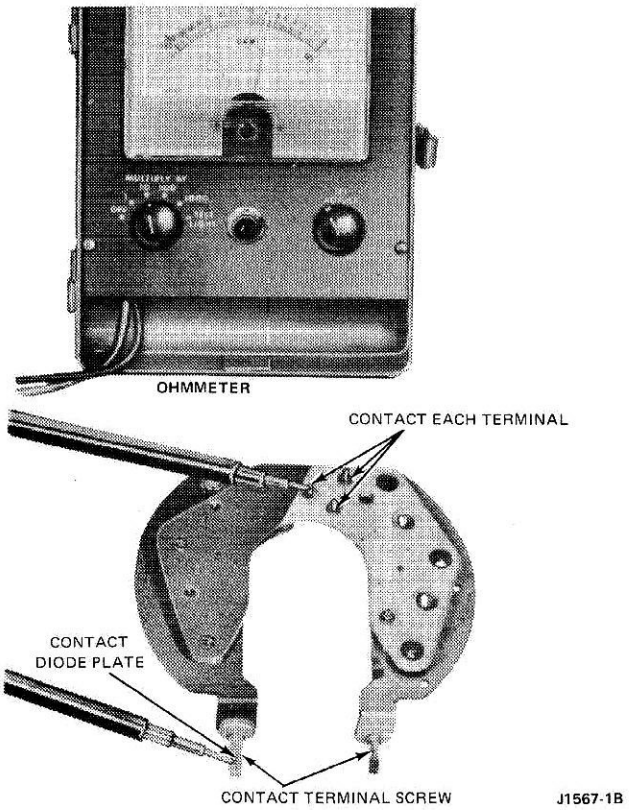


FIG. 8 Diode Test—Side Terminal Alternator

Rotor Open or Short Circuit Test

Disassemble the front housing and rotor from the rear housing and stator as outlined under Disassembly in Part 31-10 or Part 31-12. Set the ohmmeter (02-0364 or equivalent) "Multiply By" knob at 1 and calibrate the meter as directed inside the ohmmeter cover.

1. Contact each ohmmeter probe to a rotor slip ring. The meter reading should be 2.4 to 4.9 ohms.
2. A higher reading indicates a damaged slip ring solder connection or a broken wire.
3. A lower reading indicates a shorted wire or slip ring. Replace the rotor if it is damaged and cannot be repaired.
4. Contact one ohmmeter probe to a slip ring and the other probe to the rotor shaft. The meter reading should be infinite (no deflection).

   . A reading other than infinite indicates the rotor is shorted to the shaft. Inspect the slip ring soldered terminals to be sure they are not bent and not touching the rotor shaft, or that excess solder is not grounding the rotor coil connections to the shaft. Replace the rotor if it is shorted and cannot be repaired.

FUSE LINK CONTINUITY TEST

1. On the Cougar, LTD II, Mustang, Thunderbird, Lincoln Continental and Continental Mark V, make certain first that the battery is OK, then turn on the headlights or any accessory. If the headlights or an accessory do not operate, the fuse link is probably burned out.
2. On the Ford, Mercury, Fairmont, Zephyr, Pinto and Bobcat, there are two fuse links (Fig. 1). Use the same procedure as in Step 1 to test the fuse link that protects the vehicle equipment.

   To test the fuse link that protects the alternator, make certain that the battery is OK then check with a voltmeter for voltage at the BAT terminal of the alternator. No voltage indicates that the fuse link is probably burned out.

REMOVAL AND INSTALLATION

FUSE LINK REPLACEMENT

1. Procure the proper service fuse link for the vehicle being repaired (Fig. 1). Make sure that the replacement fuse link is a duplicate of the one removed with respect to gauge, length and insulation. **Do not substitute any other type of gauge or wire.** The two fuse links shown have an eyelet terminal for a 5/16-inch stud on one end. When the terminal is not required, cut off the fuse link as close to the terminal as possible and strip approximately 1/8-inch of insulation from the cut end.
2. Disconnect the battery ground cable.

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3. Disconnect the fuse link and/or fuse link eyelet terminal from the battery terminal of the starter relay. On the Thunderbird, Lincoln Continental and the Continental Mark V, the fuse link is looped *outside of the wire harness behind the point at* which the harness is clipped to the right rocker cover above the starter.

ALTERNATOR CHARGE INDICATOR LIGHT WIRING ASSEMBLY INSTALLATION PROCEDURE

The "Service Only" wiring assembly is used to replace an inoperative warning lamp bypass resistor wire (15 ohm) located in the main 14401 wiring assembly. The following procedure should be followed to detect and replace an inoperative resistor wire.

NOTE: The charge indicator light circuit must be tested with a test lamp containing a trade number 97 bulb.

Disconnect the regulator connector from the regulator. Turn the ignition switch to RUN position. Touch one test probe from the test lamp to the regulator connector "I" terminal and the other to the regulator base. The test lamp will come "on" if the circuit is in proper working order. If the 15 ohm resistor circuit is open, the indicator light will operate at full brightness and the test lamp will be out.

The resistor wire is part of the 14401 main wiring *assembly. If the resistor wire is open replace only this* wire and not the entire 14401 wiring assembly.

REPAIR PROCEDURES

FUSE LINK GENERAL REPAIRS

To repair any blown fuse link (Fig. 1) use the following procedure:

1. Determine which circuit is damaged, its location and the cause of the open fuse link. If the damaged fuse link is one of three fed by a common number 10 or 12 gauge feed wire, determine the specific affected circuit.
2. Disconnect the negative battery cable.
3. Cut the damaged fuse link from the wiring harness and discard it. If the fuse link is one of three circuits *fed by a single feed wire, cut it out of the harness* at each splice end and discard it.
4. Identify and procure the proper fuse link and butt connectors (Figs. 9 and 10) for attaching the fuse link to the harness.
5. To repair any fuse link in a 3-link group with one feed:
   a. After cutting the open link out of the harness, cut each of the remaining undamaged fuse links close to the feed wire weld.
   b. Strip approximately 1/2 inch of insulation from the detached ends of the two good fuse links. Then,

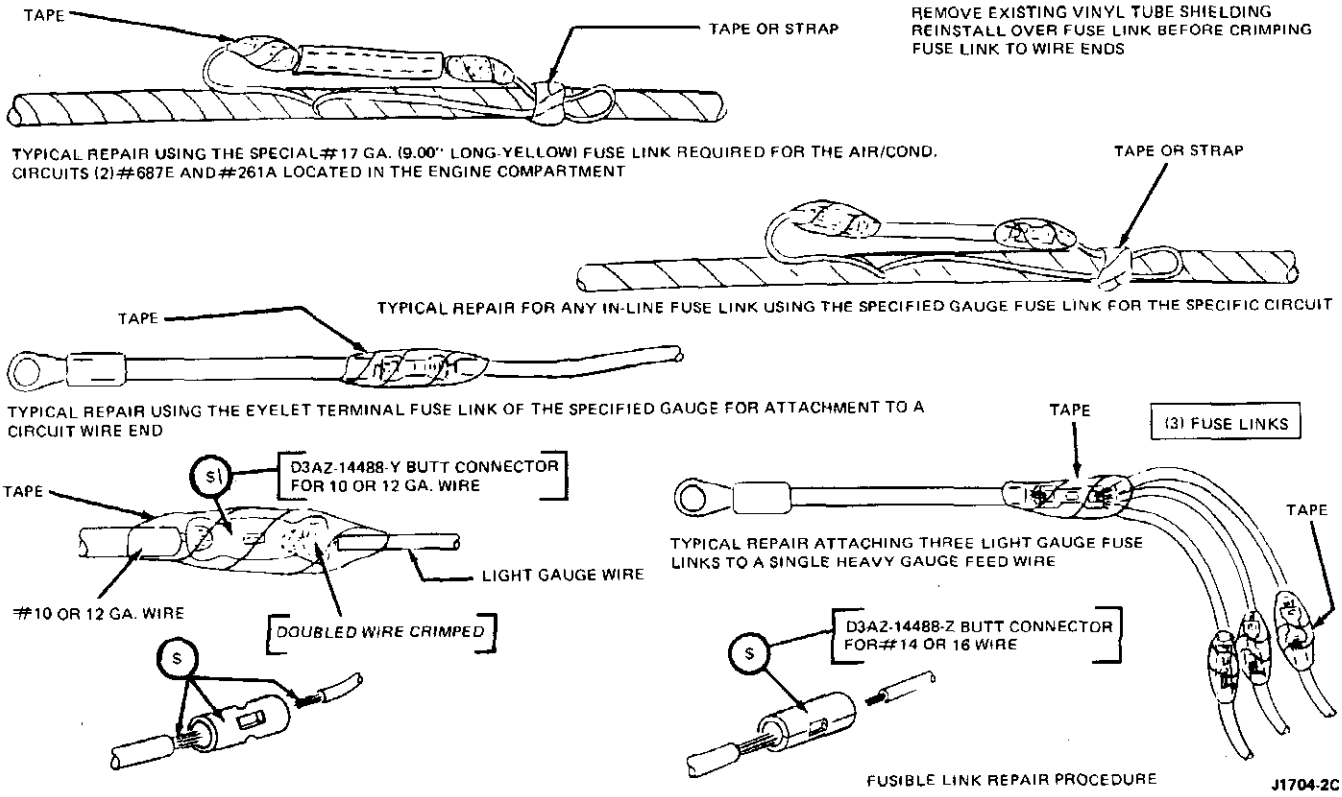


FIG. 9 Fusible Link Repair Procedure

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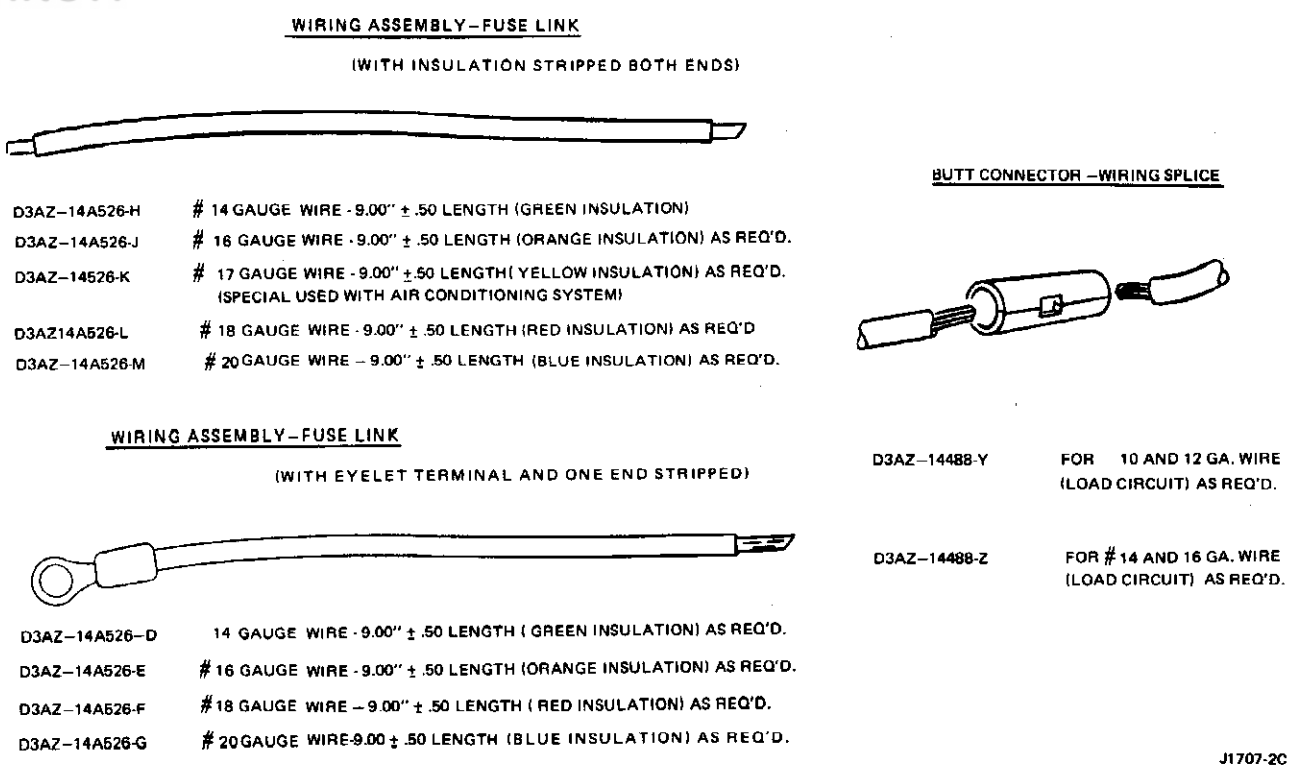


FIG. 10 Fuse Link and Butt Connector Identification

insert the two wire ends into one end of a D3AZ-14488-Y or Z Butt Connector (Fig. 13) and carefully push one stripped end of the replacement fuse link into the same end of the butt connector and crimp all three together firmly. **Care must be taken when fitting the three fuse links into the butt connector as the internal diameter is a snug fit for three wires. Make sure to use a proper crimping tool as pliers, side cutters, etc. will not apply the proper crimp to retain the wires and withstand a pull test.**

c. After crimping the butt connector to the three fuse links, cut the weld portion from the feed wire and strip approximately 1/2 inch of insulation from the cut end. Insert the stripped end into the open end of the butt connector and crimp very firmly.

d. To attach the remaining end of the replacement fuse link, strip approximately 1/2 inch of insulation from the wire end of the circuit from which the blown fuse link was removed, and firmly crimp a D3AZ-14488-Y or Z Butt Connector (Fig. 13) to the stripped wire. Then, insert the end of the replacement link into the other end of the butt connector and crimp firmly.

e. Using rosin core solder with a consistency of 60 percent tin, 40 percent lead, solder the connectors and the wires at the repairs and insulate with electrical tape.

6. To replace any fuse link on a single circuit in a harness, cut out the damaged portion, strip approximately 1/2 inch of insulation from the two wire ends and attach the appropriate replacement fuse link to the stripped wire ends with two proper size butt connectors. Solder the connectors and wires and insulate with tape, as in Step 5.

7. To repair any fuse link which has an eyelet terminal on one end such as the charging circuit (Fig. 10), cut off the open fuse link behind the weld, strip approximately 1/2 inch of insulation from the cut end and attach the appropriate new eyelet fuse link to the cut stripped wire with an appropriate size butt connector (Fig. 10). Solder the connectors and wires at the repair and insulate with tape, as in Step 5.

8. Connect the negative battery cable to the battery and test the system for proper operation.

DO NOT MISTAKE A RESISTOR WIRE FOR A FUSE LINK. The resistor wire is generally longer and has print stating, "Resistor—do not cut or splice."

When attaching a single number 16, 17, 18 or 20 gauge fuse link to a heavy gauge wire, always double the stripped wire end of the fuse link before inserting and crimping it into the butt connector for positive wire retention.

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Batteries

PART 31-02

Applies to All Models

SUBJECT	PAGE	SUBJECT	PAGE
TESTING	02-1	SPECIFICATIONS	02-2

CK3360-2B

TESTING

CAUTION: Hydrogen and oxygen gases are produced during normal battery operation. This gas mixture can explode if flames, sparks or lighted tobacco are brought near the battery. When charging or using a battery in an enclosed space, always provide ventilation and shield your eyes.

WARNING — Keep out of reach of children. Batteries contain SULFURIC ACID. Avoid contact with skin, eyes or clothing. Also, shield your eyes when working near the battery to protect against possible splashing of the acid solution. In case of acid contact with skin, eyes, or clothing, FLUSH IMMEDIATELY WITH WATER FOR A MINIMUM OF FIFTEEN MINUTES. If acid is swallowed, drink large quantities of milk or water, followed by milk of magnesia, a beaten egg, or vegetable oil. CALL A PHYSICIAN IMMEDIATELY.

To prevent sparks, carefully secure connecting points when using a booster battery. To jump start (negative grounded battery):

1. Be sure the ignition key is in OFF position.
2. Shield eyes. Use safety goggles or similar eye protection.
3. Connect ends of one cable to positive (+)terminals of each battery.
4. Connect one end of the other cables to negative (-) terminal of "good" battery.
5. Connect other end of cable to engine bolthead or similar good contact spot on the vehicle being started (NOT to negative (-) terminal of battery).
6. To prevent damage to other electrical components on vehicle being started, make certain that engine is at idle speed before disconnecting jumper cables.

NOTE: Batteries are heavy, weighing 30 lbs. or more. Lift them with your legs rather than your back to prevent muscle strains, and be careful not to drop them (possible breakage) nor to spill the contents (sulfuric acid).

NOTE: 12-volt starting motors can be damaged beyond repair if connected to a 24-volt power supply (two 12-volt batteries in series, or a 24-volt motor-generator set), even when cranking loads are relatively light. Extensive starting motor damage is more likely if the starter is connected to a 24-volt supply while being subjected to prolonged heavy cranking loads such as attempting to start an engine in subzero temperatures.

Tests are made on a battery to determine the state of charge and also the condition. The ultimate result of these tests is to show that the battery is good, needs recharging, or must be replaced.

If a battery has failed, is low in charge, or requires water frequently, good service will determine the reason for this condition. It may be necessary to follow troubleshooting procedures to locate the cause of the trouble.

Refer to Part 31-01 for charging system troubleshooting procedures.

Before attempting to test a battery, it is important to give it a thorough examination to determine if it has been damaged. Possible battery damage, with replacement often necessary, is indicated by moisture on the outside of the case (possible cracked and leaking case) and/or low electrolyte level in one or more cells (possible leak or weak cell).

Original equipment batteries incorporate a single one-piece cover which completely seals the top of the battery and the individual cell connectors. This cover MUST NOT be pierced with test probes to perform individual cell tests.

TESTS USING THE CHRISTIE TESTER 41-0002 (OR EQUIVALENT)

Follow instructions supplied with tester.

TESTS USING THE ROTUNDA BATTERY-STARTER TESTER (02-0204 OR EQUIVALENT)

BATTERY CAPACITY TEST

A high rate discharge tester (Rotunda Battery-Starter Tester 02-0204) or equivalent in conjunction with a voltmeter is used for this test.

1. Turn the control knob on the Battery-Starter Tester to the off position.

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2. Turn the voltmeter selector switch to the 20-volt position.
3. Connect both positive test leads to the positive battery post and both negative leads to the negative battery post. The voltmeter clips must contact the battery posts and not the high-rate discharge tester clips. Unless this is done, the actual battery terminal voltage will not be indicated.
4. Turn the load control knob in a clockwise direction until the ammeter reaches the applicable discharge rate specified in the discharge rate table.
5. With the ammeter reading the required load for 15 seconds, note the voltmeter reading. Avoid leaving the high discharge load on the battery for periods longer than 15 seconds.
6. If the voltmeter reading is 9.6 volts or more for a 12-volt battery, the battery has a good output capacity and will readily accept a charge, if required. Check the specific gravity. If the specific gravity is 1.230 or below, add water if necessary and charge the battery until it is fully charged. **Always disconnect the battery ground cable when charging the battery.** The battery is fully charged when the cells are all gassing freely and the specific gravity ceases to rise for three successive readings taken at hourly intervals. Additional battery testing will not be necessary after the battery has been properly charged.
7. If the voltage reading obtained during the capacity test is below 9.6 volts for a 12-volt battery, check the specific gravity of each cell.
8. If the difference between any two cells is more than 50 points (0.050), the battery is not satisfactory for service and should be replaced.
9. If the difference between cells is less than 50 points (0.050), the battery should be charged according to the charging schedule in the Specifications Section.
10. In some cases the electrolyte level may be too low to obtain a specific gravity reading. In such cases water should be added until the electrolyte level just covers the ring in the filler well, then charge the battery at 35 amperes for the maximum charging time indicated in Specifications for the capacity of the battery being tested.
11. Batteries that are completely discharged may not accept a fast charge. If this is found, the battery should be slow charged at the 20 hour rate for 2 hours, so the battery will be capable of accepting a fast charge. A specific gravity reading taken at this time will show no change from the original reading, but the battery should be charged according to the High Rate Charge Time Schedule.
12. After the battery has been charged, repeat the capacity test. If the capacity test battery voltage is still less than 9.6 volts, replace the battery. If the voltage is 9.6 volts or more, the battery is satisfactory for service.
13. If the battery is found to be discharged only, check for a loose fan belt, loose electrical connections, lights on and charging system performance.

SPECIFICATIONS

BATTERY CHARGE RATES (EXCEPT MAINTENANCE-FREE BATTERY)

Allowable Battery High Rate Charge Time Schedule ③						
Specific Gravity Reading	Charge Rate Amperes	Battery Capacity – Ampere Hours				
		36	41 & 45	53 & 54	77	80
1.125-1.150 ①	35	50 min.	65 min.	80 min.	115 min.	115 min.
1.150-1.175	35	40 min.	50 min.	65 min.	95 min.	95 min.
1.175-1.200	35	30 min.	40 min.	50 min.	70 min.	70 min.
1.200-1.225	35	25 min.	30 min.	35 min.	50 min.	50 min.
Above 1.225	5	②	②	②	②	②

① If the specific gravity is below 1.125, use the time indicated for the 1.125 specific gravity, then charge at 5 amperes until the specific gravity reaches 1.250 at 80°F.

② Charge at 5 ampere rate only until the specific gravity reaches 1.250 at 80°F.

③ At no time during the charging operation should the electrolyte temperature exceed 130°F.

BATTERY DISCHARGE RATES

Except Maintenance-Free Battery		Maintenance-Free Battery	
Battery Capacity (Ampere Hours)	Discharge Rate (Amperes)	Battery Capacity (Ampere Hours)	Discharge Rate (Amperes)
36	155	53	200
41	145	63	215
45	190	68	235
53	175		
54	225		
68	220		
77	228		

CJ1447-2F

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E.E.D. Rear Terminal Alternator

PART 31-10

Applies to All Models

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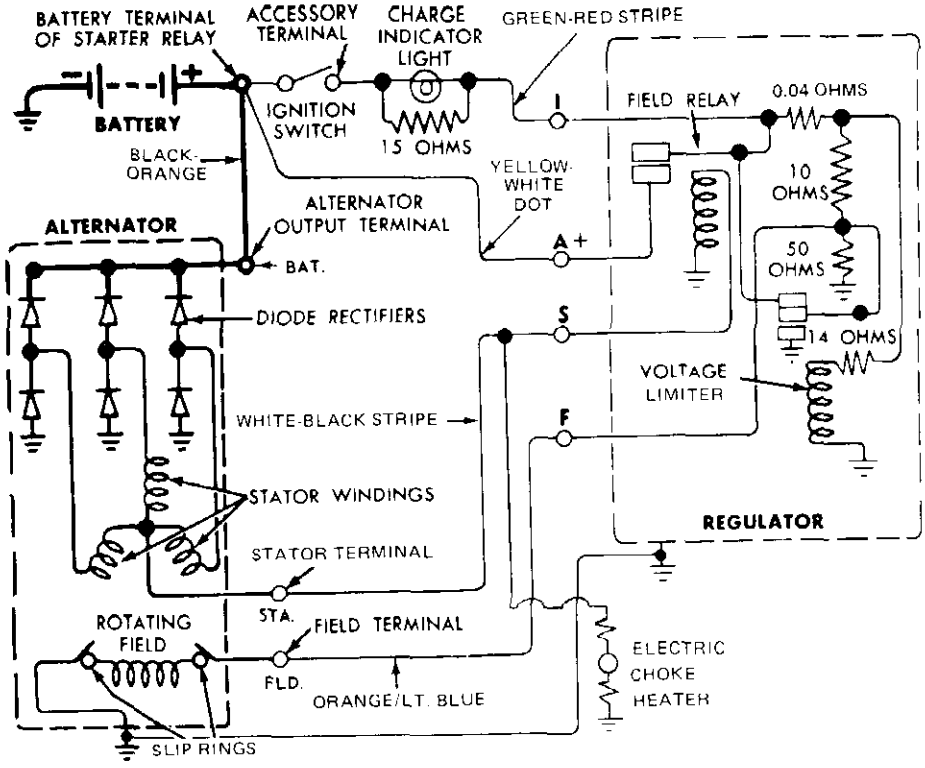
CK3361-2B

DESCRIPTION AND OPERATION

The alternator is belt driven from the engine. Current is supplied from the alternator-regulator system to the rotating field of the alternator through two brushes to two slip rings.

The alternator produces power in the form of *alternating current. The alternating current is rectified* to direct current by six diodes (eight diodes in 61 ampere alternators). The alternator regulator automatically adjusts the alternator field current to maintain the alternator output voltage within prescribed limits to correctly charge the battery. The alternator is self-current limiting.

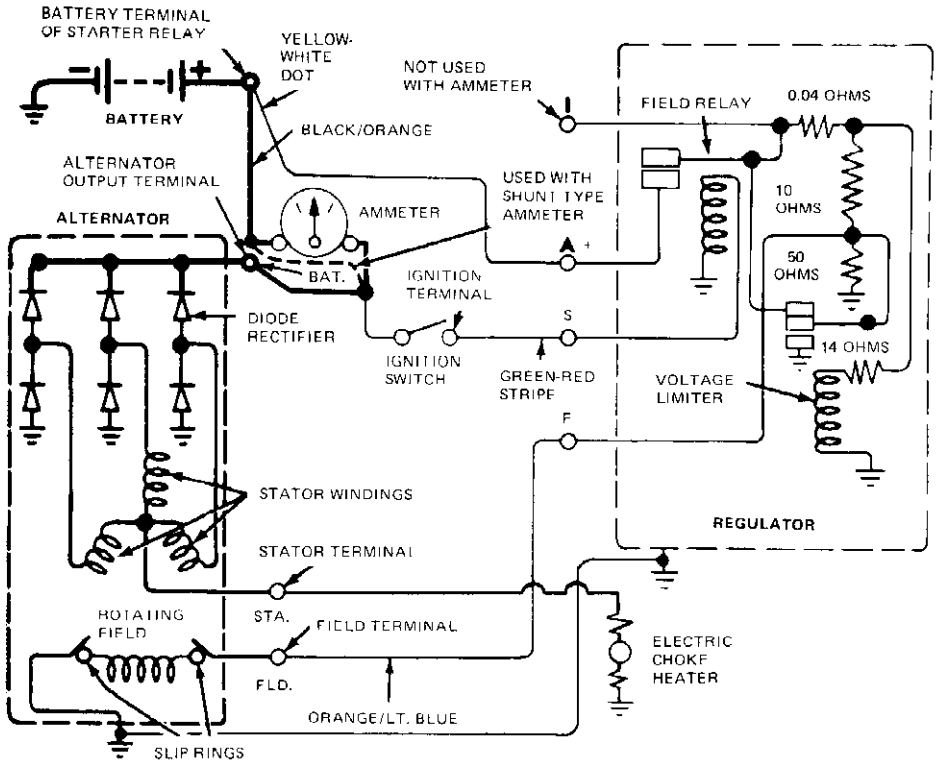
If a charge indicator lamp is used in the charging system (Fig. 1), the system operation is as follows: when the ignition switch is turned ON, a small electrical current flows through the lamp filament (turning the lamp on) and through the alternator regulator to the alternator field. When the engine is started, the alternator field rotates and produces a voltage in the *stator winding. When the voltage at the alternator* stator terminal reaches about 3 volts, the regulator field relay closes. This puts the same voltage potential on both sides of the charge indicator lamp causing it to go out. When the field relay has closed, current passes



J1210-2L

Fig. 1 Alternator Charging System—Indicator Lamp

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FIG. 2 Alternator Charging System—Ammeter

through the regulator A terminal and is metered to the alternator field.

Fuse links are included in the charging system wiring on all models (Part 31-01). This fuse link is used to prevent damage to the wiring harness and alternator if the wiring harness should become grounded, or if a booster battery is connected to the charging system with the wrong polarity.

If an ammeter is used in the charging system (Fig. 2), the regulator I terminal and the alternator stator terminal are not used. When the ignition switch is turned ON, the field relay closes and electrical current passes through the regulator A terminal and is metered to the alternator field. When the engine is started, the alternator field rotates causing the alternator to operate. The ammeter indicates current flow into (charge) or out of (discharge) the vehicle battery.

TESTING

Do not run the engine with the battery disconnected.

Check the alternator drive belt and adjust it to specification before proceeding with any tests. Check and tighten all connectors at the starter relay and battery. Refer to Part 31-01 for charging system diagnosis and test procedures.

ADJUSTMENTS

BELT ADJUSTMENT

1. Check the belt tension with Tool T63L-8620-A or equivalent. The belt tension should be within specification.
2. If the belt is not within specification, loosen the alternator mounting bolt to a snug position and loosen the adjusting arm bolts.
3. Use Tool T63L-8620-A or equivalent. To check belt tension, apply pressure on the alternator front housing only and adjust belt tension to specification.
4. Tighten the adjusting arm to alternator bolt.
5. Tighten remaining mounting bolts.

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REMOVAL AND INSTALLATION

CAUTION: Exercise care. Do not permit flames, sparks or lighted tobacco near battery.

Removal

1. Disconnect the battery ground cable.
2. Loosen the alternator mounting bolts and remove the adjustment arm alternator attaching bolt. Disengage the alternator belt.
3. Remove the electrical connectors from the alternator. The stator and field connectors are the push-on type. They should be pulled straight off the terminal studs to prevent damage to them.
4. Remove the alternator mounting bolt, and remove the alternator.

Installation

1. Position the alternator to the engine, and install the spacer (if used) and the alternator mounting bolt. Tighten the bolt to a snug position.
2. Install the adjustment arm to alternator attaching bolt.
3. Adjust the belt tension using Tool T63L-8620-A or equivalent. **Apply pressure on the alternator front housing only, when tightening the belt. Tighten the adjusting arm bolts and the mounting bolt.**
4. Install the alternator wiring harness (Fig. 3).
5. Connect the battery ground cable.

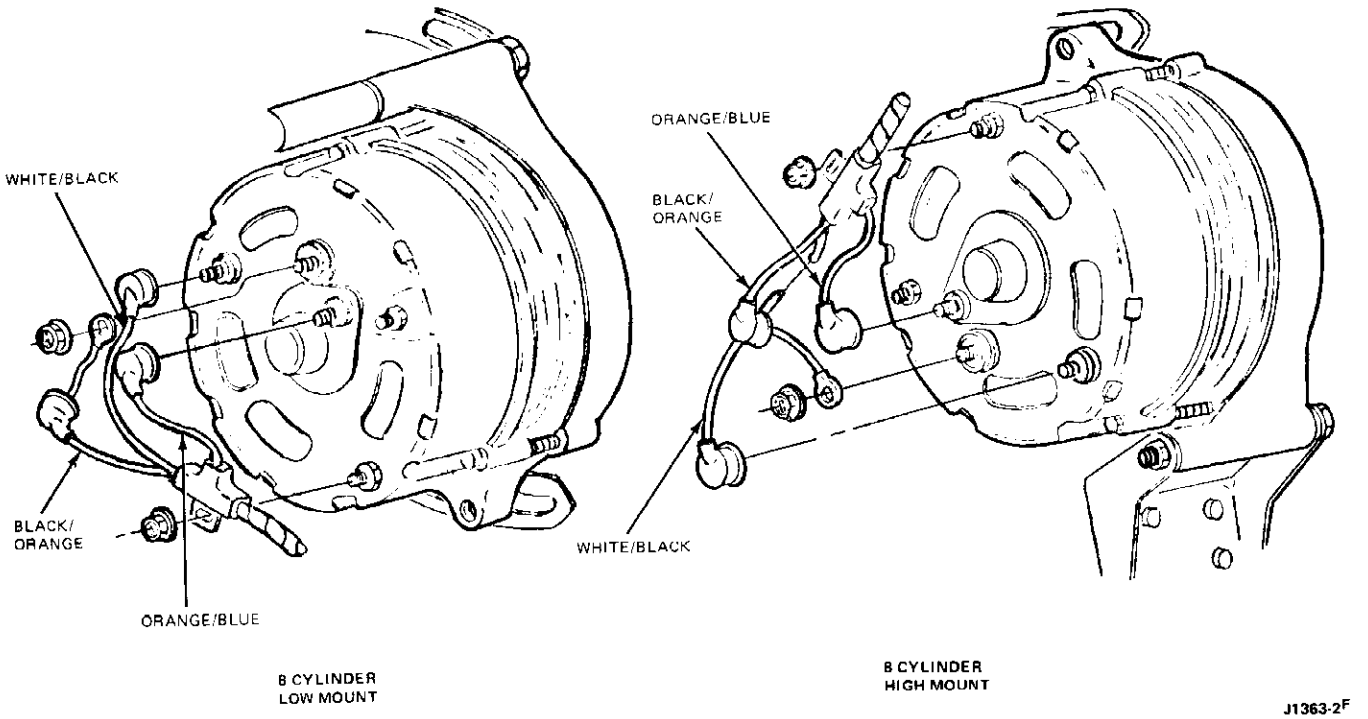


FIG. 3 Wiring Harness Connections—Typical

DISASSEMBLY AND OVERHAUL

E.E.D. REAR TERMINAL ALTERNATOR

Disassembly

Fig. 4 shows a disassembled view of the E.E.D. rear terminal alternator.

1. Mark both end housings and the stator with a scribe mark for assembly.
2. Remove the three housing through bolts.
3. Separate the front housing and rotor from the stator and rear housing.
4. Remove all the nuts and insulators from the rear housing and remove the rear housing from the stator and rectifier assembly.
5. Remove the brush holder mounting screws and remove the holder, brushes, brush springs, insulator and terminal.
6. If replacement is necessary, press the bearing from the rear housing, supporting the housing close to the bearing boss.

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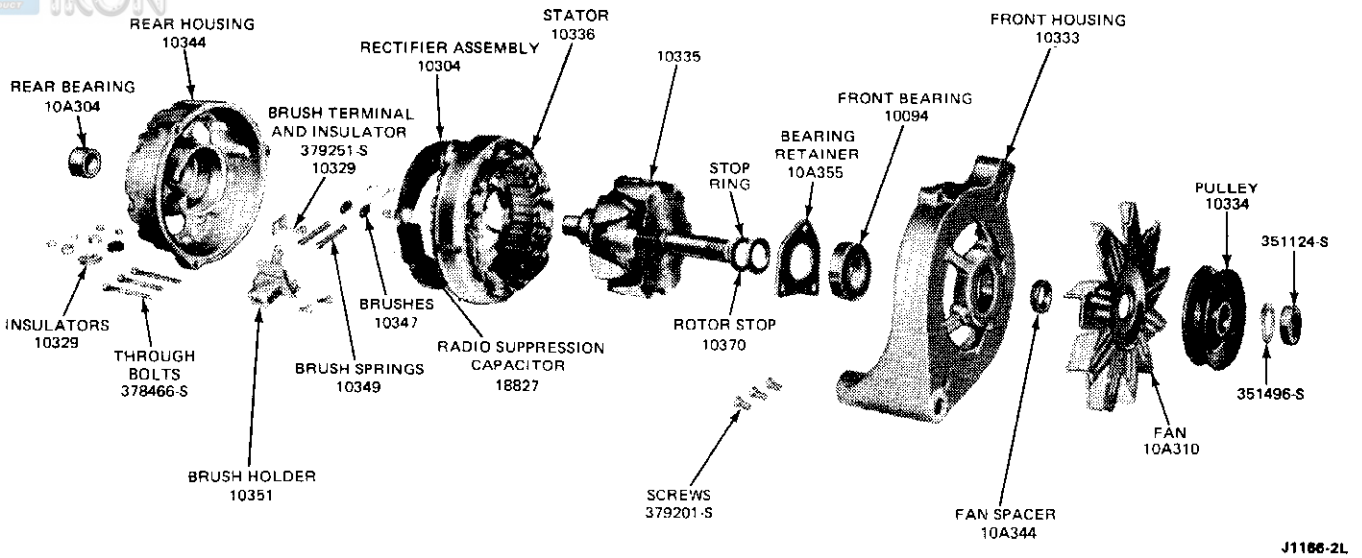


FIG. 4 Disassembled Rear Terminal Alternator

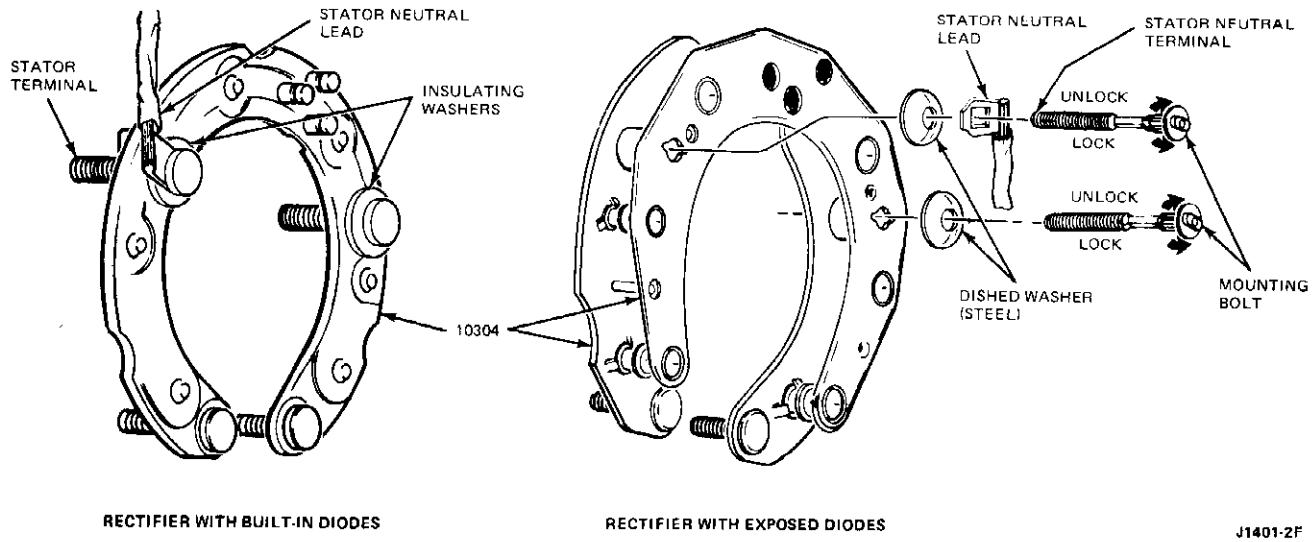


FIG. 5 Rectifier Assemblies

7. If the rectifier assembly is being replaced, unsolder the stator leads from the printed-circuit board terminals, and disconnect center tap pigtail from stator terminal. Separate the stator from the rectifier assembly. Work quickly to prevent overheating the rectifier.
8. Original production alternators will have one of two types of rectifier assembly circuit boards (Fig. 5); one has the circuit board spaced away from the diode plates with the diodes exposed. The other type is a single circuit board with built-in diodes.

   If the alternator rectifier has an exposed diode circuit board, remove the screws from the rectifier by rotating the bolt heads 1/4 turn clockwise to unlock them and then remove the screws. Push the stator terminal screw straight out on a rectifier with the diodes built into the circuit board. Avoid turning the screw while removing to make certain that the straight knurl will engage the insulators when installing. Do not remove the grounded screw (Fig. 6).
9. Remove the drive pulley nut with the tool shown in Fig. 7. Then, pull the lockwasher, pulley, fan, fan spacer, front housing and rotor stop from the rotor shaft.
10. Remove the three screws that hold the front end bearing retainer, and remove the retainer. If the bearing is damaged or has lost its lubricant, support the housing close to the bearing boss and press out the old bearing from the housing.
11. Perform a diode test and field open or short circuit test (Part 31-01).

Assembly

1. The rotor, stator and bearings must not be cleaned with solvent. Wipe these parts off with a clean cloth.
2. Press the front bearing in the front housing bearing boss (put pressure on the outer race only), and install the bearing retainer (Fig. 4).
3. If the stop-ring on the rotor drive shaft was damaged, install a new stop-ring. Push the new ring

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on the shaft and into the groove. **Do not open the ring with snap ring pliers as permanent damage will result**

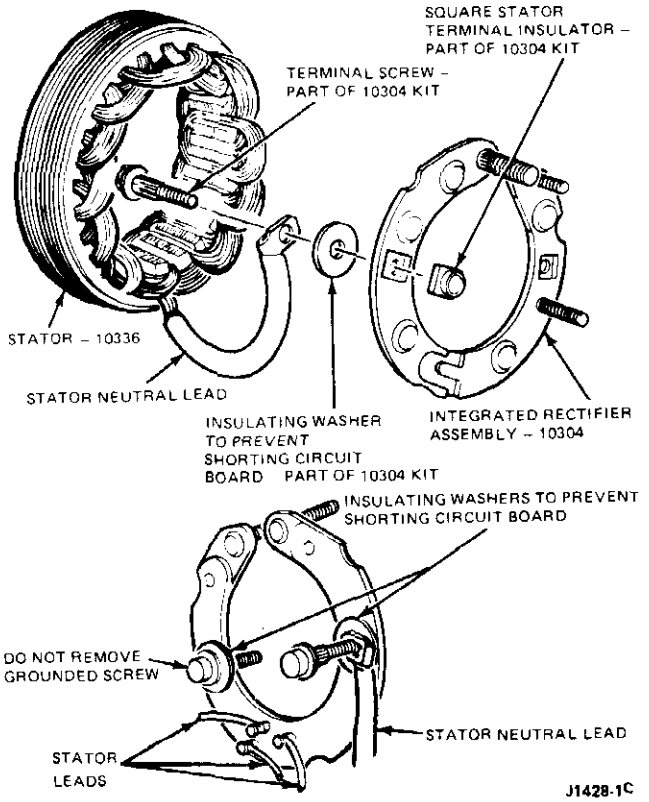


FIG. 6 Stator Terminal Installation—Rectifier With Built-In Diodes

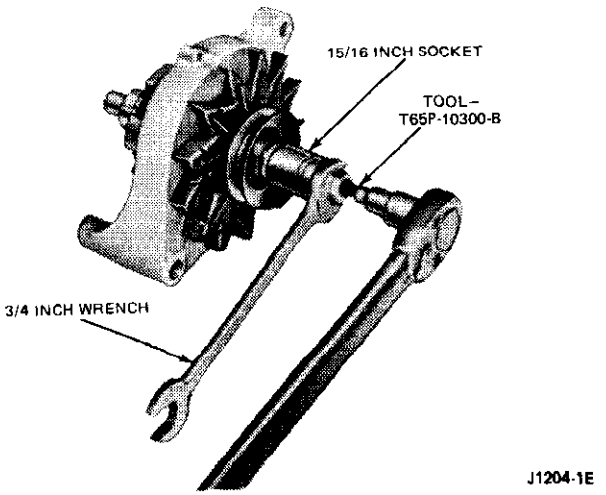


FIG. 7 Pulley Removal—Typical

4. Position the rotor stop on the drive shaft with the recessed side against the stop-ring.
5. Position the front housing, fan spacer, fan, pulley and lock washer on the rotor shaft and install the retaining nut. Tighten the retaining nut with the tool shown in Fig. 7 to the specified torque.
6. If the rear housing bearing was removed, support the housing near the bearing boss and press in a new bearing flush with the outer end surface.
7. Place the brush springs, brushes, brush terminal and terminal insulator in the brush holder and hold the brushes in position by inserting a piece of stiff wire in the brush holder as shown in Fig. 8.

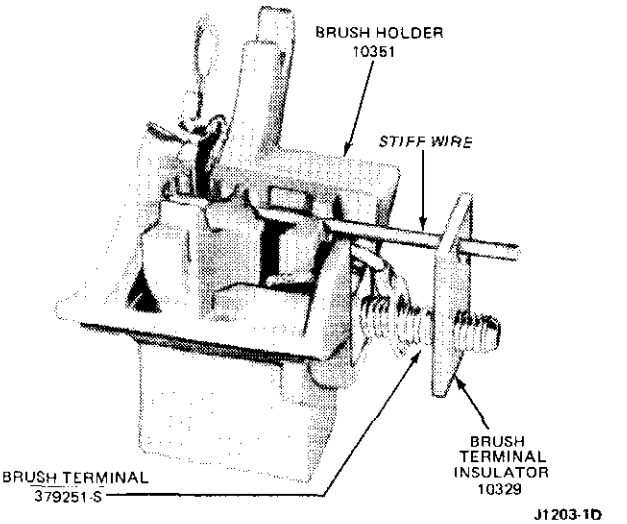


FIG. 8 Brush Holder Assembly

8. Position the brush holder assembly in the rear housing and install the mounting screws. Position the brush leads in the brush holder as shown in Fig. 9.

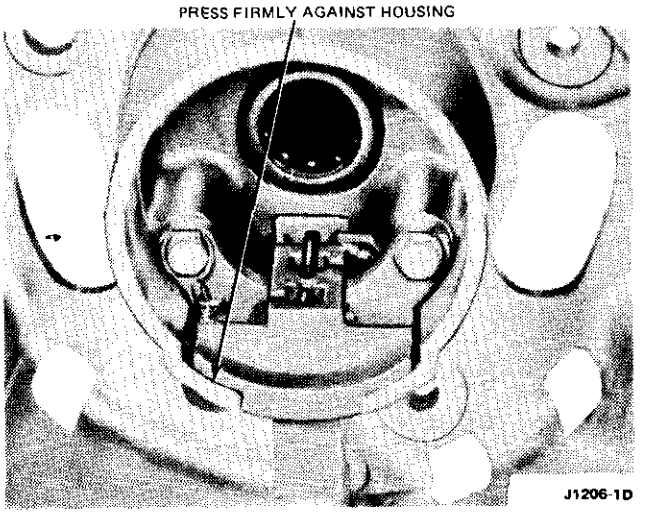


FIG. 9 Brush Lead Positions—Typical

9. Wrap the three stator winding leads around the circuit board terminals and solder them. On 65-amp alternator, push the terminals of the stator wires onto the circuit board terminals and solder them. Work quickly to prevent overheating the rectifier. Position the stator neutral lead eyelet on the stator terminal screw and install the screw in the rectifier assembly (Fig. 6).
10. For a rectifier with the diodes exposed, insert the special screws through the stator neutral wire lug, dished washers and circuit board (Fig. 5). Turn them 1/4 turn counterclockwise to lock them.

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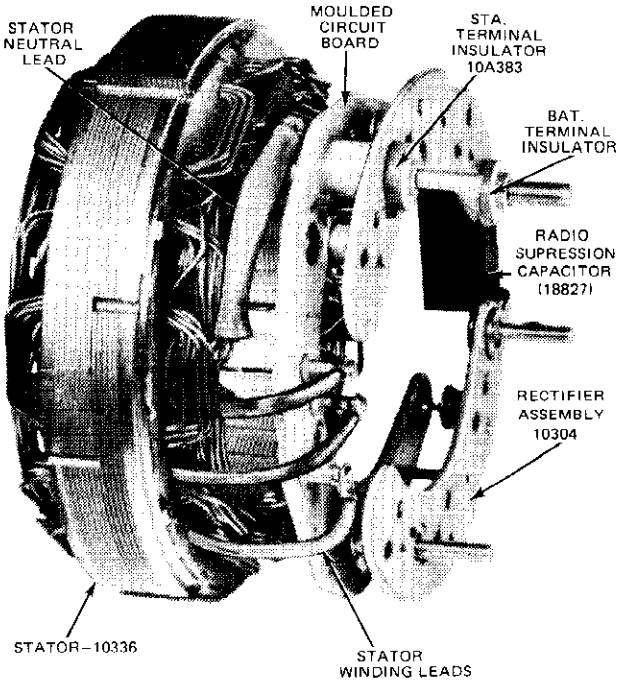


FIG. 10 Stator Lead Connections—Except 61-Ampere Alternator

11. For single circuit boards with built-in diodes, insert the screws straight through the wire lug, insulating washer and rectifier into the square hole in the rectifier into the insulator (Fig. 6). **The dished washers are to be used only on the circuit board with exposed diodes (Fig. 5).** If they are used on the integral rectifier, a short circuit will occur. A flat insulating washer is to be used between the stator terminal and the board when an integral rectifier is used (Fig. 6).
12. Position the radio noise suppression capacitor on the rectifier terminals. On the circuit board with exposed diodes, install the STA and BAT terminal insulators (Fig. 10).
13. On the single circuit board, position the square stator terminal insulator in the square hole in the rectifier assembly (Fig. 6). Position the BAT terminal insulator (Fig. 11).

    Position the stator and rectifier assembly in the rear housing. Make certain that all terminal insulators are seated properly in the recesses (Fig. 10). Position the STA (black), BAT (red) and FLD

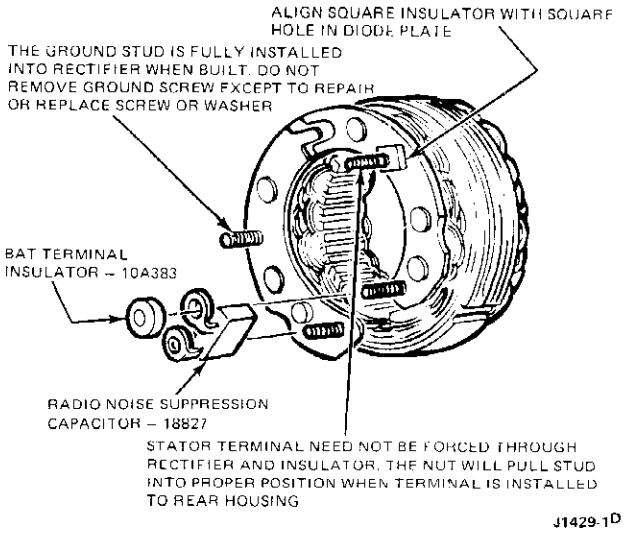


FIG. 11 Terminal Insulators—Circuit Board with Built-In Diodes

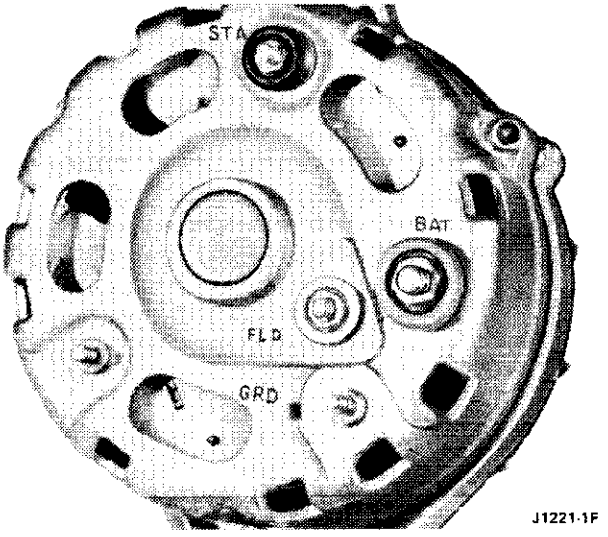


FIG. 12 Alternator Terminal Locations

(orange) insulators on the terminal bolts, and install the retaining nuts (Fig. 12).

14. Wipe the rear end bearing surface of the rotor shaft with a clean, lint-free rag.
15. Position the rear housing and stator assembly over the rotor and align the scribe marks made during disassembly. Seat the machined portion of the stator core into the step in both end housings. Install the housing through bolts. Remove the brush retracting wire, and put a daub of waterproof cement over the hole to seal it.

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SPECIFICATIONS

ALTERNATOR

Supplier	Stamp Color	Rating		Field Current Amps. @ 12 V*	Slip-Ring Turning (Inches)		Brush Length (Inches)		Pulley Nut Torque ft-lbs	Belt ① Tension (Lbs.)
		Amperes @ 15V	Watts @ 15V		Min. Dia.	Max. Runout	New	Wear-Limit		
Ford	Orange	40	600	2.9	1.22	0.0005	1/2	5/16	60-100	90-110
Ford	Green	60	900	2.9	1.22	0.0005	1/2	5/16	60-100	90-110
Ford	Green	60	900	4.0	1.22	0.0005	1/2	3/16	60-100	90-110

① Used Belt. New Belt 150. A used belt is one that has been in operation more than 10 minutes. If belt tension is out of specification or belt has been removed, reset to 110 lbs.

* A Field Current of 4 amps is used with solid-state alternator.

SPECIAL TOOLS

Ford Tool No.	Former No.	Description		Ford Tool No.	Former No.	Description
T63L-8620-A	8620 or BT-33-73-F	Belt Tension Guage		T65P-10300-B		Alternator Pulley Remover

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DETROIT IRON

E.E.D. Side Terminal Alternator

PART 31-12

Applies to All Models

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CK3362-2B

DESCRIPTION AND OPERATION

The operation of the E.E.D. side terminal alternator is the same as that for the E.E.D. rear terminal alternator given in Part 31-10. However, the internal wiring is different and is shown in Figs. 1 and 2.

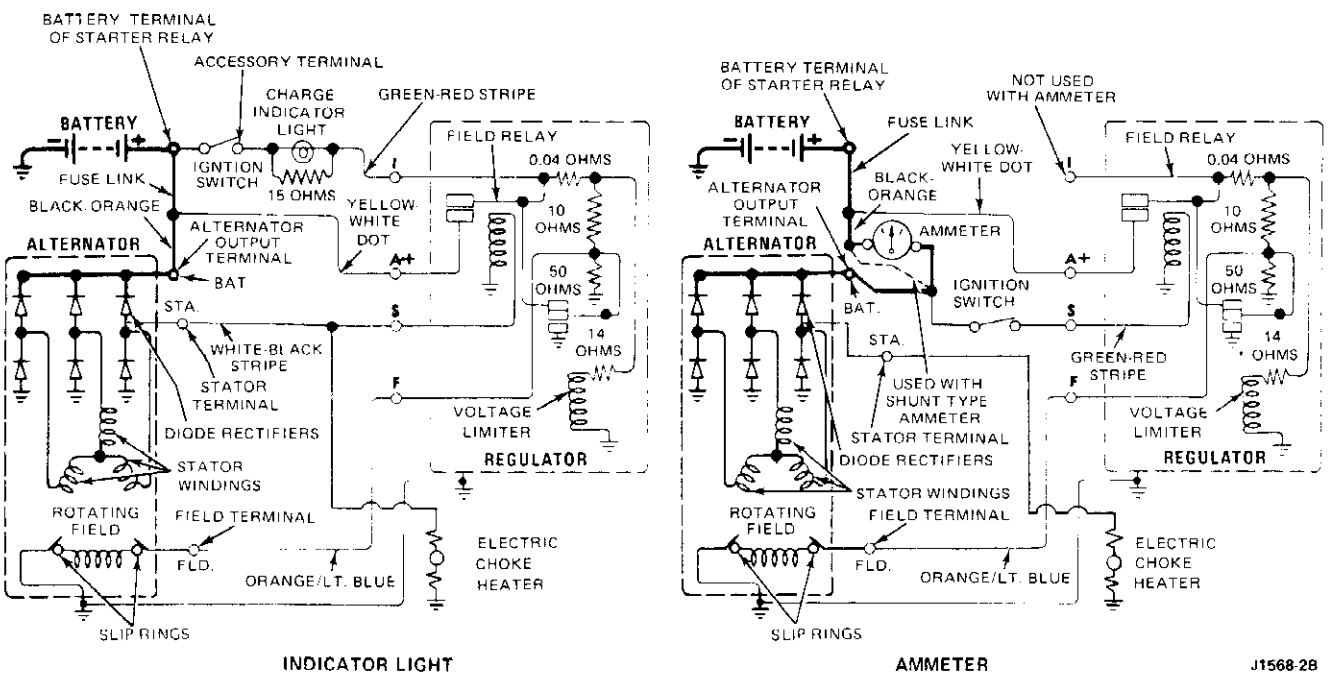


FIG. 1 70-Ampere Side Terminal Alternator Charging System

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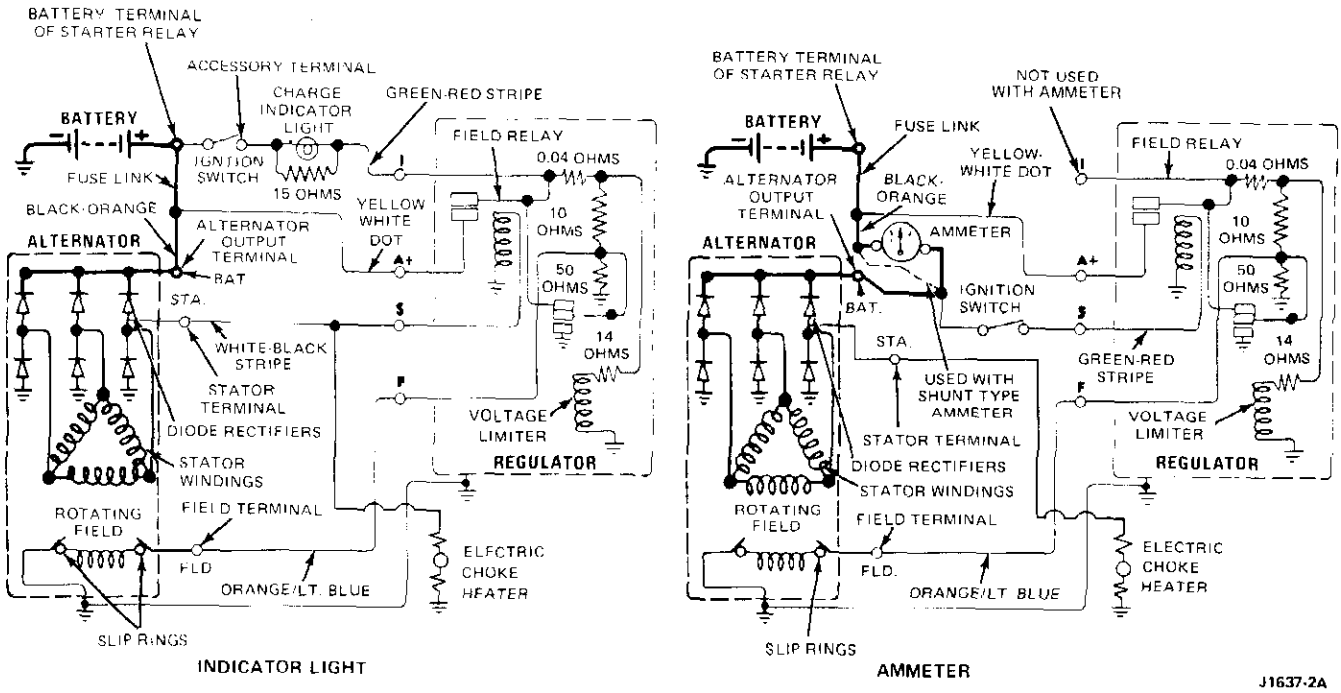


FIG. 2 90-Ampere Side Terminal Alternator Charging System

TESTING

ON VEHICLE TESTS

Check the alternator drive belt and adjust it to specification, if necessary, before proceeding with any tests. **Do not run the engine with the battery disconnected.**

Refer to Part 31-01 for Charging System Diagnosis and Test Procedures.

ADJUSTMENTS

BELT ADJUSTMENT

1. Check the belt tension with Tool T63L-8620-A or equivalent. The belt tension should be within specification.
2. If the belt is not within specification, loosen the alternator mounting bolt to a snug position and loosen the adjusting arm bolt.
3. Apply pressure to the alternator front housing adjusting ear with 1-1/8 inch open end wrench to increase the belt tension. Then, tighten the adjusting arm-to-alternator bolt.
4. Check the belt tension with Tool T63L-8620-A or equivalent. Repeat the procedure until the belt tension is within specification. Then, tighten all alternator mounting bolts.

REMOVAL AND INSTALLATION

CAUTION: Exercise care. Do not permit flames, sparks or lighted tobacco to come near battery.

SIDE TERMINAL ALTERNATOR

Removal

1. Disconnect the battery ground cable.
2. Loosen the alternator attaching bolt and remove the adjustment arm-to-alternator attaching bolt. Then, disengage the drive belt from the alternator pulley.

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3. Remove the electrical connectors from the alternator (Fig. 3). The stator and field connectors are the push-on blade type with a lock that engages with the alternator housing. Depress the lock tab and pull the connector straight off the terminals to prevent damage to them and the connector.
4. Remove the alternator attaching bolt, and remove the alternator.

Installation

1. Position the alternator to the engine, and install the spacer (if used) and the alternator attaching bolt. Tighten the bolt to a snug position.
2. Install the adjustment arm-to-alternator attaching bolt.
3. Position the drive belt on the alternator pulley and adjust the belt tension to specification with Tool T63L8620-A or equivalent. **Apply pressure on the alternator front housing adjusting ear with 1 1/8 inch open end wrench when tightening the belt.** Tighten the adjusting arm bolt and the alternator mounting bolt.
4. Connect the electrical connectors to the alternator (Fig. 3). Be sure each connection is clean and tight.
5. Connect the battery ground cable.

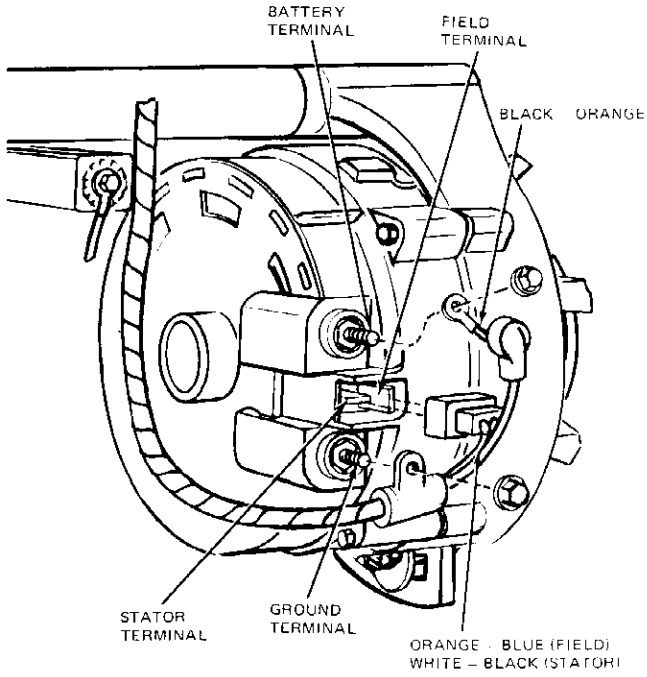


FIG. 3 Typical Wiring Connections—Side Terminal Alternator

MAJOR REPAIR OPERATIONS SIDE TERMINAL ALTERNATOR

OVERHAUL

Disassembly

Fig. 4 shows a disassembled view of the side terminal alternator.

1. Mark both end housings and the stator with a scribe mark for assembly.
2. Remove the four housing through bolts, and separate the front housing and rotor from the rear housing and stator. Slots are provided in the front housing to aid in disassembly. **Do not separate the rear housing from the stator at this time.**
3. Remove the drive pulley nut with the Tool shown in Fig. 5. Then, remove the lockwasher, pulley, fan and fan spacer from the rotor shaft.

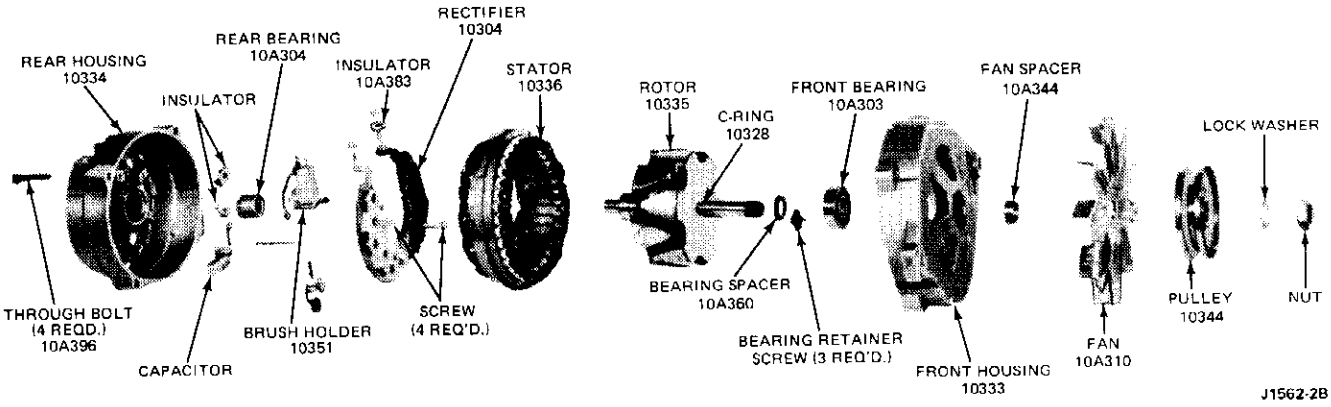


FIG. 4 Disassembled Side Terminal Alternator

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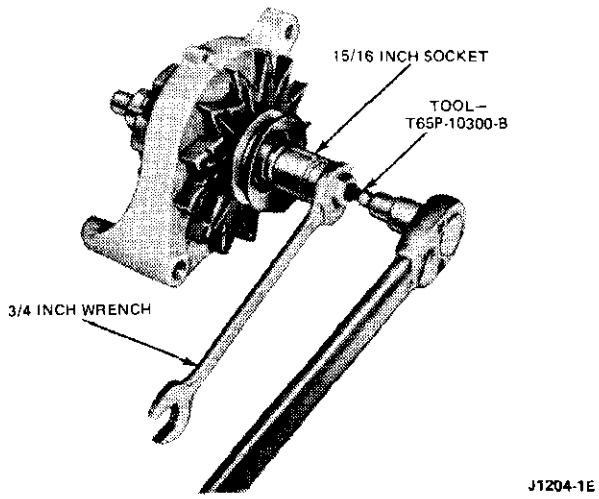


FIG. 5 Pulley Removal—Typical

4. Pull the rotor and shaft from the front housing, and remove the spacer from the rotor shaft.
5. Remove three screws retaining the bearing to the front housing. If the bearing is damaged or has lost lubricant, remove the bearing from the housing. To remove the bearing, support the housing close to the bearing boss and press the bearing from the housing.
6. Unsolder and disengage the three stator leads from the rectifier (Fig. 6). Work quickly to prevent overheating the rectifier.
7. Lift the stator from the rear housing.
8. Unsolder and disengage the brush holder lead from the rectifier. Work quickly to prevent overheating the rectifier.
9. Remove the screw attaching the capacitor lead to the rectifier.
10. Remove four screws attaching the rectifier to the rear housing (Fig. 6).

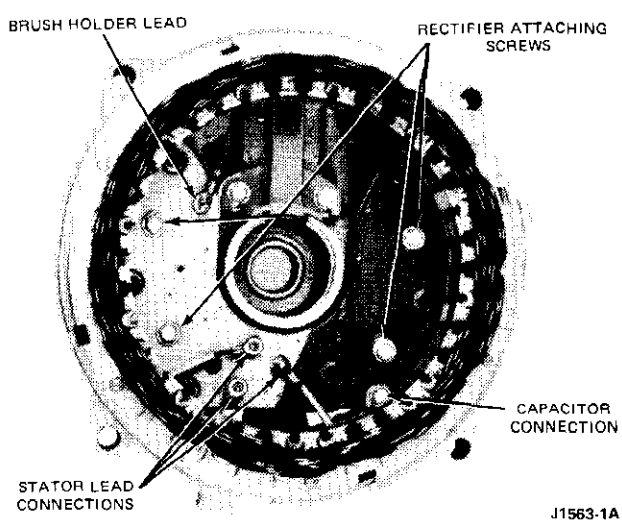


FIG. 6 Stator Lead Connections

11. Remove the two terminal nuts and insulator from outside the housing, and remove the rectifier from the housing.
12. Remove two screws attaching the brush holder to the housing and remove the brushes and holder.
13. Remove any sealing compound from the rear housing and brush holder.
14. Remove one screw attaching the capacitor to the rear housing and remove the capacitor.
15. If bearing replacement is necessary, support the rear housing close to the bearing boss and press the bearing out of the housing.

Assembly

The rotor, stator and bearings must not be cleaned with solvent. Wipe these parts with a clean cloth.

1. If the front housing bearing is being replaced, press the new bearing in the housing. **Put pressure on the bearing outer race only.** Then, install the bearing retaining screws.
2. Place the inner spacer on the rotor shaft and insert the rotor shaft into the front housing and bearing.
3. Install the fan spacer, fan, pulley, lockwasher and nut on the rotor shaft. Use the Tool shown in Fig. 5 to tighten the pulley nut.
4. If the rear bearing is being replaced, press a new bearing in from inside the housing until it is flush with the boss outer surface.
5. Position the brush terminal on the brush holder (Fig. 7). Install the springs and brushes in the brush holder, and insert a piece of stiff wire to hold the brushes in place (Fig. 7).

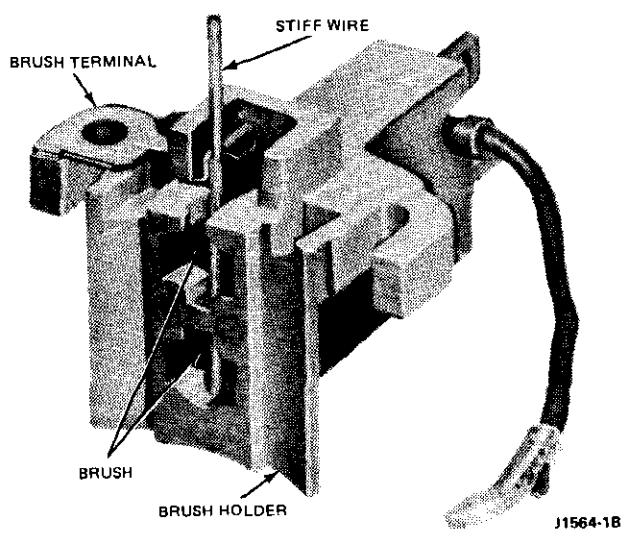


FIG. 7 Brush Holder Assembly

6. Position the brush holder in the rear housing and install the attaching screws. The brush retracting wire must stick out enough to be grabbed and pulled through later. Water-proof glue sealer may have to be pushed out. Allow wire to project out of housing. Push the brush holder toward the rotor shaft opening and tighten the brush holder attaching screws.
7. Position the capacitor to the rear housing and install the attaching screw.

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8. Place the two (rectifier) insulators on the bosses inside the housing (Fig. 8).

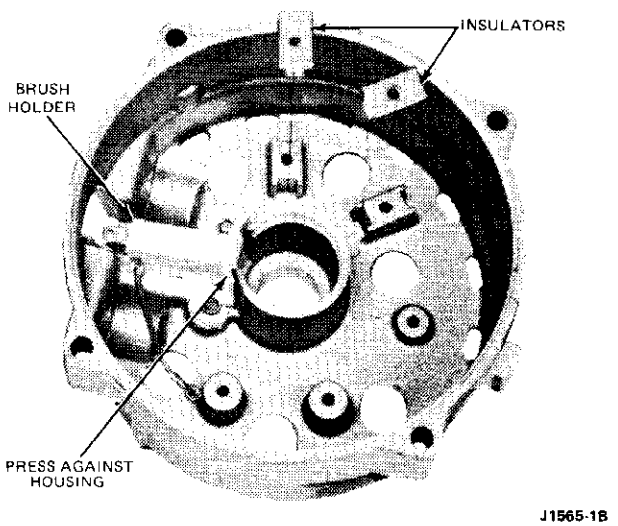


FIG. 8 Brush Holder and Rectifier Insulators Installed

9. Place the insulator on the BAT (large) terminal of the rectifier, and position the rectifier in the rear housing. Place the outside insulator on the BAT terminal, and install the nuts on the BAT and GRD terminals **finger tight.**
10. Install but do not tighten the four rectifier attaching screws.
11. Tighten the BAT and GRD terminal nuts on the outside of the rear housing. Then, tighten the four rectifier attaching screws.
12. Position the capacitor lead to the rectifier and install the attaching screw.
13. Press the brush holder lead on the rectifier pin and solder securely (Fig. 6). Work quickly to prevent overheating the rectifier.
14. Position the stator in the rear housing and align the scribe marks. Press the three stator leads on the rectifier pins and solder securely (Fig. 6). Work quickly to prevent overheating the rectifier.
15. Position the rotor and front housing into the stator and rear housing. Align the scribe marks and install the four through bolts. Tighten two opposing bolts and then the two remaining bolts.
16. Spin the fan and pulley to be sure nothing is binding within the alternator.
17. Remove the brush retracting wire and place a daub of waterproof cement over the hole to seal it.

BRUSH REPLACEMENT

Removal

1. Mark both end housings and the stator with a scribe mark for use during assembly.
2. Remove the four housing through bolts, and separate the front housing and rotor from the rear housing and stator. Slots are provided in the front housing to aid in disassembly. **Do not separate the rear housing and stator.**
3. Unsolder and disengage the brush holder from the rear housing. Remove brushes and springs from brush holders.
4. Remove the two brush holder attaching screws and lift the brush holder from the rear housing.
5. Remove any sealing compound from the rear housing and brush holder.

Installation

1. Install the springs and brushes in the brush holders and insert a piece of stiff wire to hold the brushes in place.
2. Position the brush holder to the rear housing, inserting the wire used to retract the brushes through the hole in the rear housing.
3. Install the brush holder attaching screws. Push the brush holder toward the rotor shaft opening and tighten the attaching screws.
4. Press the brush holder lead on the rectifier pin and solder securely. Work quickly to prevent overheating the rectifier.
5. Position the rotor and front housing into the stator and rear housing. Align the scribe marks and install the four through bolts. Tighten two opposing bolts and then the two remaining bolts.
6. Spin the fan and pulley to be sure nothing is binding within the alternator.
7. Remove the wire retracting the brushes, and place a daub of waterproof cement over the hole to seal it.

RECTIFIER REPLACEMENT

Removal

1. Mark both end housings and the stator with a scribe mark for assembly.
2. Remove the four housing through bolts, and separate the front housing and rotor from the rear housing and stator. Slots are provided in the front housing to aid in disassembly. **Do not separate the rear housing and stator at this time.**
3. Unsolder and disengage the three stator leads from the rectifier (Fig. 6). Work quickly to prevent overheating the rectifier. Then, lift the stator from the rear housing.
4. Unsolder and disengage the brush holder lead from the rectifier. Work quickly to prevent overheating the rectifier.
5. Remove the screw attaching the capacitor lead to the rectifier.
6. Remove four screws attaching the rectifier to the rear housing (Fig. 6).
7. Remove two terminal nuts and insulator from outside the housing, and remove the rectifier from the housing.

Installation

1. Position springs and brushes in the brush holder. Insert a piece of wire through the hole in the rear housing to hold the brushes in the retracted position.
2. Place the two rectifier insulators on the bosses inside the housing (Fig. 8).

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3. Place the insulator on the BAT (large terminal) of the rectifier, and position the rectifier in the rear housing. Place the outside insulator on the BAT terminal, and install the nuts on the BAT and GRD terminals finger tight.
4. Install but do not tighten the four rectifier attaching screws.
5. Tighten the BAT and GRD terminal nuts on the outside of the rear housing. Then, tighten the four rectifier attaching screws.
6. Position the capacitor lead to the rectifier and install the attaching screw.
7. Press the brush holder lead on the rectifier pin and solder securely (Fig. 6). Work quickly to prevent overheating the rectifier.
8. Position the stator in the rear housing and align the scribe marks. Press the three stator leads on the rectifier pins and solder securely (Fig. 6). Work quickly to prevent overheating the rectifier.
9. Position the rotor and front housing into the stator and rear housing. Align the scribe marks, install and partially tighten all four through bolts. Tighten two opposing bolts and then the two remaining bolts.
10. Spin the fan and pulley to be sure nothing is binding within the alternator.
11. Remove the brush retracting wire and place a daub of waterproof cement over the hole in the rear housing to seal it.

SPECIFICATIONS

SIDE TERMINAL ALTERNATOR

Rating		Field Current Amps. @ 12V*	Stamp Color	Slip-Ring Turning (Inches)		Brush Length (Inches)		Pulley Nut Torque (Ft.-Lbs.)	Belt ① Tension (Lbs.)
Amperes @ 15V	Watts @ 15V			Min. Dia.	Max. Runout	New	Wear-Limit		
70	1050	2.9	Black	1.22	0.0005	1/2	5/16	60-100	90-110
90	1350		Red						
90	1350	4.0	Red	1.22	0.0005	1/2	5/16	50-100	90-110

① Used Belt. New Belt 150. A used belt is one that has been in operation more than 10 minutes. If belt tension is out of specification, or belt has been removed, reset to 110 lbs.

* A Field Current of 4 amps is used with solid-state regulator.

SPECIAL TOOLS

Tool No.	Former No.	Description		Tool No.	Former No.	Description
T63L-8620-A	8620 or BT-33-73-F	Belt Tension Gauge		T65P-10300-B		Alternator Pulley Remover

CJ1570-2E

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DETROIT IRON

Alternator Electro-Mechanical Regulator

PART 31-40

Applies to All Models

SUBJECT	PAGE
DESCRIPTION AND OPERATION	40-1
TESTING	
Voltage Regulation Calibration Test	40-1
ADJUSTMENTS	40-2
REMOVAL AND INSTALLATION	40-2

CK3363-2B

DESCRIPTION AND OPERATION

CAUTION: This regulator must not be used with the 4-amp field alternator. The alternator will burn the points of the mechanical regulator.

The alternator regulator has been designed to exercise control over the charging system, and also to compensate for temperature changes. The electro-mechanical regulator is factory calibrated and is not to be adjusted.

The alternator regulator is composed of two control units, a field relay and a voltage limiter, mounted as an assembly. Refer to Wiring Diagram Manual for schematics and locations of wiring harnesses. Figs. 1 and 2, Part 31-10 show schematics of the electro-mechanical voltage regulator system.

FIELD RELAY

The field relay serves to connect the charging system voltage to the field circuit when the engine is running.

CHARGE INDICATOR CIRCUIT—LIGHT

When the ignition switch is closed, the charge indicator light, shunted with a 15-ohm resistor, allows adequate starting field current.

When the alternator builds up enough voltage to close the field relay contacts, full voltage is applied to the field, and the charge indicator light goes out.

CHARGE INDICATOR CIRCUIT—AMMETER

When the ignition switch is closed, the field relay is energized. Closing the relay contacts connects the battery and alternator output to the field through the voltage limiter contacts.

VOLTAGE LIMITER

The temperature compensated voltage limiter is a double contact unit. Voltage limiting is accomplished by controlling the amount of current supplied to the rotating field.

TESTING

Use the voltmeter section of the Rotunda tester 27-0005 or equivalent, or a separate voltmeter to test the alternator regulator. Refer to Part 31-01 for Charging System Diagnosis and Test Procedures.

VOLTAGE REGULATOR CALIBRATION TEST

The alternator belt tension must be adjusted within specification, and the charging system electrical connections must be clean and tight before testing the regulator.

TEST PROCEDURE

Connect the voltmeter positive lead to the battery positive terminal, and the negative lead to the battery negative terminal. **Turn off all electrical loads.** Then, check and record the voltmeter reading. This is base voltage reading. Connect the red lead of a tachometer to the distributor terminal of the coil and the black tachometer lead to a good ground.

Place the transmission shift lever in the NEUTRAL or PARK position, engage the parking brake and start the engine. Increase the engine speed to 1800-2200 rpm for 2 or 3 minutes. Note the voltmeter reading. It should be higher than the first reading but not more than 2.0 volts higher than base voltage. This is the regulated voltage reading. If the reading is greater than 2 volts, disconnect regulator and check alternator regulator wiring harness for open circuit or shorts, and regulator mounting screws for proper ground. Connect regulator and recheck voltage. If reading remains greater than 2 volts, replace the voltage regulator. If the reading is less

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than 2.0 volts higher than base voltage, turn on the headlamps and heater blower. The full lead voltage should be at least 0.5 volt above the base voltage. If the voltage is less than 0.5, find cause of under-voltage condition. Replace the regulator if the voltage drop is greater than 1/2 volt below the regulated voltage. Disconnect regulator and check alternator and wiring harness by placing a jumper wire from "A" to "F" terminals. Check for voltage at "S" and "I" terminals. (Voltage at "S" terminal should be 1/2 voltage reading of "I" terminal.) If alternator and harness are okay, replace regulator.

ADJUSTMENTS

The electro-mechanical regulator is factory calibrated and sealed and is not to be adjusted. If the regulator does not operate as specified in the Voltage Regulator Calibration Test, it must be replaced.

REMOVAL AND INSTALLATION

1. Remove the battery ground cable. Do not permit flame, spark or lighted tobacco near battery. On models with the regulator located behind the battery, it is necessary to loosen the battery hold down and position the battery away from the regulator.
2. Remove the regulator mounting screws.
3. Use screwdriver to unlock connector and then disconnect the regulator from the wiring harness (Fig. 1).
4. Connect the new regulator to the wiring harness.
5. Mount the regulator to the regulator mounting plate. Tighten regulator mounting screws to insure *proper ground. The radio suppression condenser* mounts under one mounting screw.
6. If the battery was moved to gain access to the regulator, position the battery and install the hold down. Connect the battery ground cable, and check the system for proper operation.

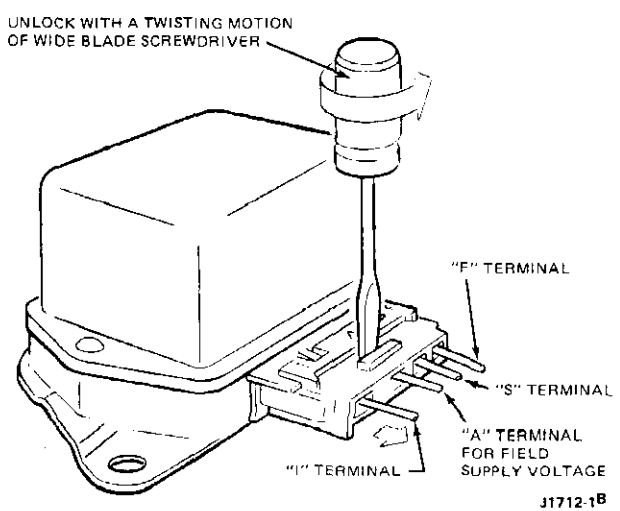


FIG. 1 Unlocking Wiring Harness Connector

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DETROIT IRON

Alternator Transistorized Regulator

PART 31-42

Applies to All Models

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION	42-1	REMOVAL AND INSTALLATION	42-1
ADJUSTMENTS	42-1		

CK3364-2B

DESCRIPTION AND OPERATION

The transistorized voltage regulator controls the alternator voltage output in a similar manner to an electro-mechanical voltage regulator, by regulating the alternator field current. The regulation is accomplished electronically with the use of transistors and diodes rather than by a vibrating armature relay. The voltage, at which regulation occurs, is determined by a network of a voltage reference diode (zener), a resistive network, and a transistor.

ADJUSTMENTS

The only adjustment on the transistorized alternator regulator is the voltage limiter adjustment. A precision voltmenter must be used. Voltage is set with the engine running and with the battery fully charged.

Adjustment of the transistorized voltage regulator must be made with the regulator at normal operating temperature. Remove the regulator cover mounting screws and remove the cover from the regulator. Use a fiber rod as a screwdriver for this adjustment. Turn clockwise to increase the voltage setting; counterclockwise to decrease the voltage setting. Turn off all electrical loads and increase engine speed to 1800-2000 rpm. Voltage adjustment should be made in 0.2 volt increments.

REMOVAL AND INSTALLATION

1. Remove the battery ground cable. **CAUTION: Exercise care at all times; do not permit flames, sparks, or lighted tobacco near battery.**
2. Remove the regulator mounting screws.
3. Disconnect the regulator from the wiring harness.
4. Connect the new regulator to the wiring harness.
5. Mount the regulator.
6. Connect the battery ground cable, and test the system for proper voltage regulation.

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DETROIT IRON

Alternator Electronic Regulator

PART 31-43

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION	43-1	REMOVAL AND INSTALLATION	43-4

CK3544-2A

DESCRIPTION

The electrical charging systems incorporate a new electronic voltage regulator. These regulators are 100% solid state, consisting of transistors, diodes, and resistors. The working functions are achieved using electronic components arranged in basically three(3) circuit divisions as follows:

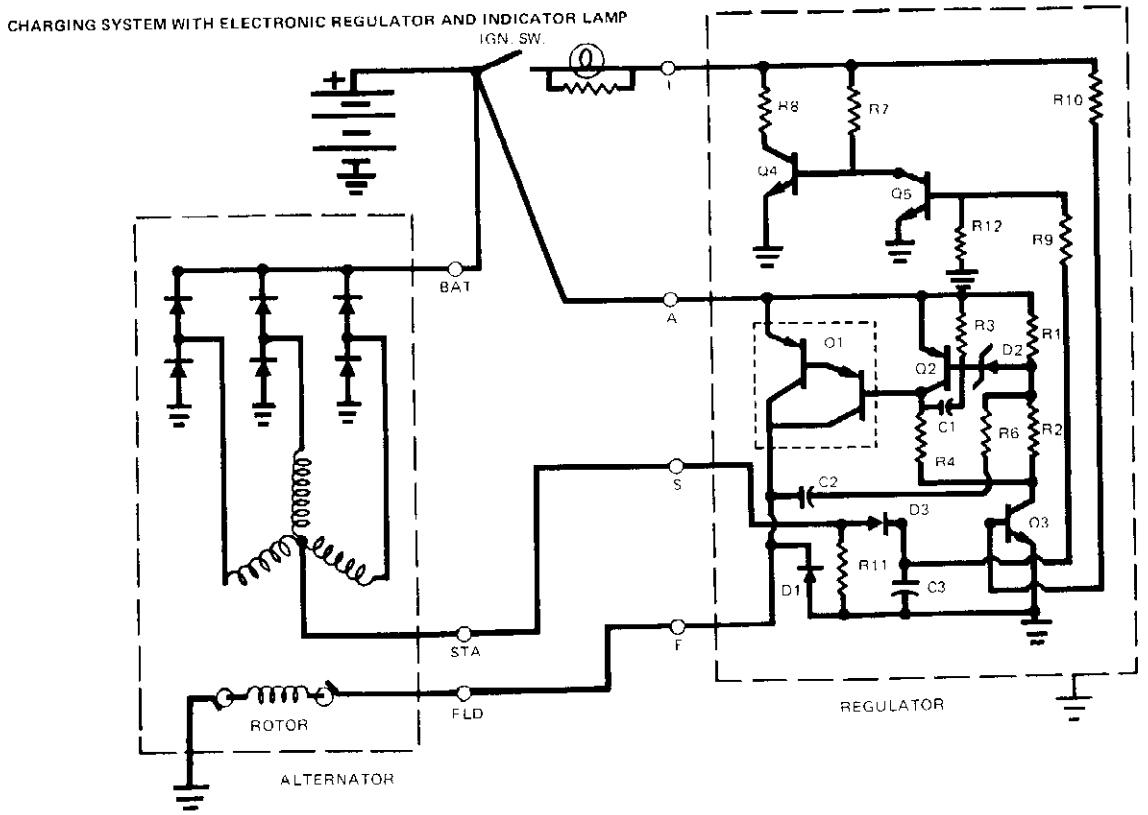
The new regulator will be released under two(2) separate part numbers with color codes. The units will look alike, but are not interchangeable with the new regulator wiring harness connector plugs.

These units will be used on vehicles equipped with an ammeter, for alternator warning-indicator-lamp equipped cars. The regulators are calibrated and preset by the manufacturer. No readjustment is required or possible on these units.

INDICATOR LAMP REGULATORS (Figure 1)

Closing the ignition switch energizes the warning lamp and turns on the regulator output stage. The alternator is now receiving maximum field current and is ready to generate an output voltage. Once the alternator rotor speed increases from zero, its output and stator terminal voltages increase from zero to system regulation level determined by regulator setting.

When the ignition switch is turned off, the solid state relay circuit causes the output stage to be turned off, interrupting all current flow through the regulator so that there is no stand-by current drain on the battery.



K3535-2A

FIG. 1 Charging System with Electronic Regulator and Indicator Lamp Schematic

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AMMETER REGULATORS (Figure 2)

The operating principle for the regulator used in ammeter equipped vehicles is much the same as the indicator lamp type.

REGULATOR APPLICATION — COMPONENTS

The new solid state regulators are being used in conjunction with other new components in the charging system and must be properly matched to prevent damage to the regulator or alternator. New components in the charging system are as follows: (Figures 3 and 4).

1. A new alternator with higher field current requirement.
2. A new warning indicator lamp shunt resistor.
3. The alternator to regulator wiring harness is changed to incorporate a new regulator connector plug. The new plug is designed so that the connector will not index with the regulator terminals when the wrong regulator is inadvertently installed in the vehicle.

APPLICATION

Whenever the system components are being replaced, the following precautions should be followed so that the charging system will work properly and components will not be damaged.

1. Always use the proper alternator in the system being serviced. The new higher field current alternator if used on the 1977 and prior model systems will destroy the electro-mechanical regulator. Also the older model alternators, if used in the new system, will have a slightly reduced output. The older model alternator with the 3.80hm field will be used as replacement for vehicles with electro-mechanical and electronic regulators. Only the older model will be serviced.
2. Never use an electro-mechanical (77 and prior models) regulator in the new charging system. The connector plug on the new system wiring harness will not index properly with the electro-mechanical regulator.
3. The new electronic regulators are color coded for proper installation. Always use the black color coded regulator in systems which use the warning lamp indicator. The blue color coded regulators must be used in ammeter gauge systems.
4. The new charging systems use a 500 Ohm resistor on the back of the instrument cluster on cars with warning indicator lamp. Do not replace this item with the older (77 and prior models) 15 Ohm resistance wire.

VISUAL INSPECTIONS

1. Check battery for proper state of charge (at least 1.200 specific gravity).
2. Check and clean all terminal connections at battery, alternator, and regulator.
3. Check fuse link between starter relay and alternator.
4. Check alternator drive belt for proper tension.

CAUTION:

BE SURE FIELD TERMINAL CONNECTOR (PUSH ON TYPE) IS INSTALLED ON THE "FIELD" TERMI-

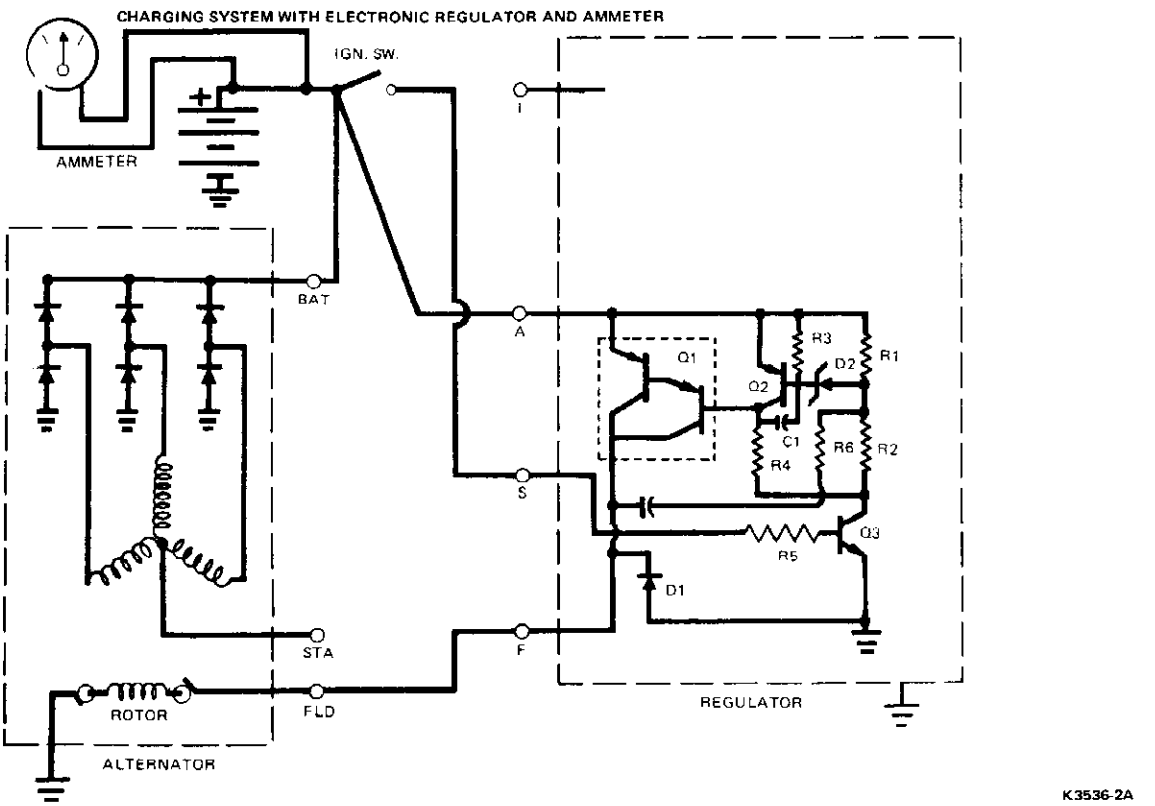


FIG. 2 Charging System with Electronic Regulator and Ammeter Schematic

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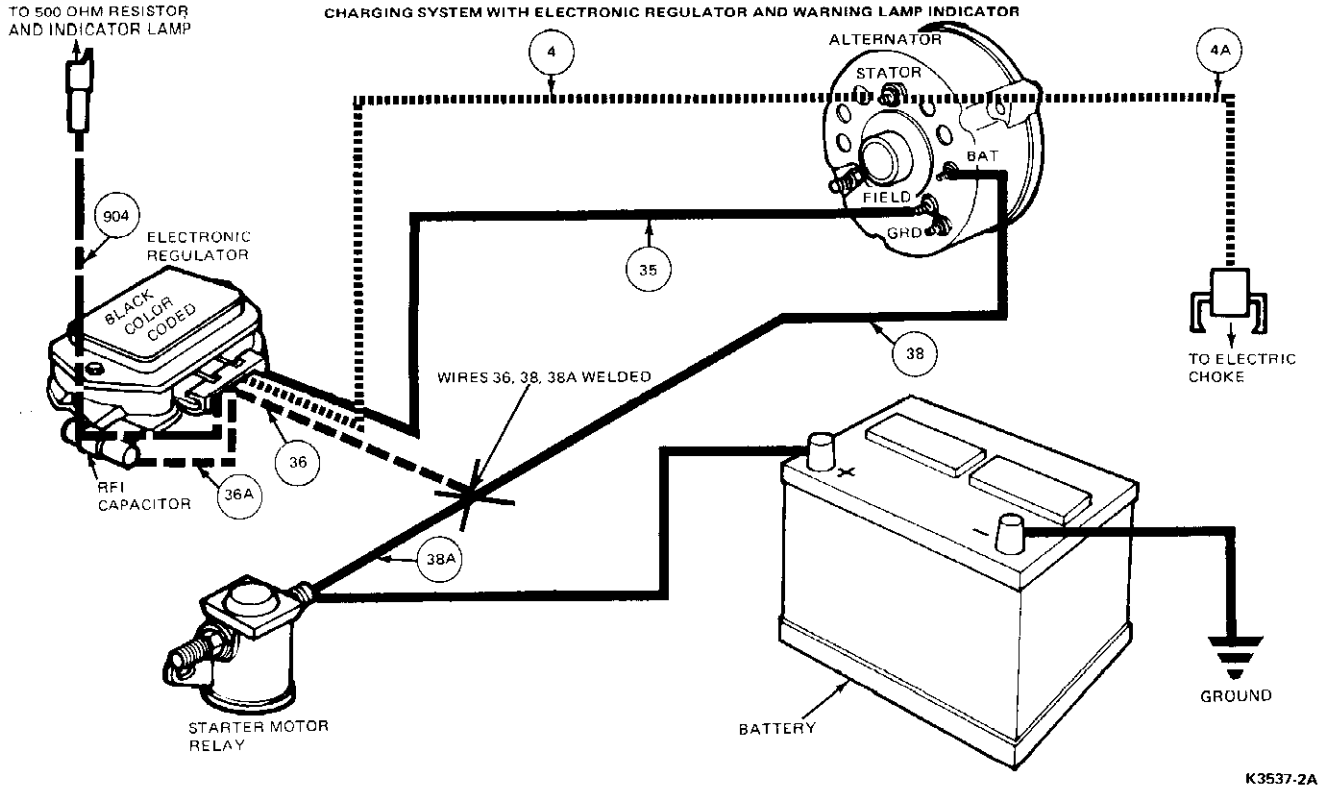


FIG. 3 Charging System with Electronic Regulator and Warning Lamp Indicator

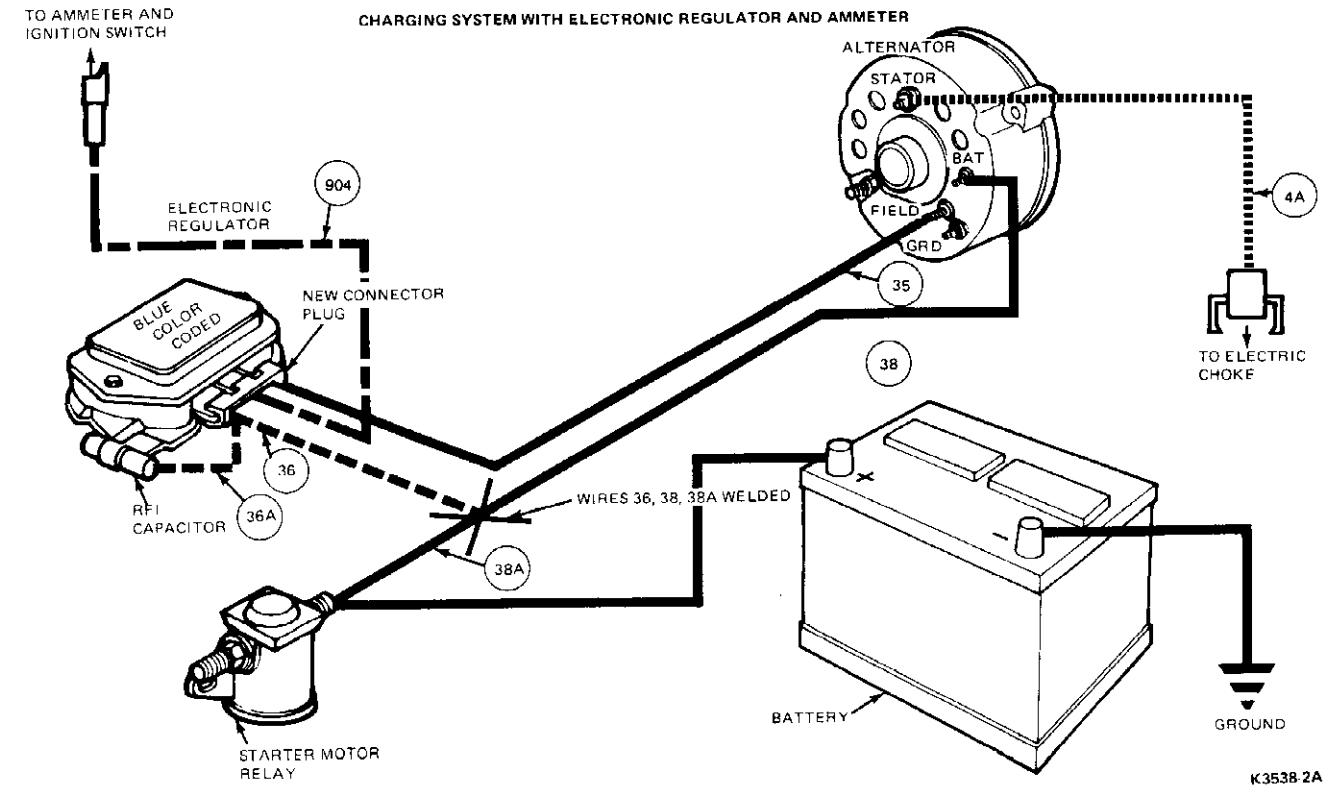


FIG. 4 Charging System with Electronic Regulator and Ammeter

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NAL STUD AT ALTERNATOR AND NOT THE GROUND STUD.

ALWAYS DISCONNECT THE CONNECTOR PLUG FROM THE REGULATOR BEFORE CHECKING ALTERNATOR OUTPUT WITH TEST PROBES OR A JUMPER WIRE.

ALWAYS DISCONNECT THE CONNECTOR PLUG FROM THE REGULATOR BEFORE REMOVING THE REGULATOR MOUNTING SCREWS. REMOVING THE CONNECTOR FROM AN UN-GROUNDED REGULATOR WITH THE IGNITION SWITCH ON WILL DESTROY THE REGULATOR.

BE SURE TO DISCONNECT ELECTRIC CHOKE WIRE FROM STATOR TERMINAL OR ALTERNATOR WHEN TROUBLE-SHOOTING CHARGING SYSTEM. CHECK ELECTRIC CHOKE WIRE FOR A GROUND CONDITION.

NEVER ATTEMPT TO POLARIZE OR TEST THE ALTERNATOR BY GROUNDING THE FIELD CIRCUIT, AS THIS WILL DESTROY THE REGULATOR.

REMOVAL AND INSTALLATION

Remove the battery ground cable. Remove the regulator mounting screws. Disconnect the regulator from the wiring harness (Fig. 1). Connect the new regulator to the wiring harness. Mount the regulator. Connect the battery ground cable, and test the system for proper voltage regulation.

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DETROIT IRON

LIGHTING SYSTEM

GROUP 32

PART TITLE	PART NO.	PART TITLE	PART NO.
AUTOMATIC HEADLAMP DIMMER	32-15	LAMP DELAY SYSTEM (AUTOLAMP)	32-12
HEADLAMP COVERS	32-06	LIGHTING SYSTEM GENERAL SERVICE	32-01
HEADLAMP SYSTEM	32-02	PARKING, REAR AND MARKER LAMPS	32-20
ILLUMINATED ENTRY	32-80	TURN SIGNAL AND HAZARD FLASHER	32-40
INTERIOR LAMPS	32-60		

CK3366-2B

Lighting System General Service

PART 32-01

Applies to All Models

SUBJECT	PAGE	SUBJECT	PAGE
GENERAL INFORMATION	01-1	DIAGNOSIS	01-2

CK3367-2B

GENERAL INFORMATION

Wherever high or low series models are designated, high series indicates the LTD, on Ford Models; and on Mercury models, high series indicates the Marquis, and Brougham. All other Ford and Mercury models are low series.

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DIAGNOSING

ELECTRICAL – LAMPS		
CONDITION	**POSSIBLE CAUSE**	**RESOLUTION**
Head Lamps		
• All exterior lamps do not light	• Loose wiring connections	• Check and secure connections at head lamp switch and dash panel connector
	• Open wiring	• Check power to and from head lamp switch. Check ground. Repair as necessary
	• Damaged head lamp switch	• Replace head lamp switch
• One head lamp does not work	• Loose connection	• Secure connection to head lamp, and ground
	• Damaged sealed beam bulb	• Replace sealed beam
	• Corroded or defective socket	• Replace as required
• Both low beam or all high beam head lamps do not work	• Loose connections	• Check and secure connections at dimmer switch and head lamp switch
	• Damaged dimmer switch	• Check dimmer switch operation. Inspect for corroded connector. Replace if necessary
	• Open wiring	• Repair as necessary
• All head lamps out. Park and tail lamps OK	• Loose connections	• Check and secure connections at dimmer switch and head lamp switch
	• Damaged dimmer switch	• Check dimmer switch operation. Inspect for corroded connector. Replace if necessary
	• Damaged head lamp switch	• Replace if necessary
	• Open wiring or poor ground	• Repair as necessary
Tail Lamps		
• One tail lamp out	• Bulb burnt out	• Replace bulb
	• Open wiring or poor ground	• Repair as necessary
	• Corroded bulb socket	• Repair or replace socket
• All tail lamps and marker lamps out – head lamps OK	• Loose connections	• Secure wiring connections where accessible
	• Open wiring or poor ground	• Check operation of front park and marker lamps, repair as necessary
	• Damaged head lamp switch	• Repair head lamps switch
Back-Up Lamps		
• Back-up lamps – one light does not function	• Bulb burnt out	• Replace bulb
	• Loose connection	• Tighten connectors
	• Open wiring	• Repair as necessary

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DETROIT IRON

ELECTRICAL – LAMPS

CONDITION	POSSIBLE CAUSE	RESOLUTION
Back-up Lamps		
• Back-up lamps – both lamps do not function	• Fuse burnt out	• Check a circuit that shares the same fuse. Replace fuse
	• Back-up lamp switch out of adjustment	• Adjust switch
	• Damaged back-up lamp switch	• Replace switch
	• Loose connections	• Tighten connectors
	• Open wiring or poor ground	• Repair as required
Parking Lamps		
• One parking lamp does not light	• Bulb burnt out	• Replace bulb
	• Open wiring or poor ground	• Check for corroded socket. Repair as required
• Both parking lamps do not light	• Loose connections	• Tighten connections
	• Open wiring or poor ground	• Check for corroded socket. Repair as required
	• Bulbs burnt out	• Replace bulbs
Front Side Marker Lamps		
• Front side marker lamp does not light – park and taillamps OK	• Bulb burnt out	• Replace bulb
	• Open wiring or poor ground	• Check socket for corrosion and good ground. Repair as required
Cornering Lamps		
• Cornering lamps – Mark V, Lincoln. Both lamps will not operate. Turn signals OK	• Switch inoperative	• Replace T/S switch
	• Fuse burnt out	• Replace fuse. If fuse blows again, check for short circuit
	• Loose connections	• Tighten connectors
	• Open wiring or poor ground	• Repair as necessary
• Cornering lamps – Mark V, Lincoln. One lamp will not operate. Turn signals OK	• Bulb burnt out	• Replace bulb
	• Loose connection	• Tighten connectors
	• Open wiring or poor ground	• Repair as necessary
	• Switch inoperative	• Replace T/S switch
• Cornering lamps – Ford, Mercury, Thunderbird, LTD II, Cougar, Versailles, Granada & Monarch. One lamp will not operate. Turn signals OK	• Bulb burnt out	• Replace bulb
	• Loose connections	• Tighten connectors
	• Open wiring or poor ground	• Repair as necessary
	• Inoperative relay and/or poor ground	• Repair bad ground or replace defective relay as required
• Cornering lamps – Ford, Mercury, Thunderbird, LTD II, Cougar, Versailles, Granada & Monarch. Both lamps will not operate. Turn signals OK	• Fuse burnt out	• Replace fuse. If fuse blows again, check for short circuit
	• Loose connections	• Tighten connections
	• Poor relay grounds	• Repair ground
	• Open wiring	• Repair as required

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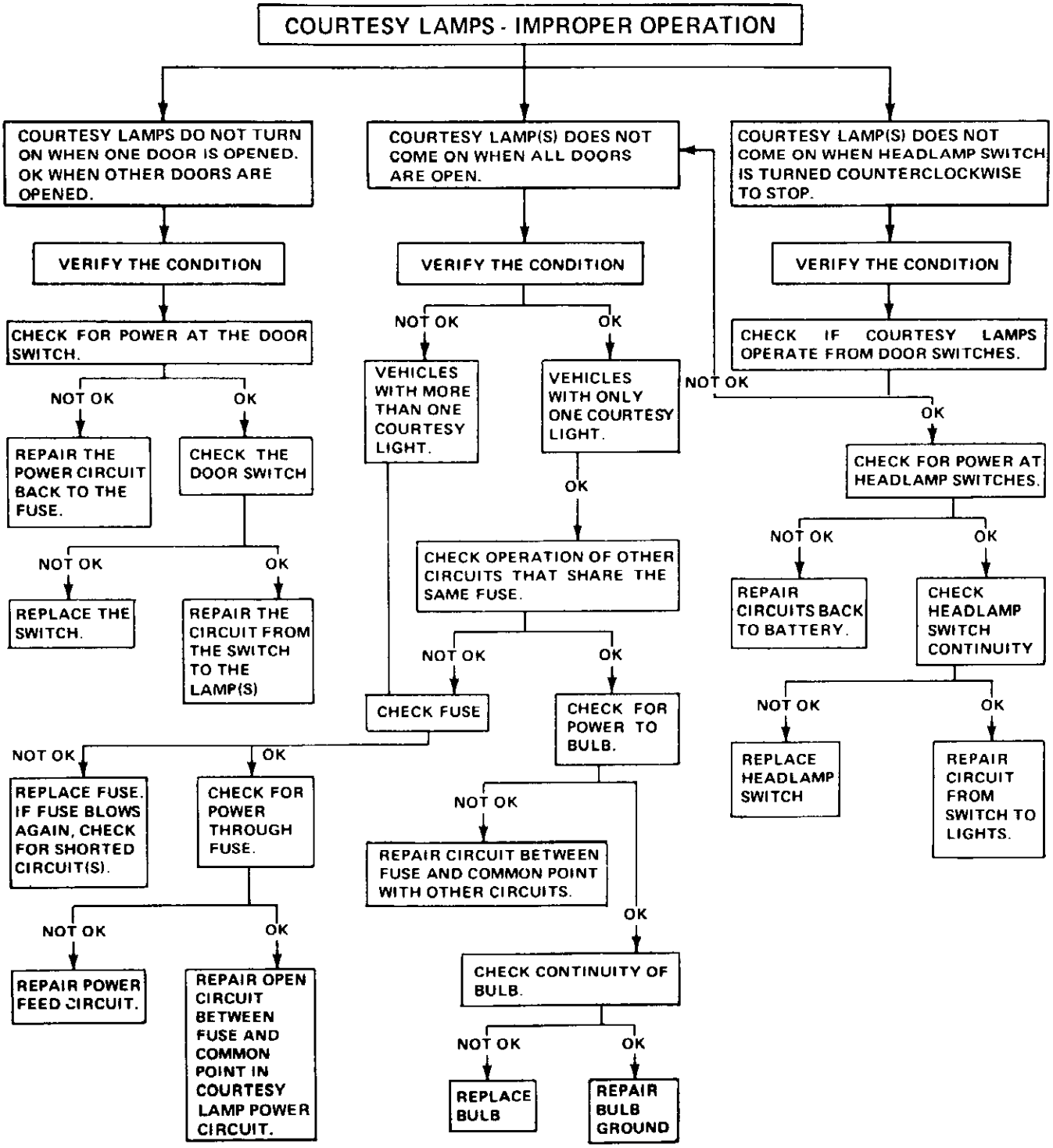
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ELECTRICAL – LAMPS		
CONDITION	**POSSIBLE CAUSE**	**RESOLUTION**
Stop Lamps		
• Stop Lamps do not light	• Fuse burn out or C.B. open	• Replace fuse or C.B. If device blows again check for short circuit.
	• Problem in turn signal circuit or switch	• Repair turn signal circuit or replace turn signal
	• Loose connections	• Secure connections at stop lamp switch
	• Stoplight switch inoperative	• Replace stop lamp switch
	• Open wiring	• Repair as required
Turn Signal Lamps		
• Turn signal lamps – one or more inoperative	• Bulb burnt out	• Replace bulb
	• Loose connections	• Secure connections
	• Open wiring or poor ground	• Repair as required
	• Turn signal switch inoperative	• Replace turn signal switch
• Turn signal lamps – all lamps inoperative	• Fuse burn out or C.B. open	• Replace fuse or C.B. If device blows again check for short circuit.
	• Turn signal flasher	• Substitute a known good flasher
	• Loose connections	• Tighten connections
	• Open wiring or poor grounds	• Repair as required
	• Turn signal switch inoperative	• Replace turn signal switch
Hazard Flasher Lamps		
• Hazard flasher lamps – do not flash	• Turn signal operation improper	• Repair turn signal system
	• Fuse or C.B. burnt out	• Replace fuse. If fuse blows again check for a short circuit
	• Hazard flasher inoperative	• Substitute a known good flasher
	• Open wiring	• Repair as required
	• Hazard flasher switch inoperative	• Repair or replace the turn signal switch assembly which includes the hazard flasher switch

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DETROIT IRON



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Headlamp System

PART 32-02

Applies to All Models

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DESCRIPTION AND OPERATION	
Autolamp	02-2
Automatic Headlamp Dimmer	02-2
Dimmer Switch	02-2
Headlamps	02-1
Headlamps ON Indicator	02-1
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Vacuum Headlamp Covers	02-2
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ADJUSTMENTS	
Headlamp Aim	02-2
REMOVAL AND INSTALLATION	
Headlamp Bulb	02-2
Headlamp Dimmer Switch	02-5
Headlamp ON Indicator	02-5
Headlamp Switch	02-4
Headlamp Switch Knob	02-5

CK3368-2B

DESCRIPTION AND OPERATION

HEADLAMPS

The Fairmont, Pinto, Thunderbird, Bobcat, Granada, Monarch and Mustang use two No. 2 or No. 2B type sealed-beam headlamps. Each lamp has low-beam and high-beam filaments.

On all other car lines, four sealed-beam headlamps are used. The two outboard or upper lamps have two filaments each, one for low-beam and one for high-beam. The numeral 2 or 2A is molded in the glass lens. Locating tabs, molded in the glass, allow the mounting of the No. 2 or 2A lamps in the outboard or upper headlamp support frames only.

The inboard or lower headlamps with a numeral 1 or 1A molded in the glass lens have only one filament. They are used together with the high-beam filaments of the No. 2 or 2A headlamps. Locating tabs molded in the glass allow the mounting of the No. 1 or 1A lamps in the inboard or lower headlamp support frames only.

HEADLAMP SWITCH (FIG. 1)

A combination three-position lighting switch, mounted at the lower left of the instrument panel, controls circuits to the headlamps, parking lamps, marker lamps, taillamps, license plate lamp, courtesy lamp and instrument panel lamps, and ashtray lamps. A circuit breaker in the switch protects the tail-lamp, license plate lamp, parking lamps and marker lamps. A separate circuit breaker protects the headlamps. See Part 34-30 for location of circuit breaker.

On vehicles equipped with headlamp covers, the distribution valve for the vacuum system is an integral part of the lighting switch. It is attached to the back of the switch body (Fig. 2).

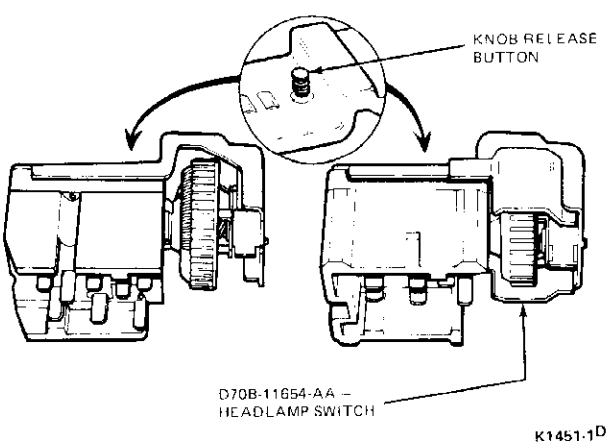


FIG. 1 Headlamp Switch

The instrument panel lamp circuit is routed through a rheostat on the switch, which is controlled by rotating the switch control knob.

A courtesy lamp switch is also a part of the lighting switch. It is actuated by rotating the switch control knob to the maximum counterclockwise position. The courtesy lamps also illuminate by the switch in the pillar when the doors are opened.

LAMPS-ON INDICATOR

Some vehicles are equipped with a Lights-On indicator and/or buzzer system, to tell the driver that he has left the exterior lamps on. It is activated when the driver's door is opened.

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DETROIT IRON

The indicator lamp and/or buzzer is connected between the left-hand front courtesy lamp switch and a relay. The relay completes the indicating circuit and ground when energized by the tail/park lamp feed from the headlamp switch.

AUTOMATIC HEADLAMP DIMMER

The automatic headlamp dimmer is a driver-operated electronic device which automatically switches the car headlamp beams in response to light from an approaching car, or light from the taillamps of a vehicle being overtaken. Refer to Part 32-15 for Service Procedures.

DIMMER SWITCH

Switching of the headlamp beams is accomplished by a floor-mounted dimmer switch.

A high beam indicator lamp, mounted in the cluster, glows when the dimmer switch is in the high beam position.

VACUUM HEADLAMP COVERS

The vacuum headlamp covers are controlled by the headlamp switch, which actuates a distribution valve located on the back of the headlamp switch. The distribution valve applies vacuum to the vacuum motors operating the vacuum covers. Refer to Part 32-06 for service procedures.

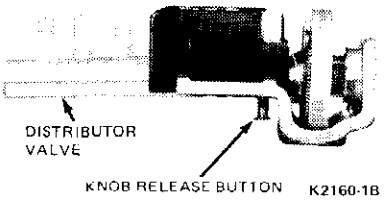


FIG. 2 Headlamp Switch With Distribution Valve

AUTOLAMP

See Part 32-12.

TESTING

Before performing any lighting system tests, be sure the battery is in a fully-charged condition and all battery cable connections are clean and tight.

A visual inspection is an important part of the lighting system test. Check for wires with frayed or damaged insulation, loose connections and proper harness routing.

Any problems found by visual inspection should be corrected before performing further tests of the lighting system.

ADJUSTMENTS

HEADLAMP AIM

Headlamp aim adjustment on all models should be made with Headlamp Aiming Kit—Rotunda No. 04-0164 or equivalent. Use the latest instructions. The adjustment should be done with the headlamp door installed.

All headlamp adjustments should be made with a half-full tank, plus or minus one gallon, the vehicle unloaded and the trunk empty, except for the spare tire and jacking equipment, and recommended pressure in all the tires.

The kit equipment can be calibrated to accommodate a slight slope in the floor, making it usable almost any place in the garage. However, area must be reasonably flat.

REMOVAL AND INSTALLATION

HEADLAMP BULB

ALL VEHICLES (FIGS. 3 AND 4)

1. If the vehicle is equipped with moveable headlamp covers (Thunderbird, Mercury, Continental Mark V, Lincoln Continental and Ford Hi-Series), close the bypass valve to raise the covers for access to the headlamp bulbs. The valve is located in the vacuum lines near the reservoir and left front fender.
2. On vehicles with exposed headlamps, remove the headlamp door mounting screws and remove the headlamp door.
3. Remove the retainer ring screws (4 on rectangular, 3 on round) and remove the retainer ring from the headlamp. Pull the headlamp bulb forward and disconnect the wiring assembly plug.

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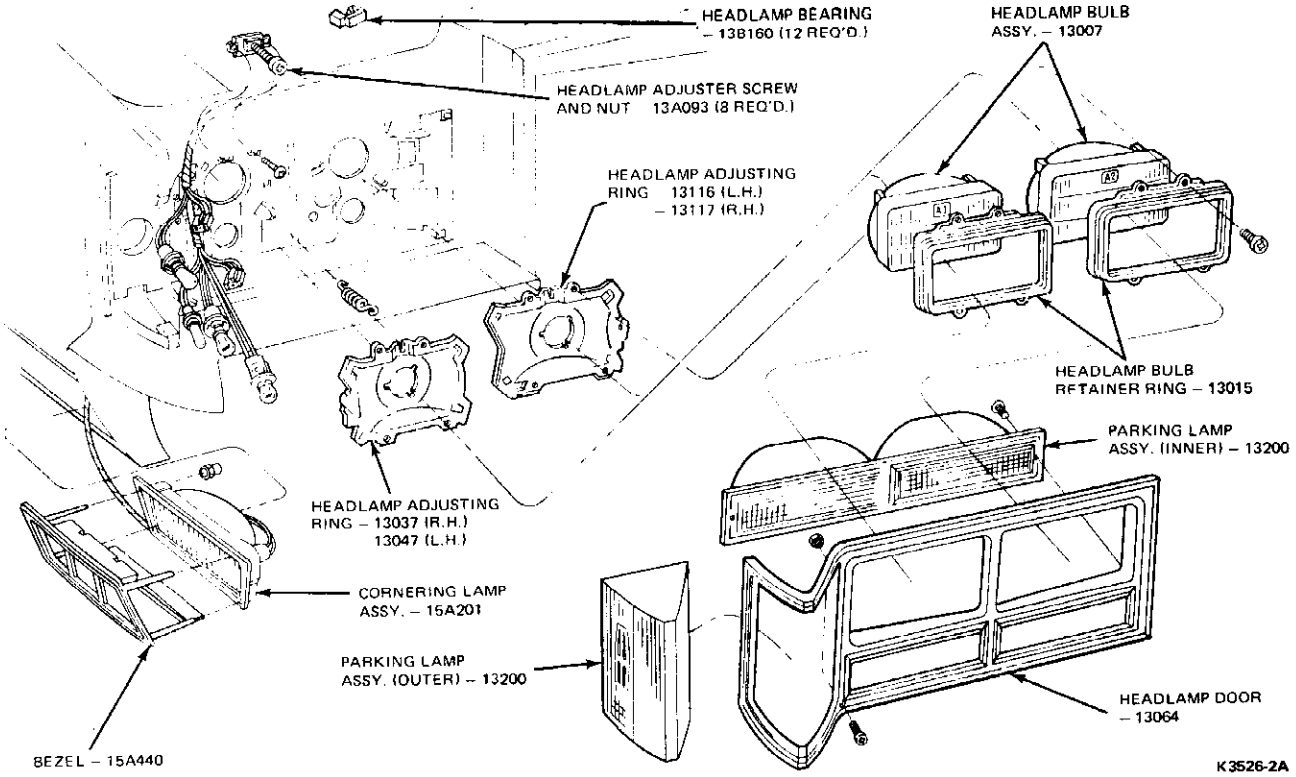


FIG. 3 Headlamp Bulb Removal—Typical Rectangular Headlamps

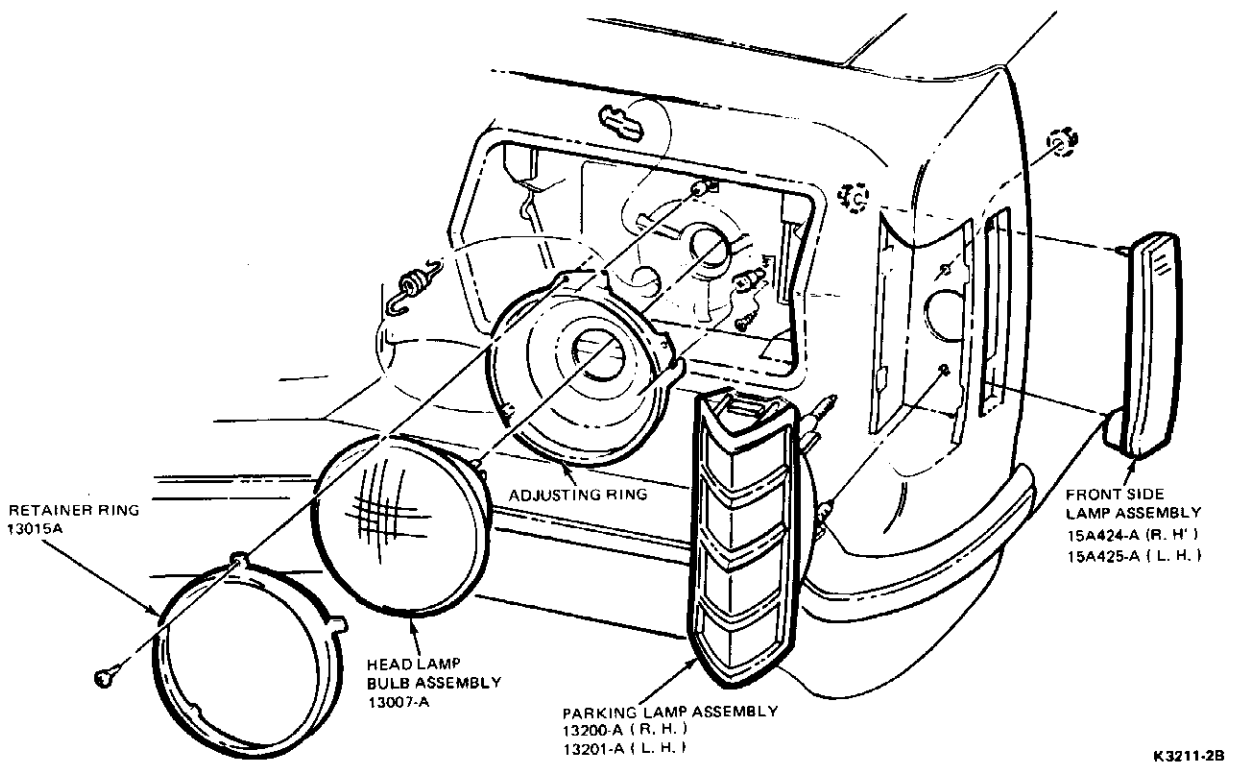


Fig. 4 Headlamp Bulb Removal – Typical Round Headlamp

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4. Connect the wiring assembly plug to the new headlamp bulb and place the bulb in position, locating the bulb glass tabs in the positioning slots.
5. Attach the bulb retainer ring to the assembly with the retainer ring screws.
6. If so equipped, place the headlamp door in position and install the mounting screws. If equipped with headlamp covers, open the by-pass valve to lower the covers.
7. Check the headlamp bulb aim and adjust, as necessary.

HEADLAMP SWITCH

FORD AND MERCURY

Removal

1. Disconnect the ground cable from the battery.
2. Remove the knob from the wiper-washer switch.
3. Remove headlamp knob switch as described below in Headlamp Switch Knob.
4. Remove the bezel nut from the light switch, and remove the finish panel lower attaching screw. Then, pull out on the bottom of the finish panel and pull out to remove.
5. Remove three screws attaching the switch mounting plate to the instrument panel. Disconnect the wire connector from the switch, and disconnect the illumination light from the harness. Disconnect the vacuum hoses from the switch, if equipped with headlamp covers.
6. Remove the switch from the mounting plate.

Installation

1. Install the switch on the mounting plate.
2. Connect the wire harness to the switch and illumination light. Connect the vacuum hoses to the switch (if so equipped), and install the switch and mounting plate on the instrument panel.
3. Install the finish panel and headlamp switch bezel nut.
4. Install the headlamp switch knob and shaft, by inserting it into the switch and pushing it all-the-way in, until a distinct click is heard.
5. Install the knob on the wiper-washer switch.
6. Connect the ground cable to the battery and check the operation of the headlamp switch.

Mustang II

Removal

1. Disconnect the battery ground cable.
2. Pull headlamp switch knob to ON position BEFORE depressing release button. Through the hole in the underside of the instrument panel, press the release button with a screwdriver, and remove the knob and shaft assembly.
3. Remove the bezel nut, lower the switch and disconnect the multiple connector.
4. Remove the switch.

Installation

1. Install the multiple connector, position the switch to the cluster, and install the bezel nut.
2. Install the knob and shaft assembly.
3. Connect the battery ground cable.

LTD II, COUGAR, FAIRMONT, ZEPHYR AND LINCOLN CONTINENTAL (LINCOLN CONTINENTAL EQUIPPED WITH POTENTIOMETER REFER TO 32-12)

Removal

1. Disconnect the battery ground cable.
2. Pull the control knob to the full ON position. Remove LTD II headlamp switch knob as described under Headlamp Switch Knob. For other models, reach up from underneath the instrument panel, and press the release button on the switch housing. With the release button pressed in, pull the knob out of the switch. To gain access to the release button on Fairmont and Zephyr vehicles equipped with air conditioning, disconnect the A/C left duct from the duct-to-register connector, loosen the two nuts that retain the left register to the utility shelf, and then remove the connector from the register.
3. Unscrew the bezel nut with Tool T65L-700-A or equivalent to detach the switch assembly from the instrument panel, and lower the switch assembly.
4. Disconnect the multiple connector and remove the switch.

Installation

1. Connect the multiple plug to the headlamp switch. If equipped with headlamp doors, install the color-coded vacuum hoses to the distribution valve fittings, identified by corresponding colors. Make sure that all connections are tight.
2. Position the switch to the instrument panel and install the bezel nut with Tool T65L-700-A or equivalent.
3. Install the knob and shaft assembly by inserting and slightly rotating it all the way into the switch, until a distinct click is heard.
4. Connect the battery ground cable and check the operation of the switch.

PINTO AND BOBCAT

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster, as outlined in Part 33-50. Then pull the headlamp switch knob to ON and depress release button.
3. Remove the headlamp switch knob and shaft assembly and retaining nut.
4. Disconnect the multiple connector plug from the switch and remove the switch from the cluster opening.

Installation

1. Connect the multiple connector plug to the switch.
2. Position the switch assembly to the instrument panel and install the retaining nut and knob and shaft assembly.
3. Install the instrument cluster assembly.
4. Connect the battery ground cable.

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THUNDERBIRD AND CONTINENTAL MARK V

Remove the cluster trim panel, as outlined in Group 33. Remove the switch mounting plate. Remove the bezel nut and disconnect the multiple connector. Then, remove the vacuum lines (if so equipped) and remove the switch.

HEADLAMPS-ON INDICATOR

1. It is available on all cars except Fairmont and Zephyr.
2. It utilizes the key warning buzzer and requires a relay.
3. In addition to the buzzer, the lamps -on indicator utilizes an instrument panel lamp on Mustang and Lincoln Continental. On console-equipped *Granada, Monarch and Versailles, the lamp is* on the console.
4. Relay locations are: above glove box in Pinto and Bobcat; on the right-hand side instrument panel under the glove box on Mustang; under the instrument panel to the right of the steering column on Granada, Monarch and Versailles; under the instrument panel centerline on Ford and Mercury; under the instrument panel inboard of the glove box on Lincoln Continental and Continental Mark V; and under the instrument panel left of the glove box on LTD II, Cougar and Thunderbird.

DIMMER SWITCH

To remove the headlamp dimmer switch, pull the floor carpet back from the area of the switch and remove the mounting screws (Fig. 5). In some vehicles, it may be necessary to loosen the scuff plate and remove the left cowl panel, in order to free the carpet. *Disconnect the three-wire connector (or the multiple* connector and single wire connector, if equipped with automatic headlamp dimmer) from the switch. To install the switch, connect the wire connector(s) to the switch terminals and install the switch to the floor. Replace the floor carpet, scuff plate, and trim panel, as required.

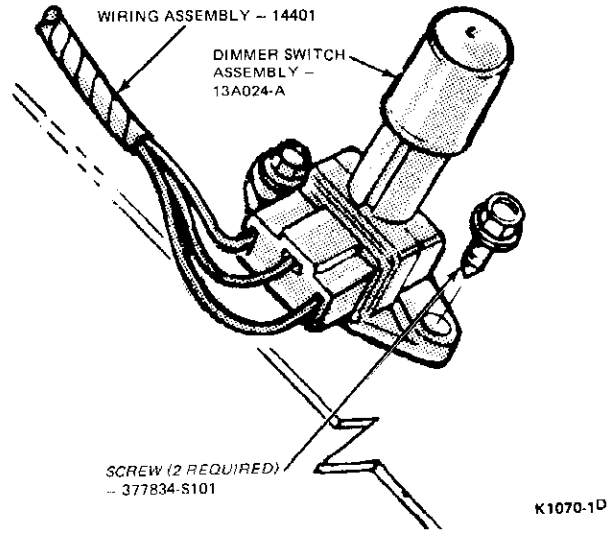


FIG. 5 Headlamp Dimmer Switch

HEADLAMP SWITCH KNOB

FORD, MERCURY, MONARCH, GRANADA, VERSAILLES AND LTD II

On these models, the headlamp switch knob is retained on the switch shaft by a spring retainer. To remove the knob prior to switch removal, proceed as follows:

1. Bend a discarded bowden cable into the shape shown in Fig. 6.

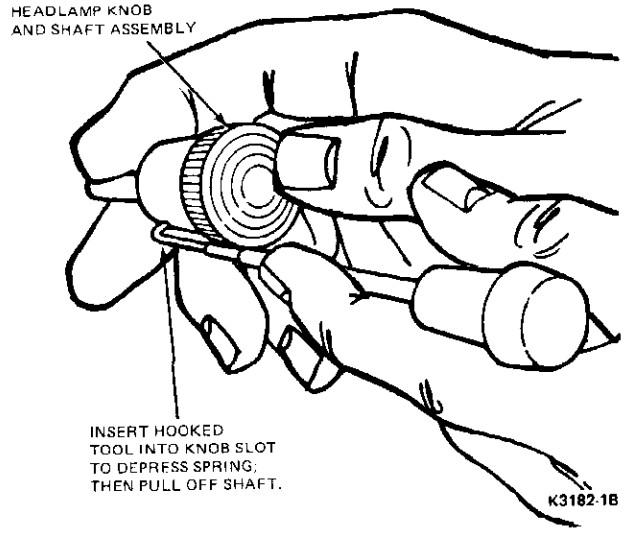


FIG. 6 Removing Headlamp Knob—Ford, Mercury, Monarch, Granada, Versailles and LTD II

2. Insert the hooked tool in the knob slot to depress the spring; then pull the knob from the shaft.
3. To install the knob, align triangular hole in knob and shaft, and simply press knob onto shaft until knob bottoms out.

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DETROIT IRON

Headlamp Covers

PART 32-06

Applies To Mercury, Ford LTD Landau, Lincoln Continental, Continental Mark V and Thunderbird

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Headlamp Covers Autolamp	06-1
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Covers Will Not Open	06-6
Leak Test	06-6
Vacuum Test Probe	06-6
REMOVAL AND INSTALLATION	
Vacuum Motor	06-7
Vacuum Reservoir	06-7

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DESCRIPTION AND OPERATION

NOTE: For all other information not covered in this Part, refer to the Wiring and Vacuum Diagram Book.

HEADLAMP COVERS (STANDARD)

The headlamp covers are opened and closed by two vacuum motors on Mercury, Ford LTD Landau, Thunderbird and Lincoln Continental and Continental Mark V. Refer to Figs. 1, 2, 3 and 4 for location of the headlamp cover operating components and installation. Note the vacuum hose routing, connections and color codes.

The headlamp switch, when pulled full out actuates a distribution valve, located on the back of the headlamp switch. The distribution valve applies vacuum to the vacuum motor operating the headlamp covers. The distribution valve also provides a vacuum relief (exhaust) port to that side of the vacuum motor diaphragm to which vacuum is not applied.

When the headlamp switch is pushed in to turn the headlamps off, the vacuum supply and relief positions of the distribution valve are reversed. This subjects the opposite side of the vacuum motor diaphragm to engine vacuum, and also vents the vacuum at the opposing side of the diaphragm to atmospheric pressure. The vacuum motor closes the headlamp covers.

A reserve vacuum reservoir provides vacuum storage, which permits limited cycling of the headlamp covers without the car engine running.

A check valve is used in the vacuum source line, to prevent vacuum from leaking from the reservoir back through the engine.

Springs are used on all models to automatically open the covers, in the event the system should lose vacuum. On Ford LTD Landau, Mercury, Thunderbird, Continental Mark V and Lincoln Continental models, the spring is built into each motor. Vacuum applied to the vacuum motor diaphragm during closing overcomes this spring tension.

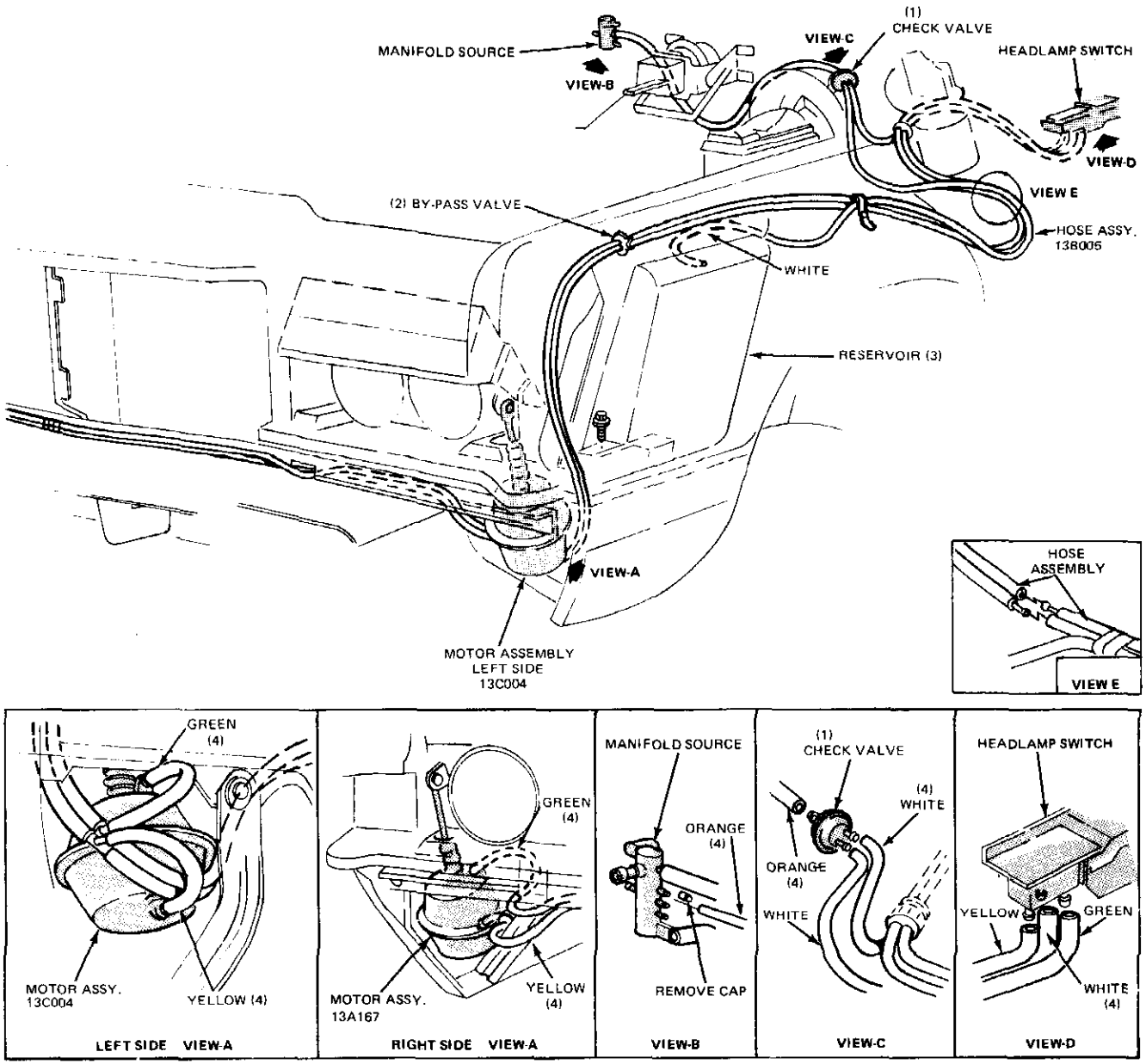
If the headlamp covers will not open automatically, a by-pass valve is provided, to vent the system and allow the covers to open. The valve is located in the vacuum lines near the reservoir and the left-hand front fender.

If the engine is shut down for a minimum of 18 hours, a normal system leak would allow the covers to open under the spring force.

HEADLAMP COVERS (AUTOLAMP)

See Part 32-12.

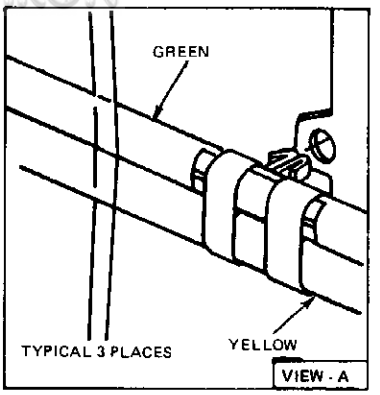
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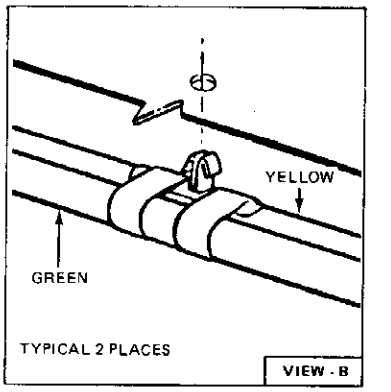


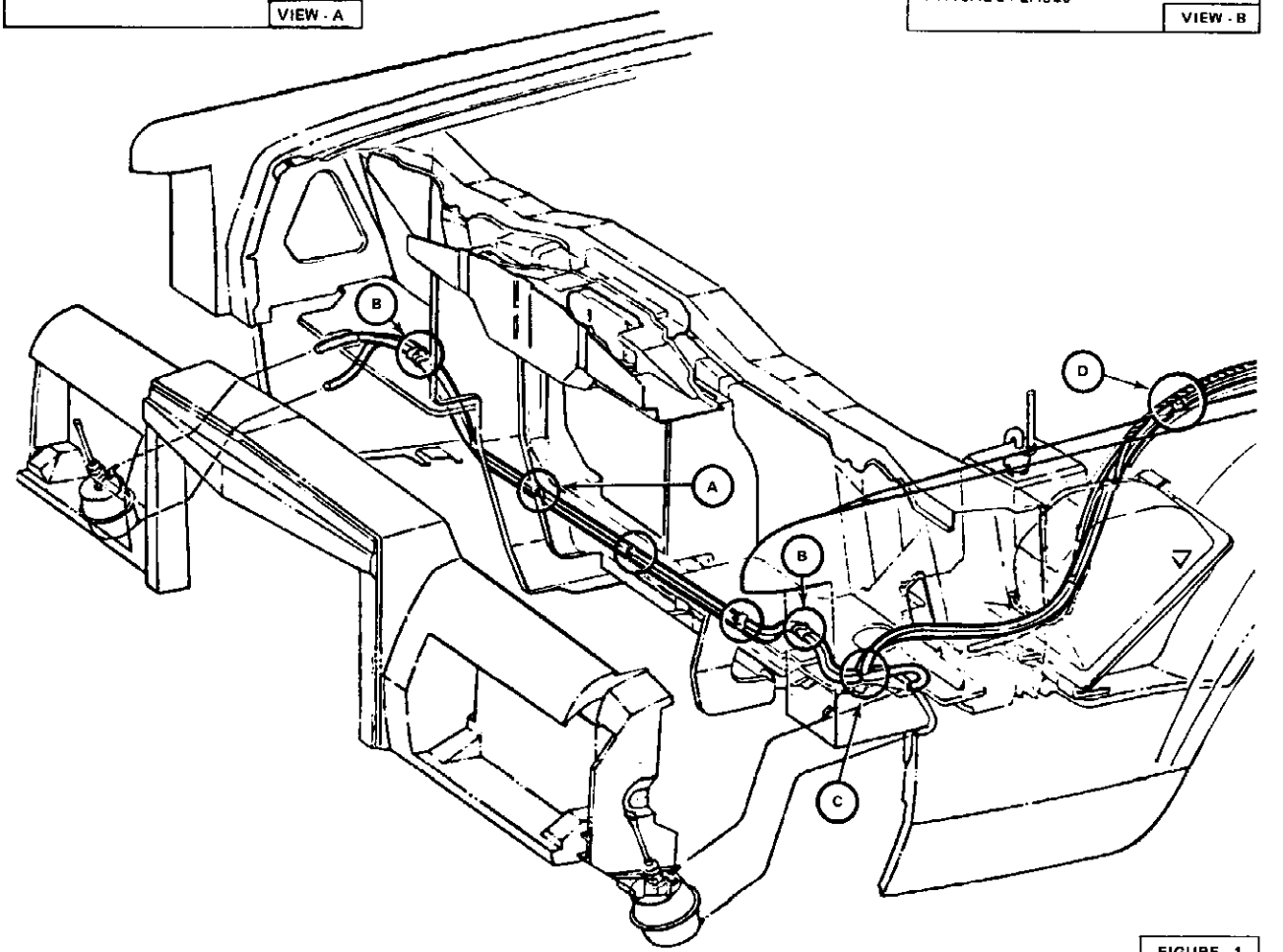
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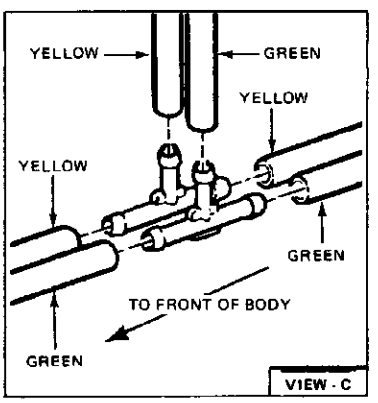
FIG. 1 Headlamp Covers and Vacuum System—Mercury and Ford High Series

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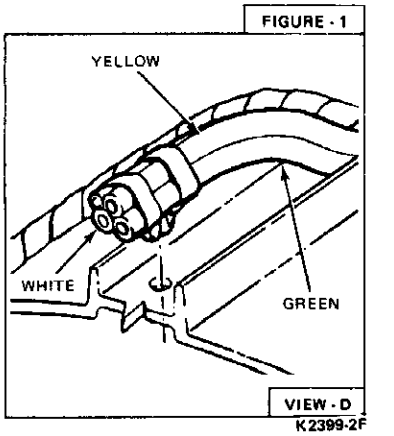


FIGURE - 1

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FIG. 2 Headlamp Covers and Vacuum System—Continental Mark V

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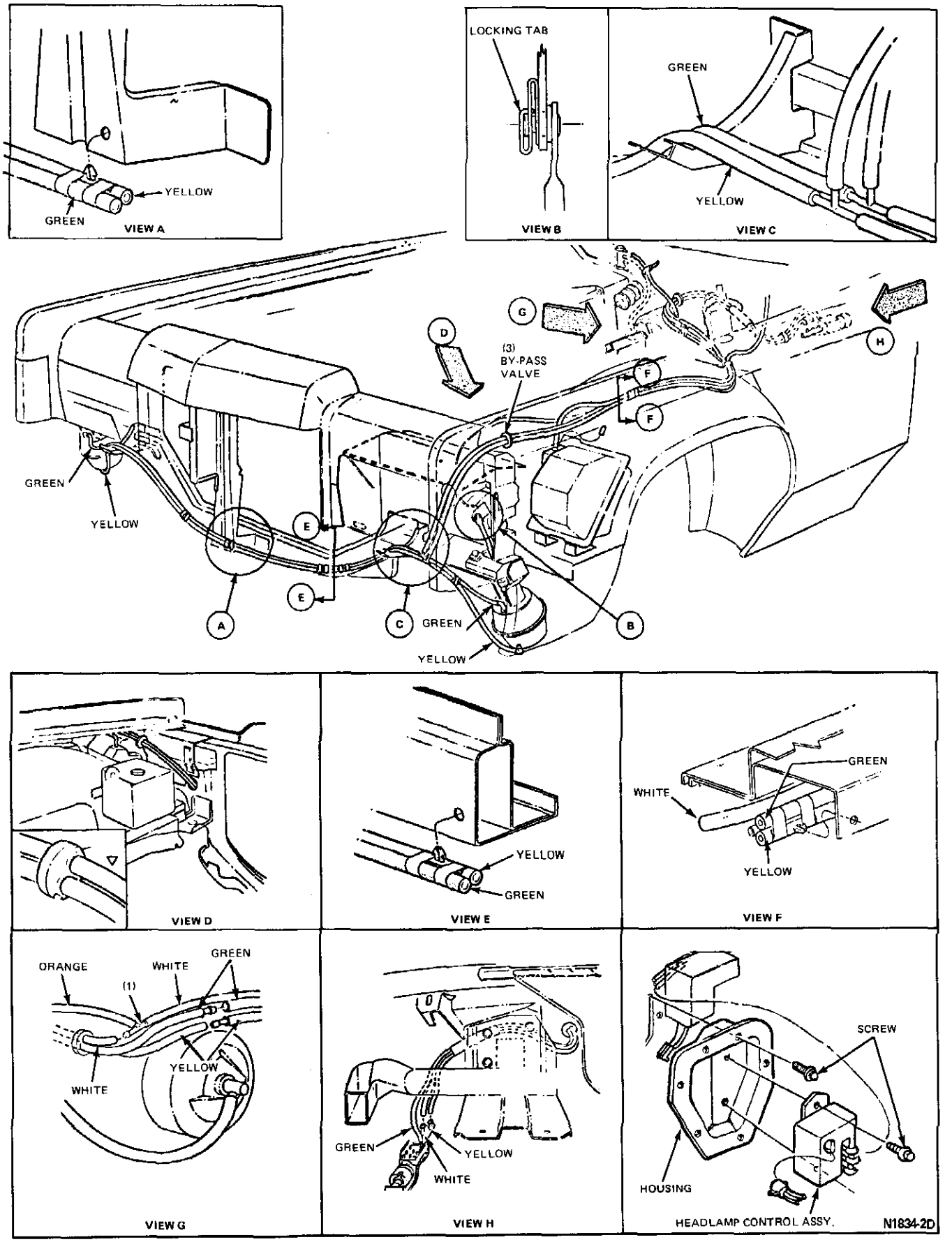


FIG. 3 Headlamp Covers and Vacuum System—Lincoln Continental

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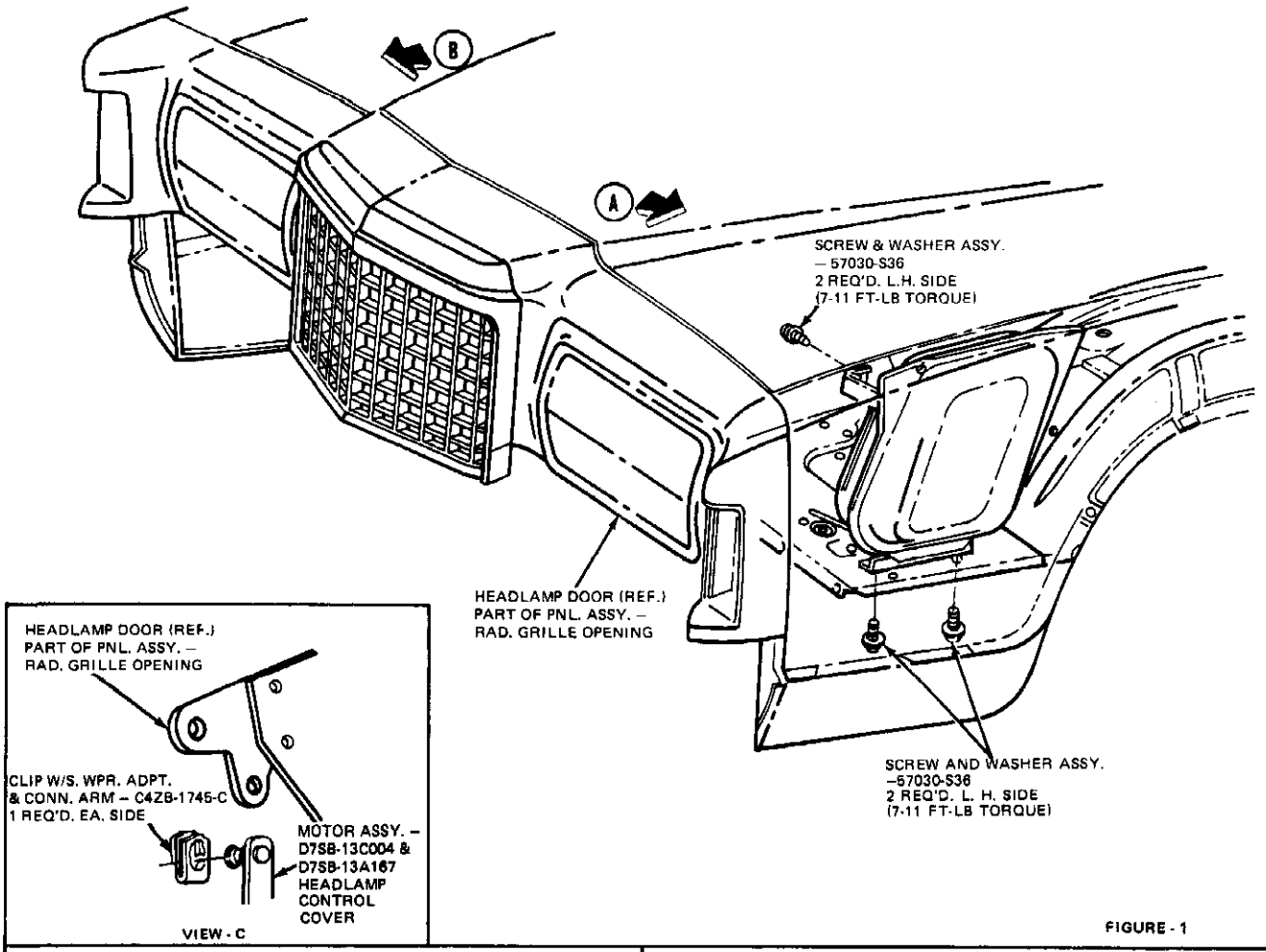
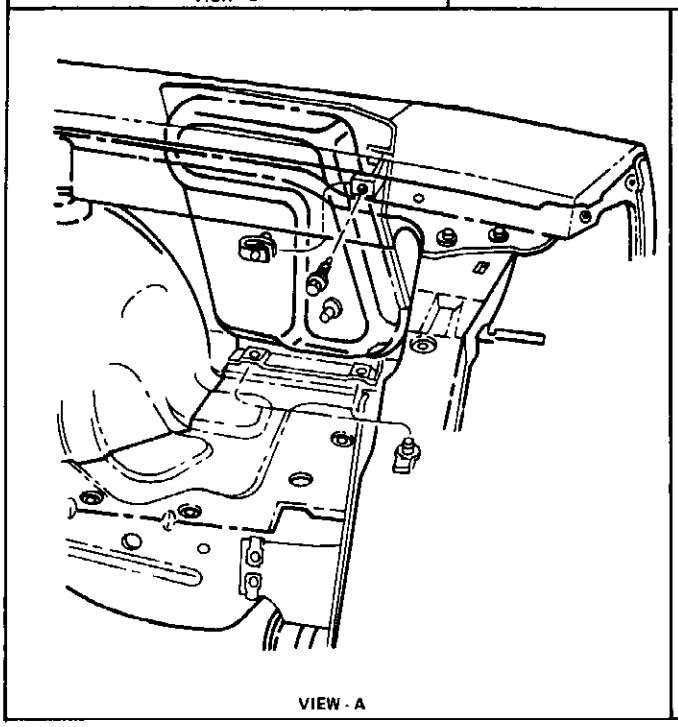


FIGURE - 1



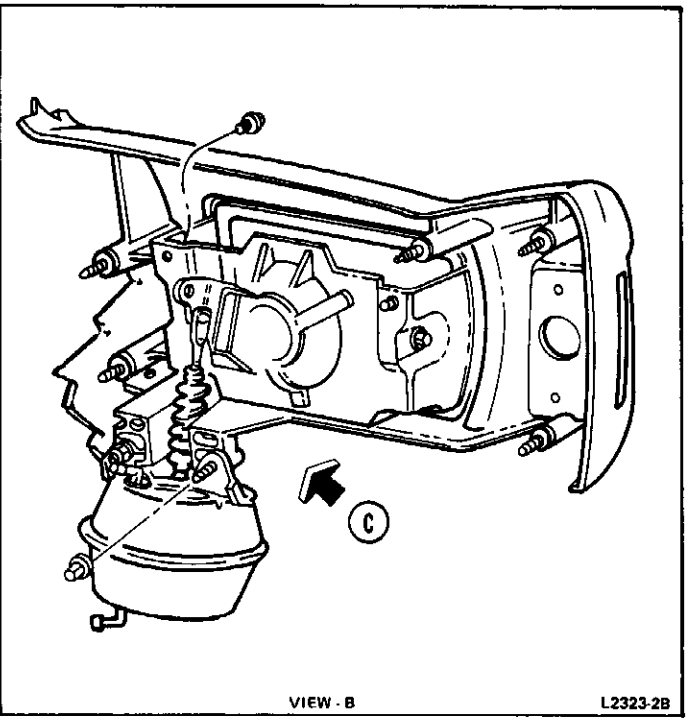


FIG. 4 Headlamp Covers and Vacuum System—Thunderbird

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TESTING

HEADLAMP COVER VACUUM SYSTEM LEAK TEST

A leak test on any part or component of the headlamp cover vacuum system, can be accomplished with the use of the vacuum test probe. (Refer to Vacuum Test Probe for fabrication.) To perform the leak test, plug the probe into the system at the desired point. The reading on the gauge should momentarily fall below the preset value of 14 inches of vacuum. If there are no leaks in that part of the system being checked, the gauge reading should come back to 14 inches of vacuum and hold steady. If a leak is present in the system, the gauge reading will not come up to 14 inches of vacuum.

The leak test for the headlamp switch can be accomplished by attaching the vacuum test probe to the center (white) port of the headlamp switch and capping the two outside ports. Move the switch selector thru the OFF-PART-ON position, and observe the reading on the vacuum probe gauge. The gauge should read 14 inches of vacuum in all of the positions. If the reading should fall off at any of the positions, the headlamp switch should be replaced.

VACUUM TEST PROBE

A vacuum gauge is required to diagnose and test a vacuum control system. The Vacuum Test Tool T77L-9510-A or equivalent) is recommended. It is also recommended that the vacuum gauge be used, as a part of a vacuum probe test. Ordinarily, a vacuum gauge is used alone to measure the vacuum from a vacuum system hose or nipple, reservoir, or the engine intake manifold. A vacuum probe tester, on the other hand, is used to supply a definite amount of vacuum to a particular point in the system. It tests the system from this point to a component.

A vacuum probe tester is not commercially supplied, but it is easily made.

1. Cut or splice a length of 3/16-inch hose, long enough to reach from the engine intake manifold to the most remote component in the vacuum system. Call the ends of the hose the manifold end and the working end.
2. Insert a 4-way connector into the working end of the hose.
3. Attach a vacuum gauge to one of the 4-way connector nipples (Fig. 4).
4. Install a short length of 3/16"hose with an adjustable hose restrictor on another nipple of the 4-way connector.
5. Install a short length of hose on the last nipple of the 4-way connector. Insert a tee connector into this hose.
6. Install a short length of hose to the two open ends of the tee connector (Fig. 4). Install a 3/16"-1/8" reducer in one hose, and a 3/16" splice connector in the other hose. By adding or removing connectors (splices) to these test probe hoses, they can be connected to any 3/16"-1/8" hose nipple, or connector, while the other test hose is plugged, or both the 3/16" and 1/8" tester probes (see Fig. 5) can be used at the same time.

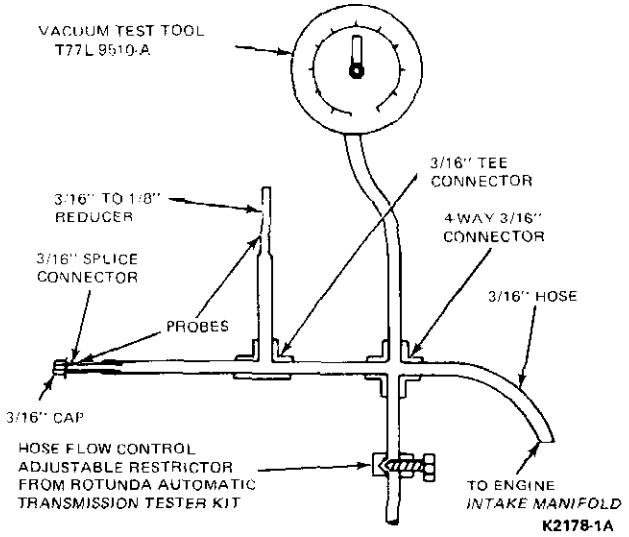


FIG. 5 Vacuum Test Probe

To adjust the probe to the required 14 inches of test vacuum, plug the test probe hoses into the vacuum source at the carburetor, and adjust the hose restrictor, until the vacuum gauge reads 14 inches. The vacuum supply at the end of the test probe hoses should be checked often, as the engine warms up, loads up, etc.

HEADLAMP COVERS WILL NOT OPEN

STANDARD SYSTEM

1. Turn on the headlamp switch.
2. Turn the by-pass valve to the vent position. If the headlamp covers have opened, check the hoses and connectors between the by-pass valve and the headlamp switch for kinks and obstructions (Fig. 5).
3. If kinks or obstructions are encountered, repair or replace as necessary.
4. If no kinks or obstructions were encountered, replace the headlamp switch.
5. If, after activating the headlamp switch and turning the by-pass valve to the vent position, the headlamp covers remained in the closed position, check the mechanisms for binds.
6. If a binding condition exists, replace or repair the faulty part.
7. If no binding condition is encountered, check the hoses and connectors between the by-pass valve and the vacuum motor(s) for kinks and obstructions.
8. If kinks or obstructions are present, repair or replace as necessary.
9. If no kinks or obstructions are found, replace the by-pass valve.

HEADLAMP COVERS WILL NOT CLOSE

STANDARD SYSTEM

1. Check the by-pass valve by turning it to the normal position, and placing the headlamp switch in the OFF position.

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2. Check for leaks and kinks or obstructions through the check valve from the intake manifold.
3. If any irregularities are found, repair or replace the hose between the intake manifold and the check valve.
4. If no irregularities are encountered, disconnect the reservoir hose at the check valve. Check the hose and reservoir for leaks.
5. If leaks are found, replace or repair as necessary.
6. If no leaks were found, check the valve port that connects to headlamp switch for vacuum and leaks.
7. If a leak is found, replace the check valve.
8. If no leak is found at the check valve port, check the valve port that connects to the headlamp switch for vacuum and for leaks.
9. If a leak is found, replace the check valve.
10. If no leak was indicated check the headlamp switch, hoses, connectors and motors in the open circuit (green hose) for kinks or obstructions.
11. If kinks or obstructions are found, replace or repair as necessary.
12. If no kinks or obstructions are found, check for leaks or obstructions at the headlamp switch, hoses, connectors and motors in the close circuit (yellow hose).
13. If leaks or obstructions are found, repair or replace as necessary.
14. If no leaks, kinks or obstructions were found, check the headlamp cover mechanism for binds, and replace or repair as necessary.

REMOVAL AND INSTALLATION

VACUUM MOTOR

Mercury, Ford LTD Landau, Thunderbird, Continental Mark V and Lincoln Continental

1. Disconnect the two vacuum hoses from the cover motor.
2. Disconnect the motor control rod from the headlamp cover.
3. Remove two nuts retaining the motor to the motor support, and remove the motor through the opening at the bottom of the vehicle.
4. Position the motor to the support bracket and install the two retaining nuts.
5. Connect the motor control rod to the headlamp cover, and connect the vacuum hoses to the motor. Be sure to connect the green stripe hose to the top of the motor, and the yellow to the bottom of the motor. Then, check the operation of the system.

VACUUM RESERVOIR

1. Raise the left front of the vehicle and remove the left front tire and wheel assembly.
2. From under the fender, remove the nuts and washers retaining the headlamp cover vacuum reservoir to the front fender apron and wheel housing.
3. Disconnect the vacuum hose from the reservoir and remove the reservoir.
4. Connect the vacuum hose to the vacuum reservoir.

   Place the reservoir in position, fitting the retaining studs into the holes in the front fender apron and wheel housing. From under the fender, install the nuts and washers to the studs.
5. Install the left front tire and wheel assembly and lower the vehicle. Check the operation of the headlamp covers.

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Headlamp Delay System -- Autolamp

PART 32-12

SUBJECT	PAGE
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CK3370-2B

DESCRIPTION AND OPERATION

The Autolamp system provides light sensitive automatic on-off control of the exterior lamps normally controlled by the regular headlamp switch. This system also provides for increased visibility for occupants when leaving the vehicle. The Autolamp system keeps the lamps on for a preselected period of time after the ignition is turned off. The preselected time lapse can be adjusted by the operator up to 4-1/2 minutes.

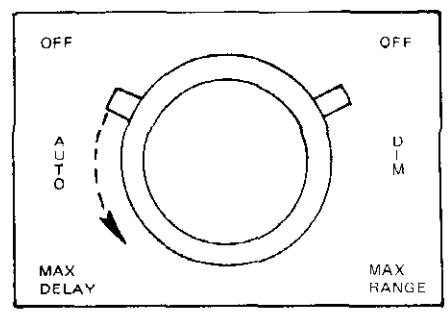
The system consists of a light sensitive photocell assembly, a transistorized amplifier, and a time-delay control which includes an on-off switch. Connections to the vehicle lights parallel the regular headlamp switch connections requiring the headlamp switch to be in the off position for the automatic control feature (Fig. 1).

In normal operation the system will turn the exterior lamps "on" when the natural outside light available to the photocell decreases below a predetermined level, such as at sunset. Also the lamps will automatically turn "off" when the level of outside light exceeds a predetermined level during daylight hours. On a car equipped with headlamp covers, the system will synchronize and control their "open" and "close" operation with that of the vehicle headlamps.

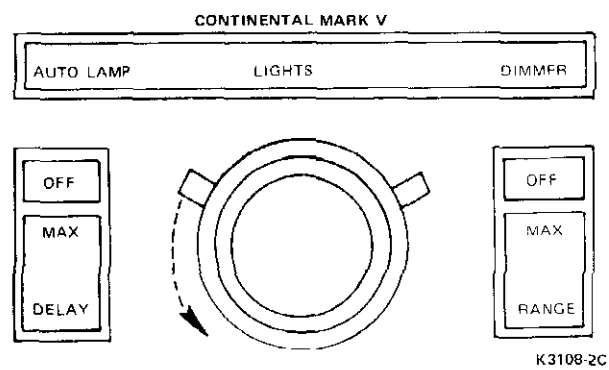
The system photocell is mounted under a group of perforated holes in the upper instrument finish panel, left of the steering column. The photocell must always be exposed to outside light to function properly. Photocell and amplifier are a matched set.

Do not place any items in the left hand corner of the windshield which may block light to the photocell.

The Lincoln Continental and Continental Mark V Autolamp Control Switch and driver's delay adjustment is located to the rear of the main headlamp switch control knob. The Autolamp system is functional for automatic operation when the "On-Off" control is moved from the "Off" position. The closer the flap control is moved toward the max-delay, the longer the lamps will stay on after the ignition is turned off (Fig. 1).



LINCOLN CONTINENTAL



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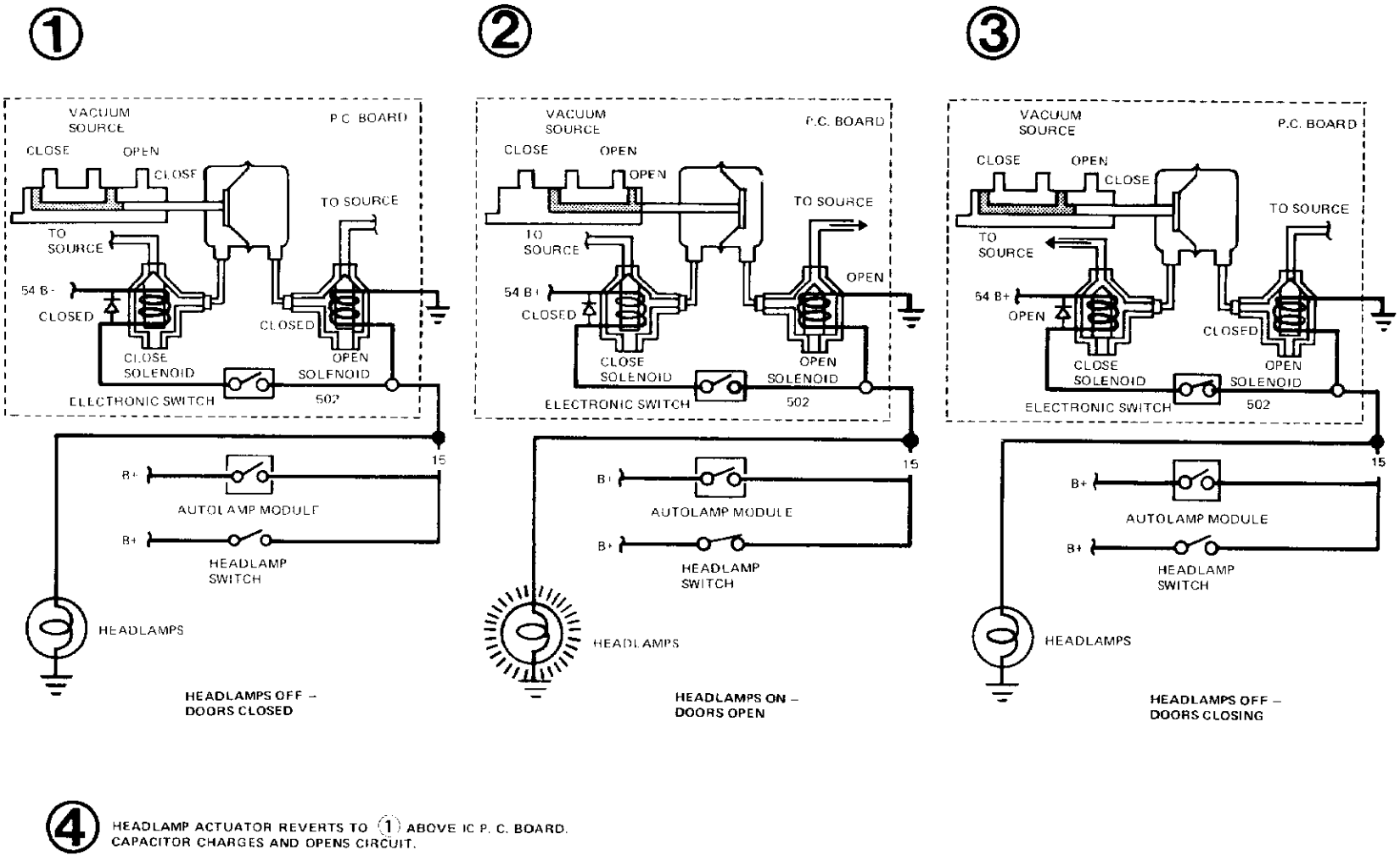
FIG. 1 Autolamp System Driver Control

If the driver desires to override the autolamp, he may do so by pulling out the regular headlamp switch. Automatic operation will not be possible until the regular headlamp switch is pushed in.

HEADLAMP COVER SOLENOID VACUUM SWITCH IN AUTOLAMP SYSTEM

When the headlamps (wire 15 in Fig. 2) are turned ON, either by manual headlamp switch or by the

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FIG. 2 Headlamp Cover Solenoid Vacuum Switch Operation in Autolamp System

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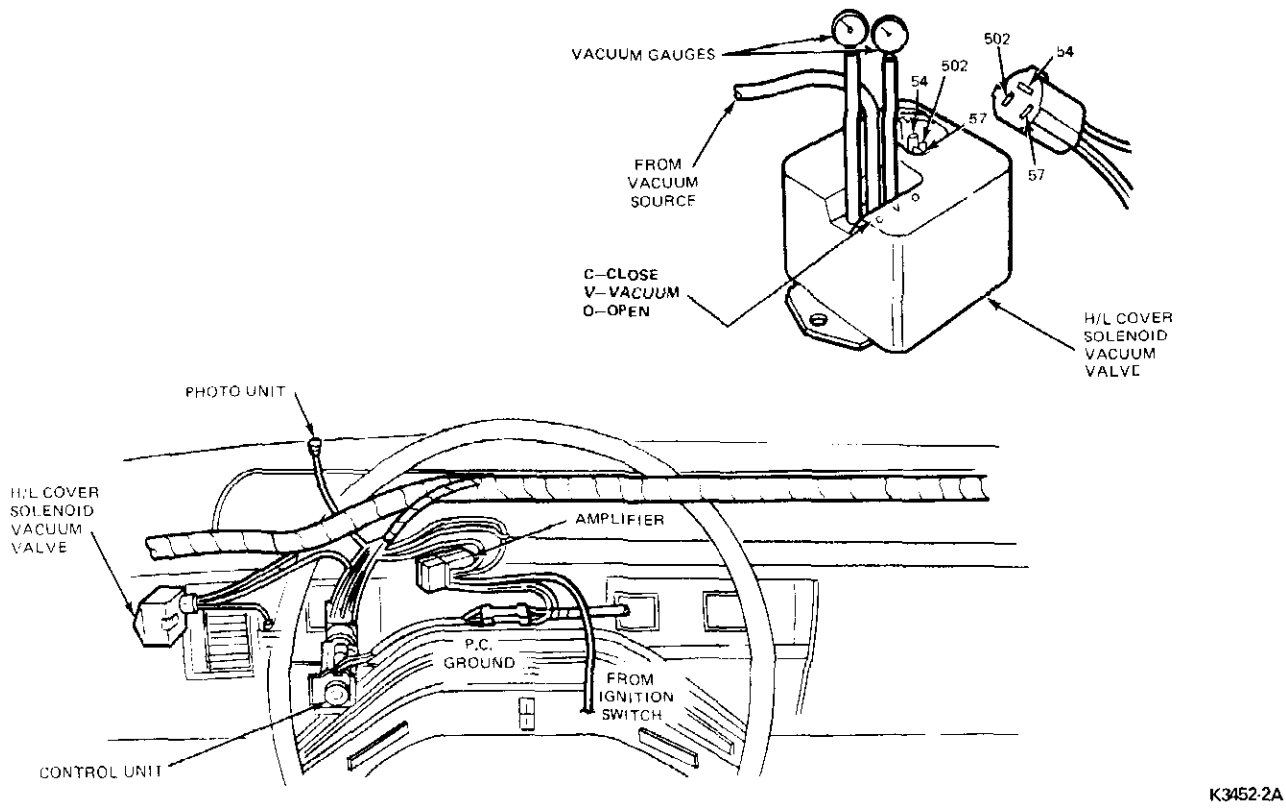


FIG. 3 Headlamp Cover Solenoid Vacuum Valve in System

Autolamp amplifier, power is supplied through wire 502 to the headlight cover solenoid vacuum valve (Fig. 3).

This actuates one of two solenoids in the valve to connect vacuum to the OPEN side of the headlamp cover vacuum motor. This OPEN solenoid remains actuated as long as wires 15/502 are "hot".

The other (CLOSE) solenoid in the vacuum valve is connected between leads 502 and 54 (which are energized all the time) through an electronic switch. As long as both circuits are at the same voltage, no current can flow through this solenoid.

When circuits 15/502 are turned OFF by the Autolamp amplifier or by the manual headlamp switch, however, several things happen:

1. The OPEN solenoid is de-activated and vents the OPEN side of the headlamp cover vacuum motor.
2. The drop in voltage in lead 502 causes the electronic switch to close and connect the CLOSE solenoid to circuit 502 (which is now at zero voltage).
3. Current flows from wire 54 through the CLOSE solenoid, through the electronic switch, through wires 502 and 15, and through the headlamps to ground. This actuates the CLOSE solenoid to connect vacuum to the CLOSE side of the headlamp cover vacuum motor.
4. The drop in voltage at wire 502 also actuates a time delay capacitator in the electronic switch. When the capacitator becomes fully charged (the delay is long enough for the headlamp doors to operate), the electronic switch opens to cut off the current flow through the CLOSE solenoid.

DIAGNOSIS

SYSTEM CHECK—HEADLAMP COVER SOLENOID VACUUM VALVE

At harness connector:

1. Verify power available at Socket 54.
2. Verify power available at Socket 502.
   a. Headlamps ON—power.
   b. Headlamps OFF—no power.
   c. Check power both from manual headlamp switch and from amplifier.
3. Check for zero resistance—Socket 57 to ground.

At valve connector:

(Before removing vacuum solenoid for testing, make sure that headlamps are turned OFF with vacuum present, to ensure that vacuum solenoid is in the CLOSE mode.)

1. With no power applied:
   a. There should be continuity between blades 502 and 57.

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b. There should be **no** continuity between blade 54 and any other blade. (Ground blade 502 to blade 54 to discharge capacitator before checking.)

2. Attach vacuum gauges to nipple C and O. Apply 15 inch vacuum to nipple V.
   a. Vacuum should show at nipple C; no vacuum at O.
   b. Trap vacuum at nipple V.
   c. Vacuum at nipple C should hold for 1 minute.
   d. Nipple O should be open to atmosphere.
3. Attach vacuum gauges to nipples O and C. Apply 15 inch vacuum to nipple V. Apply 12 volts to blades 502 and 54. Jumper blade 57 to ground.
   a. Vacuum should show at nipple O. No vacuum at C.
   b. Trap vacuum at nipple V.
   c. Vacuum at nipple O should hold for 1 minute.
   d. Nipple C should be open to atmosphere.
4. Attach vacuum gauge to nipples C and O. Apply 15 inch vacuum to nipple V. Disconnect 12 volts from 502 and immediately connect 12 volts test light between blade and ground.
   a. Vacuum should show at nipple C—no vacuum at O.
   b. Light should glow for 30-60 seconds, then go out.
   c. Trap vacuum at nipple V—vacuum at nipple C should hold for 1 minute.
   d. Nipple O should be open to atmosphere.
   e. After 60 seconds, continuity should check same as in 1.

DIAGNOSIS TIPS—QUICK CHECKS

1. Make sure lens of photo unit is clean and not obstructed.
2. Make sure there is a clean, tight ground connection for circuit 57 from the potentiometer control unit at the headlamp switch.
3. Make sure that headlamps operate normally from the **manual** headlamp switch.
4. Make sure that fuse supplying circuit 504 is O.K.
5. Remember that it is **normal** to have a slight delay between turning the switch ON or OFF (or covering or uncovering the photo unit lens) and the response of the headlamps.

ADJUSTMENTS

Two different amplifiers may be found in 1978. Both amplifiers utilize a label attached to the case which provides instructions for making adjustments as shown in Fig. 10. If it is necessary to have the headlamps turned on earlier than that which is afforded by the original setting, the adjustment screw is turned clockwise in the direction of the arrow shown as EARLY. For later turn-on of the headlamps, the adjusting screw is turned in the counterclockwise direction of the arrow shown as LATE.

REMOVAL AND INSTALLATION

SENSOR AMPLIFIER

NOTE: If the amplifier is replaced, the photocell must also be replaced; the amplifier and photocell are a matched set.

1. Unscrew the 2 screws holding the sensor amplifier bracket to the lower instrument panel support bracket.
2. Remove the connector from the sensor amplifier.
3. Remove the bracket from the amplifier by removing the 2 screws holding the bracket to the sensor amplifier.
4. Place the bracket in position on the replacement amplifier after removing the photocell and carefully setting it aside for later installation as described below under photocell.
5. Tighten the 2 screws into the amplifier.
6. Plug the connector into the amplifier.
7. Place the amplifier and bracket in position on the lower instrument panel support bracket and fasten with the 2 screws.

For headlamp switch removal and installation refer to Part 32-02.

HEADLAMP SWITCH AND/OR POTENTIOMETER

An additional feature of the Autolamp System is the removable potentiometer from the headlamp switch. Either the headlamp switch or the potentiometer can be replaced separately. The headlamp switch assembly must be removed from the vehicle in order to separate the potentiometer from the headlamp switch.

Removal

1. Disconnect the ground cable from the battery.
2. Remove the headlamp switch knob and shaft (Fig. 4).
3. Pull the two autolamp control bezels with pliers. Do not damage the bezel(s).
4. Remove the threaded headlamp switch bezel from the front of the headlamp switch. On Lincoln Continental, remove the single screw in the rear corner of the bracket. On Continental Mark V, remove the cluster opening finish panel. Refer to Part 33-50.
5. Remove the four screws from the bracket on the front of the headlamp switch (Continental Mark V).

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6. Disconnect all wires and remove the headlamp switch.
7. Remove the bracket from the headlamp switch (Continental Mark V only).
8. Remove the nut and washer from the potentiometer or headlamp switch (Fig. 4). NOTE: When assembling, notice that the top straight edge of the potentiometer is located under the two 90 degree tabs on the headlamp switch bracket (Fig. 5).

Installation

1. Assemble the headlamp switch to the potentiometer, and/or the potentiometer to the headlamp switch.
2. *Then, secure* with nut and washer (Fig. 6).
3. Position the bracket to the headlamp switch (Continental Mark V).

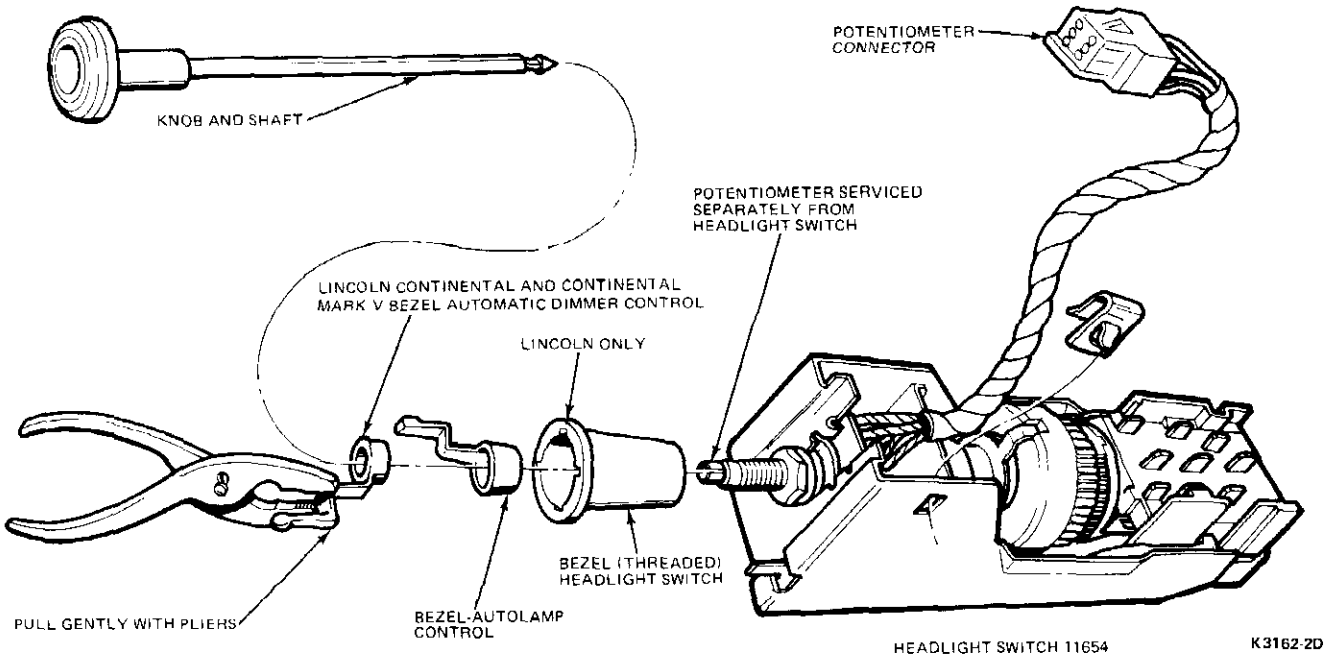


FIG. 4 Autolamp Headlamp Switch

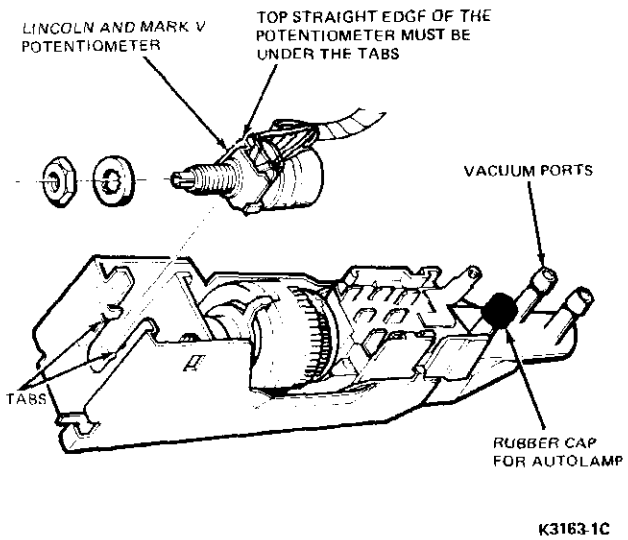


FIG. 5 Headlamp Switch—Lincoln Continental, Continental Mark V

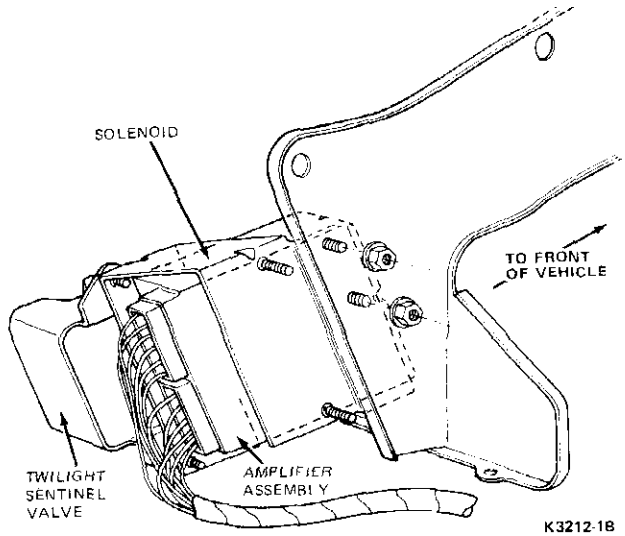


FIG. 6 Installation of Solenoid Valve—Continental Mark V, Lincoln Continental Similar

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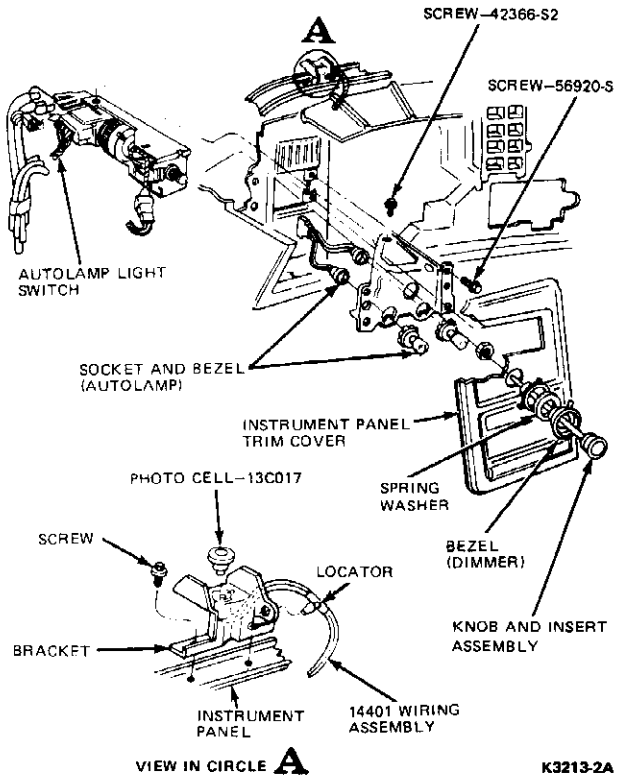


FIG. 7 Autolamp Switch—Continental Mark V Shown, Lincoln Continental Similar

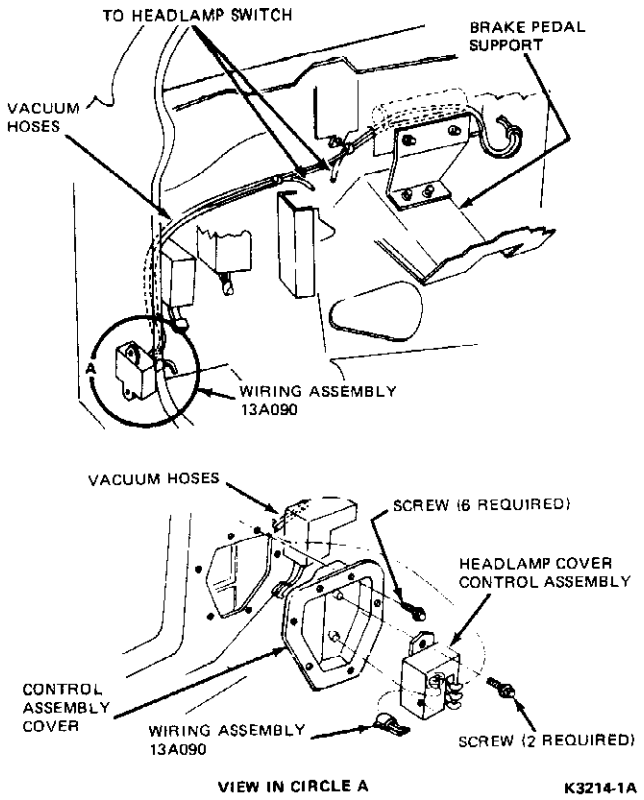


FIG. 8 Autolamp Headlamp Dimmer and Autolamp System—Lincoln Continental Shown, Continental Mark V Similar

4. Connect the headlamp switch wiring and install the headlamp switch.
5. Install the threaded headlamp switch bezel on the front of the headlamp switch. Be sure to install the single screw on the rear corner of the bracket (Lincoln Continental only). Install the cluster opening finish panel (Continental Mark V).
6. Install the autolamp control bezel (two on Lincoln Continental and Continental Mark V).
7. Install the headlamp switch knob and shaft.
8. *Connect the ground cable to the battery.*

PHOTOCELL

1. Remove the crash pad and upper finish panel as outlined in Group 45.
2. Remove photocell from socket locations as shown in Figs. 3 and 7.
3. Carefully install new photocell from replacement amplifier. NOTE: It is important that the installed photocell is the one which came with the replacement amplifier as they were calibrated together as a matched set. The system will not perform properly unless this is done.
4. Replace crash pad and upper finish panel. Refer to *Group 45.*

SYMPTOMS OF OPERATIONAL CONDITIONS:	TO RESOLVE OPERATOR ERROR
The autolamp system will not operate. The autolamp system will not delay long enough after the vehicle has been shut down.	Problems resulting from Operator Error are caused by failure to follow operating procedure or sequence requirements that have been designed into the AUTOLAMP (ON/OFF DELAY SYSTEM).
SYMPTOMS AND QUICK CHECKS OF THE ELECTRICAL SYSTEM: • Headlamps do not turn on when it gets dark outside. • Headlamps turn on too late at evening. • Headlamps turn on too early at evening. • Headlamps turn off too late in the morning. • Headlamps turn off too early in the morning.	**"QUICK CHECK"** Place autolamp control in the "off" position. Turn on headlamps using standard headlamp switch control. If headlamps do not operate, check out and correct the standard headlamp circuit. If headlamp operation is OK using the standard headlamp switch, check the Autolamp fuse. If the fuse is OK proceed with a complete check-out procedure. Refer to Autolamp amplifier adjustment.

CK3278-2B

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COMPLETE CHECKOUT PROCEDURE (FIGS. 6-9)

1. Remove sensor amplifier bracket from the lower instrument panel support bracket and separate the wiring connector from the sensor amplifier.
2. Before proceeding with the Circuit Checkout Procedure on the following pages, check all terminal pins in the amplifier wiring connector to make sure they are properly installed and in position.

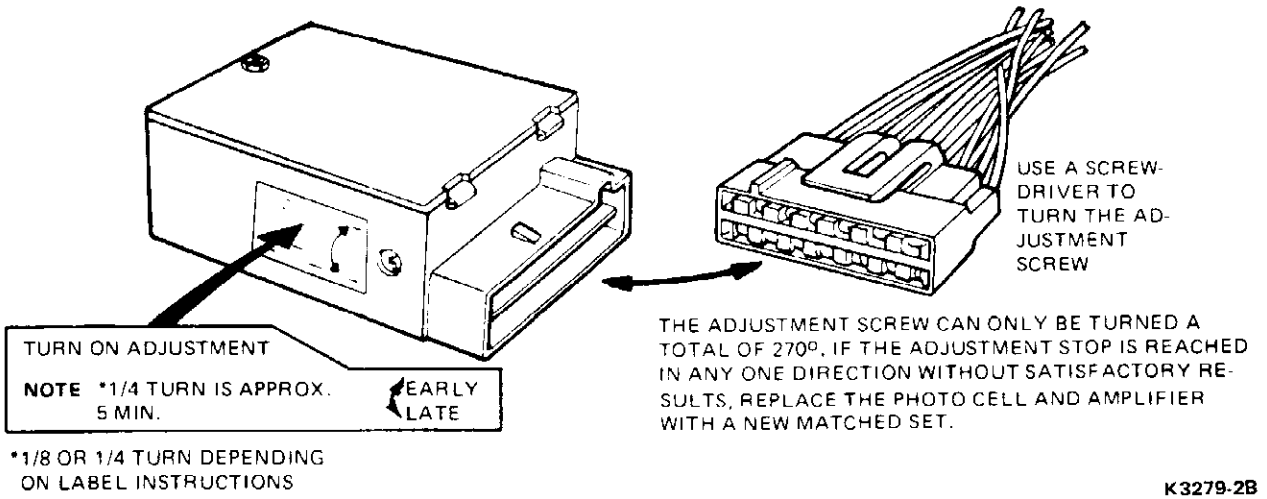
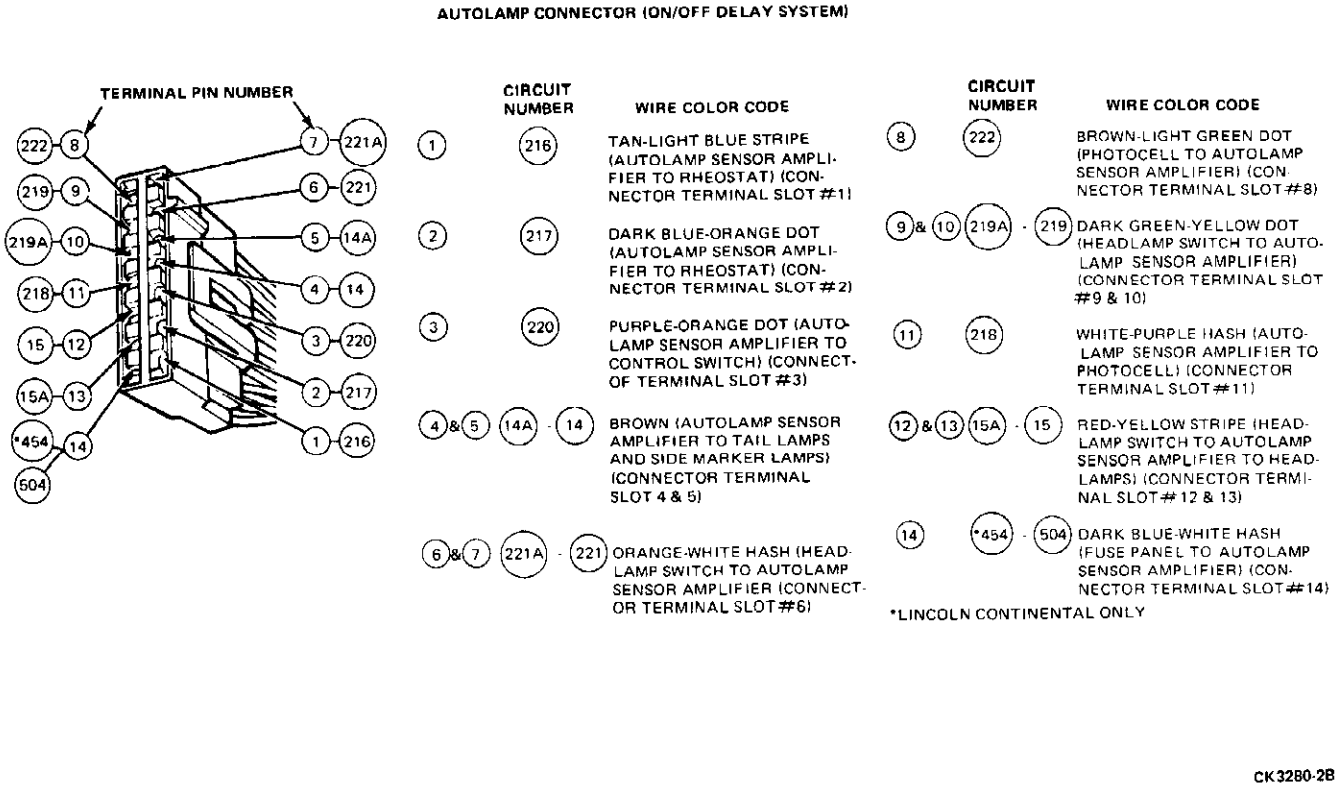


FIG. 9 Autolamp Amplifier Adjustment—Lincoln Continental, Continental Mark V



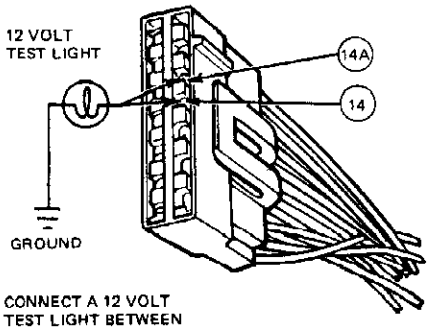
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DETROIT IRON

AUTOLAMP (ON/OFF DELAY SYSTEM)

TAIL LAMP CIRCUIT

OPERATION



CONNECT A 12 VOLT TEST LIGHT BETWEEN TERMINALS 4 OR 5 AND A GOOD GROUND

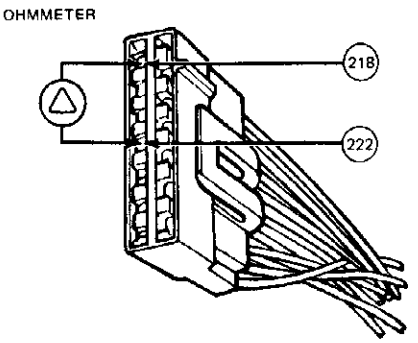
TEST AND RESULT

WITH MANUAL HEADLAMP SWITCH IN PARK OR FULL "ON" POSITION, VOLTAGE SHOULD BE MEASURED AT AUTOLAMP CONNECTOR (CIRCUITS NOS. 14 AND 14A) THIS CHECKS FOR CORRECT WIRING TO TAIL LAMP CIRCUIT.

IF NOT OK, CHECK CONTINUITY OF THE 14 BROWN WIRE BETWEEN THE AUTOLAMP AMPLIFIER CONNECTOR AND THE COMMON POINT WITH THE REAR LAMP CIRCUIT.

CK3351-2B

PHOTOCELL



CONNECT AN OHMMETER BETWEEN TERMINALS 8 AND 11

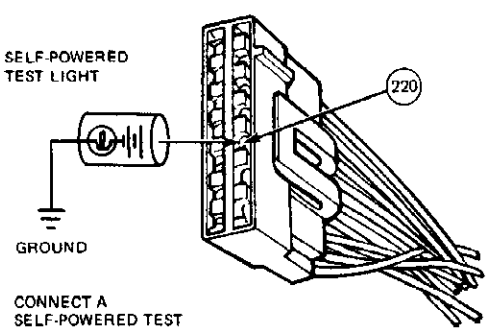
TEST RESISTANCE OF PHOTOCELL. (CIRCUIT NO. 218 AND 222). WITH PHOTOCELL IN DARKNESS, READING WILL EXCEED 100,000 OHMS. WITH PHOTOCELL UNDER BRIGHT LIGHT OR DAYLIGHT, READING WILL BE LESS THAN 1,000 OHMS.

IF NOT, REPLACE THE PHOTOCELL AND THE AUTOLAMP AMPLIFIER AS A UNIT.

CK3352-2C

ON-OFF CONTROL SWITCH

OPERATION



CONNECT A SELF-POWERED TEST LIGHT TO TERMINAL NO. 3 AND A GOOD GROUND

TEST AND RESULT

CHECK FOR SYSTEM GROUND THROUGH DRIVER'S DELAY CONTROL SWITCH. GROUND SHOULD BE MEASURED WITH AUTOLAMP SWITCH IN "ON" POSITION. CIRCUIT IS OPEN WITH SWITCH IN "OFF" POSITION.

IF NOT OK, PERFORM STEPS NOS. 1 & 2 OF THE POTENTIOMETER TEST.

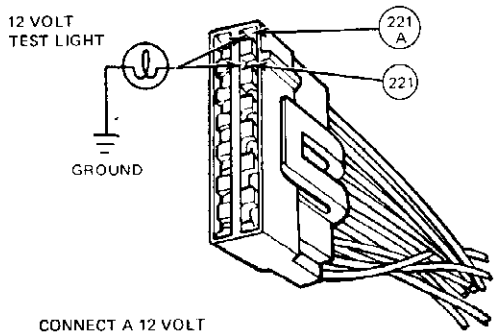
IF POTENTIOMETER TESTS OK, CHECK THE 220 CIRCUIT—PURPLE WIRE WITH ORANGE DOTS—BETWEEN THE POTENTIOMETER CONNECTOR AND AUTOLAMP AMPLIFIER CONNECTOR.

CK3353-2A

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AUTOLAMP (ON/OFF DELAY SWITCH) HEADLAMP CIRCUIT BREAKER

OPERATION



CONNECT A 12 VOLT TEST LIGHT BETWEEN TERMINAL NO. 6 OR 7 AND A GOOD GROUND

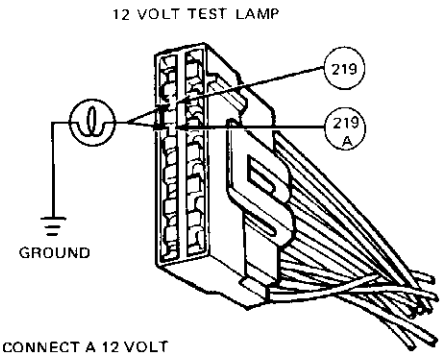
TEST AND RESULT

TEST FOR POWER FEED FROM THE HEADLIGHT SWITCH CIRCUIT BREAKER AT AUTOLAMP CONNECTOR. (CIRCUIT NO. 221 OR 221A).

IF NOT OK, CHECK THE OPERATION OF THE HEADLAMP SWITCH. IF IT IS OK, CHECK CONTINUITY OF THE 221 ORANGE WIRE WITH WHITE HASH MARKS BETWEEN THE HEADLIGHT SWITCH AND THE AUTOLAMP AMPLIFIER CONNECTOR.

CK3281-2B

TAIL LAMP CIRCUIT BREAKER



CONNECT A 12 VOLT TEST LIGHT BETWEEN TERMINAL NO. 9 OR 10 AND A GOOD GROUND

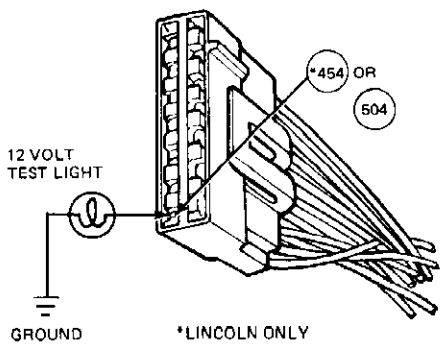
TEST FOR POWER FEED FROM HEADLAMP SWITCH CIRCUIT BREAKER AT AUTOLAMP CONNECTOR. (CIRCUIT NO. 219 OR 219A).

IF NOT OK, CHECK THE OPERATION OF THE REAR TAILLAMPS. IF OK, CHECK CONTINUITY OF THE 219 CIRCUIT–DARK GREEN WIRE WITH THE YELLOW DOTS–BETWEEN THE HEADLAMP SWITCH AND THE AUTOLAMP AMPLIFIER CONNECTOR.

CK3282-2C

AUTOLAMP (ON/OFF DELAY SYSTEM) IGNITION RUN

OPERATION



CONNECT A 12 VOLT TEST LIGHT BETWEEN TERMINAL 14 AND A GOOD GROUND

TEST AND RESULT

TEST FOR POWER FEED FROM ACCESSORY CIRCUIT OF IGNITION SWITCH. VOLTAGE IS MEASURED WITH IGNITION SWITCH IN "RUN" POSITION. (CIRCUIT NO. 454 OR 504).

IF THIS DOES NOT CHECK OUT, CHECK THE FUSE AND/OR CONTINUITY OF 504 CIRCUIT–DARK BLUE WIRE WITH WHITE HASH–(454-RED WITH LIGHT GREEN STRIPE FOR LINCOLN) BETWEEN THE FUSE PANEL AND AUTOLAMP AMPLIFIER CONNECTOR.

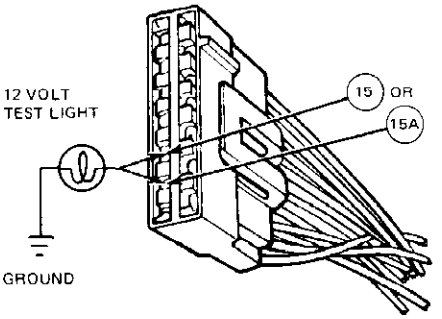
CK3283-2A

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DETROIT IRON

HEADLAMP CIRCUIT

CONNECT A 12 VOLT TEST LIGHT BETWEEN TERMINAL NO. 12 OR 13 AND A GOOD GROUND



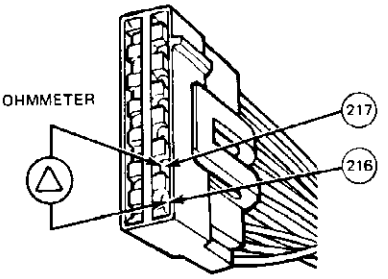
WITH MANUAL HEADLAMP SWITCH IN FULL ON POSITION, VOLTAGE SHOULD BE MEASURED AT AUTOLAMP CONNECTOR. THIS CHECKS FOR CORRECT WIRING TO HEADLAMP CIRCUIT (CIRCUIT NO. 15 OR 15A).

IF NOT OK, CHECK CONTINUITY OF THE 15 CIRCUIT –RED AND YELLOW WIRE– BETWEEN THE HEADLIGHT SWITCH CONNECTOR AND THE AUTOLAMP AMPLIFIER CONNECTOR.

CK3284-2B

DELAY CONTROL POTENTIOMETER

CONNECT AN OHMMETER BETWEEN TERMINALS NO. 1 & 2



TEST FOR CONTINUITY TO DRIVER DELAY CONTROL. WITH CONTROL IN "MAXIMUM" DELAY POSITION READING SHOULD BE APPROXIMATELY 200,000 OHMS FOR LINCOLN, MARK V AND THUNDERBIRD.

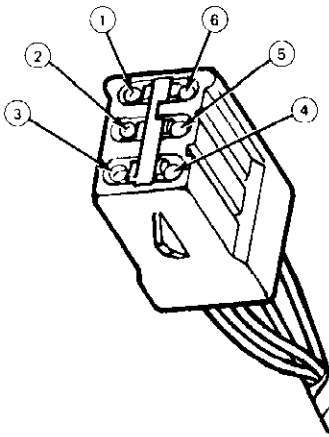
IF NOT OK, PERFORM STEP NO. 3 OF THE POTENTIOMETER TEST. IF POTENTIOMETER TESTS OK, CHECK THE 216 TAN WIRE WITH LIGHT BLUE STRIPE & THE 217 CIRCUIT DARK BLUE WIRE WITH ORANGE DOTS BETWEEN THE POTENTIOMETER CONNECTOR & AUTOLAMP AMPLIFIER CONNECTOR.

IF POTENTIOMETER TEST NOT OK REPLACE THE POTENTIOMETER.

IF ALL OF THE PRECEEDING TESTS CHECK OUT OK, AND THE AUTOLAMP (ON/OFF DELAY) SYSTEM IS MALFUNCTIONING, THE AUTOLAMP AMPLIFIER IS THE CAUSE OF THE PROBLEM. IT WILL BE NECESSARY TO REPLACE THE AMPLIFIER AND THE PHOTOCELL AS A MATCHED SET.

CK3354-2C

HEADLAMP SWITCH POTENTIOMETER CONTROL



1. USING A SELF POWERED TEST LIGHT CHECK THE CIRCUIT CONTINUITY FROM THE WIRE IN CONNECTOR CAVITY NUMBER 5, TO THE SWITCH BRACKET.

2. USING EITHER A SELF POWERED TEST LIGHT OR AN OHMMETER, CHECK THE AUTOLAMP "ON-OFF" SWITCH FUNCTION BY ROTATING THE "AUTOLAMP" CONTROL KNOB FROM "OFF" TO "ON". IT IS NECESSARY TO GO JUST PAST THE DETENT POSITION WITH THE CONTROL SWITCH IN THE "ON" POSITION. THE CONTINUITY CHECK IS PERFORMED BETWEEN CONNECTORS CAVITY NO. 5 AND 2.

3. USING AN OHMMETER CHECK THE RESISTANCE VALUE AS THE AUTOLAMP CONTROL IS ROTATED FROM "OFF" TO THE MAXIMUM TIME DELAY. THE RESISTANCE SHOULD GRADUALLY INCREASE FROM 2500/4500 OHMS AT THE "OFF" POSITION TO 140/260 K OHMS FOR THE LINCOLN, MARK V AND THUNDERBIRD. THIS CHECK IS PERFORMED BETWEEN CONNECTOR CAVITIES NO. 1 AND 6.

4. CAVITY NUMBERS 3 AND 4 ARE USED FOR AUTOMATIC HEADLAMP DIMMER OPERATION.

CK3355-2C

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Automatic Headlamp Dimmer

PART 32-15

Applies to Continental Mark V and Lincoln Continental

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CK3371-2B

DESCRIPTION AND OPERATION

The automatic headlamp dimmer is a driver-operated electronic device, which automatically switches the headlamps from high to low beam, in response to light from an approaching vehicle, or light from the taillamps of a vehicle being overtaken.

Major components of the system are: a sensor-amplifier unit, a power relay, a foot switch, a driver sensitivity control, and an interconnecting wire harness.

The sensor-amplifier unit combines a light-sensing optical device and a transistorized amplifier into one unit, with sufficient power to operate a power relay for switching headlamp beams. The Lincoln Continental and Continental Mark V sensor-amplifier unit is located between the headlamps on the driver's side. The Lincoln Continental sensor-amplifier unit and mounting bracket assembly is located in the engine compartment, attached to the left side of the radiator support assembly. A pre-calibrated level assembly is attached as a part of the sensor-amplifier unit for setting the correct vertical aim. The unit is adjusted for sensitivity at the factory and then completely sealed by filling the interior of the metal case with a moisture-proof epoxy material. The epoxy forms a capsule around all the interior parts and prohibits access to factory sensitivity adjustments or other interior parts.

The power relay is a dust sealed, single pole, double throw, 12 V.D.C. unit which provides the heavy duty contacts for switching the headlamp beams. The upper beam position is the normally closed position. The power relay also contains a diode for electrical transient damping purposes, to protect the sensor-amplifier. Observe proper polarity when connecting, to prevent burn-out of the diode and subsequent damage to the sensor-amplifier.

The foot switch is a special dimmer over-ride type that replaces the standard foot dimmer switch. One position provides automatic control of the headlamp beams, and the other position is the lower beam. It also contains an over-ride section for obtaining an over-riding high beam, when in the automatic position. The over-ride section functions as follows: With the foot switch in the automatic position, a slight downward pressure on the switch provides upper beam, regardless of the amount of light on the sensor-amplifier lens. This arrangement permits signaling an approaching vehicle, if it fails to switch to lower beam, or as a passing signal to a vehicle being overtaken. It also provides a simple test for finding the automatic position of the foot switch.

The driver sensitivity control is the ring knob on the headlamp switch. This allows the driver to adjust the sensitivity of the system to the surrounding light. With the control knob positioned at the center of its travel, the sensitivity will closely approximate factory adjustment. Rotating the knob clockwise increases sensitivity and the headlamps will switch to the lower beam, when an approaching car is farther away.

Rotating the knob counterclockwise decreases the sensitivity, allowing an approaching car to come nearer before the headlamp switching occurs. If the control is rotated to the full counterclockwise position, manual operation of the headlamp beams with the foot dimmer switch is provided.

An in-line 4 ampere (SFE-4) fuse is incorporated into the wire harness. If this fuse should blow, the circuit will revert to manual control of the headlamp beams by means of the foot switch. Removing the fuse will also revert the system to manual control.

TESTING

All components of the automatic headlamp dimmer should hold their factory adjustments indefinitely. However, an incorrect vertical aim adjustment, loose or incorrect wiring connections, or even misunderstanding

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of the operation of the unit may lead an owner to believe an adjustment or part replacement is necessary.

The following checks should be performed, in sequence, to determine the cause and correction of trouble and to eliminate unnecessary service work. This unit is transistorized and does not require a warm-up time. With the vehicle in a well-lighted area, check the system as follows:

1. Check the position of the driver sensitivity control knob. If it is rotated to either the full counterclockwise or the full clockwise position, check with the owner, to be sure he understands the operation of the unit.
2. Operate the engine at fast idle.

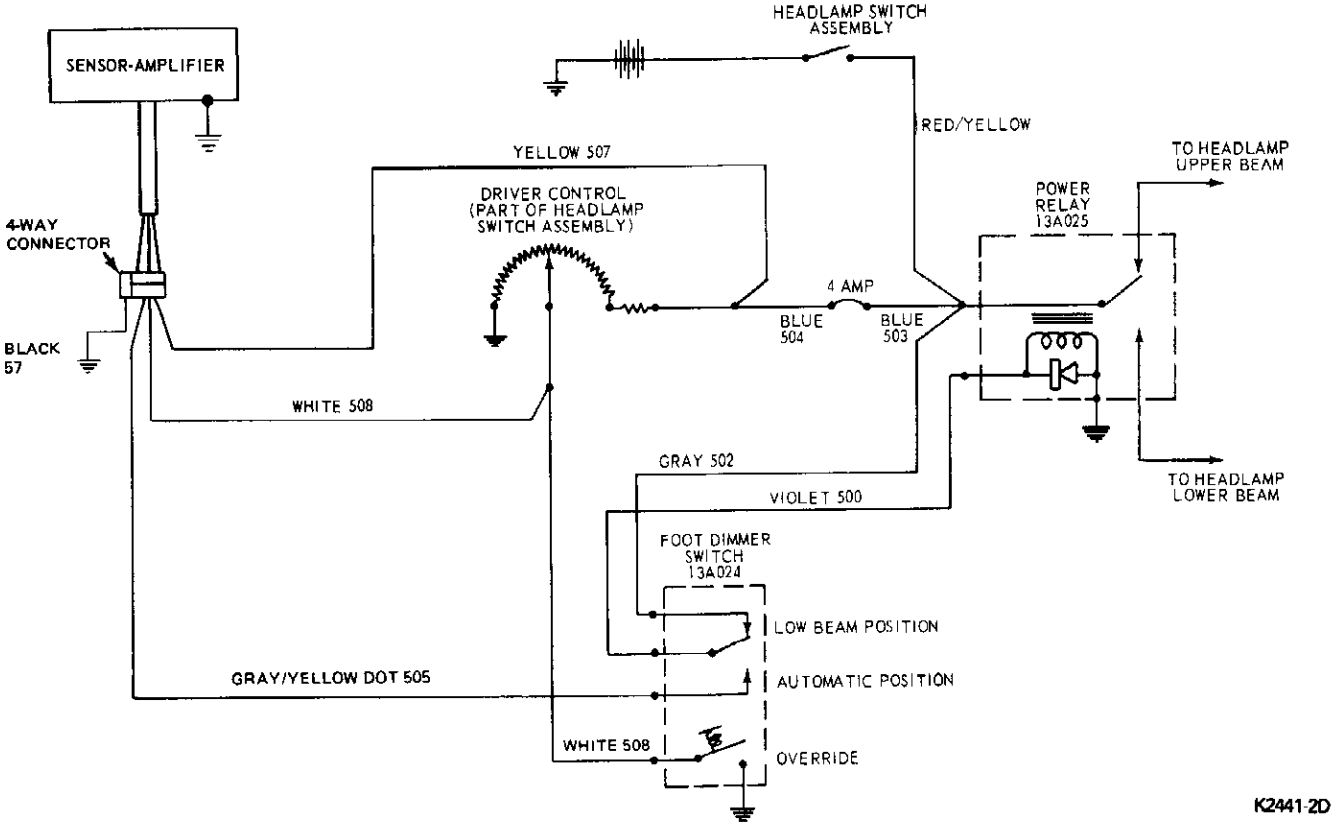


FIG. 1 Automatic Headlamp Dimmer Wiring Diagram

3. Turn the light switch on. Set the driver sensitivity control knob at the approximate center of its rotation. Actual position is dependent on ambient light level.
4. The headlamps should remain on the lower beam in both positions of the foot switch. If so, proceed to step 5. If not, perform the following checks:
   a. Check for a loose connection at the foot switch, power relay, connector near driver sensitivity control, or in-line connector between the sensor-amplifier cable and the interconnecting wire harness.
   b. Disconnect the white wire (override) from the foot switch (Fig. 1). If the lower beam is obtained in both positions of the foot switch, replace the foot switch.
   c. Disconnect the sensor-amplifier cable at the in-line connector. Fabricate a test lamp with a socket and a No. 53 bulb and 2 pieces of wire. Ground one test lamp lead and touch the other to the yellow terminal in the female connector. The test lamp should light. If not, check for a blown fuse or a loose connection at the driver sensitivity control connector or power relay.
   d. Connect one test lamp lead to battery voltage and touch the other lead to the white terminal in the connector. Rotating the driver sensitivity control knob completely counterclockwise to the OFF position should cause the bulb to light. If not, check for a loose connection at the driver sensitivity control connector, a poor solder connection at the driver sensitivity control, or a damaged driver sensitivity control (open circuit).

The function of the driver control can be fully checked with a voltmeter connected between ground and the white wire (508) terminal. With the control fully clockwise, the meter should read approximately battery voltage. With the control rotated counterclockwise to the minimum sensitivity detent position (not fully OFF), the meter reading should not exceed 3 volts. In the fully counterclockwise or OFF position, the meter should read 0 volts. Rotation of the control between minimum and maximum sensitivity positions should provide a smooth, continuous voltage change without discontinuities. Replace control if it does not function as described.

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e. Connect one test lamp lead to battery voltage and touch the other lead to the grey-yellow dot (505) terminal in the connector. Operate the foot switch two or three times. The test bulb should light in one position of the foot switch and the headlights should be on lower beam for both positions of the foot switch. If not, check for loose connections at the foot switch or power relay, a poor ground at the power relay, or a damaged foot switch or power relay. If the problem was not found in step 4, the sensor amplifier is not functioning properly and should be replaced. Reconnect sensor-amplifier headlamp dimmer assembly.

5. Place the foot switch in the automatic position and depress slightly. The headlamps should switch to the upper beam. If so, proceed to step 6. If not, perform the following checks:

   a. Check for a disconnected white wire at the foot switch.

   b. Disconnect the white wire from the foot switch and ground it to the vehicle body. If the upper beam is obtained, replace the foot switch. If not, connect the wire to the foot switch and check the continuity of the white wire to the 2-way connector near the driver sensitivity control (3-way connector Continental Mark V which includes a ground connector).

   c. Complete continuity of the white wire can be checked by disconnecting the sensor-amplifier cable from the interconnecting harness at the in line connector. Using a test lamp (No. 53 bulb), connect one lead to battery voltage and touch the other to the white terminal in the in-line connector. Push down slightly on the foot switch and the bulb should light. If not, check the continuity from the in-line connector to the foot switch.

6. Place the foot switch in the automatic position and cover the sensor-amplifier lens with a black cloth. The headlamps should switch to the upper beam. If so, remove black cloth and proceed to step 7. If not, disconnect the sensor-amplifier at the in-line connector. If the headlamps switch to the upper beam, replace the sensor-amplifier unit.

7. With the headlamps on automatic lower beam, rotate the driver sensitivity control all-the-way counterclockwise. The headlamps should switch to the upper beam. If so, proceed to step 8. If not, check the driver sensitivity control for a poor connection to ground.

8. If the system responded to step 4 thru 7 without failure, the unit is functioning properly and all that remains to be checked is the aiming and sensitivity (Refer to the Adjustment Section).

ADJUSTMENTS

HORIZONTAL AIMING ADJUSTMENT

The sensor-amplifier unit was designed to be aimed slightly to the left (2 degrees) in the horizontal plane for proper performance.

VERTICAL AIMING ADJUSTMENT

Accurate vertical aim is essential to proper performance. If the sensor-amplifier is aimed too low, reflected road light from the vehicle's own headlamps can cause the unit to hold the headlamps on low beam. The unit must be aimed as low as possible to provide maximum tolerance for vehicle loading and weight distribution.

The aiming procedures should be rechecked on new vehicles which have been driven 2,000 miles.

1. Sensor-amplifier vertical aiming should be performed with the vehicle unloaded, the trunk empty, except for the spare tire and jack assembly, gas tank at least half full, and the tires at the recommended air pressure(s).
2. Locate the vehicle on a known level floor (level within 1/4 inch fore and aft). If the floor is not level as described, the aiming procedure will not be effective.
3. Rock the vehicle sideways to equalize the springs.

   Adjust the vertical aiming screw (Fig. 2) at the rear of the sensor-amplifier and bracket assembly, until the bubble is centered in the level. Do not tamper with the screw near the end of the level. Always make the final adjustment while turning the vertical aiming screw clockwise.

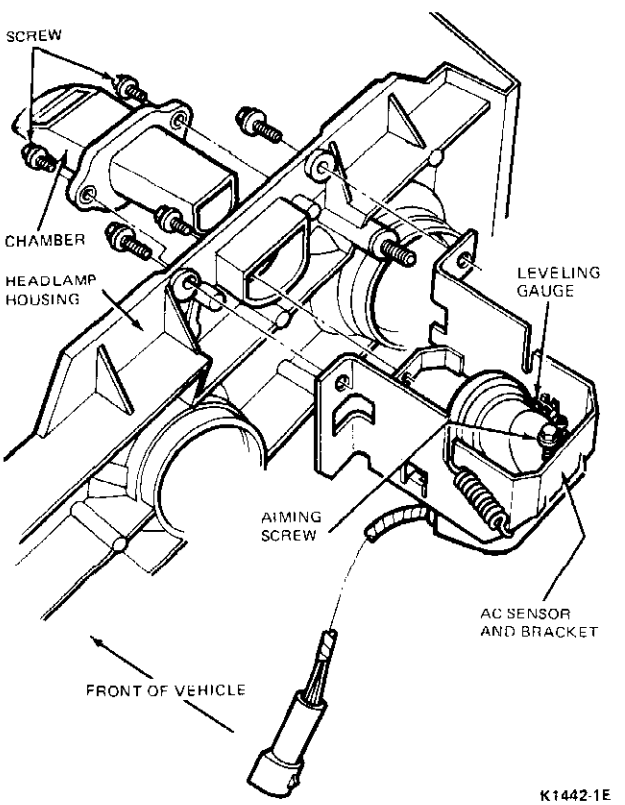


FIG. 2 Vertical Aim Adjustments on Sensor Amplifier Installation

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REMOVAL AND INSTALLATION

SENSOR-AMPLIFIER

If the automatic headlamp dimmer malfunctions and cannot be removed for repair immediately, manual operation of the headlamps may be obtained at the foot dimmer switch, in most cases, by removing the fuse from the fuse holder. The fuse holder is located in the wiring harness near the headlamp switch.

Should the car have to be driven with the sensor-amplifier unit removed, manual headlamp beam operation with the foot dimmer switch will be obtained. If both the sensor-amplifier unit and the power relay are removed, manual operation with the foot dimmer switch may be obtained by replacing the override type foot dimmer switch with a standard foot dimmer switch, and plugging the standard car wiring into it.

The driver sensitivity control (available to the driver at the light switch), will provide any adjustment requirement normally needed. However, when a sensor-amplifier unit is replaced, it will be necessary to readjust the vertical aim, as described in Vertical Aiming Adjustment in the Adjustment Section.

Removal

1. Disconnect the ground cable from the battery.
2. Disconnect the harness at the rear of the sensor-amplifier unit. Do not pull on the cable sheathing, otherwise the leads could be damaged.
3. Remove the three sensor-amplifier and bracket assembly mounting screws and lockwashers. See Fig. 3.
4. Remove the sensor-amplifier mounting bracket and chamber (Lincoln Continental only) from the vehicle.
5. Position car on a known-level surface. Vehicle should have half tank of gas, empty trunk (except for jack and spare tire), and recommended air pressure for tires. Level sensor-amplifier at hex-head screw on rear of bracket. Do **not** attempt to adjust sensor spirit level.
6. Make sure headlamp system is properly aimed. With headlamp covers open and headlamps off, look through the front chamber to see that at least 50 percent of the sensor lens can be seen. Road test under night driving conditions.

Installation

1. Position the sensor-amplifier and mounting bracket assembly, chamber (Lincoln Continental only) and install the mounting screws.
2. Connect the harness connector to the harness at the rear of the sensor-amplifier unit.
3. Connect the battery cable.
4. Test the unit for proper operation. If necessary, adjust the vertical aiming, as described in the Adjustment Section.

FOOT DIMMER SWITCH

Removal

1. Disconnect the ground cable from the battery.
2. Position the left side of the floor mat back away from the area of the foot dimmer switch. Removal of the left-hand scuff plate and trim panel may be required to allow repositioning of the floor mat.
3. Remove the two screws attaching the foot dimmer switch to the floor pan. Lift the foot dimmer switch from the floor pan (Fig. 4).
4. Disconnect the plug connectors from the foot dimmer switch.

Should installation of a standard foot dimmer switch be necessary, connect the car headlamp wiring harness to the standard foot dimmer switch.

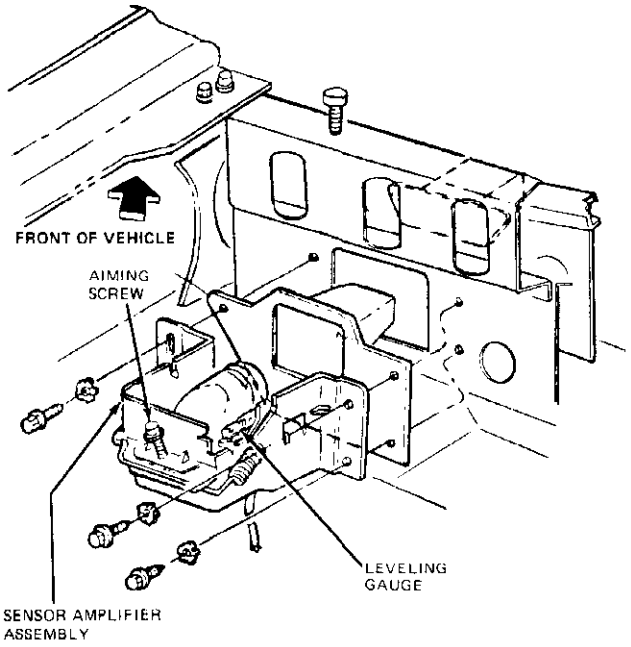


FIG. 3 Sensor Amplifier Installation (Lincoln Continental Shown, Continental Mark V Similar)

Installation

1. Connect the plug connectors to the foot dimmer switch.
2. Position the foot dimmer switch on the floor pan, and install the two attaching screws.
3. Position the floor mat in the area of the foot dimmer switch.
4. Connect the ground cable to the battery.

POWER RELAY

Removal

1. Disconnect the battery ground cable.
2. Disconnect the two plug connectors from the relay (Fig. 4).
3. Remove the two attaching screws, securing the relay to the brake pedal support and remove the relay.

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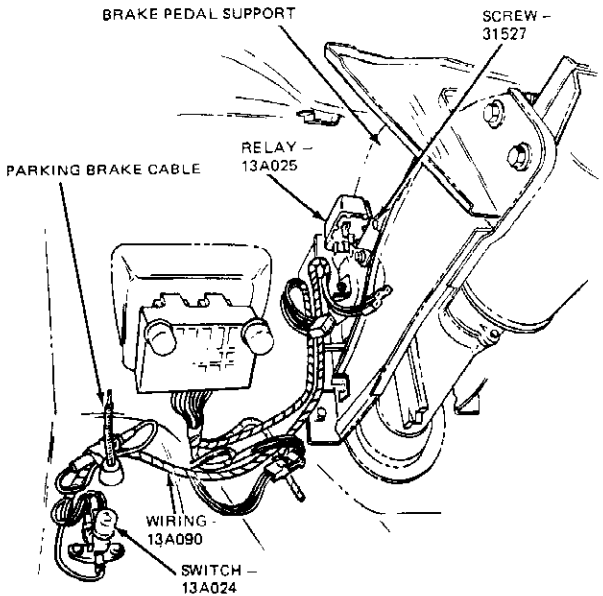


FIG. 4 Dimmer Switch, Power Relay and Harness Connections

Installation

1. Position the power relay to the brake pedal support. The terminals of the relay must point down and rearward the vehicle. Install the two attaching screws.
2. Connect the two plug connectors to the power relay.
3. Connect the battery ground cable.
4. Test the system for proper operation.

DRIVER SENSITIVITY CONTROL

Refer to Part 32-02 for Headlamp Switch Removal and Installation.

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DETROIT IRON

Parking, Rear and Marker Lamps

PART 32-20

Applies to All Models

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CK3372-2B

DESCRIPTION AND OPERATION

The parking, rear, coach and marker lamp circuits are controlled by the headlamp switch. When the headlamp switch is pulled out to the first detent, only the parking lamps, side marker lamps, coach lamps, license lamps, and taillamps are activated.

When the headlamp switch is pulled out to the second detent, the parking lamps, side marker lamps, coach lamps and taillamps remain on, while the headlamps are activated.

On Thunderbird, Continental Mark V, and Lincoln Continental vehicles, a cornering lamp bulb is installed in the same lamp body with the side marker bulb on vehicles so equipped. The cornering lamps are fed from the turn signal circuit in such a way that when the turn signal switch is activated, the cornering lamp on the turn side will burn with a steady glow.

The side marker lamps are connected in parallel with the feed circuit (from the headlampswitch) that feeds the minor filaments of the front parking and rear taillamps (Fig. 1).

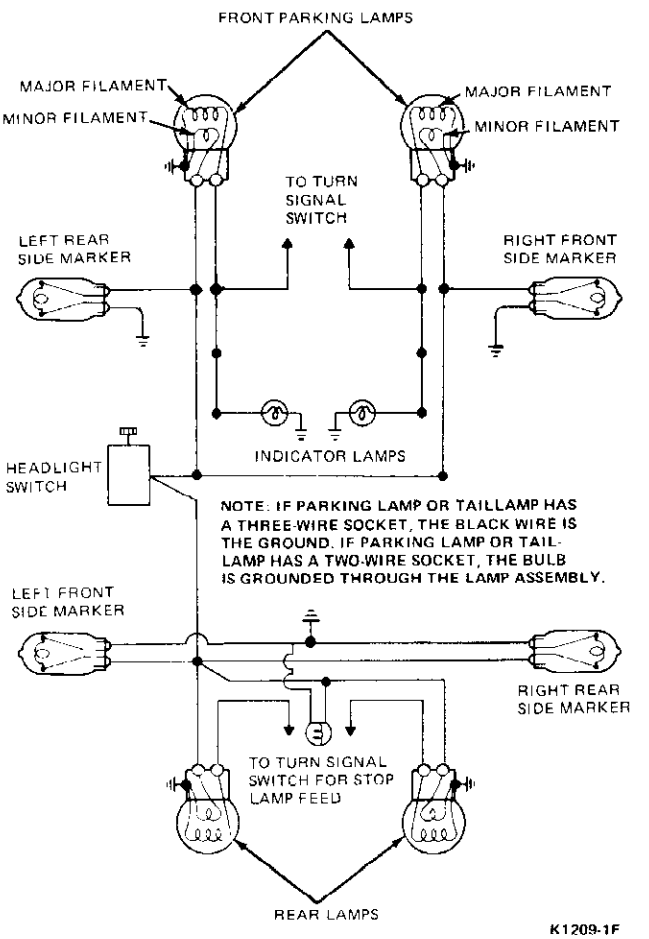


FIG. 1 Typical Side Marker Lamp Circuit

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REMOVAL AND INSTALLATION

PARKING LAMPS

Ford

The front parking lamps are located in the fender. To replace the bulb, remove the door from the lamp assembly. Three screws attach the door.

To replace the lamp assembly, unplug the wires from the harness (Fig. 2).

Mercury

The front parking lamps are located in the fender on all models.

To replace the lamp assembly on Mercury models, remove the headlamp door bezel by removing the six attaching screws. Pull the bezel and lamp housing away from the fender. To replace the bulb on Mercury models, twist the socket one-third turn counterclockwise and remove bulb and socket assembly. Push bulb in and turn counterclockwise to remove from socket.

LTD II

Combination parking lamps and side markers are located in the grille opening panel. To replace the bulbs, twist the socket and pull it from the lamp assembly.

To replace the lamp assembly on the LTD II, remove two nuts from the rear and pull the assembly. Then, disconnect the bulbs and sockets from the lamp assembly.

Granada and Monarch

To replace the bulbs, twist the socket and pull it from the lamp assembly. To replace the lamp assembly, remove the screws that retain the headlamp door. Remove screws retaining parking lamp assembly. Pull the lamp frontwards and remove lamp sockets.

Cougar and Versailles

The parking lamps are located in the outboard side of the headlamp doors. To replace the bulb or parking lamp assembly, remove the six screws from the front and pull assembly from the fender. Then disconnect the bulb and socket from the lamp assembly.

Fairmont and Zephyr

To remove the lamp body, remove screws that retain the headlamp door. Then remove screws that retain the lamp body. Pull lamp toward front of vehicle and remove lamp sockets. See Fig. 3.

Pinto, Bobcat and Mustang II—Bulb Replacement

To replace the parking lamp bulb. Remove the socket and bulb from the rear of the assembly. Remove the clips that retain the lamp assembly to the door and grille assembly. Remove the lamp. Install the socket in the parking lamp body.

Pinto and Bobcat—Body Replacement

To replace the parking lamp body assembly, remove the socket from the parking lamp body, remove 2 screws retaining the lamp body to the grille and remove lamp body. To install, reverse procedure.

Mustang II—Body Replacement

Remove the lamp socket and bulb from the rear of the lamp assembly. Remove 2 clips retaining lamp

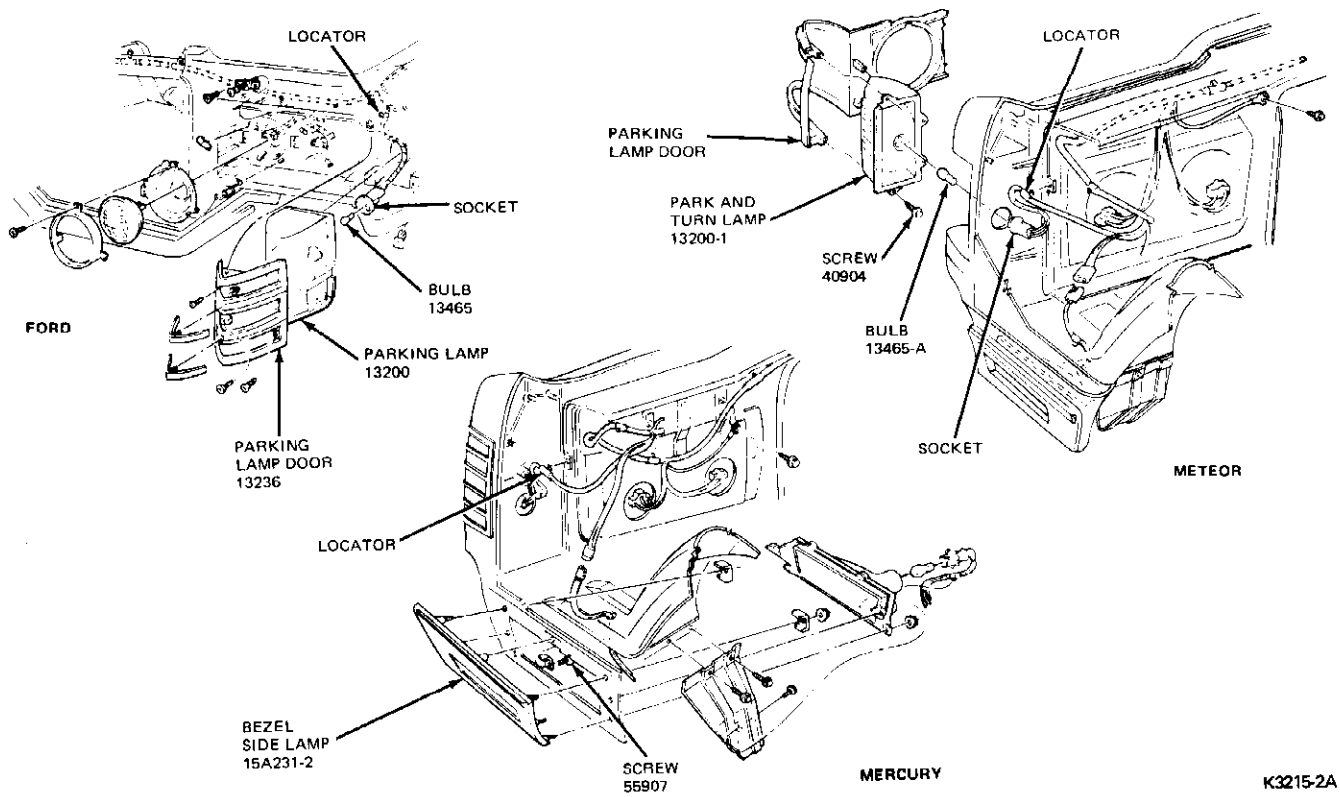


FIG. 2 Parking Lamp Assembly—Ford and Mercury

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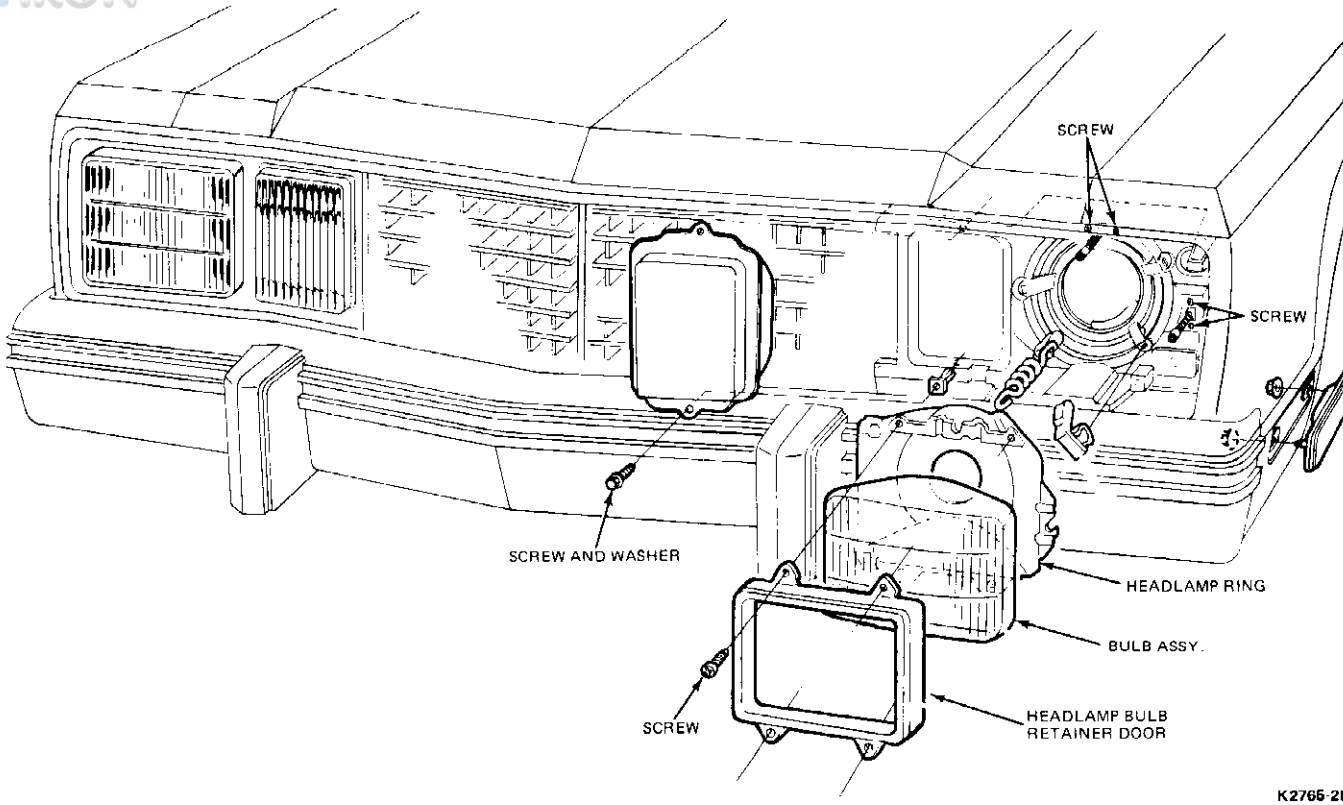


FIG. 3 Parking Lamp Installation—Fairmont Shown (Zephyr Similar)

assembly to the door or grille assembly. Remove the lamp. To install clips, push inward. Locking boss must snap into boss opening.

To replace the parking lamp body assembly remove the socket from the parking lamp body, remove the two screws retaining the lamp body to the grille and remove the lamp body assembly.

To install, position the lamp body to the grille and install the two retaining screws (Fig. 4). Then, install the socket to the lamp body assembly.

Lincoln Continental

To replace parking lamp bulb, remove door attaching screws and remove the lens and bulb. The front parking lamp assembly is located in the fender; to replace, remove two nuts, disengage wire locator and pull assembly from fender. When attaching lamp assembly, tighten nuts to 30-60 in-lbs torque. Refer to Fig. 5.

Thunderbird and Continental Mark V—Bulb Replacement

Removal

1. To replace the parking lamp bulb, it is not necessary to remove the parking lamp body. Remove the socket from the parking lamp body and replace the bulb. Install the socket in the parking lamp body.
2. To replace the lamp assembly, disconnect the parking lamp multiple connector from the dash-to-headlight junction wiring assembly under the top of the fender behind the parking lamp.
3. Remove the two retaining nuts from the lamp assembly studs at the rear of the parking lamp.

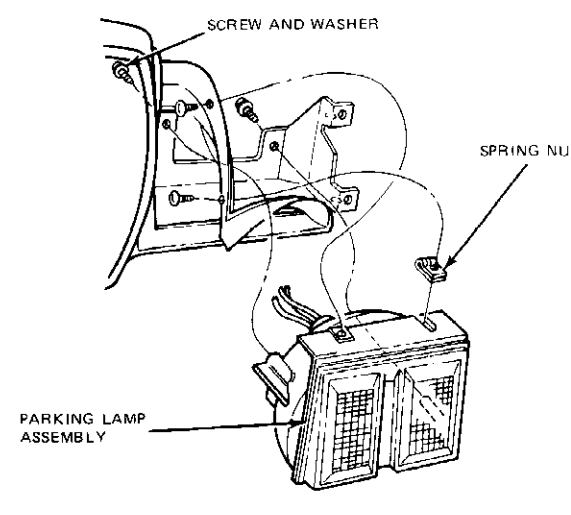


FIG. 4 Parking Lamp Installation—Pinto Shown

4. Pull the lamp body straight forward and remove it from the vehicle.

Installation

1. Position the lamp body to the fender, routing the lamp wiring through the holes in the front sheet metal. Install the two retaining nuts to the lamp body studs.
2. Connect the multiple connector to the wire harness.

REAR LAMPS

Two types of rear lamp bulb sockets are used (Figs. 6 and 7).

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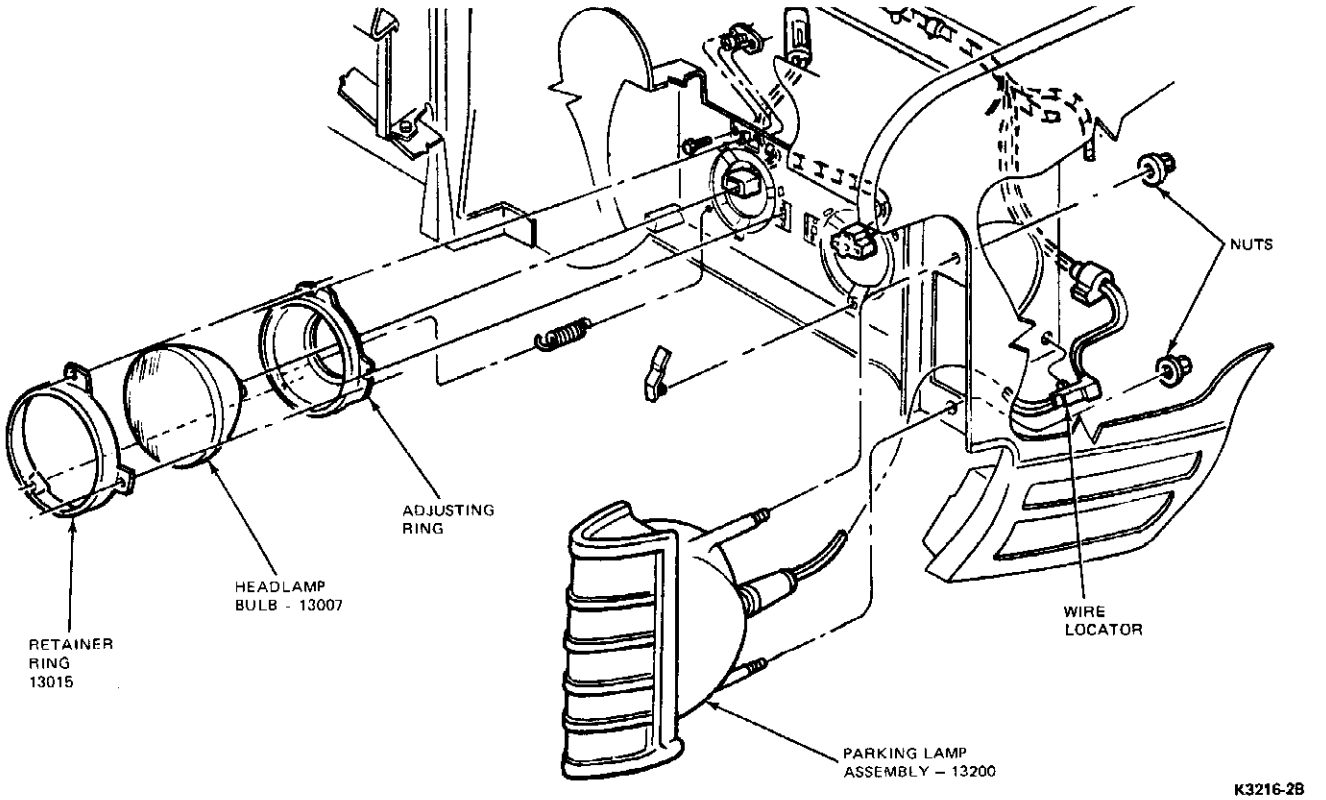


FIG. 5 Parking, Marker and Cornering Lamps—Lincoln Continental

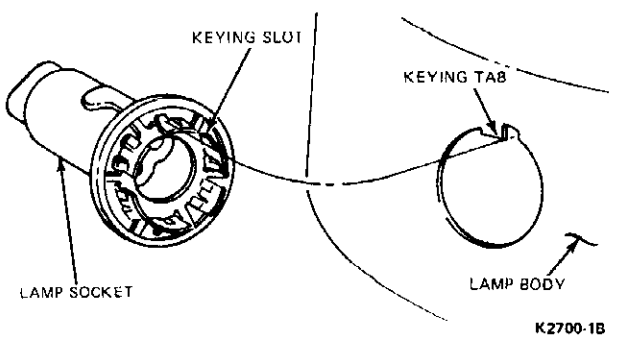


FIG. 6 Rear Lamp Bulb Socket

To remove the metal socket assembly (Fig. 6), turn the socket counterclockwise to the stop, then press the socket downward from the keying tab and rock it out of the lamp body. To install, line up the socket with the keying tab on the lamp body and press into position.

To remove the plastic socket assembly (Fig. 7), turn the socket counterclockwise to the stop, and remove the socket.

To install, index the smallest tab for locating the three locking tabs then press the socket into the lamp body and rotate clockwise to the stop.

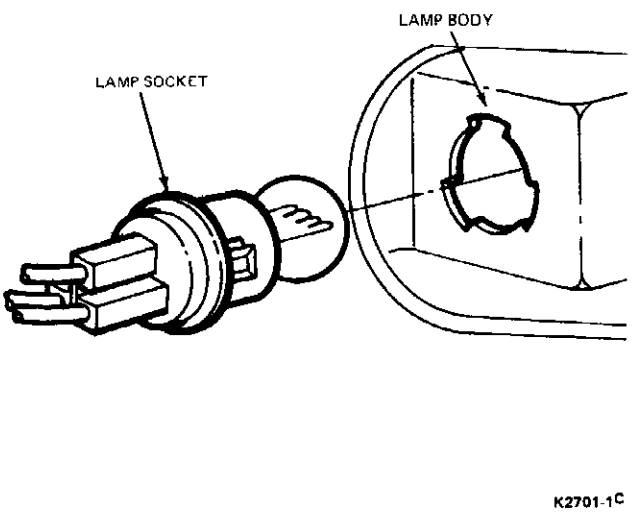


FIG. 7 Rear Lamp Bulb Socket—3 Tab Type

Versailles, Zephyr and Fairmont (Lens Replacement)

Removal

1. The lamp assembly will not have to be removed from the vehicle to replace the lens.
2. From inside the luggage compartment, remove the lamp sockets and bulb.
3. Using a hammer, break out the large portions of the damaged lens.
4. Remove the remainder of the broken lens with a chisel or sharpened screwdriver. The surface should

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be smoothed to within 1/64-inch of the normal surface.

Installation

1. Locate position of the water drainage notches on bottom edge of new lens assembly.
2. Mark positions of notches on lamp body.
3. Starting at a drainage notch location on the lamp body, apply a strip of butyl seal around the perimeter. Leave a 1/2-inch gap between ends of seal, centered about each notch in the lens for water drainage.

   NOTE: Special care should be taken to avoid bunching or tearing the seal when applying around corners.
4. Firmly press and hold for ten seconds the replacement lens into position, assuring that the butyl tape seals the lens to the body around the entire perimeter.

   CAUTION: Avoid applying pressure to the middle of the lens to keep from breaking the new part.
5. Reinstall the lamp sockets and bulbs.
6. Test the tail lamps, turn signals and back-up lamp for proper operation.

Fairmont, Zephyr, Monarch, Granada, and Versailles (Lamp Bulb Replacement)

From inside the luggage compartment, remove the lamp sockets and replace the bulbs.

Fairmont, Zephyr and Versailles (Body Replacement)

To remove lamp assembly, follow same procedure as for Granada and Monarch.

Granada and Monarch (Lens and Body Replacement)

Removal

1. The lamp assembly must be removed to replace the lens on Granada and Monarch.
2. From inside luggage compartment remove screws that retain lining board to lower back panel. Remove lining board.
3. Remove 4 lamp sockets from the lamp body.
4. Remove the nuts retaining the lamp body to the lower back panel and remove the lamp assembly.
5. Remove the screws retaining the lamp bezel and separate it from the body assembly.
6. Secure the lamp body assembly in a vise and remove the remainder of the broken lens with a chisel or a sharpened screwdriver. Sealing surface should be smoothed to within 1/64 inch of normal surface.

Installation

1. Temporarily position the new lens on the cleaned lamp body and mark the location of the two drainage notches at the bottom of the lens.
2. Remove the new lens and apply a continuous strip of butyl tape around the lamp body, following the contour of the outer rib. Leave 1/2-inch gaps in the butyl in the area of the drainage notches.
3. Firmly press, for ten seconds, the replacement lens into position, assuring that the butyl tape seals the lens to the body around the entire perimeter. Do not apply pressure to the middle of the lens.
4. Reassemble the bezel to the lamp body and tighten the attaching screws.
5. Reinstall the lamp assembly to the vehicle.
6. Reinstall the lamp sockets in the lamp assembly and test bulbs.
7. Replace the lining board to the lower back panel.

All Ford Except Wagons

The bulb can be serviced from inside the luggage compartment by removing socket from lamp body. To remove the lamp body assembly; remove three attaching nuts from inside luggage compartment, remove two sockets from housing and remove lamp assembly from vehicle. The lens cannot be serviced separately; the lens and body assembly is serviced as one unit. Refer to Fig. 8.

All Mercury Except Wagons

The bulbs can be serviced by loosening the luggage compartment trim cover and removing the sockets from the lamp body. To remove the lamp assembly from the vehicle, remove all sockets and the 7 nuts and washers from the lamp attaching studs. Pull lamp assembly rearward. To service the lens, remove the lamp assembly and 8 screws attaching the lamp body to the lamp door. To install, reverse above procedure, using new nuts and washers to provide an adequate seal. Refer to Fig. 9.

Ford and Mercury Station Wagons and Ranchero

To remove the lamp body and/or bulbs, remove six screws attaching the lamp body to the rear quarter (Fig. 10). Pull the lamp body from the quarter opening and remove the lamp sockets from the lamp body. To remove the lens, remove four lens attaching screws and separate the lens from the lamp body.

Cougar and LTD II

The bulb can be replaced by removing the bulb sockets from the rear of the lamp body inside the luggage compartment (Fig. 11).

To remove the lamp assembly, remove 2 bulb sockets from the lamp body. Remove 5 nuts that retain the quarter panel extension assembly and remove it with the lamp assembly from the vehicle. Remove 4 nuts from the lamp studs to separate the lamp from the extension. To service the door or the lens and body assembly, remove 3 retaining screws from the back of the lamp. To reassemble the lamp to the extension and install in vehicle, reverse procedure.

Cougar XR-7

The bulbs can be replaced by removing the bulb sockets from the rear of the lamp body inside the luggage compartment. To remove the lamp assembly, remove 3 bulb sockets from the lamp body and 5 nuts from the lamp studs. Remove lamp from lower back panel. To service lens, body or door, remove 6 screws from back of lamp. To reassemble lamp, reverse the procedure, insuring that the outboard sight shield is hooked into the lamp door during installation on the vehicle.

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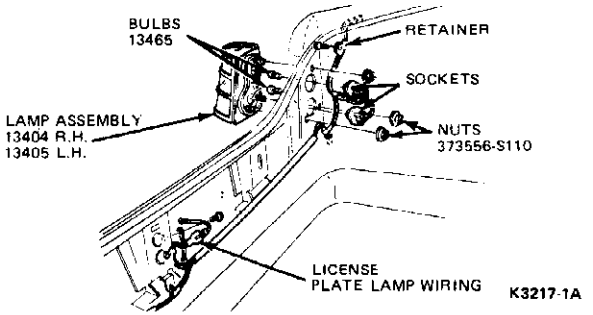


FIG. 8 Rear Lamp Installation—Ford—Except Station Wagons

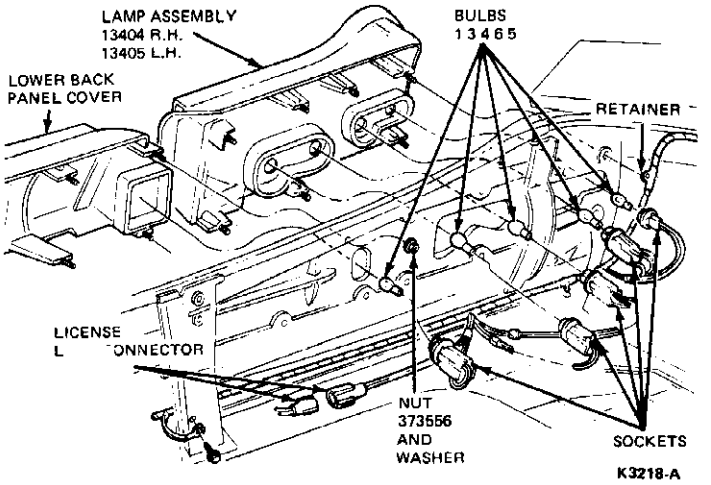


FIG. 9 Rear Lamp Installation—Mercury Except Station Wagons

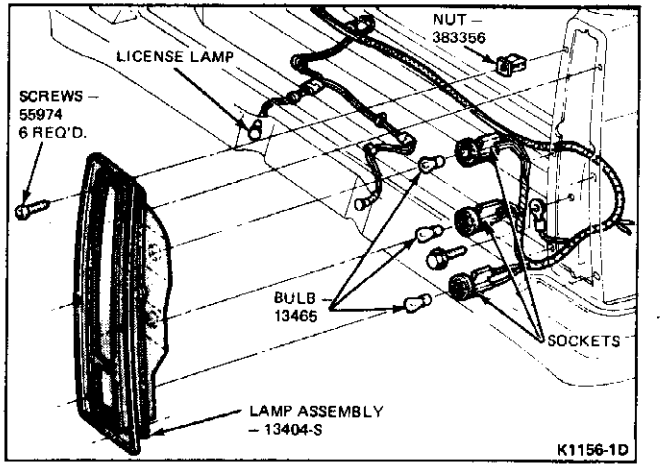


FIG. 10 Rear Lamp Installation—Ford and Mercury Station Wagons

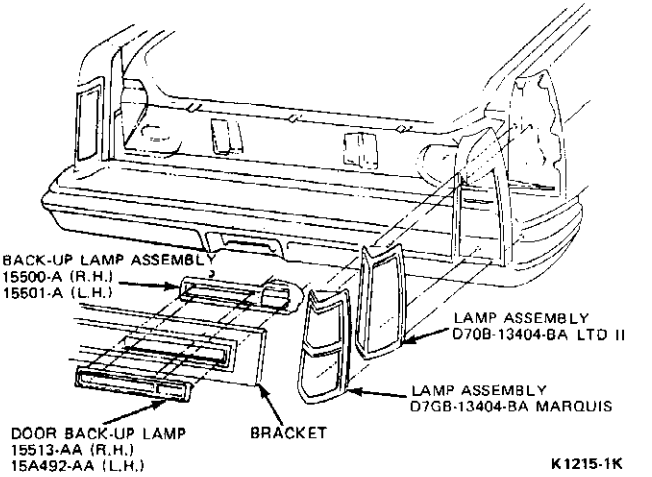


FIG. 11 Rear Lamp Installation—LTD II

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DETROIT IRON

Pinto and Bobcat—Station Wagons

To remove the bulbs, (Fig. 13) remove the lamp assembly from vehicle and twist the socket counterclockwise and remove from lamp body.

To remove the lamp body, remove the six retaining screws and disengage the sockets. Remove the lamp body assembly.

Pinto, Bobcat, Fairmont and Zephyr—Except *Station Wagons*

From inside the luggage compartment, remove the two lamp bulb sockets from the body and remove the six (seven on Bobcat) lamp body-to-back panel attaching nuts from the studs (Figs. 14 and 15). Remove the lamp body and door assembly from the outer side of the back panel.

Fairmont and Zephyr—Station Wagon

To replace the lamp assembly, remove the four screws that retain the lamp lens and body to the rear quarter opening. Pull the lamp out of the opening and remove the lamp socket and bulb.

Mustang II

From inside the luggage compartment, remove (4) bulb sockets from the lamp body and the (6) door-to-body attaching nuts from the studs. Remove the lamp body from inside the luggage compartment, and the door from the outer side of the back panel. Refer to Fig. 16.

To replace the lens, remove the (8) phillips head *screws to separate the lens from the body.*

Assemble the lens to the body by installing (8) screws. Install the lamp into the inside of the luggage compartment and the door from the outer side of the back panel and install (6) door to body attaching nuts to studs.

Lincoln Continental (Fig. 17)

1. Service of either rear lamp requires removal of both rear lamps and the center reflector assembly. During the rear lamp and center reflector assembly removal, support both to prevent bending the lower mouldings.

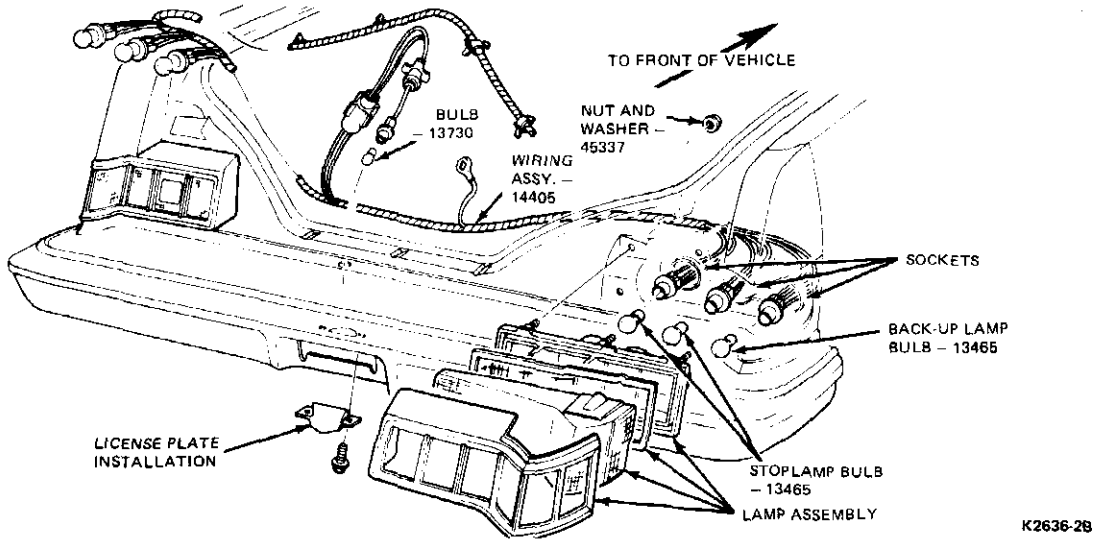


FIG. 12 Rear Lamp Installation—Cougar XR-7

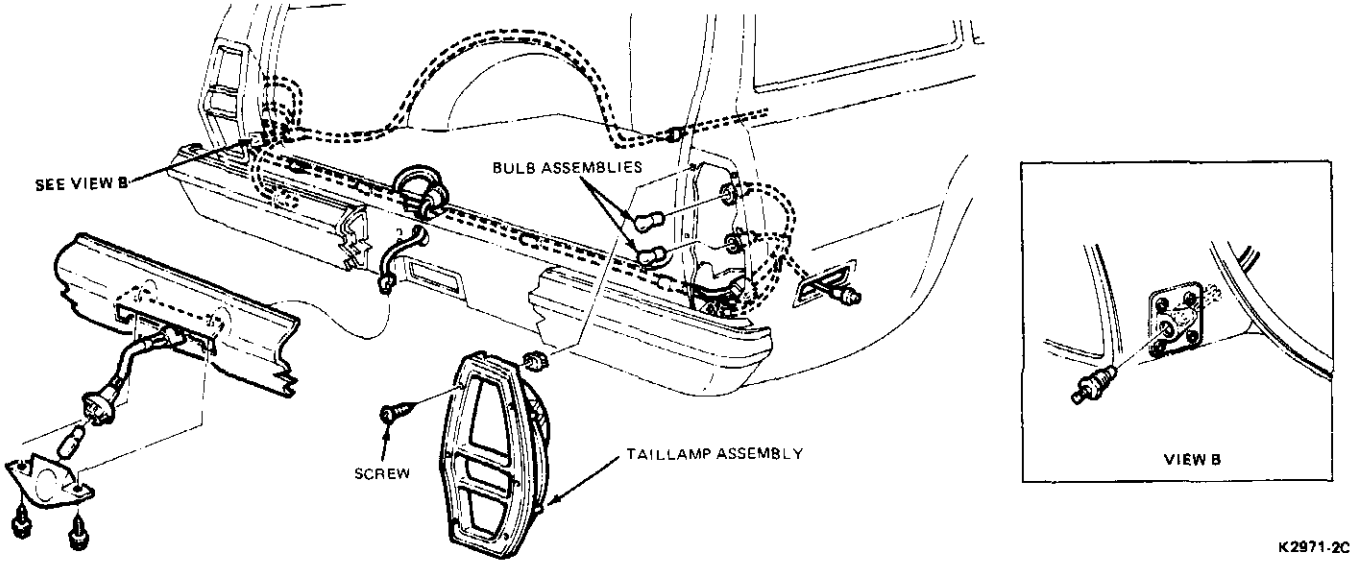


FIG. 13 Rear Lamp Installation—Pinto and Bobcat—Station Wagons

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2. From under rear bumper, remove two screws retaining the rear sight shield to both rear lamps.
3. From inside the luggage compartment, remove the rear lamp trim panel, rear and back-up lamp sockets. Remove retaining nuts from both rear lamps and center reflector.
4. With assistance from another person, lift both rear lamps and center reflector from the vehicle and place on a clean bench. Support rear lamps and center deflector to prevent bending of lower moulding.
5. Remove the screws retaining the lower moulding to the rear lamp(s).
6. Reinstall in reverse order. Tighten nuts on rear lamps and center reflector to 25-45 in-lbs torque.

Thunderbird

1. Remove the 6 screws and 2 nuts that retain the lining board to the lower back panel in the luggage compartment. Remove the lining board.
2. From inside the luggage compartment, remove the 6 rear lamp sockets and 11 retaining nuts from the rear lamp assembly.
3. Let rear lamp assembly sag as far as the stud clearance holes in the lower back panel will allow.
4. Tape the upper edge of the bumper so the bumper will not scratch the sight shield.
5. Get the center sight shield from under the overlapping portion of the right and left hand sight shields. Insert a screwdriver between the shield and the top of the bumper and slide the screwdriver the full length of the bumper, putting the sight shield above the bumper (see Fig. 18).
6. The taillamp and sight shield assembly can now be removed.
7. Remove the 7 screws that retain the sight shield to the bottom of the rear lamp assembly.
8. Install the center sight shield to the new lamp assembly and reinstall the lamp assembly to the vehicle by reversing the removal procedure.
9. Tighten all rear lamp attaching nuts to 30-60 in-lbs torque.
10. Test taillamps, turn signals and back-up lamps.

Continental Mark V

1. The bulbs can be removed by removing the rear luggage compartment trim panel and removing the plastic sockets from the lamp, turning socket counterclockwise, through holes in lower back panel (Fig. 19).
2. To remove rear lamp from vehicle, remove lamp sockets (per above) and the two washer nuts on the lamp attaching studs. Pull lamp from vehicle.
3. To service any lamp component, remove lamp (as in Step 1 and 2) and remove lamp seal from lamp body. Removal of four screws (located under body seal) will allow lamp door to separate from body.

To install the lamp body:

1. Position the lamp to the quarter panel and install the retaining nuts.
2. Position the wire grommets in the back panel and connect the wire connectors.
3. Install the compartment trim cover.
4. Check the operation of the lights.

MARKER LAMPS

Front

1. Reach behind the fender and disengage the bulb socket from the lamp body.
2. Remove the two lamp body retaining nuts and one wire retaining clip. Remove the lamp body and the retainer.
3. Position the lamp body and retainer to the fender and install the two retaining nuts and one wire clip.
4. Install the bulb socket into the lamp body.

Rear

1. Remove the lower rear corner of the trim panel in the luggage compartment, if required.
2. Remove the bulb socket from the lamp body.
3. Remove the two retaining nuts and remove the lamp body assembly (Fig. 20).
4. Position the lamp body to the panel and install the two retaining nuts.
5. Install the bulb socket into the lamp body.
6. Install the trim panel.

Granada, Monarch, Versailles, Cougar, LTD II, Ford and Mercury—Except Station Wagons

The rear marker lamps are integral with the rear lamp assembly.

CORNERING LAMP

Ford and Mercury

The cornering lamp bulb can not be removed without first removing the lamp body and the lens. From behind the fender, disconnect the lead wires at the connector, remove the four lamp retaining nuts and withdraw the lamp assembly from the inside. Remove the lens (six retaining screws) from the outer side of the lamp body. Remove the bulb from the socket and install a new one. After replacing the lens, install the lamp assembly and secure it in place by installing the retaining nuts to the studs at the inner side of the fender.

If the lamp body is being replaced, remove the lens retaining screws and transfer the bulbs to the new body.

Before installing the lamp body to the mounting bracket on the Thunderbird, be sure that the four clip and stud assemblies are properly positioned in the bracket tabs. After connecting the lead wires at the multiple plug, be sure that the lead wire locator is engaged in the locator hole.

Granada, Monarch, Versailles, Continental Mark V, Lincoln Continental, Cougar and Thunderbird

The cornering lamp bulb can be replaced from behind the front bezel by removing the socket from the body. Replace the bulb in the socket and install back in the lamp body.

To remove the lamp body, disconnect the lead wires at the multiple connector, remove the lamp body-to-bezel screws, and lower the lamp body and lead wire assembly out from behind the bumper extension.

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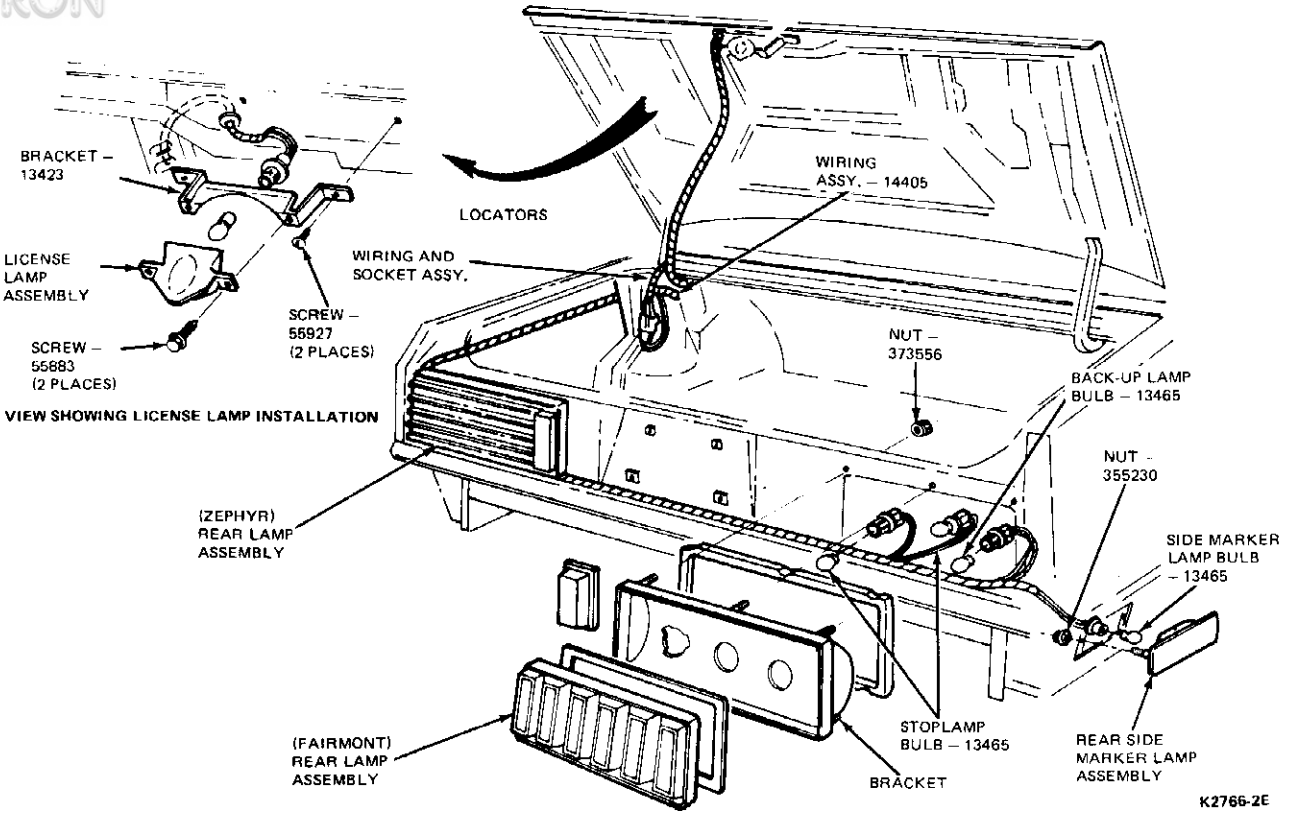


FIG. 14 Rear Lamp Installation—Fairmont and Zephyr

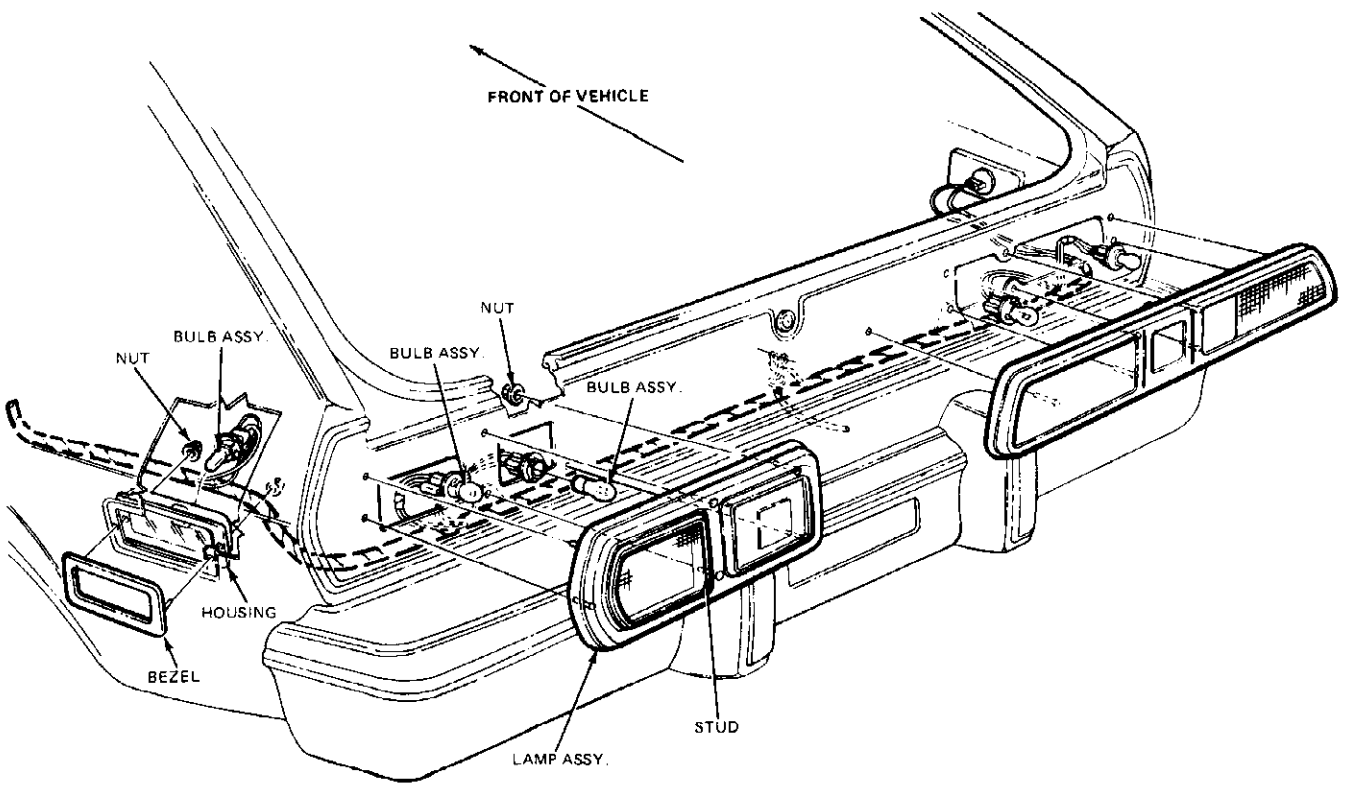


FIG. 15 Rear Lamp Installation—Pinto and Bobcat Sedan

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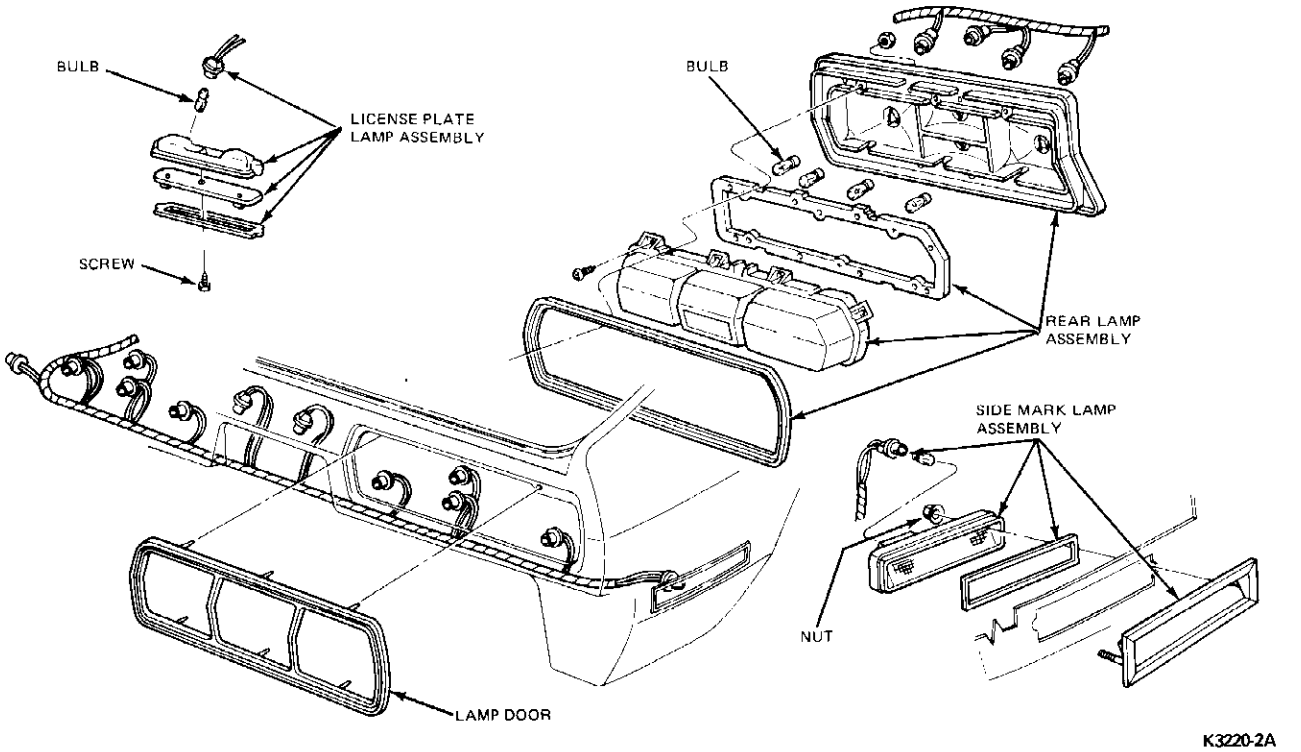


FIG. 16 Rear Lamp Installation—Mustang II

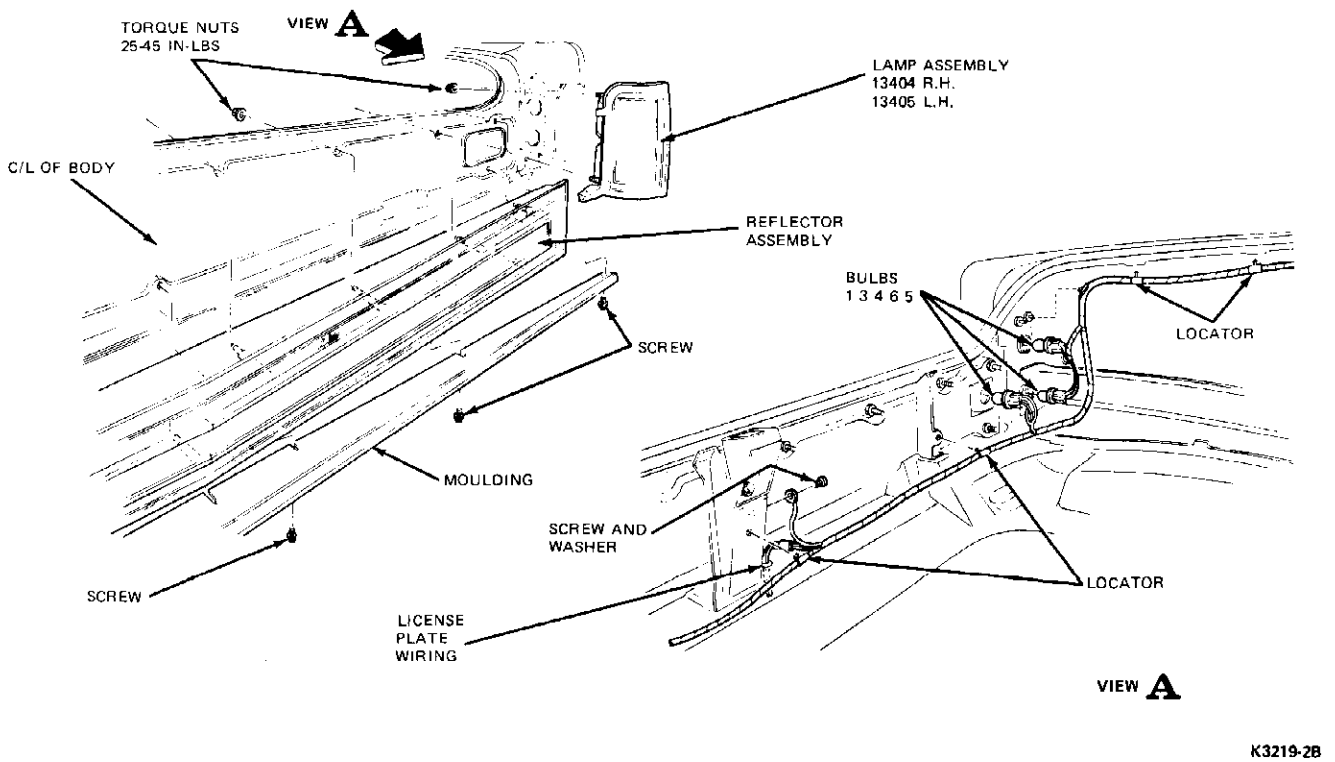


FIG. 17 Rear Lamp Installation—Lincoln Continental

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STOP LAMP SWITCH

All Except Granada, Versailles and Monarch With Vacuum-Powered Brakes

The mechanical stop lamp switch assembly is installed on the pin of the brake pedal arm, so that it straddles the master cylinder push rod (Fig. 22). The switch assembly is a slip fit on the pedal arm pin, and thus, the switch assembly moves with the pedal arm whenever the brake pedal is depressed.

The brake pedal arm pin and plastic bushing has a designed-in clearance with the eye of the master cylinder push rod (Fig. 21). Because of this clearance, whenever the brake pedal is pushed forward, the stop lamp switch contacts moving with the pedal arm are actually pushed against the end of the master cylinder push rod through the switch actuating pin. It is this movement of the switch with respect to the actuating pin and master cylinder push rod that closes the switch contacts, completing the circuit to the stop lamps.

When the brake pedal is released, the spring in the stop lamp switch returns the actuating pin to its normal position and the circuit to the stop lamp opens.

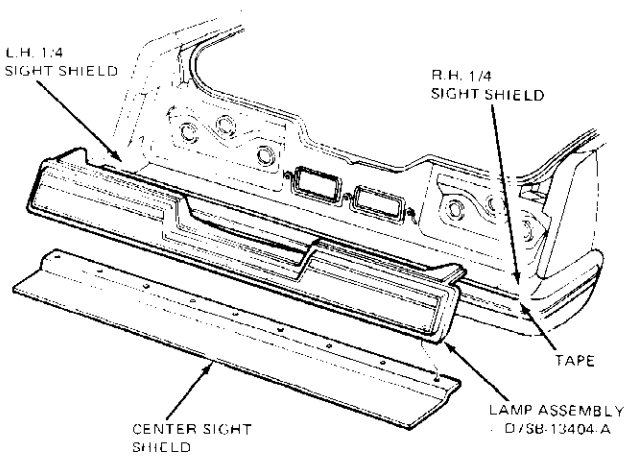


FIG. 18 Rear Lamp Installation—Thunderbird

1. Disconnect the wire harness at the connector from the switch.
2. Remove the hairpin retainer, slide the stop lamp switch, the push rod and the nylon washers and bushing away from the pedal, and remove the switch (Fig. 22).
3. Position the switch, push rod, and bushing and washers on the brake pedal pin, as shown in Fig. 22 and install the hairpin retainer.
4. Assemble the wire harness connector to the switch and install the wires in the retaining clip (Fig. 22).

Granada, Versailles and Monarch with Vacuum-Powered Brakes

Removal

1. Disconnect the negative battery cable.
2. Disconnect the stoplamp switch wire connector from the switch.
3. IMPORTANT—Loosen the brake booster nuts at the pedal support approximately 1/4 inch so booster is free to move eliminating binding during switch removal.
4. Remove the hairpin retainer and outer nylon washer from the pedal pin. Slide the stoplamp switch off the brake pedal pin just far enough for the outer arm to clear the pin. Then remove the switch.

Installation

1. Position the new stoplamp switch so that it straddles the push rod, with the slot on the pedal pin and the switch outer frame hole just clearing the pin. Slide the switch upward onto the pin and push rod. Slide the assembly inboard toward the brake pedal arm.
2. Install the outer nylon washer and the hairpin retainer.
3. Tighten the booster attaching nuts to specification.
4. Connect the stoplamp switch wire connector to the switch. Connect the negative battery cable.
5. Check the stoplamps for proper operation.

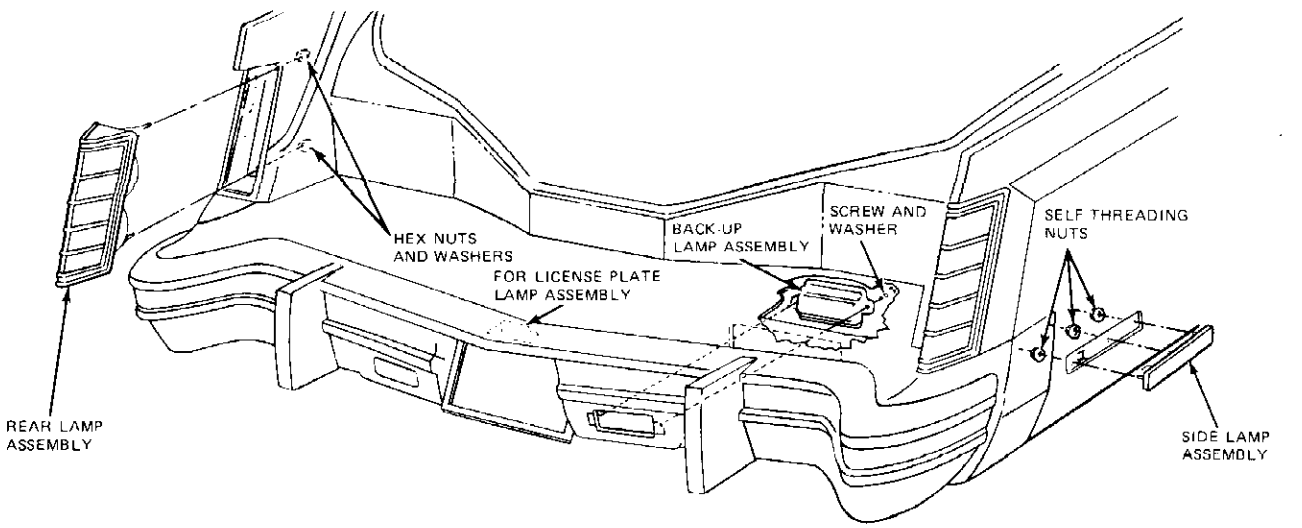


FIG. 19 Rear Lamp Installation—Continental Mark V

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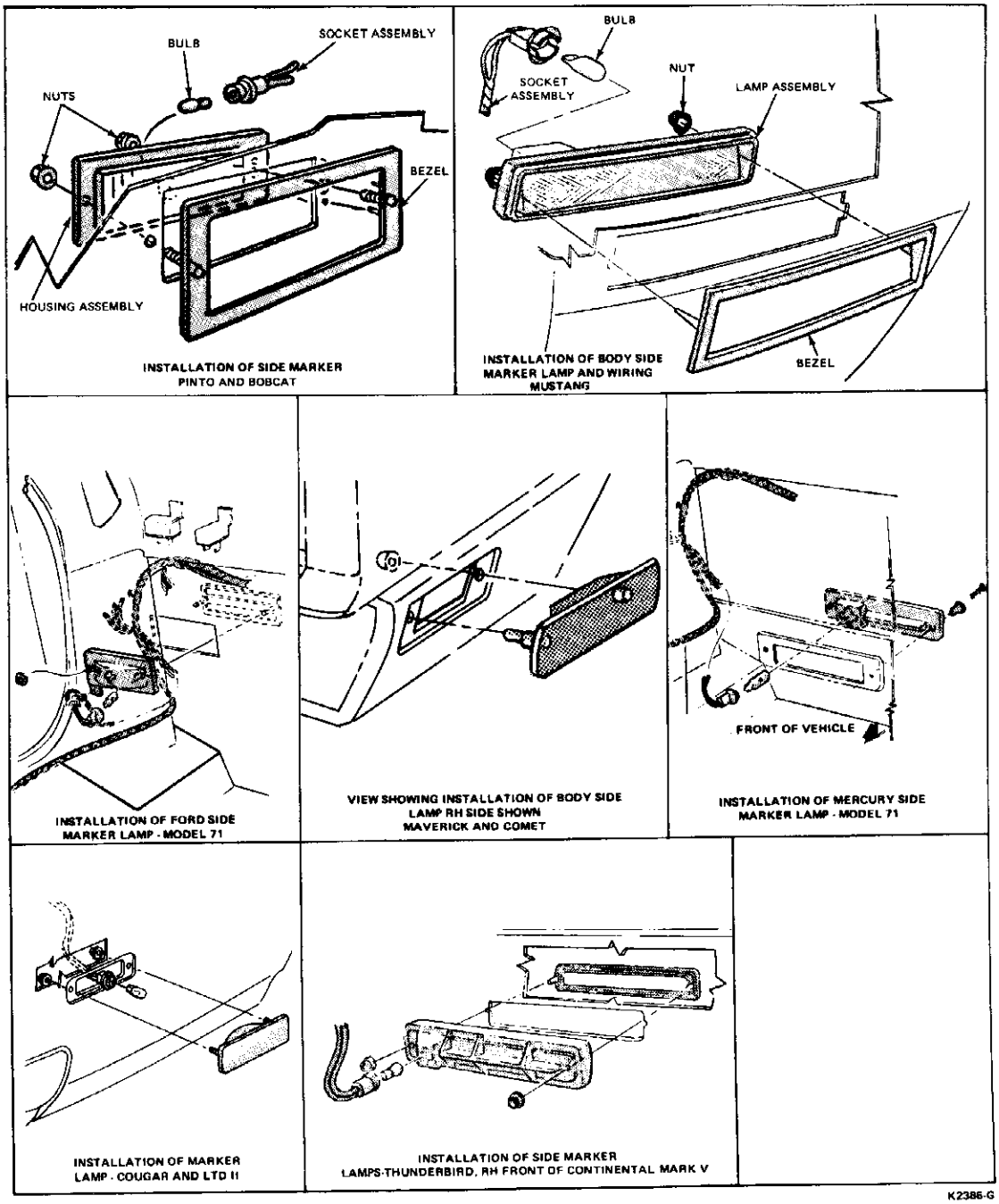


FIG. 20 Rear Marker Lamp Installation

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LICENSE PLATE LAMP

All Except Ford and Mercury Station Wagon

To replace the license lamp assembly, remove the two lamp body retaining screws and remove the lamp assembly. Remove the socket and the bulb, from the back of the lamp body.

Station Wagon—Except Ford and Mercury

The lamp can be rotated in the wrong direction which will force the locking tab out of its retaining notch and possibly break it. The license lamp lens and bezel can be removed, for bulb replacement, by turning the lens counterclockwise. By turning the lamp body seven-eighths (7/8) of a turn clockwise, the lamp body can be removed from the rear body.

BACK UP LAMPS

Ford—Except Station Wagons

The back-up lamp is located on each end of the deck lid applique. The bulb can be replaced from inside the luggage compartment by removing socket from lamp housing.

To replace the rear reflector or back-up lens, first remove the attaching nuts from the underside of the deck lid and remove rear applique from vehicle. Remove the back-up body and lens assembly from applique by removing the four attaching nuts. The lens cannot be replaced by itself. It must be serviced as a lens and body assembly.

Mercury—Except Station Wagons

To service bulbs, loosen luggage compartment trim cover. Remove socket from lamp body (part of cover assembly). To service back-up lamp components, proceed as above. Remove both rear lamp assemblies as outlined in this Part. Remove twelve (12) nut and washer assemblies from cover retaining studs. Pull cover rearward. Remove four (4) screws attaching the lamp assembly to the cover. For installation, reverse above procedure, using new nut and washer assemblies to provide adequate seal.

Fairmont and Zephyr—Station Wagons

To replace the back-up lamp assembly, remove the screws that retain the license lamp unit to the tailgate. These screws are accessible from the interior side of the tailgate panel. Separate the module from the vehicle. From the back side of the unit, remove the screws that retain the back-up lamp assembly to the unit.

Incorporated In Rear Lamp Assembly

To replace a bulb, follow procedures outlined under Rear Lamps.

BACK-UP LAMP SWITCH

Before replacing a back-up lamp switch, be sure to check the condition of the lamp bulbs.

Since all back-up lamp switches are operated by the transmission selector lever, replacement procedures differ according to mounting location of the selector lever and type of transmission used.

Floor Or Console Mounted—Automatic Transmission

Vehicles equipped with a floor or console-mounted automatic transmission still have a neutral start switch. On these vehicles, the back-up lamp switch is an integral part of the neutral start switch. For adjustment and removal and installation procedures, refer to Group 17.

Column Mounted With Automatic Transmission

1. Disconnect the back-up lamp switch wires at the plug connector. On vehicles so equipped, disconnect the two parking brake release vacuum hoses.
2. Remove the two screws, securing the back-up lamp switch to the steering column and lift the switch from the column.

   On vehicles other than LTD II, Cougar, Thunderbird and Continental Mark V, check the column to be sure that the metal switch actuator is secured to the shift tube and that it is seated as far forward against the shift tube bearing as is possible. Also check for a broken or damaged actuator.
3. Before installing a new switch to the column, check to see that the drive position gauge is inserted in the drive pinning hole. If the pin is missing, align the two holes at the drive pinning hole on top of the switch and install a No. 43 drill or 0.092-0.093 inch gauge pin.
4. While holding the selector lever against the stop in the drive detent position, place the switch on the column and install the two attaching screws.
5. Remove the gauge pin (or No. 43 drill if used).
6. Connect the switch wires to the plug connector and connect the two parking brake release vacuum hoses.

Column-Mounted—Manual Transmission

The switch is mounted at the lower end of the steering column, but does not require pinning in any position.

Remove the wire retaining clip (one screw) from the brake pedal support extension. Disengage the switch wiring from the clip and disconnect at the plug connector. Remove the switch from the steering column (two retaining screws).

When installing the switch, route the wiring from behind the back face of the clip and around through the clip jaws, and then mount the clip and wiring to the brake pedal support extension.

Floor Mounted—Manual Transmission

3-Speed Fairmont, Zephyr, Versailles, Granada and Monarch

Place the shift control lever in neutral and raise the vehicle on a hoist. Disconnect the switch lead wires at the connector, and remove the switch and bracket assembly (one retaining bolt) from the selector lever support bracket. Install a new switch, bracket and wiring assembly to the support bracket and connect the

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wires. Make sure switch is inside shift mechanism boot and that reverse shift lever directly activates switch plunger.

4-Speed—Pinto, Bobcat and Mustang II

Place the shift control lever in neutral and raise the vehicle on a hoist. Disconnect the electrical connector from the switch. Unscrew switch from the transmission extension. Screw in new switch by hand and torque to a maximum of 5 ft-lbs. Connect electrical connector to the new switch.

COACH LAMP

Lincoln Continental and Versailles

A coach lamp is mounted on the center pillar of the Lincoln Continental and Versailles.

To replace the lamp bulb, first remove the screw at the bottom (and top on half-vinyl roof) of the bezel. Remove bezel from pillar retainer clip by pulling at top of bezel (full vinyl roof). Remove lamp assembly from pillar and twist socket one-third (1/3) turn counterclockwise to remove it from the housing. Pull out lamp bulb.

REAR LAMP WIRING—FLAT FLEXIBLE

Open Circuit Conditions—Fairmont, Zephyr, LTD II and Cougar

1. Locate the open circuit.
2. Disconnect the negative battery cable from the battery.
3. Cut the plastic covering along the flat wire edges 1/2-inch back from each side of the open circuit.
4. Obtain 4 inches of 18-gauge stranded wire and strip 1/4-inch of insulation from each end.
5. Crimp a repair terminal on each end of the 4-inch wire. Crimp the female portion of repair terminal onto flat wire strip with Tool No. D7AB-17025-AA. Tape each repair terminal with electric tape.
6. Press jumper wire firmly against the wire harness. Cover with 3 layers of tape.
7. Reconnect negative battery cable and test lamps.

Separated Round Wire Weld Junction

1. Crimp repair terminal on end of round wire lead *which separated from flat wire.*
2. Cut plastic covering on flat wire edges 2 inches on each side of point of separation.
3. Place flat wire in service terminal and crimp firmly.
4. Follow Open Circuit Conditions steps above.

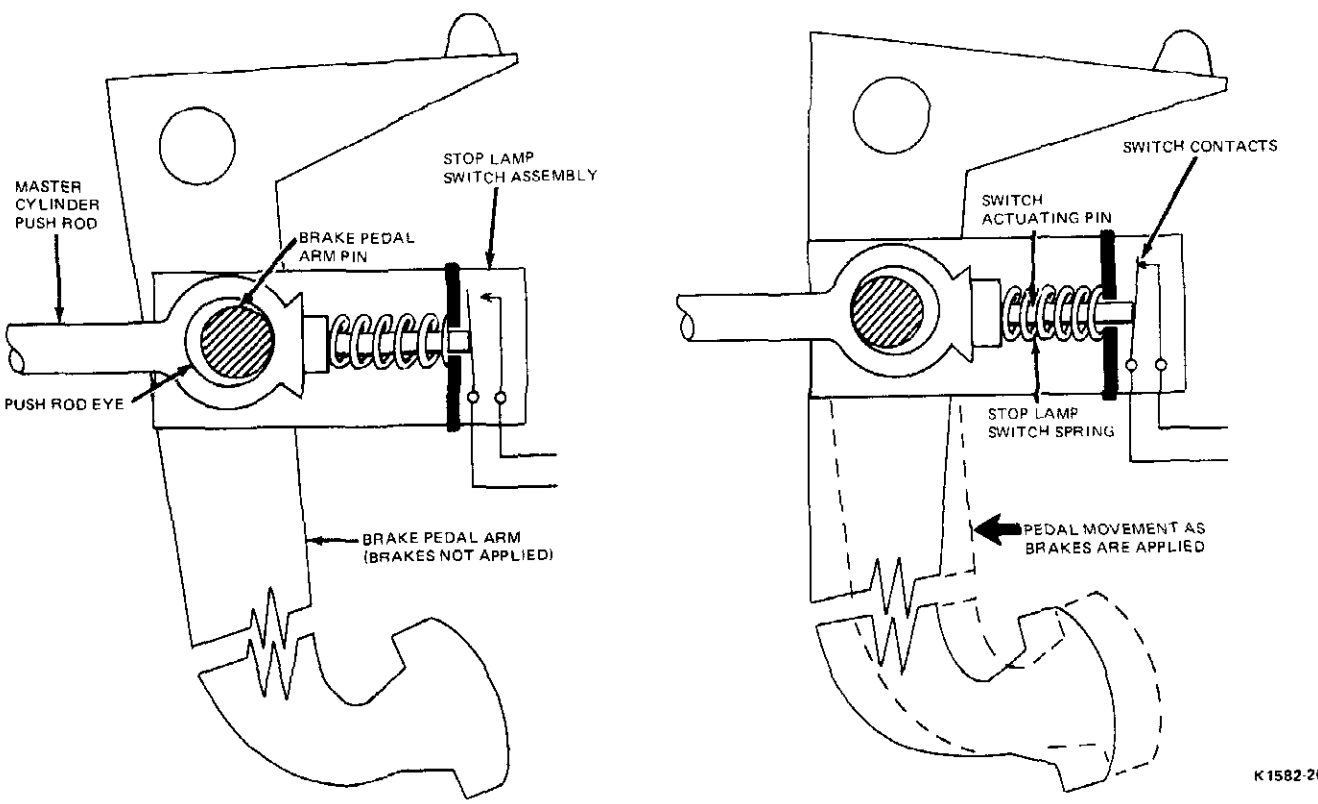


FIG. 21 Mechanical Stop Lamp Switch Operation

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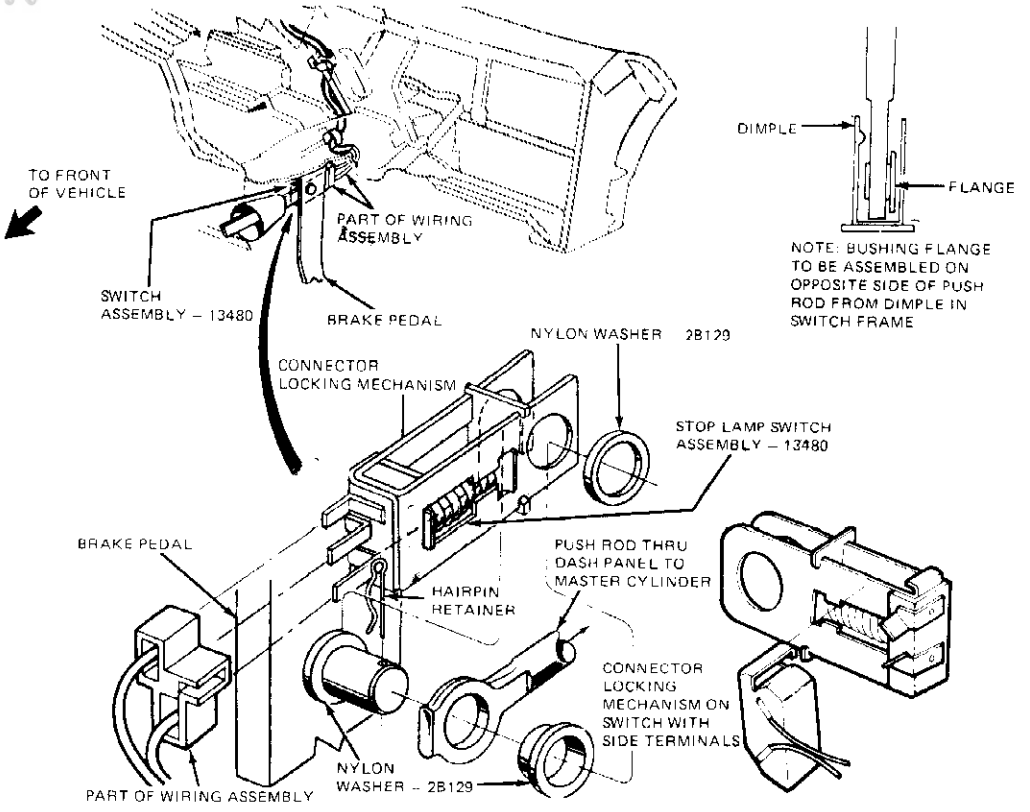


FIG. 22 Typical Stop Lamp Switch Installation

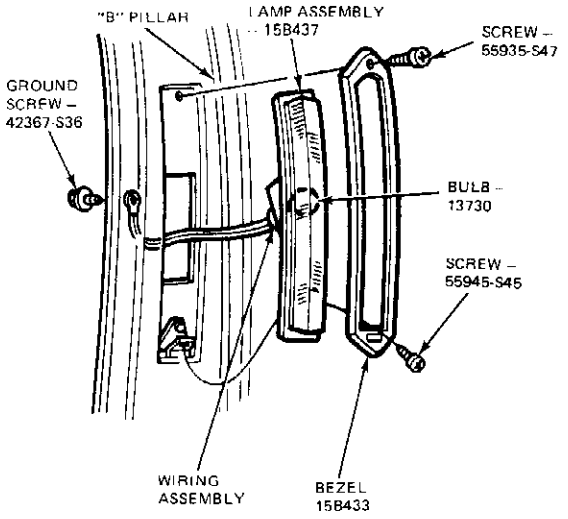


FIG. 23 Coach Lamp—Versailles

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Turn Signal and Hazard Flasher

PART 32-40

Applies to All Models

SUBJECT	PAGE
DESCRIPTION AND OPERATION	40-1
REMOVAL AND INSTALLATION	
Flasher Units	40-1
REMOVAL AND INSTALLATION (Cont'd.)	
Turn Signal/Hazard Flasher Switch and Wire Assembly	40-2

CK3373-2B

DESCRIPTION AND OPERATION

TURN SIGNAL AND HAZARD FLASHER SYSTEM

ALL VEHICLES

The turn signal and hazard flasher switches are integral parts of the same switch assembly mounted on the steering column hub.

The turn signal switch lever is on the left side of the upper steering column hub. The hazard flasher switch knob is located on the right or lower side of the upper steering column hub.

To operate the turn signals, the ignition switch must be in either the ACC or ON position. To indicate a normal full turn, move the turn signal switch lever to the second stop position for the turn desired. The lever will remain in position without manual effort until the turn is completed, at which time the steering wheel will automatically cancel the turn signals.

The hazard flasher system is operated independently of the ignition switch. All turn signal lights can be made to flash at the same time by pulling out the actuating knob of the hazard flasher switch located on the side of the steering column. Flashing is discontinued when the brake pedal is depressed.

Two flasher units are used. One unit is used in the turn signal circuit, and the other for the hazard flasher system. Refer to the Wiring and Vacuum Diagrams Manual, Form 7795P-78.

The turn signal system also has a lane change feature. To operate the lane change system, move and hold the turn signal lever to the first stop position when changing lanes. When the lane maneuver is completed, release the lever and it will return to the OFF position.

REMOVAL AND INSTALLATION

FLASHER UNITS

Refer to Fig. 1, for the flasher locations and the various types of flasher mounting.

SLOT MOUNTED FLASHERS

To remove this type of flasher, reach under the instrument panel, disconnect the wiring plug, and rotate

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the unit 90 degrees counterclockwise to disengage it from the mounting slot. To install, lock the flasher in place by inserting the tab in the slot and rotating 90 degrees clockwise. Reconnect the wiring plug.

TURN SIGNAL/HAZARD FLASHER SWITCH AND WIRE ASSEMBLY

Removal

1. Remove the retaining screw from the underside of each steering wheel spoke, and lift off the pad horn switch/trim cover and medalion as an assembly. Disconnect the horn switch wires from the terminals on all except stalk-mounted horn switch.
2. Remove the steering wheel retaining nut and, using Tool 3600AA or equivalent, remove the steering wheel from the shaft.
3. Remove the turn signal switch lever by unscrewing it from the steering column.
4. Remove the shroud from under the steering column.
5. Disconnect the steering column wiring connector plugs from the bracket as shown in Fig. 2, and remove the screws that secure the switch assembly to the column.
6. On all vehicles with a tilt column, remove the wires and terminals from the steering column wiring connector plug with a very small screwdriver and/or paper clip (Fig. 3). **Record the color code and location of each wire before removing it from the connector plug.**

   A hole provided in the flange casting, on fixed columns, makes it unnecessary to separate the wires from the connector plug. The plug with wires installed can be guided through the hole. With a tilt column however, the bracketry and narrow clearances at the lower end of the column require separation of the wires from the plug.
7. Remove the plastic cover sleeve from the wiring harness and remove the switch and wires from the top of the tilt column.
8. **Transfer the ground brush located in the turn signal switch cancelling cam to the new switch assembly on vehicles equipped with speed control.**

Installation

1. Route the wires through the top of the column, so that they come out below the flange casting, and secure the switch to the column with the retaining screws.
2. If the wires were separated from the connector plugs, install the plastic cover sleeve over the wiring harness and press the wire terminals into their correct location in the plug.
3. Connect the plugs to their mating plugs at the lower end of the column (Fig. 2).
4. Install all retaining clips, shrouds and covers that were removed and install the turn signal switch lever.
5. Install the steering wheel and retaining nut and torque to specifications.
6. Connect the horn switch wires and install the pad, horn switch/trim cover and medalion as an assembly to the steering wheel. Install the retaining screws.

Vehicle Line	Type of Mounting	Turn Signal Flasher Location	Hazard Flasher Location
Ford, Mercury, Lincoln Continental	Fuse Panel	Left Hand Sheet Metal End of Instrument Panel	Located in Fuse Panel L.H. Toe Board
Mustang	On Fuse Panel	Fuse Panel	Fuse Panel
Fairmont	Tab and Slot Tape	Instrument Panel Bracket Above Glove Box	Instrument Panel Bracket Above Glove Box
Zephyr	Tab and Slot Tape	Same as Fairmont	Same as Fairmont
Pinto	Tab and Slot	Behind Fuse Panel	Behind Fuse Panel
LTD II, Cougar, Thunderbird, and Continental Mark V	On Fuse Panel	Mark V: Center of Instr. Panel Others: On Fuse Panel	On Fuse Panel
Granada, Monarch, Versailles	Tab and Slot Tape	Instrument Panel Lower Flange – Right of Steering Column	Taped to 14401 Harness Between Instrument Panel and Steering Column Connections

CK2451-2H

FIG. 1 Flasher Unit Locations

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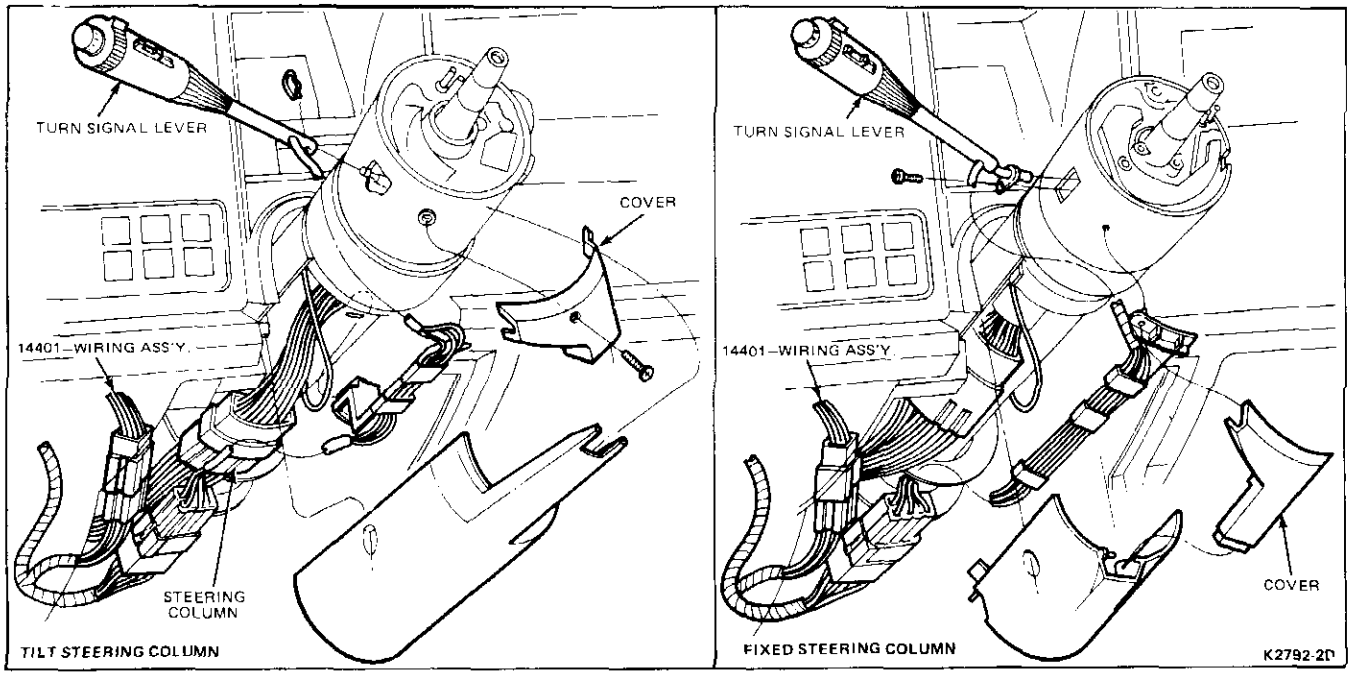


FIG. 2 Column Wire Connectors (Typical)

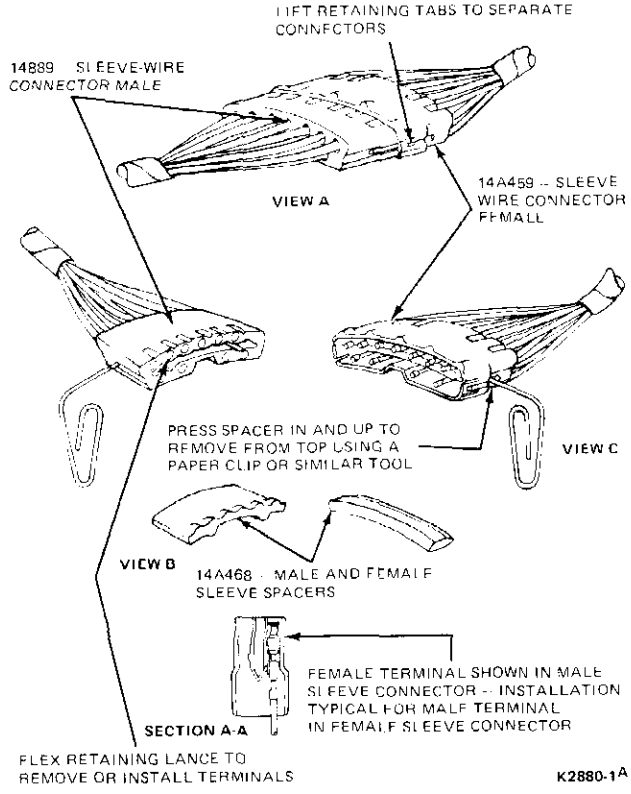


FIG. 3 Wire Terminal Removal

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Interior Lamps

PART 32-60

Applies to All Models

SUBJECT	PAGE
DESCRIPTION AND OPERATION	
Dome and Map Lamp Combination	60-1
REMOVAL AND INSTALLATION	
Cargo Lamps	60-3
Courtesy Lamp	60-2
Courtesy and Map Lamp Combination	60-3
Dome and Map Lamp Combination	60-2
REMOVAL AND INSTALLATION (Cont'd.)	
Dome Lamp	60-2
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Glove Compartment Lamp	60-4
Map Lamp and Switch	60-3
Reading Lamp Rear	60-3
Transmission Control Selector Lamp	60-4

CK3374-2B

DESCRIPTION AND OPERATION

DOME AND MAP LAMP COMBINATION

All Except Pinto, Bobcat, Mustang II, Fairmont and Zephyr

The two map lamps are located on each side of the dome-map lamp housing (Fig. 1). The map lamps are operated independently of the dome lamp by two switches located at each map lamp housing. The dome lamp is actuated by turning the headlamp switch control knob fully counterclockwise. The dome lamp also illuminates when the doors are opened, or by the switch in the pillar.

Pinto, Bobcat, Mustang II, Fairmont and Zephyr

The courtesy and map lamps on Pinto, Bobcat, Mustang II, Fairmont and Zephyr are located on the ceiling between the visors. The lamp usually retains the inboard ends of the visor on Pinto, Bobcat and Mustang II. The visor ends are not retained on Fairmont and Zephyr. The dome lamp is actuated by turning the headlamp switch control knob fully counterclockwise. The dome lamp also illuminates when the doors are opened (switch in pillar) and when the rear door on a three door model is opened (switch in latch assembly). NOTE: Rear door switch is optional. The map lamp is housed separately above the courtesy lamp, and is turned on when pulled down from the stowed position (Fig. 2).

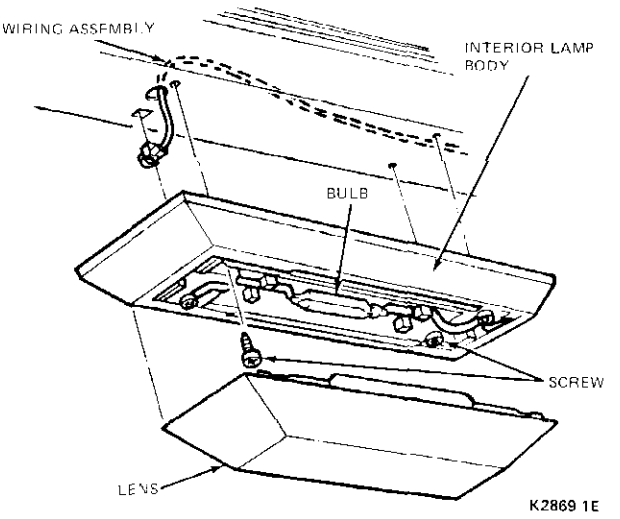


FIG. 1 Dome and Map Lamp Combination – Except Pinto, Bobcat, Mustang II, Fairmont and Zephyr

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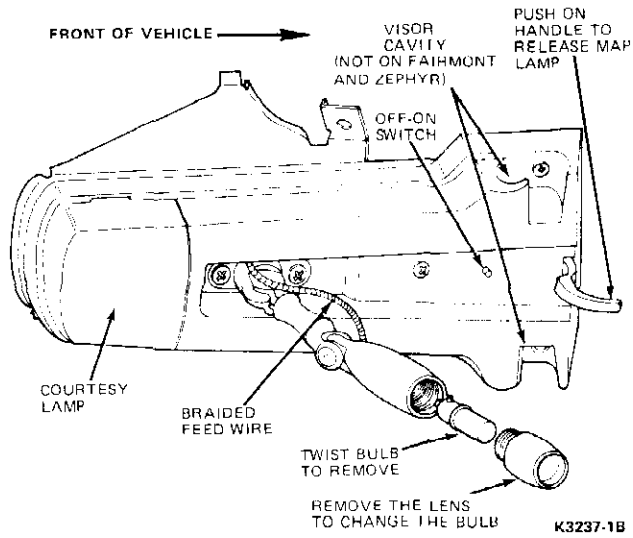


FIG. 2 Door Courtesy and Map Lamps—Pinto, Bobcat and Mustang II

REMOVAL AND INSTALLATION

DOME AND MAP LAMP COMBINATION

Ceiling Mounted—Except Pinto, Bobcat, Mustang II, *Fairmont and Zephyr*

Carefully pry the dome lamp lens, at the corners from the housing (Fig. 1). Remove the two screws retaining the map lamp lens housing to the lamp base and remove the bulbs. To remove the lamp base, remove the four retaining screws.

DOME LAMP—FAIRMONT AND ZEPHYR

The dome lamp assembly must be removed from its mounting to replace lamp bulb. Using your fingers, pull down on the left-hand side of the dome lamp assembly. Using a pair of long-nose pliers or equivalent, slide the bulb out of its socket. Be careful not to break the bulb; wear eye protection. See Fig. 3.

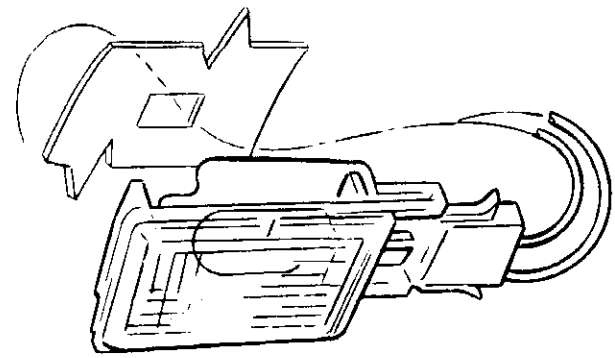


FIG. 3 Dome Lamp—Fairmont and Zephyr

DOME LAMP—PINTO, BOBCAT AND MUSTANG II

To replace the bulb, carefully pry the dome lamp lens from the housing. The entire lamp assembly may be removed by removing the two attaching screws as shown in Fig. 4.

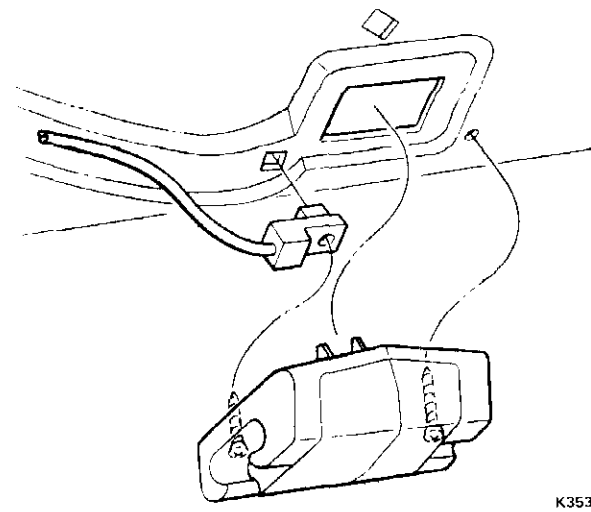


FIG. 4 Dome Lamp—Pinto, Bobcat and Mustang II

COURTESY LAMP

Door Mounted—Continental Mark V Only

To service the bulb(s), pry out the white lens at the ends, and then remove the bulb(s).

To remove the door-mounted courtesy lamp, first remove the door trim panel as outlined in Group 45. Then, remove the two lamp retaining nuts from the rear side of the panel and remove the courtesy lamp assembly.

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COURTESY AND MAP LAMP COMBINATION

Ceiling Mounted—Pinto, Bobcat, Mustang II, Fairmont and Zephyr

To remove map lamp, push retainer forward. To remove bulb first remove lens by unscrewing it from the barrel; then push bulb in and turn counterclockwise. To remove courtesy lamp, first remove lens by squeezing in at sides and pulling down. Pull courtesy lamp bulb out of its retainer.

Instrument Panel Mounted—Continental Mark V, LTD II, Cougar, Mustang II, Fairmont and Zephyr

Front compartment foot well courtesy lamps are mounted on the lower flange at both ends of the instrument panel. The bulbs are accessible from under the instrument panel for replacement without removing other parts.

READING LAMP REAR

Lincoln Continental and Continental Mark V

Rear seat lamps are mounted in the rear pillar trim panels and controlled by switches on trim panel. To replace a bulb, remove the lens from the lamp assembly. To remove the lamp assembly, remove the upper trim panel (Group 45), remove the two retaining nuts, disconnect the wiring connector and remove the lamp.

CARGO LAMPS—FORD, MERCURY, PINTO AND BOBCAT STATION WAGON

To replace bulb, remove the two screws that retain the lens to the lamp body. See Fig. 5.

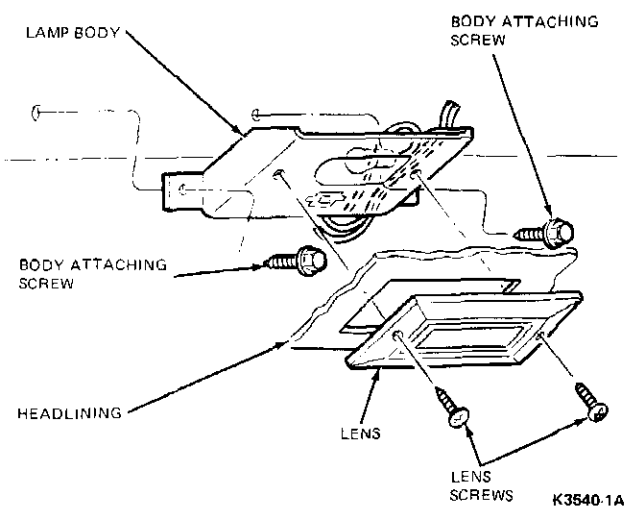


FIG. 5 Cargo Lamp—Ford and Mercury Station Wagon Shown (Pinto and Bobcat Similar)

CARGO LAMPS—FAIRMONT AND ZEPHYR STATION WAGON

To service the lamp bulb, remove the lens by inserting a small blade screwdriver between the end of the lens and lamp body and carefully pry the lens out of the body (see Fig. 6). Using a pair of long-nosed pliers, slide the bulb out of its socket. Be careful not to grip the bulb tightly; it could break. Wear eye protection.

MAP LAMP AND SWITCH

Lincoln Continental

The map lamp mounted in the center of the instrument panel pad is accessible for service by removing the three retaining screws from the map lamp assembly. To change the bulb, lower the lens from the lamp body after removing the two retaining screws and replace the bulb in the socket. Then position the lens to the lamp body, and install the screws.

To replace the switch, remove the three retaining screws in the trim plate and pull the assembly down far enough to gain access to the map lamp switch. Remove the map lamp lens attaching screws and remove the lens; then, remove the bulb. Disengage the bulb retaining clips from the map lamp body. Remove the switch attaching screws (two), disconnect the bullet connector (black wire) and remove the switch assembly. Install the new switch into position, connect the bullet connector and install the attaching screws. Snap the bulb retaining clips into position and install the bulb. Install the map lamp lens. Position the trim plate to the instrument panel and install the attaching screws.

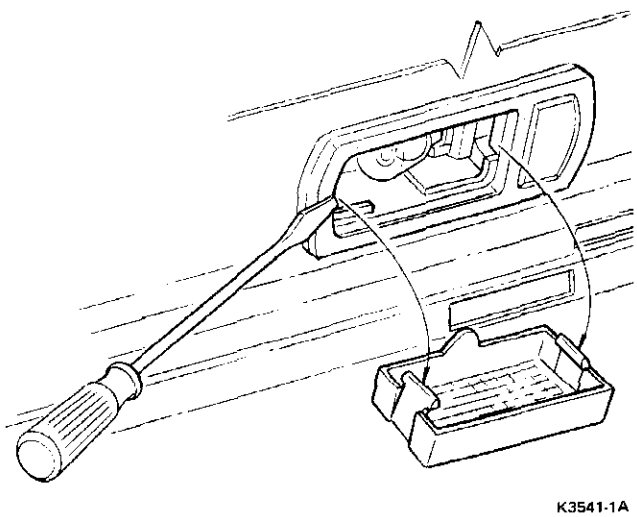


FIG. 6 Cargo Lamp—Fairmont and Zephyr Station Wagon

DOME LAMP SWITCH

Pinto, Bobcat and Mustang II

Unscrew the hex sleeve nut from the pillar, extract the switch and pull the wiring connector off the switch.

The new switch is locked onto the (14401) wiring connector by one of three tabs positioned 120 degrees apart on the switch. If, when the switch is disconnected from the wiring connector, the engaged locking tab breaks off, the switch must be rotated 120 degrees to engage a new tab. If all three tabs have been broken, the switch must be replaced.

To install the switch in the pillar, pull the wiring connector and wiring through the switch mounting hole

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in the pillar and connect the switch to the connector (Fig. 7). Then, twist the wiring and switch six turns *counterclockwise, push the wiring and connector back* through the mounting hole and screw the switch into the pillar until it is seated. Close and open the door to assure that the courtesy lamp and ignition key warning buzzer systems are operating properly.

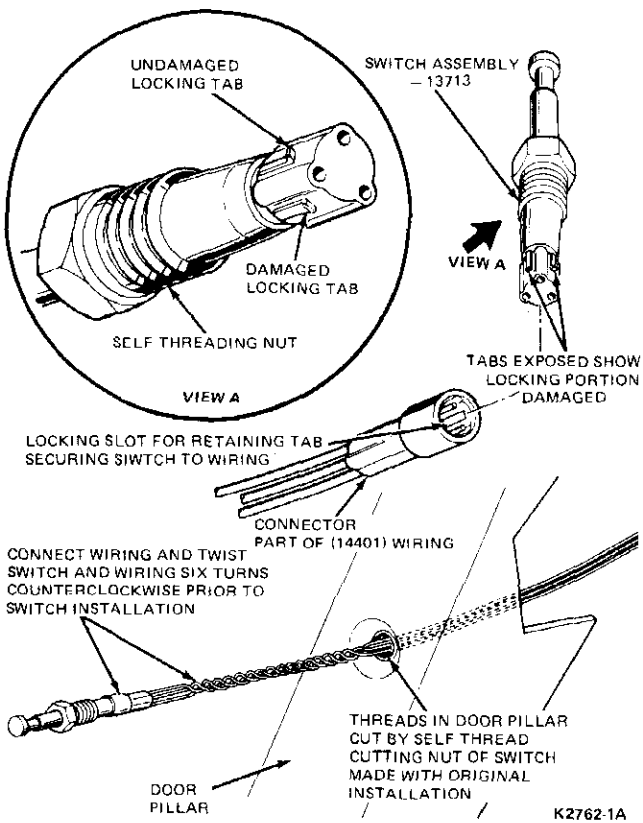


FIG. 7 Dome Lamp Swith—Pinto, Bobcat and Mustang II

TRANSMISSION CONTROL SELECTOR LAMP

Floor Mounted

1. Remove the four retaining screws from the selector lever cover and dial indicator on the floor.
2. Lift the lever cover assembly and replace the bulb.
3. Position the cover to the floor and install the four cover retaining screws.

Console Mounted

1. Remove the finish panel from the console.
2. Remove the quadrant bezel.
3. *Position the selector lever in the "1" position and* remove the lamp socket and bulb from its retainer.
4. Replace the bulb and install the socket in the retainer.
5. Install the quadrant bezel.
6. Position the finish panel and install the retaining screws.

Instrument Panel Mounted

On Ford and Mercury vehicles, the lamp is mounted on the instrument panel. The lamp can *be replaced from behind the panel.*

Steering Column Mounted—Fixed Column

For access to the lamp bulb remove the horn switch assembly (one retaining screw at underside of each steering wheel spoke) and the steering wheel (Tool 3600AA). Remove the turn signal switch lever (unscrew). Remove the three retaining screws and lift the turn signal switch out of the way. Do not disconnect or remove the switch and wiring. Remove the lamp bulb from the flange casting.

GLOVE COMPARTMENT LAMP

Ford and Mercury

The glove compartment lamp is mounted in the trim board above the compartment bin. To remove the lamp *assembly, pry the front tabs down with a flat-bladed* screwdriver. To install, place lamp assembly in position and push up on front tabs. To replace bulb, push out with thumb and finger.

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DETROIT IRON

Illuminated Entry

PART 32-80

All Except Pinto, Bobcat, Mustang II, Fairmont and Zephyr

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION	80-1	DIAGNOSIS	80-2
		REMOVAL AND INSTALLATION	80-4

DESCRIPTION

The illuminated entry system is intended to assist vehicle entry during the hours of darkness by providing illumination of the door lock cylinder, so it may be easily located for key insertion. The vehicle interior will also be illuminated by the courtesy lamps. The system is available on Ford, Mercury, Lincoln Continental, Continental Mark V, Thunderbird, LTD II, Cougar, Ranchero, Granada, Monarch, Versailles and Mustang II.

Activation of the system is accomplished by raising the outside door handle, or on the Lincoln, by pushing the door handle button, as if to open the door.

This action momentarily closes a switch mounted on the door latch mechanism, which completes the ground circuit of the electronic module and switches the system on. The vehicle interior lights turn on, and both front door lock cylinders are illuminated by a ring of light around the area where the key enters. This illumination will remain on for approximately 25 seconds, then automatically turn off. During this 25 second period, the system can be manually deactivated by turning the ignition switch to either "run" or "acc" position.

The system will be activated every time the outside front door handles are operated, whether the vehicle is locked or not. Opening the doors from the inside of the vehicle will not activate the system.

If the outside door handle is held up indefinitely so that the latch switch is continuously closed, the system will operate as normal and turn off after 25 seconds. At the completion of this cycle, if the door handle is still in the raised position, the system will remain off, and it will be impossible to activate the system from the other front door handle until the raised handle is returned to its normal position. This function is built into the logic circuitry of the system to prevent battery discharge, should the outside door handle be intentionally propped up or become jammed in any way.

The system consists of 3 main components: the electronic module, the illuminated door lock cylinder, and the door latch switch, plus the wiring harness (see Fig. 1).

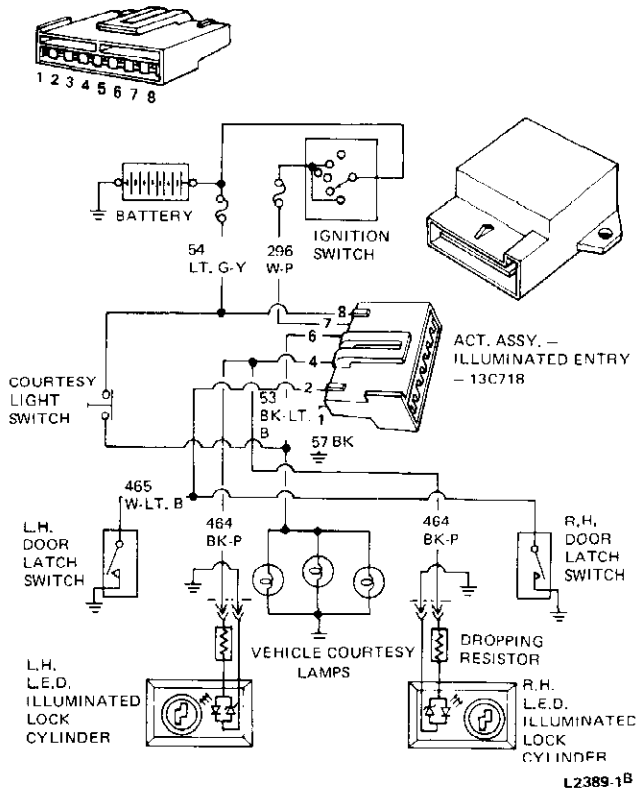


FIG. 1 Illuminated Entry Wiring Schematic

The module is mounted behind the instrument panel in the vicinity of the glove box and can be serviced from beneath, or from the front of the instrument panel on all carlines except Granada/Monarch/Versailles. On these carlines the crash pad must be removed to gain access to the module. A mounting bracket is used on Ford, Mercury, Granada/Monarch/Versailles and Mustang. On all other carlines the module is attached directly to the instrument panel.

Housed within the module is a printed circuit board, the logic circuitry, and a relay to switch B+ to the various circuits. The normal operating voltage is 9 to 16 volts, but the unit will withstand voltage up to 24 volts for a period of 15 minutes. It cannot be damaged by reverse voltages and is unaffected by vehicle transients.

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The door lock cylinder is unique to this system. It is rectangular in shape and common to all illuminated entry vehicles. A light-emitting diode (L.E.D.) provides the light source to a lens system built into the cylinder. Normal operating voltage for the L.E.D. is 3 volts. A resistor built into the harness protects the L.E.D., and is important when checking the lock cylinder illumination that 12 volts is applied only to the connector terminals. If the resistor is by-passed and 12 volts is applied to the wires between the resistor and the lock cylinder by the use of needle type probes, the L.E.D. will be instantly destroyed. Correct polarity must be observed by applying B+ to the red wire; otherwise, the L.E.D. will not light. If leads are reversed, however, no damage will be done to the assembly.

The lens system built into the cylinder is made of Acrylic Resin with a highly polished lustrous surface, and will retain its fine appearance if given proper care. A mild soap and water solution is all that is usually *required to keep the lens in its original condition. Should* the lens become contaminated with oil or grease, clean with approved solvents such as hexane, dry cleaning naptha, kerosene or methanol. Since these solvents are flammable as well as toxic, use with adequate ventilation and away from open flames. Solvents such as benzene, gasoline, acetone, carbon tetrachloride or denatured alcohol should **never** be used, as they will soften and deteriorate the lens surface causing a permanent loss in light output.

The latch switch is a grounding type leaf switch and is attached to the latch mechanism by one screw (see Fig. 2).

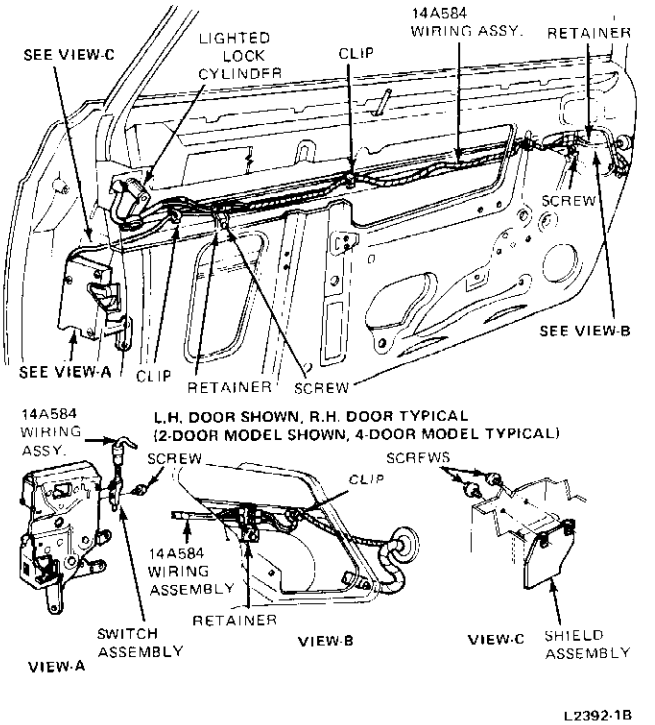


FIG. 2 Illuminated Entry System (Typical)

DIAGNOSIS

QUICK CHECKS

1. Verify that courtesy lamp circuit is working properly. If not, check fuse.
2. With the ignition switch in "accessory" or "run" position, verify that other systems which share the same accessory fuse are functional. If not, check fuse.
3. If any of the above systems are not working properly, repair the inoperative circuit and then re-check the operation of the illuminated entry system before proceeding with the following complete check-out procedure.

ILLUMINATED ENTRY SYSTEM CHECK-OUT PROCEDURE

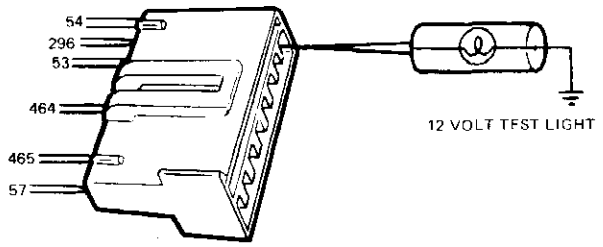
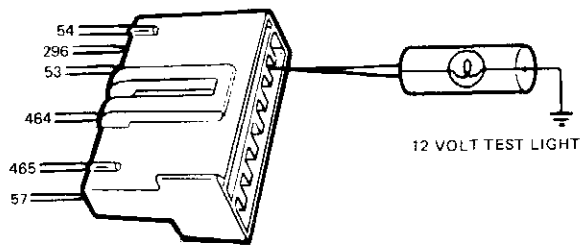
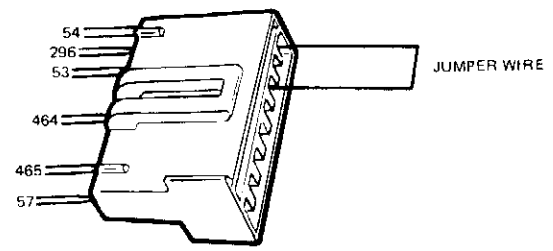
1. Terminal numbers referred to in the following procedure relate to the wiring connector attached to the illuminated entry actuator assembly. The terminals are numbered from left to right (when the connector is held as shown).
2. Any malfuntions diagnosed in Steps 4 and 5 in the charts below could be located in either front door.
3. When necessary to trace and/or repair the various circuits, refer to the respective vehicle wiring diagrams.
4. Check system fuses (2) before proceeding.

AFTER TESTING

If all of the preceding tests check out okay and the illuminated entry system is still malfunctioning, the actuator assembly is the cause of the problem and must be replaced.

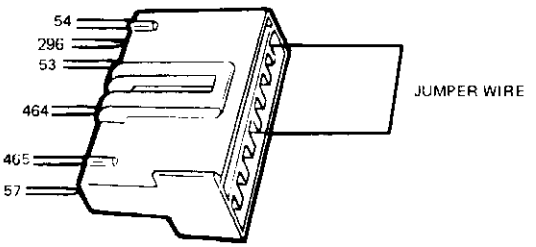
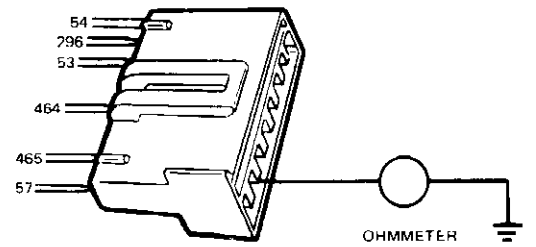
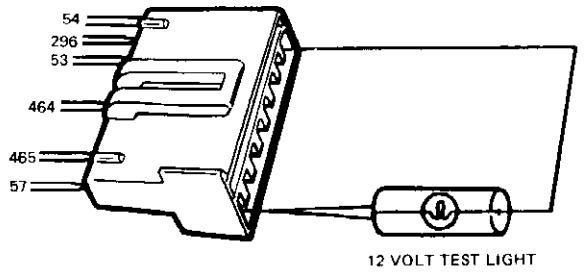
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DETROIT IRON

OPERATION	RESULT
Step 1 – Connect a 12 volt test light between Terminal No. 8 and a good ground 	Whether ignition is "On" or "Off," the test light should glow. If not, trace circuit 54 (light green with yellow stripe) back to fuse panel and repair.
Step 2 – Connect a 12 volt test light between Terminal No. 7 and a good ground. 	The test light should glow when the ignition switch is in ACCY or RUN and go out when the switch is turned to "Off" or "Lock." If not, trace circuit 296 (white with purple stripe) back to fuse panel and repair.
Step 3 – Connect a jumper wire between Terminals No. 6 and 8. 	With vehicle doors closed, interior courtesy lights should be on. If not, trace circuit 53 (black with light blue stripe) and repair.

CL2390-2A

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OPERATION	RESULT
Step 4 – Connect a jumper wire between Terminals No. 4 and 8.  	Both door lock cylinders should be illuminated. If not, trace circuit 464 (black with pink stripe) back to lock cylinder and check continuity between connector terminal at lock cylinder pigtail and the module connector to verify the wiring is good. If wiring is good, check pigtail resistor value using a needle probe and ohmmeter. Should read 135 to 198 ohms. If not, replace pigtail with service part. If yes, replace lock cyl. assy.
Step 5 – Connect an ohmmeter between Terminal No. 2 and a good ground.  	The ohmmeter should show over 10,000 ohms (open). Then, operate each outside door handle in turn, ohmmeter should show not more than 50 ohms (closed). If either readings are incorrect, then trace circuit 465 (white with light blue stripe) back to latch switches and repair. **Note:** When operating door handle, hold in raised position.
Step 6 -- Connect a 12 volt test light between Terminal No. 1 and Terminal No. 8.  	The test light should glow. If not, trace circuit 57 (black) back to ground and repair.

CL2391-2B

REMOVAL AND INSTALLATION

See Fig. 2 for removal and installation and electrical disconnect points.

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DETROIT IRON

INSTRUMENTS, CLUSTERS AND CONTROLS

GROUP 33

PART TITLE	PART NO.
CHARGE INDICATOR – AMMETER	33-11
CHARGE INDICATOR – LAMP	33-10
CLOCK	33-05
FUEL ECONOMY INDICATING SYSTEMS	33-60
FUEL INDICATING SYSTEM	33-20
IGNITION SWITCH	33-70
INSTRUMENT CLUSTER AND PRINTED CONTROL	33-50
OIL PRESSURE INDICATOR – GAUGE	33-31
OIL PRESSURE INDICATOR – LAMP	33-30
SPEEDOMETER	33-01
TACHOMETER	33-03
TEMPERATURE INDICATOR	33-40

CK3375-2B

Speedometer

PART 33-01

Applies to All Models

SUBJECT	PAGE
DESCRIPTION AND OPERATION	01-1
TESTING	01-2
REMOVAL AND INSTALLATION	
Speedometer Cables	01-4
Speedometer Core	01-4
Speedometer Core and Casing	01-4
Speedometer Head	01-2
MAJOR REPAIR OPERATIONS	
Cable Core and Casing	01-13
Drive and Driven Gears	01-13
Speedometer System Noisy	01-13
SPECIFICATIONS	01-13

CK3376-2B

DESCRIPTION AND OPERATION

SPEEDOMETER SYSTEM

The speedometer is connected to the output shaft of the transmission by means of a flexible shaft (core), and a drive gear located inside the transmission. The core drives the speedometer which registers speed in miles per hour and also drives an odometer which records distance traveled in miles and tenths of a mile.

The core or flexible shaft is housed in a flexible casing.

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TESTING

SPEEDOMETER

The Ford car master parts catalog and the Lincoln Mercury parts and accessories catalog show the proper speedometer-transmission gears to use for various rear axle and tire size combinations. The correct gears must be used to comply with Federal law.

REMOVAL AND INSTALLATION

SPEEDOMETER HEAD

Federal law requires that the odometer in any replacement speedometer must register the same mileage as that registered in the removed speedometer.

FORD, MERCURY AND LINCOLN CONTINENTAL

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50. Disconnect speedometer cable (Fig. 1).
3. Remove the 5 screws which attach the lens, and mask to the cluster and remove the lens and mask (Fig. 8, Part 33-50).

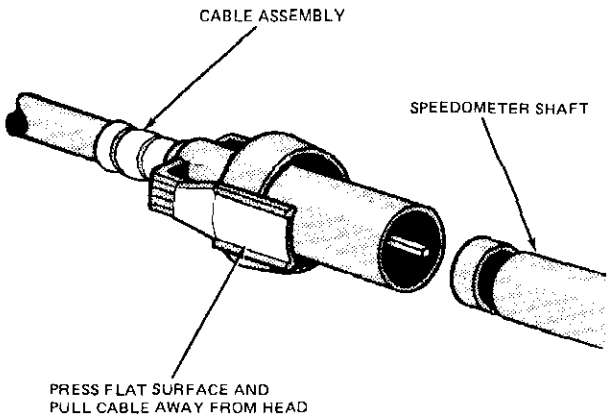


FIG. 1 Speedometer Cable Quick Connect

4. Remove the two screws attaching the speedometer head assembly to the cluster and remove the speedometer.

Installation

1. Position the speedometer head assembly to the cluster and install the two retaining screws. If speedometer assembly is being re-installed, apply a 3/16" ball of silicone damping grease in the drive hole of the speedometer head.
2. Position the mask and lens to the cluster and install the five attaching screws.
3. Install the cluster as outlined in Part 33-50. Connect speedometer cable to speedometer head.
4. Connect the battery ground cable and check speedometer operation.

MUSTANG II

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50. Disconnect speedometer cable (Fig. 1).
3. Remove the six screws that retain the mask and lens to the backplate and remove the mask and lens.
4. Remove the two speedometer head assembly retaining screws and remove the speedometer.

Installation

1. Position the speedometer head assembly to the backplate and install the two retaining screws. If speedometer assembly is being re-installed, apply a 3/16" ball of silicone damping grease in the drive hole of the speedometer head.
2. Position the mask and lens to the backplate and install the six attaching screws.
3. Install the instrument cluster as outlined in Part 33-50. Connect the speedometer cable.
4. Connect the battery ground cable and check the operation of the speedometer.

LTD II, Thunderbird and Cougar—Standard Cluster

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly as outlined in Part 33-50. Disconnect the speedometer cable (Fig. 1).
3. Remove the six screws that retain the back plate to the cluster mask.
4. Remove the two screws that retain the speedometer head assembly and remove the speedometer.

Installation

1. To install, position the speedometer to the cluster back plate and install the two retaining screws. If speedometer assembly is being reinstalled, apply a 3/16" ball of silicone damping grease in the drive hole of the speedometer head.
2. Install the mask retaining screws and install the cluster assembly as outlined in Part 33-50. Connect speedometer cable.
3. Connect the battery ground cable and check the operation of the speedometer.

LTD II, Thunderbird and Cougar XR-7—Performance Cluster

Removal

1. Disconnect the battery ground cable.

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2. Remove the instrument cluster assembly as outlined in Part 33-50. Remove the clock knob and speedometer cable (Fig. 1).
3. Remove the six screws that retain the mask and lens assembly to the back plate and remove the mask.
4. Remove the two speedometer head assembly retaining screws and remove the speedometer.

Installation

1. To install, position the speedometer head assembly to the back plate and install the two retaining screws. If speedometer assembly is being reinstalled, apply a 3/16" ball of silicone damping grease in the drive hole of the speedometer head.
2. Install the mask retaining screws, the clock knob, and install the instrument cluster assembly as outlined in Part 33-50. Connect speedometer cable.
3. Connect the battery ground cable and check the operation of the speedometer.

Fairmont and Zephyr

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly as outlined in Part 33-50. Disconnect speedometer cable (Fig. 1).
3. From the rear side of the cluster, remove the four retaining screws and separate the cluster housing from the front cover housing. Note that the two lower screws also retain the metal brackets that engage the slot in the instrument panel.
4. Remove the two speedometer retaining screws and remove the speedometer.

Installation

1. Position the speedometer in the backplate and install the two retaining screws. If the speedometer assembly is being reinstalled, apply a 3/16" ball of silicone damping grease in the drive hole of the speedometer head.
2. Install the four backplate to front cover retaining screws.
3. Install the instrument cluster assembly as outlined in Part 33-50. and check the operation of the speedometer. Connect speedometer cable.
4. Connect the battery ground cable and check speedometer operation.

Pinto and Bobcat

Removal

1. Disconnect the battery ground cable.
2. Remove cluster assembly as outlined in Part 33-50. Disconnect speedometer cable (Fig. 1).
3. From the rear side of the cluster, remove the four retaining screws, and separate the cluster front housing from the back plate. Note that the two lower screws also retain the metal brackets that engage the slot in the instrument panel.
4. Remove the two speedometer retaining screws and remove the speedometer head assembly.

Installation

1. Position the speedometer head assembly in the back plate and install the two retaining screws. If the speedometer assembly is being reinstalled, apply a 3/16" ball of silicone damping grease in the drive hole of the speedometer head.
2. Position the cluster backplate to the front housing and install the four retaining screws.
3. Install cluster assembly as outlined in Part 33-50. Connect speedometer cable.
4. Connect battery ground cable.

Continental Mark V

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly as outlined in Part 33-50. Disconnect speedometer cable (Fig. 9).
3. Remove the clock knob.
4. Remove the six screws that retain the cluster mask assembly to the back plate and remove mask assembly.
5. Remove the two speedometer head retaining screws and remove the speedometer.

Installation

1. Position the speedometer head to the cluster back plate and install the two retaining screws. If the speedometer assembly is being reinstalled, apply a 3/16" ball of silicone damping grease in the drive hole of the speedometer head.
2. Place the mask assembly over the two locator pins on the back plate and install the six screws that retain the cluster mask assembly to the back plate.
3. Install the clock knob and retaining screw.
4. Install the cluster assembly as outlined in Part 33-50. Connect speedometer cable.
5. Connect the battery ground cable and check the operation of the speedometer.

GRANADA, MONARCH AND VERSAILLES

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50. Disconnect speedometer cable (Fig. 1).
3. From the front side of the cluster remove the 5 retaining screws and separate the cluster back plate from the mask and lens assembly.
4. Remove the 2 speedometer attaching screws and remove the speedometer.

Installation

1. Position the speedometer in the back plate and install the 2 attaching screws. If the speedometer assembly is being re-installed, apply a 3/16-in ball of silicone damping grease to the drive hole of the speedometer head.
2. Place the mask assembly over the two locator pins on the back plate. Install the 5 back plate to mask and lens assembly attaching screws.
3. Install the instrument cluster, connect the battery ground cable and check the operation of the speedometer.

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SPEEDOMETER CORE

Removal

1. Disconnect the speedometer cable (core and casing assembly) from the speedometer head (Fig. 1).
2. Pull the speedometer core out of the upper end of the casing. Models with speed sensor (Figs. 3, 4, 8, 9 and 10) have upper and lower cable.
3. If the core is broken, raise the vehicle on a hoist and remove the bolt retaining the speedometer cable mounting clip to the transmission.
4. Remove the shaft and driven gear from the transmission (Fig. 2). Remove the driven gear retainer, and remove the driven gear and shaft from the cable.

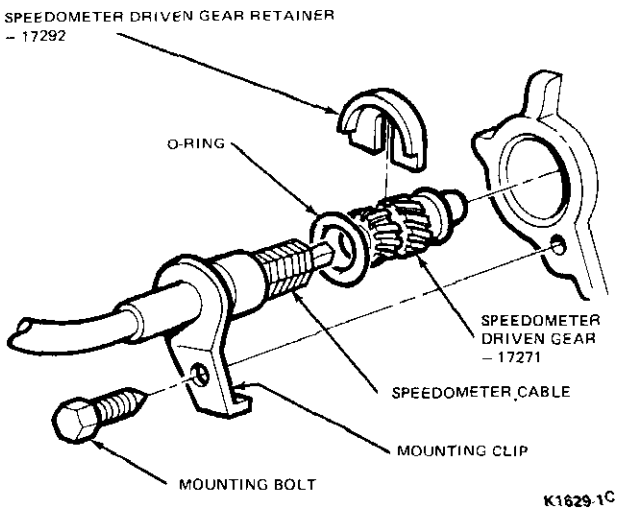


FIG. 2 Speedometer Cable to Transmission Mounting

5. Remove the lower part of the core (if it is broken) from the lower end of the casing.

Installation

1. Position the driven gear to the casing and install the gear retainer. Install the driven gear and casing in the transmission, and install the retaining bolt. Lower the vehicle.
2. Determine the exact length of the old core and cut the new core following instructions included in the core kit. (Do not cut from the squared end of the core.) Remove any burrs or frayed edges.
3. Install the tip on the core, making certain to seat the core in the bottom of the tip.
4. Place the core and tip in a crimping die, and place the die on a solid surface and strike it squarely with a hammer to crimp it.
5. Remove the crimping die.
6. Lubricate the core with cable lubricant D2AZ-19581-A or equivalent (do not over lubricate). Install the core (square end first) into the upper end of the casing and push it all the way through to the transmission. When the cable is nearly seated, twist it slightly to make sure that the squared end is engaged in the speedometer driven gear at the transmission.
7. When reinstalling speedometer assembly, apply a 3/16 inch diameter ball of silicone damping grease in the drive hole of the speedometer head.
8. Connect the cable assembly to the speedometer, being sure to eliminate any kinks in the housing and shaft. Check the operation of the speedometer.

SPEEDOMETER CORE AND CASING

Disconnect the speedometer cable from the speedometer head and push the cable and grommet through the opening in the floor pan or dash panel. Raise the car on a hoist and disengage the cable from all retaining clips. Disconnect the cable from the transmission (Fig. 2). Remove driven gear and connect the new cable to the driven gear and the transmission. Engage the new cable in the retaining clips at the marker tapes on the cable housing and route it through the opening in the floor pan or dash panel. Push the grommet in place. Lower the vehicle. When reinstalling speedometer assembly, apply a 3/16 inch diameter ball of silicone damping grease in the drive hole of the speedometer head, and connect the cable to the head.

SPEEDOMETER CABLES

All Models

Because of the increasing complexity of speedometer cable assemblies, and the importance of proper routing during installation, typical systems are shown here in Figs. 3 to 10. Installation and routing instructions are shown on each illustration.

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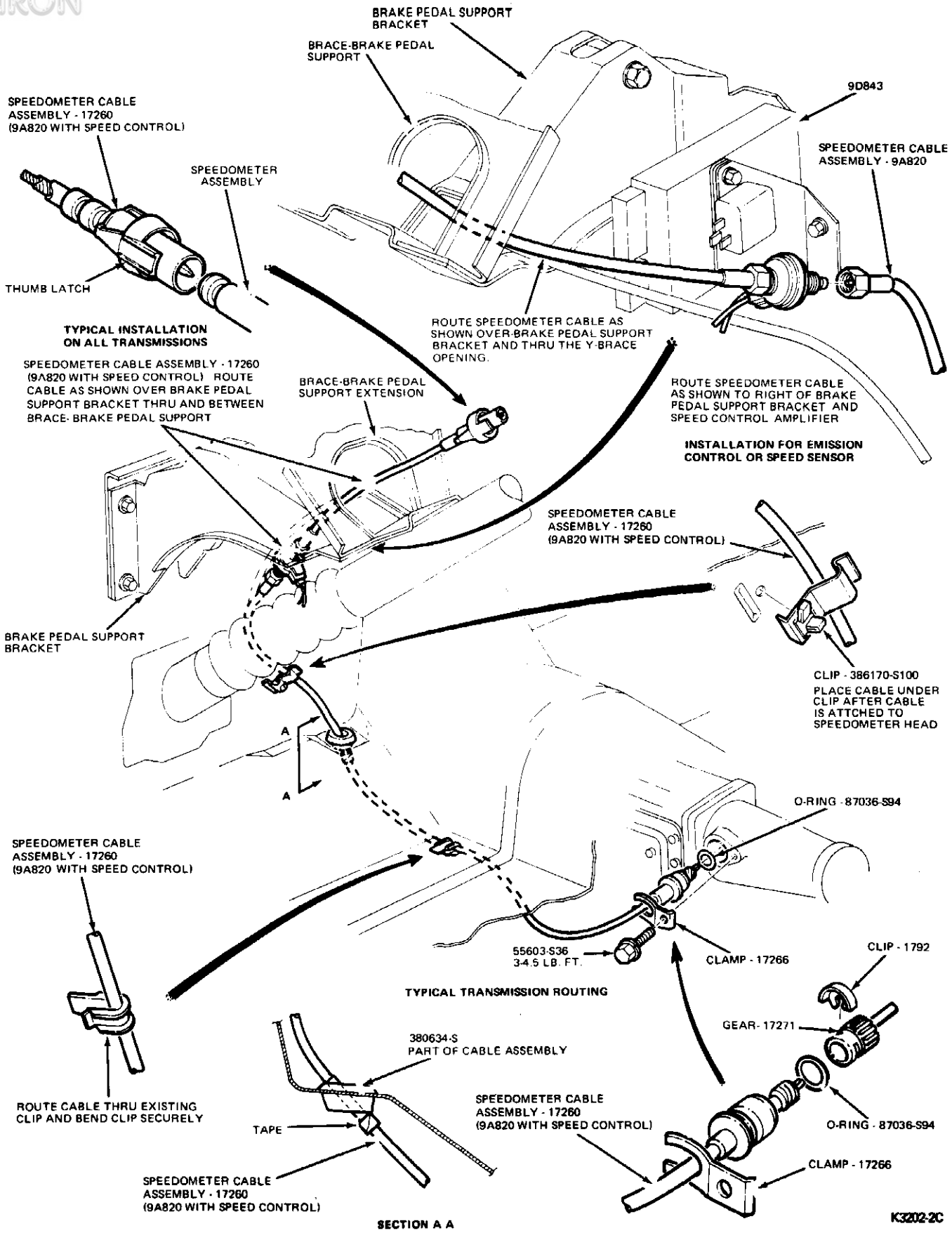


FIG. 3 Speedometer Cable—Ford, Mercury and Lincoln Continental

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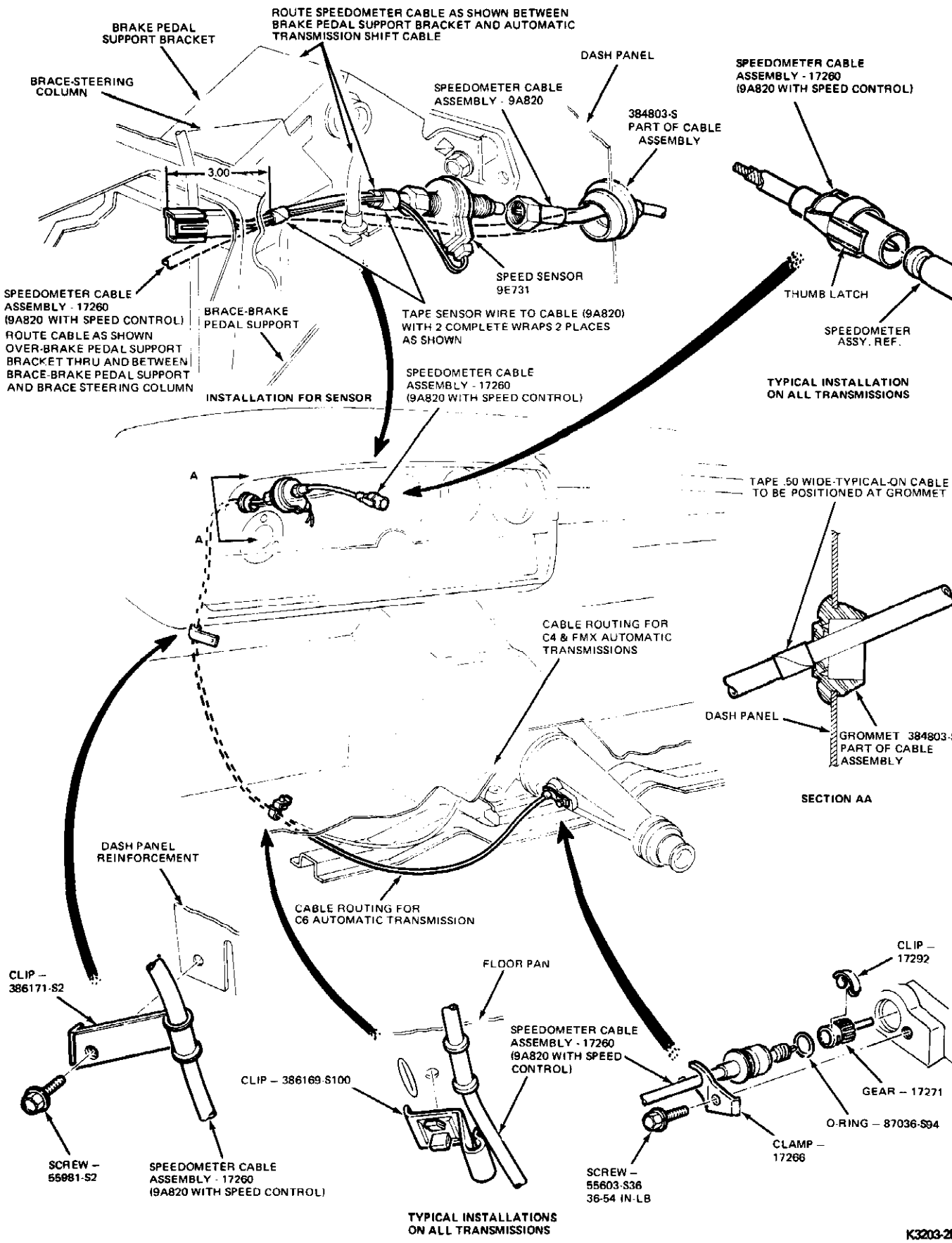


FIG. 4 Speedometer Cable—LTD II, Thunderbird and Cougar

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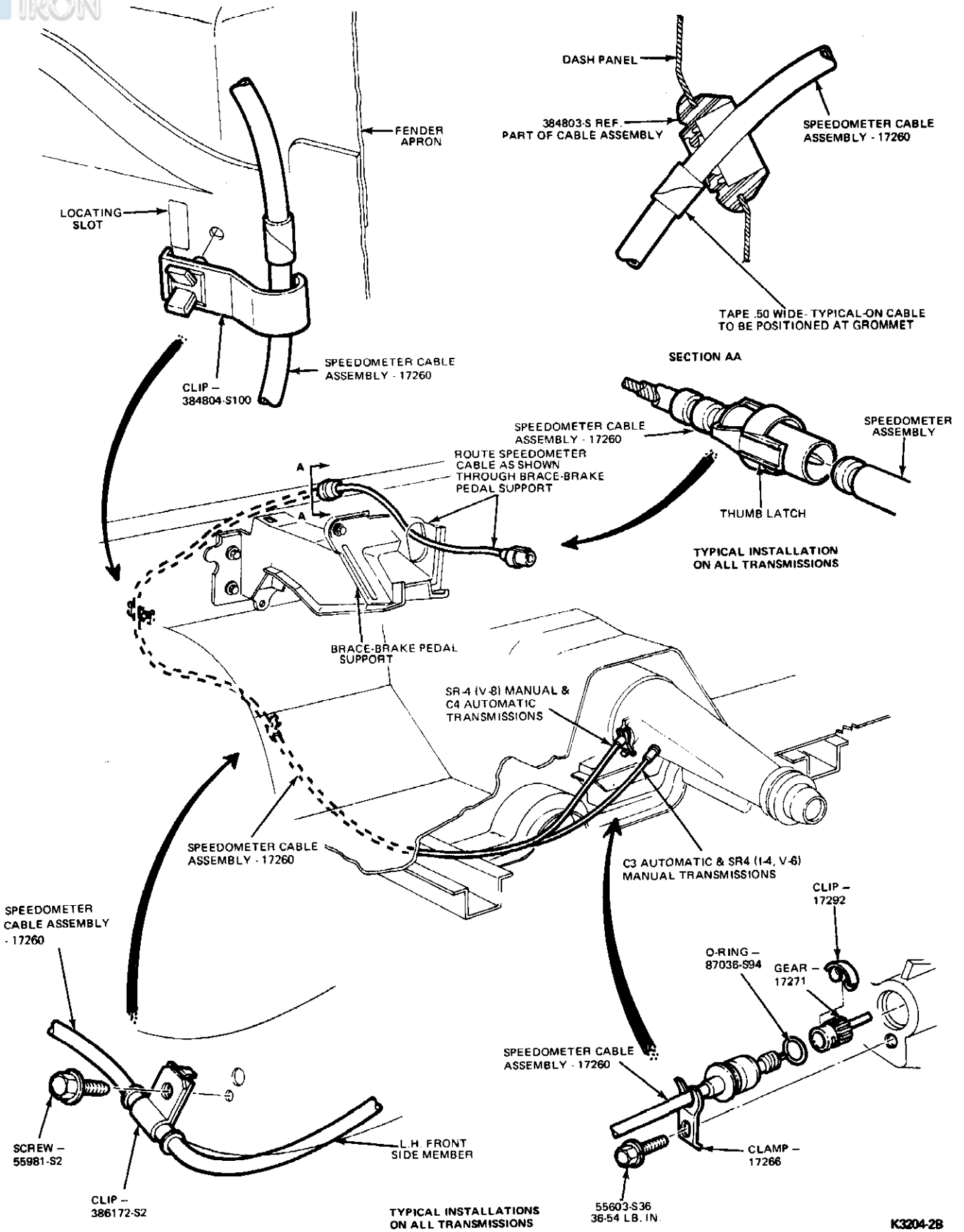


FIG. 5 Speedometer Cable— Mustang II

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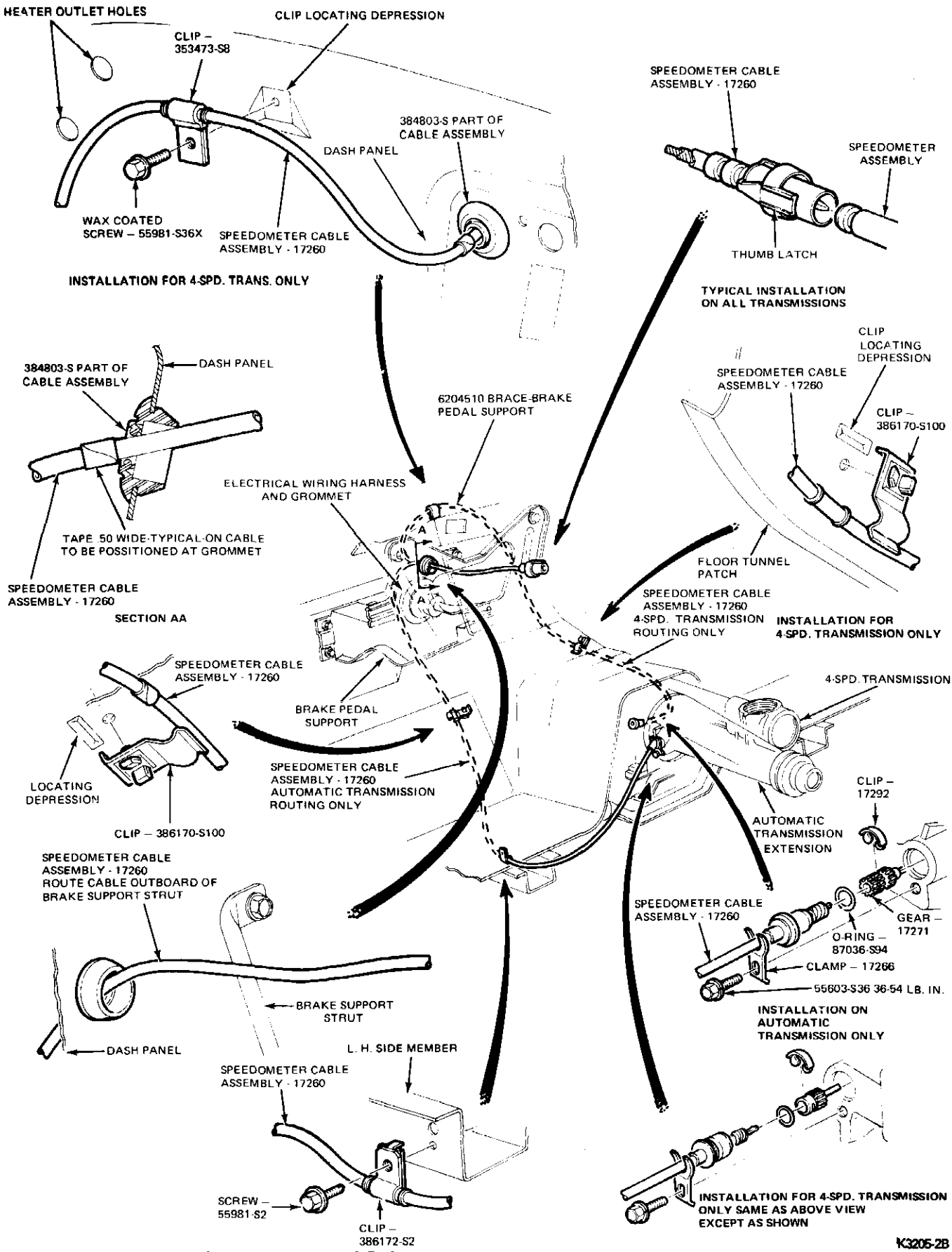
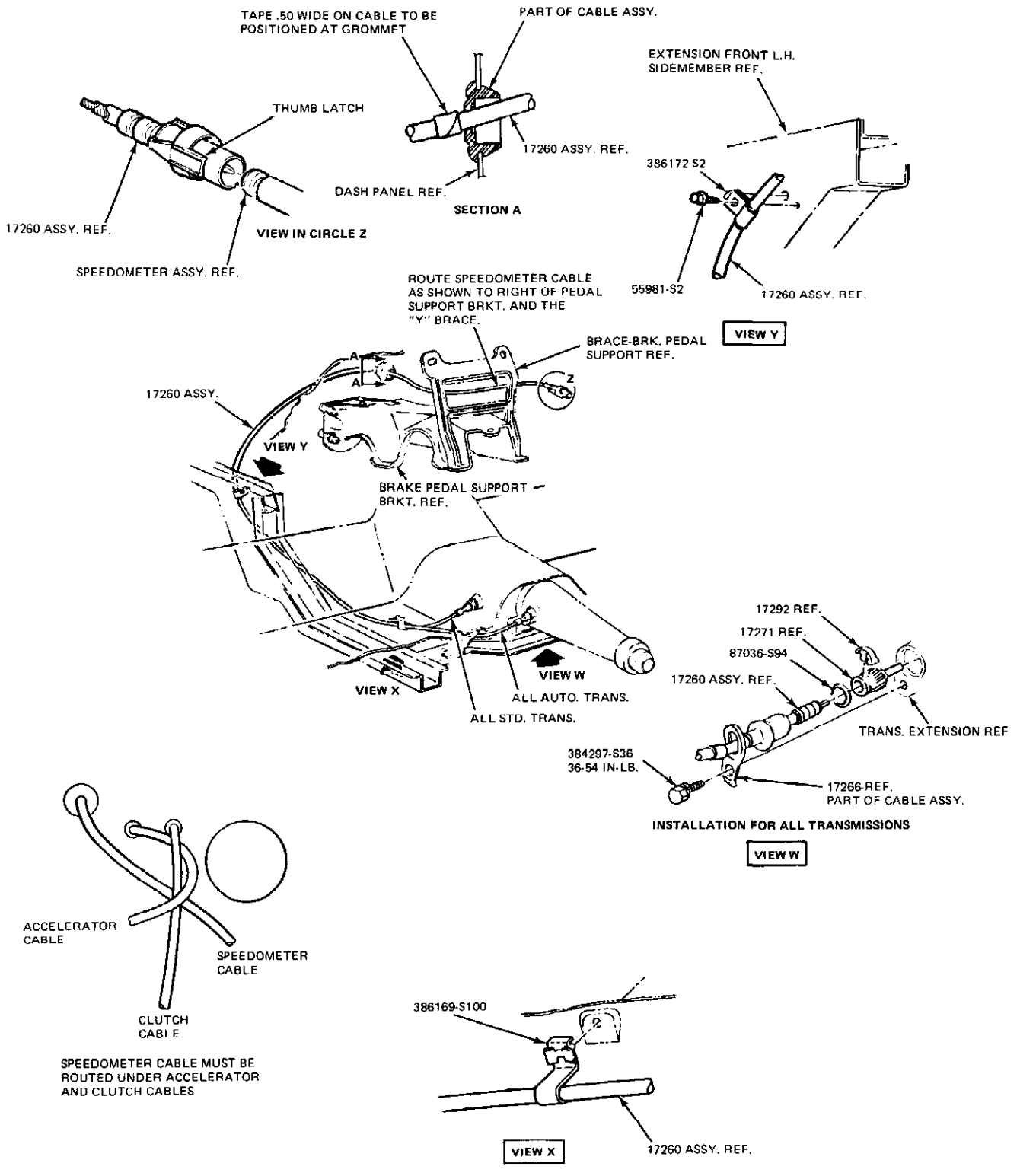


FIG. 6 Speedometer Cable—Pinto and Bobcat

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FIG. 7 Speedometer Cable—Fairmont and Zephyr

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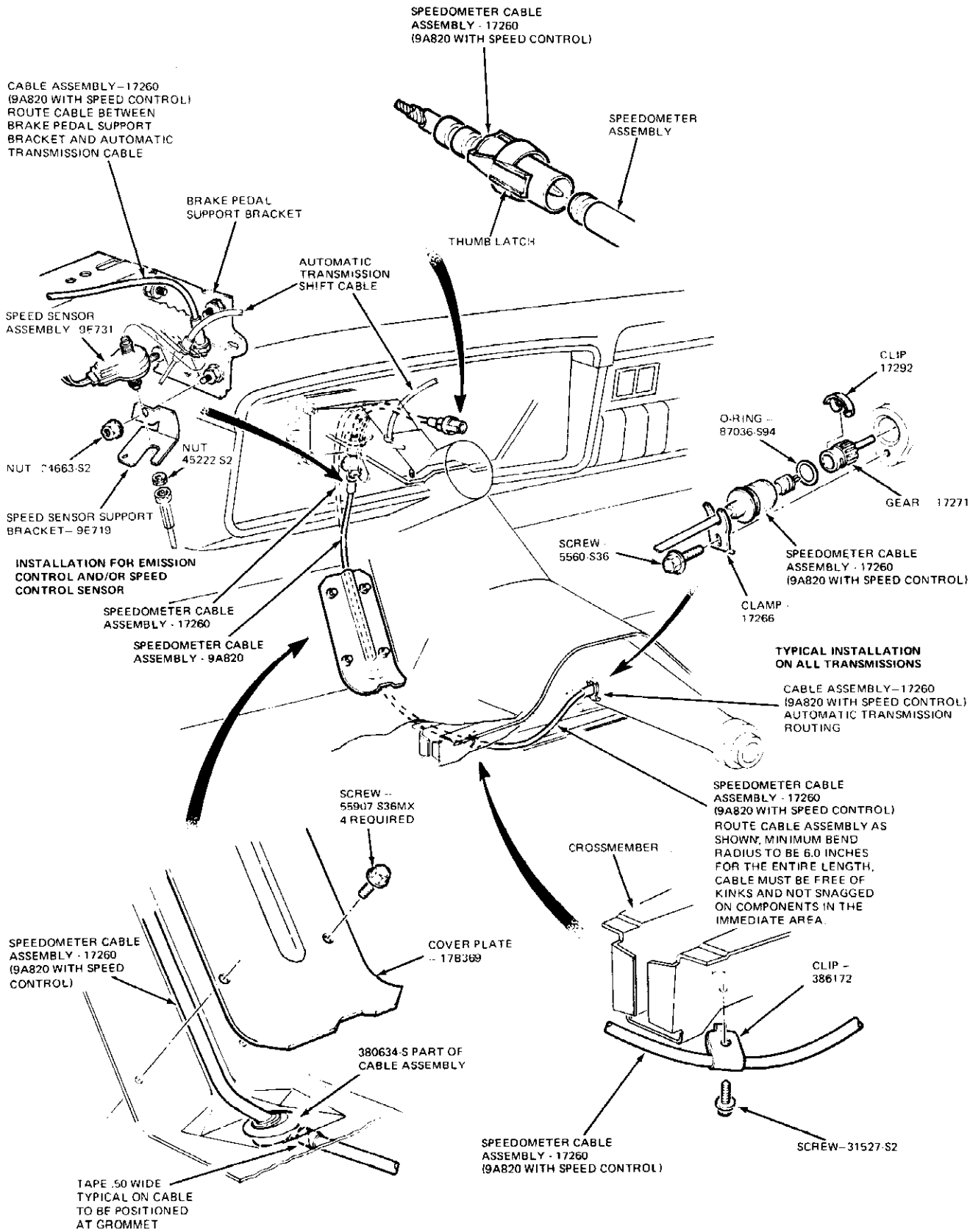


FIG. 8 Speedometer Cable—Granada, Monarch and Versailles

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DETROIT IRON

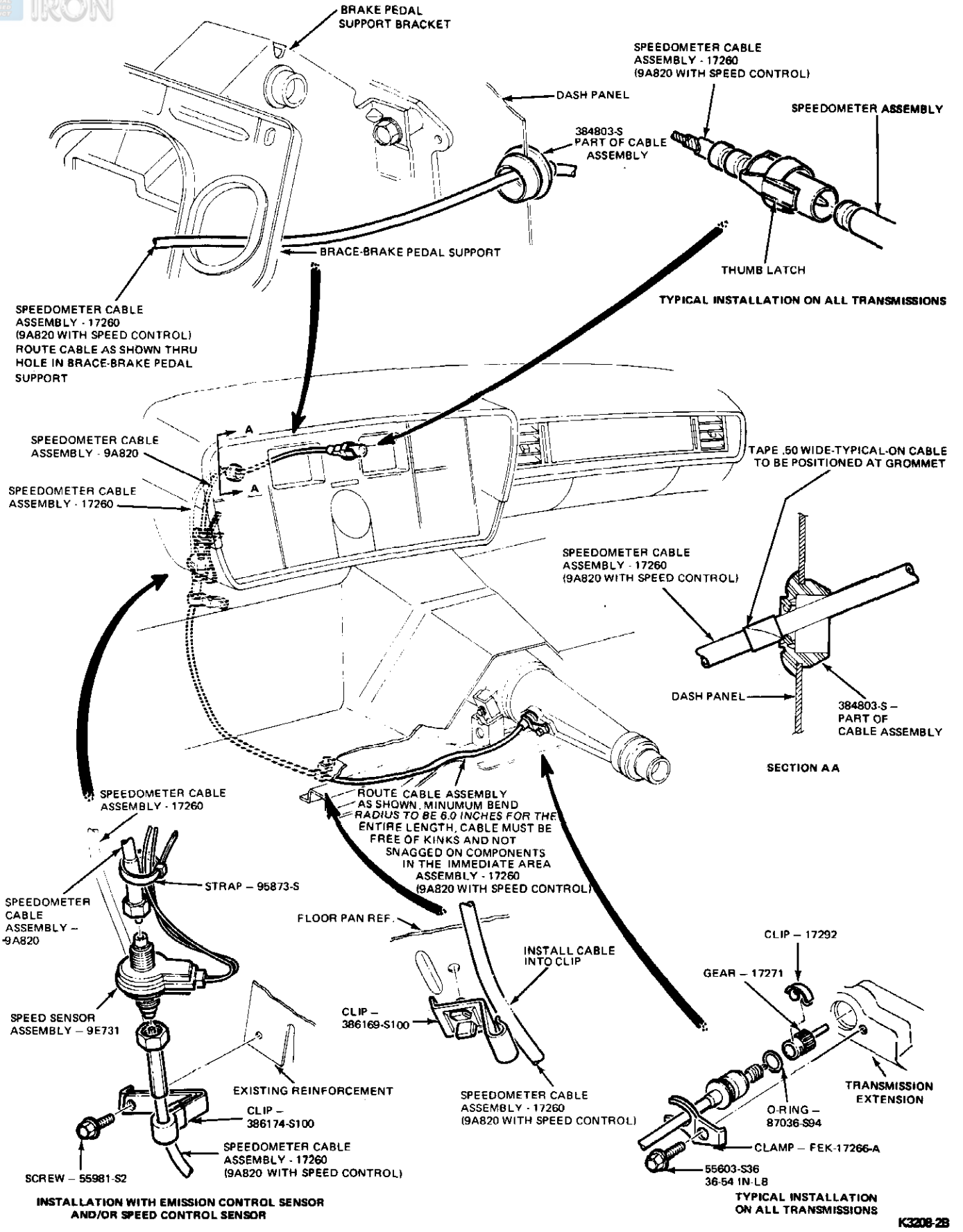


FIG. 9 Speedometer Cable—Continental Mark V

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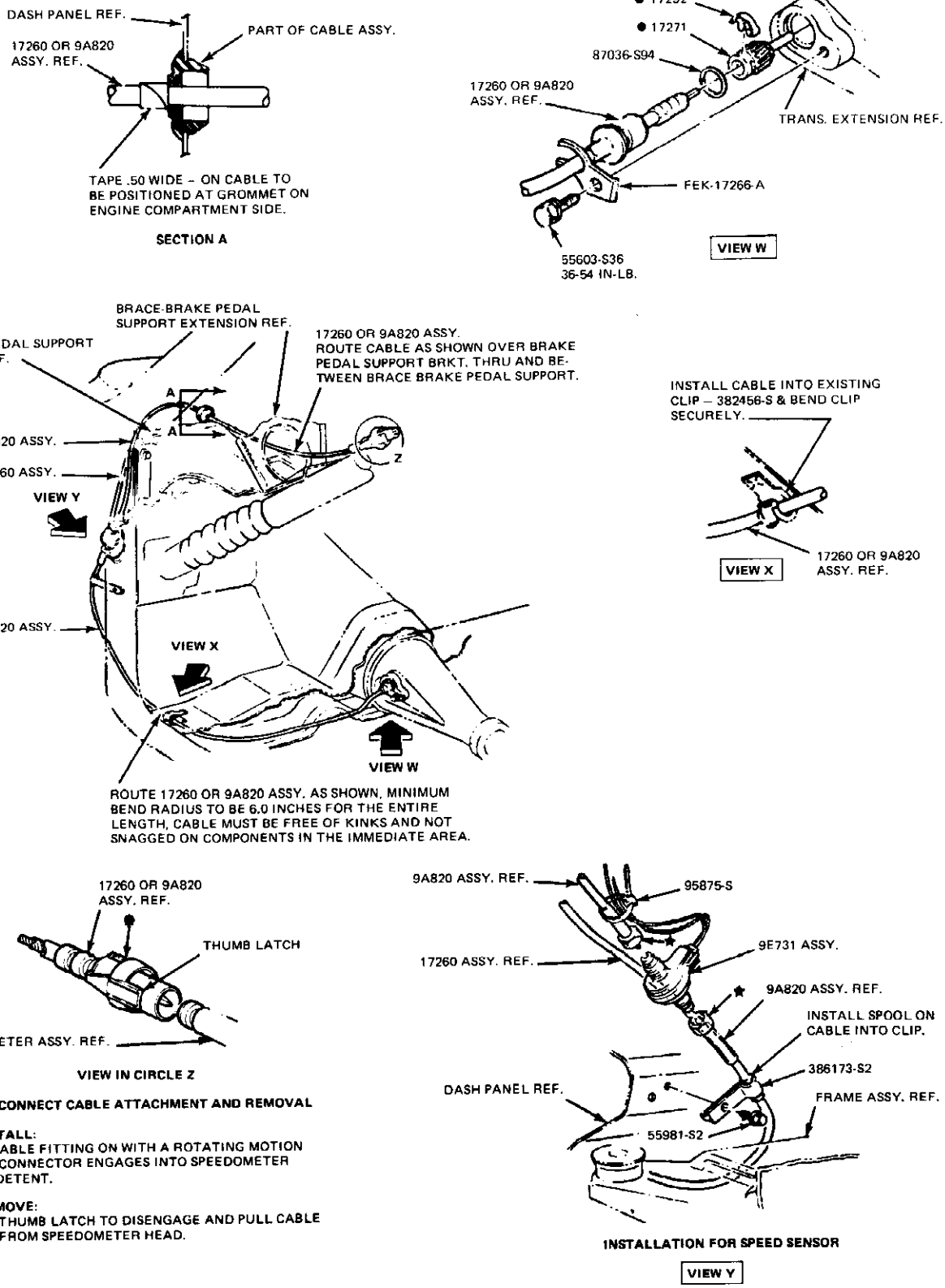


FIG. 10 Speedometer Cable—Lincoln Continental

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MAJOR REPAIR OPERATIONS

SPEEDOMETER SYSTEM NOISY

Applying heavy amounts of lube to the cable core will only stop the noise temporarily unless the actual source of noise is found and corrected. If the speed sensor or speedometer head are replaced, be sure that the square drive holes contain a sufficient amount of silicone damping grease. If not, apply a 3/16-inch diameter ball of this damping grease into the drive holes as required.

DAMAGED CABLE CORE AND CASING

1. To check for a kinked cable core, remove the core, clean it with solvent and wipe it dry. Lay the core out straight on a flat surface and roll it back and forth. Any kinks or damage will be seen. Then take an end in each hand, allowing the core to hang in approximately a 9 to 12 inch loop. Rotate both ends to be sure that the core turns evenly.
2. Routing of the cable casing is particularly important where the cable leaves the speedometer head. The optimum routing would provide that the cable and housing take virtually no change of direction for at least a length of 5 inches from the speedometer head.
3. When installing a new cable (core and casing) it is necessary that extra care be taken to see that the new assembly is guided and routed properly to eliminate any kinks.
4. Proper lubrication of the cable core is accomplished by a light application of damping grease after the cable has been wiped clean. A light film is all that is required.
5. Before connecting the cable assembly to the speedometer head, apply a 3/16 inch diameter ball of silicone damping grease to the drive hole of the speedometer head.

DAMAGED DRIVE AND DRIVEN GEARS

1. A scored, nicked or gouged driven gear is usually indicative of a damaged drive gear on those vehicles that have the drive gear integral with the transmission output shaft. The output shaft should be carefully inspected for imperfections and replaced if necessary.
2. A driven gear with two or three adjoining teeth badly scored is indicative of improper assembly procedure. The gear should be inserted in the transmission while simultaneously turning the drive shaft. This will insure initial gear engagement and prevent gear damage. **Force should never be used.**
3. Whenever a drive gear is replaced, a new driven gear should also be installed, regardless of its apparent condition.

SPECIFICATIONS

Transmission Mounting Clip Bolt Torque	3 – 4-1/2 Ft-Lbs

SPEEDOMETER CALIBRATION TOLERANCE SPECIFICATIONS

Vehicle	30 MPH Actual Speed	60 MPH Actual Speed	Odometer Measure Over Actual 10 Mile Distance
All	29-33 MPH	59-66 MPH	9.6 – 10.4 Miles

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Tachometer

PART 33-03

Applies to Bobcat, Pinto, Thunderbird, LTD II, Cougar XR-7 and Mustang II

SUBJECT	PAGE	SUBJECT	PAGE
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DIAGNOSING	03-2	REMOVAL AND INSTALLATION	03-3

CK3377-2B

DESCRIPTION AND OPERATION

The tachometer is an electrically operated instrument which indicates engine speed in Revolutions Per Minute (R.P.M.).

The tachometer is usually mounted in the instrument cluster assembly. A typical wiring diagram is shown in Fig. 1.

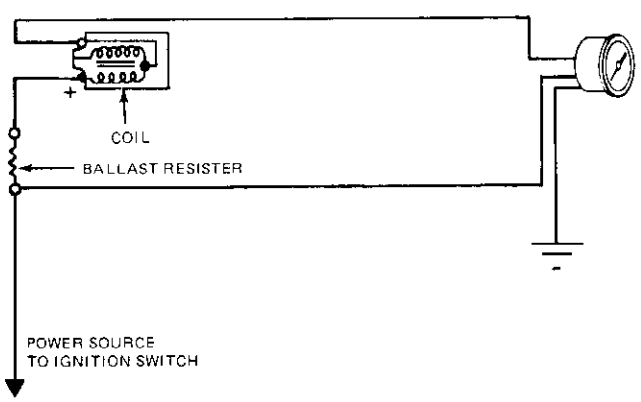


FIG. 1 Tachometer Wiring Diagram—Typical—Except 6 and 8-Cylinder Mustang II

The tachometer used for Mustang II equipped with the 5.0L (302 CID) V-8 engine is equipped with a tachometer signal control assembly mounted on the rear of the tachometer assembly (Fig. 2). This assembly is an electronic device that divides the 8-cylinder ignition pulses to the tachometer by two, which allows the 4-cylinder tachometer to be used for the 8-cylinder application.

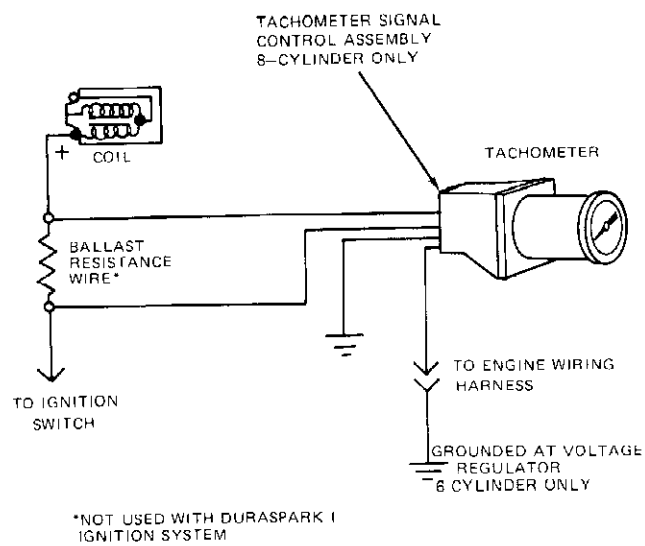


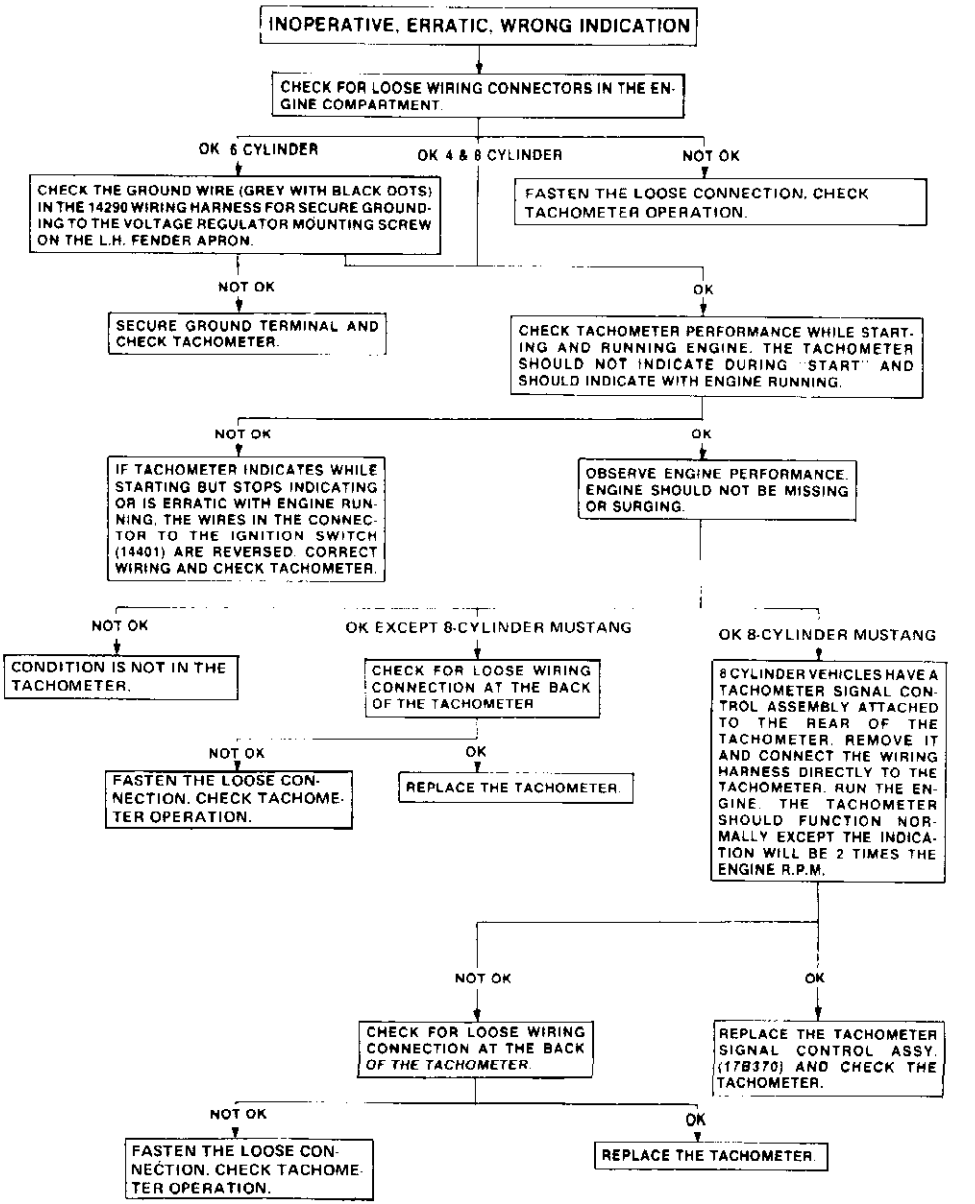
FIG. 2 Tachometer Wiring Diagram—Mustang II

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DIAGNOSING

DIAGNOSTIC PROCEDURE — TACHOMETER
THUNDERBIRD, LTD II, COUGAR XR-7, MUSTANG II, PINTO AND BOBCAT



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TESTING

To test for an inoperative tachometer signal control assembly (Mustang II, with 5.0L [302 CID V-8]) remove the assembly as outlined in this Part. Connect the wiring harness connector directly to the tachometer. Start the engine. The tachometer should function normally, except that the pointer indication will be twice the actual RPM. If not, the tachometer or wiring harness must be serviced.

If a Mustang II tachometer indicates approximately 50% higher than normal, the problem may be a loose ground connector terminal lug in the 157 circuit.

REMOVAL AND INSTALLATION

LTD II, Cougar XR-7 and Thunderbird

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly as outlined in Part 33-50. Remove the clock knob and nut.
3. Remove the six screws retaining the cluster mask to the cluster back plate and remove the mask.
4. Disconnect the tachometer connector from the instrument cluster harness connector.
5. Remove the three tachometer retaining screws and remove the tachometer.

Installation

1. Position the tachometer to the cluster back plate and install the three retaining screws.
2. Connect the tachometer lead at the connector to the instrument cluster harness connector.
3. Position the cluster mask to the back plate and install the six retaining screws. Install the clock knob and nut.
4. Install the cluster assembly as outlined in Part 33-50, and connect the battery ground cable.

Mustang II

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. If equipped with a tachometer signal control assembly (8-cylinder engine) disconnect the assembly from the rear of the tachometer assembly by removing one attaching screw and pulling the control assembly free from the tachometer electrical terminals.
4. Remove the six (6) screws attaching the mask and lens to the cluster backplate and remove the mask and lens.
5. Remove the three (3) screws attaching the tachometer to the cluster backplate and remove the tachometer.
6. Carefully remove the hi-beam jewel from the rear of the tachometer dial.

Installation

1. Carefully install the hi-beam jewel over the jewel indexing pins, until the jewel becomes flush with the rear face of the tachometer dial.
2. Position the tachometer to the cluster backplate and install the three attaching screws.
3. Position the lens and mask to the cluster backplate and install the six (6) attaching screws.
4. Connect the tachometer signal control assembly (if 8-cylinder engine) to the rear of the tachometer and install the attaching screw.
5. Install the instrument cluster.
6. Connect the battery ground cable and check the operation of the tachometer.

Pinto and Bobcat

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly as outlined in Part 33-50.
3. Remove the four screws retaining the cluster mask to the cluster back plate and remove the mask.
4. Remove the three tachometer retaining screws and remove the tachometer.

Installation

1. Position the tachometer to the cluster back plate and install the three retaining screws.
2. Position the cluster mask to the back plate and install the four retaining screws.
3. Install the cluster assembly as outlined in Part 33-50.
4. Connect the battery ground cable.

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Clock

PART 33-05

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ADJUSTMENTS (Cont'd.)	
Quartz Electric Calendar	05-1
REMOVAL AND INSTALLATION	05-1

CK3378-2B

ADJUSTMENT

ELECTRIC WIND

If the clock runs slow or fast, merely reset the clock to the proper time. This action adjusts the clock automatically. Turning the knob clockwise will cause the clock to run faster. Turning the knob counterclockwise will cause the clock to run slower.

DIGITAL

No adjustment on time keeping accuracy is required.

QUARTZ ELECTRIC CALENDAR

No timekeeping accuracy adjustment is required to set the time. Pull out the set knob and turn it clockwise to advance the time, or turn counterclockwise to set back the time.

The calendar feature displays the day of the week (with AM and PM distinction) and the date of the month. The date display advances from 1 to 31 positions; this will require setting adjustments at the end of the month for those months with less than 31 days.

The calendar feature can be adjusted with the set knob in the normal (rest) position. The day feature should be set first (if required) by turning the set knob counterclockwise (approximately 1/4 turn). Next, set the date feature by turning the set knob clockwise (approximately 1/4 turn). The calendar feature can only be advanced.

REMOVAL AND INSTALLATION

ELECTRIC WIND AND DIGITAL

Ford and Mercury

Removal

1. Disconnect the battery ground cable.
2. Remove the radio control knobs. Remove the two screws retaining the right hand instrument panel applique and remove the applique.
3. Remove the screws retaining the clock to the instrument panel.
4. Disconnect the clock lead and bulb sockets, and remove the clock.

Installation

1. Connect the clock lead and bulbs.
2. Position the clock to the instrument panel and install the retaining screws.
3. Position the right hand instrument panel applique to the instrument panel and install the two retaining screws. Install the two radio control knobs.
4. Connect the battery ground cable and set the clock.

LTD II, Cougar, Thunderbird and Ranchero—Standard Cluster. (Fig. 1)

Removal

1. Disconnect the battery ground cable.
2. Remove seven screws attaching the cluster trim panel and remove the trim panel.
3. Remove three screws retaining the clock to the cluster and panel and remove the clock.
4. Remove the two light sockets from the rear of the clock and disconnect the clock lead at the connector.

Installation

1. Install the two light sockets and connect the clock lead at the connector.
2. Position the clock to the cluster and install the three retaining screws.
3. Install the seven screws attaching the cluster trim panel.
4. Connect the battery ground cable and set the clock.

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FIG. 1 Quartz Electric Calendar Clock—LTD II, Cougar, Thunderbird and Ranchero

LTD II, Cougar XR-7, Thunderbird and Ranchero— Performance Cluster

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. Remove the clock knob and nut.
4. Remove the six screws attaching the lens and mask assembly to the cluster backplate and remove the lens and mask assembly.
5. Disconnect the clock lead, remove the two clock retaining screws and remove the clock.

Installation

1. Position the clock to the cluster backplate, install the two retaining screws and connect the clock lead.
2. *Position the lens and mask assembly to the cluster* backplate and install the six retaining screws.
3. Install the clock knob and nut.
4. Install the cluster assembly as outlined in Part 33-50.
5. Connect the battery ground cable and set the clock.

Lincoln Continental

Removal

1. Disconnect battery ground cable.
2. Remove the radio control knobs. Remove the two screws retaining the right-hand instrument panel applique and remove the applique.
3. Remove the screws retaining the clock to the instrument panel.
4. Disconnect the clock lead and bulb socket and remove the clock.

Installation

1. Connect the clock lead and bulb.
2. Position the clock to the instrument panel and install the retaining screws.
3. Position the right-hand instrument panel applique to the instrument panel and install the retaining screws. Install the two radio control knobs.
4. Connect battery ground cable and set the clock.

Continental Mark V (Fig. 2)

Removal

1. Disconnect the battery ground cable.
2. Remove the cluster assembly as outlined in Part 33-50.
3. Remove the clock, nut and knob and bezel.
4. Remove the six screws attaching the lens and mask assembly to the cluster backplate. Remove the mask and lens assembly.
5. Remove the two nuts retaining the printed circuit to the rear of the clock.
6. Remove the three screws attaching the clock to the cluster backplate and remove the clock.

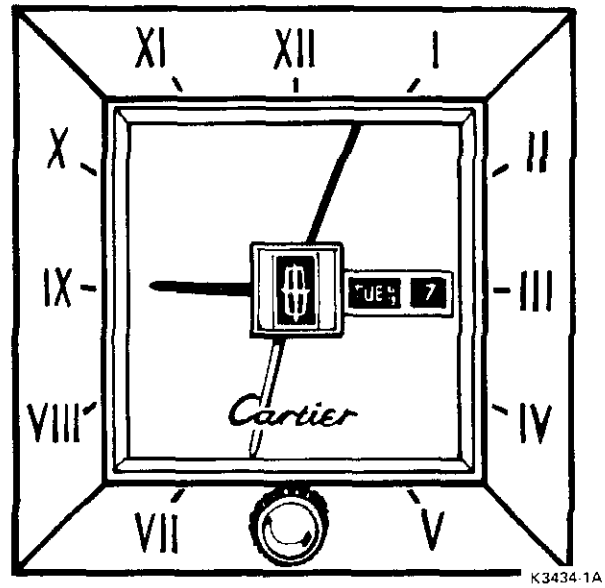


FIG. 2 Quartz Electric Calendar Clock—Continental Mark V

Installation

1. Position the clock to the backplate and install the three retaining screws.
2. Position the printed circuit to the clock and install the two retaining nuts.
3. Position the lens and mask assembly to the cluster backplate and install the six attaching screws.
4. Install the clock knob and nut.
5. Install the cluster assembly as outlined in Part 33-50.
6. Connect the battery ground cable and set the clock.

Mustang II

Removal

1. Disconnect the battery ground cable.
2. Remove three upper retaining screws for the right-hand instrument panel applique and remove the *applique by unsnapping three lower retaining* fingers.
3. Remove the three screws retaining the clock to the instrument panel.

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4. Disconnect the clock lead and bulb socket, and remove the clock.

Installation

1. Connect the clock lead and bulb socket.
2. Position the clock to the instrument panel and install the three retaining screws.
3. Install the right hand applique by snapping in the three lower retaining fingers into the panel and installing the upper three retaining screws.
4. Connect the battery ground cable and set the clock.

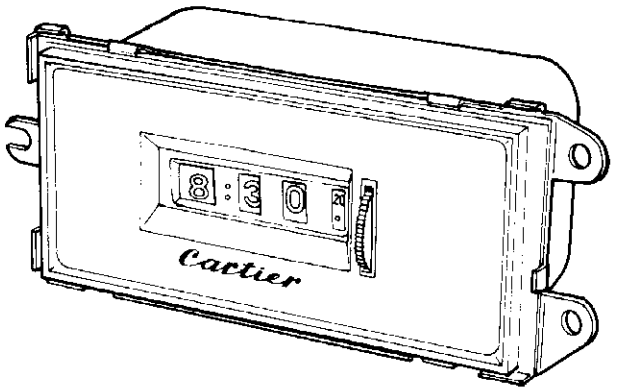
Monarch and Granada (Fig. 3)

Removal

1. Disconnect the battery ground cable.
2. Remove the glove compartment liner attaching screws and remove the glove compartment liner.
3. Remove the two outboard screws attaching the clock to the instrument trim panel.
4. Loosen the inboard trim panel attaching screw sufficiently to slip the clock out without removing the attaching screw.
5. Remove the clock from the trim panel opening.
6. Disconnect the clock power lead and bulb socket and remove the clock assembly.

Installation

1. Connect the clock power lead and bulb socket to the clock assembly.



K2630-1[8]

FIG. 3 Digital Clock—Mustang II, Monarch, Granada—Typical

2. Slip clock into position behind the instrument trim panel.
3. Install the two outboard attaching screws and tighten all attaching screws.
4. Position glove compartment liner and install and tighten the attaching screws.
5. Connect battery ground cable and check the clock for proper operation.

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Charge Indicator -- Lamp

PART 33-10

Applies to All Models

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION	10-1	REMOVAL AND INSTALLATION	10-1
TESTING	10-1		

CK3379-2B

DESCRIPTION AND OPERATION

A red alternator charge indicator lamp is used on vehicles not equipped with an ammeter. This lamp glows when the field relay fails to close.

When the ignition switch contacts are closed (switch turned on) battery current flows through the charge indicator light and the parallel resistor, and through the regulator to the field, and the lamp comes on. Vehicles with the new electronic regulator have a 500 ohm resistor. On all others the resistor is 15 ohm.

When the alternator builds up enough voltage to close the field relay the charge indicator lamp goes out.

TESTING

To test the charge indicator lamp, turn the ignition switch to the RUN position with the engine stopped. The lamp should come on. If it does not, the bulb is burned out, or the wiring to the lamp is broken.

Systems with electro-mechanical and transistorized regulators (15 ohm resistor) only.

An open resistor wire in the alternator charging system wiring harness will usually cause the charge indicator lamp to stay on until the engine speed is increased to about two thousand rpm. This effect will be noticed each time the engine is started. In some cases the lamp will not go out at all.

The charge indicator lamp may be tested with the use of a test light containing a trade number 67 or 1155 bulb.

Disconnect the regulator plug from the regulator. Turn the ignition switch to RUN position. Touch one test probe from the test light to the regulator plug I terminal and the other to the regulator base. The test light will come on if the circuit is in proper working order. If the 15 ohm resistor or circuit is open, the indicator lamp will operate at full brightness and the test light will be out.

REMOVAL AND INSTALLATION

On some vehicles it is necessary to remove the instrument cluster to gain access to the indicator bulb. These procedures are outlined in Part 33-50. On Thunderbird and Continental Mark V remove the instrument cluster trim panel as outlined in Part 33-50.

To remove the indicator bulb, turn the bulb and socket assembly 1/4 turn counterclockwise and remove. To install, position the new bulb and socket assembly to the printed circuit and turn it clockwise 1/4 turn.

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Charge Indicator -- Ammeter

PART 33-11

Applies to Mustang II, Cougar, LTD II, Thunderbird, Ranchero, Pinto and Bobcat

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION	11-1	REMOVAL AND INSTALLATION	11-1
TESTING	11-1		

CK3380-2B

DESCRIPTION AND OPERATION

The gauge is a shunt-type ammeter which senses the direction and rate of flow of electrical current to or from the battery to indicate whether the battery is being charged or discharged. The charge indicator is non-adjustable, and should be replaced if found to be inoperative.

TESTING

The following test should be conducted to check if the ammeter is operational. Turn the headlamps on with the engine off. The meter pointer should move toward the "D" or discharge scale.

If no movement of the needle is observed, inspect as follows:

SYSTEMS WITHOUT A PRINTED CIRCUIT, CHECK:

1. The rear of the meter housing for loose connections.
2. If connections are good, remove connections and check wiring for an open circuit.
3. If connections are good and wiring is not open, replace the ammeter.

If the meter moves toward the "C" or charge scale when the headlamps are turned on and the engine is off, the wire connections from the battery are reversed at the ammeter. This condition is most likely to occur in an ammeter system that uses a wiring harness instead of a printed circuit.

SYSTEMS WITH A PRINTED CIRCUIT, CHECK:

1. The rear of the meter to insure nuts are secured properly to the printed circuit.
2. If nuts are secured properly, check to insure the multiple connector is making proper contact to the printed circuit.
3. If connector is making proper contact, remove connector from printed circuit and check wiring for an open circuit.
4. If connections are good and wiring is not open, replace the ammeter.

REMOVAL AND INSTALLATION

THUNDERBIRD, RANCHERO, COUGAR AND LTD II—PERFORMANCE CLUSTER

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster, as outlined in Part 33-50. Remove the clock knob and nut.
3. Remove the six screws attaching the lens and mask assembly to the cluster backplate and remove the mask and lens assembly.
4. Remove the wires from the back of the gauge.
5. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and install the two retaining nuts.
2. Install the two wire connectors to the back of the gauge.
3. Position the lens and mask assembly to the cluster backplate and install the six retaining screws. Install the clock knob and nut.
4. Install the instrument cluster, as outlined in Part 33-50.
5. Connect the battery ground cable and check the operation of the gauge.

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MUSTANG

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly, as outlined *in Part 33-50.*
3. Remove the six screws that retain the mask and lens to the cluster backplate and remove the mask and lens.
4. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and *install the two retaining nuts.*
2. Position the lens and mask to the cluster backplate and install the six retaining screws.
3. Install the instrument cluster assembly, as outlined in Part 33-50.
4. Connect the battery ground cable and check the operation of the gauge.

PINTO AND BOBCAT (YOUTH OPTION)

Removal

1. Disconnect the battery ground cable.
2. Remove the cluster as outlined in Part 33-50.
3. From the rear side of the cluster, remove the three retaining screws and separate the cluster from the backplate.
4. Remove the gauge terminal insulator.
5. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge in the backplate and install the two retaining nuts.
2. *Install gauge terminal insulator.*
3. Position the cluster mask to the backplate and install the three retaining screws.
4. Install the cluster assembly as outlined in Part 33-50.
5. Connect the battery ground cable and check the operation of the gauge.

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Fuel Indicating System

PART 33-20

Applies to All Models

SUBJECT	PAGE
GENERAL INFORMATION	20-1
DESCRIPTION AND OPERATION	
Electronic Low Fuel Level Warning System	20-2
Fuel Filters	20-2
Fuel Indicator Gauge	20-2
Fuel Level Indicating System	20-2
Fuel Sending Unit	20-2
Instrument Voltage Regulator (IVR)	20-2
TESTING	
Electronic Low Fuel Level Warning Switch	20-4
Fuel Gauge and IVR	20-3
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Preliminary Checks	20-3
REMOVAL AND INSTALLATION	
Fuel Gauge	20-6
Fuel Sending Unit	20-6
Low Fuel Level Warning Switch	20-6

CK3381-2B

GENERAL INFORMATION

An auxiliary fuel tank is available on Mustang II vehicles (required on Mustang II equipped with V-8 engine).

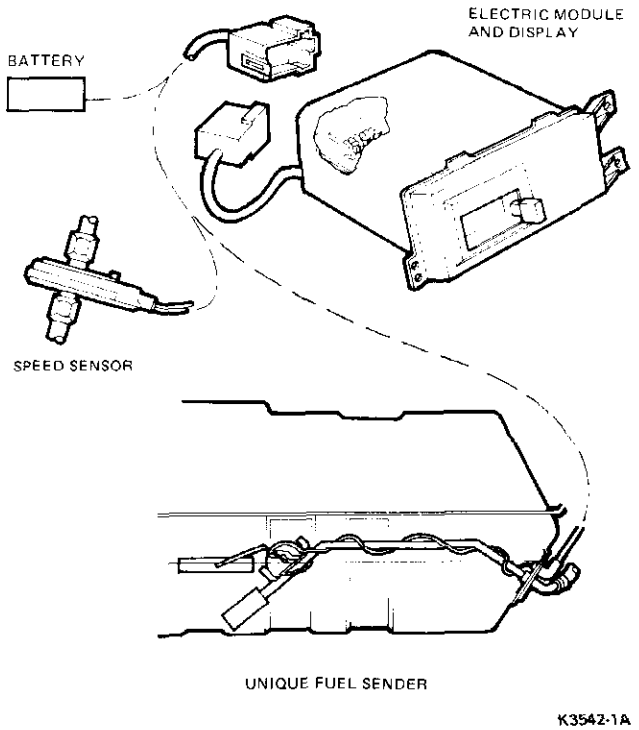


FIG. 1 Miles-to-Empty Fuel Indication System

Because the auxiliary tank empties into the main tank, it is normal for the fuel gauge to indicate FULL until the additional capacity of the auxiliary tank is used.

There is also an optional miles-to-empty electronic module for Continental Mark V. After the command switch to the right of the display is activated, the display will show the predicted miles that may be driven on the remaining fuel. If the remaining miles-to-empty is 50 or less, the display will automatically turn on and remain on until more fuel is added. The MTE module is attached to the instrument panel with three screws and two locator pins. Service of the module or its illumination bulb can be accomplished after removal of the cluster trim cover. See Fig. 1.

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DESCRIPTION AND OPERATION

FUEL LEVEL INDICATING SYSTEM

The fuel level indicating system is a bimetal-resistance type system and consists of an instrument voltage regulator, fuel indicator gauge mounted in the instrument cluster, and a sender unit located in the fuel tank (Fig. 2).

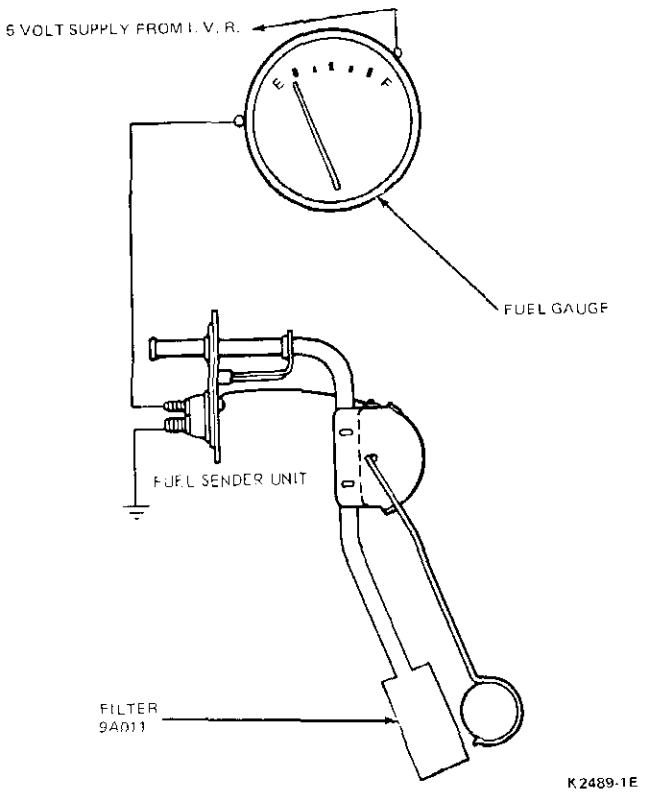


FIG. 2 Fuel Level Indicating System

INSTRUMENT VOLTAGE REGULATOR (IVR)

The instrument voltage regulator (IVR) used with the fuel indicator gauge, controls and maintains an average pulsating value of 5.0 volts at the gauge terminals. To prevent the (IVR) from causing radio interference, a radio suppression choke is connected in series between the printed circuit and the instrument voltage regulator (where specified).

FUEL INDICATOR GAUGE

The fuel indicator gauge pointer is attached to a wire wound bimetal strip, which when heated by the flow of current controlled by the fuel sender unit, produces the appropriate level indication. When the current is low, there is little heating effect and the pointer moves a short distance. As the current increases, it produces a greater heating effect, causing the pointer to move a greater distance.

FUEL SENDING UNIT

The fuel sending unit consists of a variable resistor controlled by the level of an attached float in the fuel tank. When the fuel level is low, resistance in the sender is high and allows only a low current to flow through the indicator gauge windings causing the pointer to move a short distance. When the fuel level is high, the resistance in the sender is low and allows a higher current flow causing the indicator pointer to move a greater distance.

FUEL FILTERS

Two fuel tank filters are used to eliminate the need of replacing the entire fuel sender assembly. One of these filters is 1-7/8" long and is fitted to a 5/16" fuel sender tube. The other filter is 2-3/4" long and is fitted to a 3/8" fuel sender tube. The filters are not *interchangeable and each type must be hand pressed* onto the fuel sender outlet tube until it bottoms.

ELECTRONIC LOW FUEL LEVEL WARNING SWITCH SYSTEM

Continental Mark V, Granada, Monarch and Versailles

The electronic low fuel warning system is standard equipment on Continental Mark V and optional on Granada, Monarch and Versailles.

The Electronic Low Fuel Level Warning Switch is an electronic sensing and switch device which CANNOT BE CALIBRATED without specialized calibration equipment.

The system consists of an electronic low fuel level warning switch (Fig. 3) and a low fuel level indicator lamp located on the instrument panel. Granada, Monarch and Versailles models have the indicator lamp and switch located in the console. Continental Mark V has the switch and indicator lamp located on the instrument panel. The warning switch is controlled by the difference in voltage potential between the two terminals of the fuel gauge. When the fuel tank is less than 1/4 full, the contacts within the warning switch are *closed to make the low fuel level indicator lamp glow.* The system also has a prove-out feature to check lamp operation when the ignition switch is turned ON.

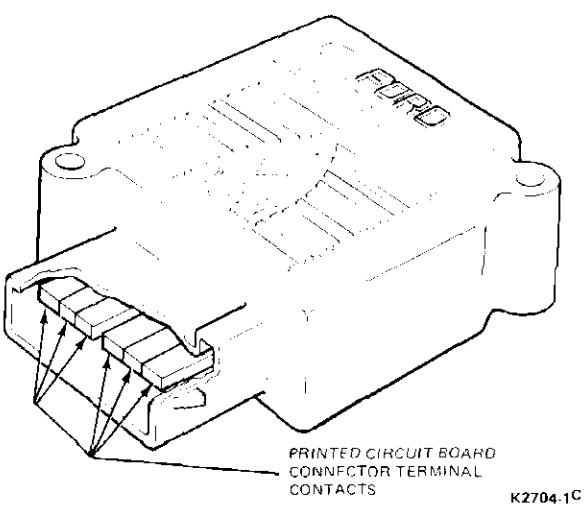


FIG. 3 Electronic Low Fuel Level Warning Switch

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TESTING

PRELIMINARY CHECKS

1. Visually inspect fuel tank for damage. A fuel tank that is collapsed or distorted from its normal shape will seriously affect the fuel indicating system operation.
2. A vehicle may be encountered where the fuel tank does not fill completely. This will result in the fuel gauge not reaching the full mark. Check by shaking the vehicle after the first fuel "blow back" or pump nozzle cutoff and then slowly metering fuel into the tank with the shut-off nozzle withdrawn to the edge of the filler neck. If the fuel gauge reaches full after this procedure, the tank will not fill because of the fuel tank or filling practices and will not be corrected by replacement of the Fuel Indicating System components.

FUEL GAUGE AND INSTRUMENT VOLTAGE REGULATOR (IVR)

Operational Test

Follow the instructions printed on the case of the Bimetal Gauge System Tester No. (21-0015) or equivalent. If a tester is not available, use the following procedure.

Disconnect the wiring connector from the terminals at the fuel sender unit. Check the terminals for possible corrosion or undercoating and clean if necessary. Connect the lead of a 12-volt test light, or the positive lead of a volt meter (20-volt scale) to the gauge lead that was disconnected from the fuel sender unit. Connect the other test lead to a suitable ground. With the ignition switch in the ON position, a flashing light or fluctuating voltage will indicate that the instrument voltage regulator is operating and that the gauge indicator circuit is not interrupted.

If a pulsating voltage is shown but the gauge was not accurate before the check, perform the calibration test.

If the light does not blink after a few seconds, or the voltage reading is steady check IV ground. If okay, replace the IVR. If a pulsating voltage or flashing light is shown, move the ground lead of the test light or voltmeter to the ground lead of the wiring connector. If the pulsating voltage or flashing light is still shown, proceed to the calibration test. If not, trace and repair the open circuit in the ground wire of the wiring harness. **Do not ground or spark either terminal of the instrument voltage regulator. This will burn out the dash wiring harness or damage the instrument voltage regulator or both.** If no voltage is indicated by the voltmeter or the test light stays off; check for an open circuit across the IVR terminals, the indicator gauge windings, or the printed circuit.

Calibration Test

When the instrument voltage regulator or the fuel gauge is suspected of being out of calibration (having a fluctuating movement or a high or low reading), both the fuel gauge and the instrument voltage regulator must be tested simultaneously. This test is done on the vehicle.

The required test equipment consists of a Bimetal System Tester No. 21-0015 or equivalent, a pair of 10 ohm and 73 ohm resistors or another fuel sender of known quality.

If the test is performed with the resistors, disconnect the wiring connector at the sender unit, connect the resistor between the gauge lead and a suitable ground, and turn on the ignition switch. With the 10 ohm resistor, the gauge should read on or above the **FULL** mark. With the 73 ohm resistor, the gauge should read on or below empty mark.

If the test is performed with a fuel sender of known quality, use the following procedure: Disconnect the wiring connector from the sender and connect it to the test sender. Connect sender housing to vehicle ground on single terminal units. Turn the ignition switch to the ON position. Move the float rod against the FULL stop position (away from the fuel filter). The gauge should read **on or above the full (F) mark.** With the float rod against the EMPTY stop (toward the fuel filter), the gauge should read **on or below the empty (E) mark.**

If the fuel gauge performs as indicated, perform the fuel sender unit test(s).

If the gauge does not perform as indicated, replace the instrument voltage regulator and re-test to determine if the gauge is causing the trouble. If the gauge now reads correctly, the trouble has been the instrument voltage regulator and is now eliminated. If the gauge is still out of calibration, replace the gauge and reinstall the old IVR.

Inoperative Fuel Gauge—Ford and Mercury

If the fuel gauge indicator will not move off "empty", the resistor wire that provides the circuit feed to the instrument voltage regulator and fuel gauge may be broken at its termination or along its length. An "open" I.V.R. resistor feed wire can be tested and, if necessary, corrected by repairing or replacing the "open" wire as outlined below:

1. Remove the cluster assembly. Refer to Part 33-50.
2. Locate circuit No. 297A (black-lt. green hash) in cluster connector.
3. Turn the ignition switch to the accessory position and test for a voltage on circuit No. 297A.
4. If the test on circuit No. 297A indicated an open circuit, locate the other end of circuit No. 297A.

   Circuit No. 297A starts at the back of the fuse panel and ends at the cluster connector.
5. Visually inspect both ends of the resistor wire for an open condition. If an open condition is observed, repair. If the wire appears O.K., connect an ohmmeter to both ends of the resistor wire. The ohmmeter should indicate 8 to 9 ohms of resistance. If the ohmmeter indicates more than 10 ohms, repair or replace the resistor wire.

Fuel Gauge Bench Test

To test the fuel gauge coil windings, remove the gauge. Connect the gauge terminals to an ohmmeter and read the gauge coil winding resistance. An upward movement of the needle from 10

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toward 14 ohms is normal because the current increases the temperature of the gauge coil windings. If the ohmmeter reads below 10 ohms or above 14 ohms, replace the gauge.

FUEL SENDER UNIT

In Vehicle Test

1. Inspect fuel tank for distortion or damage.

   NOTE: If the fuel tank is distorted or damaged, it must be repaired or replaced before further testing. Refer to Bench Test procedure if fuel sender is removed from fuel tank.

2. Connect one lead of a Rotunda 21-0005 ohmmeter or equivalent to the ground terminal of the fuel sender connector (metal housing on single terminal units), the other lead to the variable resistor terminal. Refer to Fig. 5 for terminal connector application.

   The ohmmeter should read between 8 and 86 ohms:

   If the fuel sender resistance is above 86 ohms or below 8 ohms, the fuel sender must be replaced.

3. Fill the fuel tank to capacity. Refer to item No. 2 of Preliminary Checks. The ohmmeter reading should be between 8 and 12 ohms resistance:

   If the FULL fuel tank fuel sender resistance reading is below 8 ohms or above 12 ohms, the fuel sender unit must be replaced.

4. Use the Rotunda Gasoline Tanker (37-0002) or equivalent and drain all of the fuel from the fuel tank. Observe the ohmmeter reading while the fuel tank is being drained. The resistance should increase smoothly without jumping or hesitating.

   If the resistance reading jumps or hesitates, replace the fuel sender unit.

5. When the fuel tank is empty, the ohmmeter reading should be between 60 and 86 ohms resistance:

   If the EMPTY fuel tank fuel sender resistance reading is below 60 ohms or above 86 ohms, the fuel sender unit must be replaced.

6. If the results of the previous steps are OK and an erroneous fuel indication still exists, it is necessary to perform the Instrument Voltage Regulator (IVR) and Fuel Gauge Calibration Tests.

Bench Test (With Sender Removed from Fuel Tank)

1. Connect one lead of a Rotunda (02-0005) ohmmeter or equivalent to the ground terminal of the fuel sender connector (metal housing on single terminal units), the other lead to the variable resistor terminal. Refer to Fig. 5 for terminal connector application. The ohmmeter should read between 60 and 86 ohms when the float rod is against the EMPTY stop (closest to the fuel filter):

   If the EMPTY fuel tank fuel sender resistance reading is below 60 ohms or above 86 ohms, the fuel sender unit must be replaced.

2. Observe the ohmmeter reading while slowly moving the float between the EMPTY and FULL float rod stops. The resistance increase or decrease should be smooth without jumping or hesitation. The ohmmeter should read between 8 and 86 ohms:

   If the fuel sender resistance goes above 86 ohms or below 8 ohms, the fuel sender must be replaced.

   If the resistance reading jumps or hesitates while slowly moving the float rod, the fuel sender must be replaced.

3. Move the float rod to the FULL stop position (furthest away from fuel filter). The ohmmeter should read between 8 and 12 ohms resistance:

   If the ohmmeter reading is below 8 ohms or above 12 ohms resistance, the fuel sender must be replaced.

4. Before installing a fuel sender unit, the wire harness connector should be connected to the fuel sender unit and the float rod moved from the EMPTY to FULL stops to check the fuel gauge readings:

   If Steps 1, 2, and 3 of this procedure are OK and the fuel gauge does not indicate properly as shown in Fig. 3, perform the Instrument Voltage Regulator (IVR) Operational Test and the Fuel Gauge Calibration Test.

   NOTE: Check the float before reinstalling a fuel sender unit in the fuel tank. Be sure the float rod is not bent and that the float is not:

   a. Filled with fuel
   b. Badly distorted
   c. Loose on float rod

   Check the fuel sender locating tabs. Be sure the tabs are not bent allowing the sender unit to rotate on the gasket surface as the locking ring is installed.

ELECTRONIC LOW FUEL LEVEL WARNING SWITCH SYSTEM

Continental Mark V, Granada, Monarch and Versailles

Low Fuel Indicator Light Circuit

When the ignition switch is turned ON, the lamp should glow for less than (one minute). If the lamp does not glow, test the bulb and/or perform the low fuel warning switch circuit test described below.

Low Fuel Warning Switch Circuit

Improper operation of the low fuel warning switch will be apparent when the indicator lamp remains **ON** continually with more than 1/4 tank of fuel or if the indicator lamp remains **OFF** when the tank is empty. If either condition exists, disconnect the wiring connector attached to the low fuel warning switch. With the ignition **ON**, test the terminal connector positions of the wiring harness connector shown in Fig. 5 as follows:

Position 1— **Blank** —no terminal

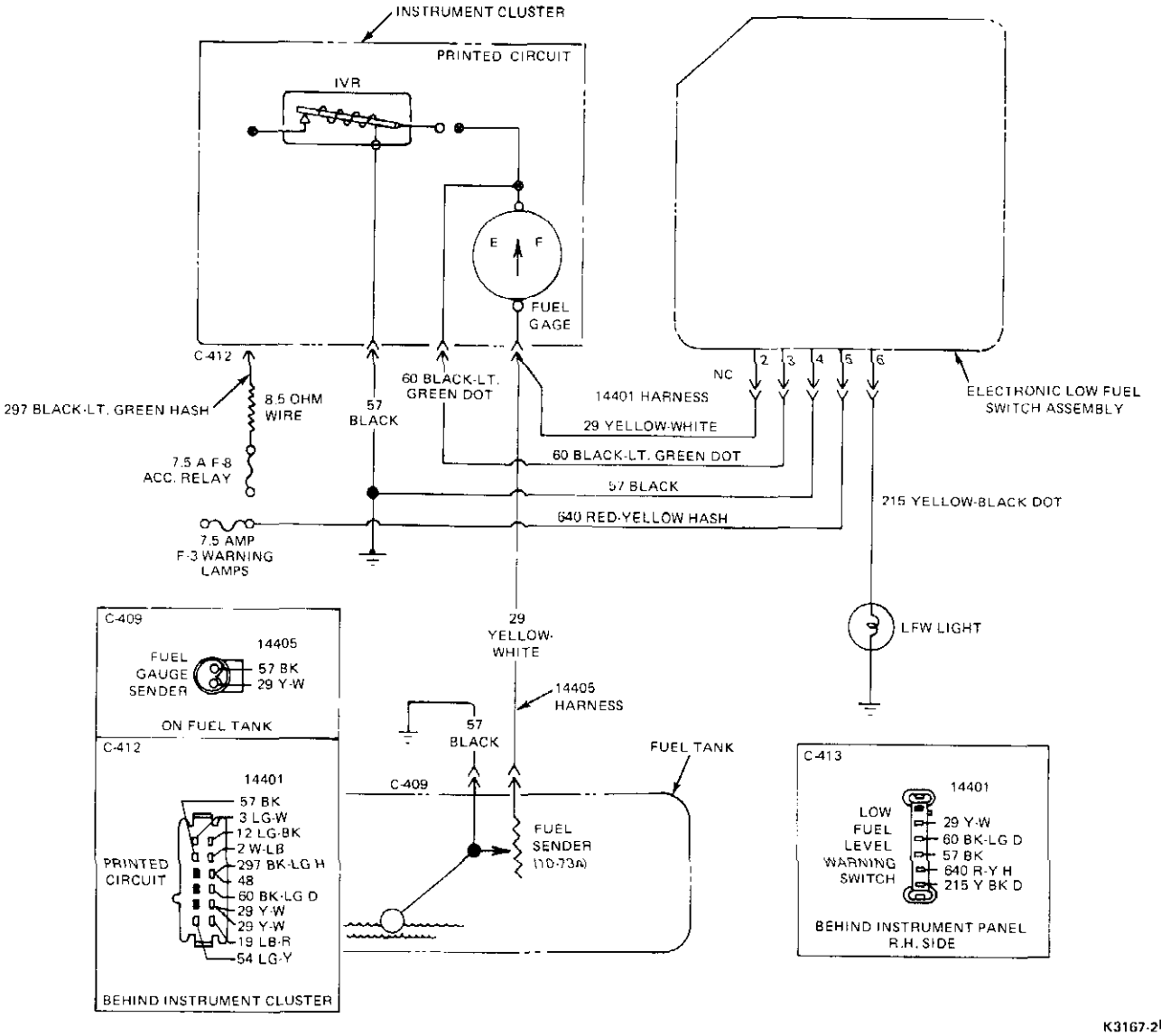
Position 2—Connect a self-powered test light between terminal and ground. Test light should blink.

Position 3—Connect test light between terminal and ground. Test light should blink and be brighter than Position 2.

Position 4—Connect test light between terminal and positive battery terminal. Test light should glow and remain ON.

Position 5—Connect test light between terminal and ground. Test light should glow and remain ON.

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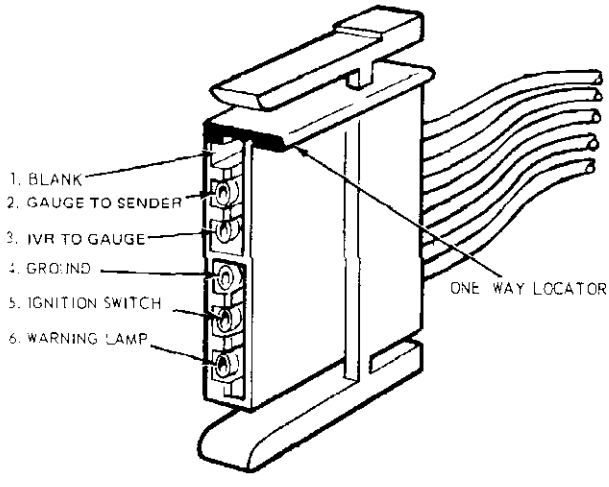
FIG. 4 Electronic Low Fuel Level Warning System Schematic—Granada, Monarch, Versailles and Continental Mark V

Position 6—Connect a jumper wire between terminal and battery positive terminal. Warning lamp on instrument panel should glow and remain ON.

If any of the above tests are unsatisfactory: trace the particular wire for an open circuit and repair as required. If all the tests show satisfactory, perform the Fuel Gauge and IVR Calibration Test and repair the system or replace defective components as required. If the Fuel Gauge and IVR Calibraton Test is OK, replace the Low Fuel Level Warning Switch and recheck the system for proper operation.

Miles-To-Empty Module

For a service flow chart on the Continental Mark V, refer to the Chart in Fig. 6.



K2705-1B

FIG. 5 Electronic Low Fuel Level Warning Switch Connector Terminals

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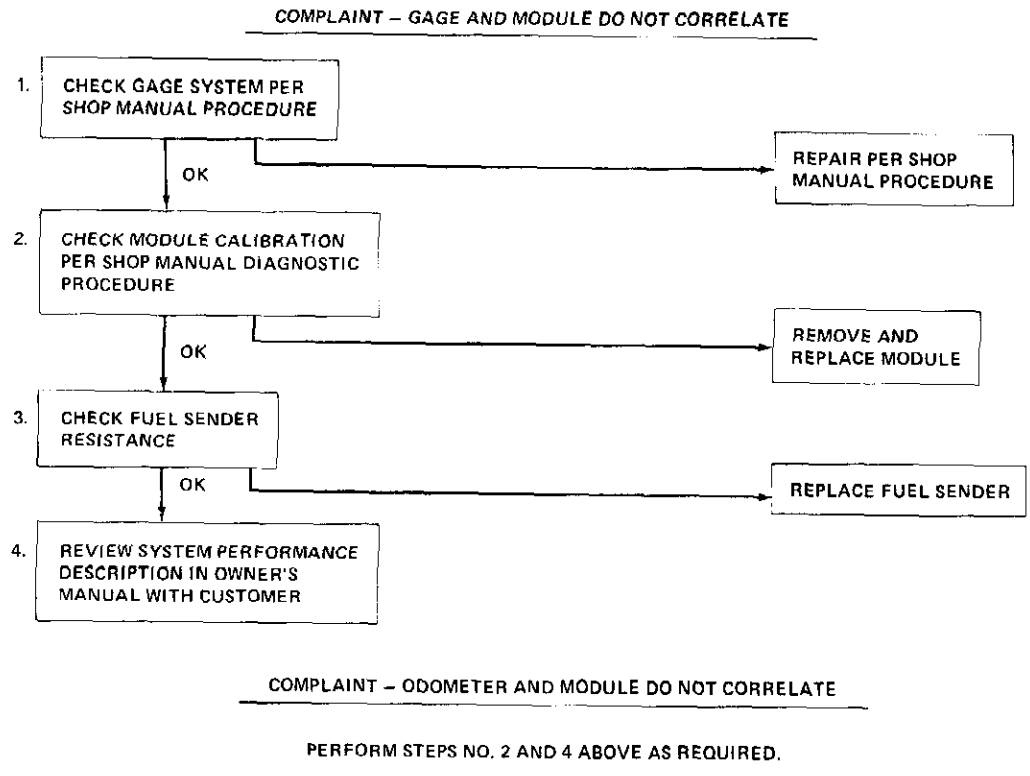


FIG. 6 Miles-to-Empty Service Flow Chart

REMOVAL AND INSTALLATION

FUEL SENDING UNIT

1. Remove the fuel from the fuel tank.
2. Remove any dirt that has accumulated around the sending unit so that it will not enter the tank or connections.
3. Disconnect the wiring connector from the fuel sender.
4. Loosen the hose clamp and disconnect the tank line at the sending unit.
5. Turn the sending unit locking ring counterclockwise and remove the locking ring, sending unit and mounting gasket.
6. Clean the fuel gauge sending unit mounting surface at the fuel tank.
7. Position a new mounting gasket and the sending unit on the fuel tank and secure it by rotating the locking ring against the stop.
8. Connect the fuel tank line and wiring connector.
9. Fill the tank.
10. Check the fuel gauge operation and check for fuel leaks.

LOW FUEL LEVEL WARNING SWITCH

CONTINENTAL MARK V

Removal

1. Remove four screws in applique panel above glove box and remove panel.
2. Remove the two switch attaching screws, the connector plug and remove switch.

Installation

1. Position the new switch assembly, install the two switch attaching screws and connector plug.
2. Install the panel and the four attaching screws.
3. Verify correct operation of the low fuel warning system.

Granada, Monarch and Versailles (See Fig. 7)

Removal

1. Open console glove box door located between the front seats.
2. Remove the two switch attaching screws, the connector plug and remove switch.

Installation

1. Attach connector plug, position the new switch assembly and install the two switch mounting screws.
2. Verify correct operation of low fuel warning system.

FUEL GAUGE

Ford, Mercury and Lincoln Continental

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.

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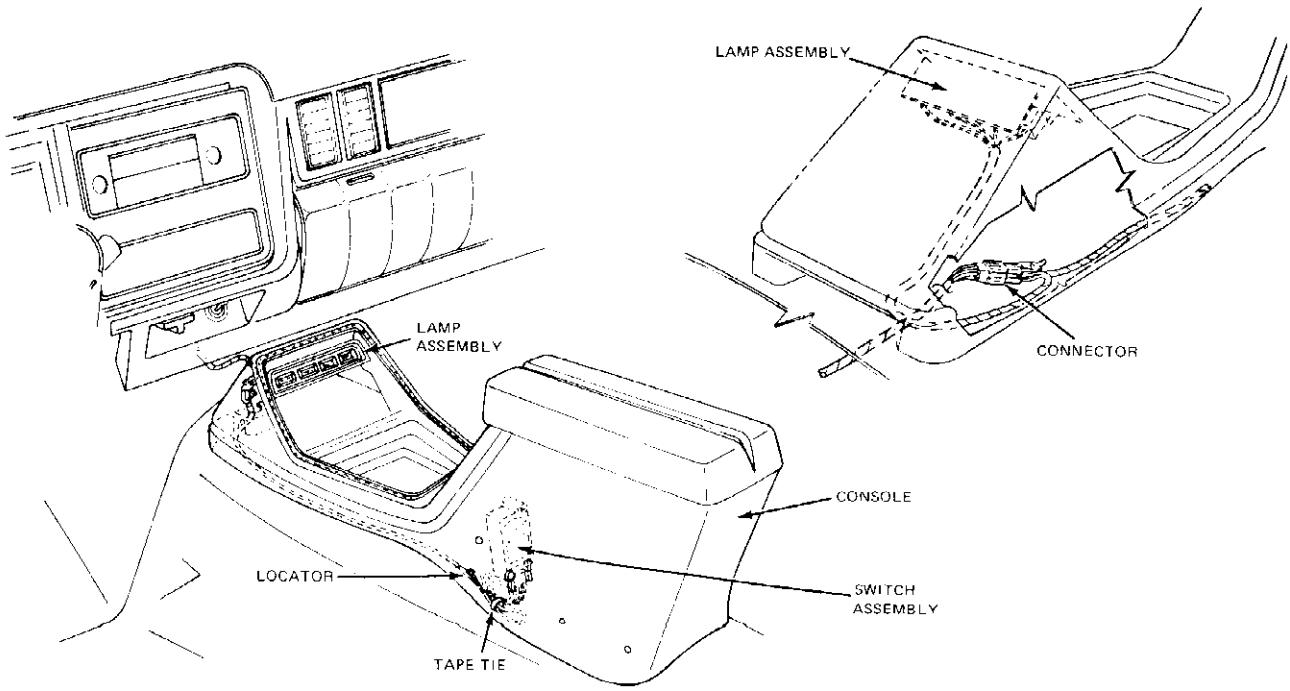


FIG. 7 Floor Console Warning Indicator Panel—Granada, Monarch and Versailles

3. Remove the mask and lens from the cluster, (five screws).
4. Remove the speedometer assembly (two screws).
5. Remove the fuel gauge (two retaining nuts).

Installation

1. Position the gauge to the cluster and install the retaining nuts.
2. Install the speedometer assembly.
3. Install the mask and lens to the cluster (5 screws).
4. Install the cluster as outlined in Part 33-50.
5. Connect the battery ground cable and check the gauge operation.

Mustang II

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly, as outlined in Part 33-50.
3. Remove the six screws that retain the mask and lens to the cluster backplate and remove the mask and lens.
4. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and install the two retaining nuts.
2. Position the lens and mask to the cluster backplate and install the six retaining screws.
3. Install the instrument cluster assembly as outlined in Part 33-50.
4. Connect the battery ground cable and check the operation of the gauge.

Thunderbird, Cougar and LTD II—Standard Cluster

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster, as outlined in Part 33-50.
3. Remove the six screws attaching the cluster backplate to the mask and lens assembly.
4. Remove the two outer dial attaching screws.
5. Remove the two gauge retaining nuts from the rear of the cluster backplate and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and install the two retaining nuts.
2. Install the two outer dial attaching screws.
3. Install the lens and mask assembly to the cluster (six retaining screws).
4. Install the instrument cluster, as outlined in Part 33-50.
5. Connect the battery ground cable and check the operation of the gauge.

Thunderbird, Cougar XR-7 and LTD II—Performance Cluster

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster, as outlined in Part 33-50. Remove the clock knob and nut.

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DETROIT IRON

3. Remove the mask and lens assembly (six retaining screws) from the cluster backplate.
4. Remove the two nuts retaining the gauge to the cluster and remove the gauge.

Installation

1. Position the gauge to the cluster back and install the two retaining nuts.
2. Position the mask and lens assembly to the cluster and install the six retaining screws. Install the clock knob and nut.
3. Install the cluster, as outlined in Part 33-50.
4. Connect the battery ground cable and check the operation of the gauge.

Fairmont and Zephyr

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. From the front side of the cluster, remove the four retaining screws and separate the cluster mask and lens assembly from the backplate. Note that these screws also retain the cluster lens to mask.
4. Remove the two gauge retaining nuts from the rear side of the cluster. Withdraw the gauge from the front side of the backplate.

Installation

1. To install, position the gauge to the cluster backplate and install the two retaining nuts from the rear side.
2. Position the cluster backplate to the mask and lens assembly and install retaining screws.
3. Install the cluster assembly, as outlined in Part 33-50.
4. Connect the battery ground cable and check the operation of the gauge.

Pinto and Bobcat (Base)

Removal

1. Disconnect the battery ground cable.
2. Remove the cluster, as outlined in Part 33-50.
3. From the rear side of the cluster, remove the four retaining screws, and separate the cluster front housing from the backplate. Note that the two lower screws also retain the metal brackets that engage the instrument panel.
4. Remove the two fuel gauge retaining nuts and remove the fuel gauge.

Installation

1. Position the fuel gauge in the backplate and install the two retaining nuts.
2. Position the cluster front housing to the backplate and install the four retaining screws.
3. Install the cluster assembly, as outlined in Part 33-50.
4. Connect the battery ground cable and check the operation of the gauge.

Pinto and Bobcat (Youth Option)

Removal

1. Disconnect the battery ground cable.
2. Remove the cluster as outlined in Part 33-50.
3. From the rear of the cluster, remove three retaining screws and separate the cluster from the backplate.
4. Remove the two fuel gauge retaining nuts.

Installation

1. Position the full gauge in the backplate and install the two retaining nuts.
2. Position the cluster mask to the backplate and install the three retaining screws.
3. Install the cluster assembly as outlined in Part 33-50.
4. Connect the battery ground cable and check the operation of the gauge.

Continental Mark V

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster, as outlined in Part 33-50.
3. Remove the clock knob and nut.
4. Remove the mask and lens assembly (six retaining screws).
5. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster and install the two gauge retaining nuts.
2. Install the lens and mask assembly (six retaining screws).
3. Install the clock knob and nut.
4. Install the instrument cluster, as outlined in Part 33-50.
5. Connect the battery ground cable and check the operation of the gauge.

Monarch, Granada and Versailles

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. Remove the mask and lens assembly (five (5) attaching screws).
4. Remove the two (2) gauge attaching nuts and remove the gauge.

Installation

1. Position the gauge to the cluster and install the two (2) attaching nuts.
2. Install the mask and lens assembly (five (5) attaching screws).
3. Install the instrument cluster as outlined in Part 33-50.
4. Connect the battery ground cable and check the operation of the fuel gauge.

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Oil Pressure Indicator -- Lamp

PART 33-30

Applies to All Models

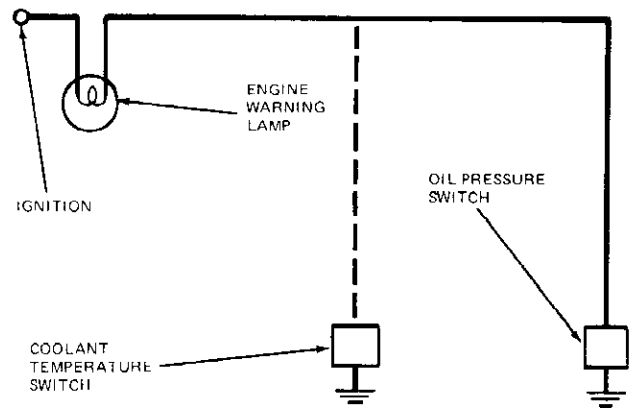
SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION	30-1	REMOVAL AND INSTALLATION	30-2
TESTING	30-1		

CK3382-2B

DESCRIPTION AND OPERATION

A red indicator lamp glows when the oil pressure is below a prescribed value. The lamp should come on when the ignition switch is first turned to the run position. The indicator lamp should go out within a few seconds after the engine starts, indicating that the oil pressure has reached a prescribed value.

The lamp is connected between the oil pressure switch unit (mounted on the engine) and the coil terminal of the ignition switch (Fig. 1).



K1591-1E

FIG. 1 Oil Pressure Indicator—Lamp System

TESTING

To test the indicator lamp, turn on the ignition switch. Do not start the engine. The lamp should come on. Start the engine. The lamp should go out, indicating that the oil pressure has built up to a prescribed value.

To test the oil pressure switch on the engine, turn the ignition switch on, but do not start the engine. The indicator lamp should come on. If the indicator lamp does not come on, remove the wire from the switch terminal and connect the wire to ground. If the lamp now comes on, the oil pressure switch is inoperative, or not properly sealed to the engine. If the lamp does not come on, the warning lamp is burned out or the system wiring is open-circuited. NOTE: There is only one indicator lamp serving both the oil pressure switch and the temperature switch on some car models. These combined systems are identified by the word "engine" on the warning lamp. Models with separate oil pressure and temperature warning systems have separately labeled warning lamps. For combined warning system, disconnect the temperature switch wire before testing the oil pressure indicating system. Be sure to use Teflon tape (D0AZ-19554-C or equivalent) or electrically conductive sealer C3AZ-19554-B or equivalent on all oil pressure switches which do not have white tape on the mounting threads.

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DETROIT IRON

REMOVAL AND INSTALLATION

SWITCH UNIT

The oil pressure switch units are mounted in different ways and locations. Figs. 2, 3, 4 and 5 are typical examples.

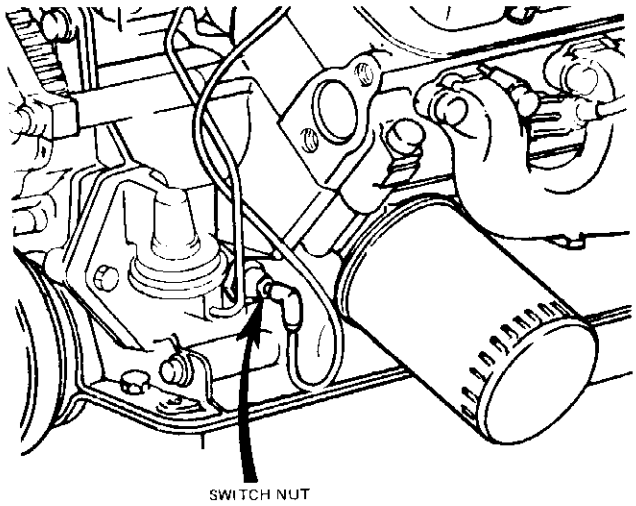


FIG. 2 Oil Pressure Switch—Typical 8-Cylinder

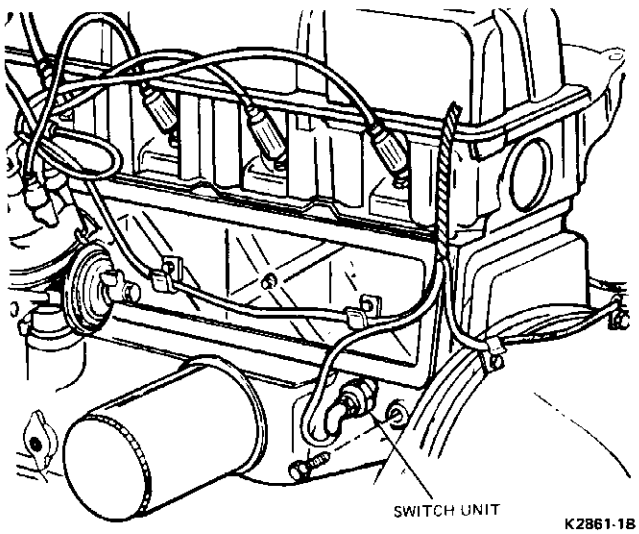


FIG. 3 Oil Pressure Switch—3.3/4.1L (200/250 CID) Engine

To remove the switch unit, disconnect the wire at the unit terminal and unscrew the unit from its mounting. Install the new switch unit, tighten to 8-18 ft-lbs. of torque. Connect the wire to the unit terminal, and check the operation of the unit. Be sure to use Teflon tape (D0AZ-19554-C) or equivalent or electrically conductive water resistant sealer C3AZ-19554-B or equivalent on the threads of the unit. The pressure switch type unit used with the indicator lamp system is not interchangeable with the variable resistance-type unit,

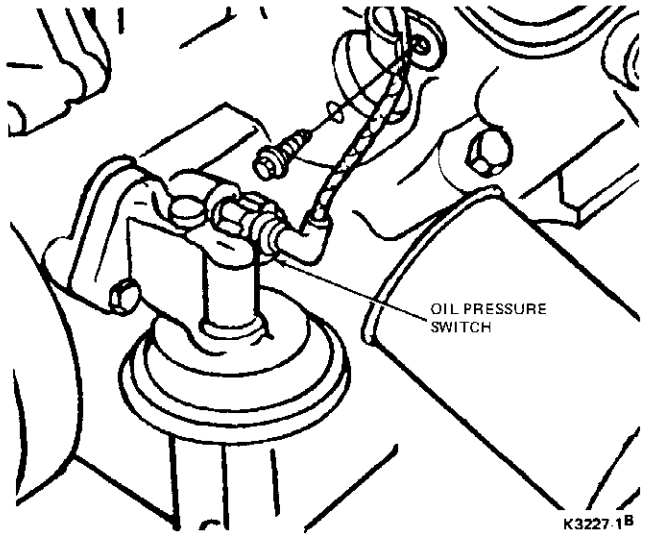


FIG. 4 Oil Pressure Switch—5.0/5.8L (302/351 W CID) Engine

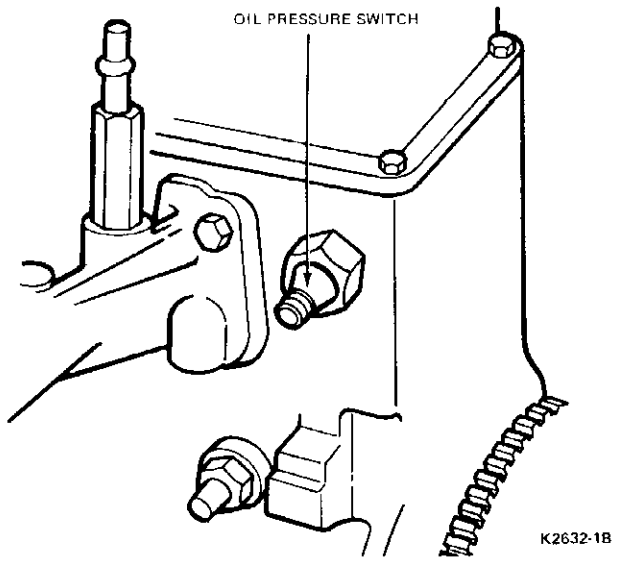


FIG. 5 Oil Pressure Switch—2.3L Engine

called a sender, used with gauge system. Refer to the Ford car master parts catalog and the Lincoln Mercury parts and accessories catalog for proper parts usage. Installation of the wrong part unit can result in an inoperative oil pressure indicating system and a damaged sender unit or gauge.

INDICATOR LAMP

On some vehicles it is necessary to remove the instrument cluster to gain access to the indicator bulb. These procedures are outlined in Part 33-50. On Thunderbird and Continental Mark V remove the instrument panel trim cover as outlined in Part 33-50.

To remove the indicator bulb, turn the bulb and socket assembly 1/4 turn counterclockwise and remove. To install, position the new bulb and socket assembly to the printed circuit and turn it clockwise 1/4 turn.

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Oil Pressure Indicator -- Gauge

PART 33-31

Applies to Cougar XR-7, LTD II, and Thunderbird

SUBJECT	PAGE
DESCRIPTION AND OPERATION	31-1
TESTING	
Calibration Test	31-1
Gauge Bench Test	31-1
Gauge and IVR Test	31-1
TESTING (Cont'd.)	
Sending Unit Test	31-1
REMOVAL AND INSTALLATION	
Oil Pressure Gauge	31-2
Sending Unit	31-2

CK3383-2B

DESCRIPTION AND OPERATION

The oil pressure gauge indicating system consists of the instrument voltage regulator, an oil pressure indicating gauge and an oil pressure sending unit, all connected in series. The sending unit consists of a diaphragm, a contact and a variable resistor. The oil pressure causes the diaphragm to move the contact on the variable resistor thus controlling the flow of current through the gauge.

When the oil pressure is low, the resistance of the sending unit is high, thus restricting the flow of current through the gauge which moves the pointer only a short distance. As the oil pressure increases, the resistance of the sending unit decreases causing a proportionately increased flow of current and movement of the pointer.

TESTING

OIL PRESSURE GAUGE AND INSTRUMENT VOLTAGE REGULATOR (IVR)

The instrument voltage regulator (IVR) used with the oil pressure gauge indicating system also supplies a common regulated voltage for the fuel level indicating system and temperature gauge indicating system (when applicable). Therefore, the IVR can only be defective if the fuel and temperature gauge exhibit similar problems (fluctuating movement or a high or low reading). If this is the case, refer to Part 33-20 and perform the fuel gauge and instrument voltage regulator operational test before proceeding with the oil gauge calibration test.

If customer complains of erratic and/or high oil pressure indication, check engine to body ground strap. The strap screws must be properly torqued.

CALIBRATION TEST

If only the oil gauge is inoperative or appears to be out of calibration, a calibration test can be conducted on the vehicle oil gauge system.

Sender Unit Test

Disconnect the wiring at the sender unit and measure the resistance between the sender's terminal stud and housing with an ohmmeter. If the ohmmeter reads below 50-ohms or above 90-ohms with the engine not running, the sender is damaged and should be replaced.

Gauge Test

The required test equipment consists of a 22-ohm resistor and a 73-ohm resistor.

Disconnect the wiring connector at the sender unit, connect one of the resistors between the lead wire terminal and ground, and turn the ignition switch to the ON or ACC position. With the 22-ohm resistor, the gauge should indicate a mid-scale reading. With the 73-ohm resistor, the gauge should read at the "L" graduation mark. Without any resistor (open circuit) the gauge reading should be the same as with the ignition switch in the OFF position.

If the gauge pointer does not move and stays below the "L" mark, check for an open circuit in the wiring assembly, the gauge windings, or the instrument cluster printed circuit. If the gauge pointer moves without any resistor connected, check for a short circuit in the lead to the sender unit. If the gauge reads out of calibration, the gauge is damaged and must be replaced.

ENGINE OIL PRESSURE CHECK

Remove the oil pressure sender unit and temporarily attach a mechanical oil pressure gauge in its place. Operate the engine to determine the oil pressure. If the oil pressure indicated on the mechanical gauge is between 7-70 psi, the instrument cluster gauge should indicate within the normal band.

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GAUGE BENCH TEST FOR OPEN WINDINGS

To test an oil gauge for open windings, remove the gauge from the vehicle. Connect the gauge to an ohmmeter and read the resistance. An upward movement of the needle from 10 toward 14 ohms is normal, because the current increases the temperature of the gauge coil (windings). If the ohmmeter reads below 10 ohms or above 14 ohms, replace the gauge.

REMOVAL AND INSTALLATION

SENDING UNIT

The sending unit (pressure switch) used with the warning indicator lamp system is not interchangeable with the sending unit used with the gauge system. Refer to the Ford car master parts catalog and the Lincoln Mercury parts and accessories catalog for proper parts usage. Misuse of the sending units can result in inoperative oil pressure indicating systems and damaged sending units or gauges. The oil pressure sending units are mounted in different ways and locations. Figs. 1 and 2 are typical examples.

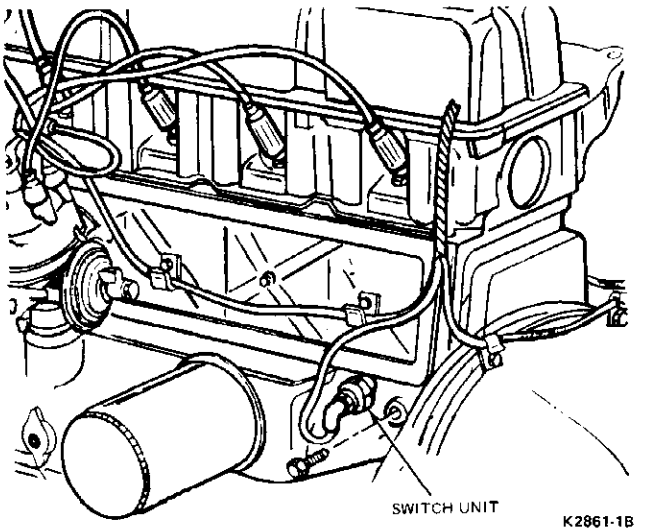


FIG. 1 Oil Pressure Switch—3.3/4.1L (200/250 CID) Engines

To replace the unit, disconnect the wire from the terminal. Remove the unit from the engine. Apply Teflon tape (D0AZ-19554-C) or equivalent or conductive sealer C3AZ-19554-B or equivalent to the threads of the new unit and install the unit. Tighten to 8-18 ft-lb torque. Connect the wire to the terminal and check the operation of the unit.

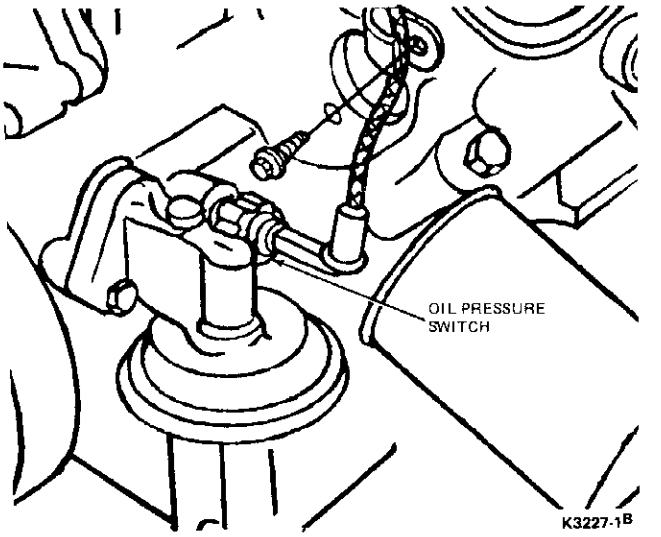


FIG. 2 Oil Pressure Sending Unit—5.0/5.8L (302/351 W CID)

OIL PRESSURE GAUGE

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. Remove the clock knob and nuts.
4. Remove the six screws attaching the lens and mask assembly to the cluster backplate and remove the mask and lens assembly.
5. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and install the two retaining nuts.
2. Position the lens and mask assembly to the cluster backplate and install the six retaining screws.
3. Install the clock knob and nut.
4. Install the instrument cluster as outlined in Part 33-50
5. Connect the battery ground cable and check the operation of the gauge.

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Temperature Indicator

PART 33-40

Applies to All Models

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Temperature Gauge System	40-1
Temperature Indicator Lamp System	40-1
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Automatic Temperature Control	40-3
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Gauge Bench Test	40-2
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REMOVAL AND INSTALLATION	
Indicator Lamp	40-4
Sending Unit or Switch	40-3
Temperature Gauge	40-3

CK3384-2B

DESCRIPTION AND OPERATION

TEMPERATURE GAUGE SYSTEM

The temperature gauge indicating system consists of a sending unit mounted in the engine block (2.3L, 5.8L [351M CID], 6.6L [400 CID]), in the cylinder head (3.3/4.1L [200/250 CID]) or intake manifold (5.0L [302 CID], 5.8L [351W], 7.5L [460 CID]) and a temperature gauge mounted on the instrument panel. When the engine temperature is low, the resistance of the sending unit is high, thus restricting the flow of current through the gauge which moves the pointer only a short distance. As the temperature of the engine increases, the resistance of the sending unit decreases causing a proportionately increased flow of current and movement of the pointer.

The engine temperature indicating system design is based on the company standard requirements for engine cooling systems. It is possible, under certain driving conditions, such as heavy traffic, or stop-and-go driving in hot weather, for the gauge pointer to read at the very top of the normal band with the coolant temperature within specifications.

TEMPERATURE INDICATOR LAMP SYSTEM

The temperature indicating system provides the driver with an indication of engine coolant operating temperature by means of an indicator lamp. This system consists of a temperature switch unit mounted in the engine block, intake manifold or engine head, lead wires and a temperature indicator lamp mounted in the instrument cluster.

The lamp is covered by a lens imprinted with the letters TEMP or ENGINE. With the lamp off, the lens appears blank.

Should the temperature of the engine coolant reach approximately 249 degrees F, the TEMP (or ENGINE) red indicator lamp will glow, indicating that the engine is overheated.

This indicating lamp is controlled by the temperature switch. The temperature switch has a temperature-sensitive bi-metallic arm which completes the circuit through the switch to the engine ground. With the ignition in the START position, the TEMP (or ENGINE) red light should glow even though the engine is cold, thus proving that the lamp bulb is operable. A set of contacts in the ignition switch (normally open) completes the proving circuit to ground in the start position.

AUTOMATIC TEMPERATURE CONTROL SYSTEM

The Automatic Temperature Control (A.T.C.) sender has two terminals and replaces the gauge sender or indicator lamp switch in those vehicles equipped with the A.T.C. system. The extra terminal disables the heater blower motor until the engine coolant warms up. This second terminal is marked either "R" in the gauge system or "C" in the indicator lamp system. It provides a ground for a relay in the A.T.C. control circuit until the coolant reaches 115°F or above. At that time the bi-metal arm opens the contact releasing the relay and allowing the blower to operate.

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DETROIT IRON

TESTING

GAUGE SYSTEM

During the test procedure, do not apply 12 volts directly to the temperature sender terminal at any time. This voltage will damage the temperature sender unit.

Verify that the engine to body ground strap is secure. A poor ground can cause a high temperature gauge indication. Idle the engine until the thermostat opens and the coolant temperature stabilizes. The temperature gauge pointer should indicate in the lower half of the normal band. If the coolant temperature does not stabilize, check the cooling system for proper function. If the gauge pointer indicates above the lower half of the normal band, test the IVR and temperature gauge circuit with Rotunda Gauge Tester WRE500-70A or 21-0015 or with a test light or voltmeter using the following procedure.

Disconnect the gauge lead from the terminal at the sender unit. Connect the lead of a 12-volt test light or the positive lead of a volt meter (20-volt scale) to the gauge lead that was disconnected from the sender unit. Connect the other test lead to a suitable ground. With the ignition switch in the ON or ACC position, a flashing lamp or fluctuating voltage will indicate that the instrument voltage regulator is operating and that the gauge circuit is not interrupted.

If a pulsating voltage is shown but the gauge is not accurate, perform the calibration test below.

If the lamp stays on or the voltage reading is steady, check the IVR ground. If good, replace the instrument voltage regulator (IVR).

If no voltage is indicated by the voltmeter or test lamp, check for an open circuit in the IVR, the gauge windings or the printed circuit. Do not ground or spark either terminal of the IVR. This will burn out the dash wiring harness or the IVR and/or printed circuit.

CALIBRATION TEST

When the IVR or one of the gauges (oil, temperature, fuel) is suspected of being out of calibration, having a fluctuating movement or a high or low reading, both the gauge and the instrument voltage regulator must be tested simultaneously. This test is done on the vehicle.

Test the IVR and temperature gauge with Rotunda Gauge Tester WRE500-70A or 21-0015 or with a 10-ohm resistor for high calibration and a 73-ohm resistor for low calibration using the following procedure:

Disconnect the lead from the gauge at the sender unit, connect the resistor between the gauge lead and ground (Fig. 1), and turn on the ignition switch. With the 10-ohm resistor, read within 1/2-pointer width on either side of the gauge pointer should indicate more than one-pointer width away from either side of the graduation. With the 73-ohm resistor, the side of the gauge pointer should indicate more than one-pointer width away from on either side of the "C" (low side) graduation.

If the gauge pointer indicates within calibration, replace the temperature sender. If the gauge pointer indicates out of calibration, replace the IVR and retest. If the gauge pointer still indicates out of calibration, replace the temperature gauge.

GAUGE BENCH TEST FOR OPEN WINDINGS

To test the gauge for open windings, remove the gauge from the vehicle. Connect the gauge to an ohmmeter and read the resistance. An upward movement of the needle from 10 toward 14 ohms is normal because the current increases the temperature of the gauge coil (windings). If the ohmmeter reads below 10 ohms or above 14 ohms, replace the gauge.

INDICATOR LAMP SYSTEM

During the test procedure, do not apply 12 volts directly to the temperature switch terminal at any time. This voltage will damage the temperature switch unit. NOTE: There is only one indicator lamp for the oil pressure switch and the temperature switch on some car lines (Fig. 1). Disconnect the oil pressure switch wire before testing the temperature indicating lamp system.

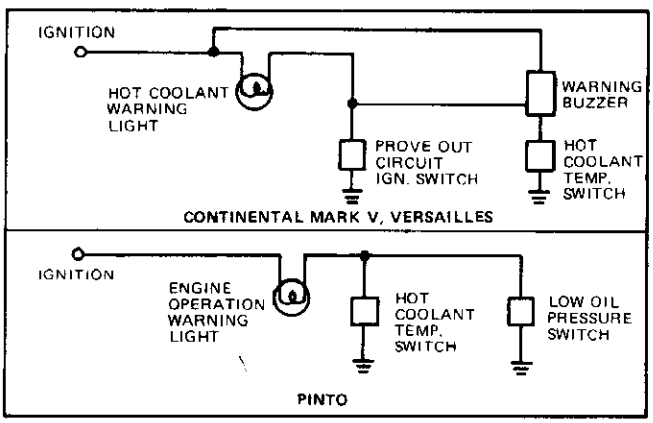


FIG. 1 Engine Coolant Warning System

Perform the test only if the engine temperature is less than 249 degrees F. If the red lamp stays on with the ignition switch turned to the ON position, an inoperative temperature sending switch is indicated. Remove the connector from the temperature (sending unit) switch; the lamp should go out. Connect a ohmmeter from the temperature switch terminal to the engine. There should be an open circuit (infinite ohms). If the meter reads zero ohms replace the switch (temperature sending unit). If the lamp is off when the ignition switch is in the ON position, turn the switch to the start position and the prove-out circuit should light the bulb. If the bulb does not glow, the bulb or the prove-out circuit is defective. Remove the bulb and check the bulb for continuity. If the ohmmeter indicates an open circuit (infinite ohms), replace the bulb and again turn the ignition switch to the start position to light the bulb with the prove-out circuit. If the bulb still does not light, check the wire continuity from the temperature sending switch to the light bulb and then to the ignition switch. Repair any breaks in the circuit.

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This should complete the prove-out circuit, so that the bulb will light when the ignition switch is again turned to the start position.

AUTOMATIC TEMPERATURE CONTROL SYSTEM

During the test procedure do not apply 12 volts directly across the "R" or "C" terminal at any time as this will damage the A.T.C. sending unit. Remove the harness from the "R" or "C" terminal to the engine. When the engine is cold (less than 125 degrees F.) the meter should read zero ohms. But, if the meter shows an open circuit (infinite ohms) replace the A.T.C. unit as this condition would allow the blower to move cold air. In cool weather with the selector lever in the automatic position and the temperature lever in the full heat position removing the connector should de-energize the relay and energize the blower. A shorting wire placed between the wiring harness connector ("R" or "C" only) and the engine should energize the relay and turn off the blower. NOTE - grounding of the other connection "I" in the wiring harness connector of a gauge system may cause damage.

REMOVAL AND INSTALLATION

SENDING UNIT OR SWITCH

The sending unit (temperature switch) used with the warning indicator lamp system is not interchangeable with the sending unit used with the gauge system. Refer to the Ford car master parts catalog and the Lincoln Mercury parts and accessories catalog for proper parts usage.

Misuse of the sending units will result in inoperative temperature indicating systems and damaged sending units or gauges.

1. Disconnect the temperature sending unit wire from the sending unit.
2. Prepare the new temperature sending unit for installation by applying Teflon tape (D0AZ-19554-C) or equivalent or a small amount of conductive water resistant sealer C3AZ-19554-B or equivalent, to the threads.
3. Drain coolant and remove the temperature sending unit from the engine and install the new temperature sending unit.
4. Connect the wire to the temperature sending unit.
5. Refill coolant system and start the engine and check the sending unit operation.

TEMPERATURE GAUGE

MUSTANG II

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. Remove the six screws that retain the mask and lens to the cluster backplate and remove the mask and lens.
4. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and install the two retaining nuts.
2. Position the mask and lens to the cluster backplate and install the six retaining screws.
3. Install the cluster assembly as outlined in Part 33-50.
4. Connect the battery ground cable and check the operation of the gauge.

THUNDERBIRD, COUGAR, LTD II, PINTO AND BOBCAT—STANDARD CLUSTER

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. Remove the six screws attaching the lens and mask assembly to the cluster backplate and remove the lens and mask assembly.
4. Remove the outer dial (two screws).
5. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and install the two retaining nuts.
2. Install the outer dial (two screws).
3. Position the mask and lens assembly to the cluster backplate and install the six retaining screws.
4. Install the cluster as outlined in Part 33-50.
5. Connect the battery ground cable and check the operation of the gauge.

THUNDERBIRD, COUGAR XR-7, LTD II, PINTO AND BOBCAT—PERFORMANCE CLUSTER

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. Remove the clock knob and nut.
4. Remove the six screws attaching the lens and mask assembly to the cluster backplate and remove the mask and lens assembly.
5. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and install the two retaining nuts.
2. Position the lens and mask assembly to the cluster backplate and install the six retaining screws.
3. Install the clock knob and nut.

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4. Install the instrument cluster as outlined in Part 33-50.
5. Connect the battery ground cable and check the operation of the gauge.

INDICATOR LAMP

FORD, MERCURY, LINCOLN CONTINENTAL

1. Remove the two instrument cluster trim cover screws and pull the trim cover rearward to gain access to the bulb.
2. Remove the bulb by turning the socket counterclockwise.
3. Install a new bulb and turn the socket clockwise.
4. Position the instrument cluster trim cover and install the two retaining screws.

FAIRMONT, ZEPHYR, GRANADA, MONARCH AND VERSAILLES

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. Remove the bulb and socket by turning counterclockwise.

Installation

1. Install a new bulb into the socket and turn clockwise.
2. Install the instrument cluster as outlined in Part 33-50.
3. Connect the battery ground cable.

PINTO AND BOBCAT

Reach up behind the instrument panel and turn the bulb and socket assembly counterclockwise. To install, position the bulb and socket assembly into the receptacle and turn it clockwise.

CONTINENTAL MARK V

Remove the instrument cluster trim panel as outlined in Part 33-50, to gain access to the indicator bulb.

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Instrument Cluster and Printed Circuit

PART 33-50

Applies to All Models

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CK3385-2B

DESCRIPTION

TRANSMISSION SELECTOR INDICATOR

NOTE: Refer to Part 17-01 for floor-mounted selector levers.

Ford, Mercury, Lincoln Continental and Continental Mark V

Removal

1. Disconnect the battery ground cable.
2. Remove the two lower steering column cover attaching screws and remove the lower cover.
3. Remove the two instrument cluster trim cover attaching screws and remove the trim cover.
4. Reach behind the cluster and disconnect the cluster feed plug from its receptacle.
5. Disconnect the speedometer cable.
6. Unsnap and remove the steering column shroud cover.
7. Remove the screw attaching the transmission indicator (PRND21) cable bracket to the steering column. Detach the cable loop from the pin on the steering column.
8. Remove the four cluster attaching screws and remove the cluster assembly.
9. Remove the two screws attaching the lens and mask and the screws attaching the transmission indicator assembly to the cluster and remove the transmission indicator (Fig. 3).

Installation and Adjustments

1. Install the transmission indicator and install the two screws attaching the transmission indicator and install the screws attaching the lens and mask to the cluster.
2. Position the cluster to the instrument panel making sure the PRND21 cable is routed properly on the right side of the steering column between the brake pedal support and the instrument panel reinforcement and install the four attaching screws.
3. *Position the transmission indicator (PRND21) cable* to the steering column and adjust the transmission selector indicator (PRND21) pointer as follows:
   a. Place the transmission selector lever on the steering column in the "P" position.
   b. Place the loop on the indicator cable assembly over the retainer pin on the socket casting.
   c. Shift the selector into the "1" position ("S" on lo-gear lockout columns) and secure the cable bracket with the screw. Do not tighten.
   d. Shift the selector into the "D" position. Adjust the slotted bracket on the column so the entire width of the pointer falls within the letter "D".
   e. Tighten the bracket screw (min. 20 in-lbs).
   f. Position the indicator cable into the tab of the column shroud retainer.
   g. When properly adjusted, the entire width of the pointer must fall within the width of the letter "D" and must only touch the remaining letters or numerals when viewed parallel to the centerline of the steering column.
4. Reach under the instrument panel and align the speedometer cable connector with the speedometer adapter and push the speedometer cable on the speedometer with a twisting motion until the catch is engaged.

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5. Push the instrument cluster feed plug into its receptacle.
6. Position the instrument cluster trim cover and install the two attaching screws.
7. Position the lower steering column cover and install the two attaching screws. Position the lower steering column shroud cover around the steering column.
8. Connect the battery ground cable and check the operation of the instruments.

Granada, Monarch and Versailles

Removal

For Steering Column—Mounted Selector:

1. Remove screws retaining the lower cluster applique cover below the steering column.
2. Remove the steering column shroud.
3. Reach under the instrument panel and depress the button on the side of the headlamp switch while withdrawing the headlamp switch control knob and shaft assembly.
4. Remove the threaded headlamp switch bezel.
5. Remove four screws retaining the cluster front cover (Fig. 1).
6. Insert a right angle standard tip screwdriver along the edges of the finish panel withdrawing the studs in sequence gradually around the periphery of the panel (Fig. 1).
7. Remove the cluster front cover.
8. Remove one screw attaching the PRND21 control cable bracket to the steering column. Detach the cable loop from the pin on the steering column.
9. Remove the two screws attaching the PRND21 assembly to the cluster mask and remove the assembly from the cluster.

Installation and Adjustments

1. Re-position the PRND21 assembly to the cluster and install the two attaching screws.
2. Place the loop on the PRND21 cable assembly over the retainer pin on the socket casting. Place the cable bracket in the "T" slot in the column and secure the bracket to the column outer tube with one screw.
3. Shift column selector lever into the "D" position. Loosen the bracket screw and slide bracket until the pointer aligns with the letter "D". Tighten the bracket screw to 20-30 in-lbs torque. The entire width of the pointer must fall within the width of the letter "D", when viewed parallel to the centerline of the steering column from the drivers position. The pointer must also touch all other indicator letters when selector lever is placed in each shift position.
4. Align the cluster front cover studs with the retainers and push the cover on gradually around the periphery of the cover.
5. Install the four front cover retaining screws.
6. Install the headlamp switch bezel and knob and shaft assembly.

CLUSTER ASSEMBLY

Monarch, Granada and Versailles

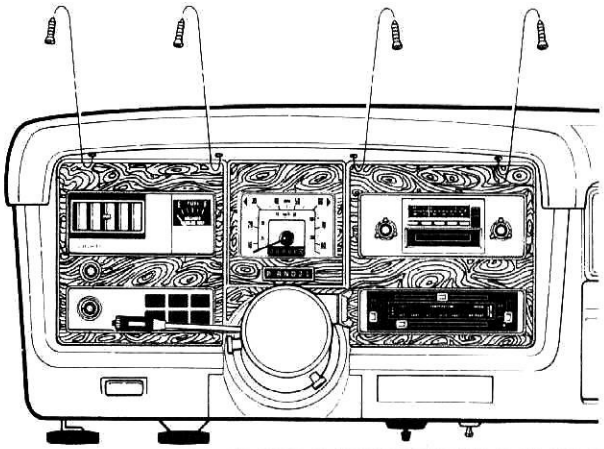
Removal

1. Disconnect the battery ground cable.
2. Remove screws retaining the lower cluster applique cover below the steering column.
3. Remove the steering column shroud.
4. Reach under the instrument panel and depress the button on the side of the headlamp switch while withdrawing the headlamp switch control knob and shaft assembly.
5. Remove the threaded headlamp switch bezel.
6. Remove four (4) screws retaining the cluster front cover (Fig. 1).
7. Insert a right angle standard tip screwdriver along the edges of the finish panel withdrawing the studs in sequence gradually around the periphery of the panel (Fig. 1).
8. Remove the cluster front cover. If vehicle is equipped with a manual transmission, go to Step 10. If not, perform Step 9.
9. Remove one screw attaching the PRND21 control cable bracket to the steering column. Detach the cable loop from the pin on the steering column.
10. Reach under the instrument panel and disconnect the speedometer cable connector.
11. Remove four (4) screws retaining the cluster to the instrument panel.
12. Pull the cluster away from the instrument panel; disconnect the cluster feed plug from its receptacle in the printed circuit (Fig. 2) Disconnect wires from the fuel gauge studs if vehicle is equipped with optional low fuel warning lamp.
13. Remove the cluster from the instrument panel.

Installation

1. Apply a 3/16 inch ball of silicone damping grease in the drive hole of the speedometer head. **NOTE: If vehicle is equipped with a manual transmission or a floor-mounted automatic transmission selector, proceed to Step 8.**
2. With the cluster lens pointing downward, move the cluster toward the cluster opening in the instrument panel.
3. Connect the instrument cluster multiple connector to the printed circuit. If vehicle is equipped with low fuel warning lamp, connect red and black wires from low fuel warning lamp to fuel gauge studs. Red wire connects to stud identified by word "red" on printed circuit.
4. Position the cluster to the instrument panel.
5. Install the four (4) cluster retaining screws. If vehicle is equipped with a manual transmission or a floor-mounted automatic transmission proceed to Step 8.
6. Place the loop on the PRND21 cable assembly over the retainer pin on the socket casting. Place the column mounting bracket in the "T" slot in the column and secure the bracket to the column outer tube with one screw.

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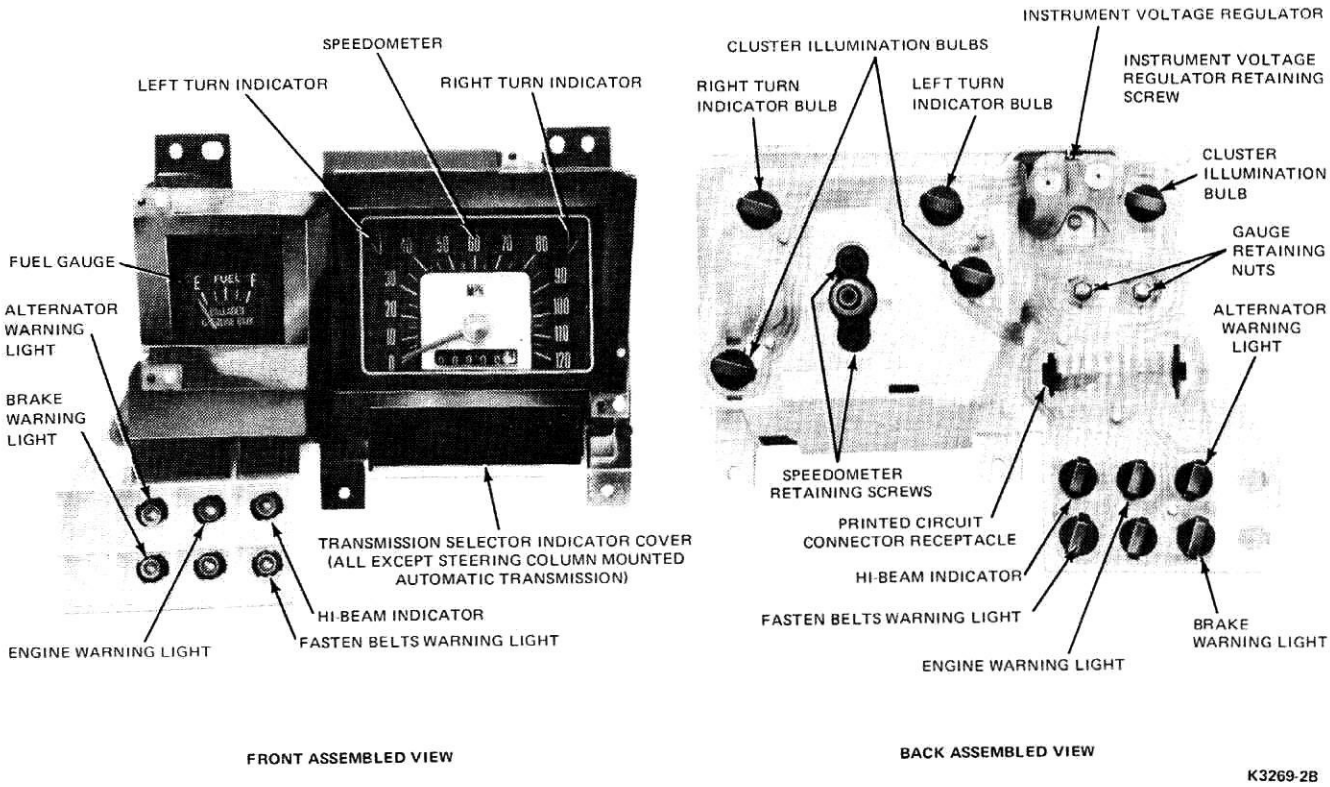


PULL COVER SLIGHTLY AWAY AT TOP; THEN CAREFULLY PULL REARWARD AT BOTTOM TO UNSNAP FOUR COVER TO PANEL RETAINERS.

K3187-1B

FIG. 1 Instrument Cluster Finish Panel—Versailles Shown—Granada and Monarch Similar

7. Shift column selector lever into the "D" position. Loosen the bracket screw and slide the bracket until pointer aligns with the letter "D". Tighten bracket screw to 20-30 in-lbs torque. The entire width of the pointer must fall within the width of the letter "D", when viewed parallel to the centerline of the steering column from the drivers position. The pointer must touch other indicator letters.
8. Reach under the instrument panel and align the speedometer cable connector with the speedometer adapter and push the speedometer cable on the speedometer with a twisting motion until the catch is engaged.
9. Align the cluster front cover studs with the retainers and push the cover on gradually around the outer edges of the cover (Fig. 1).
10. Install the four (4) front cover retaining screws.
11. Install the headlamp switch bezel and knob and shaft assembly.
12. Install column shroud.
13. Install applique cover.
14. Connect battery ground cable.



K3269-2B

FIG. 2 Front and Back Assembled View of Cluster Assembly With Callouts—Granada and Monarch Shown—Versailles Similar

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DIAGNOSING

ELECTRICAL – INSTRUMENTS AND ACCESSORIES

CONDITION	POSSIBLE CAUSE	RESOLUTION
• Cigar lighter – knob pops out before adequate heating.	• Damaged element. • Damaged socket.	• Replace element. • Replace socket.
• Cigar lighter – element stays in, won't heat up.	• Fuse burnt out. • Open in wiring. • Damaged socket. • Damaged element.	• Replace fuse. If fuse blows again, check for short circuit. • Repair wiring. • Replace socket. • Replace element.
• Clock does not work.	• Fuse burnt out. • Open in wiring. • Damaged clock.	• Replace fuse. If fuse blows again, check for short circuit. • Repair wiring. • Replace clock.
• Horn sounds continuously – vehicles without speed control.	• Short circuit between column disconnect and horn(s). • Short circuit in switch or column wiring.	• Repair as required. • Repair as required.
• Horn sounds continuously – vehicles with speed control.	• Short circuit between horn relay disconnect and horn. • Grounded circuit between horn switch and horn relay. • Open horn switch. • Damaged horn relay.	• Repair as required. • Repair as required. • Replace horn switch. • Replace horn relay.
• Horn(s) inoperative .	• Fuse or C.B. burnt out. • Poor horn ground. • Horns out of adjustment. • Damaged horn. • Open in wiring. • Damaged horn switch. • Damaged turn signal switch and wiring. • Damaged horn relay.	• Replace fuse or C.B. If fuse or C.B. goes again, check for short circuit. • Assure a good ground. • Adjust horn. • Replace horn. • Repair wiring. • Replace horn switch. • Repair or replace turn signal switch and wiring. • Replace horn relay
• Gauge inoperative – (temp., fuel, oil pressure).	• Poor sending unit ground. • Damaged sending unit. • Open in wiring. • Open IVR. • Damaged gauge.	• Assure good ground. • Replace sending unit. • Repair wiring. • Replace IVR. • Replace gauge.
• Gauge inaccurate – (temp., fuel, oil pressure).	• Damaged sending unit. • Damaged IVR • Loose wiring.	• Replace sending unit. • Replace IVR. • Repair wiring.

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ELECTRICAL – INSTRUMENTS AND ACCESSORIES		
CONDITION	**POSSIBLE CAUSE**	**RESOLUTION**
• Low fuel warning light does not operate properly – Thunderbird, Mark V & Lincoln	• Damaged wiring circuit • Damaged relay	• Perform low fuel warning switch test. Repair or replace as required • Replace relay
• Oil pressure light does not go out with ignition switch on (engine running)	• Short circuit between bulb and switch • Damaged switch • Low oil pressure	• Repair as necessary • Replace switch • Refer to engine diagnosis section in Volume II
• Oil pressure light does not light with ignition key in start or run position. (engine not running)	• Bulb burnt out • Damaged sending unit • Burnt fuse • Open in wiring	• Replace bulb • Check continuity of sending unit. Check ground. Repair or replace as required • Replace fuse. If fuse blows again check for short circuit • Repair wiring
• Hot temperature warning light does not go out (engine running)	• Damaged sending unit • Short circuit • Damaged ignition switch	• Replace sending unit • Check circuit to ignition prove out terminal. Repair as required • Check continuity of ignition switch prove out circuit. Replace as necessary
• Hot temperature warning light does not light with engine cranking	• Fuse burnt out • Bulb burnt out • Open in wiring • Engine Overheats • Damaged ignition switch	• Replace fuse. If fuse blows again, check for short circuit • Replace bulb • Check circuit to ignition prove out terminal. Repair as required • Replace ignition switch
• "Engine" light does not come on with ignition switch in "run" or "start" (engine not running)	• Fuse burnt out • Damaged oil pressure sending unit • Bulb burnt out • Open in wiring	• Replace fuse. If fuse blows again, check for short circuit • Replace sending unit • Replace bulb • Repair wiring as required
• "Engine" warning light does not go out with ignition switch on (engine running)	• Grounded circuit between bulb and switches • Damaged switches • Engine problem	• Repair as required • Replace switches • Refer to engine diagnosis section for engine overheating or low oil pressure in Volume II

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DETROIT IRON

ELECTRICAL – INSTRUMENTS AND ACCESSORIES		
CONDITION	**POSSIBLE CAUSE**	**RESOLUTION**
• Key warning buzzer sounds when driver door is opened with key not in ignition lock cylinder	• Short in key warning switch • Short in wiring	• Repair or replace key warning switch as necessary • Repair as required
• Key warning buzzer inoperative	• Fuse burnt out • Drivers door courtesy light switch defective • Damaged buzzer • Open in wiring • Damaged key warning switch	• Replace fuse. If fuse blows again, check for short circuit • Replace switch • Replace buzzer • Repair wiring • Replace key warning switch
• "Headlights on" buzzer inoperative	• Improperly installed relay and wiring connections • Open circuit, short circuit or faulty connection • Improper relay ground • Damaged relay	• Check and repair as required • Repair as required • Assure relay ground • Replace relay
• Speedometer noisy	• Improper cable connection or routing • Binding sensor • Cable core kinked, burred or bent • Damaged driven gear • Damaged speedometer	• Check for proper cable connections at head. Check cable for kinks or bends. Repair or replace as required • Check sensor for binding, erratic or noisy operation. Lube or replace sensor • Lube and replace as required • Replace driven gear • Replace speedometer head

CK3400-2B1

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ELECTRICAL – INSTRUMENTS AND ACCESSORIES		
CONDITION	**POSSIBLE CAUSE**	**RESOLUTION**
• Speedometer/odometer inoperative	• Cable disconnected • Cable broken • Binding in sensor and/or speedometer	• Connect cable • Replace cable • Replace sensor or speedometer
• Speedometer/odometer inaccurate	• Incorrect driven gear • Incorrect drive gear • Damaged speedometer	• Check speedometer and odometer over a measured mile. Check proper cable driven gear to match axle ratio and tire size. Replace gear • Check for proper drive gear for axle ratio and tire size. Replace gear • Replace speedometer
• Ignition switch – improper operation	• Binding lock cylinder • Binding or bent linkage • Binding ignition switch • Ignition slide switch out of adjustment • Open in wiring • Inoperative ignition switch	• Repair or replace lock cylinder • Repair or replace linkage • Replace switch • Adjust slide switch • Repair wiring • Replace switch
• Electric antenna motor operates in only one direction	• Open wiring between switch and antenna • Damaged switch • Inoperative antenna	• Repair wiring • Check continuity of switch. Replace if necessary • Replace antenna
• Electric antenna motor runs but wand does not move	• Bent or corroded wand • Damaged antenna	• Clean and lubricate wand if corroded. Replace antenna if wand is bent beyond repair • Replace antenna
• Electric antenna does not operate	• Fuse burnt out • Poor antenna ground • Open in wiring between switch and antenna • Inoperative switch • Inoperative antenna	• Replace fuse. If fuse blows again, check for short in wiring • Check antenna mounting bracket to assure a good ground • Repair wiring • Check continuity of switch. Replace if necessary • Replace antenna
• Stereo tape player operates, but integral radio does not operate	• Binding, sticking or distorted tape cartridge • Inoperative tape player-radio unit	• Check insertion and release of tape. Check for binding, sticking or distorted cartridge. Radio should operate when cartridge is fully removed from tape slot • Have unit repaired.

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ELECTRICAL – INSTRUMENTS AND ACCESSORIES		
CONDITION	**POSSIBLE CAUSE**	**RESOLUTION**
• Stereo tape unit does not operate but radio does operate	• Inoperative stereo tape player-radio	• Perform stereo tape unit check out procedure using tool aid cartridge (19A043). Have unit repaired
• Stereo tape programs do not automatically switch at end of each program (tape repeats)	• Damaged stereo tape player-radio	• Fully insert tool aid cartridge (19A043) in tape slot. Push volume control knob inward while tape is playing. Program should change. Try another music tape and repeat check. Remove unit for repair
• Stereo tape player sounds slow or draggy as if it has WOW or flutter	• Damaged stereo tape player-radio	• Check operation with tool aid cartridge (19A043). If tool aid cartridge sounds OK, original cartridge may need replacement. Try another good tape. Remove unit for repair if necessary
	• Loose tape wrapped around capstan shaft	• Open cartridge door and check for loose tape that may be wrapped around capstan shaft. Do not use a foreign object, screwdriver, etc. to remove this tape. Remove unit for repair
• Excessive noise or hiss on tape	• Damaged stereo tape player-radio	• Check original tape for noise and hiss. Substitute another known good tape. If good tape does not correct the problem remove the unit for repair
• Sound from player is weak, fluctuating, or lacking in high frequency	• Tape player playback head is dirty	• Hold player cartridge door open and clean playback head with a cotton swab slightly moistened with alcohol. Also swab surface of capstan shaft with alcohol, taking care not to allow any to run down into shaft bearings
	• Damaged tape player	• Remove unit for repair

CL2310-2B1

ELECTRICAL – INSTRUMENTS AND ACCESSORIES		
CONDITION	**POSSIBLE CAUSE**	**RESOLUTION**
• Speaker or speakers do not operate	• Inoperative speaker	• Substitute a known good speaker. Operate balance and fader controls. Replace speaker if necessary
	• Broken or damaged wiring and/or connections between radio and speaker(s)	• Repair or replace as required
	• Inoperative radio	• Remove radio chassis for repair
• Electric deck lid power release does not operate properly	• Fuse or C.B. blown	• Replace fuse. If fuse blows again, check for short circuit
	• Inoperative deck lid switch	• Replace switch
	• Open in supply circuit wiring	• Repair wiring
	• Latch binding	• Repair or replace latch
	• Poor latch ground or open circuit between latch and ground	• Repair ground or open circuit
	• Inoperative power lock solenoid	• Replace power lock solenoid

CL2310-2B2

TESTING

PRINTED CIRCUIT

The printed circuit which supplies current to the instrument panel lamps, gauges, and some clocks, is made of copper foil which is banded to a polyester base film (usually referred to as Mylar).

The printed circuit is mounted to the cluster housing and due to its location, cannot be easily inspected and/or tested in the vehicle. This makes the printed circuit vulnerable to damage when a probe is used for in-vehicle testing as the probe can pierce the printed circuit resulting in a short.

Since there is no approved procedure for in-vehicle testing of the printed circuit, it must be removed for visual inspection. If no visual damage is evident, each circuit should be tested with an ohmmeter or test light.

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If an open circuit or short circuit is detected, the printed circuit must be replaced.

REMOVAL AND INSTALLATION

CLUSTER ASSEMBLY

Ford, Mercury and Lincoln Continental

Removal

1. Disconnect the battery ground cable.
2. Remove the two lower steering column cover attaching screws and remove the lower cover.
3. Remove the two instrument cluster trim cover attaching screws and remove the trim cover.
4. Reach behind the cluster and disconnect the cluster feed plug from its receptacle.
5. Disconnect the speedometer cable. Unsnap and remove the steering column shroud cover. Unhook the PRND21 cable from the tab in the shroud retainer.
6. Remove the screw attaching the transmission indicator (PRND21) cable bracket to the steering column. Detach the cable loop from the pin on the steering column.
7. Remove the four cluster attaching screws and remove the cluster assembly (Fig. 3 or 4).

Installation

1. Apply a 3/16 inch diameter ball of C5AZ-19581-A silicone lubricant or equivalent in the drive hole of the speedometer head.
2. Position the cluster to the instrument panel making sure the PRND21 cable is routed properly on the right side of the steering column between the brake pedal support and the instrument panel reinforcement and install the four attaching screws.
3. Place the transmission selector lever on the steering column in the P (park) position. (Do not place column selector lever into either the I position or the S position.)
4. Adjust the PRND21 pointer per instructions in previous steps of this part.
5. Reach under the instrument panel and align the speedometer cable connector with the speedometer adapter and push the speedometer cable on the speedometer with a twisting motion until the catch is engaged.

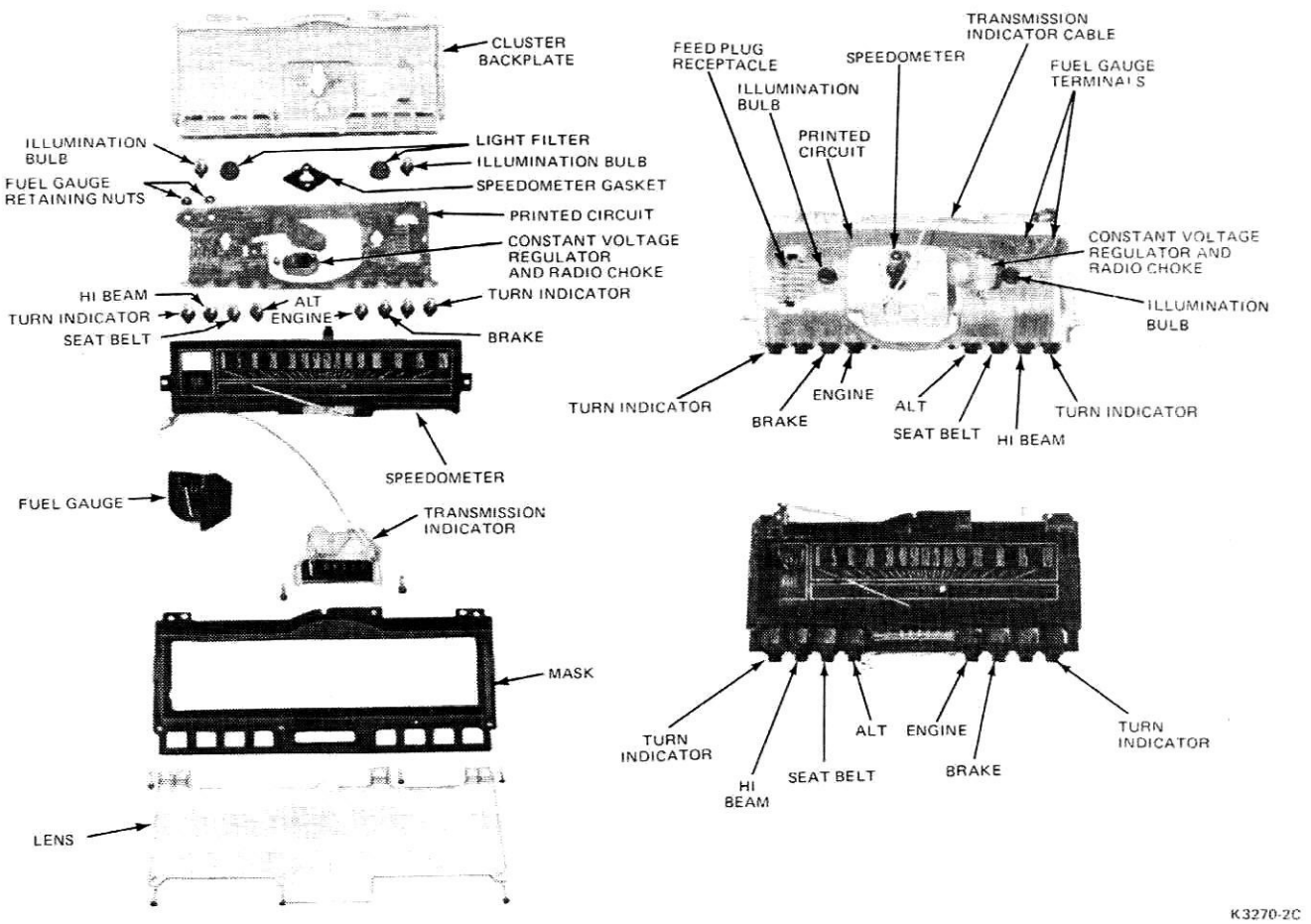


FIG. 3 Instrument Cluster—Ford, Mercury and Lincoln Continental

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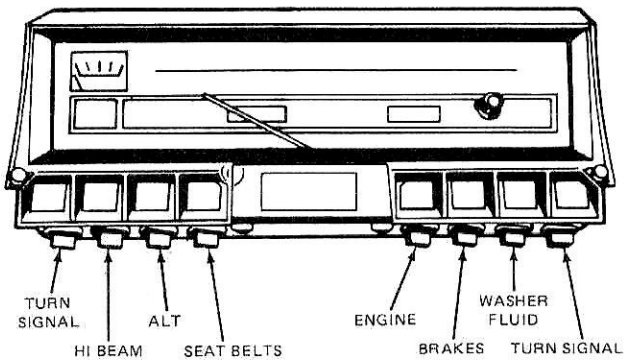


FIG. 4 Instrument Cluster—Lincoln Continental

6. Push the instrument cluster feed plug into its receptacle.
7. Position the instrument cluster trim cover and install the two attaching screws.
8. Position the lower steering column cover and install the two attaching screws. Position the lower steering column shroud cover around the steering column.
9. Connect the battery ground cable and check the operation of the instruments.

Mustang II

Removal

1. Disconnect the battery ground cable. Remove the light switch knob and bezel as outlined in Part 32-02.
2. Remove three upper and four lower retaining screws from the instrument cluster trim cover and remove the trim cover.
3. From under the instrument panel, disconnect the speedometer cable by pressing on the flat surface of the plastic connector (quick connect).
4. Remove the two upper and two lower screws, retaining the instrument cluster to the instrument panel.
5. Pull the cluster away from the instrument panel, disconnect the cluster printed circuit connector from its receptacle in the cluster backplate and the tachometer from its receptacle.
6. Remove the cluster (Fig. 5).

Installation

1. Apply a 3/16 inch diameter ball of silicone damping grease in the drive hole of the speedometer head.
2. Position the cluster near the panel opening and install the cluster printed circuit connector in its

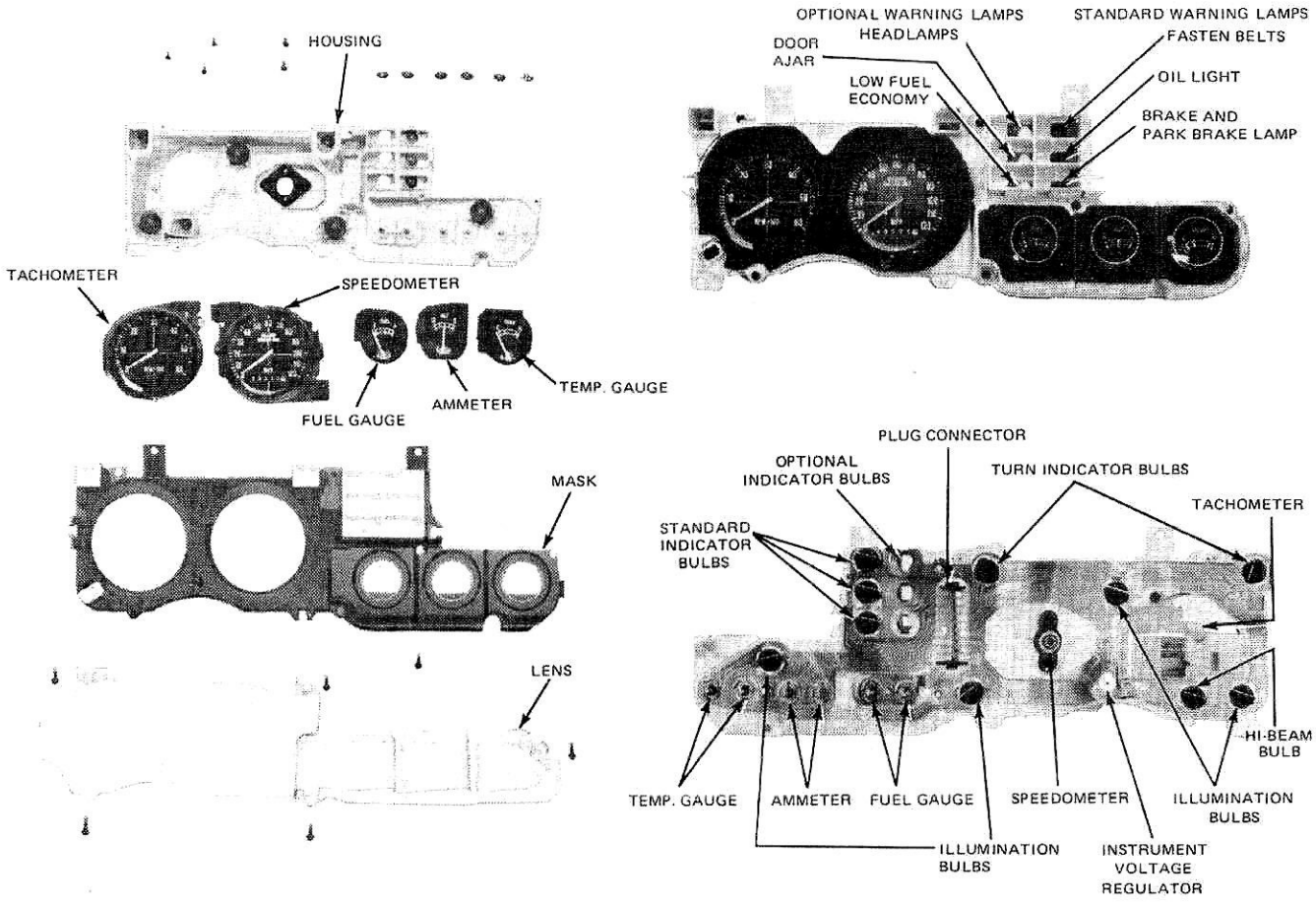


FIG. 5 Instrument Cluster—Mustang II

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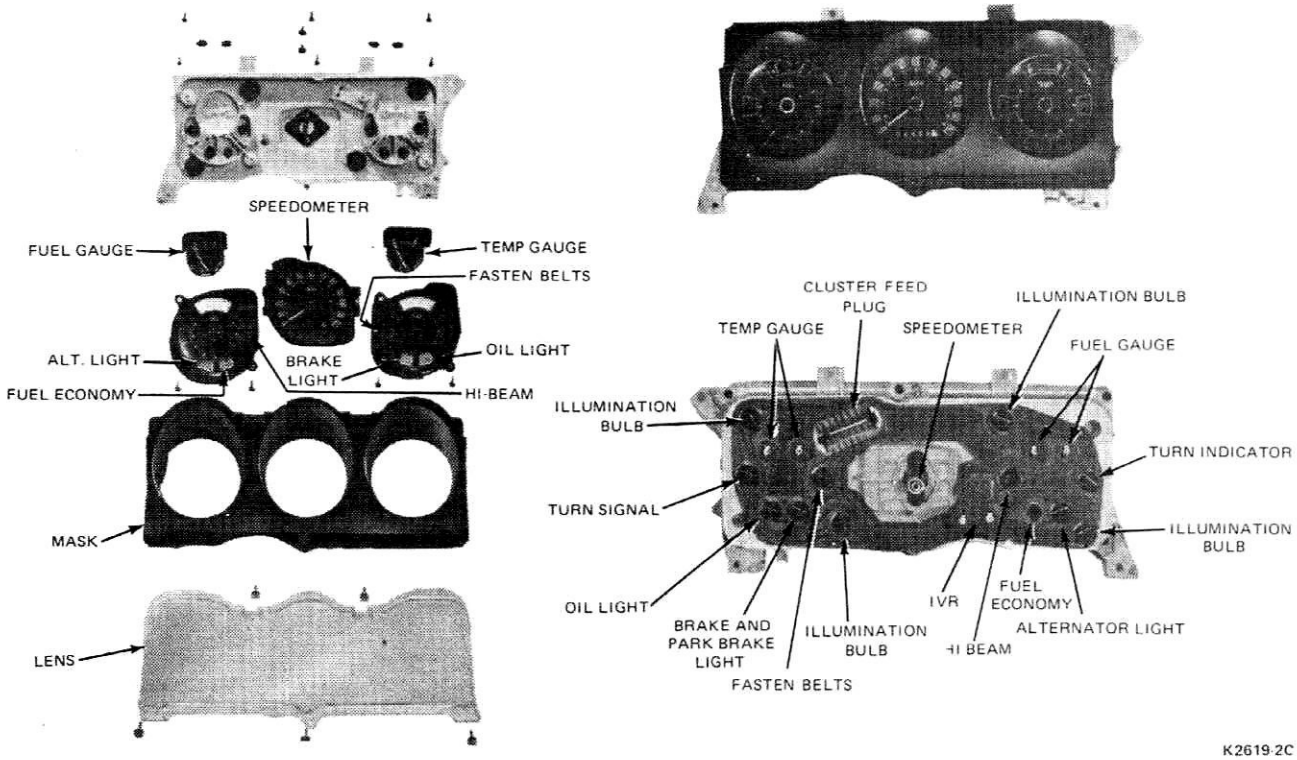


FIG. 6 Instrument Cluster—Thunderbird, LTD II, and Cougar—Standard Cluster

receptacle in the cluster backplate and the tachometer connector in its receptacle in the tachometer.

3. Position the cluster to the panel and install the four cluster retaining screws.
4. From under the instrument panel, connect the speedometer cable to the speedometer by using a twisting motion until the catch is engaged.
5. Position the cluster trim cover to the cluster assembly and install the three upper and the four lower retaining screws. Install the light switch knob and bezel as outlined in Part 32-02.
6. Connect the battery ground cable.

Thunderbird, LTD II and Cougar—Standard Cluster

Removal

1. Disconnect the battery ground cable.
2. Remove three upper and four lower retaining screws from the instrument cluster trim cover and remove the trim cover.
3. Remove one screw retaining the clock or cover to the cluster and two screws retaining the clock or cover to the instrument panel.
4. Remove clock or cover. Clock removal will necessitate wiring disconnections.
5. Remove two upper and two lower screws retaining the instrument cluster to the instrument panel.
6. Pull the cluster away from the instrument panel; disconnect the speedometer cable connector.
7. Disconnect the cluster feed plug from its receptacle in the printed circuit (Fig. 6).
8. Remove cluster from vehicle.

Installation

1. Apply a 3/16 inch diameter ball of silicone damping grease in the drive hole of the speedometer head.
2. Connect the instrument cluster multiple connector to the printed circuit.
3. Align the speedometer cable connector with the speedometer adaptor and push the speedometer cable on the speedometer with a twisting motion until the catch is engaged.
4. Position the cluster to the instrument panel.
5. Install the four cluster retaining screws.
6. Install clock or cover with three screws.
7. Position the cluster front trim cover and install the seven retaining screws.
8. Connect the battery ground cable.

Thunderbird, LTD II and Cougar XR-7—Performance Cluster

Removal

1. Disconnect the battery ground cable.
2. Remove three upper and four lower retaining screws from the instrument cluster trim cover and remove the trim cover.
3. Remove two upper and two lower screws retaining the instrument cluster to the instrument panel.
4. Pull the cluster away from the instrument panel; disconnect the speedometer cable connector.

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5. Disconnect the cluster feed plug from its receptacle in the printed circuit (Fig. 7).
6. Disconnect the overlay harness connector.
7. Remove the cluster.

Installation

1. Apply a 3/16 inch diameter ball of silicone damping grease in the drive hole of the speedometer head.
2. Position the cluster near panel opening.
3. Connect the instrument cluster multiple connector to the printed circuit. Connect the overlay harness connector to the panel wiring.
4. Align the speedometer cable connector with the speedometer adaptor and push the speedometer cable on the speedometer with a twisting motion until the catch is engaged.
5. Position the cluster to the instrument panel.
6. Install the four cluster retaining screws.
7. Position the cluster front trim cover and install the seven retaining screws.
8. Connect the battery ground cable.

Fairmont and Zephyr (Fig. 8).

Removal

1. Disconnect the battery ground cable.
2. Remove the steering column shroud.
3. Remove the cluster trim cover.
4. Remove one screw retaining the PRND21 control cable clamp to the steering column. Detach the cable loop from the pin on the steering column. Remove plastic clamp from around steering column.
5. Remove two upper and two lower screws retaining the instrument cluster to the instrument panel.
6. Pull the cluster away from the instrument panel. Disconnect the speedometer cable connector.
7. Disconnect the cluster feed plug from its receptacle in the printed circuit and the clock wiring connector, if applicable.
8. Remove the cluster.

Installation

1. Apply a 3/16-inch diameter ball of silicone damping grease in the drive hole of the speedometer head.
2. Connect the instrument feed plug to the printed circuit.
3. Align the speedometer cable connector with the speedometer adaptor and push the speedometer cable on the speedometer with a twisting motion until the catch is engaged.
4. Position the cluster to the instrument panel and engage the two locating pins.
5. Install the four cluster retaining screws.
6. Install the plastic PRND21 cable clamp around the steering column and engage the clamp locator pin in the slot in the column tube. Drive the clamp screw into the retaining clip, but do not seat. Place the loop on the PRND21 cable over the pin on the shift cane lever. Place the transmission selector in DRIVE position. Rotate the cable clamp about the column tube until the indicator pointer is centrally located on the D. Tighten the clamp screw to 20-30 in-lbs. Move lever through all shift positions and check pointer location.
7. Replace the cluster trim cover.
8. Replace the steering column shroud.
9. Connect the battery ground cable.

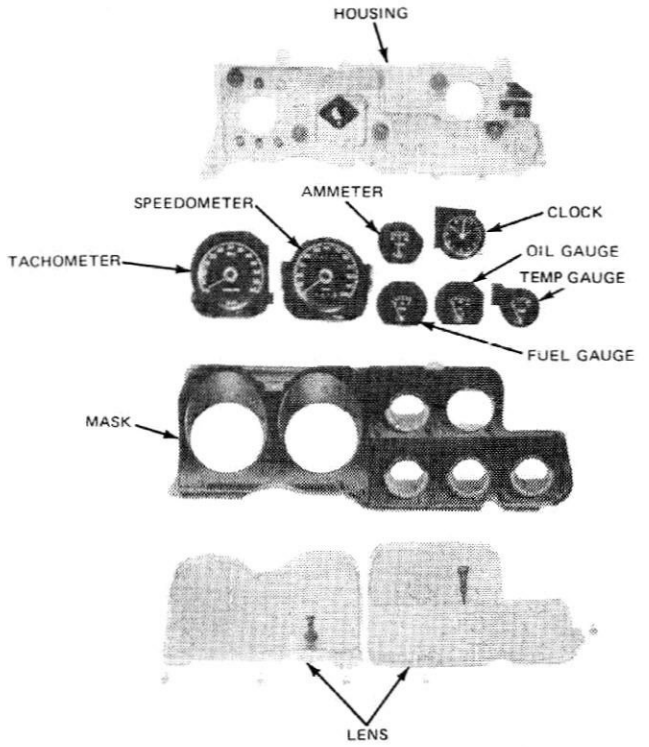


FIG. 7 Instrument Cluster—Thunderbird, LTD II and Cougar XR-7 Performance

Pinto and Bobcat—Main (Youth) Instrument Cluster

Removal

1. Remove two screws attaching lower half to upper half of steering column shroud. Remove lower half of shroud.
2. Loosen forward steering column attaching nuts 3/8 inch to 1/2-inch.
3. Loosen rearward steering column attaching nuts 3/8 inch to 1/2 inch.
4. Disconnect the printed circuit and tachometer connectors.
5. Disconnect the speedometer cable.
6. Remove four screws.
7. Pull cluster out along angle of steering column.

Installation

1. Reverse Steps 4, 5, 6 and 7 above.
2. Torque rearward steering column attaching nuts 20-37 ft-lbs.
3. Torque forward steering column attaching nuts 20-37 ft-lbs.
4. Attach the lower half to upper half of steering column shroud torquing the two screws to 5-10 ft-lbs.

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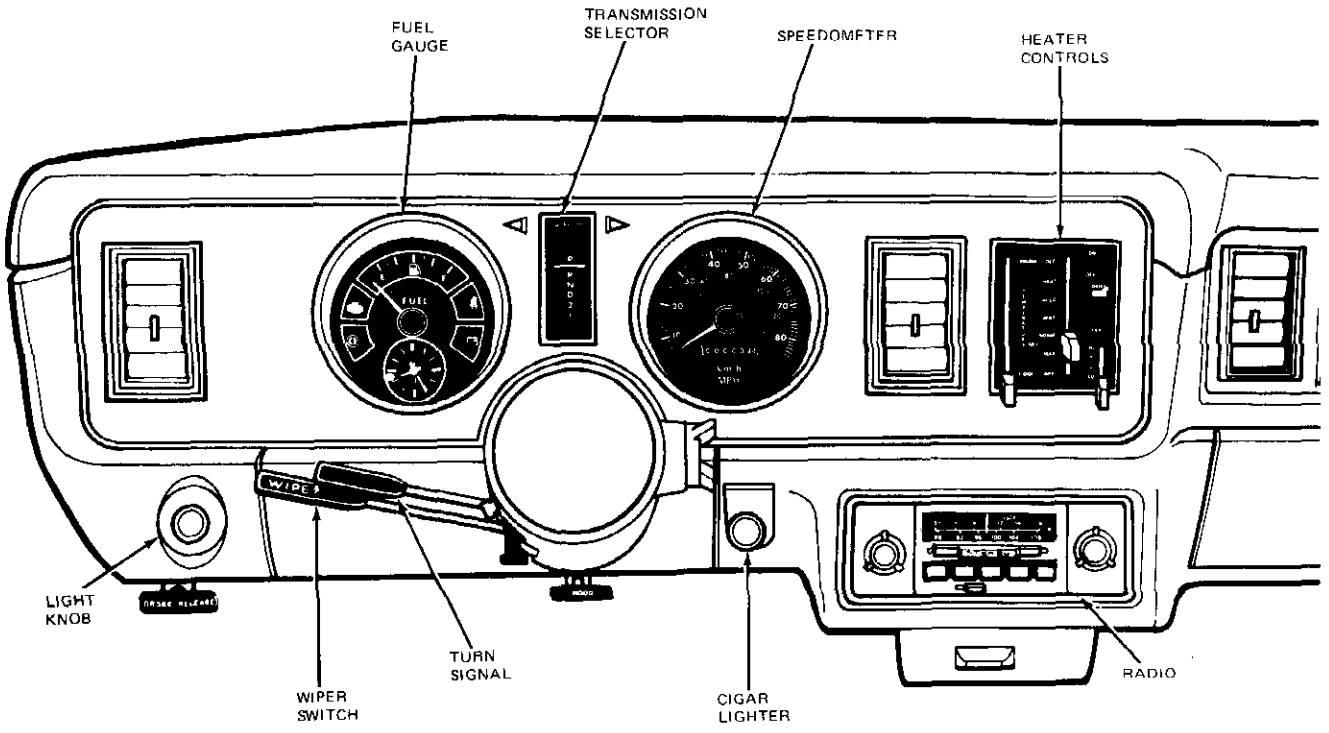


FIG. 8 Instrument Cluster—Fairmont and Zephyr

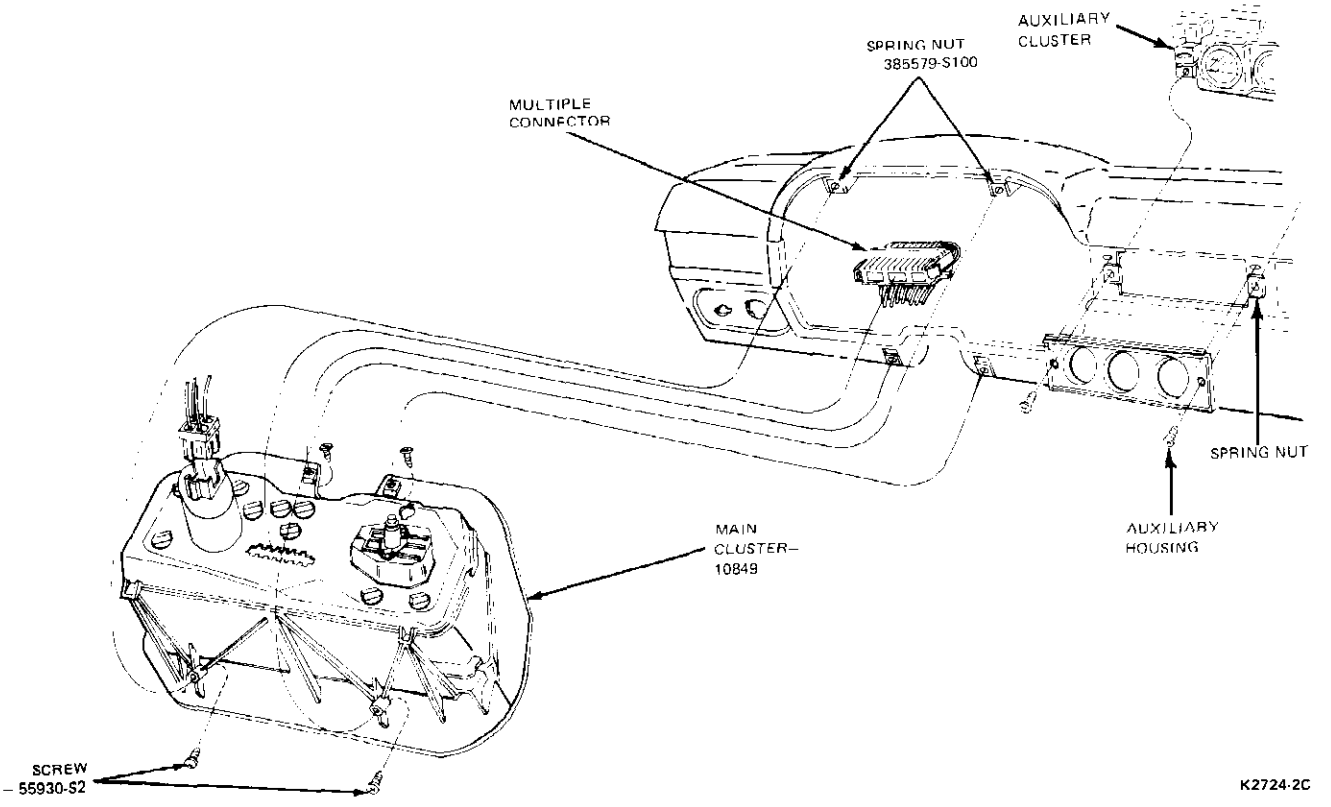


FIG. 9 Instrument Cluster—Pinto and Bobcat (Main and Auxiliary)

Pinto and Bobcat—Auxiliary Instrument Cluster.

Removal

1. Remove the main cluster as described previously.
2. Remove two screws attaching the auxiliary cluster to the instrument panel.
3. Remove the auxiliary housing from the front.

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4. Disconnect printed circuit plug.
5. Remove the auxiliary from the rear, through the access provided by the removal of the main instrument cluster.

Installation

Reverse above procedure.

Continental Mark V

Removal

1. Disconnect the battery ground cable.
2. Remove three screws attaching the upper access cover to the instrument panel pad.
3. Remove one screw retaining the lower cluster applique cover below the steering column.
4. Remove the steering column shroud.
5. Remove the heated rear window control knob.
6. Reach under the instrument panel and depress the button on the side of the headlamp switch while withdrawing the headlamp switch control knob and shaft assembly.
7. Remove the headlamp switch bezel.
8. Remove the windshield wiper/washer control knob.
9. Remove the threaded windshield wiper/washer control bezel.
10. Remove the cigar lighter from its receptacle.
11. Remove the four screws retaining the cluster front cover.
12. Insert a right angle standard tip screwdriver along the edges of the finish panel withdrawing the studs in sequence gradually around the periphery of the panel.
13. Remove the cluster front cover.
14. Remove one screw attaching the PRND21 control cable bracket to the steering column and disconnect the cable with the transmission selector in the "P" (Park) position.
15. Reach under the instrument panel and disconnect the speedometer cable connector.
16. Remove five screws retaining the cluster to the instrument panel.
17. Pull the cluster away from the instrument panel and disconnect the cluster feed plug from its receptacle in the printed circuit.
18. Tilt the cluster out, bottom first, and move the cluster toward the center of the vehicle.

Installation

1. Apply a 3/16 inch ball of silicone damping grease lubricant in the drive hole of the speedometer head.
2. With the cluster lens pointing upward, move the cluster from the center of the vehicle toward the cluster opening in the instrument panel.
3. Connect the instrument cluster multiple connector to the printed circuit.
4. Position the cluster to the instrument panel.
5. Install the cluster retaining screws.
6. Position selector lever in "P". Place the loop on the PRND21 cable assembly over the retainer pin on the socket casting and position into the "1" position. Secure the cable bracket to the column outer tube.
7. Place the transmission selector lever in "D" position, loosen and adjust the slotted bracket so the indicator is centrally located on the "D". Tighten the bracket screws to 20-30 in-lbs torque. Move lever through all shift positions and check pointer location.
8. Reach under the instrument panel and align the speedometer cable connector with the speedometer adaptor and push the speedometer cable on the speedometer with a twisting motion until the catch is engaged.
9. Align the cluster front cover studs with the retainers and push the cover on gradually around the periphery of the cover.
10. Install the four front cover retaining screws.
11. Install the cigar lighter.
12. Install the windshield wiper/washer control bezel and knob.
13. Install the headlamp switch bezel and control knob and shaft assembly.
14. Install the heated rear window control knob.
15. Install the steering column shroud.
16. Position the lower cluster applique cover and install one retaining screw.
17. Install the upper access cover with three screws.
18. Connect the battery ground cable.

CLUSTER ILLUMINATION AND/OR ILLUMINATOR BULBS

Granada, Monarch and Versailles

All bulbs can be replaced by reaching up under the instrument panel.

Ford, Mercury and Lincoln Continental

Disconnect the battery ground cable to gain access to the cluster illumination bulbs, remove the lower access panel (2 screws). To gain access to the indicator bulbs, remove the cluster trim panel (2 screws).

All Vehicles Except Ford, Mercury, Lincoln Continental, Granada, Monarch and Versailles

Most bulbs can be replaced by reaching up under the instrument panel. If the bulb cannot be reached from under the panel, remove the instrument cluster as outlined in this Part to gain access to the bulb.

PRINTED CIRCUIT

Ford, Mercury and Lincoln Continental

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly as outlined in this Part.
3. Unsnap the printed circuit from the IVR, remove the IVR attaching screw and remove the IVR and radio choke assembly.
4. Remove the illumination and the indicator bulb and socket and resistor assemblies (Fig. 3).
5. Remove the two fuel gauge retaining nuts.
6. Remove the printed circuit from the cluster.

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Installation

1. Place the printed circuit on the cluster housing and install the indicator and the illumination bulb and socket and resistor assemblies.
2. Install the two retaining nuts to the fuel gauge studs.
3. Position the IVR and radio choke assembly and install the attaching screw. Snap the printed circuit to the IVR.
4. Install the cluster assembly as outlined in this Part.
5. Connect the battery ground cable.

Thunderbird, LTD II and Cougar XR-7— Performance Cluster

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in this Part.
3. Disconnect the wire leads from the clock, ammeter and tachometer.
4. Remove the terminal nuts from the fuel, temperature and oil pressure gauges.
5. Remove the light bulb sockets.
6. Remove the instrument voltage regulator and radio choke assembly, then remove the printed circuit.

Installation

1. Position the printed circuit to the cluster back and install the instrument voltage regulator.
2. Install the light bulb sockets and the fuel, temperature and oil pressure gauge terminal nuts.
3. Connect the wire leads to the clock, ammeter and tachometer.
4. Clip the wire loom to the cluster backplate.
5. Install the cluster as outlined in this Part.
6. Connect the battery ground cable.

Granada, Monarch and Versailles

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly as outlined in this Part.
3. Unsnap the printed circuit from the IVR, remove the IVR attaching screw and remove the IVR.
4. Remove the illumination and the seven indicator bulb and socket assemblies.
5. Remove the two (2) fuel gauge retaining nuts.
6. Remove the printed circuit from the cluster.

Installation

1. Place the printed circuit on the cluster housing and install the seven indicator and the illumination bulb and socket assemblies.
2. Install the two (2) retaining nuts to the fuel gauge studs.
3. Position the IVR assembly and install the attaching screw. Snap the printed circuit to the IVR.
4. Install the cluster assembly as outlined in this Part.
5. Connect the battery ground cable.

Fairmont, Zephyr, Pinto and Bobcat (Main Cluster)

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in this Part.
3. Unsnap the printed circuit from the IVR, remove the IVR attaching screw and remove the IVR.
4. Remove the illumination and indicator bulb and socket assemblies.
5. Remove the two (2) fuel gauge attaching nuts (not required on Youth Pinto).
6. Remove the printed circuit from the instrument cluster.

Installation

1. Position the printed circuit over the locating pins on the backplate.
2. Install the bulb and socket assemblies.
3. Install the fuel gauge attaching nuts (not required on Youth Pinto).
4. Position the IVR, install the attaching screw and snap the printed circuit to the IVR.
5. Install the cluster assembly as outlined in this Part.
6. Connect the battery ground cable.

Pinto and Bobcat (Auxiliary Cluster)

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in this Part.
3. Unsnap the printed circuit from the IVR, remove the IVR attaching screws and remove the IVR.
4. Remove the illumination bulb and socket assembly.
5. Remove the alternator gauge terminal insulator.
6. Remove the six gauge attaching nuts.
7. Remove the printed circuit from the instrument cluster.

Installation

1. Position the printed circuit over the locating pins on the backplate.
2. Reverse Steps 1 through 6 above.

Mustang II

Removal

1. Disconnect the battery ground cable.
2. Remove instrument cluster as outlined in this Part.

   NOTE: If vehicle has V-8 engine, remove the tachometer module as outlined in Part 33-03 and retain for assembly.
3. Disengage snaps from instrument voltage regulator.
4. Remove IVR and choke assembly (if so equipped) and retain for assembly.
5. Remove the terminal nuts from the gauge assembly.
6. Remove the light sockets and retain for assembly.
7. Remove printed circuit (Fig. 5).

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Installation

1. Position the printed circuit over the locating pins of the backplate.
2. Install all of the lamp sockets.
3. Install terminal nuts, being careful to position gauges properly in backplate.
4. Install IVR and choke assembly (if so equipped) and attach printed circuit.

   NOTE: If vehicle has V-8 engine, install tachometer module to tachometer as outlined in Part 33-03.
5. Install instrument cluster as outlined in this Part.
6. Connect the battery ground cable.

Thunderbird, LTD II and Cougar—Standard Cluster

Removal

1. *Disconnect the battery ground cable.*
2. Remove the instrument cluster.
3. Remove the terminal nuts from the fuel and temperature gauges.
4. Remove the lamp sockets and note their location for assembly.
5. Remove the instrument voltage regulator and radio choke and remove the printed circuit.

Installation

1. Position the printed circuit over the dowel pins and install the instrument voltage regulator and radio choke.
2. Install the lamp sockets.
3. Install the gauge terminal nuts.
4. Install the instrument cluster.
5. *Connect the battery ground cable.*

Continental Mark V

Remove the instrument cluster. Disconnect battery ground cable. Remove the four nuts attaching the printed circuit to the clock and the fuel gauge terminals. Remove the instrument voltage regulator and *radio choke. Remove the light bulb sockets and remove* the printed circuit.

To install, position the printed circuit to the cluster back and install the bulb sockets. Install the instrument voltage regulator. Install the four nuts attaching the printed circuit to the clock and fuel gauge terminals. Install the instrument cluster. Connect battery ground cable.

INSTRUMENT VOLTAGE REGULATOR

The instrument voltage regulator is calibrated at the manufacturing plant. Do not attempt to re-calibrate the regulator. If the regulator does not function properly, it should be replaced.

Ford, Mercury and Lincoln Continental

Removal

1. *Disconnect the battery ground cable.*
2. Remove the lower access trim panel (2 screws).
3. From behind the cluster, remove the printed circuit from the IVR and radio choke.
4. Remove the IVR attaching screw and remove the IVR and choke assembly.
5. Remove the choke from the IVR.

Installation

1. Position the choke to the IVR and snap it into place.
2. Position the IVR to the printed circuit and install the attaching screw.
3. Snap the printed circuit to the IVR and choke assembly.
4. Position the lower access trim panel and install the two attaching screws.
5. *Connect the battery ground cable.*

All Vehicles Except Ford, Mercury, and Lincoln Continental

Remove the instrument cluster assembly. Remove the regulator to cluster retaining screw and snap-off the printed circuit connector buttons.

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Fuel Economy Indicating Systems

PART 33-60

Applies to All Models

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Fuel Economy Warning Lamp	60-1
DIAGNOSIS	60-3
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REMOVAL AND INSTALLATION	
Fuel Economy Gauge	60-4
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DESCRIPTION AND OPERATION

FUEL ECONOMY GAUGE

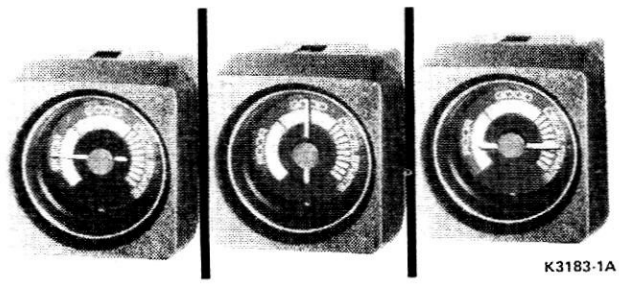
Cougar and LTD II (Base Cluster W/O Clock)

The fuel economy gauge indicates engine manifold vacuum, as a function of throttle position and engine load. The face of the gauge dial is divided into three segments; Poor (low vacuum), Good (normal vacuum for cruise), and Decelerate (high vacuum). Although the gauge is not intended as a close tolerance vacuum indicator, it may be assumed that a gauge reading continuously below the Good band (normal cruise or idle) may mean poor engine performance due to improper ignition timing or manifold vacuum leakage. Refer to Part 29-02 of this Manual for further diagnosis. The gauge as it appears in each condition is shown in Fig. 1.

The fuel economy gauge is located in the right instrument cluster opening nearest the center of the vehicle. The instrument cluster trim cover must be removed for replacement.

A manifold vacuum pulsation restrictor is inserted in the 1/4-inch vacuum tube at the end closest to the manifold vacuum connection. This enables the inside area of the vacuum hose to serve as a small vacuum reservoir, thereby reducing the manifold vacuum pulsations and to also damp the gauge reading restriction against sudden accelerator operation.

NOTE: Examine the vacuum tube end closest to the manifold vacuum connection for the installation of the pulsation restrictor whenever the gauge needle reacts excessively to vacuum changes or when needle "vibration" is noted.



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FIG. 1 Fuel Economy Gauge Readings (Typical)

FUEL ECONOMY WARNING LAMP

The fuel economy warning lamp system consists of a normally closed vacuum switch, an instrument panel warning lamp, vacuum hose, wire harness, and attaching hardware. Its operation is similar in function to that of the oil pressure (switch type) indicating system, except the switch opens when vacuum is applied, rather than pressure.

An amber colored warning lamp in the instrument panel warns the vehicle operator when the engine manifold vacuum has dropped below the specified limit. This represents a higher level of fuel consumption so that the operator may correct his driving habits or condition for improved fuel economy.

Electrical Circuit

The warning lamp bulb is powered by the ignition switch accessory circuit through the printed circuit board of the instrument panel. The wire harness and normally closed switch assembly provide the ground circuit for the bulb. With the ignition switch ON and the engine not running, the amber colored light exhibiting the words "LOW FUEL ECONOMY" will be illuminated. As the engine is started and the manifold vacuum reaches

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DETROIT IRON

VACUUM SWITCH MOUNTING LOCATIONS

Vehicle	Switch Mounting Location	Vehicle	Switch Mounting Location
Pinto Bobcat	Left Fender Apron	LTD II and Cougar	Upper Cowl Right Side Above A/C Case
Mustang II	Upper Cowl Left Side	Ford/Mercury	Upper Cowl Above Brake Booster
Fairmont/ Zephyr	Right Fender Apron	Thunderbird/ Continental Mark V	
Granada/ Monarch/ Versailles	Right Side of Upper Cowl	Lincoln Continental	

CK3193-1E

the specified limit (refer to specifications), the vacuum switch opens the ground circuit and the warning lamp will go out.

Switch Mounting Locations

The fuel economy vacuum switch and mounting bracket assemblies for all car lines are mounted in the engine compartment as noted in the following chart:

Vacuum Connections

A 3/16 inch vacuum tube is connected to the vacuum port on the vacuum switch assembly. On all vehicles, except Granada, Monarch and Versailles with catalytic converters, the vacuum tube is connected to a manifold on the engine. Granada, Monarch and Versailles with catalytic converters have the vacuum tube connected into the vacuum manifold located on the cowl.

TESTING

FUEL ECONOMY GAUGE

A standard vacuum system test, using the Rotunda Tool 20-0015 or equivalent, hand-operated vacuum test pump, is conducted as follows:

1. Disconnect the vacuum tube at the manifold vacuum connection.
2. Insert the medium-size tapered-tester vacuum tip into the end of the vacuum tube and hand pump the vacuum tester to approximately 20-inches vacuum. Observe the tester vacuum gauge reading for an indicated loss in vacuum. Observe for the following results:
   a. If the tester vacuum gauge indicates a loss in vacuum, remove the vacuum tube connector from the threaded vacuum connector on the back of the gauge. Apply a short length of Teflon Sealer Tape D0AZ-19554-C or equivalent) around the threads of the vacuum connection and reinstall the vacuum tube connector on the threaded vacuum connection. Recheck the gauge with the hand vacuum pump. If the tester gauge still indicates a loss in vacuum, replace the Fuel Economy Gauge assembly.
   b. If the vacuum reading remains steady, the vacuum tube and gauge are OK. Check the end of the tube to be sure the pulsation restrictor is installed; then reconnect the manifold vacuum connection.
3. Remove the three upper and five lower instrument cluster trim cover retaining screws and pull the trim cover rearward to disconnect the vacuum tube from the tube connector on the back of the fuel economy gauge.
4. Connect the vacuum tube of the hand-operated vacuum test pump directly to the fuel economy gauge tube connector. Pump the tester to approximately 20-inches vacuum and observe the tester vacuum gauge reading for an indicated loss in vacuum. Observe for the following results:

   If the tester vacuum gauge indicates a loss in vacuum, replace the fuel economy gauge assembly.

   If the tester vacuum gauge reading remains steady, the 1/4-inch vacuum hose to the engine manifold vacuum port must be repaired or replaced.

   NOTE: Be sure to transfer the pulsation restrictor to the new vacuum tube if replacement is required.

FUEL ECONOMY WARNING LAMP

Warning Lamp Circuit Test

1. Turn the ignition switch ON (do not start engine) and check the operation of all warning lamps (Fuel Economy, Alt., Engine, etc.).

   Results:

   a. If the other warning lamps operate but the low fuel economy warning lamp does not operate, proceed to Step No. 2.
   b. If the warning lamps do not function, check the fuse and ignition accessory circuit to instrument panel. Repair as required.
2. Disconnect the wire harness connector from the fuel economy vacuum switch connector.
3. Attach a jumper wire to the terminal connector of the wire harness and attach the other end of the jumper wire to a good vehicle frame ground or to the battery negative (-) ground terminal.

   Results:

   a. If the low fuel economy warning lamp lights, the circuit is OK. Refer to vacuum switch functional test and switch ground check for further system testing.
   b. If the low fuel economy warning lamp does not illuminate, the problem is a burned out indicating bulb or possible open harness wire between the vacuum switch connector and the instrument panel connector. Repair as required and recheck the system for proper operation.

Vacuum Switch Functional Test

1. Disconnect the electrical connector and vacuum tube from the switch.

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2. Connect a self-powered test light to the spade terminal of the switch connector and to the vacuum switch mounting bracket.
3. Connect a short piece of 3/16-inch vacuum tube to the vacuum connector of the vacuum switch.
4. Use the Rotunda Model No. 20-0015 or equivalent hand-operated vacuum pump and apply the specified vacuum.

   Results: With No Vacuum—Test Light ON; With Specified Vacuum—Test Light OFF.

   a. If both of the above results are OK, the switch is good.

   b. If either of the above results are incorrect, replace the switch.

Vacuum Switch Ground Check

1. Connect a self-powered test light to the mounting bracket of the vacuum switch and to a suitable vehicle frame ground connection.

   Results:

   a. If the test light illuminates, the ground is OK.

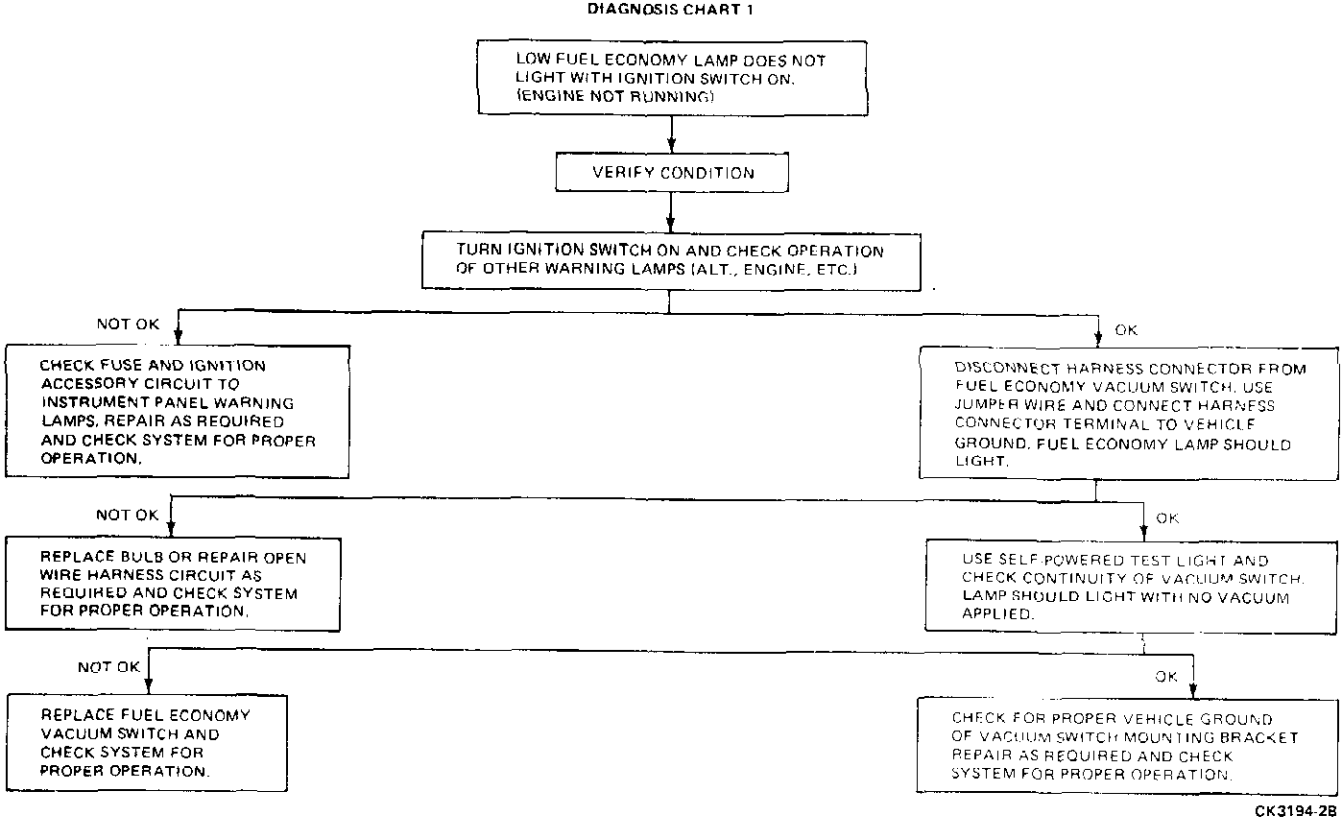
   b. If the test light does not illuminate, remove the mounting bracket screws and clean the metal surfaces to insure a proper mounting bracket-to-frame ground connection.

DIAGNOSIS

FUEL ECONOMY WARNING LAMP

Refer to the following Diagnosis Charts for diagnosing system problems.

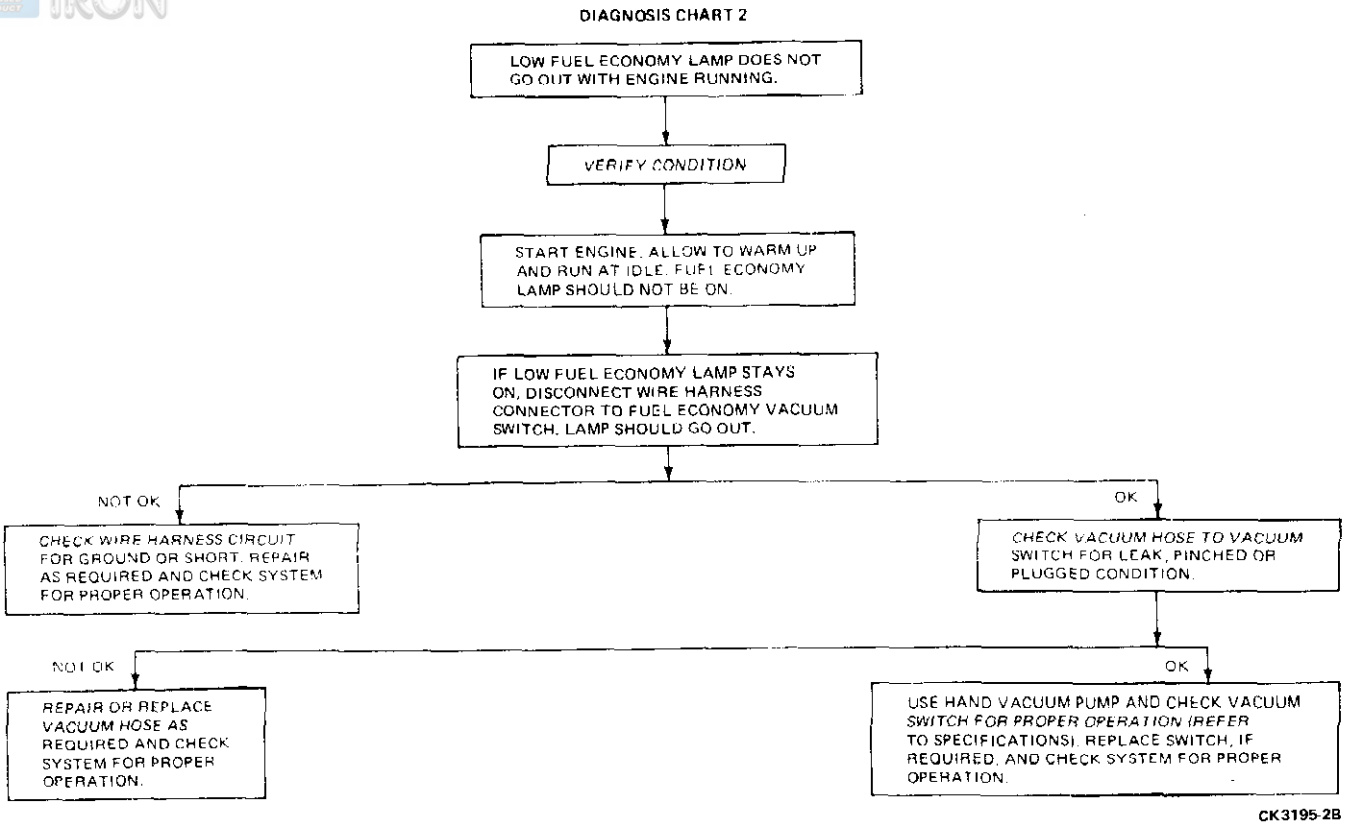
DIAGNOSIS CHART 1



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DETROIT IRON



REMOVAL AND INSTALLATION

FUEL ECONOMY GAUGE

Removal

1. Remove the three upper and five lower retaining screws from the instrument panel trim cover, pull the trim cover rearward and disconnect the vacuum tube from the tube connection and the bulb-and-socket assembly from the back of the fuel economy gauge. Remove the trim cover and gauge assembly (Fig. 2).
2. Remove the three fuel economy gauge cover retaining screws and remove the cover and gauge assembly from the trim cover.
3. Remove the two gauge mounting bracket retaining nuts and lockwashers. Remove the U-shaped gauge mounting bracket and the retaining ring.
4. Remove the fuel economy gauge from the gauge cover.
5. Remove the tube connector from the back at the fuel economy gauge assembly.

Installation

1. Apply a short length of Teflon Sealer Tape (DOAZ-19554-C or equivalent) around the threads of the vacuum connection on the back of the gauge. Install the vacuum tube connector on the threaded vacuum connection and tighten the vacuum tube connector to specifications.
2. Insert the fuel economy gauge into the front of the gauge cover opening and align the gauge with the index slot in the gauge cover opening (Fig. 2).
3. Position the gauge retaining ring and the U-shaped gauge mounting bracket on the back of the gauge assembly.
4. Install the two gauge mounting bracket retaining nuts and lockwashers. Tighten to specifications.
5. Position the fuel economy gauge cover and gauge assembly on the back of the instrument panel trim cover. Install the three gauge cover retaining screws and tighten to specifications.
6. Position the instrument panel trim cover and gauge assembly near the instrument panel and connect the fuel economy gauge vacuum tube on the gauge tube connector.
7. Insert the panel light bulb and socket assembly into the opening on the back of the gauge.
8. Position the instrument panel trim cover and gauge assembly and install the trim cover three upper and five lower mounting screws finger tight. Tighten the mounting screws to specifications.

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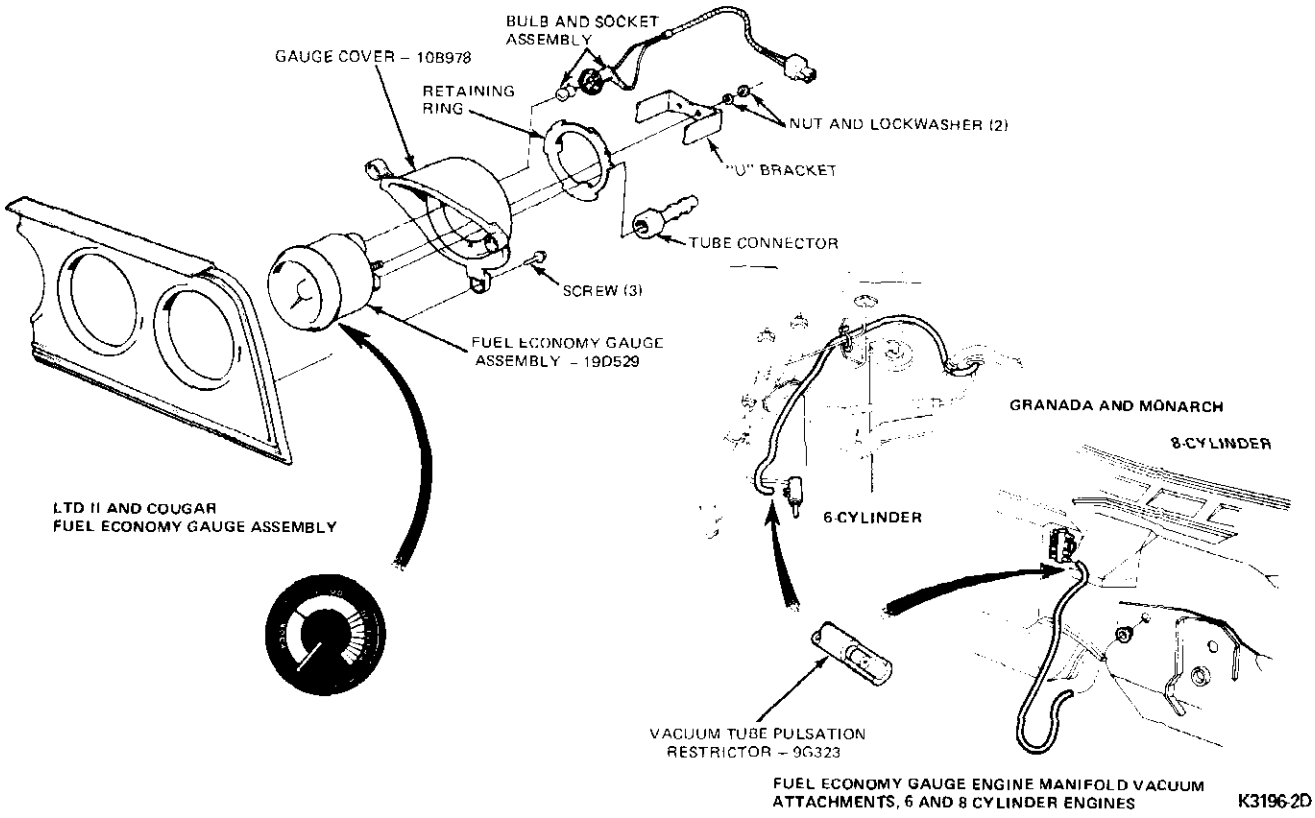


FIG. 2 Fuel Economy Gauge

SPECIFICATIONS

FUEL ECONOMY GAUGE

FUEL ECONOMY GAUGE

Item	Torque
Gauge Bracket Attaching Nuts	2-4 in-lb
Gauge Cover Attaching Screws	5-12 in-lb
Instrument Cluster Trim Cover, Attaching Screws	8-16 in-lb
Gauge to Vacuum Tube Connector*	30-40 in-lb

*With sealer tape on threads.

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DETROIT IRON

FUEL ECONOMY WARNING LAMP

FUEL ECONOMY WARNING LIGHT

VACUUM SWITCH SPECIFICATIONS – (INCHES OF HG.)*

VEHICLE	Eng.	2.3L	2.8L	3.3L (200 CID)	4.1L (250 CID)		5.0L (302 CID)		5.8L (351M CID)	5.8L (351W CID)	6.6L (400 CID)	6.6L (400 CID)	7.5L (460 CID)	7.5L (460 CID) Police Interceptor
	Trans.	All	All	All	M/T	A/T	M/T	A/T	All	All	All	All	All	All
Pinto, Bobcat		4	4											
Mustang II		4	6				6	6						
Fairmont, Zephyr				4	6	4	6	4						
Granada, Monarch, Versailles				4	6	4	6	4						
Cougar and LTD II									4	4	6	6	6	6
Ford, Mercury									4	4	6	6	6	6
Thunderbird, Lincoln Continental													6	
Continental Mark V													6	

*Switch Contacts Open At Indicated Vacuum or Above
Switch Contacts Closed Below Indicated Vacuum

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Ignition Switch

PART 33-70

Applies to All Models

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DESCRIPTION AND OPERATION

The ignition switch is mounted on the steering column and is controlled by the lock cylinder through an actuator in the locking mechanism (Fig. 1). The switch plunger is connected to the actuator by the switch actuator rod (Fig. 1).

The lock cylinder also controls the mechanism which provides a positive lock for the transmission linkage and the steering system. The locking mechanism is located in the casting at the upper end of the steering column (Fig. 1).

The lock positions are ACC, LOCK, OFF, RUN and START. With column shift automatic transmissions, the ignition key can be removed from the lock cylinder only when the shift lever is in PARK position and the key is in LOCK position. The ACC position operates while the steering and transmission systems remain locked. Turning the key to OFF position shuts off the engine without locking the steering or transmission systems.

BLADE-TYPE SWITCH

The switch has blade-type terminals that engage with one multiple connector. See Figs. 2 and 3. The multiple connector is secured to the switch by integral locking fingers.

A push-button steering wheel lock mechanism is used on LTD II, Cougar, Granada, Monarch, Mustang II and Pinto vehicles equipped with the floor-mounted shift system. This button, on the left side of the steering column, must be pushed in before the ignition key can be removed.

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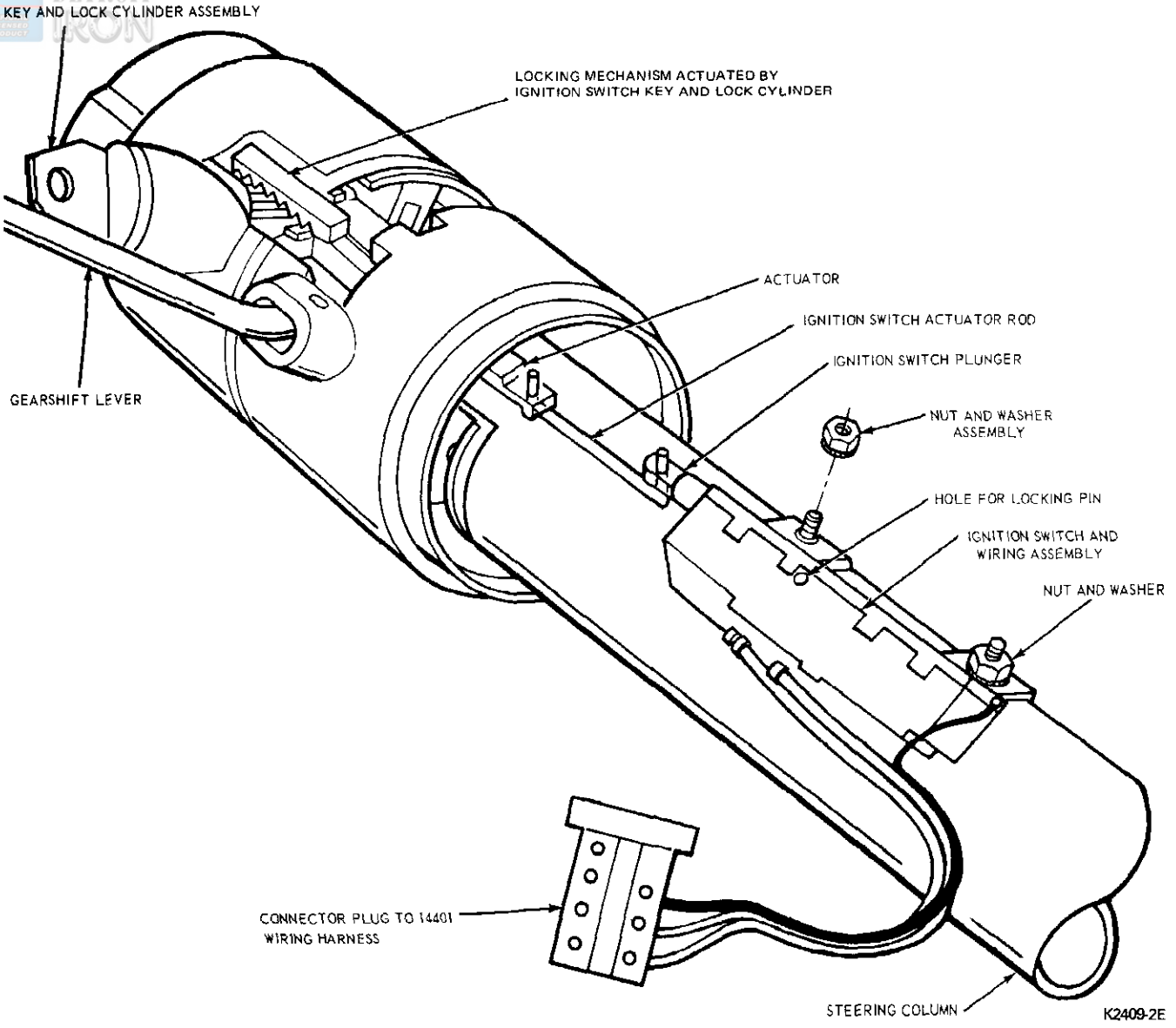


FIG. 1 Pin Type Connector Ignition Switch

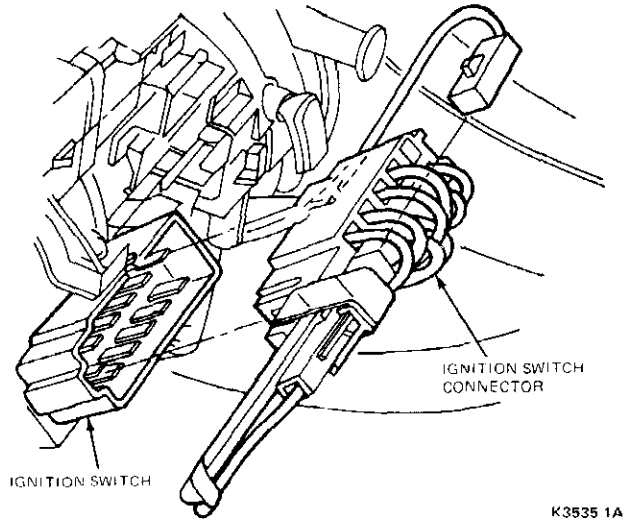


FIG. 2 Blade Type Ignition Switch for Fairmont/ Zephyr

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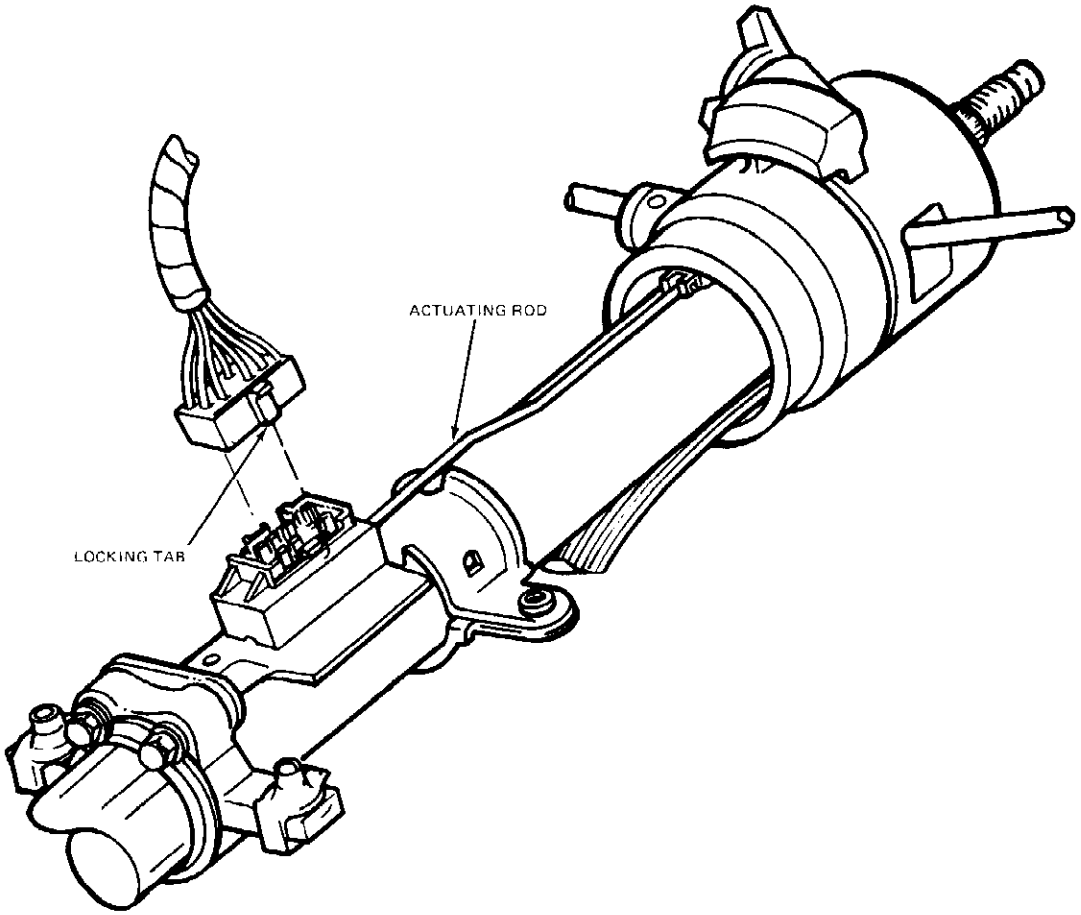


FIG. 3 Spade-Type Connector Ignition Switch

TESTING

PIN-TYPE CONNECTOR

Disconnect the switch wire multiple plug by lifting the two retaining tabs over the spurs on the connector sides while pulling the connectors apart (Fig. 4).

To remove the connector plug from the retaining bracket, lift up on the retaining tab and pull the connector from the bracket.

Test the continuity through the switch by connecting a self powered test lamp or ohmmeter between the plug terminals indicated for each switch position in Fig. 5.

SPADE-TYPE CONNECTOR

Disconnect the multiple connector by spreading apart the locking fingers and pulling the plugs from the switch. Test the continuity through the switch by connecting a self powered test lamp or ohmmeter between the plug terminals indicated for each switch position in Fig. 6.

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DETROIT IRON

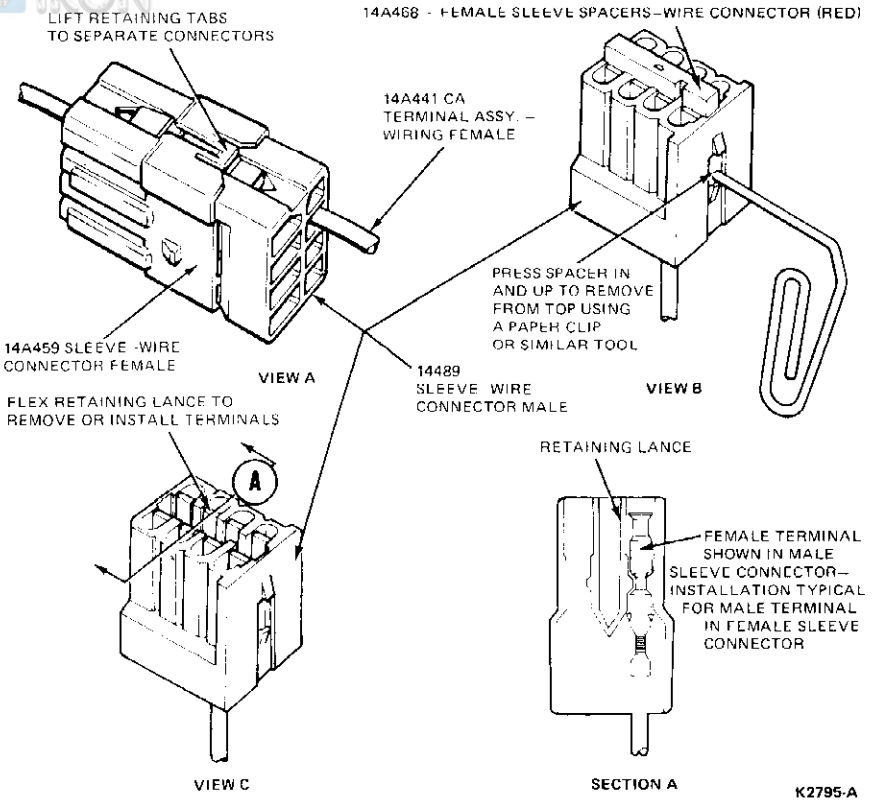


FIG. 4 Ignition Switch Wire Connector—Lincoln Continental Shown

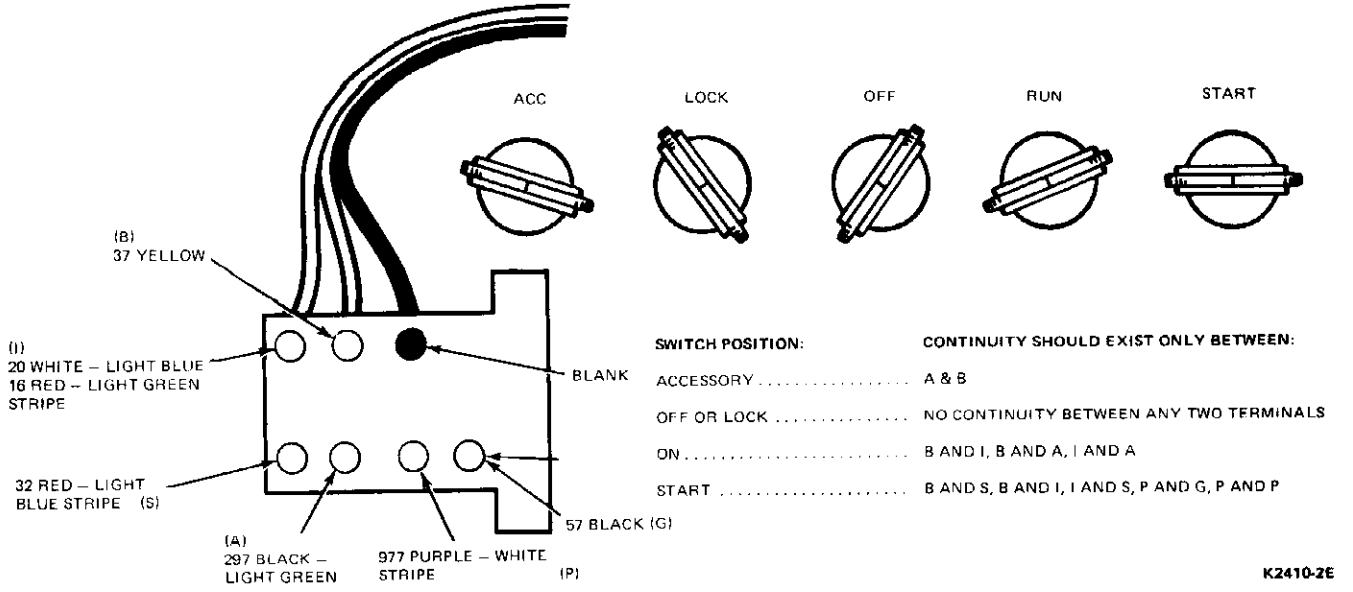
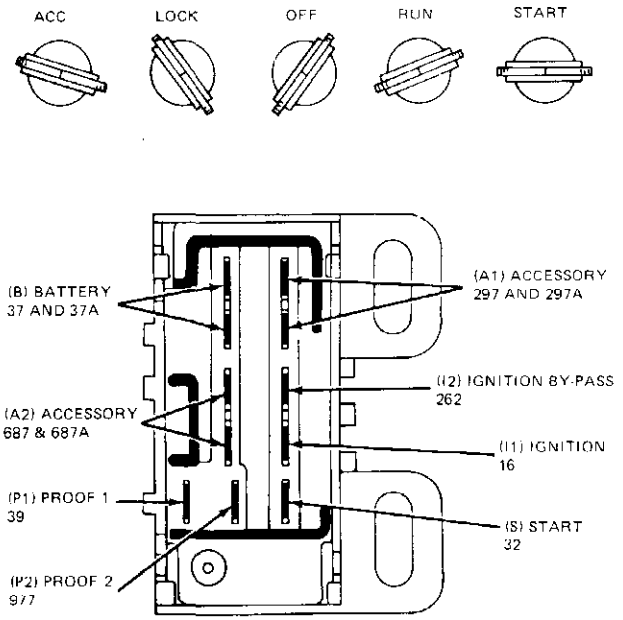


FIG. 5 Pin-Type Connector Ignition Switch Continuity Test

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SWITCH POSITION:	CONTINUITY SHOULD EXIST ONLY BETWEEN:
ACCESSORY	37 AND 297
LOCK	37 AND 37A - 297 AND 297A – 687 AND 687A
OFF	37 AND 37A - 297 AND 297A -- 687 AND 687A
RUN	16 – 687 -- 37 297
START	39 – 977 GROUND; 37 AND 37A; 32 AND 262

CIRCUIT PAIRS 37 AND 37A, 687 AND 687A AND 297 AND 297A ARE CONNECTED TOGETHER INTERNALLY IN THE SWITCH.

K2877-1G

FIG. 6 Spade-Type Connector Ignition Switch Continuity Test

ADJUSTMENTS

SWITCH

1. Rotate the ignition key back and forth to either side of lock, until a drill bit can be inserted through the locking pin hole as far as possible (minimum 3/8"). The lock pin holes and drill bit diameters are located and specified as follows:

   Blade-type switch with metal switch housing: right side of switch next to steering column tube, 5/64 drill.

   Pigtail-type switch: uppermost part of switch at metal-plastic junction, 3/32 drill.

2. Loosen the two ignition switch mounting nuts.
3. Turn the ignition key to lock (feel for detent) and remove the ignition key.
4. Move the switch up and down along the column to locate the mid-position of rod lash and torque the two ignition switch mounting nuts to 40-65 in-lbs.
5. Remove the drill bit from the ignition switch locking pin hole.
6. Plug in electrical connector and operate the lock cylinder to insure the switch is positioned properly.

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DETROIT IRON

REMOVAL AND INSTALLATION

SWITCH (ALL EXCEPT FAIRMONT AND ZEPHYR)

1. For LTD II, Cougar, Thunderbird, Lincoln Continental and Continental Mark V, remove the instrument cluster as specified in Part 33-50. To remove steering column shrouds and lower column, see Parts 13-03 and 13-04.
2. Disconnect the battery cable.
3. Disconnect the switch wiring at the multiple plug.
4. Remove the two nuts that retain the switch to the steering column.
5. On vehicles with a pigtail-type ignition switch, detach the switch plunger from the switch actuator rod and remove the switch.

   For a blade-type switch, lifting the switch vertically upward will disengage the actuator rod from the switch.
6. When installing the ignition switch, both the locking mechanism at the top of the column and the switch itself must be in LOCK position for correct adjustment.

   To hold the mechanical parts of the column in LOCK position, move the shift lever into PARK (with automatic transmissions) or REVERSE (with manual transmissions), turn the key to LOCK position, and remove the key. New replacement switches, when received, are already pinned in LOCK position by a metal shipping pin inserted in a locking hole on the side of the switch.

   For an existing switch, pull the switch plunger out as far as it will go and then move it in one detent to LOCK position. Insert a 3/32 inch diameter wire or drill shank in the locking hole on top of the switch (Fig. 1). For blade-type switch, move the switch carrier (located on bottom of switch) with a 0.10" diameter rod to the lock detent. At this point, a 5/64" diameter drill will fit in the lock hole on the side of the switch. The switch is now pinned in LOCK position.
7. Connect the switch plunger to the switch actuator rod for pigtail ignition switches.
8. Position the switch on the column and install the retaining nuts, but do not tighten them.
9. Move the switch up and down along the column to locate the mid-position of rod lash, and then tighten the retaining nuts.
10. Remove the locking pin, connect the battery cable, and check for proper start in PARK or NEUTRAL. Also check to make certain that the start circuit cannot be actuated in the DRIVE and REVERSE position.
11. Attach the steering column to the brake support bracket and install the shrouding.

SWITCH (FAIRMONT AND ZEPHYR)

1. Disconnect negative battery cable and remove steering column trim shroud by removing 4 self-tapping screws.
2. Disconnect the ignition switch electrical connector.
3. Drill out the "break-off head" bolts that connect the switch to the lock cylinder housing using a 1/8" drill.
4. Remove two bolts using an EX-3 "easy out" tool or equivalent.
5. Disengage the ignition switch from the actuator pin.
6. Adjust ignition switch by sliding carrier to "Lock" position. Insert a 7/16" drill bit through switch housing and into carrier, preventing movement of carrier.
7. Rotate ignition key to "Lock" position. Install ignition switch on the actuator pin.
8. Install new "break-off head" bolts and torque until the heads break off.
9. Remove adjustment drill bit or adjusting pin.
10. Connect electrical connector to ignition switch.
11. Connect negative battery cable. Check ignition for proper operation. Install steering column trim shrouds.

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WIRING HARNESSES, CONNECTORS AND CIRCUIT PROTECTION

GROUP 34

PART TITLE	PART NO.
DASH-TO-HEADLAMP JUNCTION WIRING HARNESS	34-10
DASH PANEL-TO-ENGINE WIRING HARNESS	34-20
FUSES AND CIRCUIT BREAKERS	34-30
INSTRUMENT PANEL-TO-DASH WIRING HARNESS	34-01

CK3388-2B

Instrument Panel-to-Dash Wiring Harness

PART 34-01

Applies to All Models

SUBJECT	PAGE
REMOVAL AND INSTALLATION	
Ford, Mercury	01-1
Lincoln Continental	01-5
LTD II, Cougar	01-11
Fairmont, Zephyr	01-7
Monarch, Granada, Versailles	01-11
Pinto, Bobcat, Mustang II	01-7
Thunderbird, Continental Mark V	01-11

CK3389-2B

REMOVAL AND INSTALLATION

There are electronic ignition module connectors on all car lines.

Due to the limited accessibility for service on resistors mounted under the instrument panel, it is recommended that the complete resistor and connector assembly be removed as a unit from the plenum chamber prior to separating the resistor from the wiring connector. The resistor is attached to the plenum chamber with 2 snap-in retainers or two screws. On some car lines the resistor is in the engine compartment and is not necessary to remove. Electrical connector disengagement is shown in Figs. 1, 2 and 3.

WIRING HARNESS

FORD AND MERCURY (FIG. 4)

Removal

1. Disconnect the battery ground cable.
2. Disconnect the yellow wire from the battery terminal of the starter relay and pull the red-light blue wire from the relay start terminal.
3. Disconnect the wires from the heater blower motor and resistor. Then remove the harness (14401) from the six straps and clamps along the right fender apron and the dash panel.
4. Disconnect the engine wire harness at the connectors at the rear of the engine. Disconnect wires from the dual brake switch, oil pressure switch, windshield wiper motor and ignition module and push the grommets and wires through the dash panel into the passenger compartment.
5. Remove the bolt that connects the multiple connector (14290) on the dash panel to the fuse panel. Pull the connector from the fuse panel and dash panel.
6. Remove the instrument panel pad (Group 45).
7. Remove the instrument panel radio speaker and disconnect the antenna cable from the radio. Then, disconnect any R.P.O (optional) wiring connectors under the radio speaker.
8. Disconnect the right door switch wires at right end of the instrument panel.

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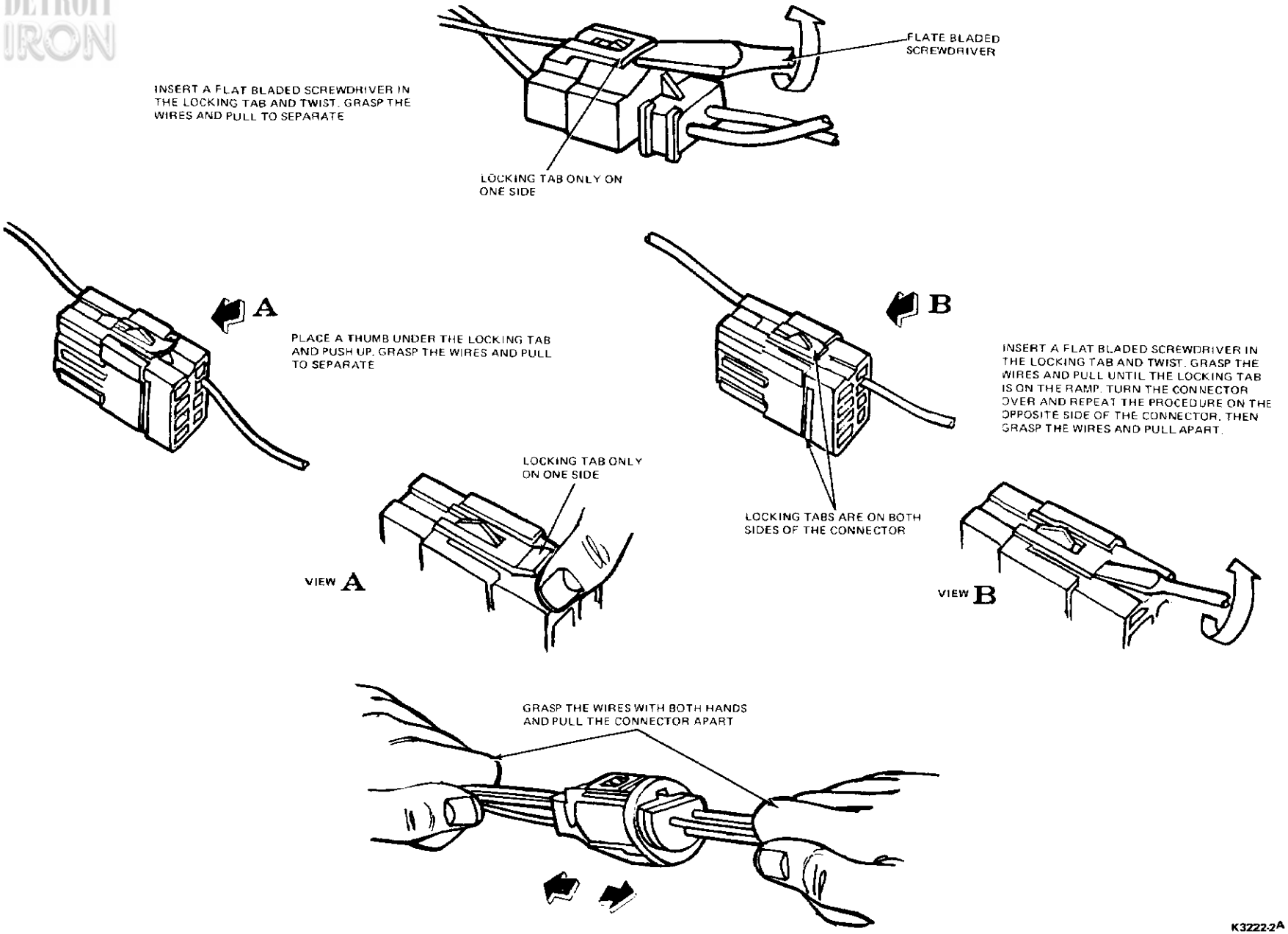


FIG. 1 Electrical Connector Disengagement—In Line Connectors

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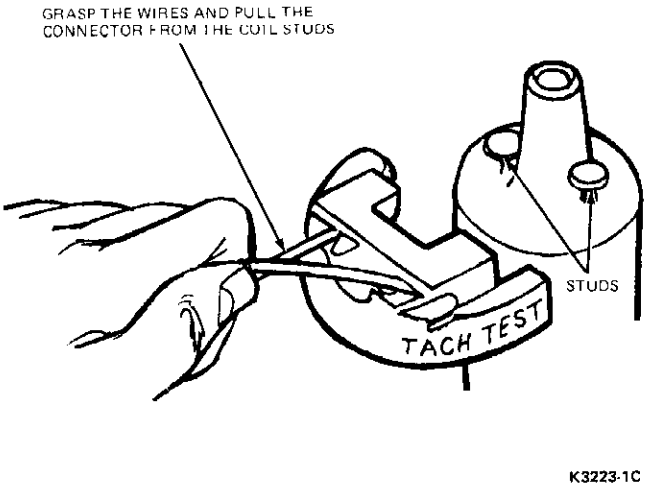


FIG. 2 Electrical Connector Disengagement—Component Connectors

9. Remove the trim panel below the steering column and remove the steering column shroud.
10. Disconnect the back-up lamp switch, turn signal indicator switch column connector and stop lamp switch wires.
11. Disconnect the vacuum hose connector from the heater or air conditioner control assembly. If equipped with air conditioning, disconnect one Bowden cable from the control assembly. Disconnect two Bowden cables, if equipped with heater only.
12. Disconnect the wire from the parking brake switch.
13. Disconnect the connector to the left door switch.
14. Loosen the front screw, retaining the left door scuff plate to the rocker panel. Pull the carpet back away from the dimmer switch area and remove the wire shield on the floor. Disconnect the harness connectors to the rear lamps and the dimmer switch.
15. Disconnect the automatic transmission indicator cable from the steering column. Remove the steering column bolts and lower the steering column.
16. Remove ignition switch connector from the steering column and remove one wrap-around clip holding the ignition switch wire to steering column connector bracket.
17. Disconnect the speedometer cable from the speedometer.
18. Place a protective cover over the steering column.
19. Remove four instrument panel attaching bolts.
20. With the help of an assistant, lift the instrument panel from the vehicle and place it face down on a clean bench. Remove all A/C ducts; left hand, right hand and center.
21. Remove the harness from the retainers behind the instrument cluster. Remove any overlay wire assemblies from the retainer clips.
22. Disconnect the harness from the headlight switch, wiper switch, left hand instrument panel courtesy lamp, seat belt warning buzzer and the turn signal flasher. Disconnect the ground wire from left end of instrument panel and remove wiper switch illumination bulb.
23. Disconnect the harness from the cluster printed circuit, heater-air conditioning control, ash tray lamp and the cigar lighter.
24. Remove the harness retainer behind the ash tray, and disconnect the radio from the harness.
25. Disconnect the harness from the clock, glove box lamp and switch. Disconnect right hand courtesy lamp (if so equipped). Then, remove harness from retainers above glove box and remove from instrument panel.
26. Remove the clip locators: One rear of cluster and two on the vertical brace, right hand side of the radio. Remove the 14401 harness from the instrument panel.

Installation

1. Compare the new harness with the old harness. Transfer the hazard flasher, key warning buzzer and all fuses to the new harness fuse panel. Transfer bulbs to new harness sockets.
2. Position new harness to instrument panel, install the two clip locators into the holes provided, place in retainers above glove box, and connect the glove box lamp and switch to the harness. Connect the right hand courtesy lamp.
3. Connect radio and clock to harness and install harness retainer behind ash tray. Connect harness to cigar lighter, ash tray lamp, heater-air conditioning control and the cluster printed circuit.
4. Insert the wiper switch illumination bulb into hole and connect the ground wire to the left end of the instrument panel.
5. Connect the harness to the headlamp switch, wiper switch, left hand instrument panel courtesy lamp (if so equipped), seat belt buzzer and turn signal flasher. Then, install the harness retaining clips behind the cluster. Install all R.P.O. (optional) wiring (if removed). Install the A/C ducts (if so equipped).
6. With an assistant, position the instrument panel in the vehicle and start one attaching bolt at each end. Connect the ignition switch connector to the steering column, reinstall the retaining clip around the ignition switch, steering column connector and secure in hole on the column retainer bracket.
7. Install the two remaining instrument panel attaching bolts and tighten the four bolts securely.
8. Connect the speedometer cable to the speedometer, and the transmission selector indicator cable to the steering column. Adjust the transmission selector indicator as outlined in Group 13.
9. Position the steering column to the instrument panel and install the attaching bolts.
10. Connect the harness to the dimmer switch and the rear lamps harness. Then, install the harness connector shield, reposition the carpet, and tighten the scuff plate screw.
11. Connect the left door switch connector to harness and install the cowl side trim panel. Then, connect harness to the parking brake switch.

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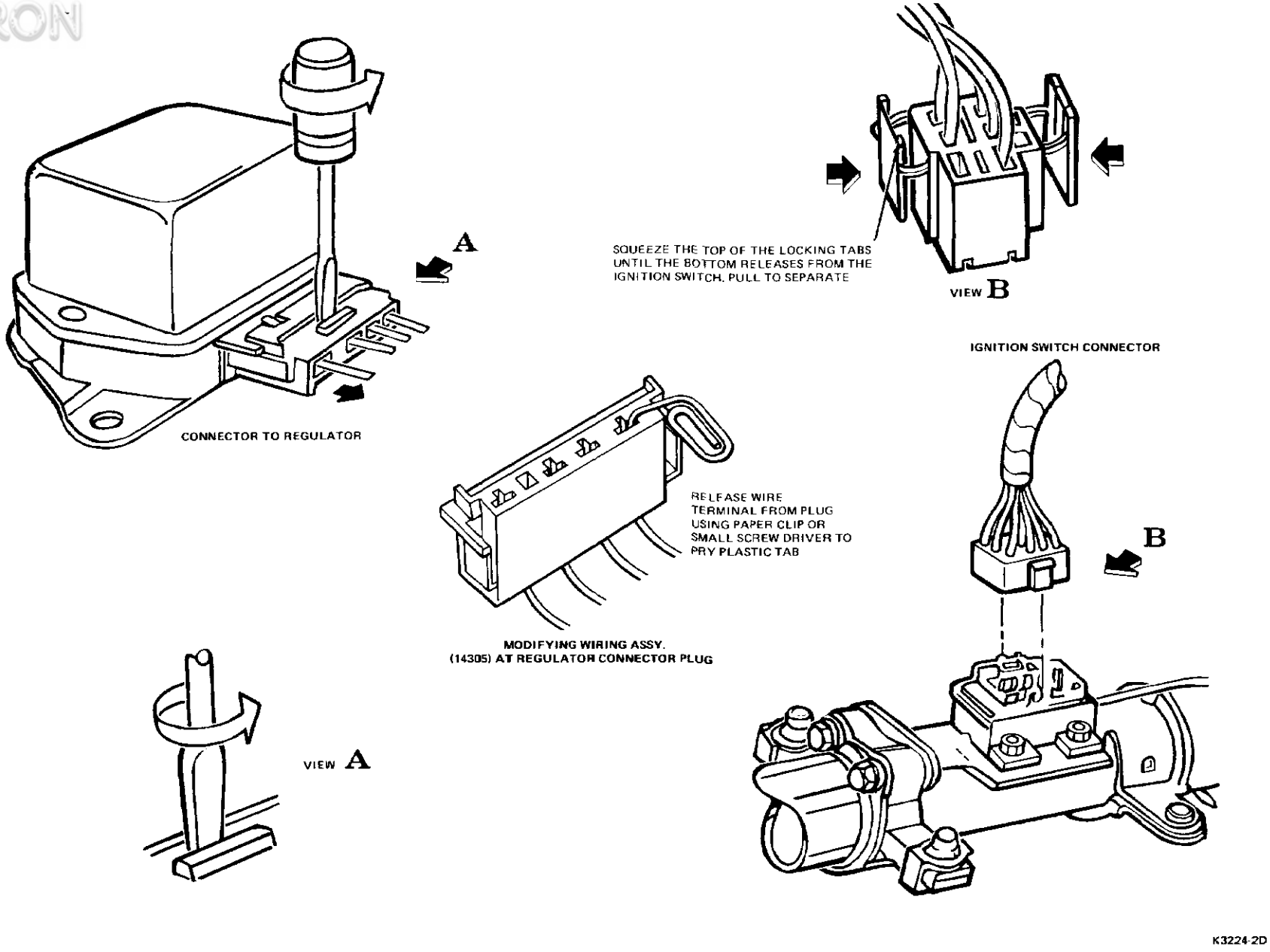


FIG. 3 Electrical Connector Disengagement—Component Connectors

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12. Connect the Bowden cable(s) and vacuum hose harness connector to the heater or air-conditioning control assembly.
13. Connect the stop lamp switch, turn indicator switch, and the back-up lamp switch.
14. Install the trim panel below the steering column and the steering column shroud.
15. On the right side of the panel, connect the right door switch wires to the harness. Connect the hardshell connector. Connect the antenna cable to the radio, and install the radio speaker.
16. Push the three harness ends through the holes in the dash panel and seat the grommets. Secure the fuse panel to the dash panel, and connect the engine compartment connector (14290) plug to the fuse panel. Install the connector-to-fuse panel screw (14290).
17. Working under the hood, connect the harness to the dual brake switch, oil pressure switch, wiper motor, ignition module and engine harness at rear of engine. Route the harness along dash and right fender apron and secure in place.
18. Connect the harness to the heater blower motor and resistor and the starter relay.
19. Connect the ground cable to the battery and check the vehicle and electrical items for proper electrical operation. Then, install the instrument panel pad.

LINCOLN CONTINENTAL (SEE FIG. 4)

Removal

1. Disconnect the battery ground cable.
2. Remove the bolts that connect the multiple connector (14290 and 14398) on the dash panel to the fuse panel. Pull the connector from the fuse panel and dash panel. Disengage bulkhead connector from the dash panel.
3. Disconnect connections to the windshield wiper motor and ignition module and push the grommets and wires through the dash panel into the passenger compartment.
4. Remove the instrument panel pad (Group 45).
5. Disconnect the antenna cable from the radio. Then disconnect any optional wiring connectors in the section.
6. Disconnect connector to the R.F. regulator wiring harness near centerline of instrument panel. Remove the tie strap to the upper center brace.
7. Disconnect connector to the electro-voltage relay by the glove box.
8. Remove the trim panel below the steering column and remove the steering column shroud.
9. Disconnect the back-up lamp switch, turn signal indicator switch column connector and stop lamp switch wires.
10. Disconnect the vacuum hose connector from the air conditioner control assembly. Disconnect one Bowden cable from the control assembly.
11. Disconnect the wire from the parking brake switch.
12. Loosen the front screw retaining the left door scuff plate to the rocker panel. Pull the carpet away from the dimmer switch area and remove the wire shield on the floor. Disconnect the harness connectors to the harness on the floor pan, the dimmer switch, the L.F. regulator wiring, moon roof wiring and search radio switch, if so equipped.
13. Disconnect the automatic transmission indicator cable from the steering column. Remove the steering column bolts and lower the steering column.
14. Remove ignition switch connector from the steering column and remove one tie strap around ignition switch, turn signal switch and cornering lamp wires.
15. Disconnect the speedometer cable from the speedometer.
16. Place a protective cover over the steering column.
17. Remove four instrument panel attaching bolts and braces.
18. With the help of an assistant, lift the instrument panel from the vehicle and place it face down on a clean bench. Remove all A/C ducts.
19. Remove the harness from the retainers behind the instrument cluster. Remove any overlay wire assemblies from the retainer clips.
20. Disconnect the harness from the lighting switch, wiper switch, left-hand instrument panel courtesy lamp, seat belt warning buzzer and the turn signal flasher. Disconnect the ground wire from left end of instrument panel and wiper and lighting switch illumination jumper.
21. Disconnect the harness from the cluster printed circuit, air conditioning control, ash tray lamp and cigar lighter.
22. Remove the harness retainer behind the ash tray, and disconnect the radio from the harness.
23. Disconnect the harness from the clock, glove box lamp and switch. Remove clip locator and disconnect right-hand courtesy lamp. Then remove harness from retainers above glove box and remove from instrument panel.
24. Remove the clip locators above the cluster at the L.H. side and above the R.H. courtesy lamp. Remove the 14401 harness from the instrument panel.

Installation

1. Compare the new harness with the old one. Transfer the hazard flasher, key warning buzzer and all fuses to the new harness fuse panel. Transfer bulbs to new harness sockets.
2. Position the new harness to instrument panel, install the clip locators above glove box lamp and switch to the harness. Connect the right-hand courtesy lamp and locator.
3. Connect radio and clock to harness and install harness retainer behind ash tray. Connect harness to cigar lighter, ash tray lamp, air conditioning control and the cluster printed circuit.
4. Connect 2-way connector to wiper switch and lighting switch illumination jumper, and bulbs for optional lighting.
5. Connect the harness to the lighting switch, wiper switch, left-hand instrument panel courtesy lamp, key warning buzzer, turn signal flasher, and power window relay. Then install the harness retaining

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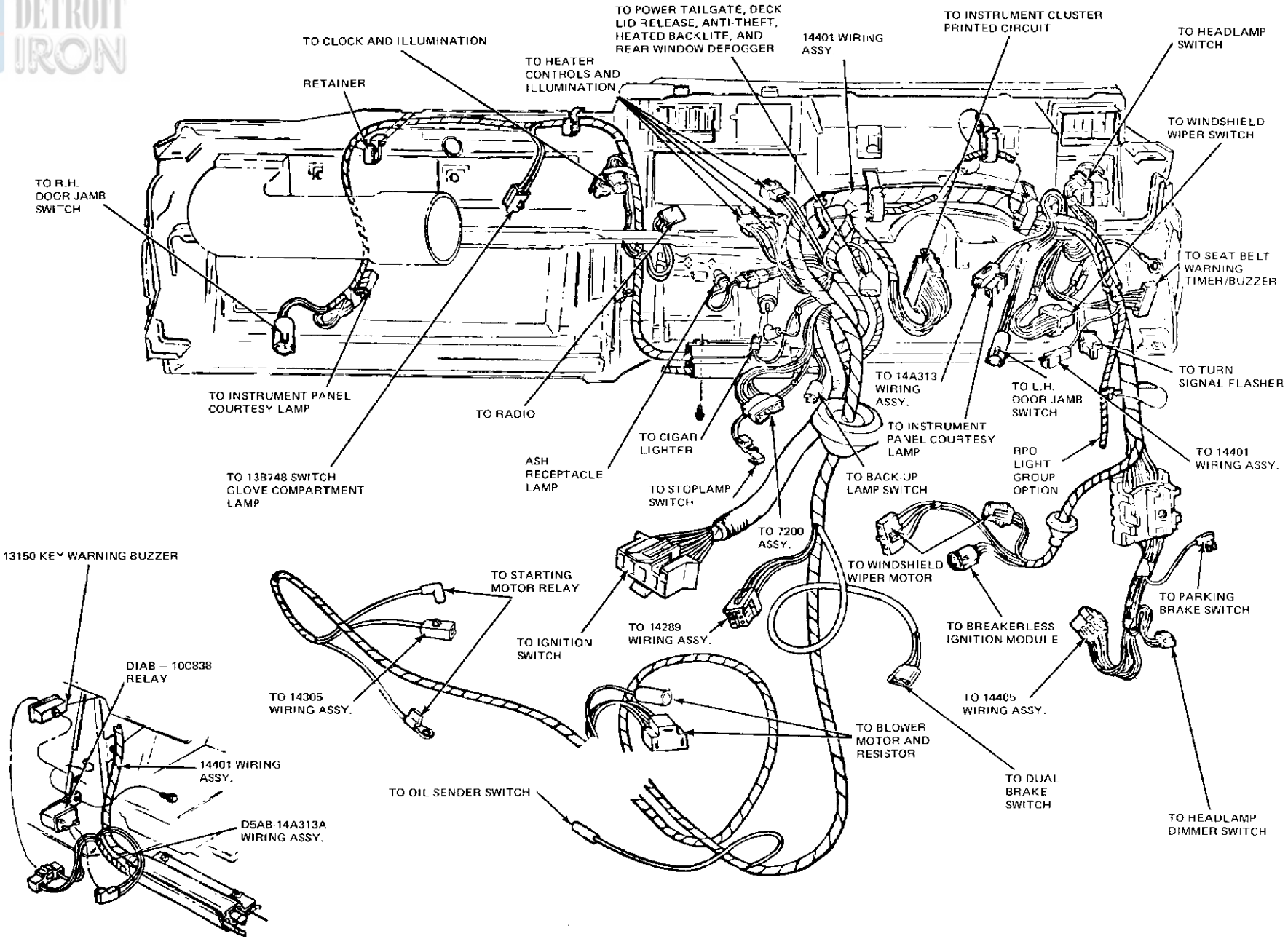


FIG. 4 Instrument Panel and 14401 Wire Harness—Ford (Mercury and Lincoln Continental Similar)

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clips over the cluster. Install all optional wiring. Install A/C ducts.

6. With an assistant, position the instrument panel in the vehicle and start one attaching bolt at each end.
7. Install the two remaining instrument panel attaching bolts and tighten all four securely. Install braces.
8. Connect the speedometer cable to the speedometer, and the transmission selector indicator cable to the steering column. Adjust the transmission selector indicator as outlined in Group 13.
9. Position the steering column to the instrument panel and install attaching bolts. Connect the ignition switch connector, the stop lamp switch connector, the turn signal switch connector, the back-up lamp switch connector and cornering lamp switch connector to the mating connectors on the steering column. Then route connectors through hole in dash panel and seat grommet. Place J-clip around wiring and pull up securely to brake pedal support.
10. Connect the harness to the dimmer switch, the harness on the floor pan, L.F. power window harness, moonroof wiring and search radio wiring, if so equipped. Place locator (14401) into oval shield just below the fuse panel. Also place L.F. regulator harness and optional wiring into the shield. Then install the harness connector shield, reposition the carpet and tighten the scuff plate screw.
11. Connect the Bowden cable and vacuum hose harness connector to the A/C control assembly.
12. Install the trim panel below the steering column and steering column shroud. On the R.H. side of the panel, connect the 14401 harness to the electro-voltage relay.
13. Connect the right door switch wires to the harness. Connect the hardshell connector. Connect the antenna cable to the radio and install the radio speaker.
14. Push the harness ends through the holes in the dash panel and seat the grommets. Secure the fuse panel to the dash panel and connect engine compartment connectors (14401 and 14398) to the fuse panel. Install the connector-to-fuse panel screws.
15. Under the hood, connect the harness to the wiper motor and ignition module.
16. Connect the ground cable to the battery and check the vehicle and electrical items for proper electrical operation. Then install the instrument panel pad.

FAIRMONT AND ZEPHYR (FIG. 5)

Removal

1. Disconnect the battery ground cable.
2. Pull off the heater/AC control knobs and pry off the heater/AC control panel and lens assembly. Remove the control-to-instrument panel retaining screws. Position the control out of the panel opening. Disconnect the blower switch, light bulb, and the temperature and defroster cables (remove screws and clips), and remove the heater/AC control.
3. Drop the headlamp switch from behind the instrument panel and disconnect the multiple plug from the switch. Disconnect the emission system wires, and seat belt buzzer wires.
4. Disconnect and remove the courtesy lamp switch from the left front door hinge pillar and pull the wiring free of the pillar.
5. The fuse panel is attached to the lower instrument panel.
6. Disconnect the multiple plug to the back-up and rear turn signal lamps. Disconnect the connectors at the fuel gauge sender unit lead and at the dome lamp feed wire, pull the dome lamp wires from the cowl. Disconnect connectors at steering column for wiper motor, turn signal, emergency flasher, ignition module, horn, dimmer switch and washer switch.
7. Disconnect stop lamp switch, steering column wiring, cigar lighter and neutral switch.
8. Remove the harness from the vehicle by pulling it out through the instrument cluster opening.

Installation

1. Connect the harness plugs to the turn signal and hazard flasher units and to the plugs on the wires going to the wiper motor, stop lamp switch, emergency flasher, ignition module, horn, dimmer switch, steering column wiring, cigar lighter, and neutral switch.
2. Reverse removal procedure.

PINTO, BOBCAT AND MUSTANG II (FIGS. 6 AND 7)

The Pinto and Bobcat instrument panel and 14401 wire harness is shown in Fig. 6. Refer to Fig. 7 for connector locations on Mustang II.

Removal

1. Reaching behind the right end of the instrument panel, disconnect the harness multiple connectors from the right courtesy lamp connector, the temperature switch, the turn signal flasher, the key buzzer and the hazard flasher. Disconnect the harness bullet connector from the wire to the right seat belt retractor. Disconnect the wires to the optional seat belt warning system, if so equipped.
2. Disconnect the harness single wire connectors from the cigar lighter. Disconnect the harness plugs from the seat belt buzzer and indicator lamp.
3. Disengage the right half of the harness from two retaining clips.
4. Proceeding from right to left, remove the harness shield (2 screws), and disconnect the harness connectors to the A/C resistor, A/C switch illumination bulb, and radio or heated backlamp.
5. At the left side of the instrument panel, disconnect the harness multiple plugs at the instrument cluster, the ignition switch wiring, the steering column wiring, the windshield wiper motor wiring, the dimmer switch wiring, the windshield wiper switch, the headlamp switch, heated backlamp relay (right of instrument panel) and switch (right of steering column), left seat belt retractor wiring, taillamp wiring and the left courtesy lamp wiring. Disconnect

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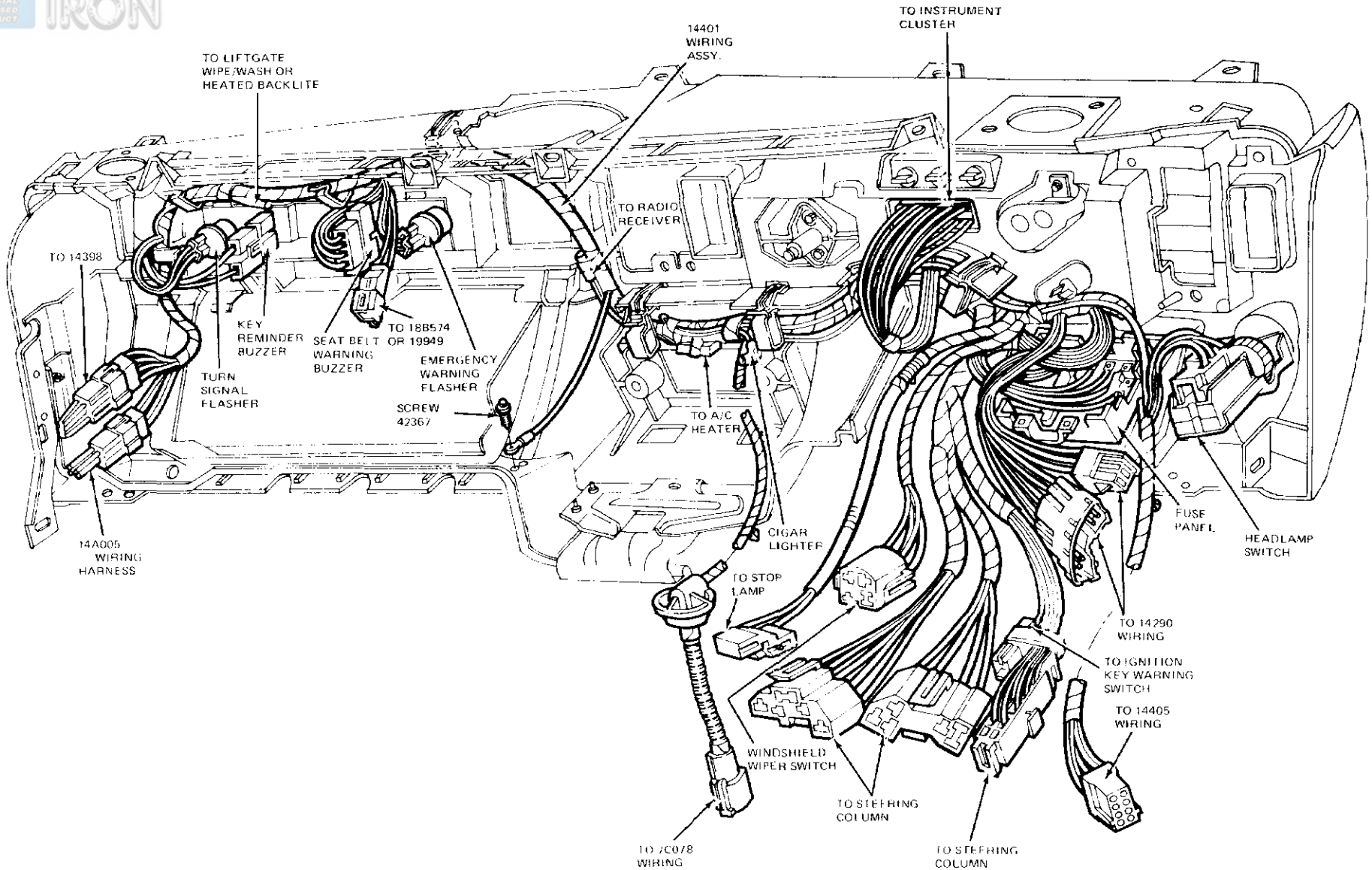


FIG. 5 Instrument Panel and 14401 Wire Harness—Fairmont and Zephyr

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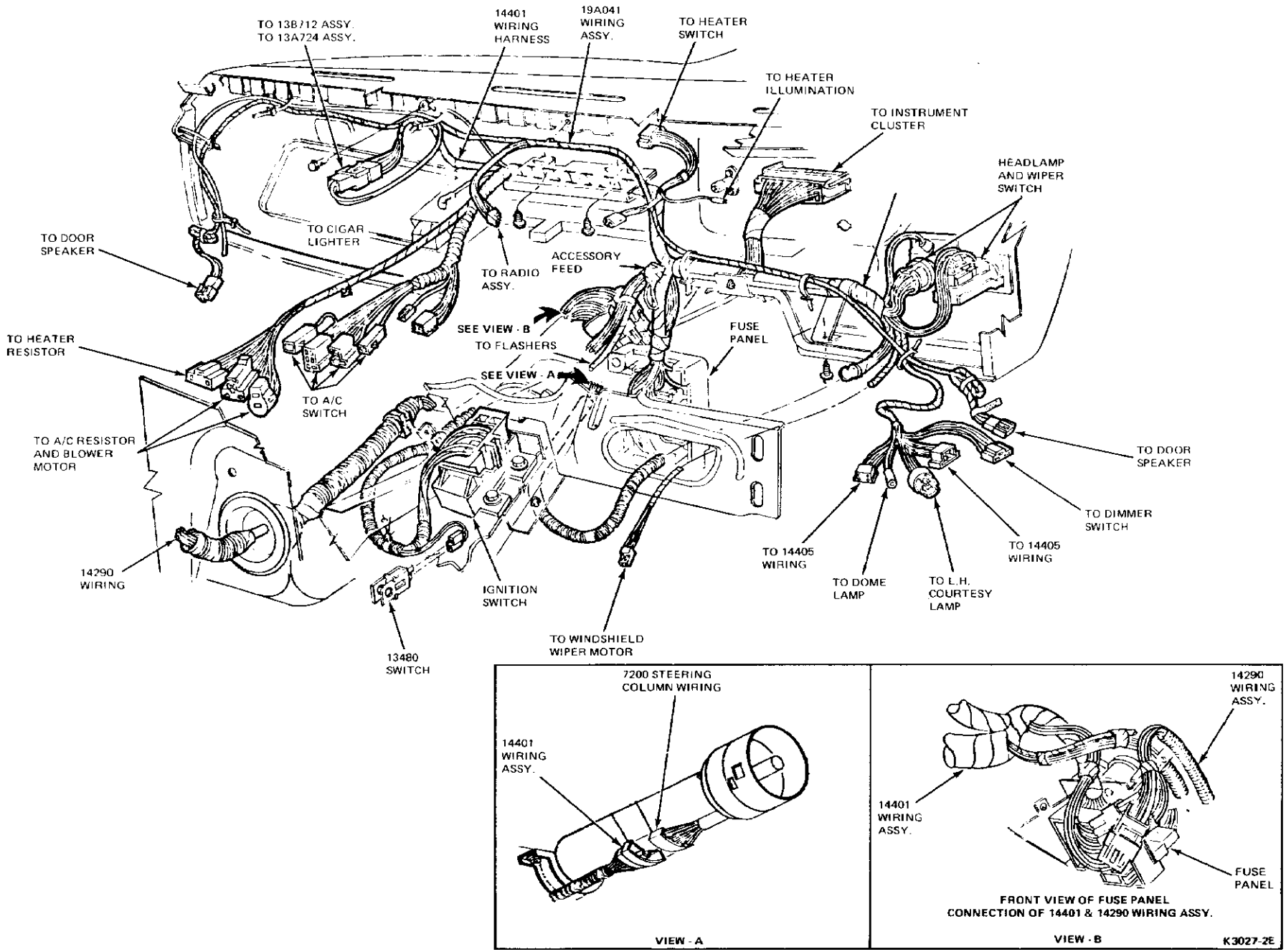


FIG. 6 Pinto and Bobcat Instrument Panel and 14401 Wire Harness

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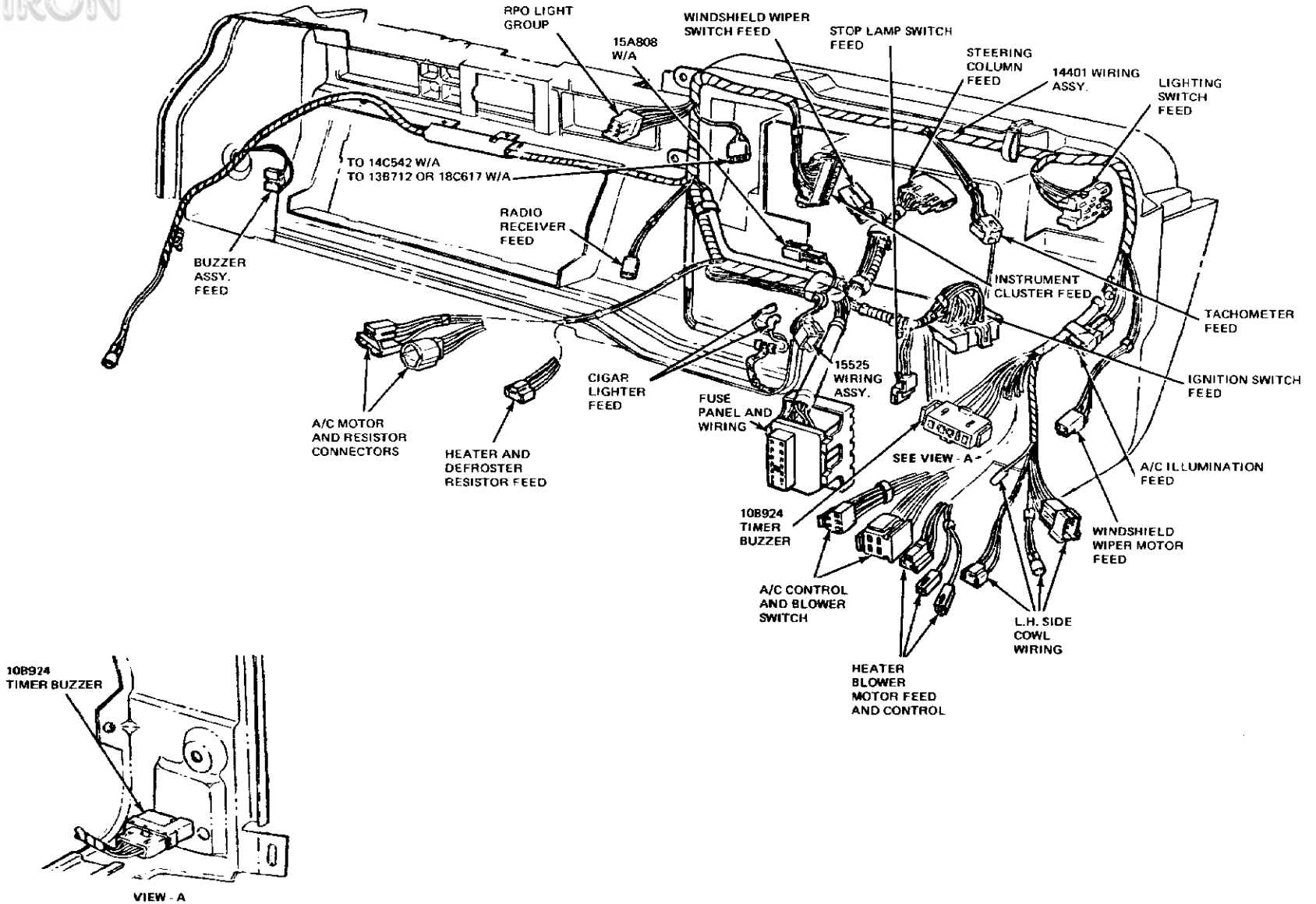


FIG. 7 Instrument Panel and 14401 Wire Harness—Mustang II

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the single wire connector to the dome lamp. Disengage the illumination bulb from the instrument cluster and the windshield wiper switch.

6. Disengage the harness and integral shield from under the left side of the instrument panel.
7. Remove the fuse panel-to-multiple connector retaining screw, disconnect the panel from the connector, and remove the harness from the vehicle.

Installation

1. Position and route the harness behind the instrument panel.
2. Engage the harness and integral shield at the left end of the instrument panel.
3. At the left end of the instrument panel, connect the harness multiple plugs to their matching plugs whose wiring goes to the left courtesy lamp, the taillamp, the dimmer switch, the windshield wiper motor, the steering column, heated backlamp relay, left seat belt retractor, and the ignition switch. Connect the harness multiple connectors that plug directly to the headlamp switch, the windshield wiper switch and the instrument cluster. Connect the single wire connector to the dome lamp. Engage the illumination bulb in the instrument cluster.
4. Plug the fuse panel (at the end of the harness) into the multiple connector at the brake pedal support, and install the panel-to-connector retaining bolt.
5. Proceeding from left to right, install the harness removable shield (2 screws), and connect the harness wires to the A/C resistor, A/C switch illumination bulb, heated backlamp switch, and radio or defogger.
6. Engage the right half of the harness to the two retaining clips.
7. At the right side of the instrument panel, connect the harness single wire connectors to the clock illumination bulb and the cigar lighter. Connect the harness plugs to the seat belt buzzer and indicator lamp.
8. At the right end of the instrument panel, connect the harness multiple connectors to the hazard flasher, the ignition key buzzer, the turn signal flasher, the temperature switch, the optional seat belt warning system (if so equipped) and the right courtesy lamp connector. Connect the harness bullet connector to the right seat belt retractor wiring.

INSTRUMENT PANEL—

LTD II, Cougar, Monarch, Versailles, Granada, Thunderbird and Continental Mark V (Figs. 8 through 11)

To replace the harness, it will be necessary first to remove the entire instrument panel assembly from the vehicle and set it on a bench. Refer to Figs. 8 through 11 for component locations.

Removal

1. Disconnect the battery ground cable.
2. Remove the steering column trim cover (snaps off).
3. Remove the steering wheel (Group 13), the turn signal lever (Group 32) and the gear shift lever (Group 13) to provide clearance.
4. Remove the instrument cluster from the instrument panel (Group 33).
5. Remove the left and right cowl side kick pads.
6. Disconnect the three harness plugs (1 to the ignition switch, 1 to the backup lamp switch wiring and 1 to the turn signal switch wiring) at the brake pedal support.
7. Remove the parking brake release handle from the lower edge of the instrument panel (2 screws).
8. Remove the wiring harness shield (3 clips and 3 screws).
9. Disconnect the harness plugs at the floor pan below the brake pedal.
10. Disconnect the lead to the parking brake indicator lamp switch, if so equipped.
11. Disconnect the multiple plug from the dimmer switch.
12. Disconnect the turn signal and hazard flashers from the wire harness on Continental Mark V.
13. The fuse and circuit breaker panel, which is a part of the instrument main (14401) wiring harness assembly, is mounted on the instrument panel (Part 34-30). The illustration shows the fuse—C.B. panel and connector assembly without the individual 14401 harness wires attached. To remove the assembly from the dash panel, remove the retaining screw from each of the harness connector plugs in the engine compartment at the left side of dash panel. Pull the harness plugs out of the fuse—C.B. Connector Assembly. Depress the four tabs that hold the connector assembly to the dash panel, and push the connector together with the fuse—C.B. panel into the passenger compartment. There is no bulk-head connector on Granada and Monarch (See Fig. 10).

    On Continental Mark V, a branch of the harness goes through a grommet in the dash panel to the engine compartment. In the engine compartment, disconnect the two harness plugs to the windshield wiper motor, the plug to brake indicator lamp switch, and the plug to the electric spark control sensor, if so equipped. Pull this portion of the harness through the grommet into the passenger compartment.
14. Disconnect the vacuum harness connector plugs and the temperature control cable from the heater or manual A/C—heater control head (does not apply if equipped with ATC).
15. Disconnect the vacuum hose (with yellow stripe) from the panel-defrost door vacuum motor located in the center air distribution duct.
16. Disengage the right courtesy lamp (jamb) switch from the right A pillar, and pull the switch and wiring free of the pillar (LTD II, Cougar and Thunderbird only).
17. Remove the instrument panel-to-cowl right brace screw at the top of the instrument panel (LTD II, Cougar and Thunderbird only).

    On Continental Mark V, a brace runs between the steering column support and the lower edge of the instrument panel. Remove the brace attaching screw at the steering column support.

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18. Remove the instrument panel-to-cowl center brace nut (screws on Continental Mark V) at the cowl.
19. Remove the instrument panel upper left and right retaining nuts, and the lower left and right end retaining screws.
20. Remove the instrument panel assembly from the vehicle and place it on a bench face down. Besides the 14401 wiring harness, the following items are still attached to the panel: the glove box, radio, radio speaker (LTD II, Cougar and Thunderbird only), heater or heater—A/C or ATC control, fuse-circuit breaker panel, and upper air ducts.

Installation

1. Install the instrument panel to the dash so that the dash upper left and right studs enter their respective upper left and right stud holes in the instrument panel flanges. Install the retaining nuts on the studs, but do not tighten.
2. On LTD II, Cougar and Thunderbird, position the center brace, so that hole in the brace fits over the stud at the center of the cowl. Install the brace retaining nut on the stud, but do not tighten.

   On Continental Mark V, position the center brace, so that the hole in the brace is aligned with the screw hole at the center of the cowl. Install the brace retaining screw, but do not tighten.
3. Install the lower left and right instrument panel-to-side cowl screws, but do not tighten them.
4. On LTD II, Cougar and Thunderbird, attach the instrument panel-to-cowl right brace to the top of the instrument panel with one screw. Do not tighten the screw.

   On Continental Mark V, attach the instrument panel lower flange support brace to the steering column support (1 screw). Do not tighten.
5. Adjust the instrument panel assembly so that the center air distribution duct in the panel seats firmly over the rectangular opening in the plenum chamber of the heater or A/C assembly.
6. After adjusting the instrument panel properly in place, tighten the screws and stud nuts as follows: instrument panel lower left and right retaining screws to 12-20 ft-lbs; instrument panel upper left and right retaining nuts to 7-11 ft-lbs; panel to cowl center brace nut at the cowl to 7-11 ft-lbs, and panel to cowl right brace screw at the top of the instrument panel to 8-18 in-lbs. Tighten the brace screws snug on Continental Mark V.
7. Secure the radio speaker to the cowl with two screws (LTD II, Cougar and Thunderbird only).
8. Engage the right courtesy lamp (jamb) switch in the right A pillar (LTD II, Cougar, and Thunderbird only).
9. Connect the harness plug to the blower motor resistor, and connect the power leads at the motor.
10. Connect the vacuum hose (with yellow stripe) to the panel-defrost door vacuum motor located in the center air distribution duct.
11. Connect the vacuum harness connector plugs and the temperature control cable to the heater or heater—A/C control head. (Does not apply if equipped with ATC.)
12. Push the fuse-C.B. panel and connector assembly into the cut-outs in the dash panel until the four connector-to-dash tabs lock it in place (Part 34-30, Fig. 13).
13. From the engine side of the dash panel, connect the plugs from two other wiring harnesses to the retainer connector assembly. Install the plug retaining screws and torque to 18-28 in-lbs.
14. On Continental Mark V, push the branch of the harness that goes into the engine compartment through the grommet in the dash panel. In the engine compartment, connect the two harness plugs to windshield wiper motor, the plug to the brake indicator lamp switch, and the plug to the electric spark control, if so equipped.
15. Connect the wire harness to the turn signal and hazard flashers (Continental Mark V).
16. Connect the harness multiple plug to the dimmer switch.
17. Connect the lead to the parking brake indicator lamp switch, if so equipped.
18. At the floor pan below the brake pedal, connect the two multiple and three single connector plugs to the harness. Then install the shield over the harness and secure it to the floor pan (3 clips and 3 screws).
19. Install the parking brake release handle to the lower edge of the instrument panel (2 screws).
20. At the steering column, connect the four harness plugs (2 to the ignition switch, 1 to the back-up switch wiring, and 1 to the turn signal switch wiring).
21. Install the left and right cowl side kick pads.
22. Install the instrument cluster in the instrument panel (Group 33).
23. Install the instrument panel pad (Group 45).
24. Install the gear shift lever, the turn signal lever (Group 32), and the steering wheel (Group 13).
25. Install the steering column trim cover, and connect the battery ground cable.

WIRING HARNESS—

LTD II, COUGAR, THUNDERBIRD, GRANADA, MONARCH AND VERSAILLES (FIGS. 8, 10 AND 11)

Removal

1. Remove the instrument panel from the vehicle, as outlined in the foregoing procedure.
2. With the instrument panel on the bench face down, disconnect the wire from the left courtesy lamp.
3. Remove the philips head screws from the five harness shield retainers at the lower lip of the instrument panel.
4. Cut the two plastic straps that retain the harness to other wires.
5. Disconnect three harness connectors (4 if equipped with heated backlamp) from the heater or heater A/C control.
6. Remove the harness left shield from the instrument panel.

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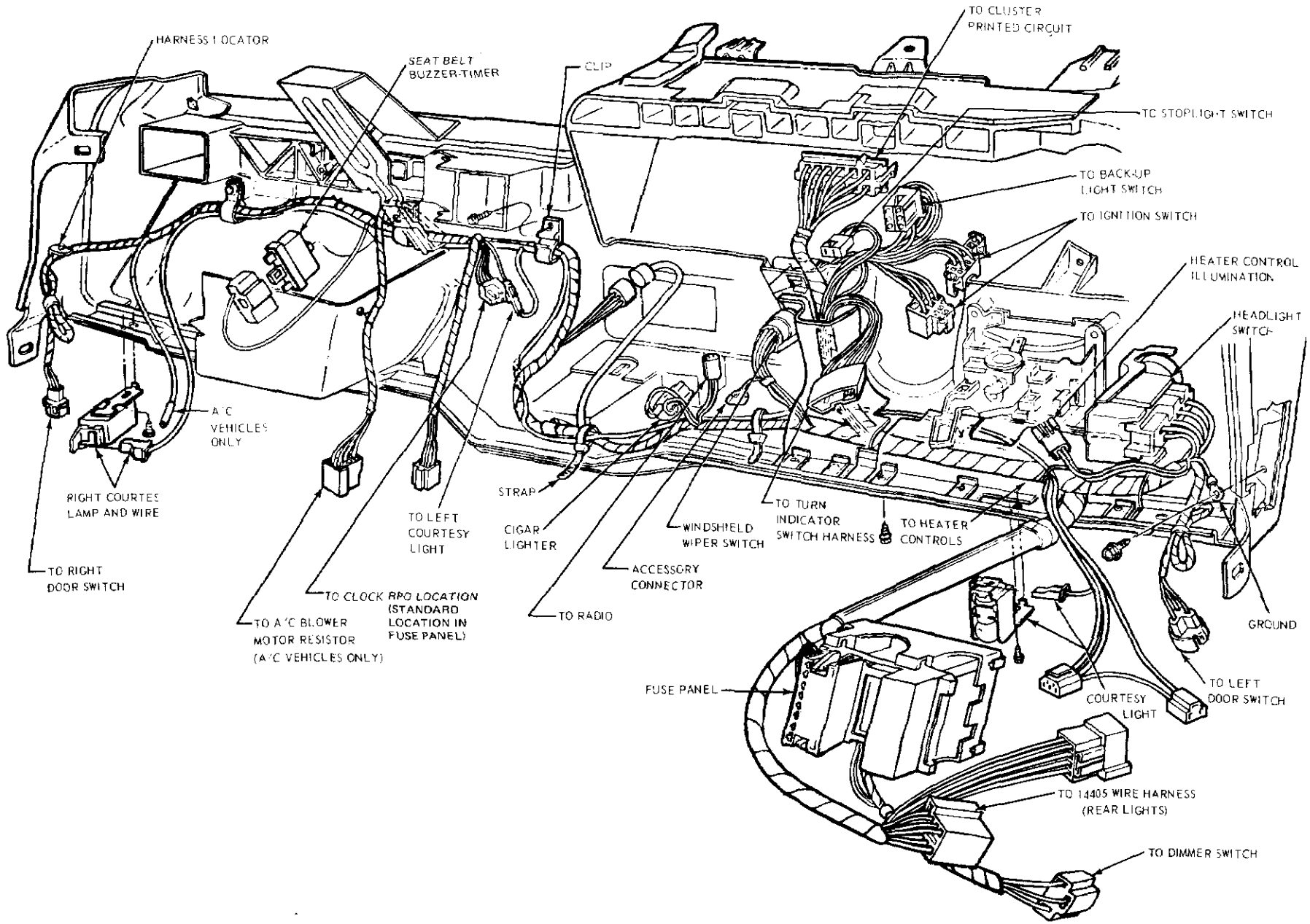


FIG. 8 LTD II, Cougar and Thunderbird Instrument Panel and 14401 Wire Harness

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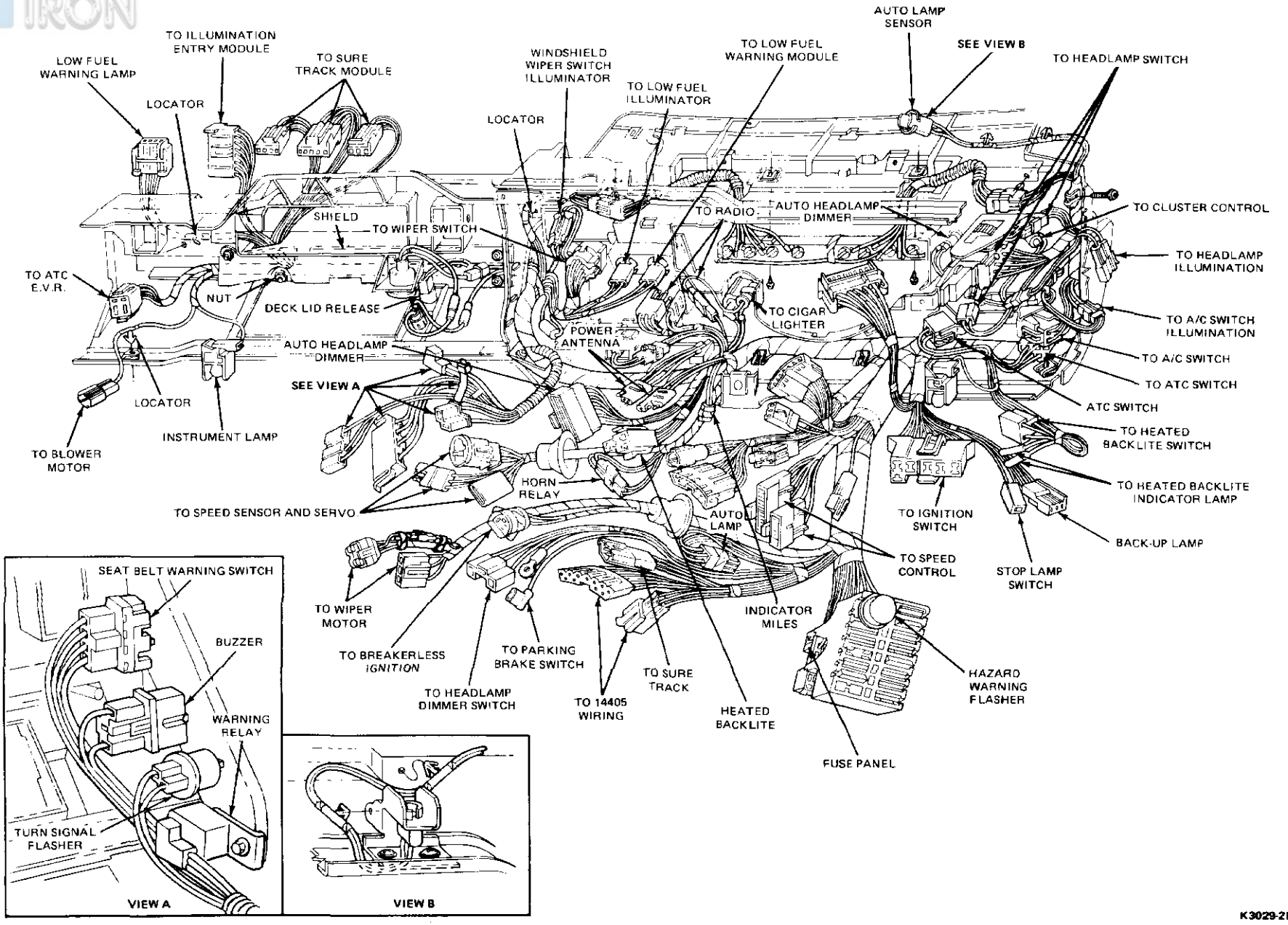


FIG. 9 Instrument Panel and 14401 Wire Harness—Continental Mark V

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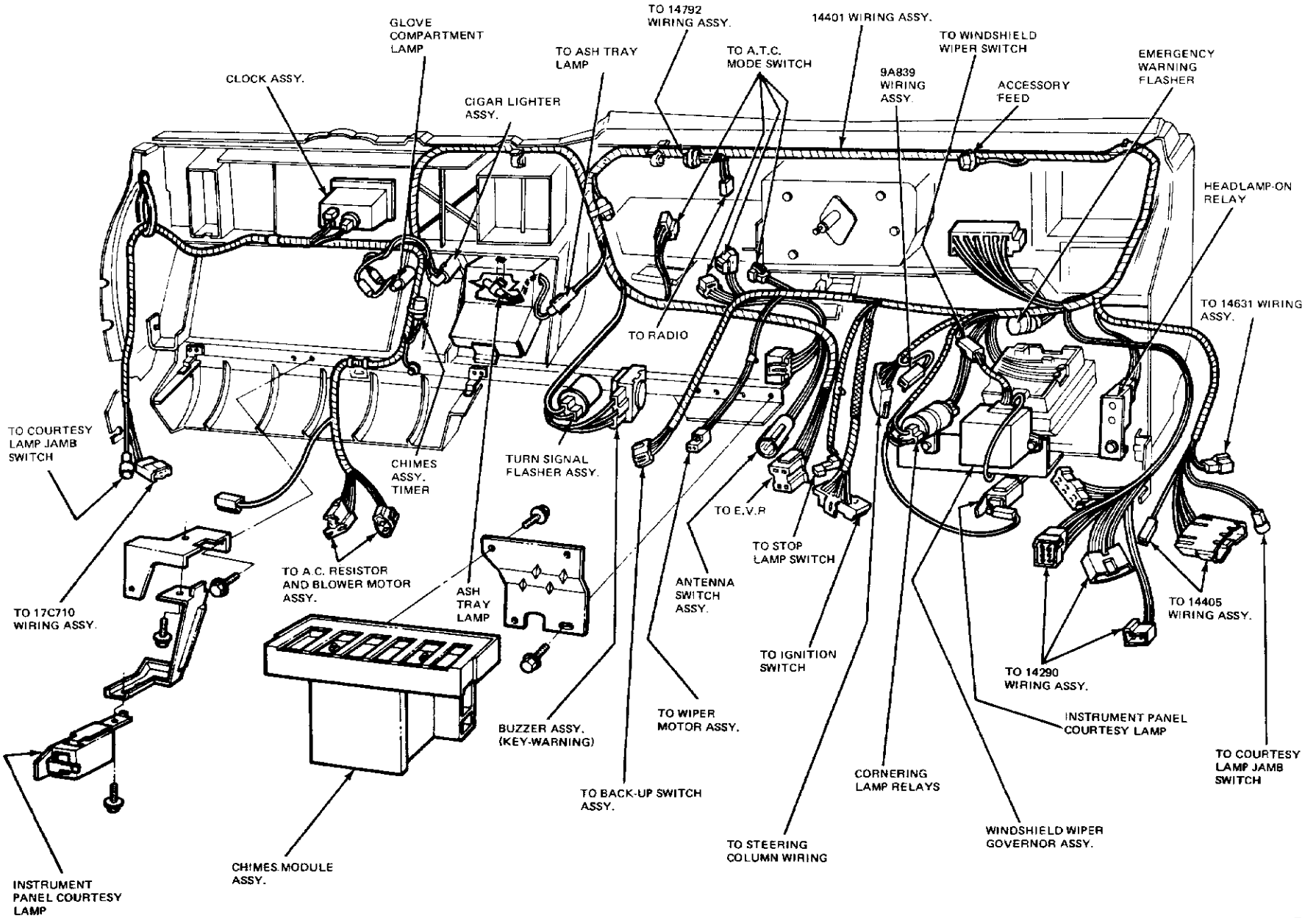
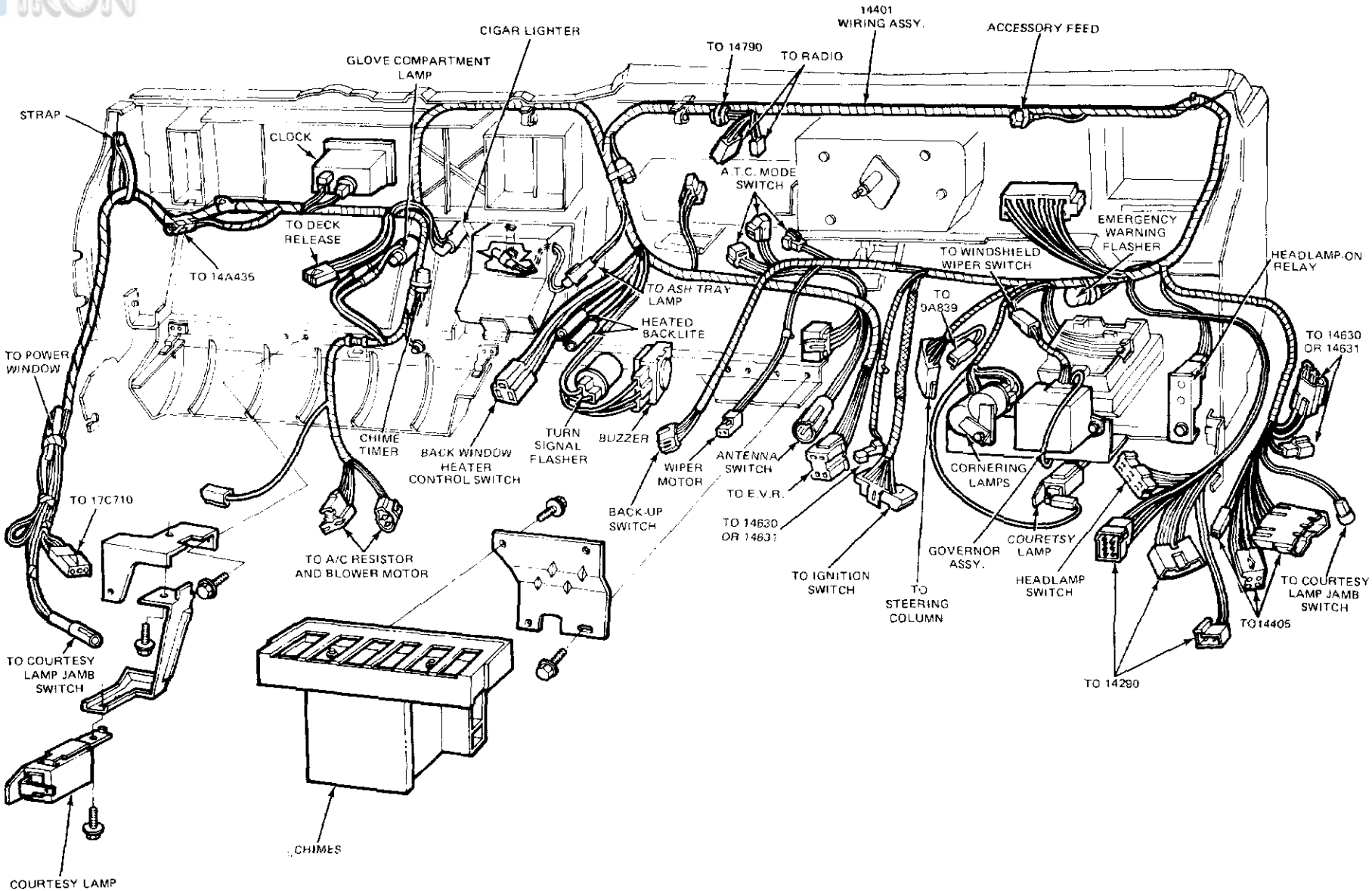


FIG. 10 Instrument Panel and 14401 Wire Harness—Granada and Monarch

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DETROIT IRON



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FIG. 11 *Instrument Panel and 14401 Wiring Harness—Versailles*

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7. Disconnect the harness multiple connector from the headlamp switch, and remove the ground wire screw near the switch.
8. Pull the harness out from the instrument panel as far as the right side of the steering column opening.
9. Disconnect the harness plug from the windshield wiper switch, and pull the harness out from under the right shield near the radio.
10. Remove the radio rear support bracket (2 nuts), squeeze the harness plastic locators, and remove the harness from the support bracket.
11. Disconnect the power and ground leads from the cigar lighter and the harness leads from the radio and speaker.
12. Disconnect the ash tray illumination bulb connector plug and the glove box lamp wire. Disconnect the harness plug and seat belt buzzer.
13. Squeeze the harness plastic locator and remove the right end of the harness (with plug to courtesy lamp switch) from the right end of the instrument panel. Disconnect the single wire connector from the right courtesy lamp (R.P.O.).
14. Disconnect any other harness leads as required by optional equipment.
15. Remove the retaining screws from the three clips that hold the harness to the instrument panel across the top of the glove box.
16. Squeeze the harness plastic locator, and disengage it from the instrument panel and the center of the glove box.
17. Pull the harness out from the center of the instrument panel.

Installation

1. Transfer the two flashers to the fuse and circuit breaker panel on the replacement 14401 wiring harness.
2. Position the right end of the new harness along the right side of the instrument panel, and push the harness plastic locators into the instrument panel over the center of the glove box and at the right end of the panel.
3. Secure the three harness retaining clips to the panel across the top of the glove box (3 screws).
4. Connect the single wire connector to the right courtesy lamp (part of 14A313 wiring assembly).
5. Connect the glove box lamp wire and the harness plugs to the ash tray illumination bulb and seat belt buzzer.
6. Connect the harness leads to the radio, speaker, and cigar lighter (power and ground).
7. Push the harness plastic locator into the radio support bracket and install the bracket (2 nuts).
8. Position the harness under the right plastic shield to the right of the steering column opening, and connect the harness plug to the windshield wiper switch.
9. Continue laying the harness along the left lower edge of the instrument panel.
10. Connect the harness multiple connector to the headlamp switch and the ground wire to the panel near the headlamp switch (1 screw).
11. Install the plastic shield over the left side of the harness. Fasten the plastic shields to the lower edge of the instrument panel with five retaining clips and screws (2 for right shield, 3 for left shield).
12. Connect the three harness connectors (4 if equipped with heated rear window or defogger) to the heater or heater—A/C control.
13. Fasten the center of the harness to other wires with two plastic straps.
14. Connect the harness plug to the left courtesy lamp, and attach the lamp assembly to the left lower edge of the instrument panel (1 screw).
15. Connect any other harness leads as required by optional equipment.
16. Install the instrument panel in the vehicle, as outlined in the foregoing procedure.

WIRING HARNESS—

CONTINENTAL MARK V (FIG. 9)

Removal

1. Remove the instrument panel from the vehicle as outlined in this section.
2. With the instrument panel face down, disconnect the lead to the right courtesy lamp and the sure track brake plugs at the right end of the harness. Disconnect the harness plug to the low fuel indicator switch and the plugs to the timer, if so equipped, and deck lid release switch.
3. Disconnect the bullet connectors to the glove box lamp.
4. Remove the harness right shield at the top of the glove box (2 nuts and 2 screws).
5. Remove turn signal flasher, seat belt buzzer and key buzzer from center shield cancelled instrument panel brace.
6. Disconnect the harness plugs to the cigar lighter, and the windshield wiper switch.
7. Disconnect the two plugs to the radio, the plug to the power antenna, and the plug to the ash tray lamp.
8. Disconnect the harness plugs at the headlamp switch and to the switch illumination bulb and to the automatic headlamp dimmer, if so equipped.
9. Disconnect hardshell connectors from A/C or ATC control switch.
10. Disconnect the harness lead from the left courtesy lamp.
11. Disconnect any other harness leads that may be connecting the harness to the instrument panel for optional equipment.
12. Disengage the harness center horizontal shield from along the lower edge of the instrument panel.
13. Disengage the harness L shaped shield from the left lower side and from the left end of the instrument panel. The harness can now be lifted out of the panel.

Installation

1. Transfer the buzzer and all the fuses and circuit breakers to the fuse—circuit breaker panel on the new 14401 wiring harness assembly.

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2. Position the harness in the instrument panel so as to engage the L shaped harness shield into the left end and lower side of the panel.
3. Engage the center horizontal shield to the panel along its lower edge. Then, route the shorter branch of the harness upward, and route the longer branch over the top of the glove box to the right end of the panel.
4. Connect the harness lead to the left courtesy lamp.
5. On all Continental Mark V and on Thunderbirds equipped with ATC, connect the harness plugs (four, if equipped with heated rear window) to the ATC control head.
6. Connect the harness plugs to the headlamp switch, the switch illumination bulb, and the automatic headlamp dimmer, if so equipped.
7. Connect the two harness plugs to the radio, the plug to the power antenna, and the plug to the ash tray lamp.
8. Connect the harness plugs to the in-car sensor, the cigar lighter and the windshield wiper switch.
9. Position the vertical shield over the harness at the center of the instrument panel and secure it with three screws.
10. Install the relay panel (attached to the harness) to the instrument panel (2 screws).
11. Position the right shield over the harness along the top of the glove box. Install two retaining nuts at the right side of the shield and two retaining screws at the left end.
12. Connect the harness bullet connectors to the glove box lamp and the seat belt indicator lamp.
13. Connect the leads at the right end of the harness: two plugs to ATC box, if so equipped; plug to low fuel indicator switch; two plugs to suretrack brake circuit, and the lead to the right courtesy lamp.
14. Connect any other harness leads as required by optional equipment.
15. Install the instrument panel in the vehicle as outlined in this section.

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Dash-to-Headlamp Junction Wiring Harness

PART 34-10

Applies to All Models

SUBJECT	PAGE
REMOVAL AND INSTALLATION	
Ford and Mercury	10-1
Granada, Monarch, Fairmont, Zephyr, Versailles	10-1
Lincoln Continental	10-4
REMOVAL AND INSTALLATION (Cont'd.)	
LTD II, Cougar and Thunderbird	10-3
Pinto, Bobcat, Mustang II	10-2
Continental Mark V	10-3

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REMOVAL AND INSTALLATION

FORD AND MERCURY

Removal

Disconnect the ground cable from the battery. From under the hood, remove the bolt that attaches the wire harness connector to the fuse panel at the dash panel, and unplug the connector from the fuse panel.

Disconnect the windshield washer hose from the left jet. Remove two hose locators at the cowl top and disengage the harness locators along the left fender apron. Disconnect connector plugs for cornering lamps and anti-theft circuits (if so equipped).

Disconnect the lead wires at the horns and washer pump. Disconnect electrical connector from compressor clutch and straps from tubing on A/C and ATC equipped vehicles. Fabricate a stopper plug for the windshield washer reservoir, remove the reservoir from the left fender apron (2 mounting screws), disconnect the hose from the reservoir and install the plug.

Disconnect the lamp socket(s) lead wire going to the left parking light. Disconnect the connector to the left *cornering light, if so equipped.*

Unplug the harness from behind the headlight sealed beam bulbs and withdraw the harness out through the radiator left support. Then, remove the harness ground screw near the left side of the radiator.

After disconnecting the harness from the headlights on the right side, pull the harness back through the radiator right support. Remove the ground wire (one screw), and disengage the harness locating clips from *the radiator support. Disconnect the* lamp socket(s) to *the right parking light and to the right cornering light* (if so equipped).

Disconnect the wire lead to the air conditioner evaporator thermostat, if equipped with A/C.

FAIRMONT, ZEPHYR, GRANADA, MONARCH AND VERSAILLES

Removal

1. Disconnect wire from parking brake warning switch. Remove wiring from large clip under instrument panel.
2. *Disengage grommet from dash panel.*
3. Working in the engine compartment, pull the 14290 harness through dash panel.
4. Disconnect washer hose at cowl and washer bottle. On the *left-hand fender apron, unplug connectors* from the dual brake warning switch, washer bottle, breakerless ignition module, horn and 14289 engine wire.
5. On the right-hand fender apron remove *connections from starter motor, voltage regulator,* and relay (Fig. 1). Unplug connector to 14305 alternator wiring and A/C fast idle solenoid jumper, if so equipped (Granada, Monarch and Versailles only).
6. At the front of car, remove both headlamps, unplug headlamp connectors, parking lamp and side marker lamp sockets. Remove ground screws from both sides of radiator support. Disconnect ambient temperature switch on *radiator support. Loosen the* two radiator-to-support upper bolts to provide clearance for removing the harness (Granada, Monarch and Versailles only).
7. On Fairmont and Zephyr, loosen radiator *attachment bolts and raise radiator approximately* 1.5 inches to provide clearance under radiator to remove the harness.
8. Remove wiring harness by starting at right-hand fender apron, working *across the radiator support* then along left-hand fender apron. Retain loose clips along the bottom of Fairmont and Zephyr radiator support and on right-hand fender apron to use with new wiring. All other retainers are part of new wiring harness.

Installation

1. Starting at the dash panel, route the wiring through hole in dash and seat grommet. Route wiring along left-hand fender apron using existing holes and locators on wiring assembly.

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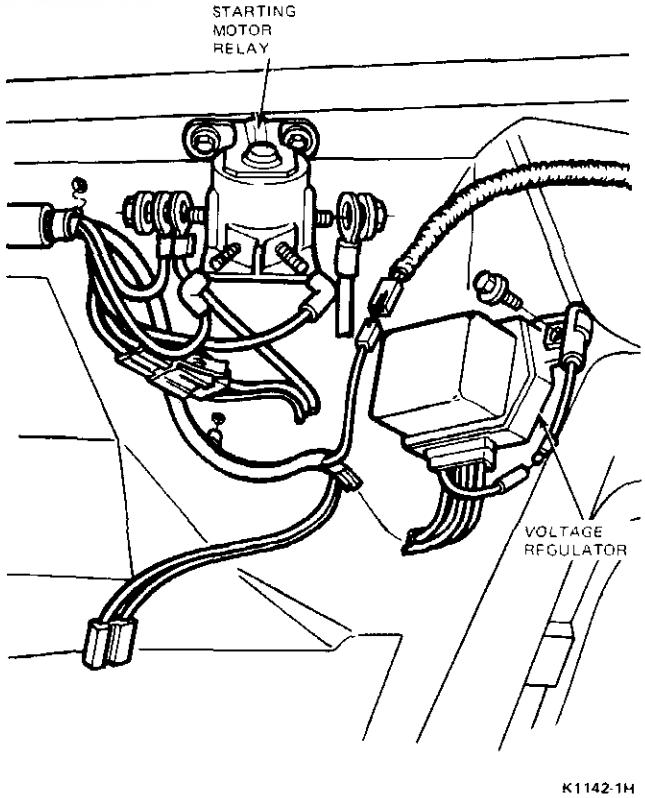


FIG. 1 Starting Motor Relay and Alternator Regulator Wiring Connections Fairmont, Zephyr, Granada, and Monarch

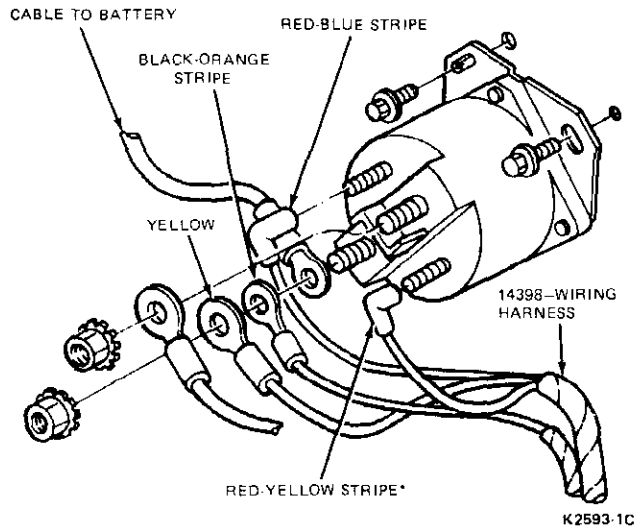


FIG. 2 Harness Connections at Alternate Starting Motor Relay—Lincoln Continental, Continental Mark V, Thunderbird, LTD II and Cougar

2. Route wiring along radiator support.
3. Route headlight connectors, parking lamp sockets and side marker lamp sockets through holes in radiator support. Install sockets to lamps. Plug connectors onto headlamps and install headlamps. Attach ground terminals. Connect ambient temperature sensor.
4. Route wiring along right-hand fender apron. Make connections to voltage regulator, starter motor relay and 14305 alternator wiring. Retain wiring with existing straps.
5. Tighten radiator-to-support bolts (Granada, Monarch and Versailles). Install and secure radiator mounting bolts (Fairmont and Zephyr).
6. On left-hand fender apron make connections to horn, washer bottle, breakerless ignition module, 14289 engine wiring and dual brake warning switch. *Connect washer hose.*
7. Under instrument panel, connect 14290 wiring to 14401 wiring. Install 14290 in clip. Route wire to headlamp dimmer switch and parking brake warning switch.
8. Connect battery ground cable.
9. Check all electrical components for operation.

PINTO, BOBCAT AND MUSTANG II

Removal

1. Disconnect the battery ground cable.
2. For Mustang II, the 14401-A (instrument panel-to-dash) wiring harness terminates at the dash in a disconnect panel. The 14290-A harness (dash-to-headlight junction) terminates in a multiple connector that plugs into the forward side of the dash panel disconnect. Pinto and Bobcat utilize a grommet installation at the 14290 dash panel and connects to the 14401 wiring harness with two multiple connectors inside vehicle. Loosen the bolt that retains the multiple plug to the dash panel disconnect, disengage the dash panel connector for Mustang II only.
3. Disconnect the hoses from the windshield washer jets. Disconnect the harness connectors from the breakerless ignition module, dual brake warning switch, carburetor solenoid, and the oil and water temperature sending unit (2.3 Litre engine).
4. Disconnect the hoses from the windshield washer reservoir and the harness wires from ignition coil and vacuum valve (2.3 and 2.8 Litre engine), and windshield washer pump on all engines, disconnect the alternator wires at the multiple connector.
5. Disconnect the harness connectors from the alternator regulator and horn. Remove the ground wire screw.
6. *Disconnect the harness wires from the starter relay.* Make a note of the terminals to which the wires are connected, so that the new harness will be properly connected.
7. Remove both headlight doors (2 screws each) and disconnect the headlight bulbs from the harness.
8. Disengage both parking light and both side marker light bulb sockets and remove all four bulbs from the sockets. For Pinto and Bobcat, disconnect park lamp wiring assembly (13234).
9. Remove the ground wire attaching screws on radiator support.
10. Remove the battery-to-apron hold down bolt, so that the harness can be removed.
11. Starting at the right fender apron, disengage the harness locators and move the harness back to the center of the dash panel.

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12. Disengage locators at the left fender apron and remove the harness from the vehicle.

Installation

1. Position and route the harness, engage all the locators.
2. Install the left-hand parking and side marker light bulb in their sockets and engage the sockets in their proper receptacles.
3. Connect the alternator regulator ground wire, and connect the harness connector to the alternator regulator.
4. Connect the harness wires to the starter relay.
5. Position the battery hold-down and install the retaining bolt in the fender apron.
6. Connect the harness wires to the temperature sending unit (2.3 Litre engine), oil pressure sending unit (2.3 Litre engine), dual brake warning switch, vacuum valve and the carburetor solenoid. Connect the hoses to the windshield washer jets.
7. Connect the harness wires to the ignition coil (2.3 and 2.8 Litre engines) and windshield washer pump motor. Connect the hose to the washer reservoir.
8. Connect multiple connector to alternator wiring assembly.
9. Install the right-hand parking and side marker light bulb in their sockets, and engage the sockets in their proper receptacles. For Pinto and Bobcat, connect park lamp wiring assembly (13234) to engine compartment main loom (14290).
10. Connect the harness wire to the horn and connect the ground wires.
11. Connect and install the two headlight bulbs, and install the two headlight doors (2 screws each).
12. For Mustang II, engage the harness multiple connector to the dash panel disconnect and tighten the connector retaining bolt. For Pinto and Bobcat install grommet in dash panel and connect 14290 multiple connectors to the 14401 main loom.
13. Connect the battery ground cable.
14. Make sure all electrical units operate properly.

LTD II, THUNDERBIRD AND COUGAR

Removal and Installation

1. Disconnect the battery ground cable.
2. In the engine compartment, at the left side of the dash panel, remove the retaining screw from the (inboard) harness connector plug and pull the plug from the fuse-circuit breaker panel connector.
3. Disconnect the windshield washer hose from the jet at the underside of the hood.
4. Pull the four harness fasteners (Fig. 2) from along the left fender apron, one from the front fender top front reinforcement, three fasteners from the left end of the side radiator support.
5. Fabricate a stopper plug for the windshield washer reservoir, disconnect the hose from the reservoir, and install the plug.
6. Disconnect the harness lead plugs from the washer pump motor, and the two horns. Disconnect the ground wire from the left side (front surface) of the radiator support.
7. Remove the left parking lamp assembly attaching screws and pull the wiring forward. Then, disengage the left side marker socket and bulb. Remove park lamp socket and bulb from the lamp body.
8. Disconnect the headlight plugs. Disconnect the connector for the wire leads to the ambient temperature switch on the hood latch support. Remove the locator clips from the upper radiator support and hood latch support.
9. Remove the right parking lamp attaching screws and pull wiring forward. Then disengage the park lamp and side marker socket and bulb assemblies from the lamp body.
10. Disconnect the ground wire from the right side of the radiator support.
11. Pull three harness fasteners from across the rear surface of the upper radiator support center and four fasteners from the right side of the radiator support. Disconnect ambient switch connector (front center radiator).
12. Starting at the right side of the radiator support, pull the harness to the left side and lift it out of the vehicle.
13. Before installing the replacement harness, transfer the side marker light bulbs to new harness.
14. Make sure all electrical units operate properly.

CONTINENTAL MARK V

NOTE: Starter relay (Fig. 2) on Continental Mark V is attached to the right front fender apron. Because the apron is plastic, a ground wire is required to complete the relay control circuit. Inspect for loose relay attaching nuts and for loose ground wire connection. Inspect for damage and replace if necessary.

Removal and Installation

1. Disconnect the battery ground cable.
2. In the engine compartment at the dash panel, remove the retaining screw from the (inboard) harness connector, and pull the connector from the fuse-circuit breaker panel connector.
3. Disconnect the windshield washer hose from the left jet at the underside of the hood.
4. Pull out four harness fasteners from along the left fender apron and one fastener from the forward end of the left frame side rail.
5. Disconnect the harness lead to the A/C compressor clutch (if so equipped).
6. Fabricate a stopper plug for the windshield washer reservoir, disconnect the hose from the reservoir, and install the plug. Disconnect the harness lead connector from the washer pump motor.
7. Disconnect the six harness connectors from the leads going to the side marker, cornering and parking lights left and right. These connections are accessible from underneath the vehicle.
8. Disconnect the ground wires (1 screw each) from the left and right ends, front side of the radiator support.
9. Disconnect the harness connectors from the horns. There are two horns mounted on the right headlight splash shield.

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10. Disconnect the harness plugs from the four headlights. It will be necessary to remove the plastic covers (right and left sides) between the grille and radiator support for access (4 screws each).
11. Remove the radiator plastic shield from the center of the radiator support (4 retaining screws).
12. Remove the five fasteners that hold the harness along the radiator support.
13. Starting at the right side of the radiator support, pull the harness from right to left across the radiator support and lift it out of the vehicle.
14. Route the new harness from the right side of the radiator support across the front and then along the fender apron to the fuse CB panel connector at the dash panel.
15. Connect the harness at the same points from which it was disconnected in the foregoing steps.
16. Make sure all electrical units operate properly.

LINCOLN CONTINENTAL

NOTE: Starter relay (Fig. 2) on Lincoln Continental is attached to the right front fender apron. Because the apron is plastic, a ground wire is required to complete the relay control circuit. Inspect for loose relay attaching nuts and for loose ground wire connection. Inspect for damage and replace if necessary.

Removal and Installation.

1. Remove sight shield and disconnect the battery ground cable.
2. In the engine compartment at the left side of the dash panel, remove the retaining screw from the (upper) harness connector and pull the connector from the fuse-circuit breaker panel connector.
3. Disconnect the harness plugs from the windshield washer pump motor and from the A/C compressor clutch and locator from left-hand fender apron.
4. Remove grommet from left-hand fender apron and locator from left-hand cornering lamp body. Disconnect the harness connector to the left side marker cornering lights, left parking light-wire and left headlight were connector. Disconnect the harness ground wire from the left end of the radiator support (1 screw).
5. Raise the front end of the vehicle. From underneath right center, reach up and disconnect the harness plugs from the two horns and from the ATC thermostatic (outside temperature) switch connector.
6. Remove grommet from right-hand fender apron and locator from right-hand cornering lamp body.
7. Lower the vehicle and disconnect the harness ground wire from the right end of the radiator support.
8. Disconnect the harness connector to the right side marker and cornering lights and the plug to the right parking light.
9. To gain access to the right-hand headlight connector plugs, it will be necessary to remove two right-hand headlight bulbs (Refer to Part 32-02). Disconnect the harness plugs from the headlights.
10. Disengage the harness fasteners from across the top of the radiator support.
11. Pull the rear end of the harness (with main connector plug) forward and out between the left fender and fender apron. The entire harness can now be lifted out of the vehicle.
12. Thread the rear end of the replacement harness (with main plug) from the front of the vehicle back through the space between the left fender and fender apron to the dash panel.
13. Connect the harness at the same points from which it was disconnected in the foregoing steps.
14. Make sure all electrical units operate properly.

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Dash Panel-to-Engine Wiring Harness

PART 34-20

Applies to Models as Indicated

SUBJECT	PAGE	SUBJECT	PAGE
REMOVAL AND INSTALLATION		REMOVAL AND INSTALLATION (Cont'd.)	
Granada, Monarch and Versailles	20-3	LTD II, Cougar and Thunderbird	20-1
Lincoln Continental	20-2	Continental Mark V	20-1

CK3391-2B

REMOVAL AND INSTALLATION

LTD II, COUGAR AND THUNDERBIRD

1. Disconnect the battery ground cable.
2. At the left side of the dash panel in the engine compartment, remove the retaining bolt from the left multiple connector that plugs into the fuse and circuit breaker panel. Pull the harness plug out of the fuse-circuit breaker panel connector.
3. Disconnect the harness connector from the windshield wiper motor wiring. Disconnect the harness hard shell connector for the dual brake warning switch. Disconnect the six terminal connector at rear of engine, left-hand side, for the Ammeter and Tachometer leads. (Optional Performance Cluster).
4. Disconnect the harness 10817 connectors that connect to the 14289 wiring harness to engine temperature and oil pressure sending units, ignition coil and emission wiring.
5. Unfasten harness 14398 from along the upper edge of the dash panel by disengaging four harness locator and sealer assemblies from the dash. If the vehicle is equipped with A/C, remove the straps if optional (R.P.O.) wiring assemblies are attached and routed with the 14398 wiring assembly.
6. Disengage two harness locators from the right fender apron, and pull the harness out of the vehicle up to the starting motor relay.
7. Position the forward end of the replacement harness near the relay. Disconnect the old harness lead, and connect the replacement harness lead at each of two starting motor relay terminals, one at a time. Disconnect the old harness and connect the new harness to the connector from the 14305 wiring harness (to regulator). Remove the old harness.
8. Route the new harness back over the right fender apron and across the dash panel, and fasten it in place with the six locators and straps, if required.
9. Connect the harness at all the points from which the old one was disconnected in the foregoing steps.

CONTINENTAL MARK V

Removal

1. Disconnect the battery and remove the air cleaner and ambient connector.
2. Disconnect 14305 connector on 400 CID with 40/60 amp alternator only. Disconnect 70/90 amp alternator from wiring assembly. If working on a Continental Mark V with a 460 CID of 400 CID engine, raise the vehicle on a hoist. Disconnect the harness leads at the alternator, noting the color code of each lead and its terminal for proper reconnection. Remove the alternator adjusting arm bolt, loosen the through bolt, and disengage the belts from the pulley. Swing the alternator upwards to provide clearance, so that the harness can be pulled out between the alternator and the engine (40-60 AMP. alternator only). Lower the vehicle, remove the harness retaining clip (1 bolt) from the front of the right cylinder head, and pull the harness up from the alternator.
3. At the left side of the dash panel in the engine compartment, remove the bolt from the left multiple connector into the fuse and circuit breaker panel. Pull the harness connector out of the fuse-circuit breaker panel. Disconnect connector to breakerless ignition module and distributor.
4. Disconnect the harness lead (bullet connector) to the engine compartment light. Disconnect the harness connector to the power antenna. Disconnect the harness connector at the engine oil pressure switch. Remove two locators from left-hand rocker cover.
5. Unfasten one harness locator from the dash panel and pull the harness out as far as the right side of the engine.
6. Unfasten the two harness locators from the locator plate holes at the front and rear of the right valve cover (460 CID) and 400 CID. Remove strap from ATC suction line at plenum.
7. Disconnect the harness connectors at the throttle solenoid, the ignition coil and the water temperature switch.
8. At the voltage regulator, disconnect the multiple and single connectors. Remove two shield grounds.
9. Unfasten the three harness locators from the right fender apron and work the harness out of the vehicle.

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DETROIT IRON

Installation

1. Position and route the complete harness by fastening the locators as follows: one locator in the engine right valve cover; one strap on ATC suction line at plenum; two locators along the top of the dash panel, and three locators at the right fender apron near the regulator. Connect two shield grounds.
2. Connect the multiple and single connectors to the voltage regulator.
3. On Continental Mark V 460 CID push the alternator branch of the harness down between the alternator and the engine (40-60 AMP alternator only) for later hookup when the car is on a hoist. Install the harness retaining clip (1 bolt) to the front of the right cylinder head, in the horizontal position; on a 400 CID connect 14305 connector 40/60 amp alternator and attach wiring assembly to ATC on 70/90 amp alternator.
4. Connect the harness connectors at the throttle solenoid, the ignition coil, the water temperature switch, breakerless ignition module and distributor.
5. Connect the harness connectors to the engine oil pressure switch, the power antenna and the bullet connector to the engine compartment lamp.
6. Plug the large multiple connector (on the rear end of the harness) into the fuse-circuit breaker panel connector at the left side of the dash panel. Install the plug retaining bolt.
7. On Continental Mark V 460 CID, raise the vehicle on a hoist. From underneath the vehicle, connect the harness leads to the alternator. Note that the routing of the alternator wire for the 40-60 amp and 70-90 amp alternator is different. Engage the belts to the pulley, swing the alternator into place, tighten the through-bolt and install the adjusting arm bolt. Lower the vehicle.
8. Connect the battery ground cable and install the air cleaner.
9. Check the operation of all electrical units.

LINCOLN CONTINENTAL

Removal

1. Disconnect the battery and remove the air cleaner.
2. Disconnect the harness from the starting motor relay; (1) eyelet (1 or 2); push-on terminals and (1) ground eyelet.
3. Disconnect the harness from voltage regulator; (1) four way connector, (1) single connector and (1) eyelet under regulator mounting screw.
4. Remove (4) harness locators from the right front fender apron.
5. Disconnect the harness from the alternator; (2) push-on terminals and (2) screw-on eyelet type.
6. Remove harness locator from the left-hand rocker cover on 400 CID engines.
7. Remove one harness locator from right-hand front outboard rocker cover mounting bolt clip and remove strap from attaching ATC suction line at evaporator case on 400 CID engine.
8. Separate connectors, electric choke (1 connector) and shielding ground (1 eyelet).
9. Separate 2-way connections to ambient sensor and blower motor; also multiple terminal connector to blower motor resistor and ground eyelet.
10. Separate single connections to the oil pressure switch and to heated backlamp wiring assembly (18C617), if so equipped.
11. Remove (1) locator and attaching screw from the cowl top outer panel and (2) locators from the left-hand rocker cover. Also remove (3) adjusting straps attaching harness to cowl top outer panel.
12. Disconnect 3-way connector to the distributor, 2-way connector to the ignition coil, 2-way connector to the water temperature switch and 1-way connector to the throttle solenoid.
13. Disconnect connector (1-way) to the 14401 wiring assembly.
14. Disconnect (3) multiple connectors to the A/C safety relays.
15. Disconnect the 4-way connector to the ignition module.
16. Loosen connector attaching bolt to bulkhead connector, disengage connector and remove harness from vehicle.

Installation

1. Loosely position the new wiring harness to the engine and install the two locators into the holes in the brackets on the right valve cover. Install the screw through the shielding ground eyelet and into the front bracket on 460 CID engines only.
2. Engage the bulkhead connector, install and tighten the retaining bolt.
3. Connect the multiple connectors (2) to the air conditioner safety relays.
4. Connect the 1-way connector to the instrument panel wiring harness (14401).
5. Connect the distributor, ignition coil, water temperature sender and throttle solenoid.
6. Install locator into hole in cowl top outer panel, install attaching screw and adjusting straps around harness.
7. Connect oil pressure switch and heated backlamp wiring assembly (if equipped).
8. Connect blower motor resistor and blower motor. Connect heater/AC ambient temperature switch and ground eyelet.
9. Connect electric choke assist at carburetor.
10. Connect push-on and screw-on connectors at alternator.
11. Position (4) locators into right front fender apron and connect voltage regulator (one 4-way connector, one single connector, and one eyelet under regulator mounting screw).
12. Connect the harness to the starter relay push-on terminals and install the eyelet harness ground under the top relay mounting screw. On Canadian vehicles, it may be necessary to connect the starter override switch, if equipped.
13. Connect the battery and install the air cleaner assembly.

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GRANADA, MONARCH AND VERSAILLES —CALIFORNIA ONLY

Removal and Installation

1. Disconnect the battery ground cable.
2. Disconnect connections to breakerless ignition module, distributor, and 14290 wiring on left fender apron.
3. Disconnect water temperature sender and oil pressure sender connections.
4. Disconnect oil jumper (12060) from 14289 at left side of distributor.
5. Disconnect carburetor crank solenoid and throttle positioner solenoid connections to 14289 if so equipped.
6. Remove wiring harness clip attachment at front of left valve cover.
7. Reverse procedure for installation.

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Fuses and Circuit Breakers

PART 34-30

Applies to All Models

SUBJECT	PAGE
GENERAL INFORMATION	
Location and Values of Fuses and Circuit Breakers	30-1
Warning Buzzer Locations	30-1
REMOVAL AND INSTALLATION	
Combined Fuses and Circuit Breaker Panel	30-7
Fuse Panel	30-7
Individual Fuses and Circuit Breakers	30-7
Wire Terminals	30-8

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GENERAL INFORMATION

WARNING BUZZER LOCATIONS

Key Warning Buzzer

The key warning buzzer location for the **Continental Mark V, Mustang II, Lincoln Continental, Fairmont and Zephyr** is on the right side and behind the instrument panel above the glove box. The **Lincoln Continental** key warning buzzer is on the left-hand end panel of the instrument panel. The location for **Ford and Mercury, LTD II, Thunderbird and Cougar** is located on the left side of the dash panel and mounted on the fuse panel. **Pinto and Bobcat** location is on the right steering column on forward side of fuse panel mounting bracket. On **Granada, Monarch and Versailles,** it's behind the instrument panel on the lower reinforcement center of the car.

Seat Belt Warning Buzzer

The seat belt warning buzzer on the **Lincoln Continental, Thunderbird, Continental Mark V, LTD II, Cougar, Fairmont, Zephyr, Bobcat and Pinto** is located on the right side, behind the instrument panel.

The **Ford and Mercury** buzzer is also behind the instrument panel, but on the left side. On Granada and Monarch vehicles, the buzzer is located behind the instrument panel on the lower reinforcement.

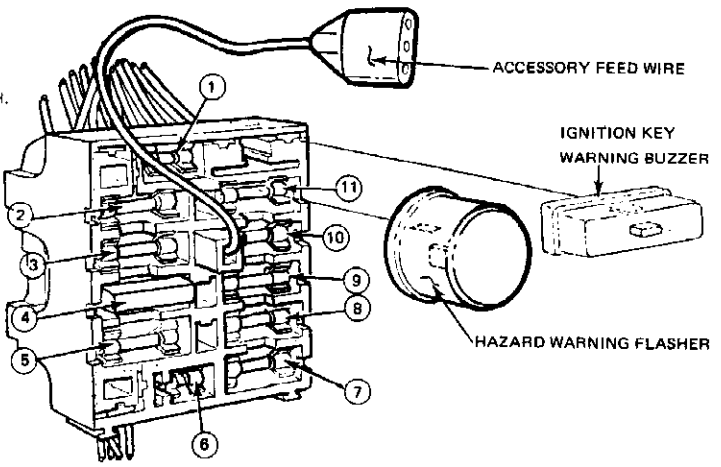
LOCATION AND VALUES OF FUSES AND CIRCUIT BREAKERS

The Pinto, Fairmont and Zephyr models have a fuse panel which contains most of the fuses used in the electrical system. LTD II, Cougar, Mustang II, Thunderbird, Continental Mark V, Ford, Mercury, and Lincoln Continental models have a combination fuse and circuit breaker panel which contains most of the fuses and circuit breakers used in the system. Figs. 1 through 8 show the fuse panels or combination panels for each vehicle line.

The locations and values of the fuses and circuit breakers not contained in the panels are given in the circuit protection charts for each vehicle line (Figs. 9 and 10).

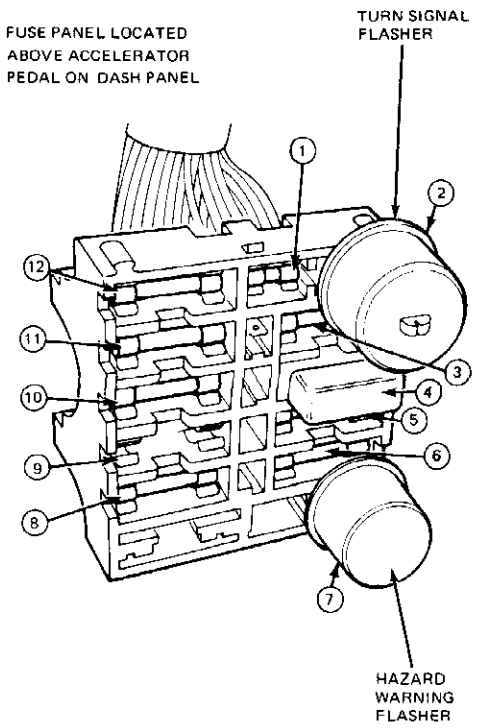
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1	(7.5 AMP. FUSE)	WARNING LIGHTS – ENGINE HOT (COMBINATION OIL PRESSURE), THROTTLE POSITIONER, DUAL BRAKE, SEAT BELT, PARKING BRAKE, ALTERNATOR INDICATOR
2	(15 AMP. FUSE)	RADIO (MERCURY: POWER ANTENNA)
3	(20 AMP. FUSE)	WINDSHIELD WASHER, REAR WINDOW DE-ICE, CONTROL SAFETY RELAY COIL FEED, POWER WINDOW RELAY COIL FEED (4-DOOR ONLY), POLICE ACCESSORY RELAY COIL FEED, CORNERING LIGHTS, REAR DOOR CIGAR LIGHTERS, DECK LID RELEASE, DEFOGGER, AND SPEED CONTROL RELAY, A/C CLUTCH.
4	(25 AMP. FUSE) (20 AMP. C.B.)	STATION WAGON TAILGATE WINDOW 2-DOOR POWER WINDOWS
5	(8.25 AMP. C.B.)	WINDSHIELD WIPER SYSTEM
6	(4 AMP. FUSE)	INSTRUMENT PANEL AND CLUSTER, GAUGE ILLUMINATION, CLOCK, RADIO, ASH TRAY, HEADLIGHT AND WINDSHIELD WIPER SWITCH, HEATER-A/C AND ATC CONTROL AND SURE-TRACK (MERCURY)
7	(20 AMP. FUSE)	HEATER (OR 35 AMP. FUSE FOR A/C OR ATC)
8	(20 AMP. FUSE)	BACK-UP LIGHTS, TURN SIGNALS
9	(15 AMP. FUSE)	COURTESY LIGHTS, INSTRUMENT PANEL, R.H. AND L.H. DOORS, DOME, GLOVE BOX, CARGO (STATION WAGON ONLY), LUGGAGE COMPARTMENT, CLOCK FEED, KEY WARNING BUZZER AND SEAT BACK LATCH RELAY CONTROL, LIGHTED VISOR VANITY.
10	(15 AMP. FUSE)	HAZARD FLASHER SYSTEM AND STOP LIGHTS
11	(15 AMP. FUSE)	CIGAR LIGHTER
11A	(30 AMP. FUSE)	STATION WAGON REAR WINDOW (KEY SWITCH) AND SEAT BACK LATCH (2-DOOR)



LOCATED LEFT OF STEERING COLUMN ON DASH PANEL

FIG. 1 Fuse Panel—Ford and Mercury



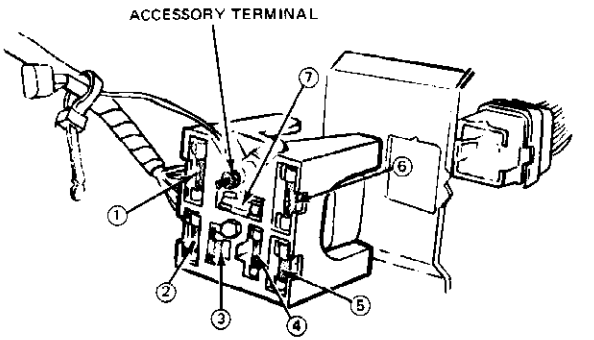
1	(4 AMP. FUSE)	CLUSTER, HEATER OR AIR CONDITIONER CONTROL, RADIO, ASH TRAY, AND CLOCK ILLUMINATION LAMPS.
2		TURN SIGNAL FLASHER
3	(7.5 AMP. FUSE)	OIL, BRAKE, BELTS INDICATOR LAMPS, SEAT BELT, BUZZER, THROTTLE SOLENOID POSITIONER, EMISSION CONTROL SOLENOID.
4	(6.0 AMP. CIRCUIT BREAKER)	WINDSHIELD WIPER MOTOR
5	(15 AMP. FUSE)	WINDSHIELD WASHER MOTOR, DOOR AJAR WARNING LIGHT, HEATER BACKLITE CONTROL INDICATOR LAMP AND ANTI-THEFT MODULE, FUEL-MONITOR INDICATING LAMP
6	(7.5 AMP. FUSE)	RADIO/TAPE PLAYER
7		HAZARD FLASHER
8	(20 AMP. FUSE)	HORN AND CIGAR LIGHTER
9	(15 AMP. FUSE)	DOME LIGHT, GLOVE BOX LAMP, MAP LAMP, TRUNK LAMP, DOOR, INSTRUMENT PANEL, COURTESY, KEY, HEADLAMP-ON WARNING BUZZER AND LAMP, CLOCK FEED, ANTI-THEFT MODULE, HORN FEED AND SEAT BELT WARNING SYSTEM FEED.
10	(15 AMP. FUSE)	STOP AND HAZARD WARNING LAMPS.
11	(15 AMP. FUSE) (35 AMP. FUSE)	HEATER MOTOR POWER FEED (WITH STD. HEATER) AIR CONDITIONER MOTOR POWER FEED
12	(15 AMP. FUSE)	BACK-UP LAMPS, TURN SIGNAL LAMPS

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FIG. 2 Fuse Panel—Mustang II

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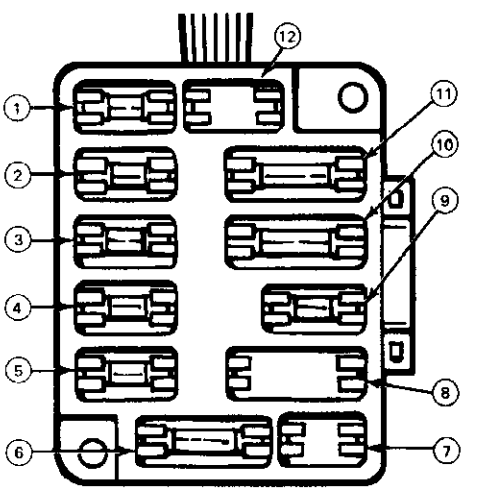
(1)	20 AMP FUSE	HAZARD WARNING FLASHER, CIGAR LIGHTER AND CLOCK FEED (CONSOLETTE ONLY)
(2)	14 AMP FUSE	COURTESY, DOME, LUGGAGE COMPARTMENT LIGHTS, AND IGNITION KEY WARNING BUZZER
(3)	4 AMP FUSE	INSTRUMENT PANEL AND CLUSTER LIGHTS, CLOCK AND TRANSMISSION INDICATOR (PRND21) ILLUMINATION LIGHTS
	7.5 AMP FUSE	(RADIO) OPT.
(4)	14 AMP FUSE	INDICATOR LIGHTS, THROTTLE POSITIONER, EMISSION CONTROL SOLENOID, AND SEAT BELT WARNING BUZZER AND LIGHT, LOW VACUUM WARNING LAMPS
(5)	14 AMP FUSE 35 AMP FUSE	HEATER AND DEFROSTER FOR AIR CONDITIONER
(6)	20 AMP FUSE	BACK-UP LIGHTS, RADIO FEED AND WINDSHIELD WASHER, TURN SIGNAL
(7)	20 AMP FUSE	(RPO) ACCESSORY FEED – REAR WINDOW DEFOGGER



K2571-2H

FIG. 3 Fuse Panel—Fairmont and Zephyr

1	BLANK	
2	15 AMP FUSE	A/C CLUTCH
3	15 AMP FUSE	COURTESY LAMPS
4	20 AMP FUSE	HORNS AND CIGAR LIGHTER
5	15 AMP FUSE	EMERGENCY WARNING AND STOP LAMPS
6	14 AMP FUSE	WARNING LAMPS FOR FUEL ECONOMY, ENGINE, BRAKES, FASTEN BELTS, LIFTGATE OPEN INDICATOR, EMISSION CONTROL SOLENOIDS.
7	BLANK	
8	15 AMP FUSE 35 AMP FUSE	HEATER BLOWER MOTOR A/C BLOWER MOTOR
9	15 AMP FUSE	TURN SIGNAL AND BACK-UP LAMPS
10	6 AMP C.B.	WINDSHIELD WASHER/WIPER
11	7.5 AMP FUSE	RADIO
12	4 AMP FUSE	INSTRUMENT PANEL ILLUMINATION LAMPS

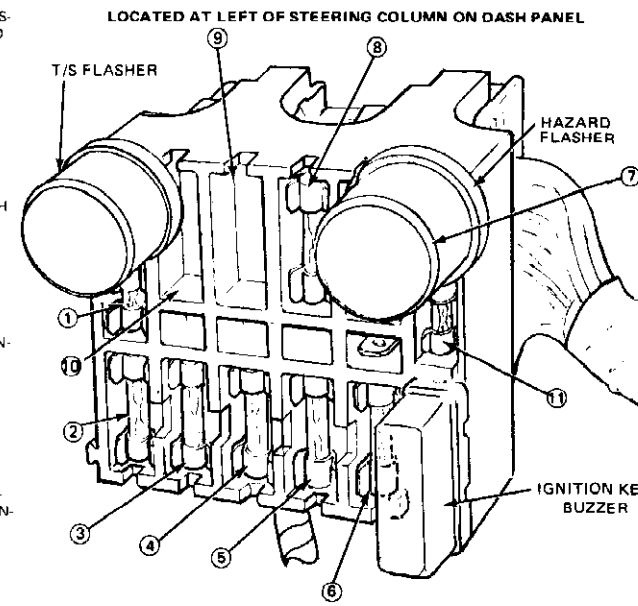


K3199-2E

FIG. 4 Fuse Panel—Pinto and Bobcat

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(1)	(4 AMP. FUSE)	INSTRUMENT PANEL AND CLUSTER ILLUM. LIGHTS TRANSMISSION INDICATOR (PRND21), CLOCK LIGHTS, WINDSHIELD WIPER SWITCH, HEADLIGHT SWITCH AND HEATER – A/C SWITCH ILLUM., LOW VACUUM GAUGE ILLUM.
(2)	(20 AMP. FUSE) (35 AMP. FUSE)	HEATER AC/ATC
(3)	(20 AMP. FUSE)	A/C COMPRESSOR CLUTCH, BACK-UP LIGHTS, TURN SIGNAL LIGHTS
(4)	(15 AMP. FUSE)	COURTESY LIGHTS, DOME AND READING LIGHTS, CARGO, GLOVE BOX, KEY WARNING BUZZER AND SEAT BACK LATCH CONTROL, HEADLAMP-ON WARNING BUZZER, CLOCK.
(5)	(15 AMP. FUSE)	STOP LIGHTS.
(6)	(20 AMP. FUSE)	CIGAR LIGHTER, STATION WAGON REAR WINDOW, 2-DOOR SEAT LATCH.
(7)	(7.5 AMP. FUSE)	RADIO
(8)	(20 AMP. FUSE)	WINDSHIELD WASHER, POWER WINDOW, SAFETY RELAY CONTROL, HEATED REAR WINDOW RELAY CONTROL, POLICE ACCESSORY RELAY CONTROL, SPEED CONTROL.
(9)	(25 AMP. FUSE) (20 AMP. C.B.)	ACCESSORY FEED, STATION WAGON POWER TAILGATE. POWER WINDOW (2-DOOR).
(10)	(8.25 C.B.)	BLANK.
(11)	(7.5 AMP. FUSE)	WARNING LIGHTS, DUAL BRAKE SYSTEM, SEAT BELT WARNING LAMP AND BUZZER AND SOLENOID THROTTLE POSITIONER, LOW VACUUM WARNING LAMP.



K2583-2K

FIG. 5 Fuse and Circuit Breaker Panel—LTD II, Cougar and Thunderbird

(1) 6 AMP FUSE – INSTR. PNL. & CLUSTER LAMPS, ATC H/LAMP SW., RADIO TRAY, C/LGTRS., CLOCK, W/S WIPERS & TRANS. LAMPS & ILLUMINATED THERMOMETER

(2) 35A AMP FUSE – AUTOLAMP, ATC BLOWER

(3) 20 AMP FUSE – AUTOLAMP, ATC CLUTCH, BACK-UP LAMP & TURN SIGNALS & TRAILER TOW RELAYS (CONTROL)

(4) 15 AMP FUSE – COURT. LAMPS, GLOVE BOX, TRUNK, CLOCK FEED, DOME, MILES-TO-EMPTY LAMP & SEATBACK LATCH CONTROL, IGN. LOCK CYL. WARNING BUZZER, VISOR MIRROR LAMP AND ILLUMINATED ENTRY SYSTEM, READING LAMP (DIAMOND JUBILEE), GARAGE DOOR OPENER

(5) 50 AMP CIRCUIT BREAKER – POWER SEATS, AUTO SEATBACK RELEASE LATCH & HORNS

(6) BLANK

(7) 20 AMP FUSE – CIGAR LIGHTER (DOORS)

(8) 25 AMP FUSE – STOP LAMPS, HAZARD FLASHER SYSTEM

(9) *20 AMP FUSE – CIGAR LGTR. (INSTR. PANEL) & POWER DOOR* LOCK

(10) 4 AMP FUSE – SURE TRACK BRAKE SYSTEM

(11) 15 AMP FUSE – RADIO & POWER ANTENNA

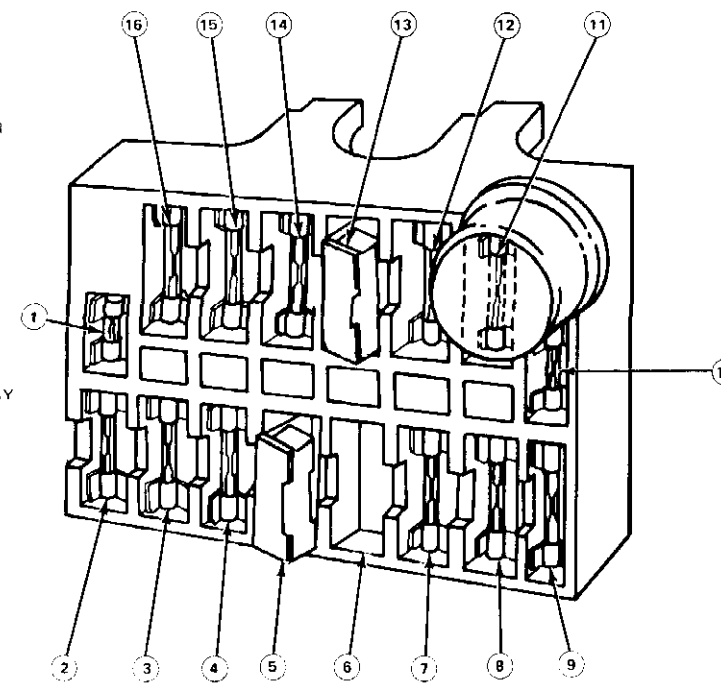
(12) 15A AMP FUSE – SPEED CONTROL AND ELECTRIC DEICE RELAY CONTROL, ATC CLUTCH, ATC IDLE SOLENOID

(13) 20 AMP CIRCUIT BREAKER – POWER WINDOWS & ELECTRIC TRUNK LID MOONROOF RELAY

(14) 15 AMP FUSE – HEATED MIRROR, REAR WINDOW DEICE INDICATOR LAMP

(15) 7.5 AMP FUSE – CORNERING LAMPS

(16) 7.5 AMP FUSE – WRNG. LAMPS: DOOR AJAR, SEAT BELT, LOW FUEL, OIL FUEL VAPOR SOLENOID, PRESS., TEMP., DUAL BRAKE WARNING, SEAT BELT BUZZER, MILES-TO-EMPTY



K2582-2K

FIG. 6 Fuse and Circuit Breaker Panel—Continental Mark V

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DETROIT IRON

(1) 4 AMP FUSE – SURE-TRACK BRAKE SYSTEM
(2) 7.5 AMP FUSE – WARNING LAMP: SEAT BELT, DUAL BRAKE WARNING LAMP, THROTTLE POSITIONER, EMISSIONS AND PARKING BRAKE WARNING SYSTEM
(3) BLANK
(4) 20 AMP FUSE – STOPLAMPS, AND HAZARD FLASHER SYSTEM
(5) 25 AMP FUSE – CIGAR LIGHTER
(6) 30 AMP CIRCUIT BREAKER – POWER SEATS, HORNS, AUTO SEAT-BACK RELEASE LATCH, AND DOOR LOCKS
(7) 15 AMP FUSE – COURTESY LAMPS, DOORS, READING LAMPS, LUGGAGE COMPARTMENT, MAP LAMP, GLOVE BOX LAMP, CLOCK FEED, SEATBACK LATCH CONTROL, IGNITION LOCK CYLINDER KEY WARNING BUZZER, ILLUMINATED VISOR, ILLUMINATED LOCK CYLINDER, GARAGE DOOR OPENER

NOTE–VANITY MIRROR LIGHT IS ON THE SAME CIRCUIT AS THE GARAGE DOOR OPENER OPTION. HOWEVER, IN THE DRIVER'S VISOR, THERE IS A 2-AMP FUSE FOR THE VANITY MIRROR LAMP. THE VANITY MIRROR IS PROTECTED BY A 15-AMP AND A 2-AMP FUSE. THE GARAGE DOOR OPENER IS PROTECTED BY A 15-AMP FUSE ONLY.

(8) 6 AMP FUSE – INSTRUMENT PANEL AND CLUSTER LAMPS, RADIO, CLOCK, WINDSHIELD WIPER, HEADLAMP SWITCH, ATC CONTROL, TRANSMISSION QUADRANT, AND R.R. VIEW O/S MIRROR, AND ILLUMINATED THERMOMETER
(9) 7.5 AMP FUSE – SPEED CONTROL, WINDSHIELD WASHER SWITCH, BACKLITE, DEICE CONTROL
(10) 20 AMP FUSE – TURN SIGNAL AND BACK-UP LAMPS AND ATC COMPRESSOR CLUTCH
(11) 35 AMP FUSE – ATC BLOWER (LOW TO MEDIUM HIGH) AND A/C CLUTCH
(12) 7.5 AMP FUSE – WINDOW SAFETY RELAY COIL AND DECK LID RELEASE CONTROL, SPEED CONTROL AND BACKLITE DEICE CONTROL
(13) 15 AMP FUSE – RADIO AND POWER ANTENNA, CB RADIO
(14) 20 AMP CIRCUIT BREAKER – POWER WINDOWS, MOON ROOF FEED, AND DECK LID RELEASE FEED
(15) 7.5 AMP FUSE – AUTO LAMP
(16) 7.5 AMP FUSE – CORNERING LAMPS

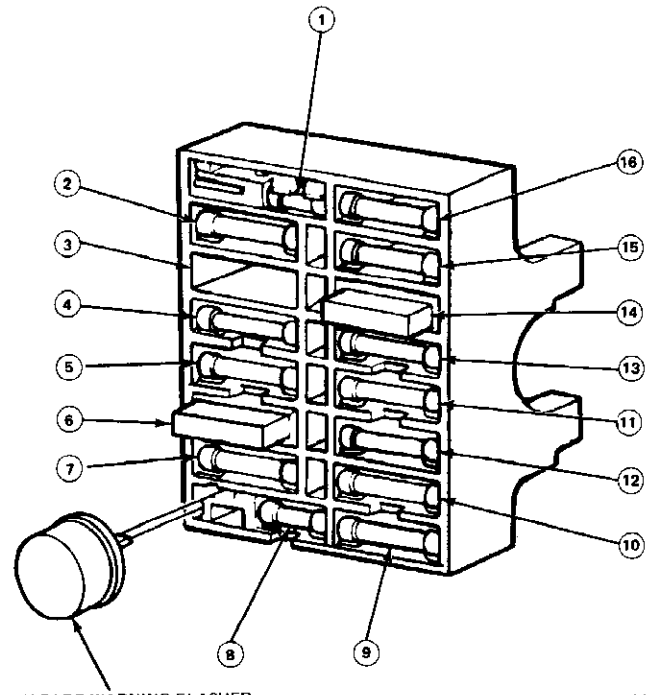


FIG. 7 Fuse and Circuit Breaker Panel—Lincoln Continental

(1) 14 AMP. FUSE – WARNING LIGHTS, IGNITION SYSTEM
(2) 15 AMP. FUSE – HEATED BACKLITE INDICATOR LAMP, HEATED MIRROR
(3) 35 AMP. FUSE – A/C BLOWER MOTOR & CONTROLS
(4) 20 AMP. FUSE – TURN SIGNAL FLASHER, BACK-UP LIGHTS
(5) 6 AMP. FUSE – WINDSHIELD WIPER & WASHER
(6) 15 AMP. FUSE – RADIO & POWER ANTENNA
(7) 4 AMP. FUSE – ILLUMINATION LAMPS (INSTR. PANEL)
(8) BLANK
(9) 20 AMP. FUSE – HEATED BACKLITE SWITCH AND RELAY CONTROL FEED, HORN WARNING ACTUATOR, SPEED CONTROL AMPLIFIER, CORNERING LAMPS, WINDOW REG, SAFETY RELAY CONTROL FEED, ILLUM. ENTRY LAMPS FEED
(10) 15 AMP. FUSE – STOP LAMPS, COURTESY LAMPS – LUGGAGE COMPT. GLOVE BOX, DOORS, INSTR. PANEL, DOME, *VANITY MIRROR, GARAGE DOOR OPENER
(11) 30 AMP. FUSE – CIGAR LIGHTER, HORNS
(12) 20 AMP. FUSE – EMERGENCY WARNING FLASHER

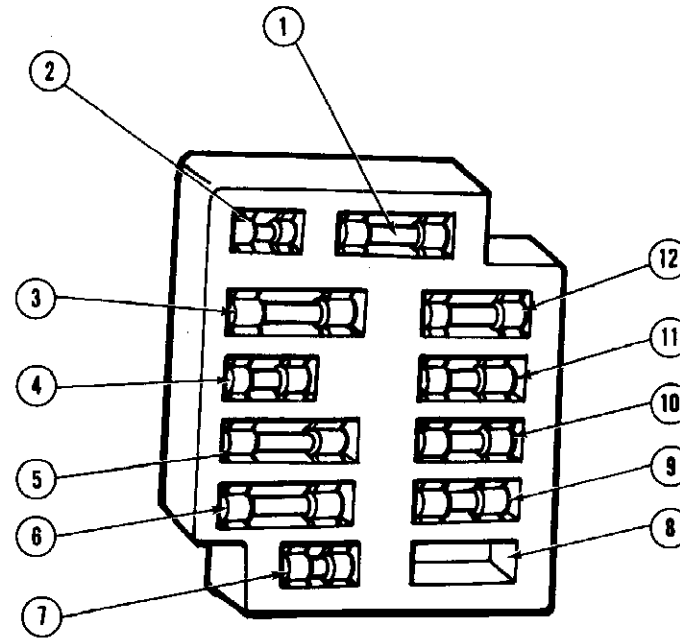


FIG. 8 Fuse and Circuit Breaker Panel—Granada, Monarch and Versailles

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MUSTANG

Circuit	Circuit Protection and Rating	Location
Headlamps and Hi-Beam Indicator	18 Amp C.B.	Integral with lighting switch
Parking, Marker, License, Tail Lamps, Transmission Indicator (PRND21), Lamp and Headlamps "ON" Relay Control	15 Amp C.B.	Integral with lighting switch
Heated Backlite	Fuse Link	In harness (dealer repair)
Load Circuit	Fuse Link	In harness (dealer repair)
Engine Compartment Lamp	Fuse Link	In harness (dealer repair)
Electric Choke	Fuse Link	In harness (dealer repair)

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FORD, MERCURY AND METEOR

Circuit	Circuit Protection and Rating	Location
Headlamps and Hi-Beam	18 Amp C.B.	Integral with lighting switch
Parking Lamps, Marker Lamps, License Lamps, Tail Lamp, Horns, Trailer Towing, Tail Lamp Relay	15 Amp C.B.	Integral with lighting switch
Windshield Wiper (2 Speed)	8.25 Amp C.B.	In fuse panel
Intermittent Windshield Wiper (2 Speed)	8.25 Amp C.B.	In fuse panel
Engine Compartment Lamp, Heated Rear Window, Trailer Towing (Brakes), Trailer Towing Lamps Load Circuit	Fuse Link	In fuse panel in wiring harness
Power Windows (4-Door) Engine Compartment Lamp, Power Seat, Door Locks	20 Amp C.B.	Starter relay
Electric Rear Window De-Icer (Station Wagon Only)	30 Amp Fuse	Under instrument panel

THUNDERBIRD, LTD II AND COUGAR

Circuit	Circuit Protection and Rating	Location
Headlamps	22 Amp. C.B.	Integral with lighting switch
Parking Lamps, Marker Lamps, License Lamps, Tail Lamps, Horns, Console PRND21	15 Amp C.B.	Integral with lighting switch
Windshield Wiper (2 Speed) and Interval	C.B.	In windshield wiper switch
Engine Compartment Lamp	20 ga. Fuse Link	Wiring—Engine Compartment
Power Windows, Power Seat, Power Rear Window [1]	20 Amp C.B.	On starter relay
Window Motor, Seat Motor	C.B.	In motor
Electric Rear Window Defroster	14 ga. Fuse Link	Wiring—Engine Compartment
Trailer Towing	16 ga. Fuse Link	Wiring—Engine Compartment

[1] * Additional 20 Amp C.B. for the power tailgate. Fuse is located in the fuse panel.

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GRANADA, MONARCH, VERSAILLES

Circuit	Circuit Protection & Rating	Location
Electric Rear Window Defroster	Fuse Link	In Harness (Dealer Repair)
Load Circuit	Fuse Link	In Harness (Dealer Repair)
Electric Choke Power Feed	Fuse Link	In Harness (Dealer Repair)
HeadLamps, High Beam Indicator	18 Amp. C.B.	Integral With Lighting Switch
Park Lamps, License Plate Lamp, Taillamps, Side Marker Lamps	15 Amp. C.B.	Integral With Lighting Switch
Anti-Skid	4 Amp. Fuse	Engine Compartment (Left Hand Side)
Power Seat, Windows and Door Locks and Seat Back Release	20 Amp. C.B.	On Starter Motor Relay

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FIG. 9 Fuses and Circuit Breakers—Additional

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DETROIT IRON

FAIRMONT AND ZEPHYR

Circuit	Circuit Protection and Rating	Location
Headlamps & High Beam Indicator	18 Amp. C.B.	Integral with lighting switch
Front and Rear Marker, Side Parking, Rear and License Lamps	15 Amp. C.B.	Integral with lighting switch
Windshield Wiper Circuit, Rear Window	4.5 Amp. C.B.	Integral with windshield wiper switch
Heated Backlite	16 G.A. Fuse Link	Engine Compartment

CONTINENTAL MARK V

Circuit	Circuit Protection and Rating	Location
Parking Lamps, License Lamp, Tail Lamps, Marker Lamp, Headlamp On Relay and Coach Lamps, Indicator Lamp Feed, Headlamp Buzzer	15 Amp. C.B. 20 Amp. C.B. (with Autolamp)	In headlamp switch
Headlamps and Hi-Beam	18 Amp. C.B. 20 Amp. C.B. (with Autolamp)	In headlamp switch
Windshield Wiper and Washer System (2-Speed and Interval)	8.25 Amp. C.B.	Integral with wiper switch
Automatic Headlamp Dimmer	4 Amp. Fuse	Cartridge in feed line
Power Window and Electric Trunk Lid	20 Amp. C.B.	Fuse Panel
Power Seat and Power Seat Latch, Horn	30 Amp. C.B.	Fuse Panel
Stop Lamp, Hazard Flasher System	2.5 Amp. Fuse	Fuse Panel
Moon Roof	25 Amp. Fuse	Near brake pedal support
Electric De-Ice and Backlite	16 G.A. Fuse Link	In wiring (Engine Compartment)
Load Circuit	14 G.A. Fuse Link	In wiring (Engine Compartment)

LINCOLN CONTINENTAL

Circuit	Circuit Protection and Rating	Location
Automatic Headlamp Dimmer	4 Amp. SFE-4	In-line fuse
Parking Lamps, License Plate Lamp, Tail Lamp, Ash Receptacle Lamp, Marker Lamps, Headlamp On Warning Relay Control	20 Amp. C.B. (RPO) 15 Amp. C.B. (STD.)	In headlamp switch
Headlamps, Hi-Beam, "Headlamps-On" Warning Buzzer	20 Amp. C.B. (RPO) 18 Amp. C.B. (STD.)	In headlamp switch
Windshield Wiper	8.25 C.B.	In wiper switch
Power Window & Deck Lid Release	20 Amp. C.B.	Fuse Panel
Power Seat and Power Seat Latch	30 Amp. C.B.	Fuse Panel
Horns, Door Locks	20 Amp. C.B.	Fuse Panel
Stop Lamp and Hazard Flasher		
Electric De-Ice and Backlite	16 G.A. Fuse Link	In wiring (Engine Compartment)
Load Circuit	14 G.A. Fuse Link	In wiring (Engine Compartment)
ATC High Blower (De-Ice Defrost)	17 G.A. Fuse Link	In wiring (Engine Compartment)

PINTO, BOBCAT

Circuit	Circuit Protection and Rating	Location
Headlamps	18 Amp. C.B.	Integral with lighting switch
Rear, License, Marker, Park Lamps, Transmission Indicator Lamp (PRND21)	15 Amp. C.B.	Integral with lighting switch
Windshield Wiper Circuit	6 Amp. C.B.	Integral with windshield wiper switch
Heated Backlite	14 G.A. Fuse Link	In harness (Engine Compartment)
Load Circuit	Fuse Link	In harness (Engine Compartment)

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FIG. 10 Fuses and Circuit Breakers—Additional

REMOVAL AND INSTALLATION

INDIVIDUAL FUSES AND CIRCUIT BREAKERS

Snap the old unit out and the new unit into the retaining clips in the panel (Figs. 1 through 7).

FUSE PANEL—EXCEPT GRANADA, MONARCH AND VERSAILLES

The fuse panel (on models so equipped) is a part of the instrument panel-to-dash panel (14401) wiring harness. The fuse panel cannot be replaced separately from the harness.

To remove the wiring harness, of which the fuse panel is a part, follow the instructions for the appropriate car line in Part 34-01.

FUSE PANEL—GRANADA, MONARCH AND VERSAILLES

The fuse panel on Granada, Monarch and Versailles models is located at the left underside of the instrument panel, just above the parking brake release handle. To remove fuse panel cover, remove screw on cover and slip the two cover tabs out of their slots in the instrument panel. See Fig. 11. For Fairmont/Zephyr, the fuse panel is located at the left underside of the instrument panel, adjacent to the steering column behind cover.

COMBINED FUSE AND CIRCUIT BREAKER PANEL

The fuse and circuit breaker panel and the panel retainer-connector assembly (Fig. 12) are both a part of the (14401) instrument panel-to-dash panel wiring harness. In Fig. 12, these parts are shown without the individual (14401) wires attached, so that one can see how they are installed to the dash panel. Fig. 14 is typical of the (14401) wires attached.

One side of the retainer-connector assembly locks into the fuse and circuit breaker panel; the other side locks into cut-outs in the dash panel (Figs. 12 and 13). The two main wiring harnesses plug into the retainer-connector assembly at the engine side of the dash panel, as shown.

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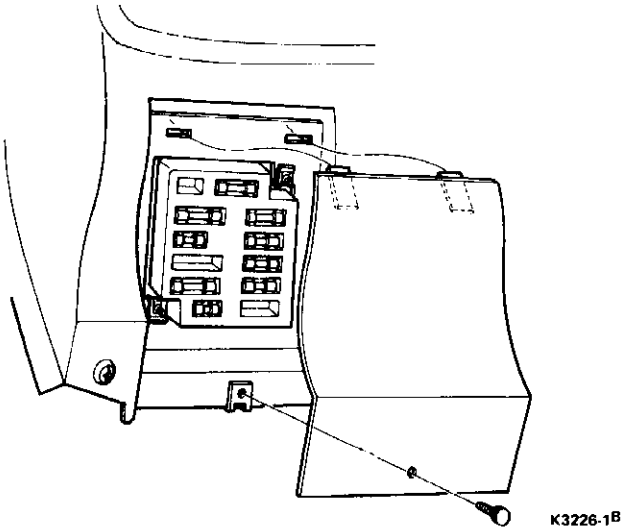


FIG. 11 Fuse Panel Cover—Granada and Monarch

Removal

1. Disconnect the battery ground cable.
2. In the engine compartment at the left side of the dash panel, remove the retaining screw from each of the harness connector plugs (Fig. 12).
3. Pull the harness plugs out of the fuse-C.B. connector assembly.
4. Depress the four tabs that hold the connector assembly to the dash panel, and push the connector together with the fuse-C.B. panel into the passenger compartment (Fig. 12).
5. To unlock the fuse-C.B. panel from the retainer-connector assembly, it will be necessary to work from the passenger side of the dash panel. Depress the two locking tabs and slide the connector assembly out of the panel. (Figs. 13 and 14).

Installation

1. To lock the connector assembly to the fuse-C.B. panel, align the four fixed connector tabs with the slots in the panel bosses and then slide the fixed tabs into the slots until the two locking tabs are engaged (Fig. 14).
2. Push the panel and connector assembly into the cut-outs in the dash panel, until the four connector-to-dash tabs lock it in place (Figs. 12 and 13).
3. Connect the two wiring harness plugs to the retainer-connector assembly and install the plug retaining screws. Torque the screws to 18-28 in-lbs.

WIRE TERMINALS

To remove an individual wire from its connector, it will first be necessary to remove the connectors from the dash panel and/or the fuse-C.B. panel as outlined in the foregoing procedure.

To remove a wire from the connector, release the retaining tang from the wire terminal with a narrow screwdriver (Figs. 15 and 16) and pull the wire and terminal out of the connector. To re-install, push the terminal into the connector until the retaining tang snaps into the locking hole in the terminal (Figs. 15 and 16).

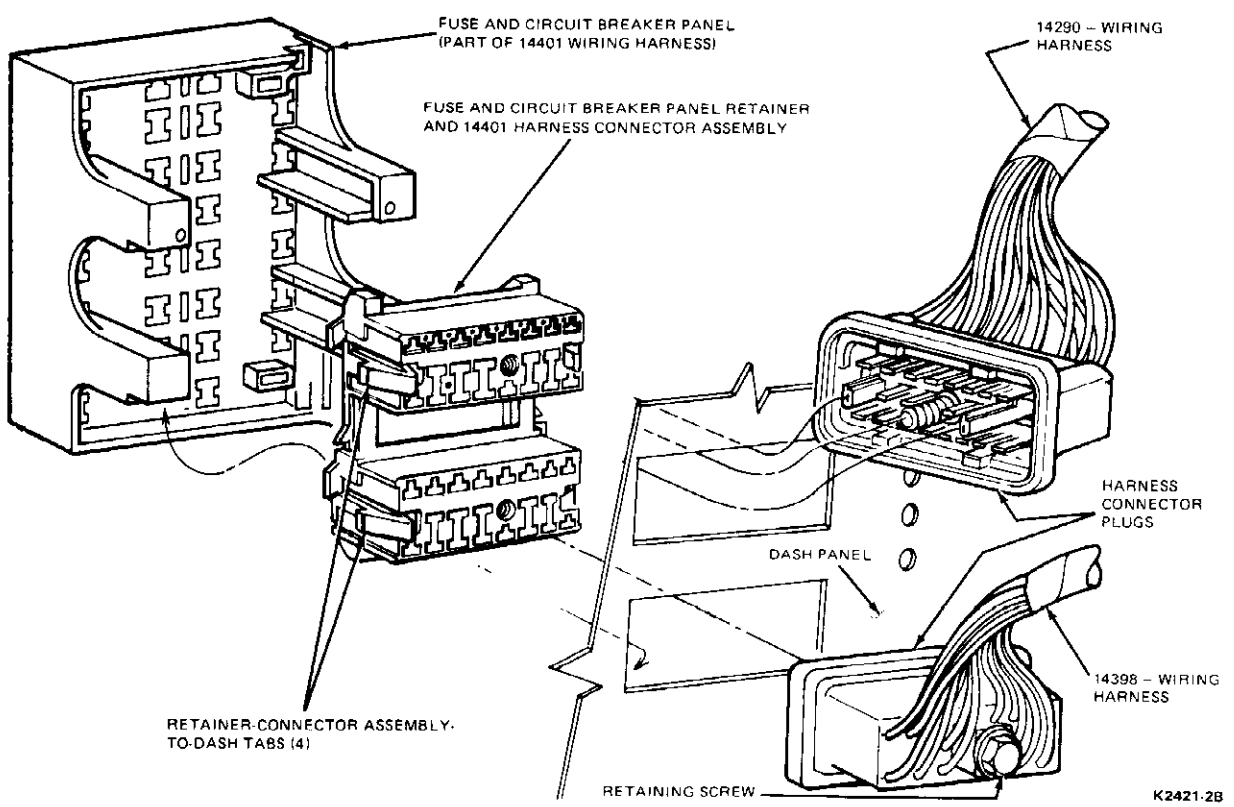


FIG. 12 Typical Removal and Installation of Fuse and Circuit Breaker Panel to Dash Panel—Lincoln Continental Shown

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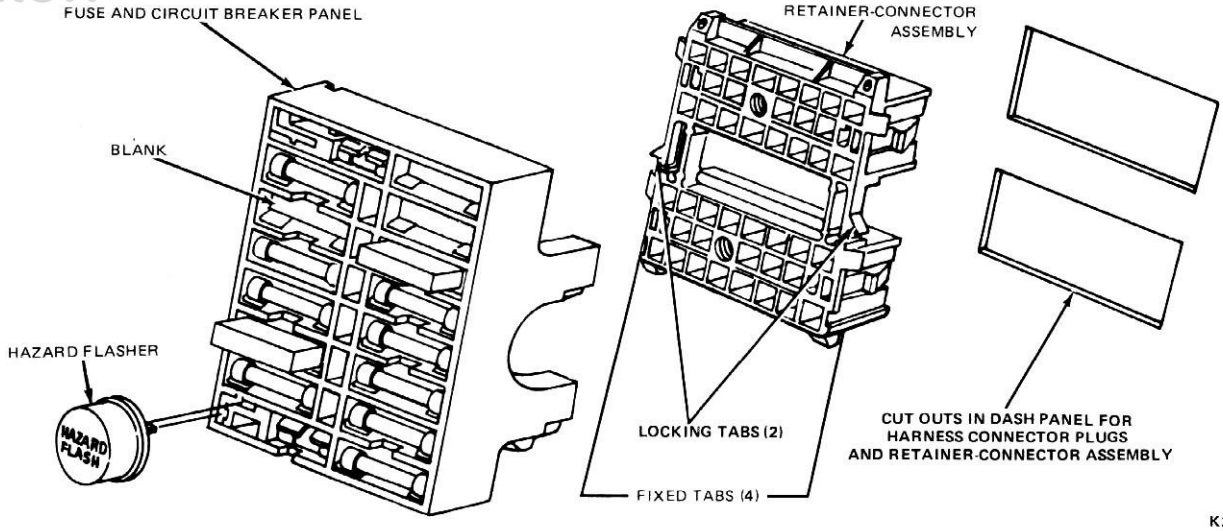


FIG. 13 Separation of Fuse-Circuit Breaker Panel from Connector—Lincoln Continental Shown

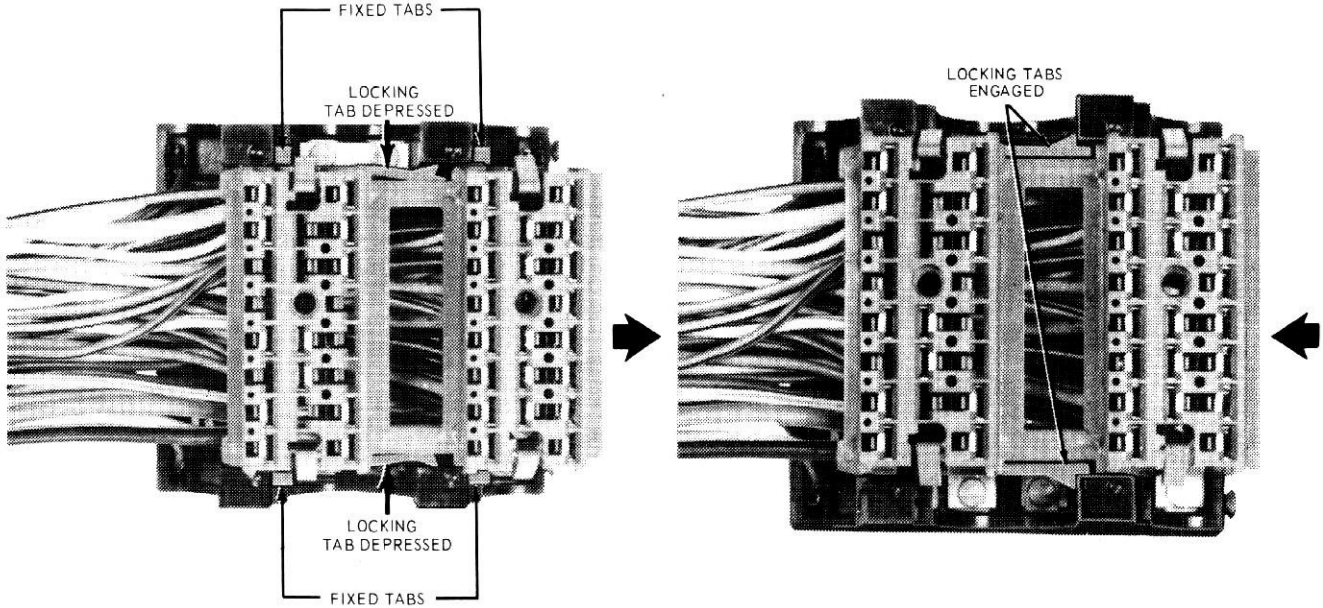


FIG. 14 Typical Fuse-Circuit Breaker Panel-to-Connector Assembly Engagement—LTD II, Cougar Shown

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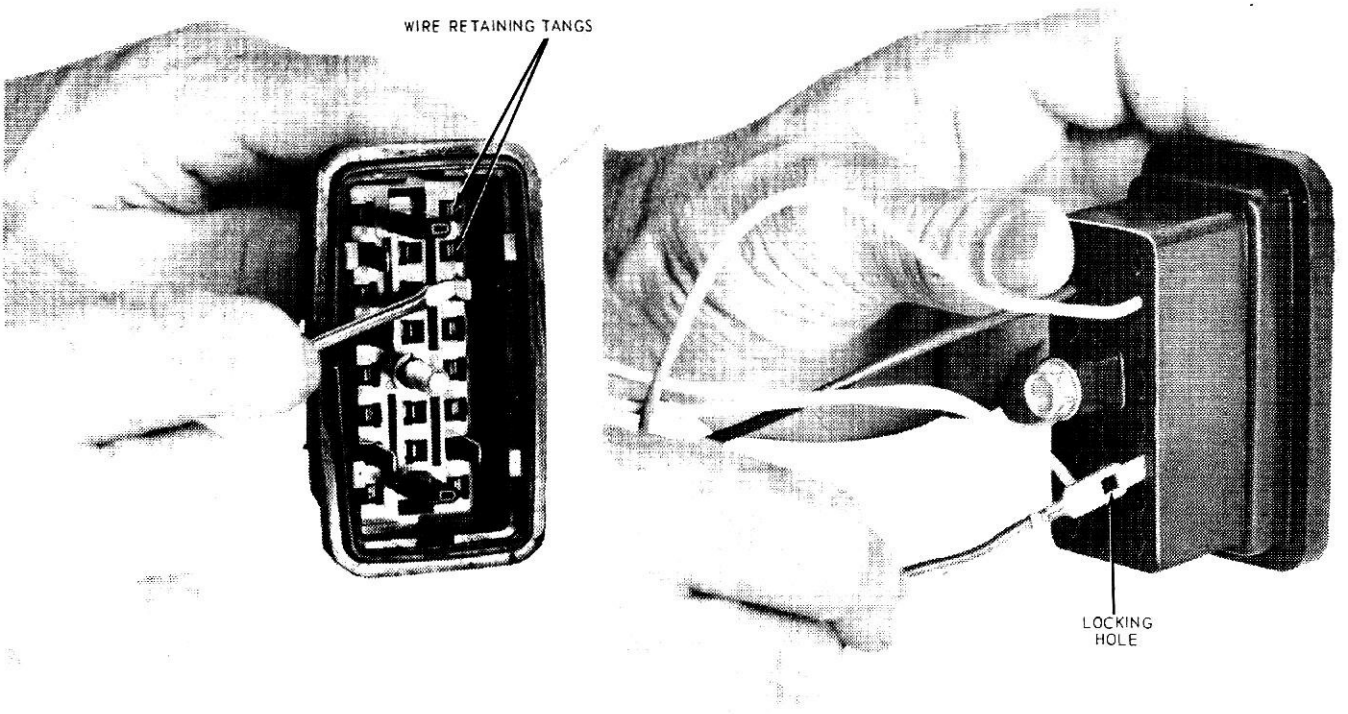


FIG. 15 Wire (Male) Terminal to Harness Connector Plug Installation

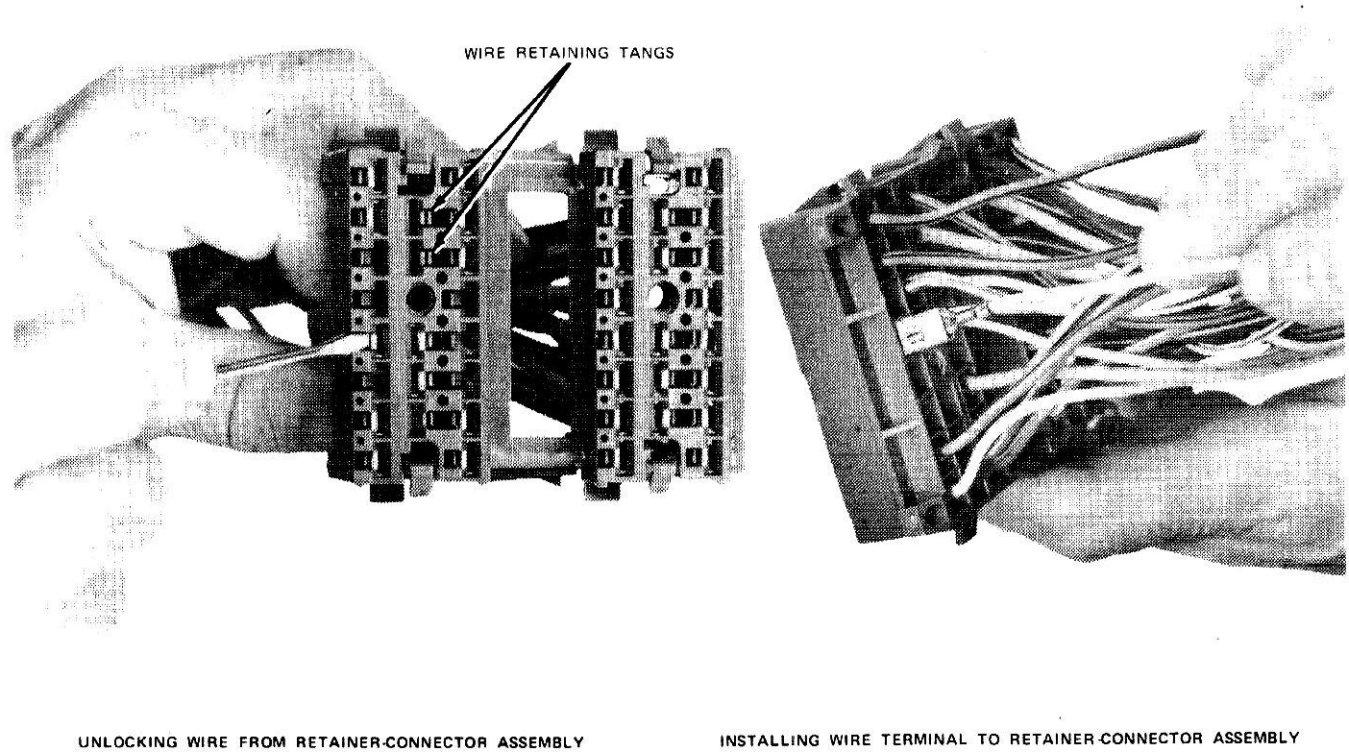


FIG. 16 Wire (Female) Terminal to Retainer-Connector Assembly Installation

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DETROIT IRON

AUXILIARY EQUIPMENT

GROUP 35

PART TITLE	PART NO.
Antennas – Power	35-21
Antennas – Standard	35-10
Ash Receptacles and Cigar Lighters	35-40
Horns	35-80
Mirrors – Inside and Outside	35-50
Radio and Stereo Tape Player	35-01
Speakers	35-30
Windshield Washers	35-70
Windshield Wipers – Electric	35-60

CL2296-2B

Radio and Stereo Tape Player

PART 35-01

Applies to All Models

SUBJECT	PAGE
DIAGNOSIS	01-1
TESTING	
Stereo Tape Player and Cassette Tape Player	01-11
ADJUSTMENTS	
Antenna Trimmer	01-12
Push Buttons	01-11
Stereo Speaker Balance	01-12
REMOVAL AND INSTALLATION	
Radio and/or Tape Player	01-12
Radio Interference Suppression	01-16
CLEANING	
Stereo Tape Player Head and Capstan	01-19
SPECIFICATIONS	01-19

CL2297-2B

DIAGNOSIS

RADIO TESTS

Internal diagnostic examination of the radio should be left to the authorized radio service center. However, the automotive technician should be able to analyze and isolate radio reception conditions to the proper area or component causing the condition. All radio conditions can be isolated to one of four general areas. The trouble will be found in the antenna system, radio chassis (receiver), speaker system or radio noise suppression equipment.

The Diagnosis Charts and Tests in this section should be used with the Wiring Diagram Book and the Radio Tester Tool (T65P-18805-A or equivalent) to accurately diagnose and quickly repair most radio system problems.

RADIO RECEPTION

Antenna Position

Adjust the power antenna to 31 inches for the best FM operation.

Tuning

Always fine tune the radio with the hand control knob after depressing a pushbutton. This assures that the radio will be set in the center of the station where

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it will obtain minimum noise and the best possible reception. If a particular station has too much interference, try tuning to a stronger station.

FM multiplex has a range of about 20 miles before reception noises are heard. This means that in problem areas with tall buildings or hills it is necessary to select the strongest possible station.

Experience will dictate which FM stations are best for your area.

Tone Control

If any particular area is full of interference, use the tone control to cut out some of the noise by turning it toward the bass position (counterclockwise).

If the vehicle is equipped with optional rear speakers, favoring those rear speakers in noisy areas will help to reduce noise.

Antennas and Mobility

Although an automobile radio will give outstanding mobile reception, it cannot provide the continuous reception of that enjoyed in the home radio. The home receiver is not limited by the vehicle operating characteristics and certain geographical effects as is the mobile unit. For example, for the best FM reception, the automobile antenna should be designed similar to a TV antenna and pointed in the direction of the station. The best AM antenna is a long piece of wire...the higher the wire the better the reception. However, because of design necessity, the automobile antenna is restricted in size, height, direction and must receive both AM and FM stations. This means that a limited amount of the station's signal reaches the car radio. In addition, the car and its radio are portable. This mobility and reduced signal pickup results in FM FLUTTER. This is normal.

Interfering Noise

Located within a few feet of the radio is the automobile's powerful ignition system. This high voltage of this system produces noisy side effects that can interfere with both the AM and FM stations. Although precautions have been taken to minimize ignition noise, a certain amount can be heard on FM when the station is not quite tuned. Ignition noise from passing vehicles can occasionally be heard if they do not have proper suppression equipment installed. These same vehicles produce interference in the television sets. Very little can be done with the radio receiver to protect against this type of external interference.

Electrical Accessories

Some of the many electrical accessories being added on today's vehicles contribute to additional radio interference. These devices are constantly scrutinized to establish their electrical compatibility with the radio. Add-on or faulty accessories can cause radio noise problems.

FM Flutter

FLUTTER can best be described as repeated pops and hissing bursts heard in the speaker, during an otherwise good broadcast. Usually this condition exists while traveling in the fringe area of the station. Flutter will become more severe beyond approximately 25 miles of the station. The signal loss becomes greater away from the station, until finally noise takes over and you can no longer receive the station. Flutter may also be noticed near the station because of the line-of-sight characteristics of FM radio waves. This condition can happen when a building or large structure is between the radio receiver and the station you are trying to receive. Some of the FM signal bends around the building, but certain spots have almost no signal. Some of these signal losses are only a few inches wide and if the car is parked in one of these dead spots, you will only hear noise from the speaker. As you move out of the shadow of the structure, the station will return to normal. Flutter will not occur on AM because the AM radio waves are much longer than FM waves.

FM Multi-Path Cancellation

Another effect caused by the line-of-sight characteristic is called CANCELLATION. This condition exists when the radiowaves are reflected from objects or structures. The noise produced by cancellation are similar to flutter, with the addition of distortion in the program. A more familiar description of cancellation is its similarity to the multiple ghosts and picture jumping that occur on television when a low flying plane passes. The same condition exists in the car, except that the car is moving and the reflecting structure is stationary. The reflected signal cancels the normal signal, causing the antenna to pick up noise and distortion. Cancellation effects are most prominent in metropolitan areas, but can also become quite severe in hilly terrain and depressed roadways.

FM Capture and Overloading

FM CAPTURE is an unusual condition that occurs when traveling in the vicinity of a broadcast tower. If listening to a weak FM station, when passing the broadcast tower, a stronger station occurs without changing the radio dial. When passing the tower, the station may switch back and forth a few times before returning to the station originally tuned. When several broadcast towers are present (common in metropolitan areas) several stations may OVERLOAD the receiver resulting in considerable station changing, mixing and distortion. Fortunately, this condition is localized and it will not harm the receiver. Some overloading may also be noticed on AM, but usually to a lesser degree.

Receiving FM Multiplex

Because more data is carried in the FM multiplex waves than in the monaural FM broadcasts, flutter, cancellation and capture are even more noticeable. The FM multiplex noise-free broadcast range is approximately five miles less than that recieved with the monaural FM radio. The AM/FM, FM Multiplex radio may never encounter any of these troublesome conditions as they are more prominent in metropolitan areas, hilly terrain and depressed roadways. However, when diagnosing FM Multiplex, it is recommended to accurately tune to the strongest FM Multiplex station.

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DETROIT IRON

NOISY AM RECEPTION – ENGINE RUNNING, VEHICLE IN/NOT IN MOTION

VERIFY CONDITION BY OPERATING RADIO.

CHECK ANTENNA CABLE CONNECTIONS INCLUDING EXTENSION CABLE (IF SO EQUIPPED). CONNECTIONS MUST BE CLEAN AND SECURE.

NOT OK

CLEAN AND/OR SECURE ANTENNA CABLE CONNECTIONS AS REQUIRED.

OK

CHECK TO MAKE SURE ANTENNA IS SECURELY MOUNTED TO BODY AT GROUND POINTS. (MANUAL ANTENNA – MOUNTING SCREWS TO FENDER. ELECTRIC ANTENNA – MOUNTING NUT ABOVE FENDER; AND ALSO, MAKE SURE THAT PRONGS OF GROUNDING COLLAR AT FENDER UNDERSIDE ARE CONTACTING METAL.) CONTACTS MUST BE CLEAN AND METAL -- TO – METAL

NOT OK

CLEAN AND/OR SECURE GROUND CONNECTIONS AS REQUIRED.

OK

CHECK FOR PRESENCE OF ALL REQUIRED SUPPRESSION EQUIPMENT, BODY GROUNDING STRAP USAGE, SECURITY, CLEANLINESS AND METAL-TO-METAL CONNECTION. SEE SHOP MANUAL FOR LOCATION(S).

NOT OK

INSTALL OR TIGHTEN AND/OR CLEAN CONNECTIONS AS REQUIRED.

OK

CHECK HOOD BONDING CLIP FOR EXCESSIVE USAGE, SECURENESS OF MOUNTING TO SHEET METAL AND CONTACT WITH HOOD. HOOD BONDING CLIP MUST SCRATCH HOOD PAINT. SEE SHOP MANUAL FOR LOCATION(S).

NOT OK

INSTALL, SECURE, OR FORM HOOD BONDING CLIP AS REQUIRED.

OK

CHECK THE MOUNTING AND CONNECTING WIRES OF THE FOLLOWING COMPONENTS (IF SO EQUIPPED) FOR SECURENESS, CLEANLINESS, METAL – TO – METAL CONTACT: ALTERNATOR REGULATOR CONDENSER, IGNITION COIL CONDENSER, ALTERNATOR CONDENSER, AND INSTRUMENT VOLTAGE REGULATOR CHOKE.

IMPORTANT: THE CONDENSER MOUNTING POINTS ARE USED TO COMPLETE THE ELECTRICAL CIRCUIT AND MUST BE MOUNTED SECURELY TO CLEAN SURFACES.

NOT OK

CLEAN AND/OR SECURE CONNECTIONS AS REQUIRED.

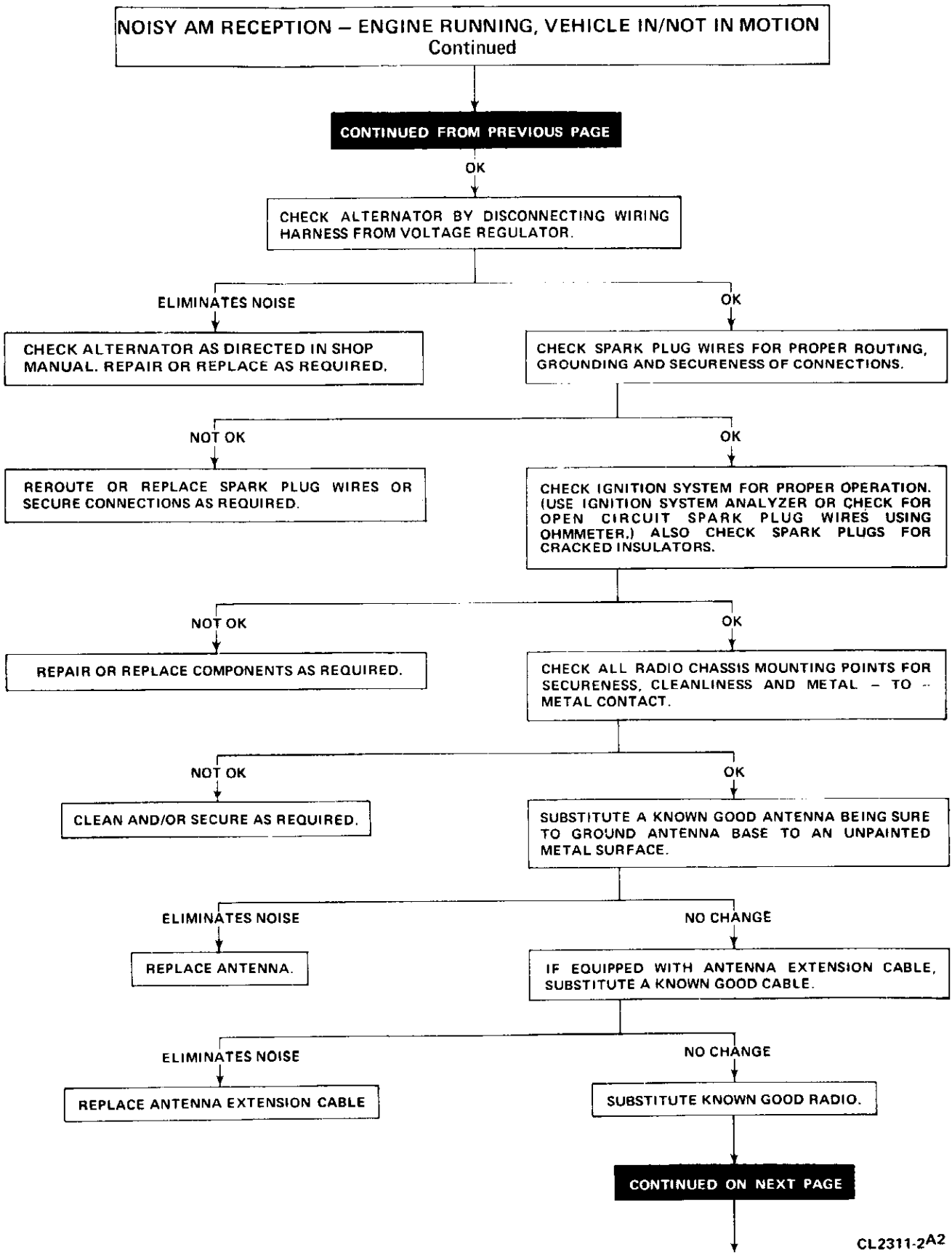
OK

CHECK THE OPERATION OF THE ALTERNATOR REGULATOR CONDENSER, IGNITION COIL, CONDENSER AND ALTERNATOR, BY REPLACING WITH KNOWN GOOD COMPONENTS.

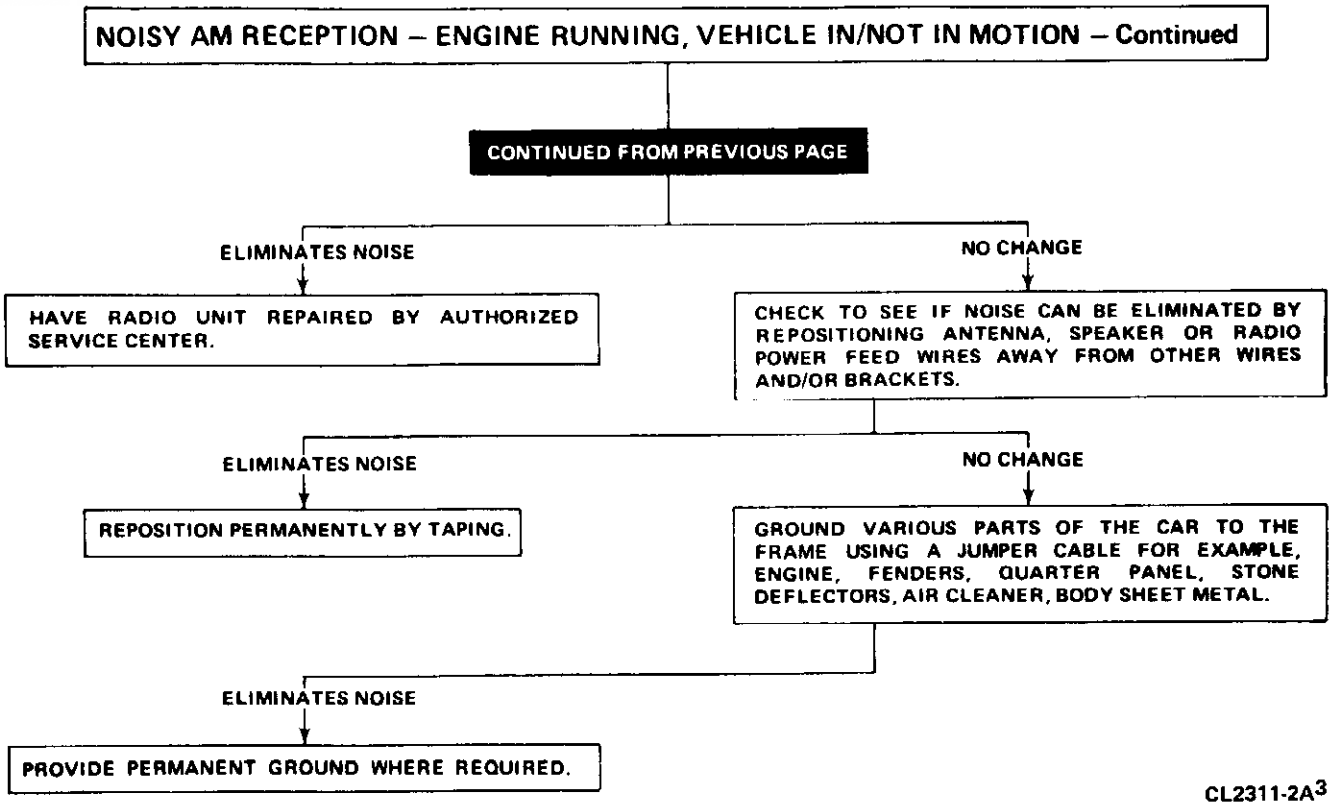
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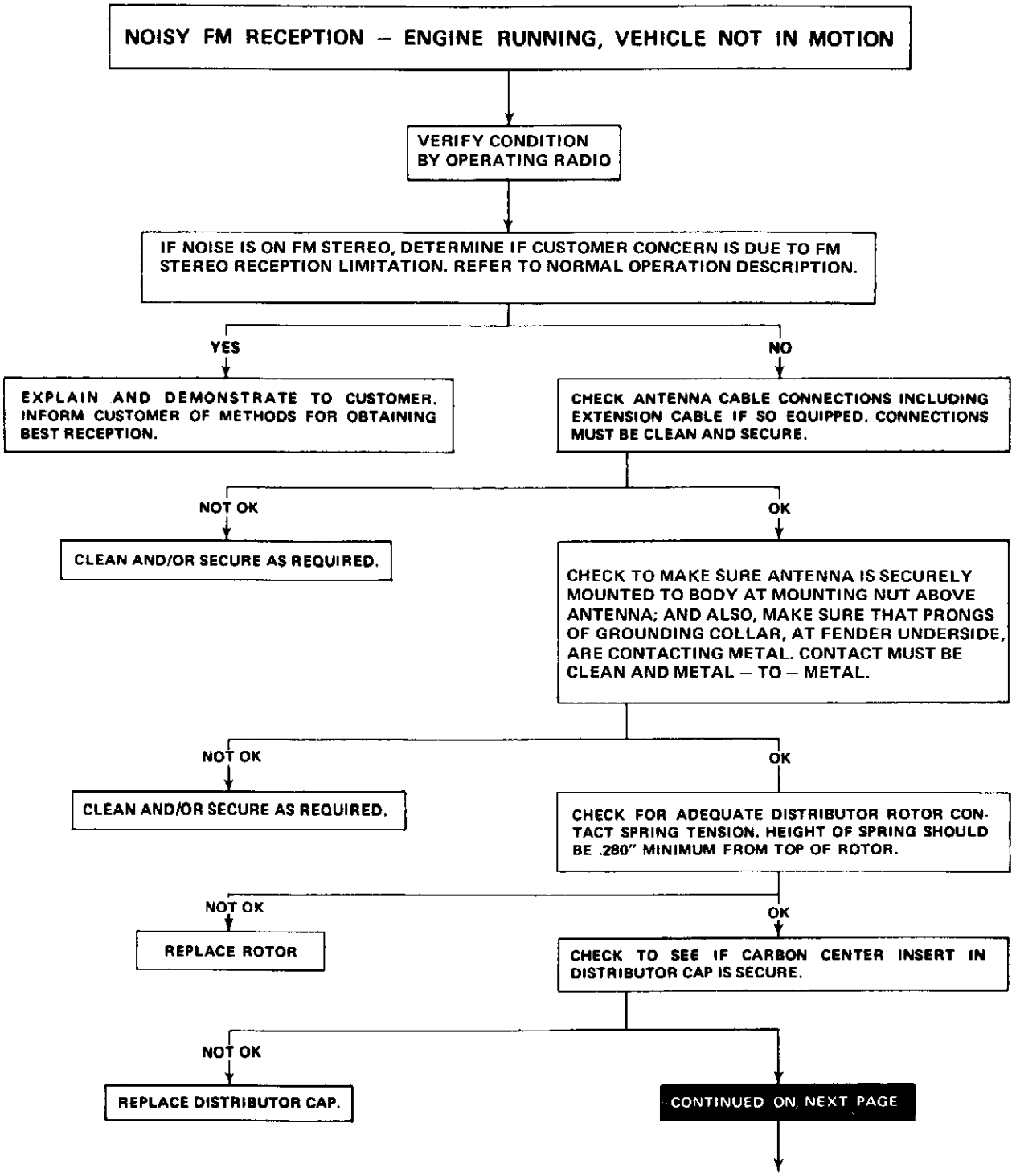


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NOTE: ALL SURFACES USED FOR GROUNDING MUST BE CLEAN TO ENSURE GOOD ELECTRICAL CONTACT. REMOVE ANY DIRT, RUST, GREASE PAINT, ECT.

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DETROIT IRON

NOISY FM RECEPTION – ENGINE RUNNING, VEHICLE NOT IN MOTION – Continued

CONTINUED FROM PREVIOUS PAGE

OK

CHECK SPARK PLUG WIRES FOR PROPER ROUTING AND SECURENESS OF CONNECTIONS.

NOT OK

REROUTE OR SECURE CONNECTIONS AS REQUIRED.

OK

CHECK IF WIRES ARE SUPPRESSOR TYPE AND IF SPARK PLUGS ARE THE CORRECT TYPE.

NOT OK

REPLACE SPARK PLUGS OR WIRES WITH THE CORRECT TYPE.

OK

CHECK IGNITION SYSTEM FOR PROPER OPERATION. (USE IGNITION SYSTEM ANALYZER OR CHECK FOR OPEN CIRCUIT SPARK PLUG WIRES USING OHMMETER.) ALSO CHECK SPARK PLUGS FOR CRACKED INSULATORS.

NOT OK

SERVICE OR REPLACE COMPONENTS AS REQ'D.

OK

CHECK ALL RADIO CHASSIS MOUNTING POINTS FOR SECURENESS, CLEANLINESS AND METAL – TO – METAL CONTACT.

NOT OK

CLEAN AND/OR SECURE AS REQUIRED.

OK

SUBSTITUTE A KNOWN GOOD ANTENNA BEING SURE TO GROUND ANTENNA BASE TO AN UNPAINTED METAL SURFACE.

ELIMINATES NOISE

REPLACE ANTENNA.

NO CHANGE

IF EQUIPPED WITH ANTENNA EXTENSION CABLE, SUBSTITUTE A KNOW GOOD CABLE.

ELIMINATES NOISE

REPLACE ANTENNA EXTENSION CABLE.

NO CHANGE

CHECK ALTERNATOR BY DISCONNECTING WIRING FROM VOLTAGE REGULATOR.

ELIMINATES NOISE

CHECK ALTERNATOR AS DIRECTED IN SHOP MANUAL. REPAIR OR REPLACE.

NO CHANGE

SUBSTITUTE KNOWN GOOD RADIO.

ELIMINATES NOISE

HAVE RADIO UNIT REPAIRED BY AUTHORIZED SERVICE CENTER.

NO CHANGE

CHECK TO SEE IF NOISE CAN BE ELIMINATED BY REPOSITIONING ANTENNA, SPEAKER OR RADIO POWER FEED WIRES.

ELIMINATES NOISE

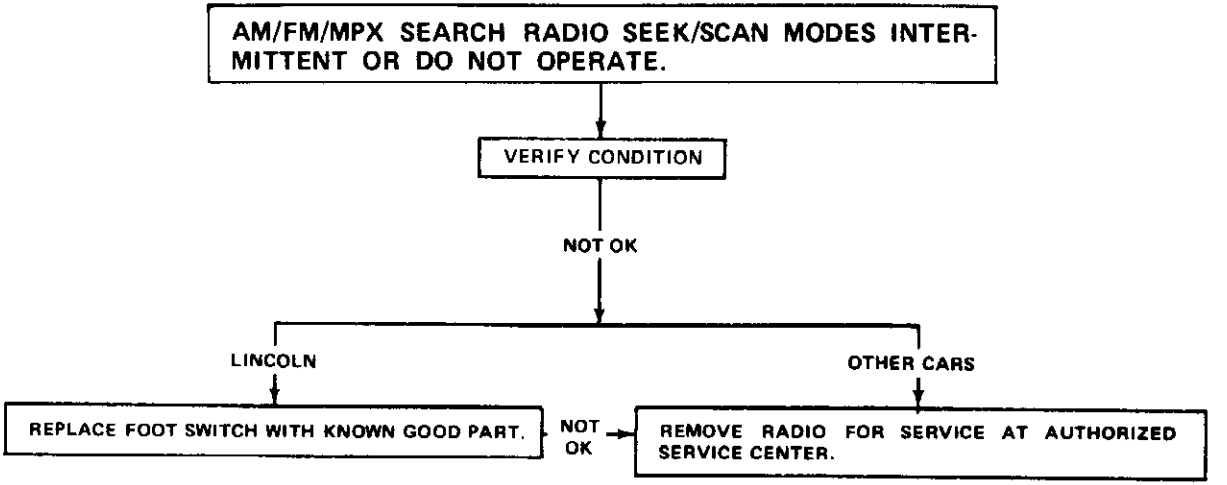
REPOSITION PERMANENTLY BY TAPING.

NOTE: ALL SURFACES USED FOR GROUNDING MUST BE CLEAN TO ENSURE GOOD ELECTRICAL CONTACT. REMOVE ANY DIRT, RUST, GREASE, PAINT, ETC.

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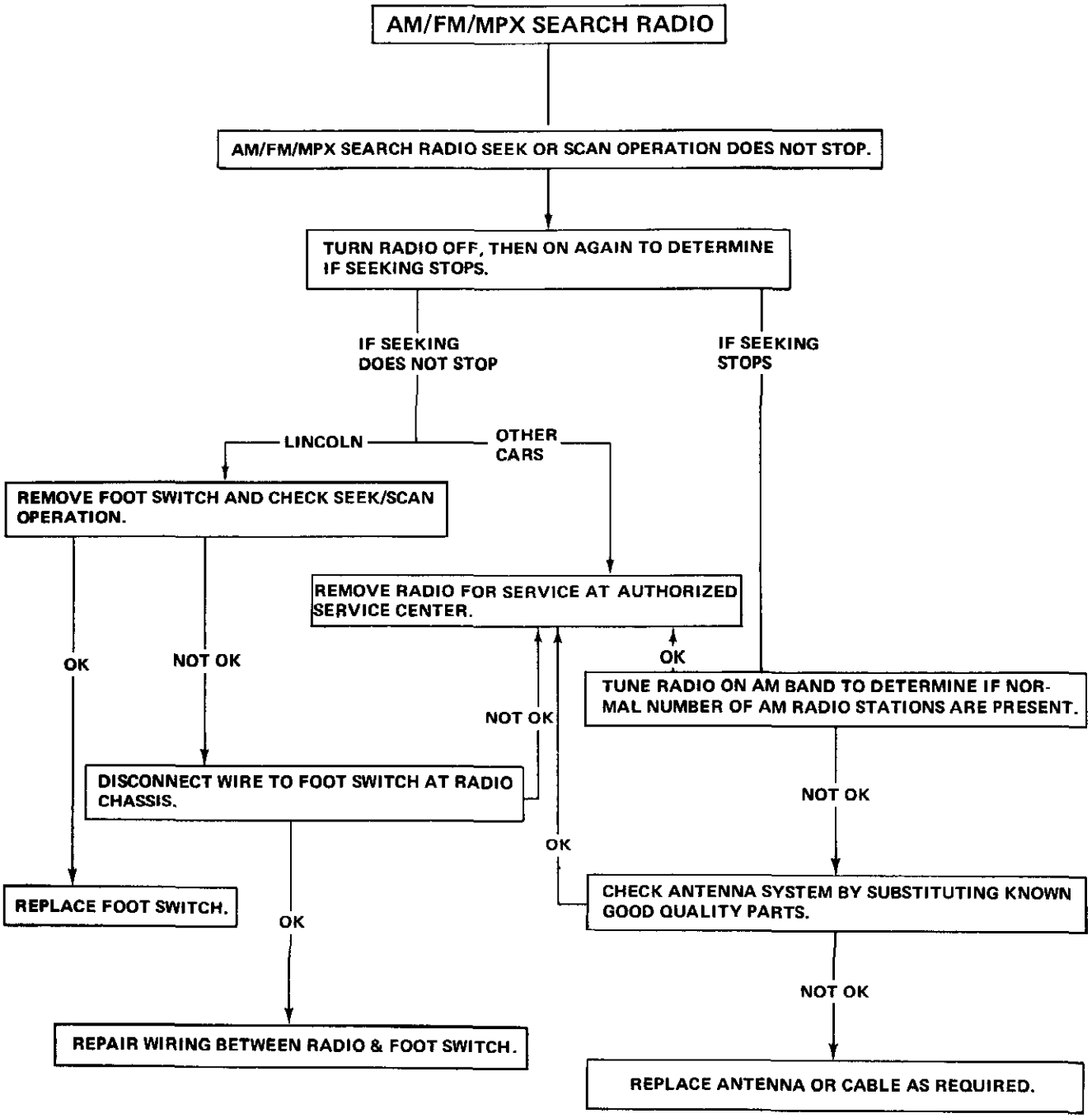
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AM/FM/MPX SEARCH RADIO



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RADIO IS INOPERATIVE, HAS WEAK RECEPTION OR IS INTERMITTENT

VERIFY CONDITION

CHECK FUSE IF RADIO IS INOPERATIVE.

NOT OK

REPLACE FUSE AND OPERATE ELECTRIC ANTENNA.

NOT OK

REFER TO ELECTRIC ANTENNA DIAGNOSIS.

OK

OPERATE RADIO.

IF FUSE DOES NOT BLOW AGAIN

RADIO SYSTEM IS OK.

IF FUSE BLOWS AGAIN

DISCONNECT RADIO, REPLACE FUSE, AND CHECK FOR FUSE SURVIVAL.

NOT OK

IF FUSE BLOWS TROUBLE IS IN THE WIRING – REPAIR AS NECESSARY.

OK

CHECK POWER FEED CABLE FOR PROPER CONNECTION.

NOT OK

CONNECT CABLE

OK

CHECK FOR POWER TO RADIO USING TESTLIGHT OR VOLTMETER.

NOT OK

REPAIR HARNESS TO RADIO.

OK

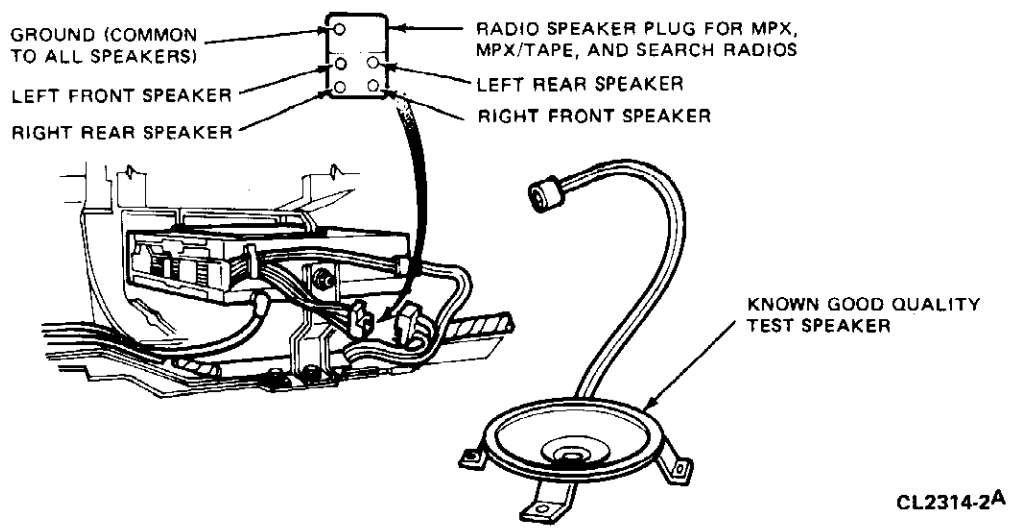
CHECK FOR DAMAGED ANTENNA CABLE. CHECK ANTENNA BY USING APPROPRIATE ANTENNA TEST. CHECK SPEAKER(S) AND ASSOCIATED WIRING BY SUBSTITUTING KNOWN GOOD QUALITY PARTS. CONNECT TEST SPEAKERS DIRECTLY INTO OUTPUT(S) OF RADIO.) SEE SKETCH BELOW.

NOT OK

REPAIR OR REPLACE ANTENNA OR SPEAKERS, AS REQUIRED.

OK

HAVE RADIO CHASSIS REPAIRED BY AUTHORIZED SERVICE CENTER.



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DETROIT IRON

TESTING

STEREO TAPE PLAYER AND CASSETTE TAPE PLAYER

During extremely cold weather operation, allow the unit to warm up approximately 5 minutes before testing.

Turn the player on by rotating the volume control (left knob) clockwise approximately 1/2 turn. Insert tool aid cartridge D6AA-19A043-CA for stereo tape player, and D8DF-19A199-CA (open end to the right) for cassette tape player. Set the tone control (ring knob behind the volume control) at full clockwise rotation. Let the tape run until music starts playing, then re-adjust the controls for desired volume, tone and fader. Listen for continuous music on all four programs. Recording will be heard for two seconds on Left channel, with Right channel blank, then for two seconds on the Right channel, with Left channel blank. Absence of recording on either channel constitutes a malfunction of that channel. Adjust the fader control for full rear, to insure operation of all four speakers. By successively pressing in on the volume control knob, the channels should switch in order 1 to 2 to 3 to 4 to 1 etc.

ADJUSTMENTS

PUSH BUTTONS

AM Radio

Pull out one of the push buttons to unlock the push button mechanism. Tune in the desired station with the manual tuning knob. After the station is clearly tuned in, push the button straight in until it stops, then release it.

Repeat this procedure for the remaining buttons. You can frequently get better reception by "fine tuning" with the manual control after using a push button.

AM-FM Monaural Radio

The AM-FM-Monaural Radio push buttons can be set to a total of any (5) AM and (5) FM stations.

Slide the band selector bar to the left for AM station selection and follow the push button setting procedure described under AM radio. Slide the selector bar to the right for FM station selection and follow the push button setting procedure described under AM radio.

AM-FM-MPX Stereo Radio

The AM-FM-MPX Stereo Radio push buttons can be set to (5) AM stations and (5) FM or FM stereo stations.

CAUTION: DO NOT OPERATE THE BAND SELECTOR BAR IF ANY PUSHBUTTON IS PULLED OUT.

Slide the band selector bar to the left for AM station selection and follow the push button setting procedure described under AM radio. Slide the band selector bar to the right for FM and FM stereo station selections and once again, follow the push button setting procedure described under AM radio.

AM-FM Stereo Radio and Tape Player or Cassette Tape Player

The AM-FM Stereo Radio (with tape or cassette tape player) push buttons can be set to (5) AM stations and (5) FM stations.

CAUTION: DO NOT PRESS THE FM OR AM BAND SELECTOR BUTTON WHEN ONE OF THE PUSH BUTTONS IS PULLED OUT.

Push the AM selector button (right side) and follow the push button setting procedure described under AM radio. Push the FM selector button (left side) and once again, follow the push button setting procedure described under AM radio.

AM Radio with Stereo Tape Player

The AM radio (with stereo tape player) push buttons can be set to (5) AM stations.

Allow radio to warm up for (5) minutes, and follow procedure described under AM Radio for pushbutton setting.

AM-FM Stereo Radio and Quadrosonic Tape Player

The AM-FM stereo radio and quadrosonic tape player push buttons can be set to (5) AM stations and (5) FM or FM stereo stations.

CAUTION: DO NOT PRESS THE AM OR FM BUTTON WHEN ONE OF THE PUSHBUTTONS IS PULLED OUT.

Allow the radio to warm up for (5) minutes and follow procedure described under AM-FM Stereo Radio and Tape Player.

AM-FM Stereo Town and Country Search Radio

The AM-FM stereo Town and Country search radio can be manually pre-set by pushbuttons as described under AM-FM stereo radio, or it can seek automatically AM, FM or FM stereo stations.

The upper left hand control is a momentary contact switch. Depressing the SEEK button will cause the radio to search out and stop at the next station on the dial.

The upper right-hand control is a momentary contact switch. Depressing the SCAN button will cause the radio to search out the next station, play that station for approximately 8 seconds and then continue the scan cycle. At the desired station, the scan cycle may be stopped by pusing the SCAN button again prior to the end of the 8-second dwell period.

CAUTION; THE PUSH BUTTONS MUST ALL BE SET BEFORE THE BAND SELECTOR BAR WILL OPERATE. DO NOT OPERATE THE BAND SELECTOR BAR IF ANY PUSH BUTTON IS PULLED OUT.

In the upper center control there is a slide switch for Town, Country and Stereo modes. The Town

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mode will stop only on stations with strong signals. The Country mode will stop on all stations, and the Stereo will stop only FM stereo stations. The band selector bar must be in the FM position for the Stereo mode.

STEREO SPEAKER BALANCE ADJUSTMENT

The speaker balance adjustment on the Stereo Tape player can be made through the tape door. However, only in extreme cases of speaker imbalance, should a speaker balance adjustment be made.

1. Properly adjust the receiver to an FM broadcast and allow unit to operate for (5) minutes. The stereo jewel should not be illuminated.
2. Open the tape door and with a screwdriver, slowly rotate the adjusting screw. Turning the screw to the right increases the volume of the right speakers. Turning the screw to the left increases the volume of the left speakers.
3. Test speaker balance with a quality tape.

NOTE: The speaker balance adjustment on the AM-FM Stereo Radio can be made with the slide lever under the pushbuttons.

ANTENNA TRIMMER

Fading or weak AM radio reception due to an inadequate signal pick-up may, in some instances, be corrected by adjusting the antenna trimmer. The trimmer is located at the right rear or the front side of the radio. **It must be noted that fading or weak reception may be due to an improperly extended antenna, faulty antenna or radio.**

1. Inspect the antenna lead-in plug and socket to be sure that they are clean. Clean them if required.
2. Extend the antenna to its maximum length and position the vehicle in an open area away from steel buildings.
3. Turn the radio on.
4. Tune the radio to a weak station around 1600 KC (16 on the dial). Adjust the volume control so that the station is barely audible.
5. Adjust the antenna trimmer to obtain maximum volume from the station.

REMOVAL AND INSTALLATION

RADIO AND/OR TAPE PLAYER

Ford, Mercury and Lincoln Continental

Removal

1. Disconnect the battery ground cable.
2. Remove the radio knobs and the screws attaching the bezel-to-instrument panel (Fig. 1).
3. Remove the radio mounting plate attaching screws.
4. Pull the radio to disengage it from the lower rear support bracket.

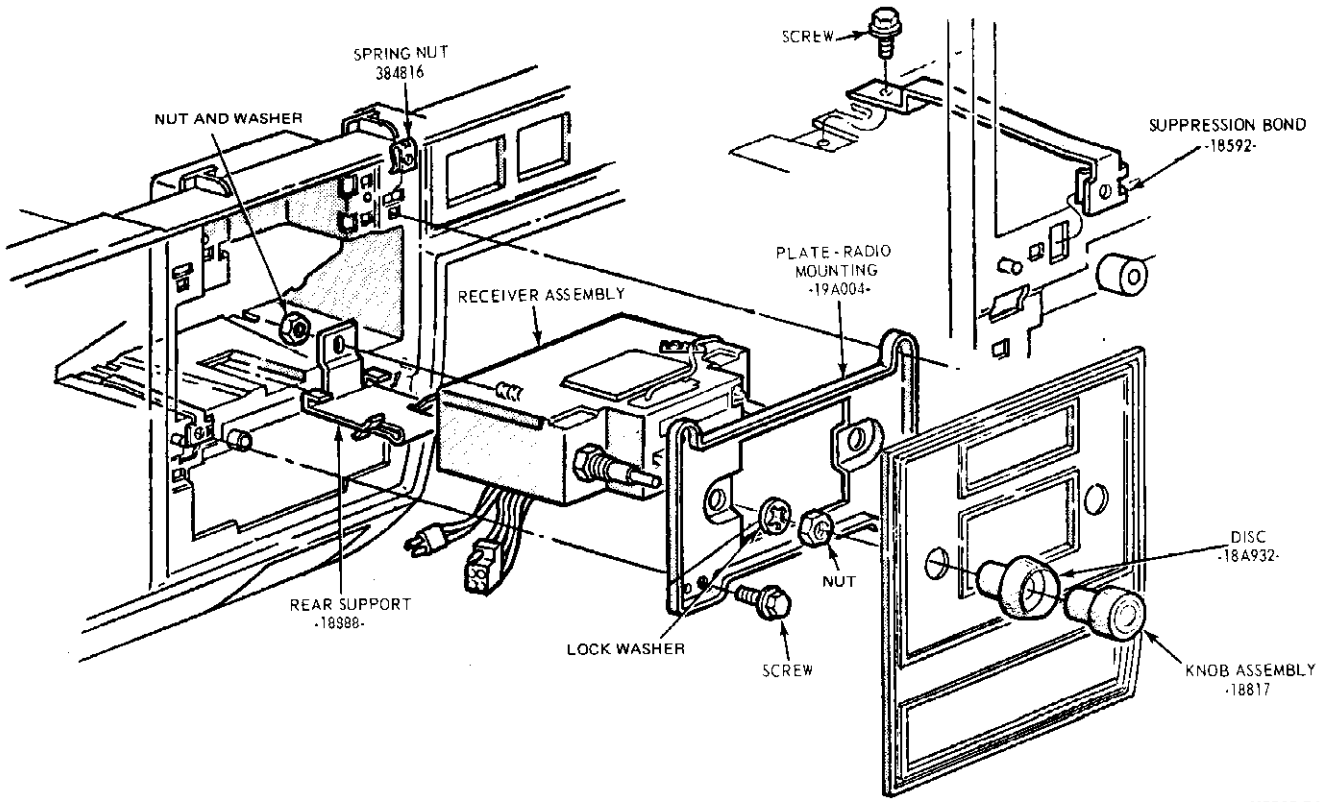


FIG. 1 Radio Installation—Ford, Mercury and Lincoln Continental

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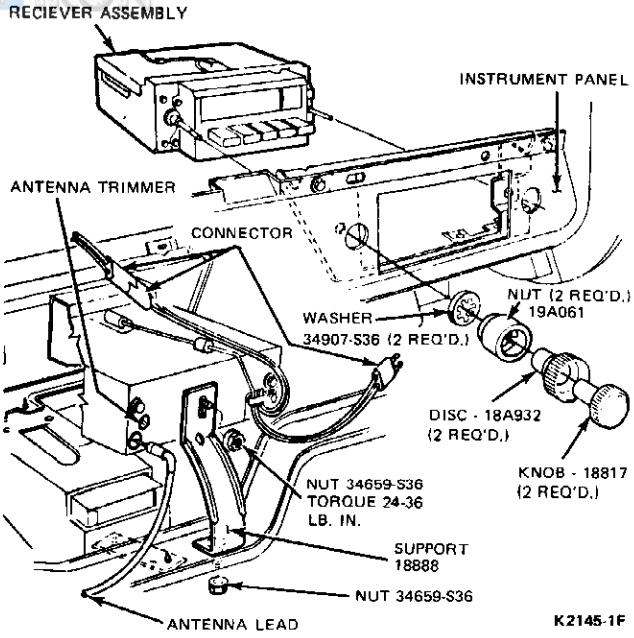


FIG. 2 Radio Installation—LTD II, Thunderbird and Cougar

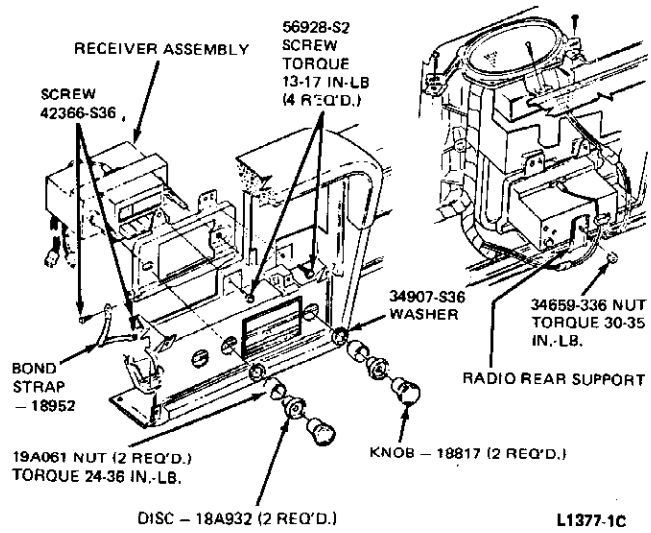


FIG. 3 Radio Installation—Mustang II

5. Disconnect the power, antenna and speaker leads and remove the radio.
6. Remove the radio to mounting plate retaining nuts and washers and remove the mounting plate.
7. Remove the rear upper support retaining nut and remove the support.

Installation

1. Position the rear upper support to the radio and install the retaining nut.
2. Position the mounting plate to the radio and install the retaining nuts and washers.
3. Position the radio part way into the instrument panel and connect the power lead, antenna speaker leads.
4. Push the radio in to engage the lower rear support bracket and attach the radio assembly to instrument panel with screws.
5. Install the radio right hand bezel-to-instrument panel (2) screws and radio discs and control knobs.
6. Connect the battery ground cable.
7. Adjust the radio push buttons for the desired stations.

LTD II, Thunderbird and Cougar

Removal

1. Disconnect the battery ground cable.
2. Remove the radio knobs, discs, control shaft nuts and washers.
3. Remove the radio rear support to instrument panel attaching nut. (Fig. 2).
4. Lower the radio and disconnect the power lead, speaker lead and antenna cable-lead-in wires from the radio chassis.

Installation

1. Connect the power lead, speaker and antenna cable lead-in wires to the radio chassis.
2. Position the radio to the instrument panel and install the two bezel washers and nuts.
3. Install the radio rear support bracket-to-instrument panel attaching nut.
4. Connect the battery ground cable.
5. Install the radio control discs and knobs, set the push buttons for the desired stations and check the radio for operation.
6. Adjust the antenna trimmer, if necessary.

Mustang II

Removal

1. Disconnect the battery ground cable.
2. Remove the radio knobs, discs, control shaft nut and washers (see Fig. 3).
3. Remove ashtray.
4. Remove the radio rear support-to-instrument panel attaching nut and lower attaching bolt.
5. Lower the radio and disconnect the power lead and antenna cable lead-in wires from the radio chassis.

Installation

1. Connect the power lead, speaker and antenna cable lead-in wires to the radio chassis.
2. Position the radio to the instrument panel and install the two bezel washers and nuts.
3. Replace the lower attaching bolt through the ashtray when installing the rear support bracket to instrument panel attaching nut.
4. Connect the battery ground cable.
5. Install the radio control discs and knobs, set the push buttons for the desired stations and check the radio for operation.
6. Adjust the antenna trimmer, if necessary.

Fairmont and Zephyr

Removal

1. Disconnect the battery ground cable. Remove seat belt interlock module located below radio.
2. Disconnect power lead, speaker leads and antenna lead-in-cable from the radio receiver (Fig. 4).

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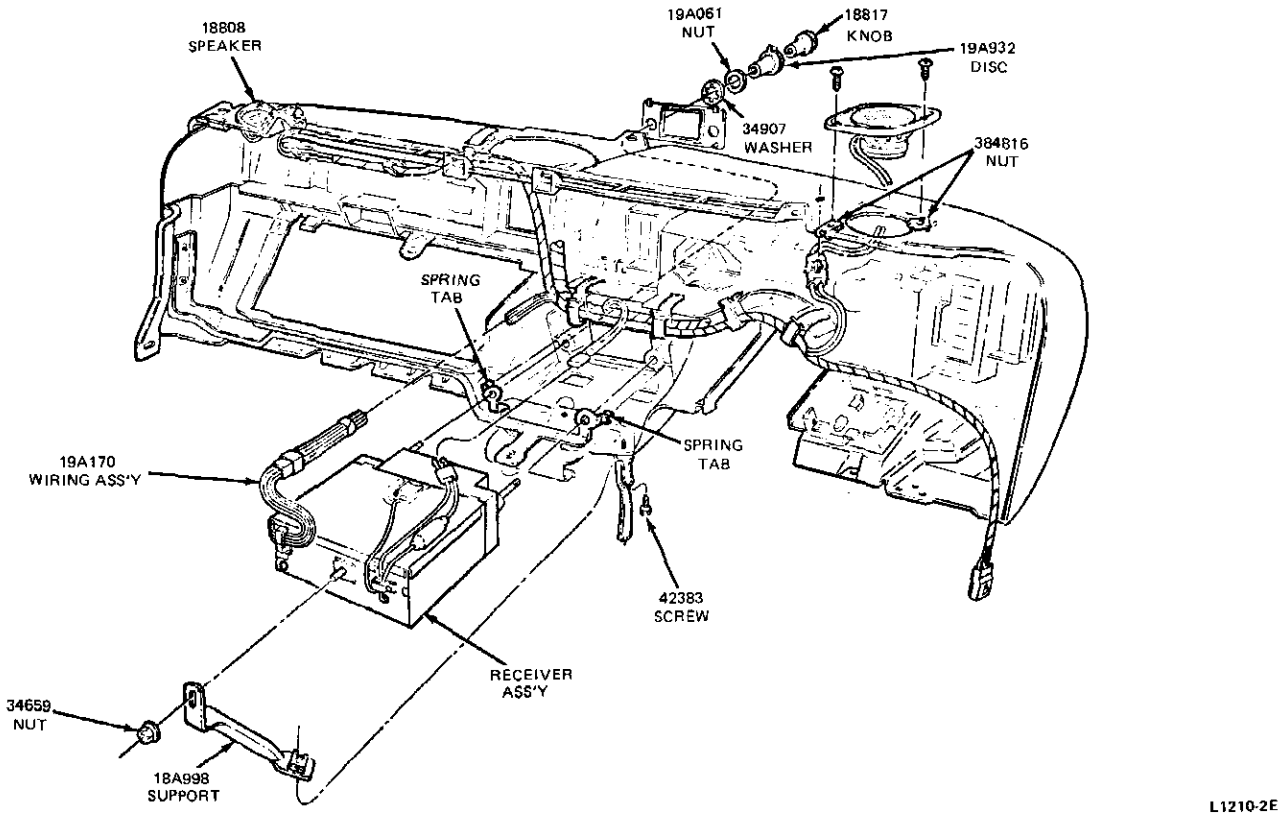


FIG. 4 Radio Installation—Fairmont and Zephyr

3. Remove the control knobs, discs, control shaft nuts and washers.
4. Remove the radio rear support attaching nut.
5. Remove radio receiver from bezel and rear support then lower from instrument panel.

Installation

1. Position the radio under the instrument panel and install into the bezel and rear support.
2. Install nut finger tight on attachment to rear support.
3. Install washers and nuts on control shafts and tighten to specification.
4. Tighten the rear support nut.
5. *Connect power lead, speaker leads and antenna* to the radio receiver.
6. Install discs and knobs. Install seat belt interlock module.
7. Connect battery ground cable, check radio for operation and set the push buttons.
8. Adjust the antenna trimmer, if necessary.
9. Ensure that the ground strap engine-to-dash panel is properly connected (Fig. 5).

Pinto and Bobcat

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument panel trim brace cover.
3. Remove the rear support-to-radio attaching bolt (Fig. 6).
4. Remove four screws attaching the bezel to the instrument panel opening.
5. Pull the radio out from the instrument panel and disconnect the speaker wires, power wire and the antenna lead-in cable. Then, remove the radio.
6. Remove the knob and disc from each control shaft.
7. Remove the nuts and washers from the control shafts, and remove the bezel from the radio.

Installation

1. Position the bezel to the radio and install the washers and retaining nuts (Fig. 6).
2. Install the disc and knob on each control shaft.
3. Connect the speaker wires, power wire and antenna lead-in cable to the radio.
4. Position the radio into the instrument panel opening, and install the four bezel-to-instrument panel attaching screws.
5. Install the rear support attaching screw and the instrument panel brace trim cover.
6. Connect the engine-to-dash ground cable (Fig. 7).

Continental Mark V

Removal

1. Disconnect the battery ground cable.
2. Pull the radio knobs and discs from the shafts.
3. Remove the nut and washer from both radio control shafts (Fig. 8).
4. Remove two screws attaching the twilight sentinel amplifier and lower the amplifier.

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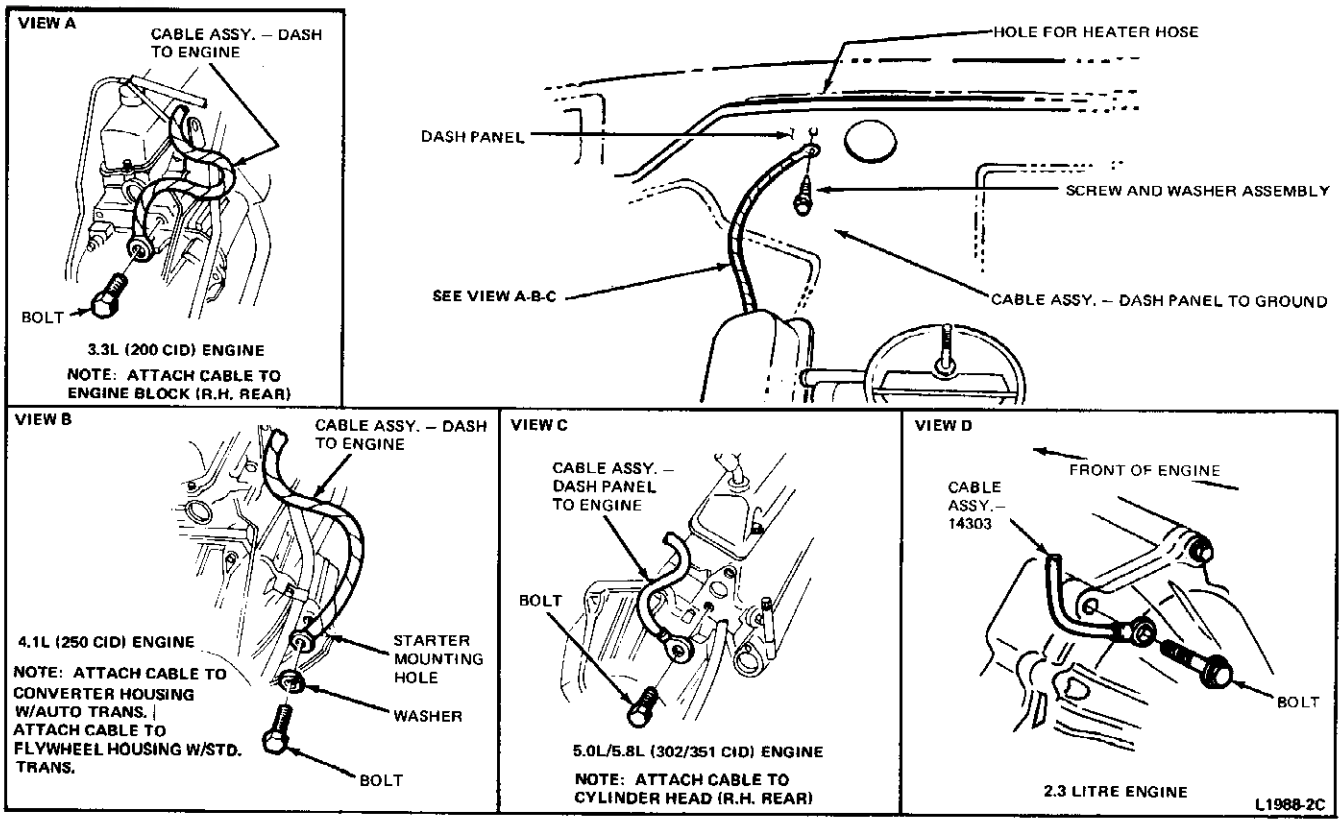


FIG. 5 Ground Cable Engine to Dash Panel—Breakerless Ignition With or Without Radio—Fairmont, Zephyr, Granada and Monarch

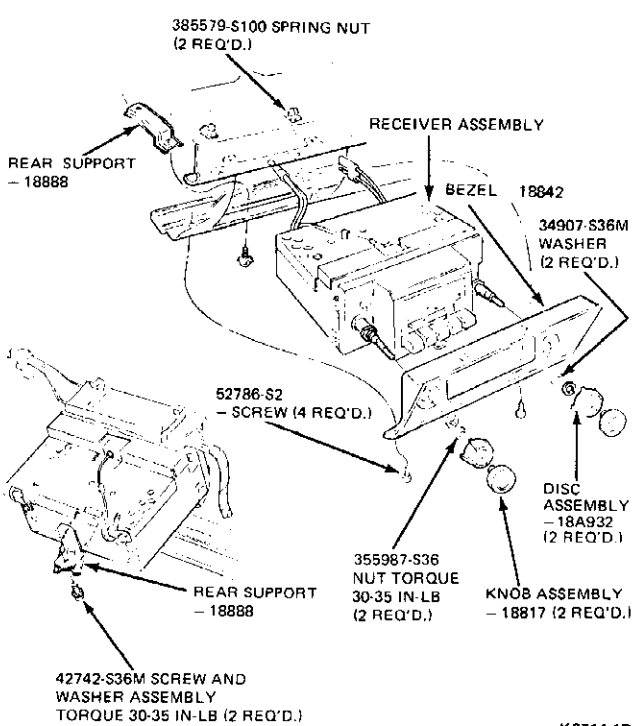


FIG. 6 Radio Installation—Pinto and Bobcat

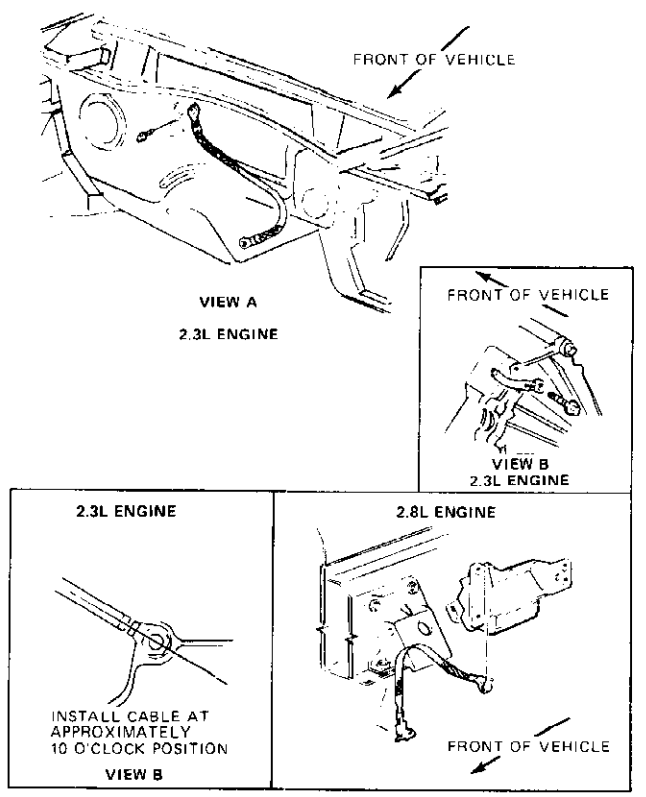


FIG. 7 Ground Cable; Engine to Dash Panel—Pinto, Bobcat and Mustang II

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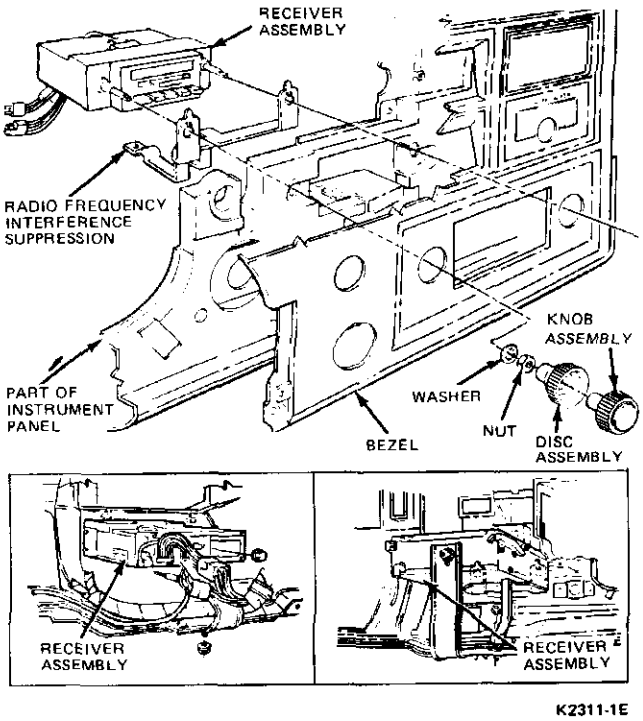


FIG. 8 Radio Installation—Continental Mark V

5. Remove two screws attaching the air conditioning duct beneath the radio and remove duct.
6. Remove the radio rear support-to-panel attaching screw.
7. Disconnect the radio power lead and speaker lead at the connectors.
8. Disconnect the antenna cable lead-in and remove the radio.

Installation

1. Connect the power lead, speaker lead and antenna cable lead-in to the radio chassis.
2. Position the radio to the instrument panel.
3. Install the washers and nuts on the control shafts. Tighten to specification.
4. Install the radio rear support attaching screw. Tighten to specification.
5. Install the discs and knobs to the control shafts.
6. Install the twilight sentinel amplifier and attach with two screws. Tighten screws to specifications (if removed).
7. Install the air conditioning duct with two screws.
8. Connect the battery ground cable.
9. Check the operation of the radio and set the push buttons. Adjust antenna trimmer if required.

Monarch, Granada and Versailles

Removal

1. Disconnect the battery ground cable.
2. Remove the headlamp switch from the instrument panel applique.
3. Remove all knobs for heater, air conditioner, windshield wiper/washer and radio receiver knobs and discs.
4. Remove six (6) screws attaching instrument panel applique to instrument panel and remove applique.
5. Disconnect antenna lead-in cable from radio.
6. Remove four (4) screws attaching radio bezel to instrument panel and slide radio and bezel out of the lower rear support bracket and instrument panel opening toward the passenger compartment far enough to disconnect the power lead and speaker leads from the radio receiver and remove radio (Fig. 9).
7. Remove nut attaching rear support bracket to radio and remove bracket.
8. Remove nuts and washers from control shafts and remove bezel from radio.

Installation

1. Install rear support bracket on radio receiver. Install attaching nut and torque to specification.
2. Install radio bezel on radio. Install attaching washers and nuts on radio shafts and torque to specifications.
3. Insert radio with bezel and rear support bracket through instrument panel opening far enough to connect the power lead, speaker leads and antenna lead-in cable. Then insert radio upper rear support bracket into lower rear support bracket.
4. Center radio and bezel into instrument panel opening and attach bezel with four (4) screws and torque to specification.
5. Install instrument panel applique to panel and attach with six (6) screws. Torque screws to specification.
6. Install knobs on heater, air conditioner, windshield wiper/washer. Install radio receiver discs and knobs. Install headlamp switch on instrument panel.
7. Connect battery ground cable. Check the radio for operation, set the push buttons and adjust antennna trimmer, if necessary.
8. Ensure the ground strap engine-to-dash panel is properly connected.

RADIO INTERFERENCE SUPPRESSION

The interference suppression equipment installations for the various models are shown in Fig. 10.

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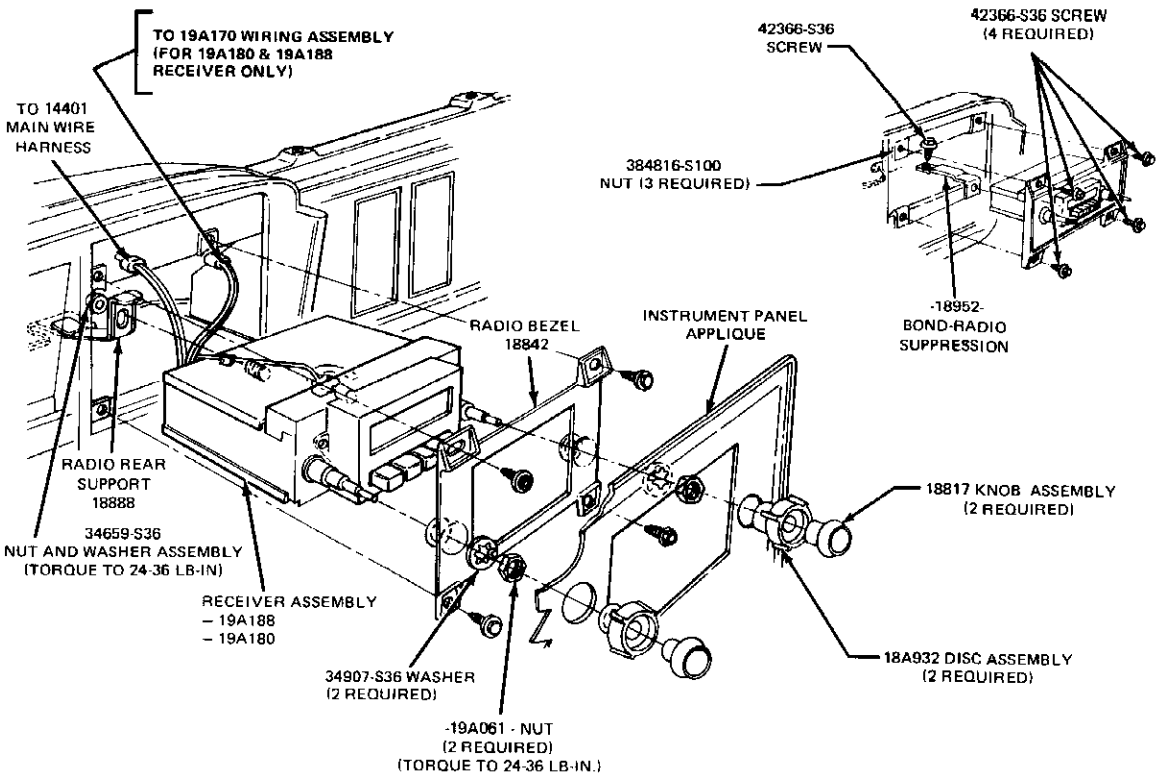
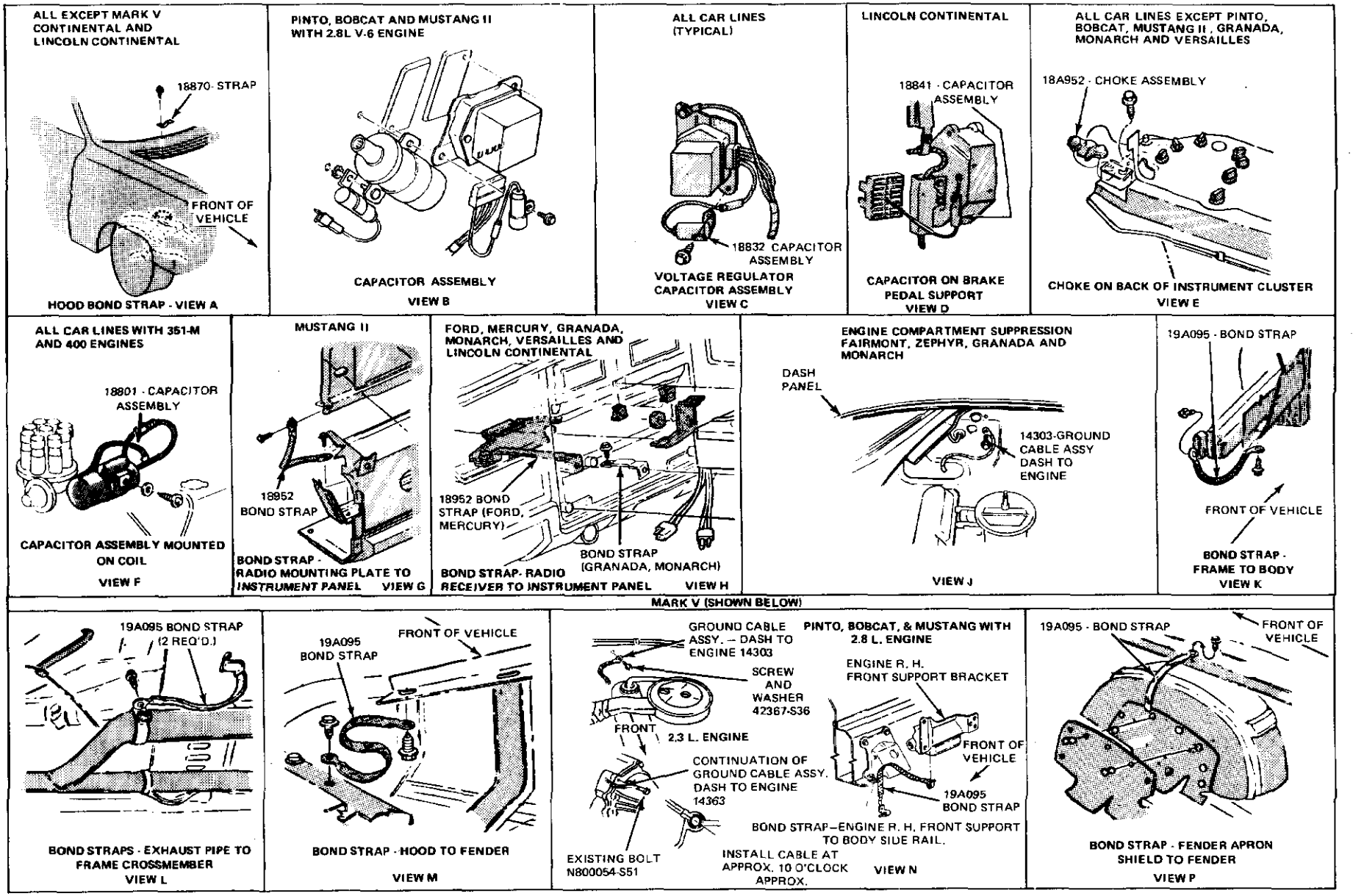


Fig. 9 Radio Installation—Granada, Monarch and Versailles

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L1405-2G

FIG. 10 Radio Interference Suppression

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CLEANING

STEREO TAPE PLAYER HEAD AND CAPSTAN

The playback head and capstan in the tape player may accumulate tape coating residue (oxide) as the tape passes over the head. This accumulation may need to be periodically removed as part of normal maintenance, if it causes weak or wavering sound. This should be done by holding the player door open and cleaning the playback head with a cotton swab, slightly moistened with alcohol. To clean the capstan, trip the on-off switch at the slot with the eraser end of a pencil and hold the alcohol moistened swab against the rotating capstan. **Excess alcohol on the swab may run down the capstan and damage the bearings. Do not use carbon tetrachloride.**

SPECIFICATIONS

The locations of the radio fuses in the various vehicles fuse panels are shown in Group 34, Part 30.

All torque specifications are shown in the appropriate Figs.

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Antennas -- Standard

PART 35-10

Applies to All Models

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REMOVAL AND INSTALLATION	
Antenna	10-6
REMOVAL AND INSTALLATION (Cont'd.)	
Antenna Base	10-8
Antenna Cable	10-8
Antenna Mast	10-8

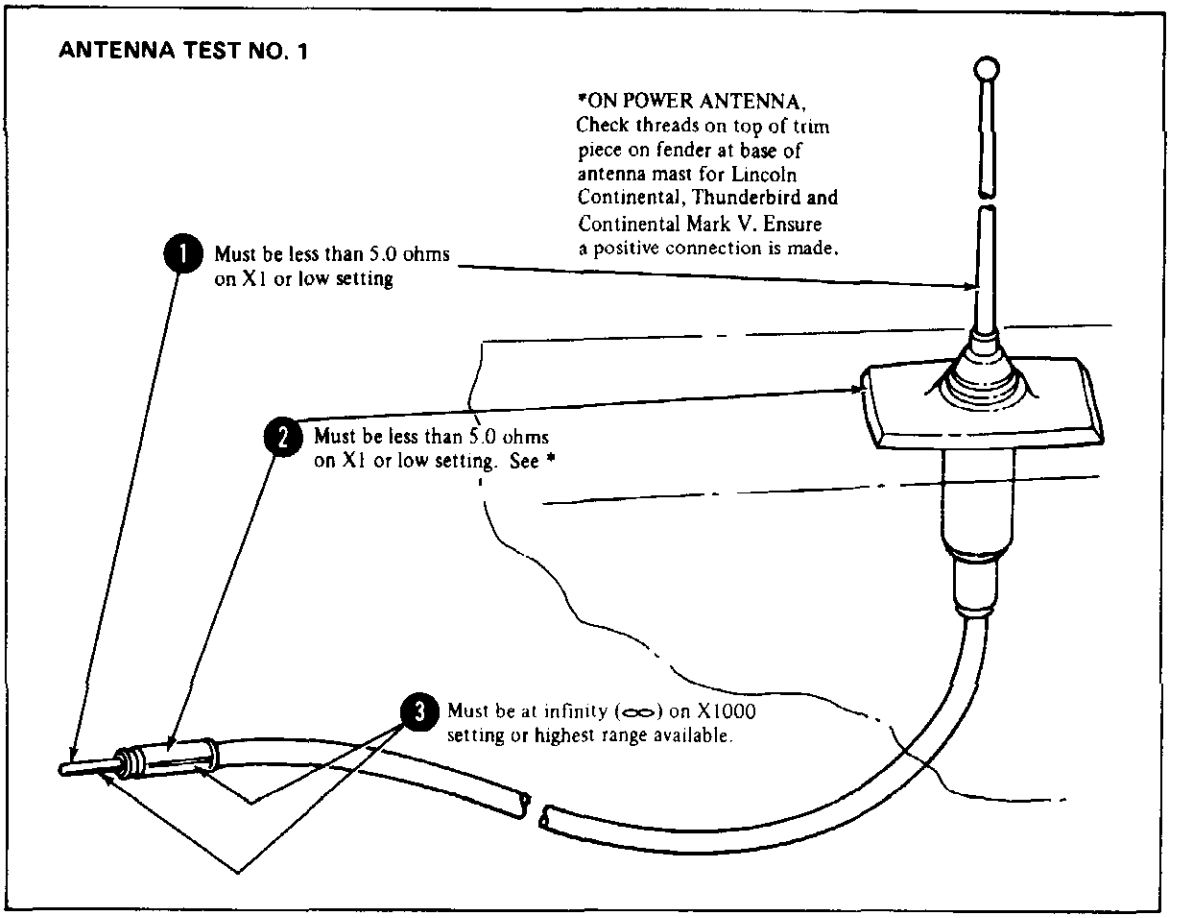
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DIAGNOSING

RADIO ANTENNA TEST (ALL ANTENNA TYPES)

With antenna installed on vehicle and cable unplugged from radio, perform the following resistance tests with an ohmmeter. Probes must contact antenna at points specified by arrowheads.



RESULTS

If ohmmeter tests are satisfactory – the antenna is good.

ACTION

If any ohmmeter reading is unsatisfactory take the following action:

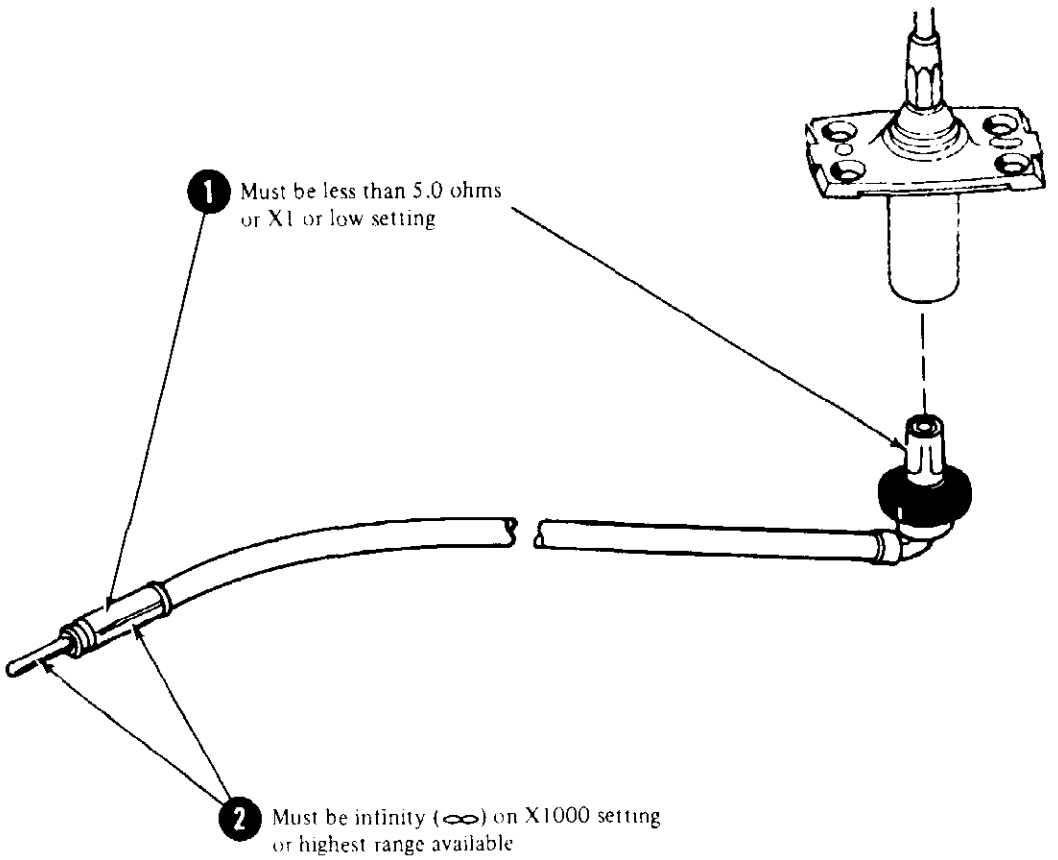
- If one piece assembly, replace the complete antenna and cable assembly.
- If detachable cable and mast, perform antenna test No. 2 and 3.
- If power antenna, perform antenna test No. 4.
- If manual antenna with extension cable, perform antenna test No. 4.

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TESTING ANTENNA EQUIPPED WITH DETACHABLE CABLE AND MAST.

When results in test No. 1 have been unsatisfactory, disconnect the antenna mast and base from the cable. Refer to Shop Manual for procedures. Perform the following tests:

ANTENNA TEST NO. 2



RESULTS

If ohmmeter readings are satisfactory, the cable is good. Perform Antenna Test No. 3.

ACTION

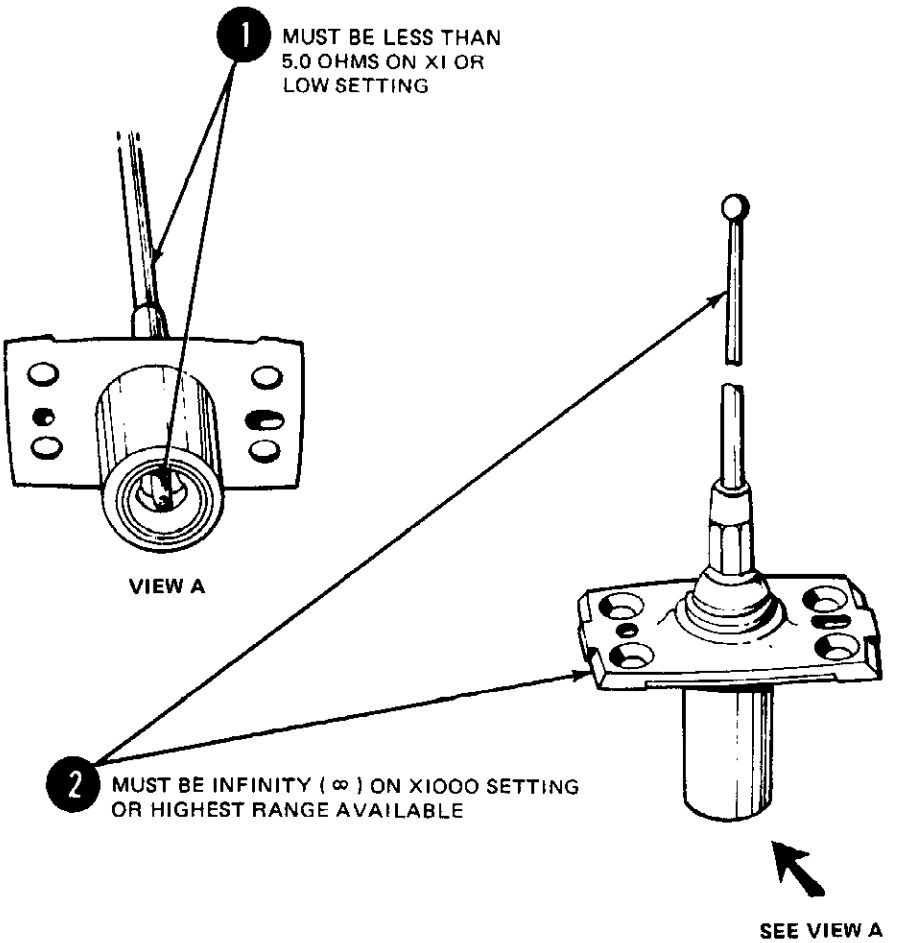
If either reading is unsatisfactory, replace the cable.

CL2315-2A2

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DETROIT IRON

ANTENNA TEST NO. 3



RESULTS

IF OHMMETER READINGS ARE SATISFACTORY, ANTENNA MAST AND BASE ARE GOOD, REPLACE CABLE.

ACTION

IF EITHER READING IS UNSATISFACTORY, REPLACE ONLY THE BASE ASSEMBLY. THE MAST SHOULD BE GOOD.

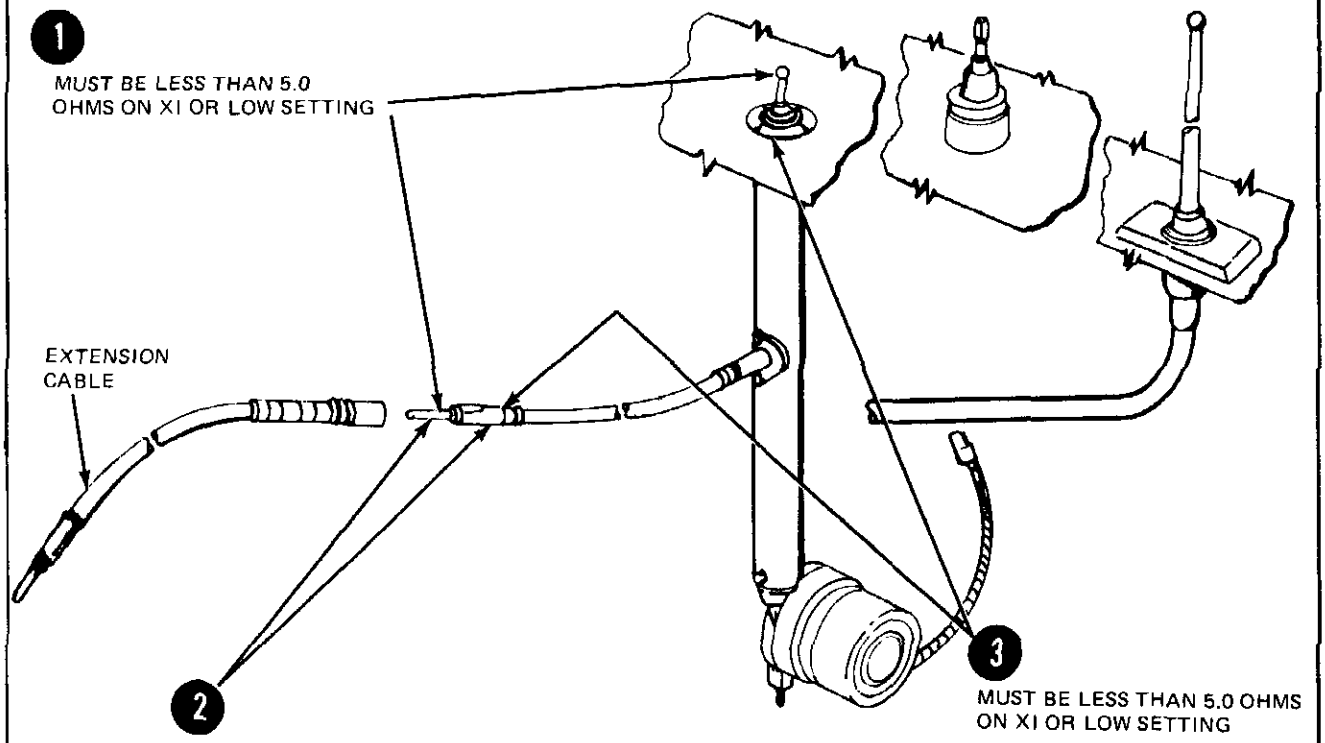
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ANTENNA TEST NO. 4

THUNDERBIRD (POWER) & CONTINENTAL MARK V

MERCURY & LINCOLN CONTINENTAL

THUNDERBIRD (MANUAL) & GRANADA MONARCH



NOTE: CHECK AT TRIM PIECE ON FENDER AT BASE OF ANTENNA FOR POSITIVE CONNECTION.

RESULTS

IF ANY OHMMETER READING IS UNSATISFACTORY, REPLACE MOTOR AND TUBE ASSEMBLY OR ANTENNA AND CABLE ASSEMBLY, AS REQUIRED.

ACTION

IF ALL RESULTS ARE SATISFACTORY, MOTOR AND TUBE OR ANTENNA AND CABLE ASSEMBLY IS GOOD, REPLACE EXTENSION CABLE.

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REMOVAL AND INSTALLATION

ANTENNA

MUSTANG

Removal

1. Disconnect the antenna lead-in cable from the connector at the right side of the radio and the two routing clips (Fig. 1).
2. Remove the snap-on cap and four screws retaining the antenna to the fender.
3. Remove the antenna locating clips in the hinge pillar area. Tie a piece of twine to the antenna lead-in cable for use as pull-line during antenna installation.
4. Pull out the grommet and remove the antenna assembly.

Installation

1. Mark the location of the locating clips on the new antenna lead-in cable and transfer the clips and twine to the new antenna.
2. Remove grommet (1" x 2") from the hinge pillar inside of the vehicle.
3. Pull the grommet in place, fasten the locating clips, position the antenna cable to the two retainers and connect the antenna lead-in cable to the radio.
4. Insert the antenna lead-in cable into the fender opening and route the lead-in wire through the hinge pillar area to the inside of the vehicle. Thread antenna cable through grommet (1" x 2") and install grommet (1" x 2") in the hinge pillar.
5. Install the antenna-to-fender retaining screws and install the cap.

LTD II, THUNDERBIRD AND COUGAR

1. Disconnect the antenna lead-in cable from the rear of the radio receiver. Tie a string to the end of the antenna lead. Pull the grommet from the seated position and remove the cable from the routing clips (Fig. 2).
2. Remove the antenna cap, four screws and remove the antenna assembly.
3. Tie the string to the new antenna lead.
4. With the front right door OPEN, position the antenna assembly in the fender opening, transfer the locating clips on the antenna and install the antenna.
5. Pull the antenna lead through the opening and route the cable under the glove box. Connect the lead to the radio.

FAIRMONT AND ZEPHYR

1. Disconnect the antenna lead from the side of the radio receiver and remove the clips retaining the lead to the instrument panel (Fig. 3). Tie a string to the end of the antenna lead in cable for use as a pull line during antenna installation.

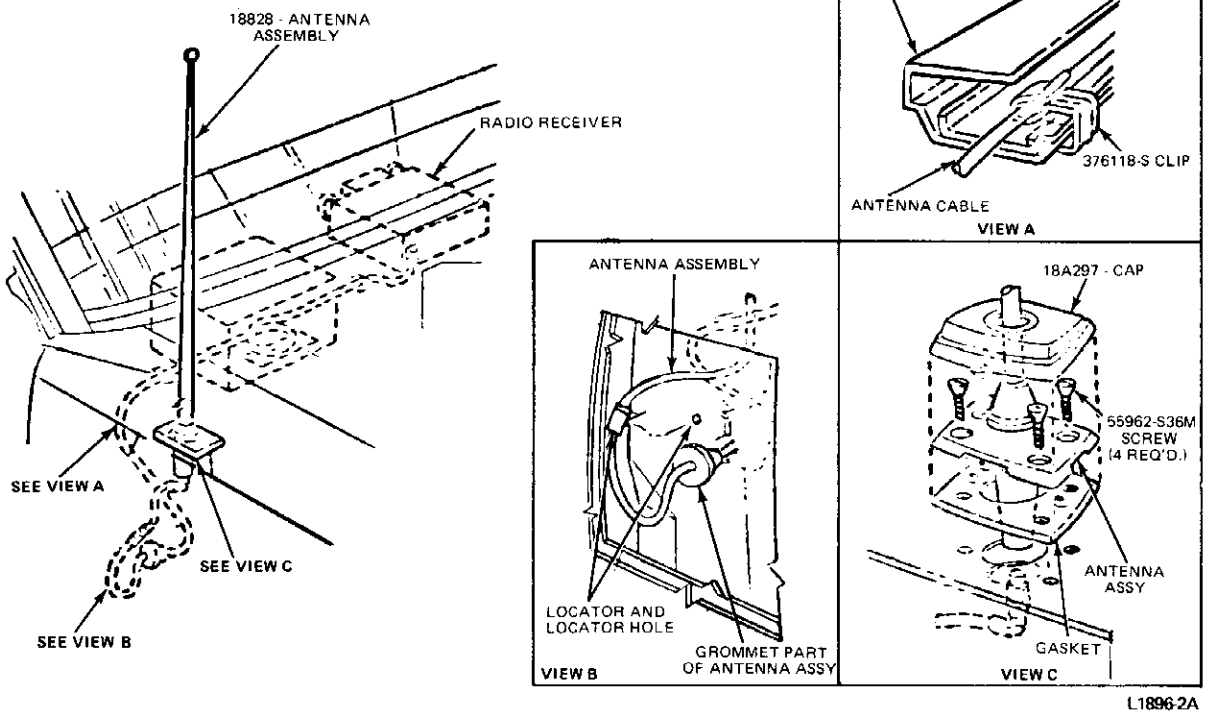


FIG. 1 Antenna Installation—Mustang

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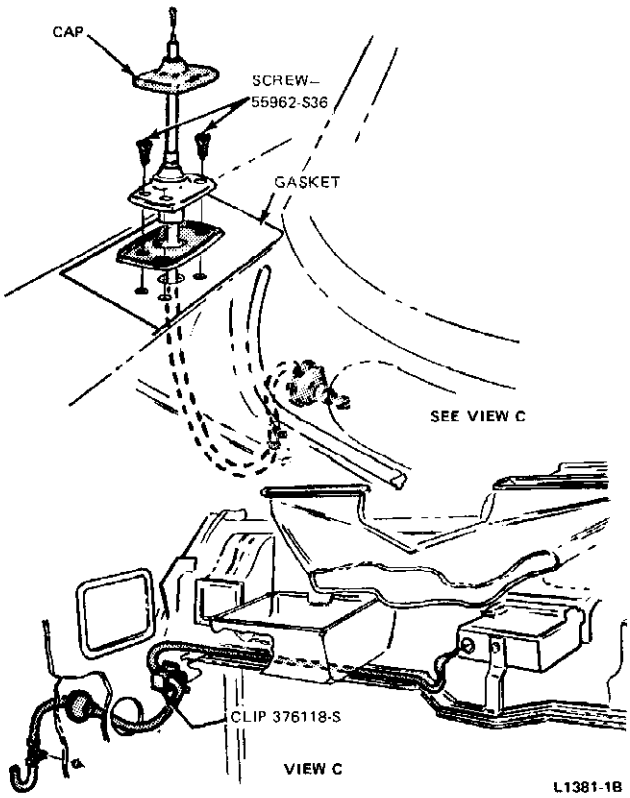


FIG. 2 Antenna Installation—LTD II, Thunderbird and Cougar

2. Remove the antenna cap, four screws, pull the cable through the hole and remove the antenna assembly.
3. Tie the string to the new antenna lead.
4. Position the antenna assembly in the fender opening, put the gasket in position on the antenna and install the antenna base to the fender (Fig. 3).
5. Using the string, pull the antenna lead through the opening, install the retaining clips and connect the lead to the radio.

PINTO AND BOBCAT

Removal

1. Disconnect the antenna connector at the rear of the radio (Fig. 4) and remove the clips retaining the cable to the instrument panel.
2. Remove the snap-on cap and four screws retaining the antenna to the fender, and remove the antenna assembly (Fig. 4).
3. Tie the string to the new antenna lead.
4. Position the antenna assembly in the opening, transfer the locating clips on the antenna and install the antenna.
5. Pull the antenna lead through the opening and route the lead under the glove box and connect the lead to the radio.

GRANADA AND MONARCH

Removal and Installation

1. On cars with air conditioning, remove 3 screws attaching sight shield to lower right-hand reinforcement of instrument panel and remove shield.
2. Remove radio from instrument panel using instructions described under Radio—Removal and Installation, Part 35-01.

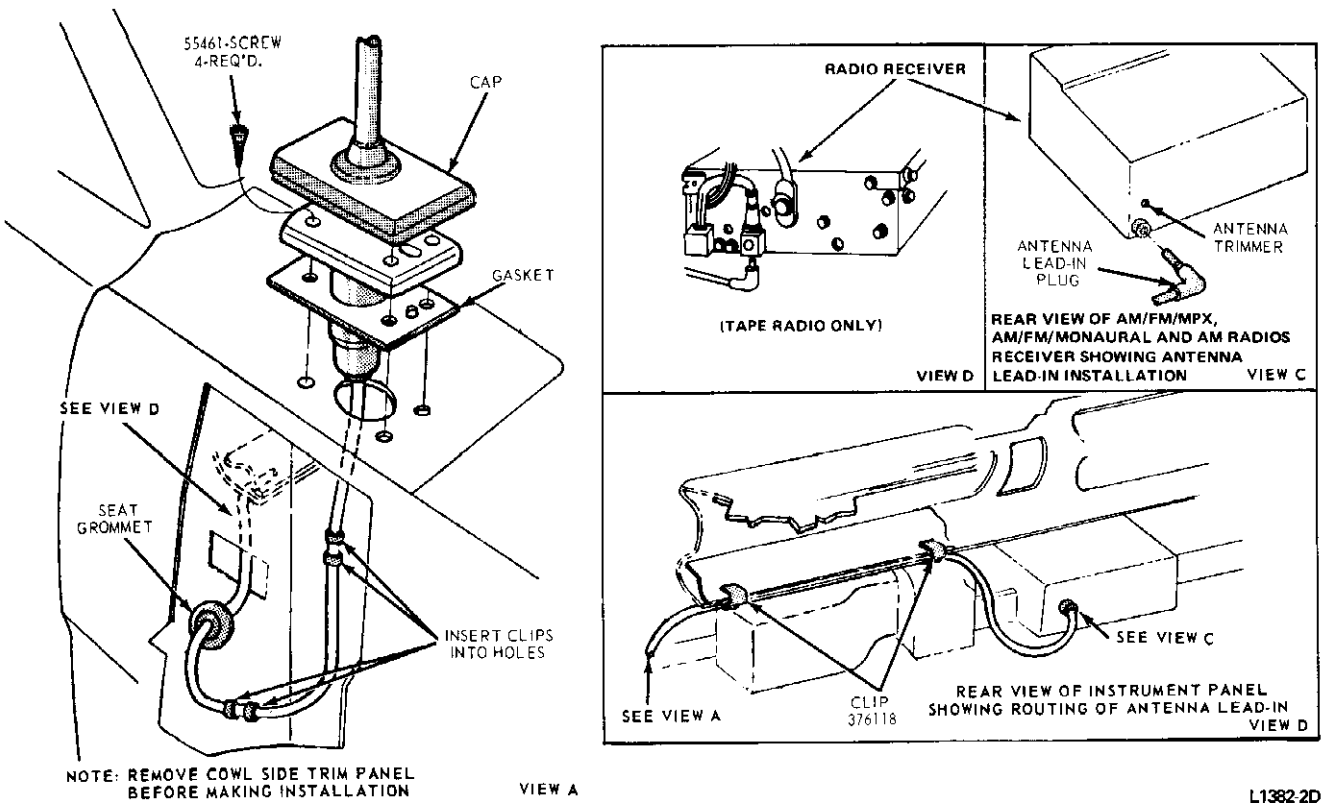


FIG. 3 Antenna Installation—Fairmont and Zephyr

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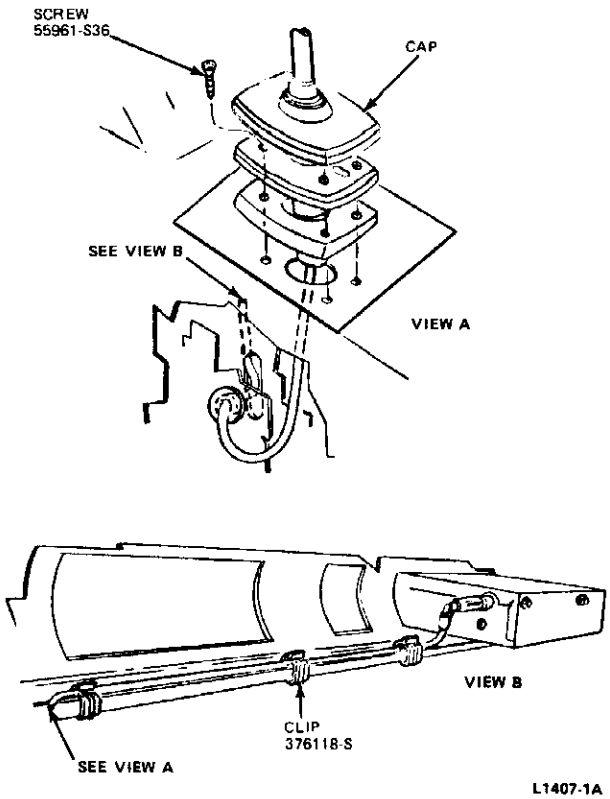


FIG. 4 Antenna Installation—Pinto and Bobcat

3. Disconnect antenna extension cable from radio and tie a piece of twine to the cable.
4. Disconnect antenna assembly from extension cable connector and remove extension cable locator from hole in lower instrument panel reinforcement. Pull extension cable from under the instrument panel leaving the twine in place under the instrument panel.
5. Tie antenna end of the twine to radio connector end of the new antenna extension cable. From the radio opening in the instrument panel, pull the twine far enough to connect extension cable to the radio. Remove twine and connect cable to radio (Fig. 5).
6. Install radio in instrument panel according to instructions described under Radio—Removal and Installation, Part 35-01.
7. Install extension cable locator into lower instrument panel reinforcement and connect cable to antenna lead.
8. On all cars with air conditioning, attach sight shield to lower right-hand of instrument panel reinforcement with three screws.

ANTENNA MAST

FORD AND MERCURY

The antenna mast, base and cable are detachable (Fig. 6).

ANTENNA BASE

FORD AND MERCURY

Removal

1. Remove the snap cap from the antenna (Fig. 6).
2. Remove the base attaching screws.
3. Pull **(do not pry)** the antenna up through the fender far enough to reach the antenna lead.
4. Then, twist and pull **(do not pry)** the antenna lead from the base.

Installation

1. Position the gasket to the base assembly.
2. Insert the antenna lead securely into the antenna base and install the attaching screws (base to fender).
3. Install the cap to the antenna base (snap on).
4. Remove the shipping plug and install the antenna mast into the base.

ANTENNA CABLE

FORD AND MERCURY

Removal

1. Remove the instrument panel pad assembly, see Part 45-61.
2. Remove the antenna base as outlined above and disconnect the antenna cable from the base assembly.
3. Disconnect the antenna lead from the radio and the clip on the instrument panel (Ford only).
4. Remove the plastic leaf catcher and pull the cable and grommet through the retainer wall (Fig. 6).
5. Remove the right side windshield wiper stop.
6. Disengage the antenna retaining and locator clips and remove the antenna.

Installation

1. Route the cable through the retainer wall and seat the grommet. Pull the antenna cable from inside the vehicle to seat the grommet to the wall.
2. Pass the cable through the clip on the instrument panel (Ford), and connect the lead to the radio.
3. Route the cable and connect the locator clip(s) to the cowl and fender.
4. Install the right side windshield wiper stop. Make sure the notch is positioned to clear the antenna cable.
5. Install the plastic leaf catcher.
6. Route the antenna cable through the fender hole and install the cable as outlined under Antenna Base, Removal and Installation, this Part.

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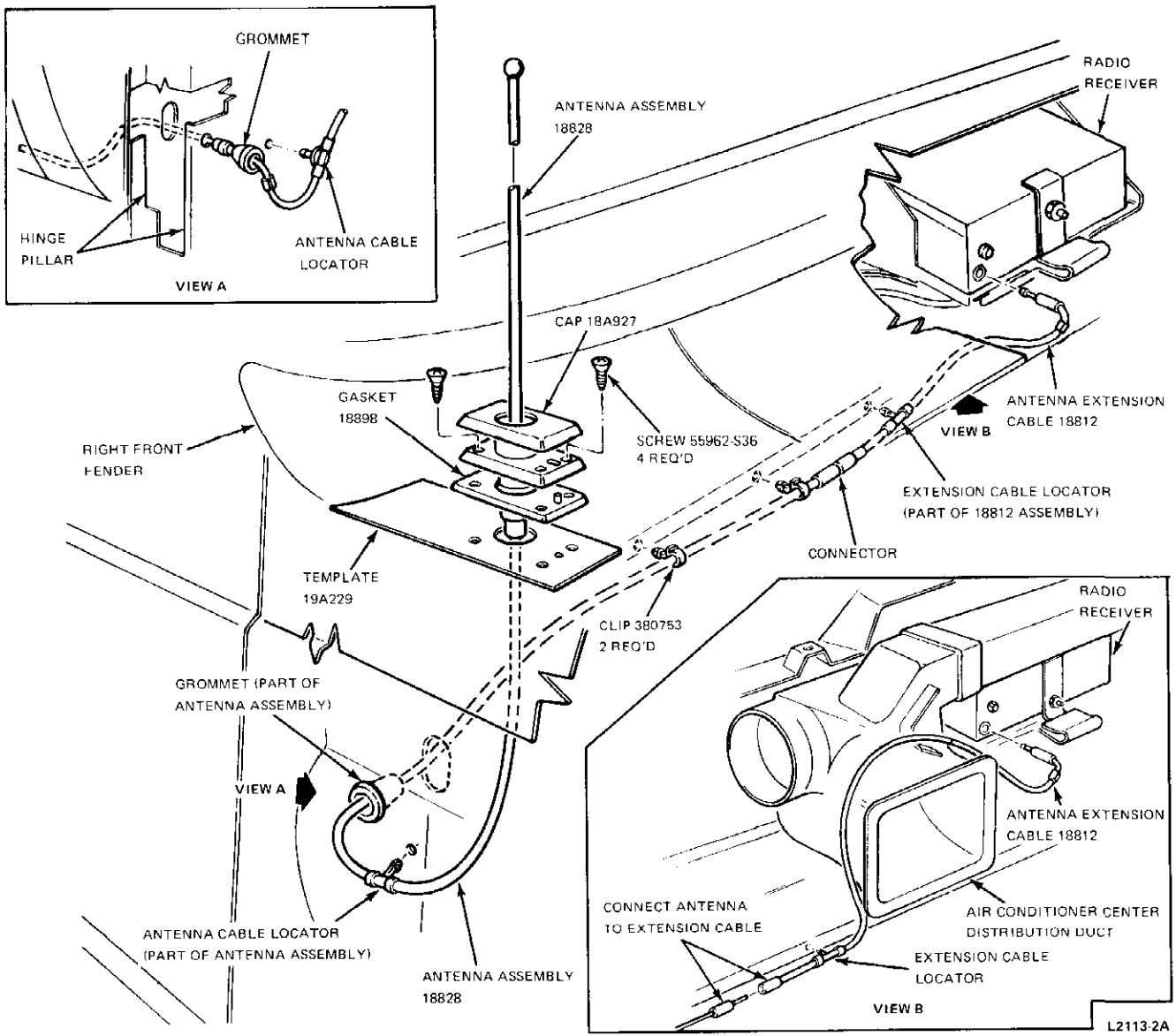


FIG. 5 Radio Antenna Installation— Monarch and Granada

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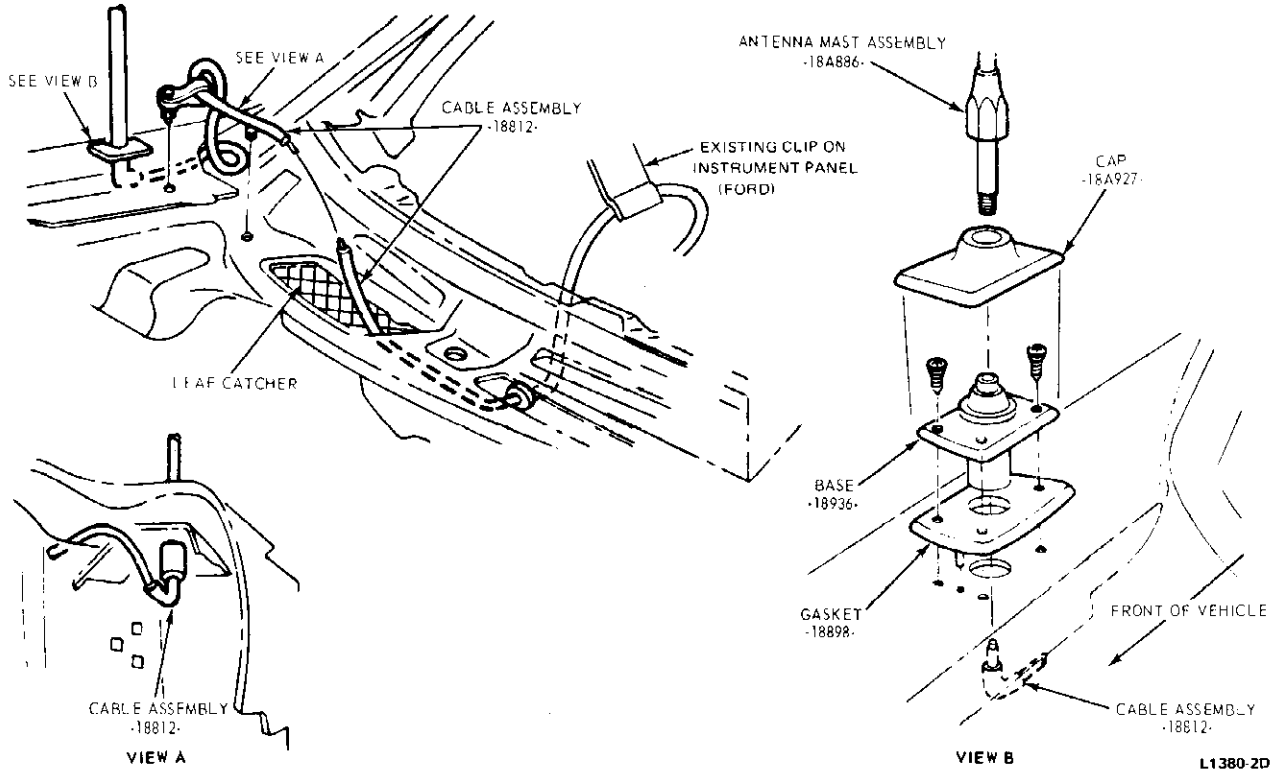


FIG. 6 Antenna Installation—Ford and Mercury

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Antennas -- Power

PART 35-21

Applies to Continental Mark V, Lincoln Continental, Mercury and Versailles

SUBJECT	PAGE
REMOVAL AND INSTALLATION	
Antenna	21-1
REMOVAL AND INSTALLATION (Cont'd.)	
Antenna Switch	21-1

CL2299-2B

REMOVAL AND INSTALLATION

For diagnosis, refer to Part 35-10.

ANTENNA

CONTINENTAL MARK V

Removal and Installation

1. From under the instrument panel, disconnect the antenna lead from the extension cable (near the right cowl trim panel) and push the cable grommet through the dash panel. Disconnect the antenna motor wires at the connector.
2. Remove the lower bracket attaching screws (Fig. 1).

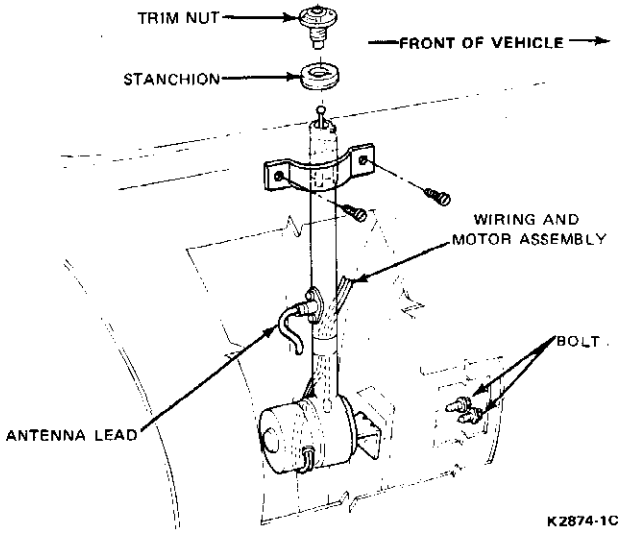


FIG. 1 Power Antenna Installation—Continental Mark V

3. Remove the top two attaching screws.
4. Position the antenna and tighten two screws to 24-36 in-oz. Make sure top of antenna is centered and within black insulator.
5. Install the lower bracket attaching screws and tighten to 40-70 in-lbs.
6. Pull grommet on antenna lead into the dash panel sheet metal hole and connect the lead to the extension cable. Tape the cable to the bottom of the blower housing. Connect the antenna motor wires at the connector.
7. Check the operation of the antenna and radio.

LINCOLN CONTINENTAL, MERCURY AND VERSAILLES

Removal

1. Lower the antenna and remove the luggage compartment left trim panel (Figs. 2 and 3).
2. Disconnect the lead-in cable from the antenna.
3. Disconnect the antenna motor wires at the connectors.
4. Remove the trim nut from the antenna.
5. Remove the screw from the antenna mounting bracket located at the bottom of the motor.
6. Remove the antenna assembly from the vehicle.

Installation

1. Clean the underside of the rear fender to assure a good ground when the antenna is installed.
2. Install the collar on the antenna assembly and wrap (two and one-half) turns of sealer around antenna tube, on top of the antenna collar before positioning antenna. (Lincoln Continental only.)
3. Position the antenna to the fender and install the gasket, spacer and trim nut.
4. Tighten the top nut to specification.
5. Install the antenna bracket and tighten the screw.
6. Connect the antenna lead-in cable and motor wires at the connector.
7. Tighten the bracket screw to specification and check the operation of the antenna and radio.
8. Install the luggage compartment trim panel.

ANTENNA SWITCH

CONTINENTAL MARK V AND VERSAILLES

Remove the switch attaching screw (Fig. 4) for Continental Mark V. See Fig. 5 for Versailles. Lower the switch and wire assembly, disconnect the wire at the connector and remove the switch. To install, connect the wire assembly at the connector, position the switch and install the retaining screw.

MERCURY AND LINCOLN CONTINENTAL

Removal

1. Remove knob assembly from antenna switch.

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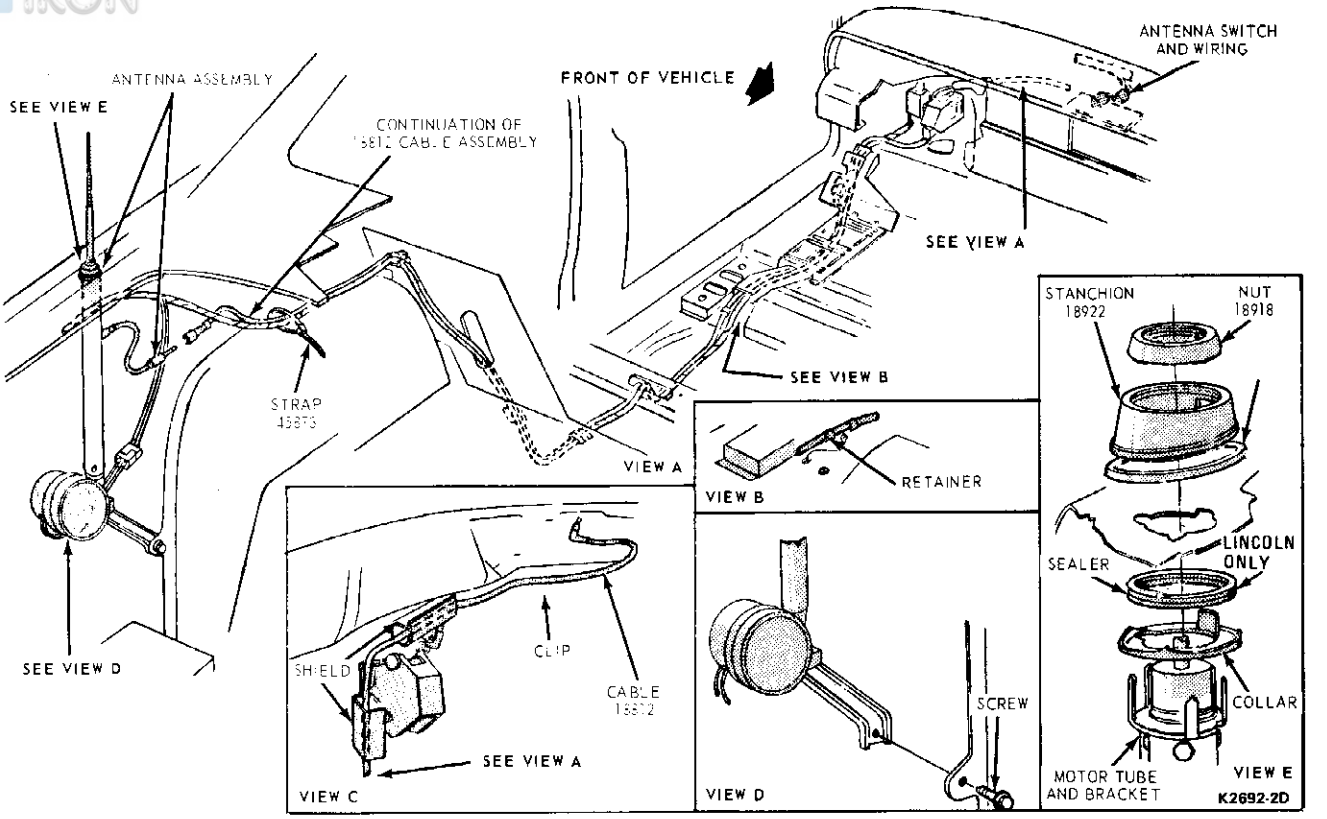


FIG. 2 Power Antenna Installation—Lincoln Continental and Mercury

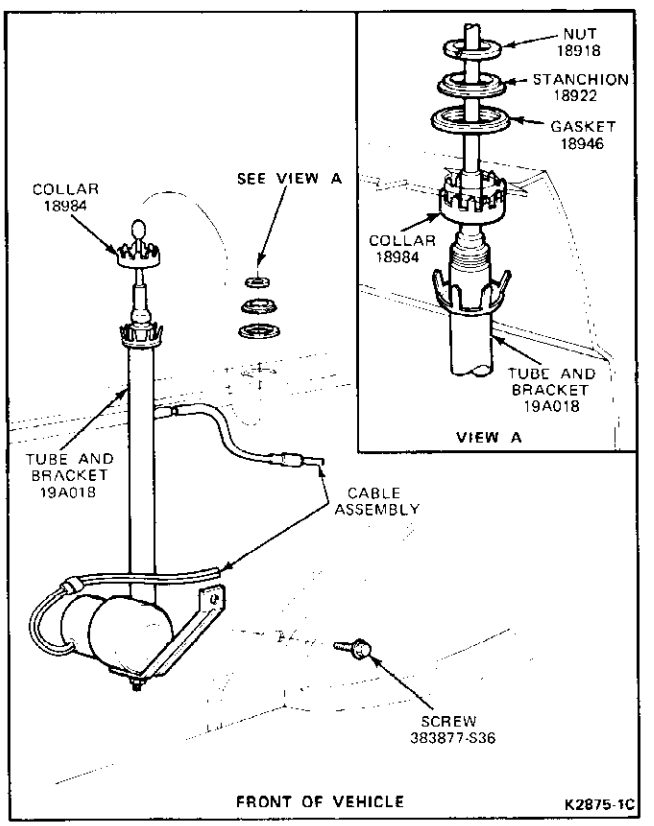


FIG. 3 Power Antenna Installation—Versailles

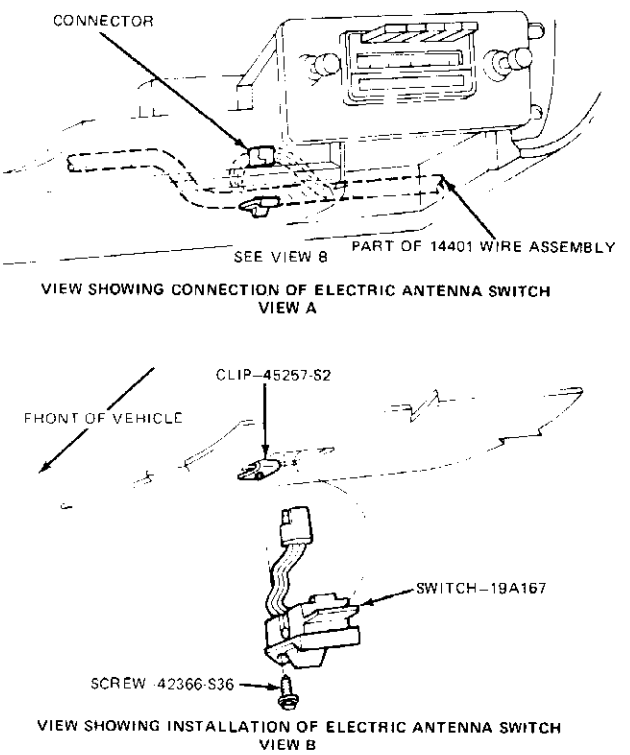


FIG. 4 Antenna Switch Installation—Continental Mark V

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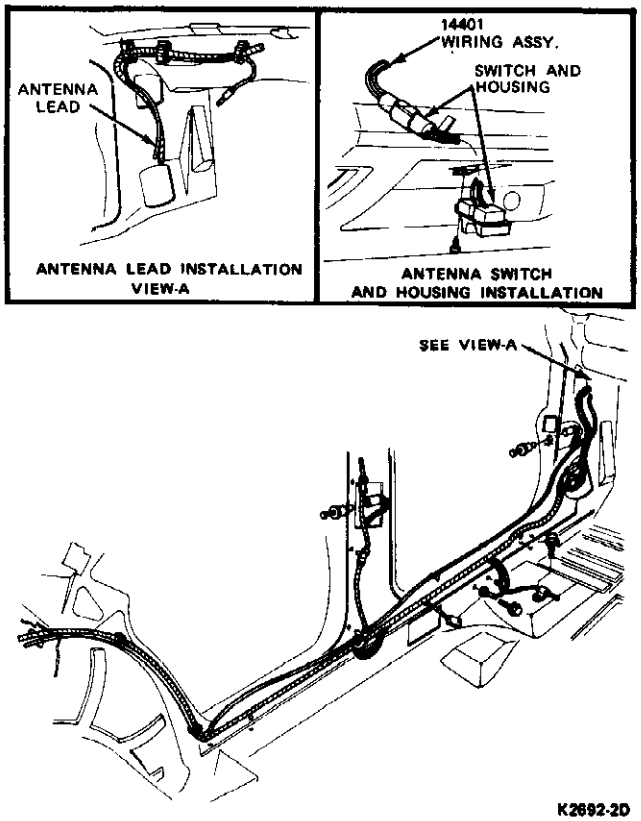


FIG. 5 Antenna Switch Installation—Versailles

2. Remove two screws that attach the center applique to the instrument panel and remove.
3. Disconnect the switch wires at the connector (Fig. 6).
4. Remove two screws that attach the switch to the instrument panel and remove the switch.

Installation

1. Install switch and attach to instrument panel with two screws.
2. Connect switch wires.
3. Install center applique and attach with 2 screws.
4. Install knob assembly on antenna switch.

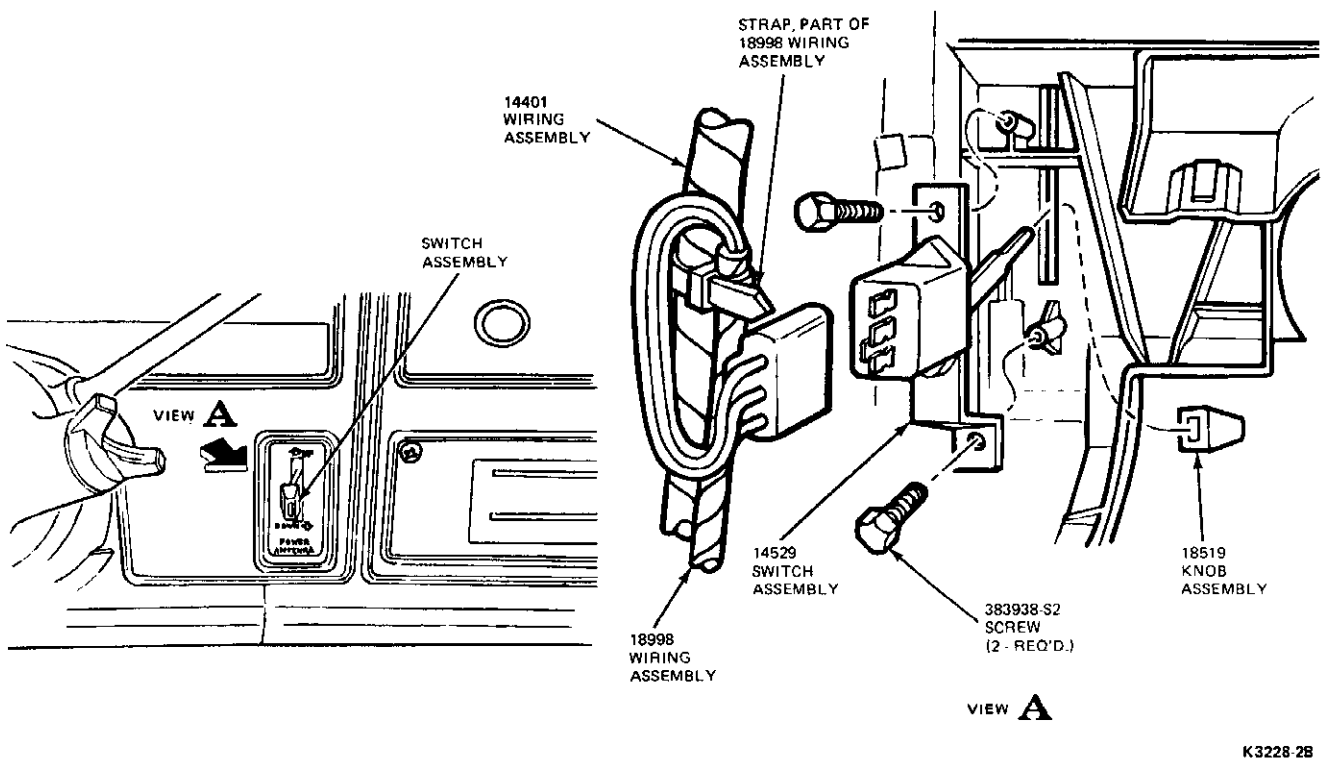


FIG. 6 Antenna Switch Installation—Mercury

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DETROIT IRON

Speakers

PART 35-30

Applies to All Models

SUBJECT	PAGE
DESCRIPTION	30-1
REMOVAL AND INSTALLATION	
Door and Cowl Speakers	30-3
REMOVAL AND INSTALLATION (Cont'd.)	
Front Speaker/Instrument Panel	30-1
Rear Seat Speakers	30-3

CL2300-2B

DESCRIPTION

The radio speakers used in all vehicles have 3.2 ohms impedance. The new speakers are not interchangeable with the 8 ohm speakers used in past models.

REMOVAL AND INSTALLATION

FRONT SPEAKER—INSTRUMENT PANEL

LTD II, Cougar, Ford, Thunderbird, Mercury and Ranchero

1. Remove the instrument panel pad as outlined in Group 45.
2. Remove the speaker and plate assembly retaining screws, disconnect the speaker lead at the connector and remove the speaker and plate assembly. Refer to Fig. 1 for Ford and Mercury and Fig. 2 for LTD II, Thunderbird, Cougar and Ranchero.
3. Remove the speaker to plate retaining nuts and remove the speaker from the plate.
4. To install, position the speaker to the plate and install the retaining nuts.
5. Connect the speaker lead to the radio.
6. Position the speaker and plate assembly and install the retaining screws. Torque screws to specification.
7. Check the speaker operation. Install the instrument panel pad as outlined in Group 45.

Fairmont and Zephyr

1. Remove the ash tray from the instrument panel. See Part 35-40.
2. Remove the glove box assembly.
3. For air conditioned cars only, remove the right hand air conditioning duct (Group 36).
4. Disconnect the radio-to-speaker connector and remove the tape.
5. Remove the two nuts attaching the speaker to the speaker plate and lower the speaker through the glove box opening. The nut attaching the left side of the speaker to the plate can be removed through the ash tray opening.
6. Install the speaker through the glove box opening and on to the speaker mounting plate screws (Fig. 3).

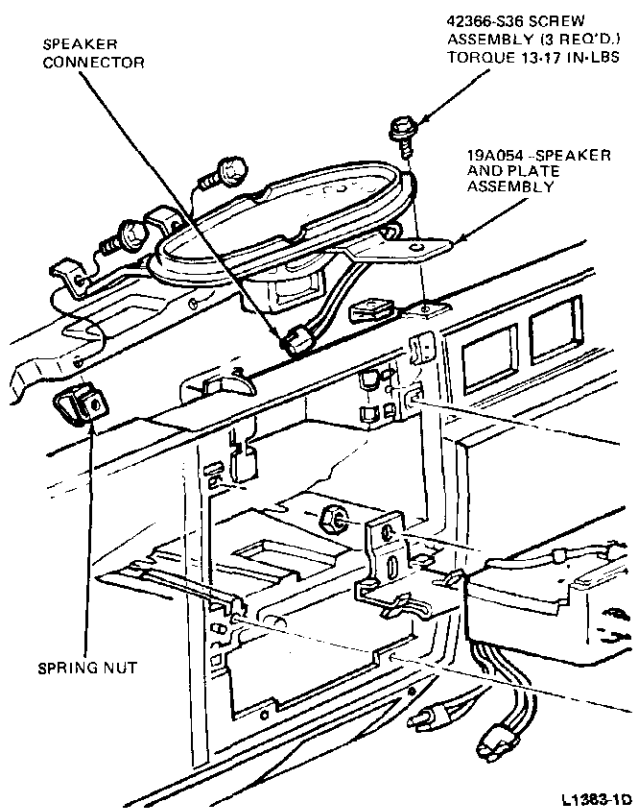


FIG. 1 Front Speaker Installation—Ford and Mercury

7. Install the speaker attaching nuts and torque to specifications.
8. Attach the speaker lead to the radio connector and tape the leads to the top of the radio.
9. Check speaker for operation.
10. Install the air conditioner right hand duct if removed. Install the glove box assembly and ash tray in the instrument panel.

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MUSTANG II

1. Remove the instrument panel pad as outlined in Group 45.
2. Remove the speaker and plate assembly retaining screws, disconnect the speaker lead and remove the speaker and plate assembly.
3. Remove the speaker-to-plate retaining screws and remove the speaker from the plate (Fig. 4).
4. To install, position the speaker to the plate and install the retaining screws.

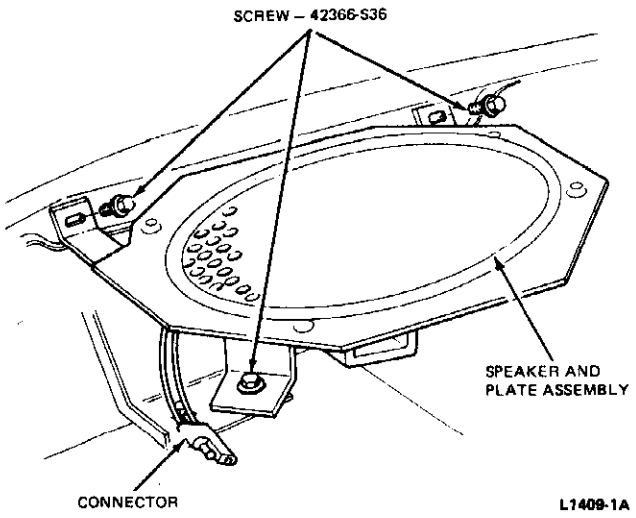


FIG. 2 Front Speaker Installation—Cougar, LTD II, Thunderbird and Ranchero

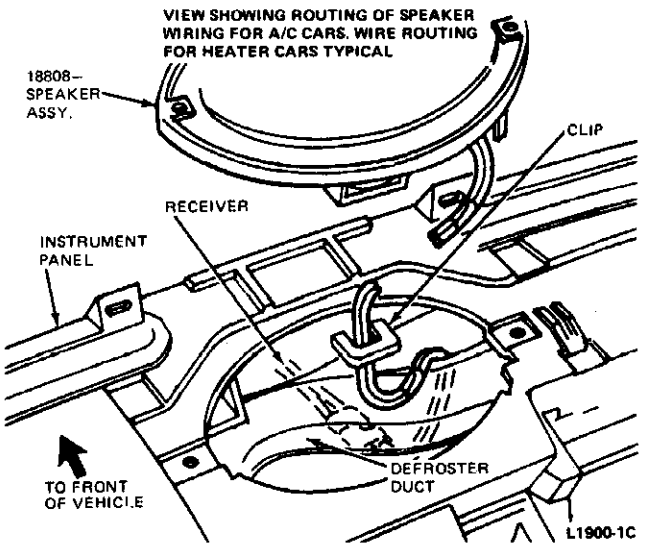


FIG. 3 Front Speaker Installation—Fairmont and Zephyr

5. Connect the speaker lead to the radio.
6. Position the speaker and plate assembly and install the retaining screws. Torque screws to specification.
7. Check the speaker operation. Install the instrument panel pad as outlined in Group 45.

Pinto and Bobcat

1. Remove the screws retaining the heater control and pull the control rearward. On vehicles equipped with air conditioning, pull the air conditioning register rearward and remove. Remove the console (if so equipped).
2. Remove four screws retaining the radio-to-instrument panel and one screw at the rear support bracket. Pull the radio rearward in the vehicle. (Fig. 5).
3. Working through the heater control and/or air conditioning control and the radio opening, (air conditioned vehicles) remove the duct extension, then disconnect the speaker lead. Remove the two speaker retaining screws and remove the speaker through the radio opening.
4. Position the speaker and install the two retaining screws and torque to specification. On air conditioned vehicles install the air conditioning duct extension.

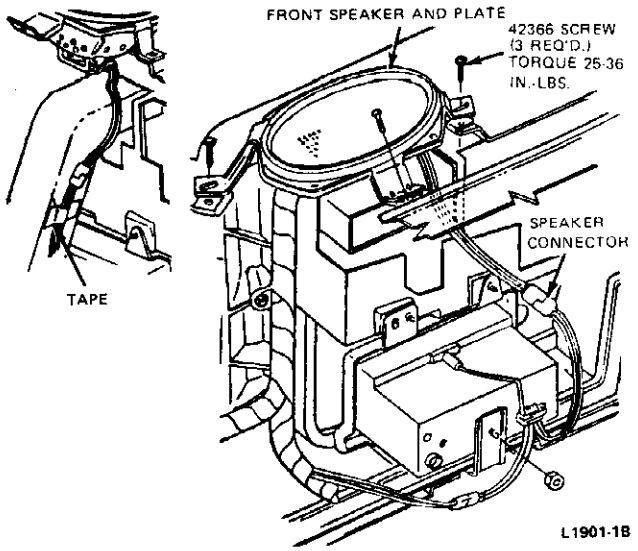


FIG. 4 Front Speaker Installation—Mustang II

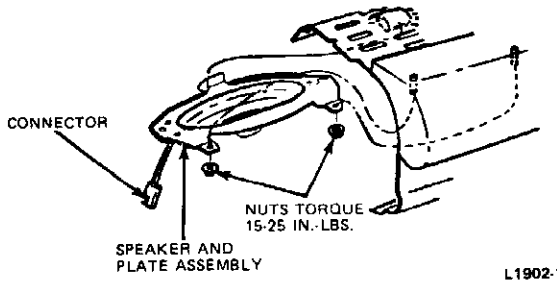


FIG. 5 Front Speaker Installation—Pinto and Bobcat

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5. Position the radio, connect the speaker and install the four screws at the instrument panel and one rear bracket screw and torque to specification. Check speaker operation.
6. Position the heater control and/or air conditioning register and install the retaining screws.
7. Replace the console assembly (if removed).

Granada and Monarch

Removal

1. Remove the instrument panel pad as outlined in Part 45-61.
2. Remove the instrument panel upper finish panel.
3. Remove the three (3) screws attaching the speaker to the speaker mounting plate and lift the speaker from the plate. Disconnect the radio and speaker connector.
4. Remove the speaker (Fig. 6).

Installation

1. Route the speaker lead through the opening in the speaker mounting plate and connect it to the radio lead.
2. Install the speaker to the mounting plate with three (3) screws.
3. Check the speaker for operation.
4. Install the instrument panel upper finish panel and pad as shown in Part 45-61.

SPEAKERS—DOOR/COWL

All Passenger Cars

1. Remove the door trim panel as outlined in Group 45. Refer to the applicable Figures shown in 7, 8, 9, 10 and 11 for speaker installation. Remove the four speaker retaining screws.
2. Remove the screws attaching the speaker grille to the door. (Pinto and Bobcat only).
3. Disconnect the speaker lead and remove the speaker.

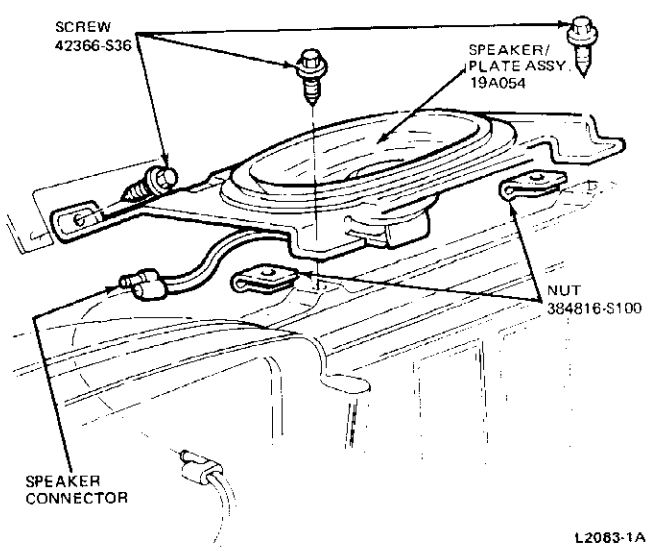


FIG. 6 Front Speaker Installation—Granada and Monarch

4. To install, connect the speaker lead, position the speaker to the door and/or cowl side panel and install the retaining screws.
5. Push the locator clip into the hole in the door inner panel and check the speaker operation. Position speaker grille on door panel and install the attaching screws (Pinto and Bobcat only). Torque to specifications.
6. Install the door and/or cowl trim panel as outlined in Group 45.

REAR SEAT SPEAKERS

All Sedans Except Pinto, Bobcat and Mustang II

1. Remove the spare tire and jack assembly from the luggage compartment of Ford, Mercury, Continental Mark V, and Lincoln Continental vehicles.

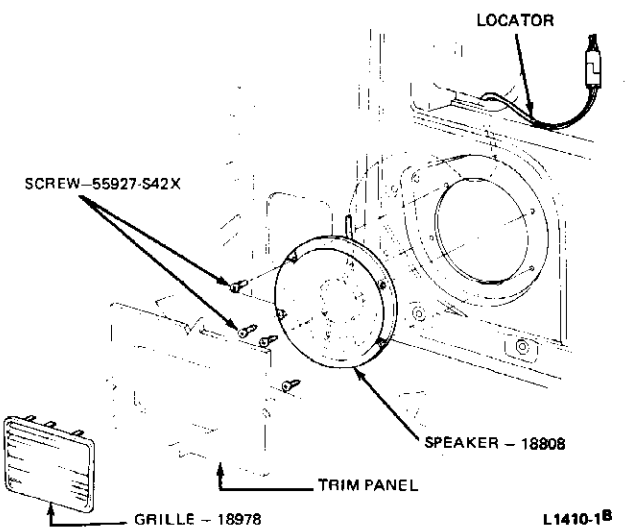


FIG. 7 Door Speaker Installation—All Cars except Pinto, Bobcat, Mustang II, Fairmont, Zephyr and Lincoln Continental

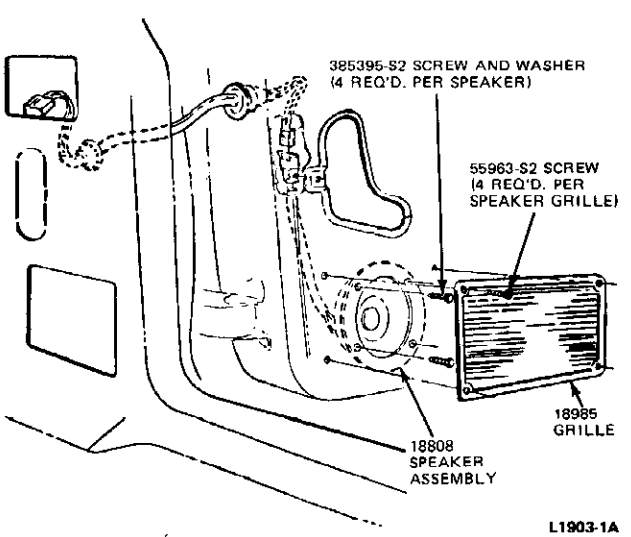


FIG. 8 Door Speaker Installation—Pinto and Bobcat

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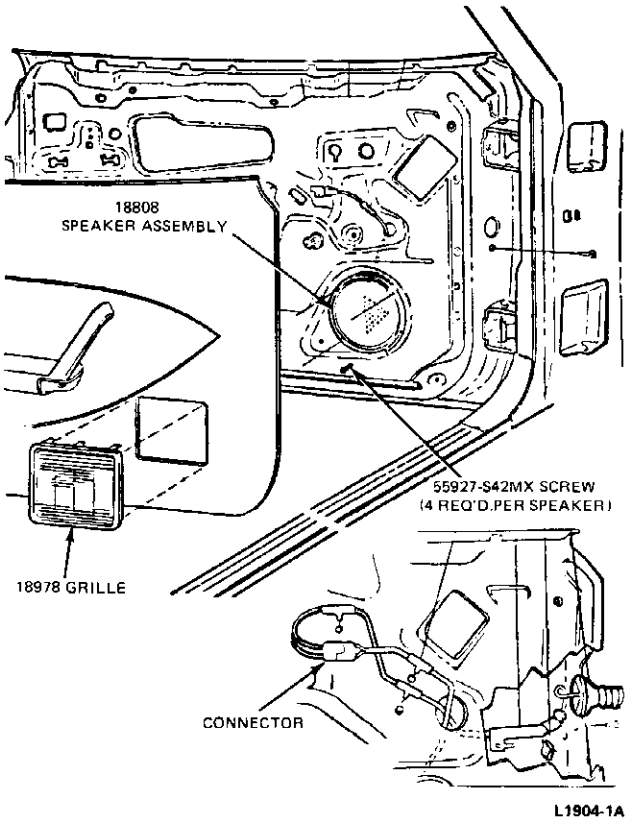


FIG. 9 Door Speaker Installation—Mustang II

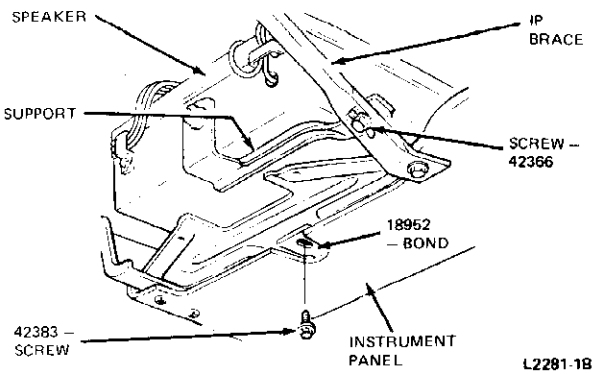


FIG. 10 Cowl Speaker Installation—Fairmont and Zephyr

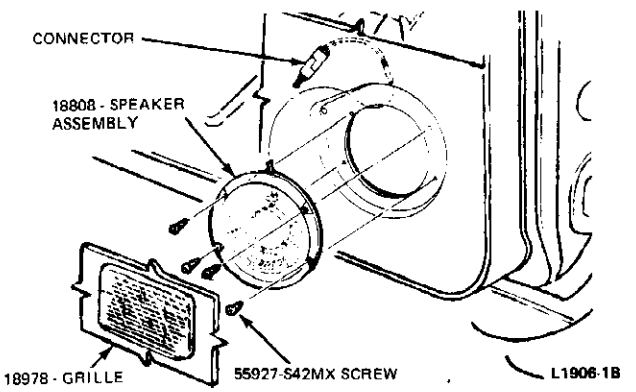


FIG. 11 Door Speaker Installation—Lincoln Continental

2. From within the luggage compartment, disconnect the speaker lead from the radio wire harness.
3. Remove the speaker cover and the speaker attaching nuts and speaker from the underside of the package tray (Fig. 12).

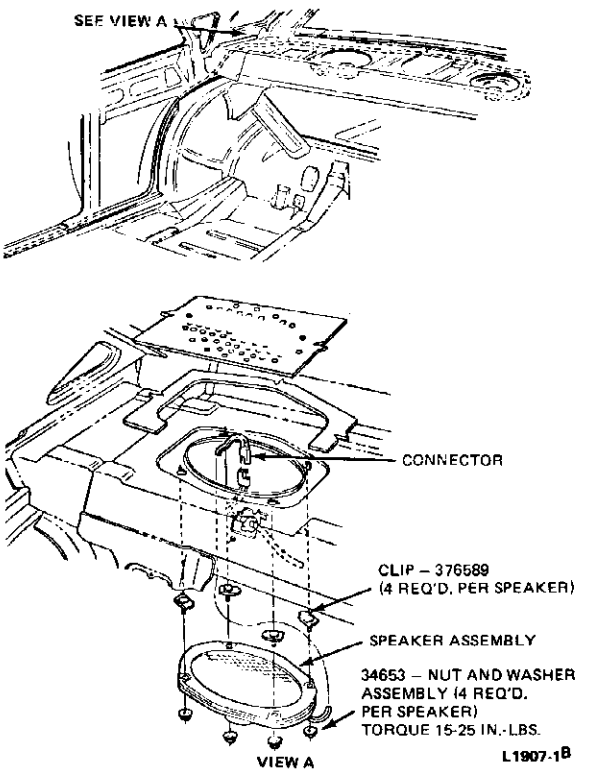


FIG. 12 Typical Sedan—Rear Seat Speaker Package Tray Installation—All Sedans Except Pinto, Bobcat and Mustang II

4. To install, position the speaker to the underside of the package tray and install attaching nuts. Torque nuts to specification. Install the speaker cover.
5. Connect speaker lead and check speaker for proper operation.
6. Install the spare tire and jack assembly in the luggage compartment (if removed).

Ford, Mercury, Fairmont and Zephyr—Station Wagons

1. Remove the screws attaching the speaker and grille assembly to the quarter trim panel.
2. Lift the speaker and grille assembly from the trim panel and disconnect the speaker connector lead (Fig. 13).
3. Remove the nuts attaching the speaker to the grille assembly and remove the speaker from the grille.
4. To install, position the speaker on the grille assembly and install the attaching nuts. Torque nuts to specification.
5. Connect the speaker connector lead and check the speaker operation.
6. Insert the speaker into the trim panel opening and install the attaching screws through the grille. Torque screws to specifications.

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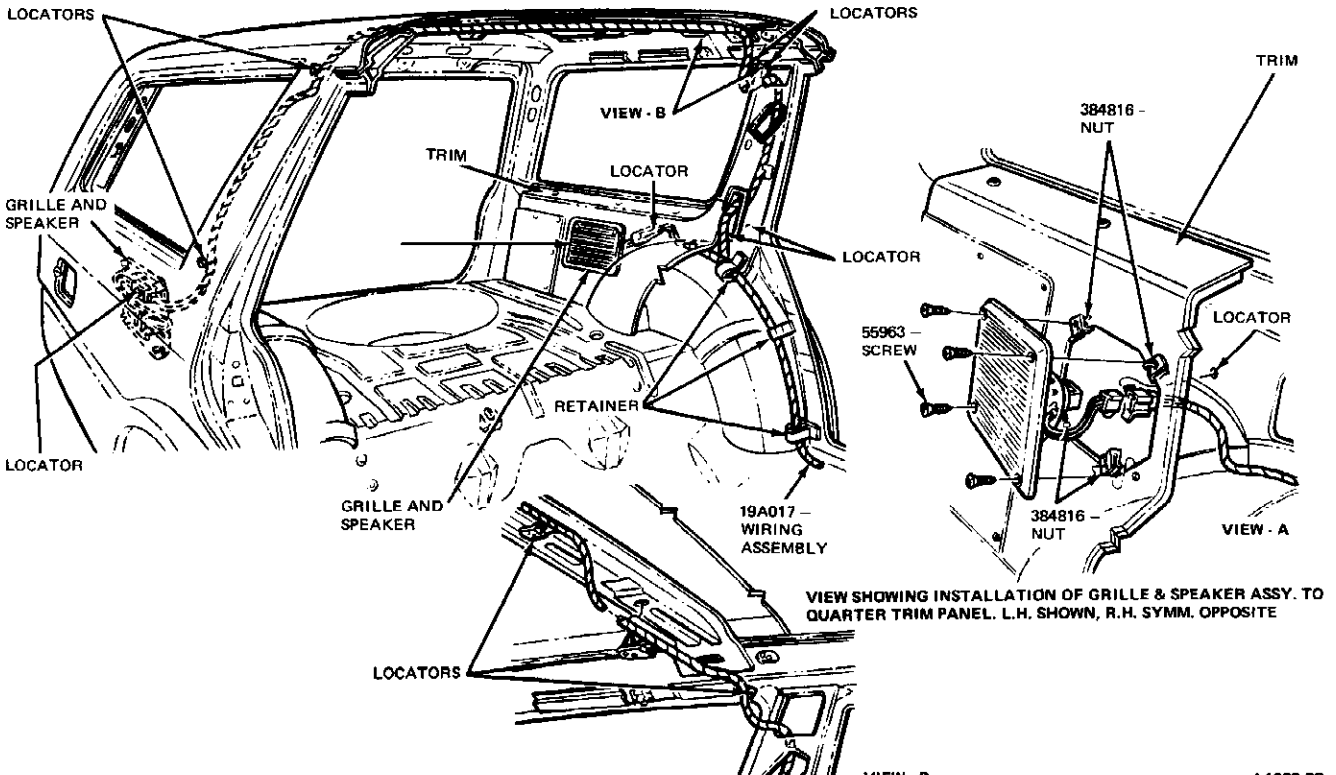


FIG. 13 Rear Speakers—Ford, Mercury, Fairmont and Zephyr—Station Wagons

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Ash Receptacles and Cigar Lighter

PART 35-40

Applies to All Models

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REMOVAL AND INSTALLATION (Cont'd.)	
Cigar Lighter – Instrument Panel	40-1

CL2301-2B

REMOVAL AND INSTALLATION

ASH RECEPTACLES

Ash receptacle retainer assemblies, in the instrument panel, may be serviced by first disengaging the box assembly and then removing the retainer mounting screws.

CIGAR LIGHTER—INSTRUMENT PANEL

ALL VEHICLES EXCEPT FAIRMONT, ZEPHYR, LINCOLN CONTINENTAL, THUNDERBIRD AND CONTINENTAL MARK V

1. Disconnect the battery ground cable, and remove the lighter element.
2. From under the instrument panel, disconnect the lighter wire, remove the socket retainer and the socket.

FAIRMONT AND ZEPHYR

1. Disconnect the battery ground cable.
2. Remove the ash receptacle assembly, and disconnect the lighter wire.
3. Remove the element, remove the retainer and the socket.

LINCOLN CONTINENTAL

1. Disconnect the battery ground cable.
2. Remove the glove box.
3. Open the ash receptacle.
4. Through the glove box opening, disconnect the cigar lighter wire assembly from the main wiring assembly, remove the socket retainer, and remove the socket.

THUNDERBIRD AND CONTINENTAL MARK V

Remove the cluster trim cover as outlined in Part 33-50. Disconnect the lighter wire, remove the socket retainer and remove the socket.

CIGAR LIGHTER—ARM REST

Lincoln Continental, Continental Mark V and Mercury

Disconnect the negative battery cable from the battery. Remove one housing retaining screw (Fig. 1). Lift housing up to gain access to the lighter leads. Disconnect the lead from the lighter. Remove the lighter socket retainer and remove the socket.

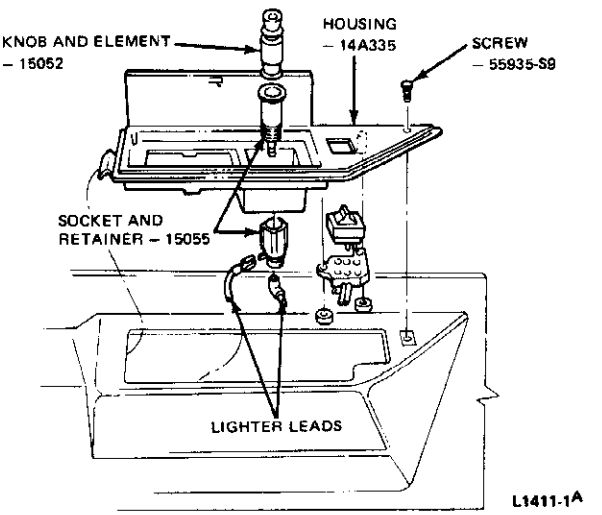


FIG. 1 Arm Rest Ash Receptacle Installation—Typical

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Mirrors—Inside and Outside

PART 35-50

Applies to All Models

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Remote Control Rear View Mirror R.H.	50-2
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DESCRIPTION	
Heated Rear View Mirror	50-8

CL2302-2B

REMOVAL AND INSTALLATION

INSIDE REAR VIEW MIRROR

Removal (Spring Type)

1. Depress the small spring which is visible through a slot between the windshield mounting bracket and the mirror bracket located at the bottom center.
2. Simultaneously slide mirror assembly upward and away from the windshield mounting bracket. Do not remove spring.
3. If the bracket vinyl pad remains on the windshield, apply low heat from an electric heat gun until the vinyl softens. Then, peel the vinyl off the windshield and discard.

Removal (Set Screw Type)

1. Loosen the mirror assembly- to-mounting bracket set screw (Fig. 1).

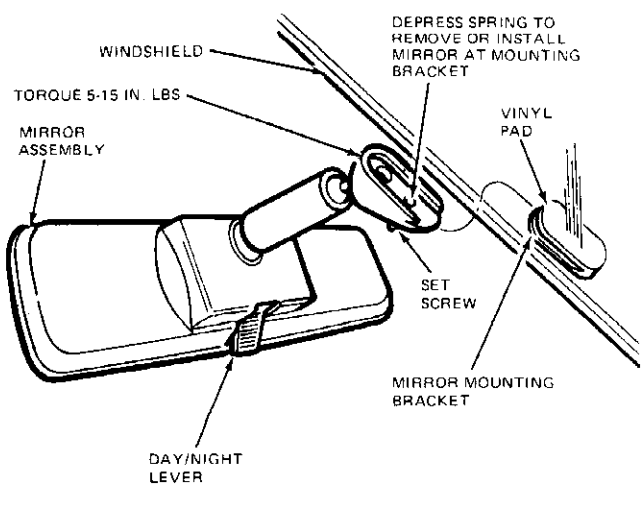


FIG. 1 Inside Rear View Mirror Installation

2. Remove the mirror assembly by sliding upward and away from the mounting bracket.
3. If the bracket vinyl pad remains on the windshield, apply low heat from an electric heat gun until the vinyl softens. Then, peel the vinyl off the windshield and discard.

Installation (Set Screw and Spring Type)

1. Locate and mark the mirror mounting bracket location on the outside surface of the windshield with a wax pencil.
2. Thoroughly clean the inside of the windshield with mild abrasive cleaning powder and a clean cloth saturated in alcohol. Then, use a paper towel and remove all cleaner from the windshield.
3. Roughen the bonding surface of the mounting bracket with fine grit sandpaper. Then, wipe the surface clean with a paper towel soaked in alcohol.
4. Spray on a generous amount of Minute Bond Accelerator or equivalent to the bonding surface of the mounting bracket. Allow the bonding material to dry for five minutes. Do not touch the mounting surface.
5. Spray on a **thin** film of Accelerator or equivalent to the mounting surface of the windshield. Allow the bonding material to dry for one minute.
6. Apply three drops of Minute Bond or equivalent to the mounting surface of the bracket.
7. Quickly position the mounting bracket on the windshield. The 3/8 inch circular depression in the bracket must be toward the bottom edge. Press and hold the bracket firmly against the windshield for about one minute.
8. Allow the bond to set for five minutes. Then, remove any excess bonding material from the windshield with an alcohol dampened rag.
9. Attach the mirror to the mounting bracket and tighten the set screw to 10 in. lbs. torque (set screw type).
10. Attach the mirror to the mounting bracket by depressing spring (spring-type).

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OUTSIDE REAR VIEW MIRROR

The conventional outside rear view mirror is mounted on the left door. To remove the mirror, remove the attaching screws and lift off the mirror and gasket.

REMOTE CONTROL REAR VIEW MIRROR—L.H.

Removal

1. Remove the bezel nut from the remote control actuator.
2. Remove the door trim panel mirror plate and then remove the mirror cable attaching clips.
3. Remove the mirror attaching screw(s) and remove the mirror and control cable from the door.

Installation

1. Position the mirror to the door and install the attaching screw(s) (Figs. 2, 3 and 4).
2. Install the mirror cable attaching clips, route the cable inside the door, attach the mirror plate and bezel nut and install the door trim panel.
3. Install the bezel nut and check the operation of the mirror and operate the window up and down to insure that the mirror cables do not interfere with the window mechanism.

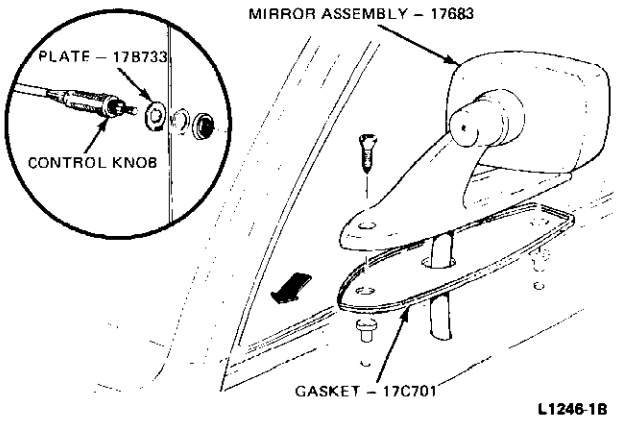


FIG. 2 L.H. Remote Control Mirror Installation—LTD II, Cougar, Lincoln Continental, Mustang, Pinto and Bobcat

REMOTE CONTROL REAR VIEW MIRROR—R.H.

Removal

NOTE: On Monarch and Granada models equipped with anti-theft devices, it is necessary to remove the right hand cowl trim panel for servicing the right-hand mirror.

1. Remove the bezel and/or nut from the remote control actuator (Figs. 4, 5, 6, 7, 8 and 9).
2. Remove the cable retainer and/or retaining clips from the instrument panel assembly.
3. Remove the door trim panel, as outlined in Group 45; remove the cable-to-door retaining clip and unseat the retaining grommets.

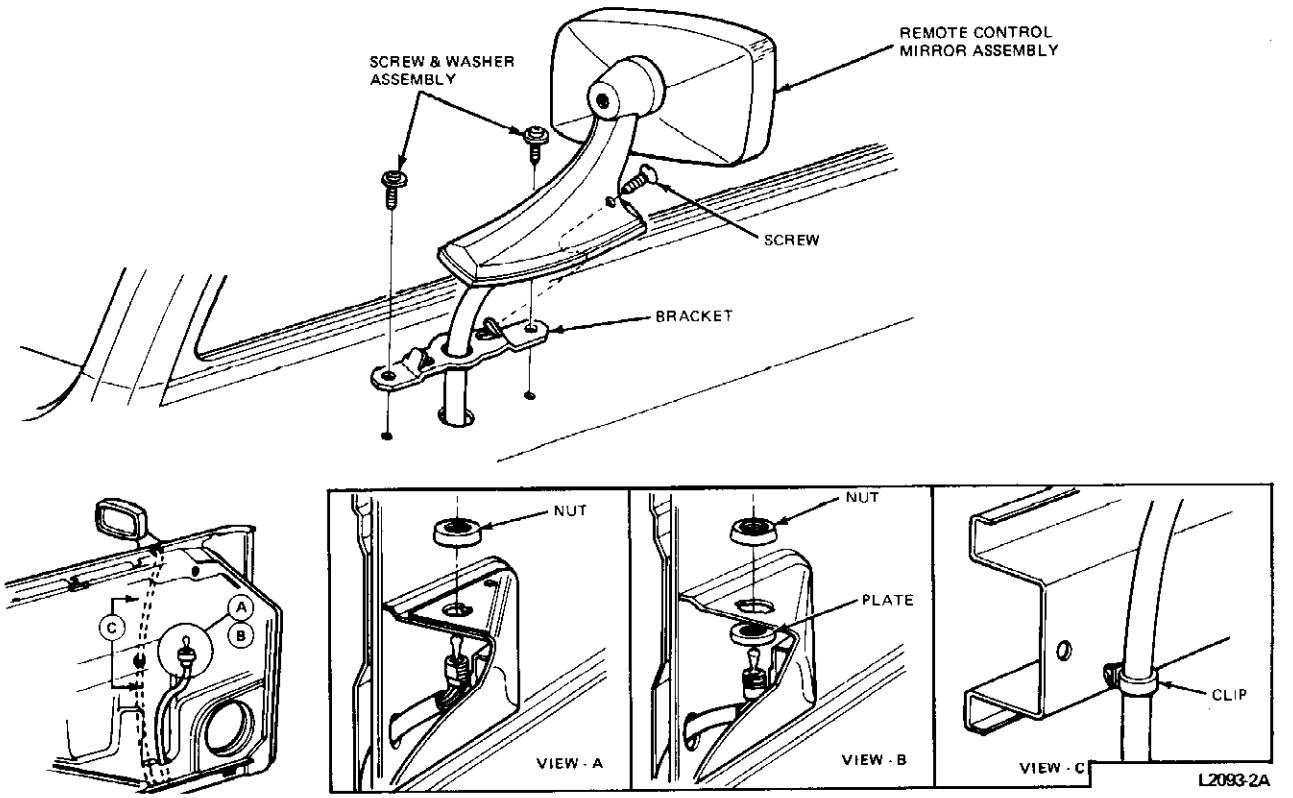


FIG. 3 L.H. Remote Control Mirror Installation—Ford and Mercury

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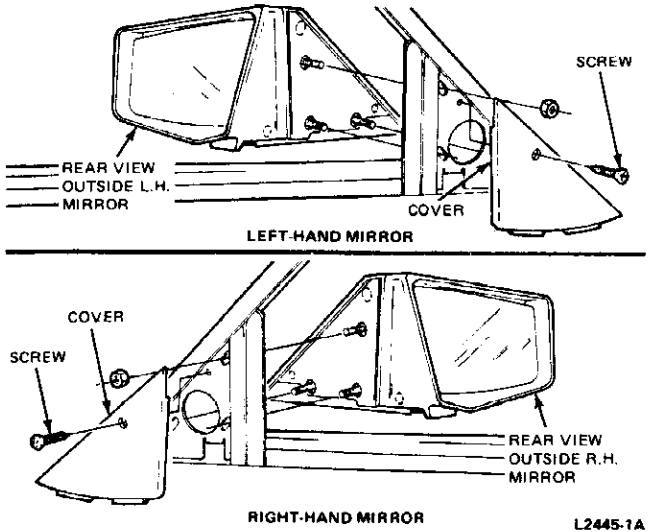


FIG. 4 L.H. and R.H. Remote Control Mirror Installtion—Fairmont and Zephyr

4. Remove the mirror attaching screw(s) and carefully remove the mirror and cable assembly from the door.

Installation

1. Carefully route the mirror cable and actuator assembly through the door, front pillar post and install the mirror attaching screw(s).
2. Install the mirror cable-to-door retaining clip and seat the grommets into position (Figs. 3, 4, 5, 6, 7, 8 and 9).
3. Position the cable and actuator to the instrument panel and install the retaining clips and/or retainer. Then, install the actuator bezel and/or nut.
4. Check the mirror operation and operate the window up and down to insure that the mirror cables do not interfere with the window mechanism. Install the door trim panel.

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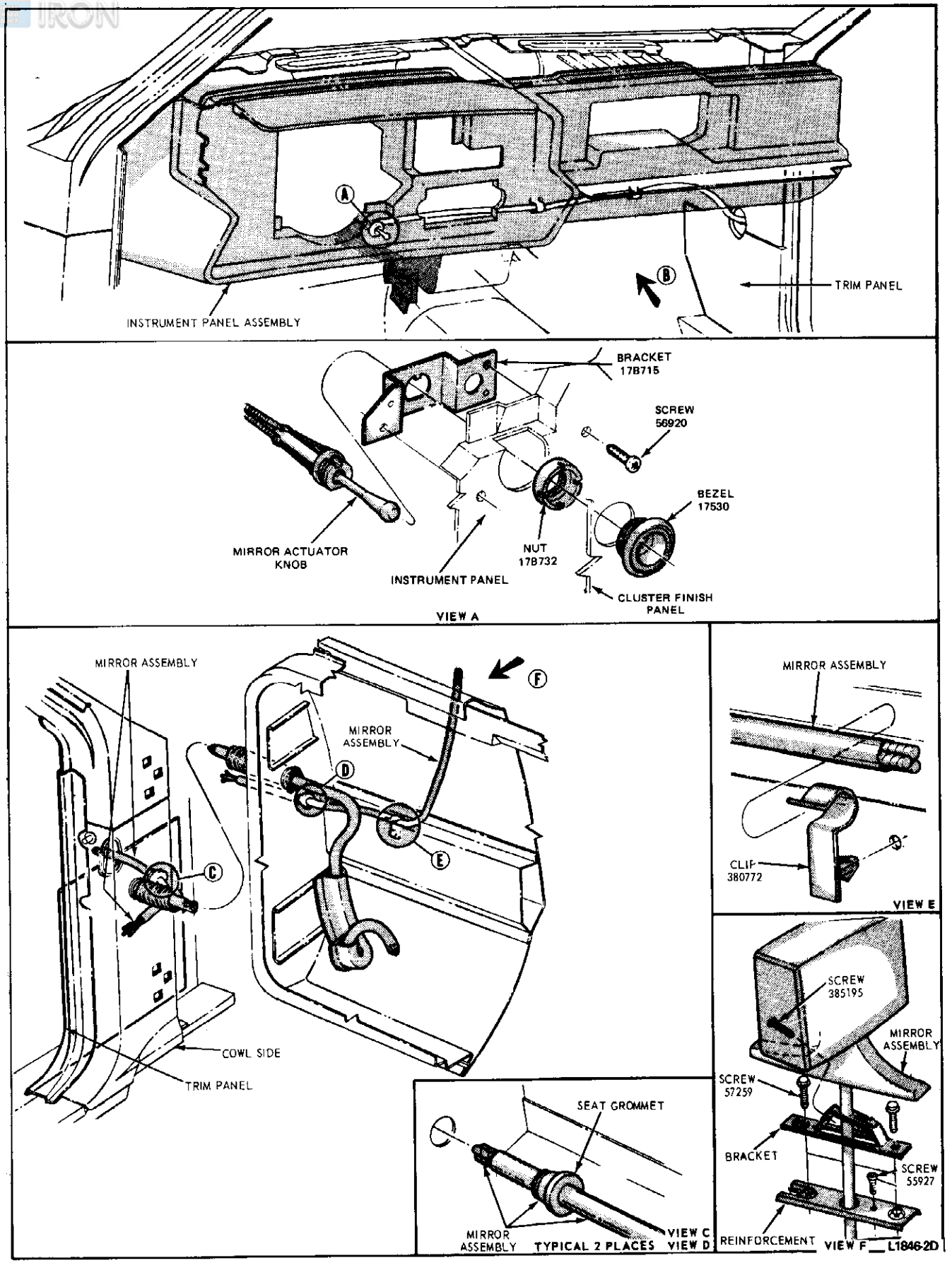


FIG. 5 R.H. Remote Control Mirror Installation—Lincoln Continental and Continental Mark V

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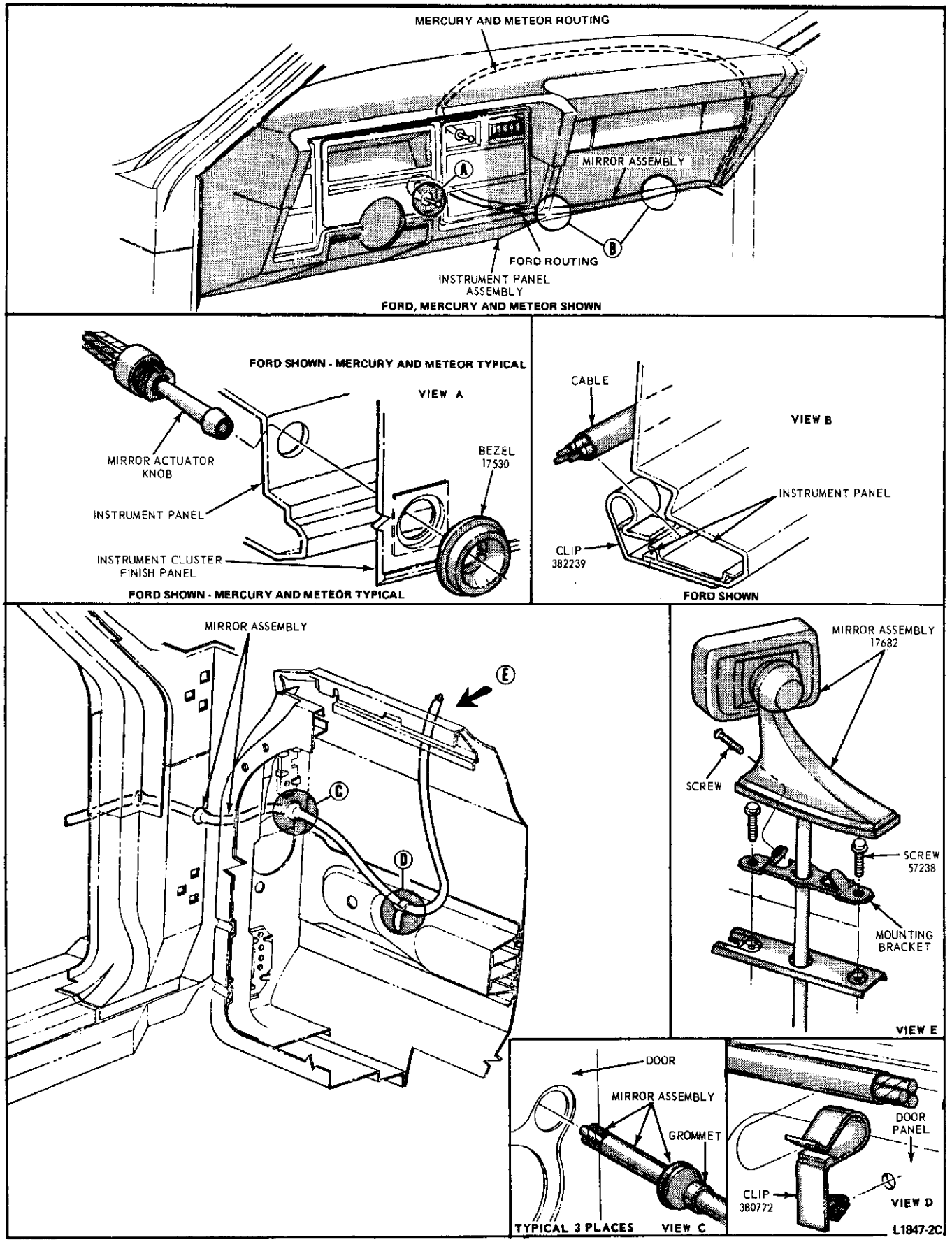
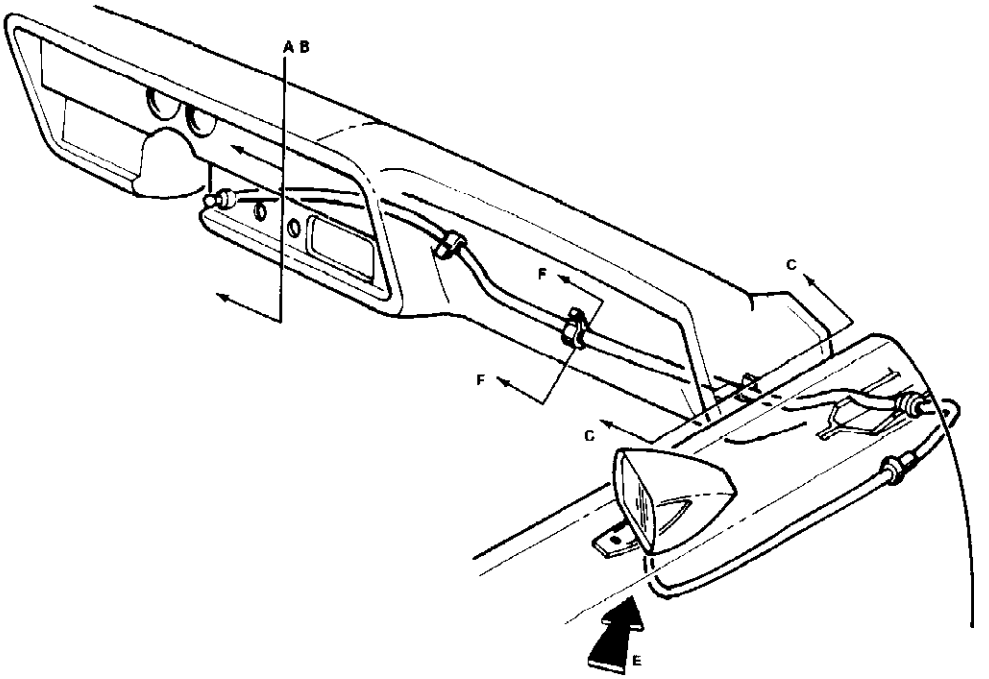


FIG. 6 R.H. Remote Control Mirror Installation—Ford, Mercury and Meteor

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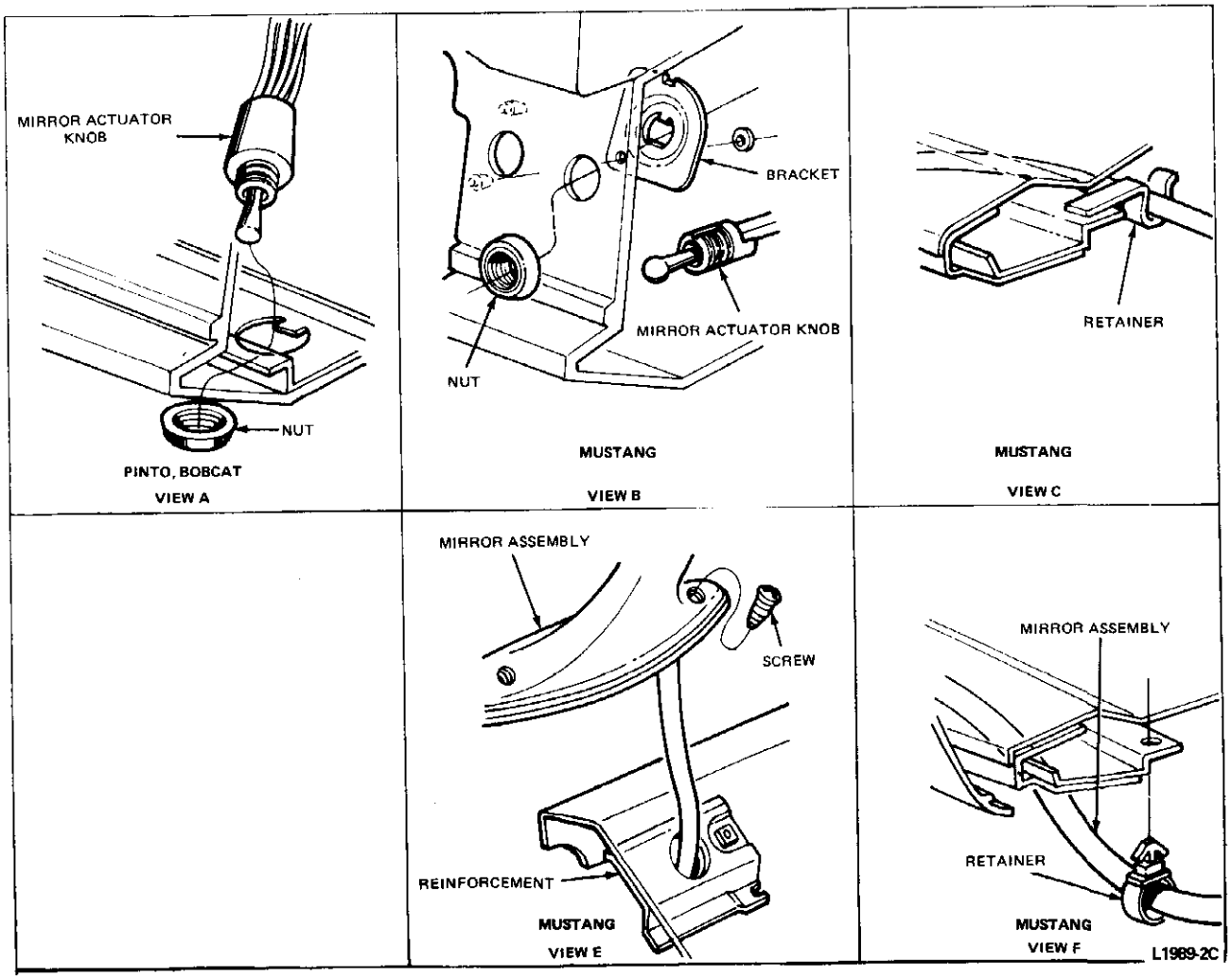


FIG. 7 R.H. Remote Control Mirror Installation—Mustang, Pinto and Bobcat

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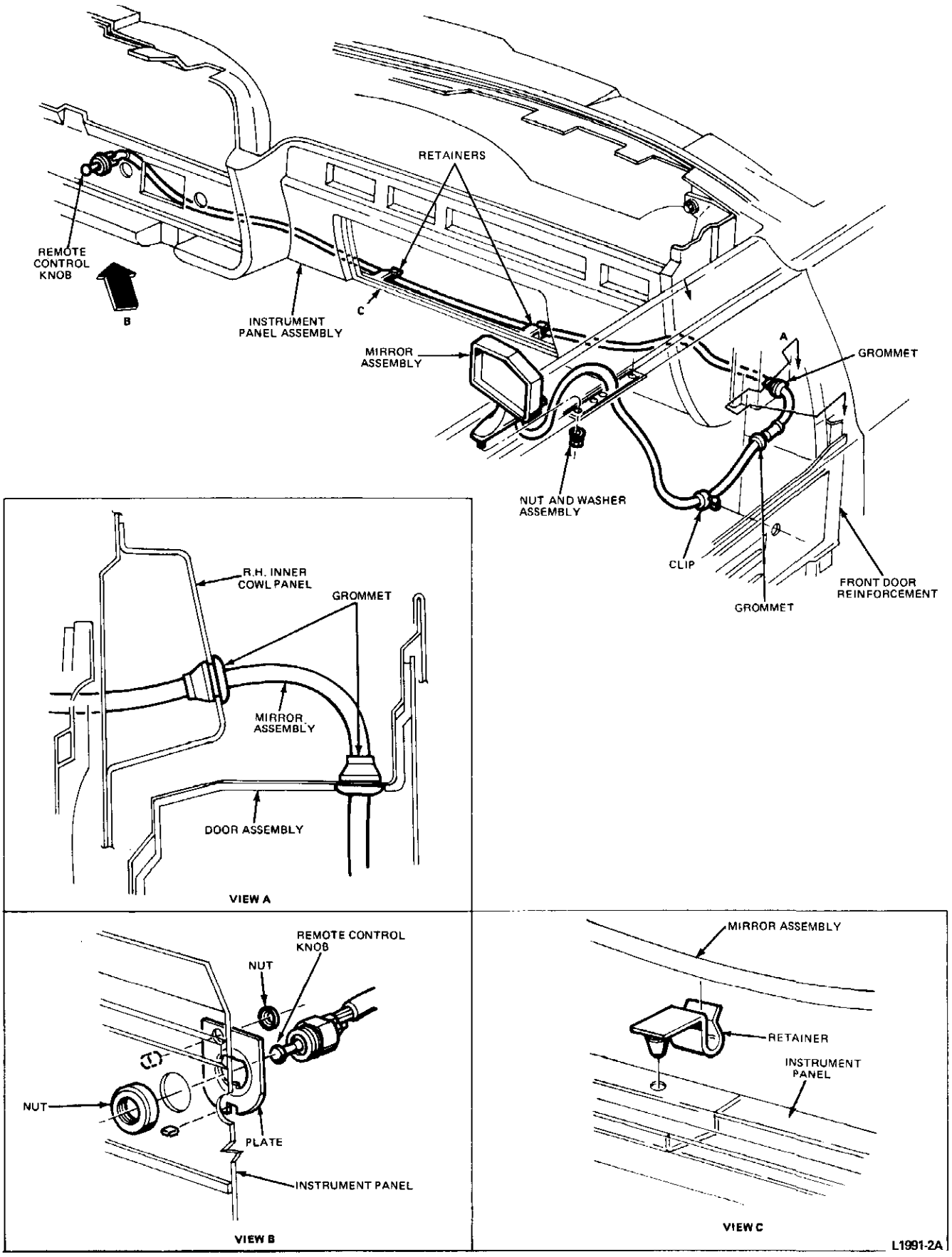


FIG. 8 R.H. Remote Control Mirror Installation—LTD II and Cougar

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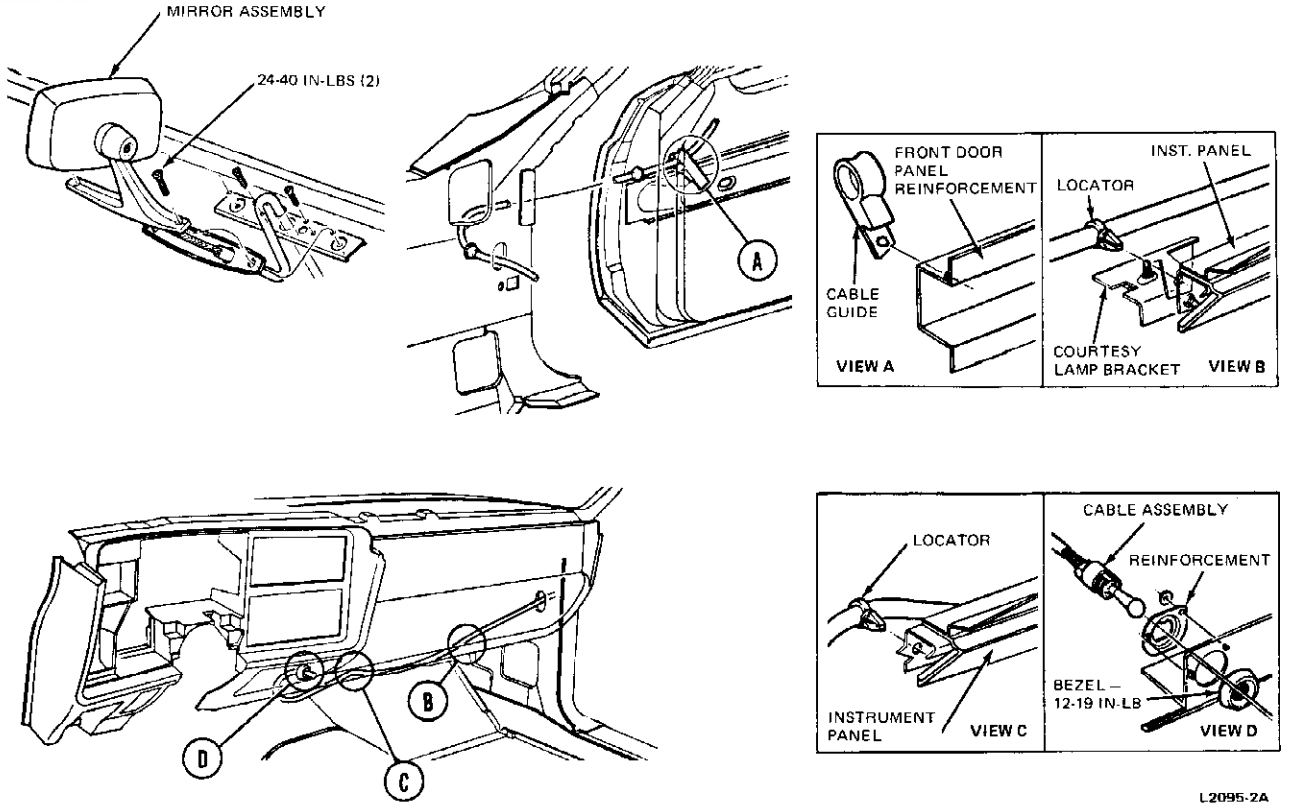


FIG. 9 R.H. Remote Control Mirror Installation—Granada, Monarch and Versailles

CLEANING

OUTSIDE REAR VIEW MIRROR

Outside rear view mirrors should not be cleaned with a dry cloth or abrasive cleaning powders. Do not remove ice with a scraper. The mirror should only be cleaned with a soft cloth and mild detergent and water, otherwise damage to the reflective surface may result.

DESCRIPTION

HEATED REAR VIEW MIRROR—CONTINENTAL MARK V AND LINCOLN CONTINENTAL (Fig. 10)

A new, electrically-heated, thermostatically-regulated outside rear view mirror has been released for the Mark V and Lincoln Continental cars. The thermostat is part of the mirror heating element, and cannot be serviced separately. The new mirror works in conjunction with the heated backlite, and cannot be purchased as a separate unit. The heated mirror wiring makes connection with the 14631 window wiring harness in the L.H. front door. The mirror, and backlite heat is controlled by the same switch in the instrument panel. The No. 186 feed wire circuit (Brown-Light Blue Hash Mark Wire Color) is protected by a 15 Amp. fuse in the fuse panel for Mark V and by a 10 Amp. circuit breaker located behind the glove box for Lincoln. The heated mirror is distinguished from the unheated mirror by the word "Heated" located on the upper L.H. portion of the mirror glass.

If the heated rear view mirror should not operate (heat up), disconnect the heated mirror harness from the 14401 harness and determine that the backlite is heating up. If the backlite is not functioning properly, follow procedures as shown in Part 36-86, pages 1 thru 4.

Reconnect the heated mirror harness to the 14401 wiring assembly and check for system function.

If the heated backlite indicator lamp is not "on" use a 12 volt test lamp and check for voltage at the 15 Amp. fuse in the fuse panel. If the fuse is defective replace fuse and check for correct operation. If fuse fails again the heated mirror circuits have to be checked for a possible short. Disconnect heated mirror feed from 14401 harness. Trace the No. 186 (Brown-Light Blue Hash Mark) feed wire into the L.H. front door. Check the continuity of the No. 186 circuit from the fuse panel in the instrument panel through the 14401 main harness through the 14631 L.H. front door wiring to the heated

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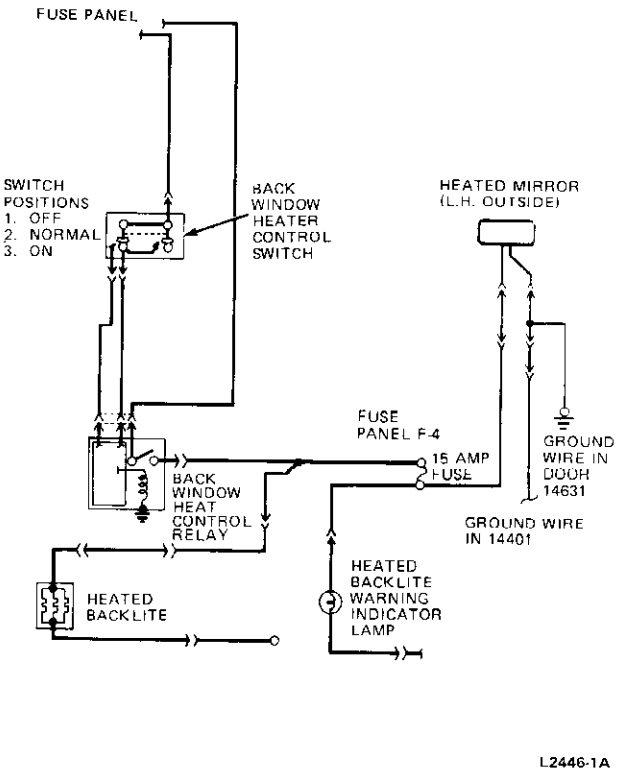


FIG. 10 Wiring Schematic for Heated Rear View Mirror

mirror. Also check for proper grounding of the mirror assembly thru its ground wire in the 14631 wire assembly. If continuity exists in the 14631 door wiring, check for continuity through the mirror heating element. If the heating element shows no continuity, or the mirror is mechanically defective remove and replace the mirror assembly in accordance with Part 35-50. Start the engine and check the system for proper operation. Verify that mirror and backlite, heat in conjunction with the control switch operation.

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DETROIT IRON

Windshield Wipers - Electric

PART 35-60

Applies to All Models

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CL2303-2B

DESCRIPTION AND OPERATION

WINDSHIELD WIPER SYSTEM—NON DEPRESSED PARK

Bobcat, Pinto, Fairmont, Zephyr, Mustang II, Granada, Monarch and Versailles

The windshield wipers are actuated by a permanent magnet, rotary type electric motor. The two wiper arms and blades are mounted on a pivot shaft, one at each side of the windshield. The pivot shafts are connected to the motor by linkage arms and attaching clips.

WINDSHIELD WIPER SYSTEM—DEPRESSED PARK

Ford, Mercury, LTD II, Cougar, Lincoln Continental, Thunderbird and Continental Mark V

The wiper motor is a two-speed, permanent magnet depressed park type with the brush end plate at one end of the housing and a gear housing at the other end. The park switch is located in the gear cover and the park mechanism is located in the output arm.

The motor is mounted on the engine side of the cowl outer panel inboard of the master cylinder. A drive arm connects the motor directly to the drop arm of the right pivot shaft on Ford, Mercury, LTD II, Thunderbird, Lincoln Continental and Cougar. The drive arm connects the motor to the drop arm of the left pivot shaft on *Continental Mark V.*

INTERMITTENT WIPER GOVERNOR

The intermittent operation of the windshield wiper motor is controlled by a variable resistor in the windshield wiper control switch, which in conjunction with the electronic governor, allows a variable pause between wiping cycles.

Normal operation of the wiper switch (except Ford, Granada, Monarch, *Mustang II and Mercury*), is to rotate the wiper-washer knob or switch to the right. The first position is for slow speed and the second is for high speed.

For intermittent operation, rotate the wiper-washer knob or switch to the left. The more it is rotated to the left, the greater the resistance and the longer the time between wiper blade sweeps.

Normal operation of the wiper switch on the Ford and Mercury vehicles, is to slide the wiper-washer knob towards the right. The first position (about 3/4" long) is for intermittent, the second is for low speed and the third is for high speed.

When the control knob or switch is placed at the left side of the intermittent position, the time interval between wiper blade sweeps is at maximum. As the

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control is moved toward the right side of the intermittent position (before the detent is felt) the time interval between sweeps is reduced.

When the detent position is felt as the switch is moved toward the right, the wiper system will go into low speed and the next detent position, on the extreme right, is high speed.

The variable resistor in the switch in conjunction with electronic pause control, regulates the operation of the motor for the desired time interval.

Normal operation of the wiper switch on the Granada, Monarch and Mustang II vehicles is to slide the wiper switch towards the right. The first position is for intermittent, the second is for low and the third is for high speed.

When the wiper switch is placed in the intermittent position, the wipers complete a cycle and then pause before the next cycle. As you rotate the interval time control knob clockwise, the length of the pause is increased.

The governor used on all carlines except Granada, Monarch and Mustang II has a unique feature: Operation of the windshield washers while the switch is in the intermittent position, electrically overrides the governor, causing the wipers to operate at low speed.

Normal intermittent wipe operation resumes when the wash knob is released.

The governor used on Granada, Monarch and Mustang II has two unique features: electrically coordinated wash and wipe action when the wiper switch is in the "off" position and the washer button is depressed, and additionally, extra wipe cycles are provided for drying the windshield after the washer button is released. The wiper system will then automatically shut off.

The governor has a unique feature: Operation of the windshield washers while the switch is in the intermittent position, electrically overrides the governor, causing the wipers to operate at low speed.

When the wash knob is released, additional wipes are provided for drying the windshield after which normal intermittent wipe operation resumes.

DIAGNOSING

ELECTRICAL – WIPERS AND WASHERS		
CONDITION	**POSSIBLE CAUSE**	**RESOLUTION**
• Windshield wipers do not operate	• Open circuit breaker	• Replace C.B. If it goes again, check for short circuit
	• Open in wiring	• Repair as required
	• Switch	• Perform switch test. Repair as required
	• Motor	• Perform motor test. Repair as required
	• Bent or damaged linkage	• Repair or replace
	• Inoperative governor on intermittent wiper system	• Replace governor
• Windshield washer does not operate	• Low fluid level	• Fill as required
	• Split, loose, pinched or kinked hose	• Inspect, repair as required
	• Fuse blown*	• Replace fuse. If fuse blows again, check for short circuit
	• Open in wiring	• Repair as required
	• Washer Motor	• Replace motor, seal and impeller assembly

*Ford-Mercury-Pinto-Bobcat Only. In others, the washer circuit protection is provided by the circuit breaker. **CL2316-2B**

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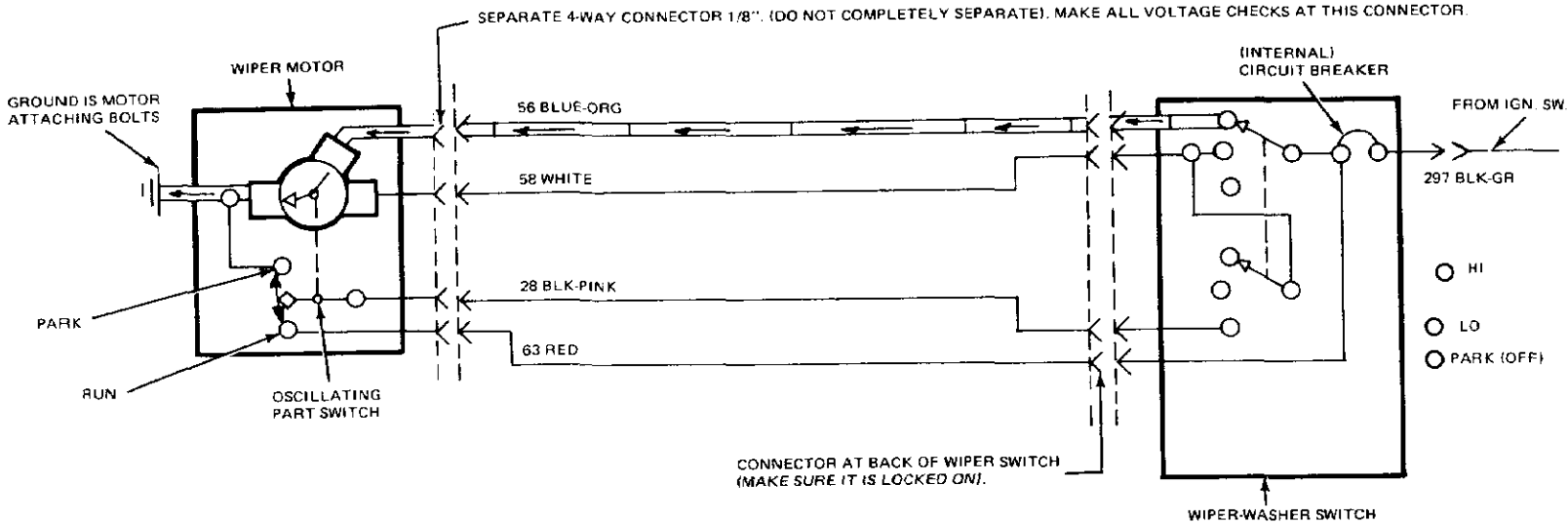
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WINDSHIELD WIPER SYSTEM "A" MOTOR, NON-INTERVAL

PINTO/BOBCAT

HIGH-SPEED OPERATION – WITH THE WIPER SWITCH IN THE "HIGH" SPEED POSITION, THE CURRENT FLOW IS ILLUSTRATED BY ARROWS ON THE CIRCUIT DIAGRAM. CURRENT FLOWS FROM THE IGNITION SWITCH THROUGH THE WIPER SWITCH TO THE WIPER MOTOR.

FIGURE 1 – (ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION)



HIGH SPEED TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN HIGH POSITION FOR WIPER MOTOR TEST.

SEPARATE 4-WAY CONNECTOR AT THE MOTOR APPROXIMATELY 1/8" TO ALLOW VOLTAGE CHECKS. CHECK FOR VOLTAGE AT #56 CIRCUIT. IF NO VOLTAGE, TRACE CIRCUIT BACK TO SOURCE TO DETERMINE PROBLEM. IF THERE IS VOLTAGE, GROUND THE MOTOR CASE TO THE BODY WITH A WIRE JUMPER. IF MOTOR RUNS, REPAIR GROUND. IF MOTOR DOES NOT RUN REPLACE IT.

CL2387-2B1

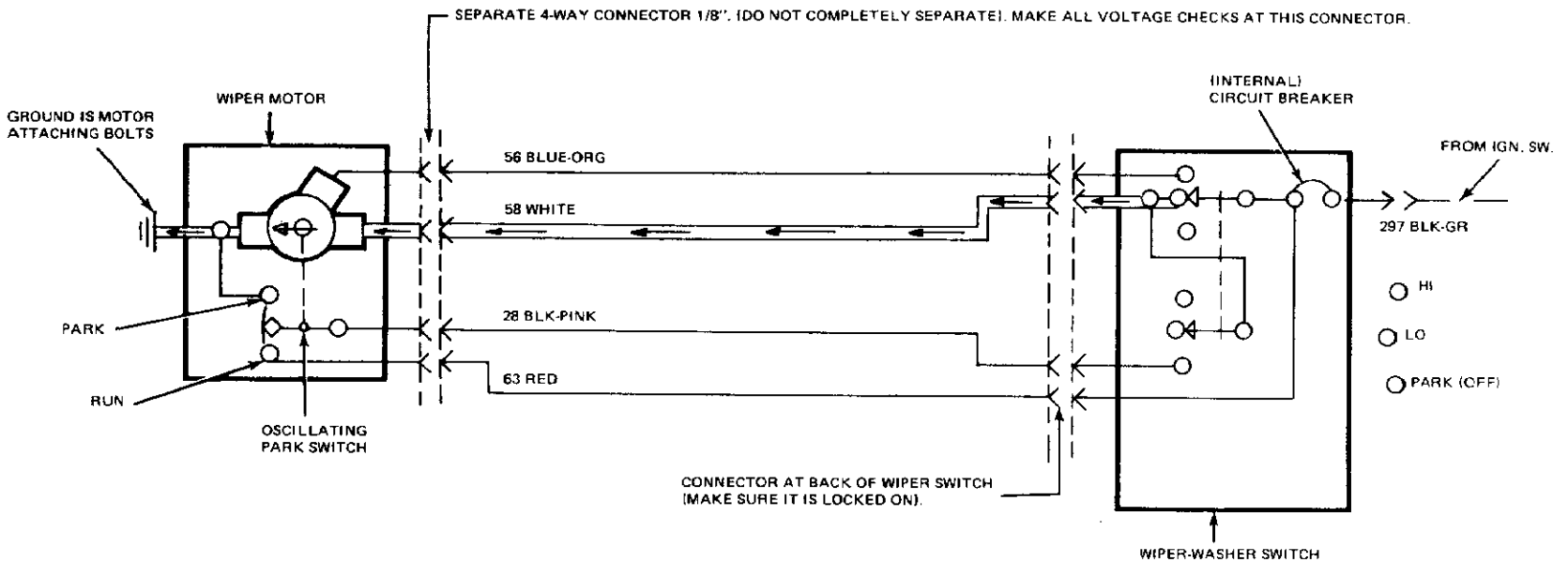
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WINDSHIELD WIPER SYSTEM "A" MOTOR, NON-INTERVAL

PINTO--BOBCAT

LOW-SPEED OPERATION – WITH THE WIPER SWITCH IN THE "LOW" SPEED POSITION, THE CURRENT FLOW IS AS ILLUSTRATED BY ARROWS ON THE CIRCUIT DIAGRAM. CURRENT FLOWS FROM THE IGNITION SWITCH THROUGH THE WIPER SWITCH TO THE WIPER MOTOR.

FIGURE 2 – (ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION).



LOW-SPEED TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN LOW POSITION FOR WIPER MOTOR TEST.

SEPARATE 4-WAY CONNECTOR AT THE MOTOR APPROXIMATELY 1/8" TO ALLOW VOLTAGE CHECKS. CHECK FOR VOLTAGE AT THE #58 CIRCUIT. IF NO VOLTAGE, TRACE CIRCUIT BACK TO SOURCE TO DETERMINE PROBLEM. IF THERE IS VOLTAGE, GROUND THE MOTOR CASE TO THE BODY WITH A WIRE JUMPER. IF MOTOR RUNS, REPAIR GROUND. IF MOTOR DOES NOT RUN REPLACE IT.

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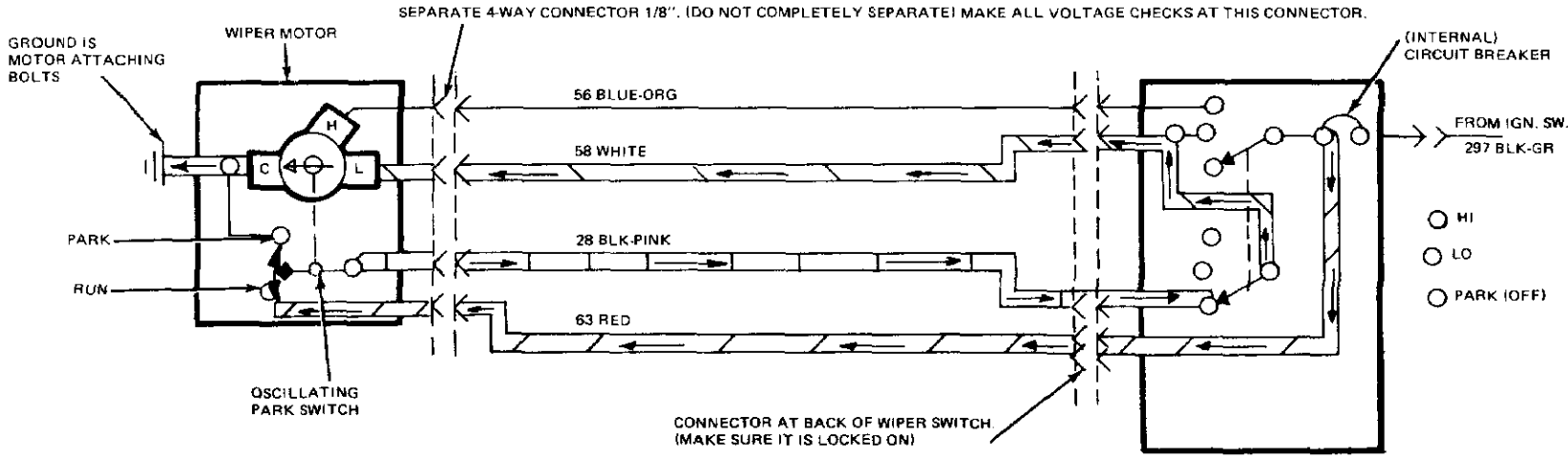
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WINDSHIELD WIPER SYSTEM "A" MOTOR, NON-INTERVAL

PINTO–BOBCAT

PARK OPERATION – WITH THE WIPE CH IN THE OFF POSITION, THE WIPERS WILL COMPLETE ONE CYCLE THROUGH THE WIPER MOTOR'S PARK SWITCH. CURRENT FLOW IS ILLUSTRATED B' WS ON THE CIRCUIT DIAGRAM. CURRENT FLOWS FROM THE IGNITION SWITCH THROUGH THE WIPER SWITCH TO THE WIPER MOTOR'S OSCILLATING PARK SWITCH *(RUN) FOR 9/10 OF ONE CYCLE. THE LOW SPEED RUN CIRCUIT IS FROM* THE WIPER MOTOR'S PARK SWITCH TO THE MOTOR'S LOW SPEED BRUSH, ACROSS THE ARMATURE AND OUT A COMMON BRUSH TO GROUND. AT THE LAST 1/10 PORTION OF THE CYCLE, THE OSCILLATING PARK SWITCH MOVES FROM ITS (RUN, B+) POSITION TO (PARK, GROUND), STOPPING THE MOTOR IN THE PARK POSITION.

FIGURE 3 – (ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION).



PARK TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN THE "OFF" POSITION FOR WIPER MOTOR TEST.

SEPARATE 4-WAY CONNECTOR AT THE MOTOR APPROXIMATELY 1/8" TO ALLOW VOLTAGE CHECKS. CHECK FOR VOLTAGE AT #58, #28, #63 CIRCUITS. IF VOLTAGE IS PRESENT ON ALL THREE CIRCUITS AND WIPER BLADES ARE IN NON-PARK POSITION, USE A JUMPER WIRE AND ELECTRICALLY GROUND THE WIPER MOTOR CASE. IF MOTOR PARKS, REPAIR MOTOR GROUND. IF MOTOR DOES NOT RUN TO PARK POSITION, REPLACE MOTOR.

- IF VOLTAGE IS ON THE #63 CIRCUIT ONLY, *REPLACE THE MOTOR.*
- IF VOLTAGE IS ON THE #63 AND #28 CIRCUITS ONLY, TRACE THE #28 AND #58 CIRCUITS BACK TOWARD THE WIPER SWITCH TO DETERMINE SOURCE OF PROBLEM.

CL2387-28[3]

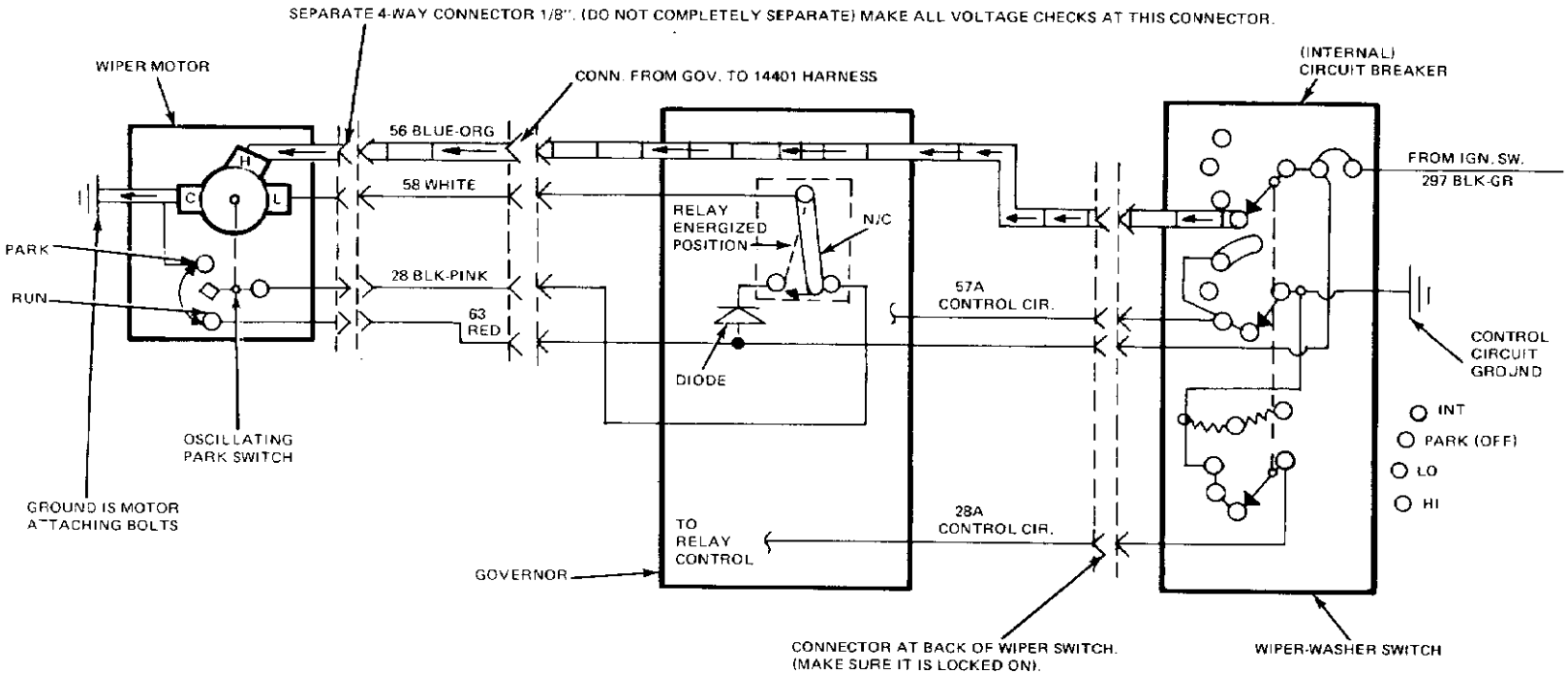
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WINDSHIELD WIPER SYSTEM "A" MOTOR – INTERVAL

PINTO–BOBCAT

HIGH-SPEED OPERATION – WITH THE WIPER SWITCH IN THE HIGH SPEED POSITION, THE CURRENT FLOW IS AS ILLUSTRATED BY ARROWS ON THE CIRCUIT DIAGRAM. CURRENT FLOWS FROM THE IGNITION SWITCH THROUGH THE WIPER SWITCH AND GOVERNOR TO THE WIPER MOTOR.

FIGURE 4 – (ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW)



HIGH-SPEED TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN HIGH POSITION FOR WIPER MOTOR TEST.

SEPARATE 4-WAY CONNECTOR AT THE MOTOR APPROXIMATELY 1/8" TO ALLOW VOLTAGE CHECKS. CHECK FOR VOLTAGE AT THE #56 CIRCUIT. IF THERE IS VOLTAGE, GROUND THE MOTOR CASE TO THE BODY WITH A WIRE JUMPER. IF MOTOR RUNS, REPAIR GROUND. IF MOTOR DOES NOT RUN, REPLACE IT.

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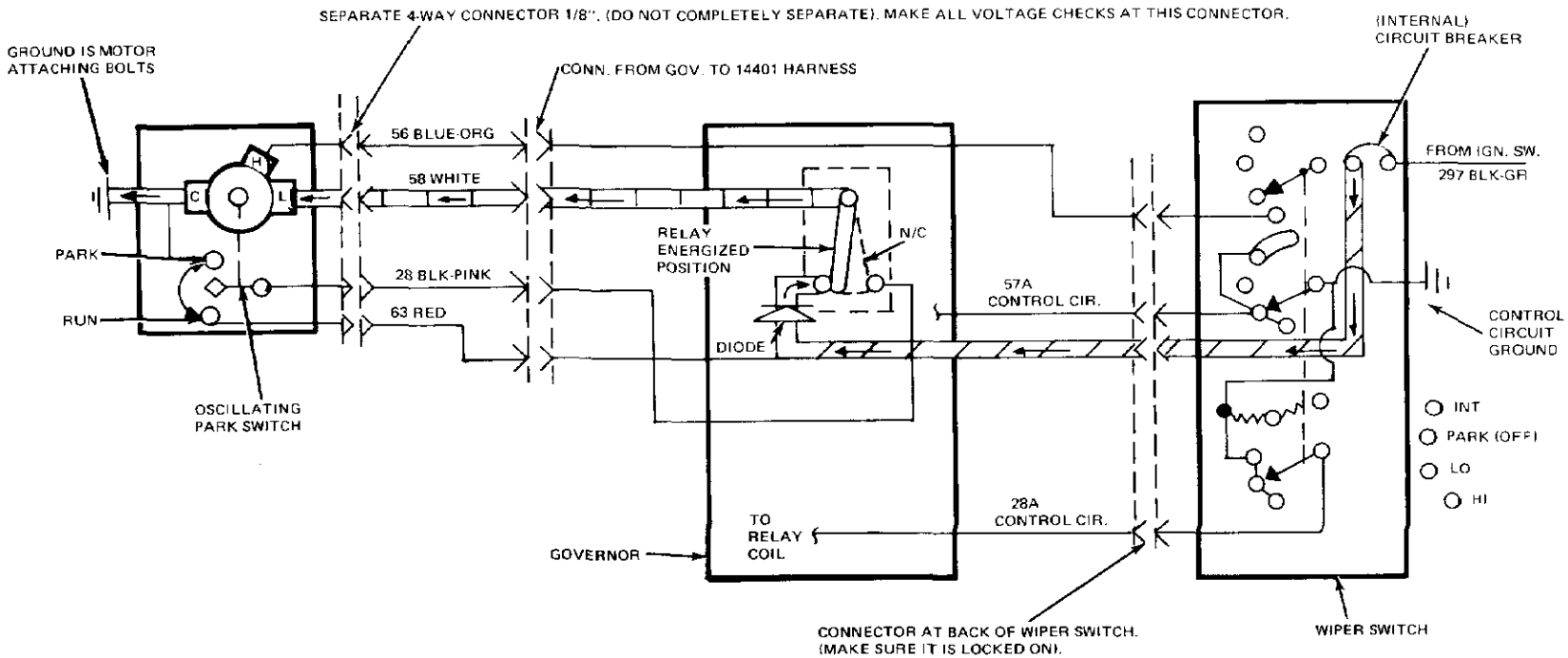
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WINDSHIELD WIPER SYSTEM "A" MOTOR – INTERVAL

PINTO–BOBCAT

LOW-SPEED OPERATION – WITH THE WIPER SWITCH IN THE LOW POSITION, THE CURRENT FLOW IS AS ILLUSTRATED BY ARROWS ON THE CIRCUIT DIAGRAM. CURRENT FLOWS FROM THE IGNITION SWITCH THROUGH THE WIPER SWITCH AND ENERGIZED RELAY CONTACTS OF THE GOVERNOR TO THE WIPER MOTOR.

FIGURE 5 – (ARROWS INSIDE DOUBLE LINES DENOTE CURRENT FLOW DIRECTION)



LOW-SPEED TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN LOW POSITION FOR WIPER MOTOR TEST.

A. SEPARATE 4-WAY CONNECTOR AT THE MOTOR APPROXIMATELY 1/8" TO ALLOW VOLTAGE CHECKS. CHECK FOR VOLTAGE AT THE #58 CIRCUIT. IF THERE IS VOLTAGE, GROUND THE MOTOR CASE TO THE BODY WITH A WIRE JUMPER. IF MOTOR RUNS, REPAIR MOTOR GROUND. IF MOTOR DOES NOT RUN, REPLACE IT.

B. IF VOLTAGE IS ON #63 CIRCUIT BUT NOT ON THE #58 CIRCUIT, GROUND CONTROL CIRCUITS AT THE WIPER SWITCH CONNECTOR. IF VOLTAGE IS NOW ON THE #58 CIRCUIT, REPAIR GOVERNOR GROUND CIRCUITS OR REPLACE WIPER SWITCH. IF NO VOLTAGE ON #58 CIRCUIT, REPLACE THE GOVERNOR.

C. IF NO VOLTAGE ON THE #63 CIRCUIT (RED) TRACE THE CIRCUIT BACK TO SOURCE TO DETERMINE PROBLEM.

NOTE: IF DIODE FAILS OPEN OR RELAY IS INOPERATIVE, WIPERS WILL OPERATE IN HIGH SPEED AND PARK ONLY. LOW AND INTERMITTENT WILL NOT OPERATE.

CL2387-28[5]

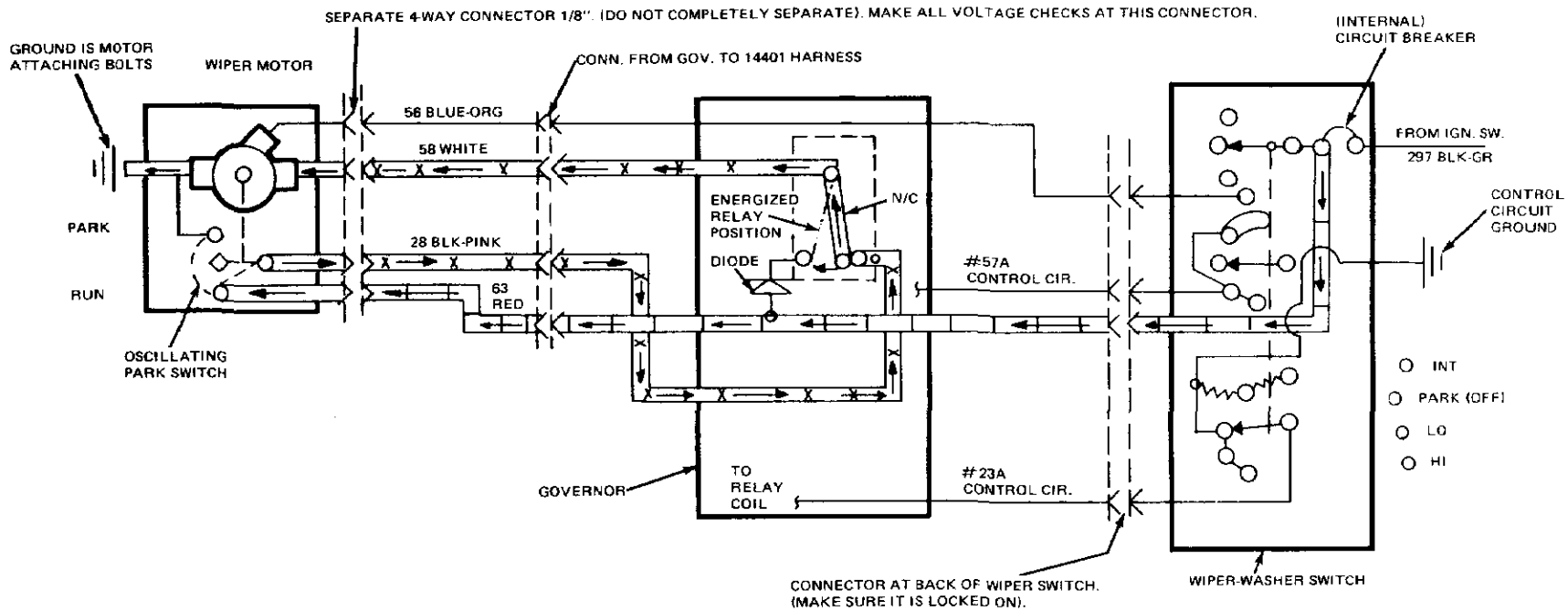
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WINDSHIELD WIPER SYSTEM "A" MOTOR – INTERVAL

PINTO–BOBCAT

PARK OPERATION – WITH THE WIPER SWITCH IN THE OFF POSITION, THE WIPERS WILL COMPLETE ONE CYCLE THROUGH THE WIPER MOTOR'S PARK SWITCH. CURRENT FLOW IS ILLUSTRATED BY ARROWS ON THE CIRCUIT DIAGRAM. CURRENT FLOWS FROM THE IGNITION SWITCH ACROSS A CIRCUIT BREAKER IN THE WIPER SWITCH TO THE WIPER MOTOR'S OSCILLATING PARK SWITCH (RUN), FROM THE PARK SWITCH THROUGH N/C GOVERNOR RELAY CONTACTS (DE-ENERGIZED) TO THE MOTOR'S LOW SPEED BRUSH, ACROSS THE ARMATURE AND OUT A COMMON BRUSH TO GROUND FOR 9/10 OF ONE CYCLE. AT THE LAST 1/10 OF THE CYCLE, THE OSCILLATING PARK SWITCH MOVES FROM ITS (RUN, B+) POSITION TO (PARK, GROUND), STOPPING THE MOTOR IN THE PARK POSITION.

FIGURE 7 – (ARROWS INSIDE DOUBLE LINE DENOTES CURRENT FLOW DIRECTION)



PARK TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN THE "OFF" POSITION FOR WIPER MOTOR TEST.

A. SEPARATE 4-WAY CONNECTOR AT THE MOTOR APPROXIMATELY 1/8" TO ALLOW VOLTAGE CHECKS. CHECK FOR VOLTAGE AT THE #58 CIRCUIT. IF THERE IS VOLTAGE, GROUND THE MOTOR CASE TO THE BODY WITH A JUMPER WIRE. IF MOTOR RUNS, REPAIR GROUND. IF MOTOR DOES NOT RUN, REPLACE IT.

B. IF THERE IS VOLTAGE ON CIRCUITS #63 AND #28 BUT NO VOLTAGE ON CIRCUIT #58, REPLACE THE GOVERNOR.

C. IF THERE IS VOLTAGE ON CIRCUIT #63 BUT NOT ON #28, REPLACE THE WIPER MOTOR.

D. IF NO VOLTAGE ON CIRCUIT #63, TRACE THE CIRCUIT BACK TO SOURCE TO DETERMINE PROBLEM.

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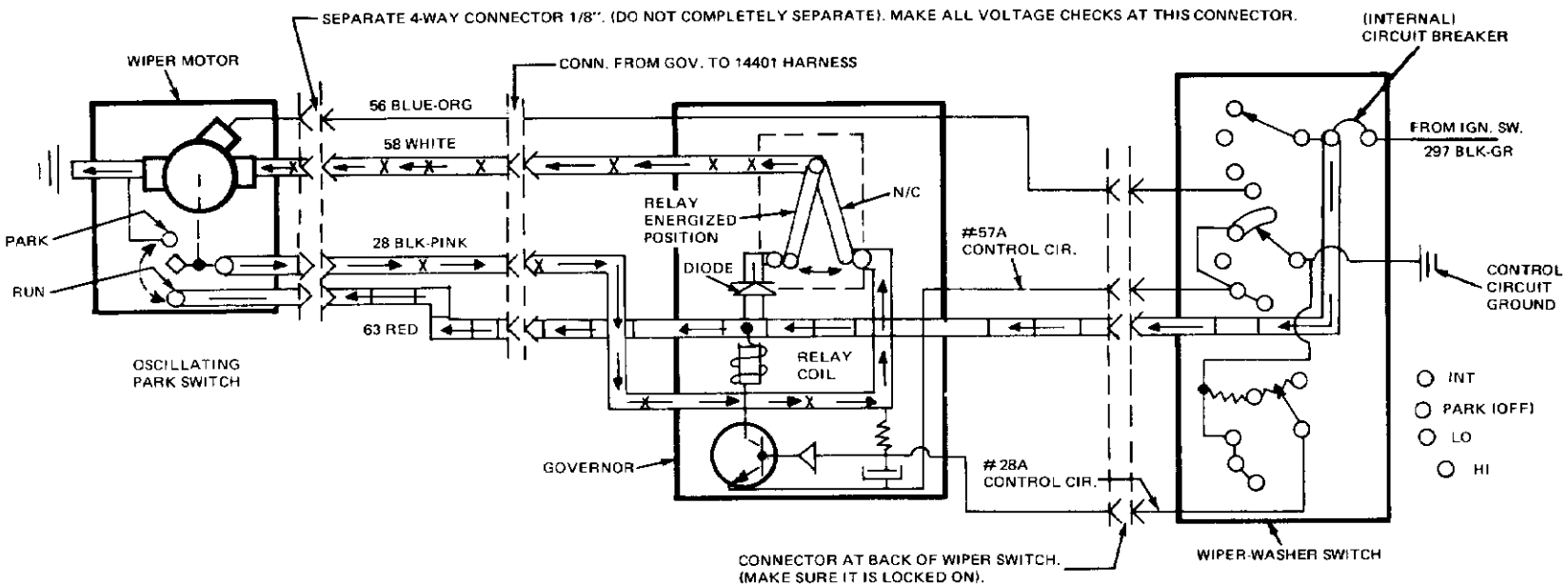
WINDSHIELD WIPER SYSTEM "A" MOTOR – INTERVAL

PINTO–BOBCAT

INTERMITTENT WIPER OPERATION – ASSUME WIPERS ARE IN THE PARK POSITION. WHEN THE WIPER SWITCH IS PLACED IN THE "INT" MODE, THE MOTOR'S OSCILLATING PARK SWITCH CONTACTS ARE AT GROUND, AND THE GOVERNOR RELAY IS ENERGIZED. INITIALLY, CURRENT FLOWS FROM THE IGNITION SWITCH, THROUGH A DIODE AND ENERGIZED CONTACTS IN THE GOVERNOR TO THE WIPER MOTOR'S LOW SPEED BRUSH. THE MOTOR ROTATES 1/10 OF A CYCLE. THE WIPER MOTOR'S OSCILLATING PARK SWITCH CONTACTS THEN CHANGE FROM PARK (GROUND) TO RUN (B+) AND MOMENTARILY AFTER THEY CHANGE POSITION THE RELAY IN THE GOVERNOR DE-ENERGIZES. A SECOND PATH TO THE WIPER MOTOR IS COMPLETED AS ILLUSTRATED BY ARROWS ON THE CIRCUIT DIAGRAM. THE MOTOR ROTATES THROUGH THE REMAINING 9/10 OF ONE REVOLUTION. WHEN THE OSCILLATING PARK SWITCH CONTACTS AGAIN TOUCH GROUND (PARK), THE MOTOR WILL PARK. THE GOVERNOR'S ELECTRONIC CIRCUIT DELAYS ENERGIZING OF THE RELAY UNTIL THE CIRCUIT TIMES OUT. THEN THE RELAY ENERGIZES AND THE LOW SPEED INTERMITTENT CYCLE IS REPEATED.

NOTE: DISCHARGE RATE OF THE GOVERNOR'S CAPACITOR TO GROUND THROUGH THE WIPER SWITCH CONTROLS THE TIME DELAY (RELAY "PICK-UP" TIME) OF THE SYSTEM.

FIGURE 6 – (ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION).



INTERMITTENT WIPER TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN THE INTERMITTENT POSITION FOR WIPER MOTOR TEST.

A. SEPARATE 4-WAY CONNECTOR AT THE MOTOR APPROXIMATELY 1/8" TO ALLOW VOLTAGE CHECKS. CHECK FOR VOLTAGE ON THE #63, #28 AND #58 CIRCUITS. IF VOLTAGE IS ON THE #58 CIRCUIT, USE A JUMPER WIRE AND ELECTRICALLY GROUND THE MOTOR CASE. IF MOTOR RUNS, REPAIR MOTOR GROUND. IF MOTOR DOES NOT RUN, REPLACE MOTOR.

B. IF VOLTAGE IS ON #63 AND #28 CIRCUITS, (WIPERS ARE OUT OF PARK) BUT NO VOLTAGE ON #58 CIRCUIT, REPLACE THE GOVERNOR. IF WIPERS ARE IN PARK, GROUND CONTROL CIRCUITS #57A AND #28A AT THE WIPER SWITCH. IF VOLTAGE IS NOW ON #58 CIRCUIT, REPAIR GOVERNOR GROUND CIRCUITS OR REPLACE THE WIPER SWITCH. IF NO VOLTAGE ON #58 CIRCUIT, REPLACE THE GOVERNOR.

C. IF THE WIPER MOTOR IS OUT OF THE PARK POSITION AND THERE IS VOLTAGE ON CIRCUIT #63 BUT NOT ON #28, REPLACE THE WIPER MOTOR.

D. IF NO VOLTAGE ON CIRCUIT #63 TRACE THE CIRCUIT BACK TO SOURCE TO DETERMINE PROBLEM.

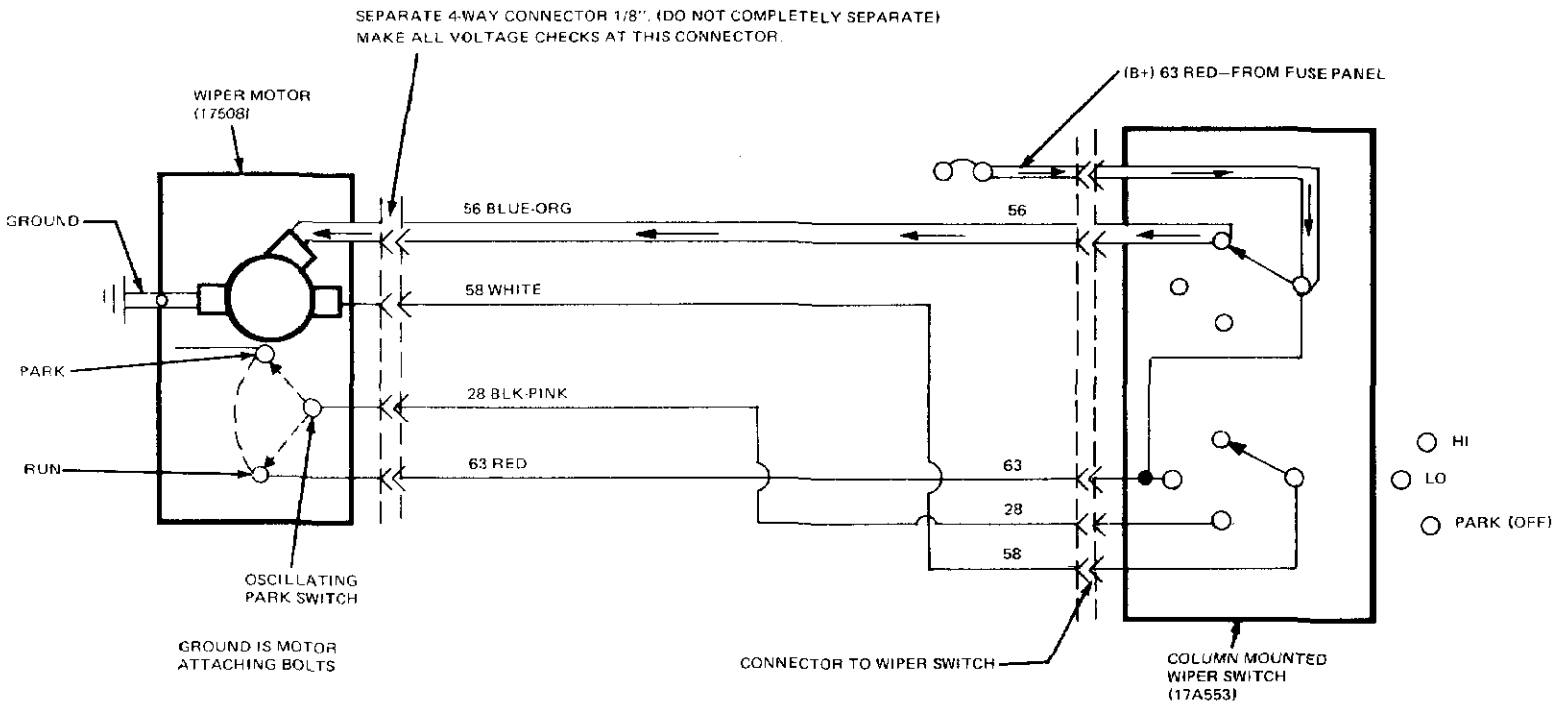
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WINDSHIELD WIPER SYSTEM "A" MOTOR, NON-INTERVAL
FAIRMONT, ZEPHYR, MUSTANG II, GRANADA, MONARCH AND VERSAILLES

HIGH-SPEED OPERATION – WITH THE WIPER SWITCH IN THE "HIGH" SPEED POSITION, THE CURRENT FLOW IS ILLUSTRATED BY ARROWS ON THE CIRCUIT DIAGRAM. CURRENT FLOWS FROM THE IGNITION SWITCH, ACROSS A CIRCUIT BREAKER IN THE FUSE PANEL, THROUGH THE WIPER SWITCH TO THE WIPER MOTOR.

FIGURE 1 – (ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION)



HIGH-SPEED TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN HIGH POSITION FOR WIPER MOTOR TEST.

SEPARATE 4-WAY CONNECTOR AT THE MOTOR APPROXIMATELY 1/8" TO ALLOW VOLTAGE CHECKS. CHECK FOR VOLTAGE AT THE #56 CIRCUIT. IF NO VOLTAGE, TRACE CIRCUIT BACK TO SOURCE TO DETERMINE PROBLEM. IF THERE IS VOLTAGE, GROUND THE MOTOR CASE TO THE BODY WITH A WIRE JUMPER. IF MOTOR RUNS, REPAIR GROUND. IF MOTOR DOES NOT RUN REPLACE IT.

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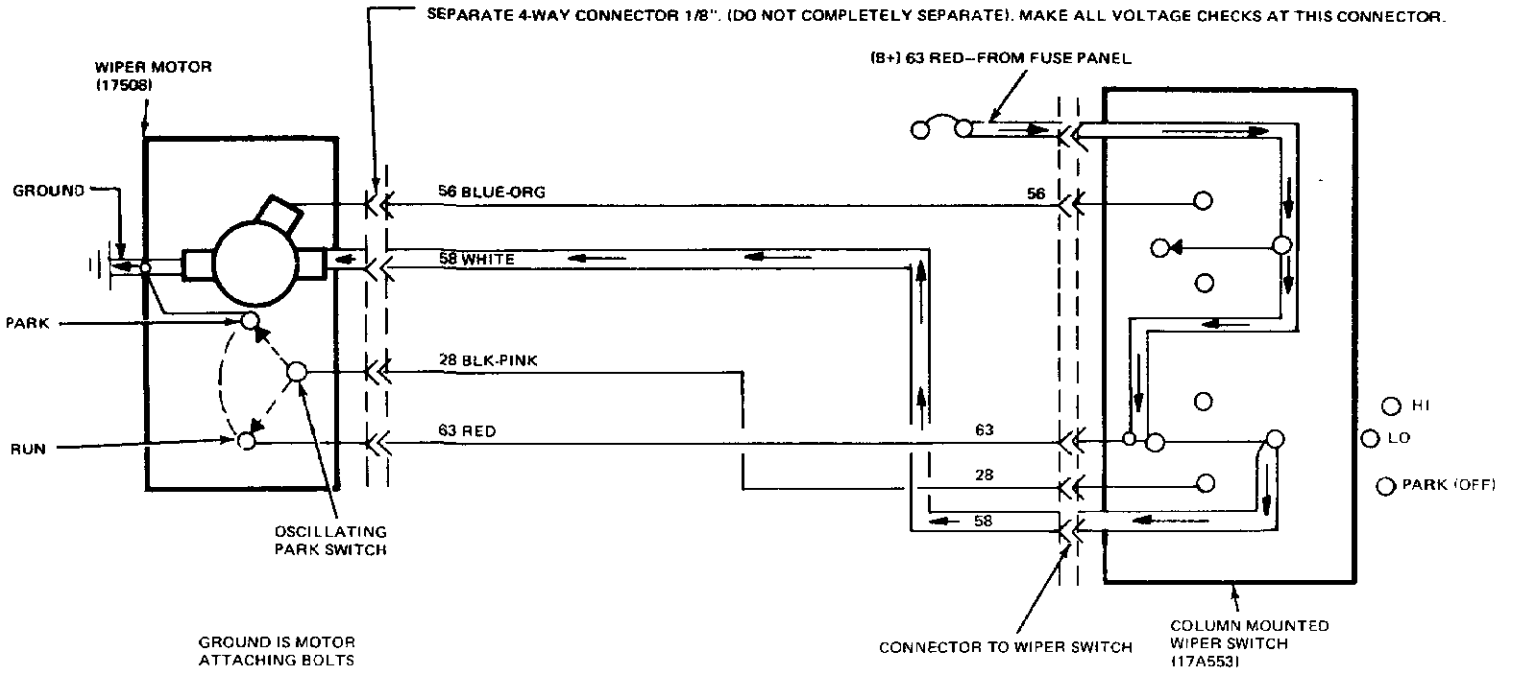
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WINDSHIELD WIPER SYSTEM "A" MOTOR, NON-INTERVAL
FAIRMONT, ZEPHYR, MUSTANG II, GRANADA, MONARCH AND VERSAILLES

LOW-SPEED OPERATION – WITH THE WIPER SWITCH IN THE "LOW" SPEED POSITION, THE CURRENT FLOW IS AS ILLUSTRATED BY ARROWS ON THE CIRCUIT DIAGRAM. CURRENT FLOWS FROM THE IGNITION SWITCH, ACROSS A CIRCUIT BREAKER PANEL, THROUGH THE WIPER SWITCH TO THE WIPER MOTOR.

FIGURE 2 – (ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION).



LOW-SPEED TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN LOW POSITION FOR WIPER MOTOR TEST.

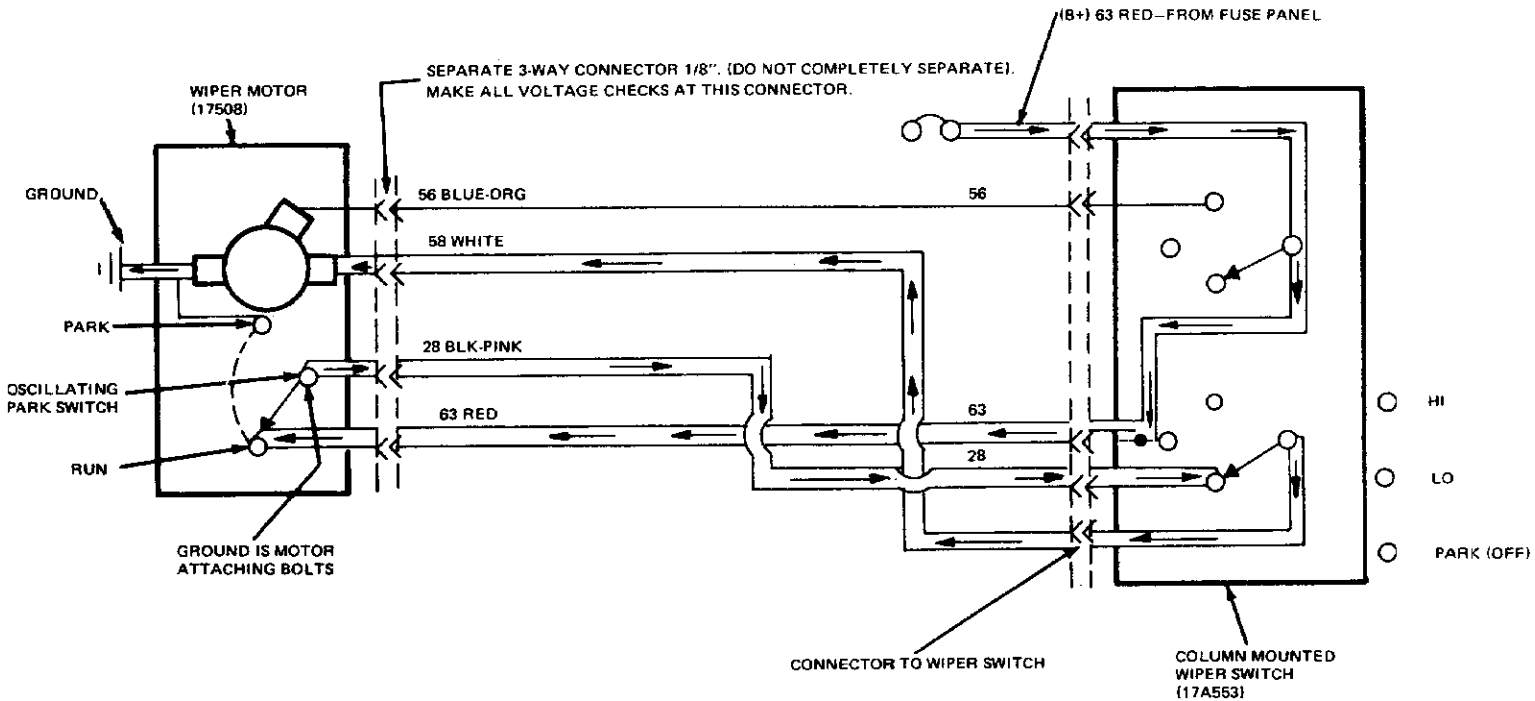
SEPARATE 4-WAY CONNECTOR AT THE MOTOR APPROXIMATELY 1/8" TO ALLOW VOLTAGE CHECKS. CHECK FOR VOLTAGE AT #58 CIRCUIT. IF NO VOLTAGE, TRACE CIRCUIT BACK TO SOURCE TO DETERMINE PROBLEM. IF THERE IS VOLTAGE, GROUND THE MOTOR CASE TO THE BODY WITH A WIRE JUMPER. IF MOTOR RUNS, REPAIR GROUND. IF MOTOR DOES NOT RUN REPLACE IT.

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WINDSHIELD WIPER SYSTEM "A" MOTOR, NON-INTERVAL
FAIRMONT, ZEPHYR, MUSTANG II, MONARCH, GRANADA AND VERSAILLES

PARK OPERATION – WITH THE WIPER SWITCH IN THE OFF POSITION, THE WIPERS WILL COMPLETE ONE CYCLE THROUGH THE WIPER MOTOR'S PARK SWITCH. CURRENT FLOW IS ILLUSTRATED BY ARROWS ON THE CIRCUIT DIAGRAM. CURRENT FLOWS FROM THE IGNITION SWITCH ACROSS A CIRCUIT BREAKER IN FUSE PANEL THROUGH THE WIPER SWITCH TO THE WIPER MOTOR'S OSCILLATING PARK SWITCH (RUN), FROM THE WIPER MOTOR'S PARK SWITCH TO THE MOTOR'S LOW SPEED BRUSH, ACROSS THE ARMATURE AND OUT A COMMON BRUSH TO GROUND FOR 9/10 OF ONE CYCLE. AT THE LAST 1/10 OF THE CYCLE, THE OSCILLATING PARK SWITCH MOVES FROM ITS (RUN, B+) POSITION TO (PARK, GROUND), STOPPING THE MOTOR IN THE PARK POSITION.

FIGURE 3 – (ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION).



PARK TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN THE "OFF" POSITION FOR WIPER MOTOR TEST.

SEPARATE 4-WAY CONNECTOR AT THE MOTOR APPROXIMATELY 1/8" TO ALLOW VOLTAGE CHECKS. CHECK FOR VOLTAGE AT THE #58, #28, #63 CIRCUITS. IF VOLTAGE IS PRESENT ON ALL THREE CIRCUITS AND WIPER BLADES ARE IN NON-PARK POSITION, USE A JUMPER WIRE AND ELECTRICALLY GROUND THE WIPER MOTOR CASE. IF MOTOR PARKS, REPAIR MOTOR GROUND. IF MOTOR DOES NOT RUN TO PARK POSITION, REPLACE MOTOR.

IF VOLTAGE IS ON THE #63 CIRCUIT ONLY, REPLACE WIPER MOTOR.

IF VOLTAGE IS ON #63 AND #28 CIRCUITS, REPLACE THE WIPER SWITCH.

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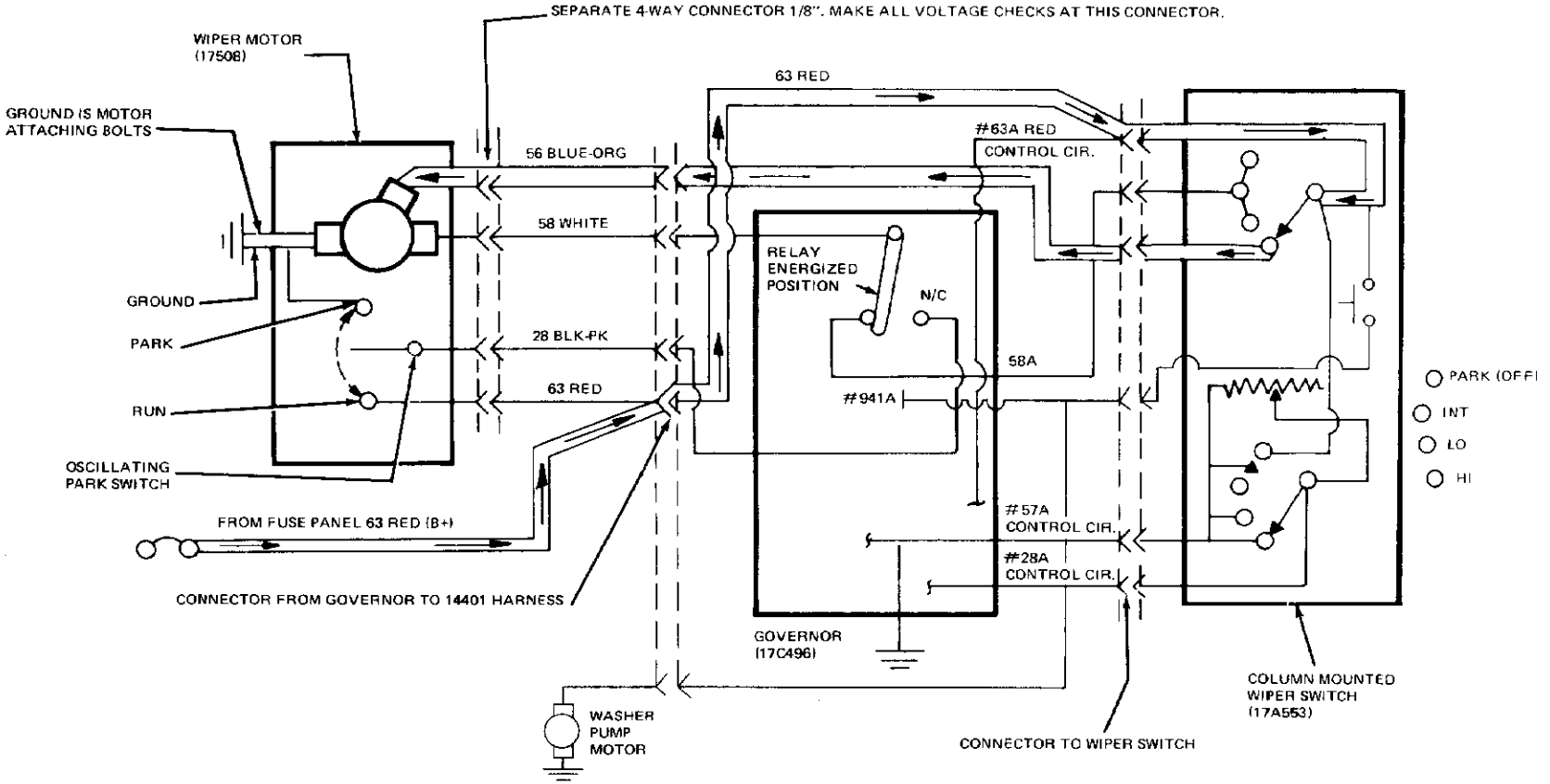
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WINDSHIELD WIPER SYSTEM "A" MOTOR – INTERVAL

FAIRMONT, ZEPHYR, MUSTANG, MONARCH, GRANADA AND VERSAILLES

HIGH-SPEED OPERATION – WITH THE WIPER SWITCH IN THE HIGH SPEED POSITION, THE CURRENT FLOW IS AS ILLUSTRATED BY ARROWS ON THE CIRCUIT DIAGRAM. CURRENT FLOWS FROM THE IGNITION SWITCH TO A CIRCUIT BREAKER IN THE FUSE PANEL, FROM THE FUSE PANEL THROUGH THE WIPER SWITCH AND TO THE WIPER MOTOR.

FIGURE 4 – (ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW).



HIGH-SPEED TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN HIGH POSITION FOR WIPER MOTOR TEST.

SEPARATE 4-WAY CONNECTOR AT THE MOTOR APPROXIMATELY 1/8" TO ALLOW VOLTAGE CHECKS. CHECK FOR VOLTAGE AT THE #56 CIRCUIT. IF NO VOLTAGE, TRACE CIRCUIT BACK TO SOURCE TO DETERMINE PROBLEM. IF THERE IS VOLTAGE, GROUND THE MOTOR CASE TO THE BODY WITH A WIRE JUMPER. IF MOTOR RUNS, REPAIR GROUND. IF MOTOR DOES NOT RUN, REPLACE IT.

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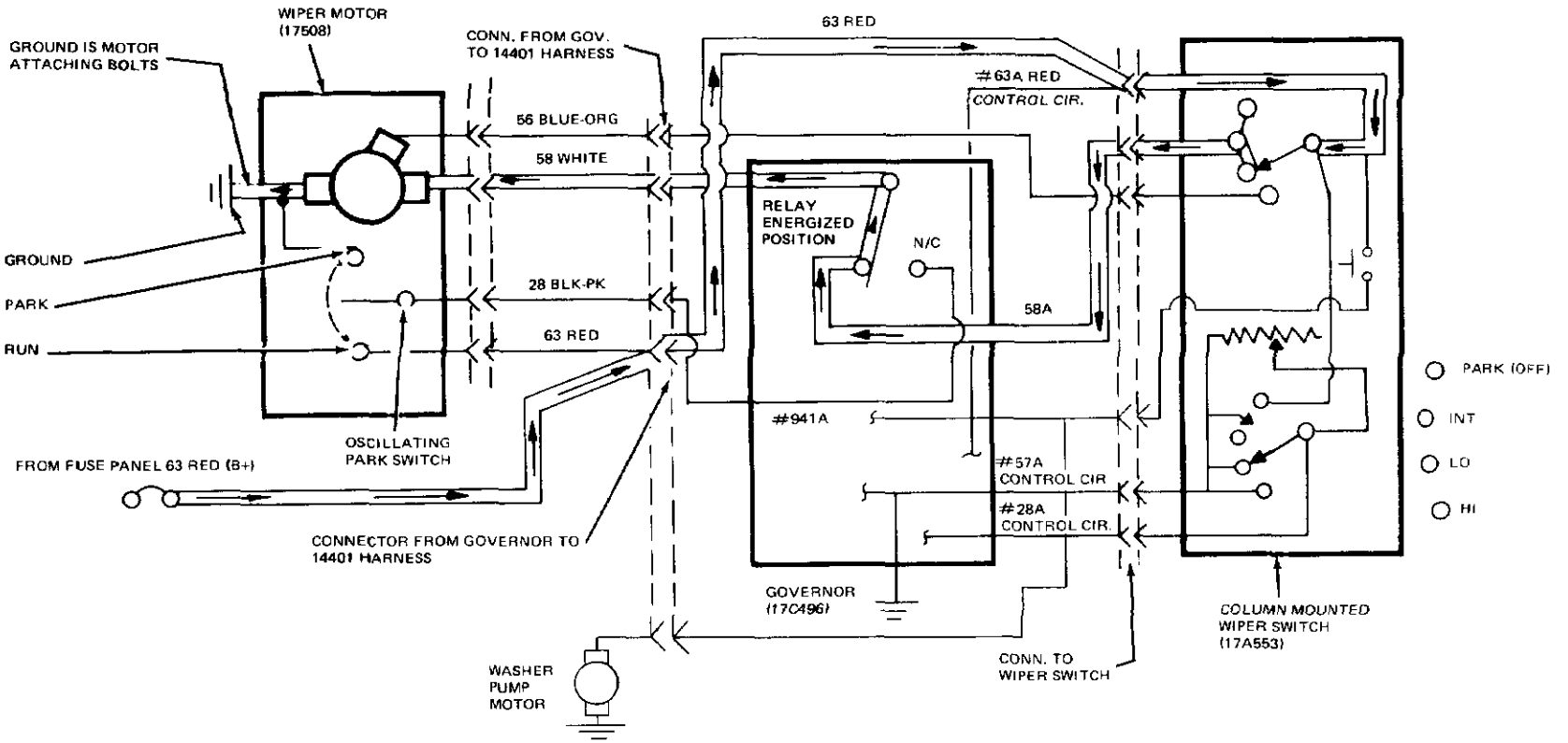
WINDSHIELD WIPER SYSTEM "A" MOTOR – INTERVAL

FAIRMONT, ZEPHYR, MUSTANG, MONARCH, GRANADA AND VERSAILLES

LOW-SPEED OPERATION – WITH THE WIPER SWITCH IN THE LOW POSITION, THE CURRENT FLOW IS AS ILLUSTRATED BY ARROWS ON THE CIRCUIT DIAGRAM. CURRENT FLOWS FROM THE IGNITION SWITCH TO THE FUSE PANEL, FROM THE FUSE PANEL THROUGH THE WIPER SWITCH AND ENERGIZES RELAY CONTACTS OF THE GOVERNOR TO THE WIPER MOTOR.

FIGURE 5 – (ARROWS INSIDE DOUBLE LINES DENOTE CURRENT FLOW DIRECTION).

SEPARATE 4-WAY CONNECTOR. (DO NOT COMPLETELY SEPARATE). MAKE ALL VOLTAGE CHECKS AT THIS CONNECTOR.



LOW-SPEED TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN LOW POSITION FOR WIPER MOTOR TEST.

A. SEPARATE 4-WAY CONNECTOR AT THE MOTOR APPROXIMATELY 1/8" TO ALLOW VOLTAGE CHECKS. CHECK FOR VOLTAGE AT THE #58 CIRCUIT. IF THERE IS *VOLTAGE, GROUND THE MOTOR CASE TO THE BODY WITH A WIRE JUMPER. IF MOTOR RUNS, REPAIR MOTOR GROUND. IF MOTOR DOES NOT RUN, REPLACE IT.*

B. IF VOLTAGE IS ON #58A CIRCUIT BUT NOT THE #58 CIRCUIT, GROUND CONTROL #28A CIRCUIT AT THE WIPER SWITCH CONNECTOR. IF VOLTAGE IS NOW ON THE #58 CIRCUIT, REPAIR GOVERNOR GROUND CIRCUITS OR REPLACE WIPER SWITCH. IF NO VOLTAGE ON #58 CIRCUIT, REPLACE THE GOVERNOR.

C. IF NO VOLTAGE ON THE #58A CIRCUIT, TRACE THE CIRCUIT BACK THROUGH WIPER SWITCH TO #63 CIRCUIT.

D. IF NO VOLTAGE ON THE #63 CIRCUIT, TRACE THE CIRCUIT BACK TO SOURCE TO DETERMINE PROBLEM.

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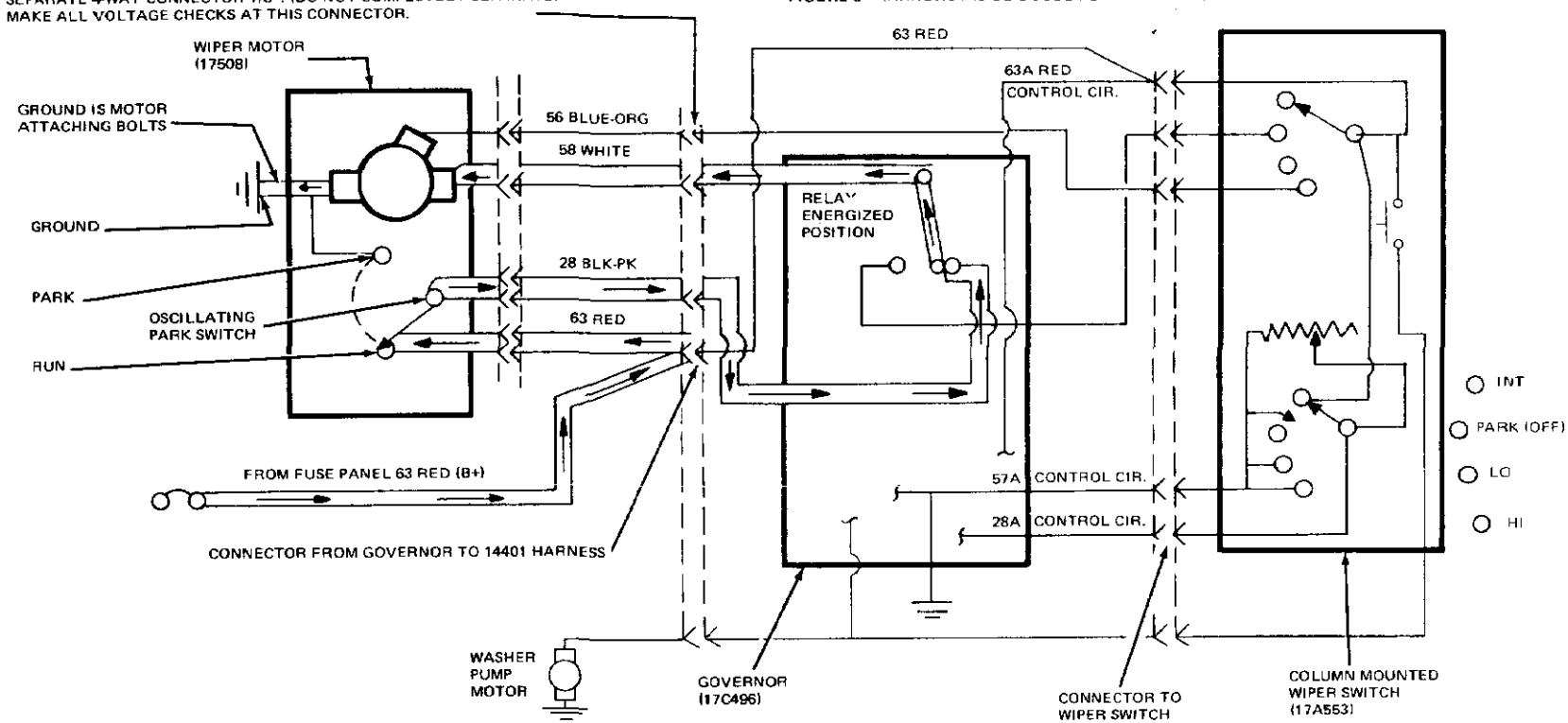
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WINDSHIELD WIPER SYSTEM "A" MOTOR – INTERVAL

FAIRMONT, ZEPHYR, MUSTANG, MONARCH, GRANADA AND VERSAILLES

PARK CIRCUIT OPERATION – WITH THE WIPER SWITCH IN THE "OFF" POSITION, THE WIPERS WILL COMPLETE ONE CYCLE THROUGH THE WIPER MOTOR'S PARK SWITCH. CURRENT FLOW IS ILLUSTRATED BY ARROWS ON THE CIRCUIT DIAGRAM. CURRENT FLOWS FROM THE IGNITION SWITCH TO A CIRCUIT BREAKER IN THE FUSE PANEL. FROM THE FUSE PANEL INTO WIPER MOTOR'S OSCILLATING PARK SWITCH (RUN) FOR 9/10 OF ONE CYCLE. THE LOW SPEED RUN CIRCUIT IS FROM THE WIPER MOTOR'S PARK SWITCH, THROUGH THE NORMALLY CLOSED CONTACTS OF THE GOVERNOR, TO THE MOTOR'S LOW SPEED BRUSH, ACROSS THE ARMATURE AND OUT A COMMON BRUSH TO GROUND. AT THE LAST (1/10) PORTION OF THE CYCLE, THE OSCILLATING PARK SWITCH MOVES FROM ITS RUN (B+) POSITION TO PARK (GROUND), STOPPING THE MOTOR IN THE PARK POSITION.

FIGURE 6 – (ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION).



PARK TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN THE "OFF" POSITION FOR WIPER MOTOR TEST.

A. SEPARATE 4-WAY CONNECTOR AT THE MOTOR APPROXIMATELY 1/8" TO ALLOW VOLTAGE CHECKS. CHECK FOR VOLTAGE AT THE #58 CIRCUIT. IF THERE IS VOLTAGE, GROUND THE MOTOR CASE TO THE BODY WITH A JUMPER WIRE. IF MOTOR RUNS, REPAIR GROUND. IF MOTOR DOES NOT RUN, REPLACE IT.

B. IF THERE IS VOLTAGE ON CIRCUITS #63 AND #28 BUT NO VOLTAGE ON CIRCUIT #58, REPLACE THE GOVERNOR.

C. IF THERE IS VOLTAGE ON CIRCUIT #63 BUT NOT ON #28, REPLACE THE WIPER MOTOR. (WIPERS OUT OF PARK).

D. IF NO VOLTAGE ON CIRCUIT #63, TRACE THE CIRCUIT BACK TO SOURCE TO DETERMINE PROBLEM.

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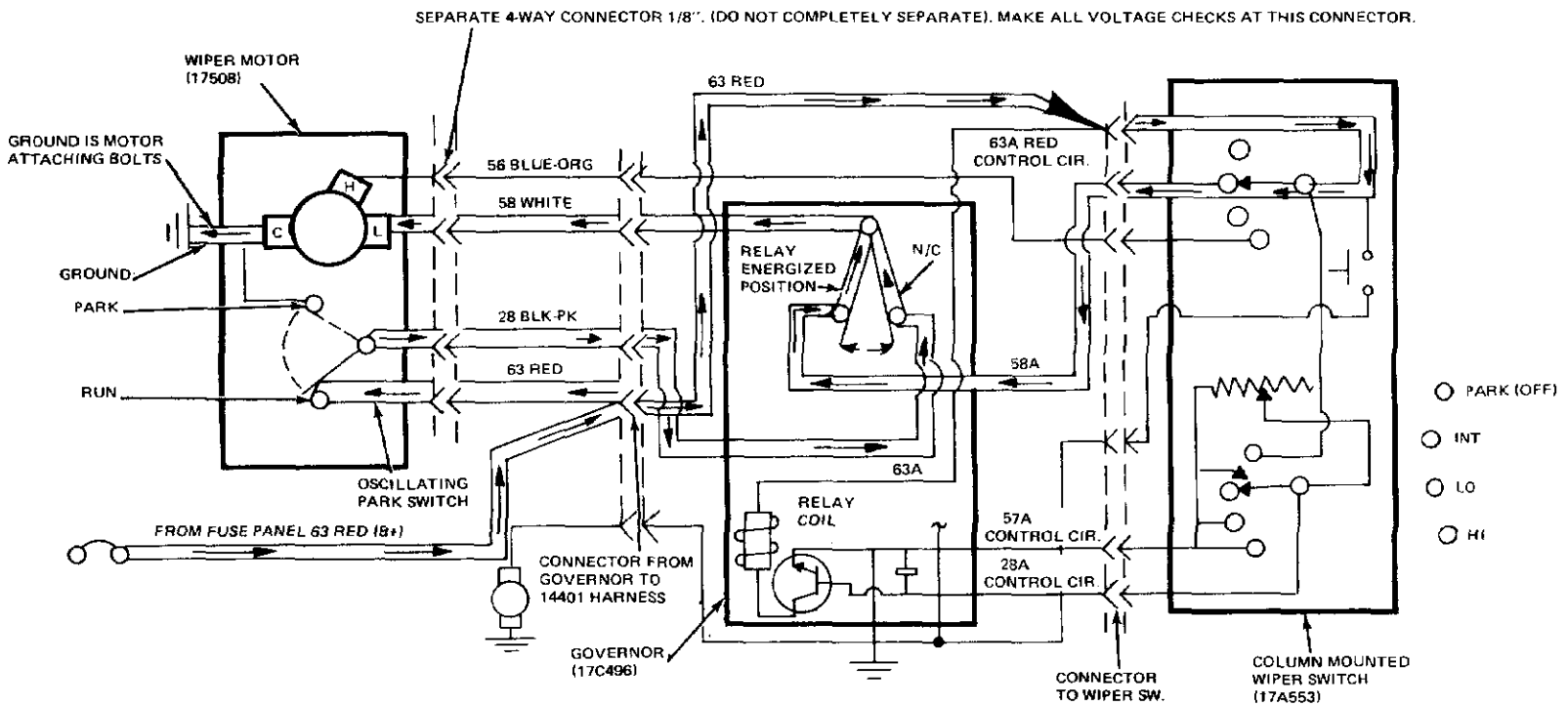
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WINDSHIELD WIPER SYSTEM "A" MOTOR – INTERVAL

FAIRMONT, ZEPHYR, MUSTANG–MONARCH & GRANADA AND VERSAILLES

INTERVAL WIPER OPERATION – ASSUME WIPERS ARE IN THE PARK POSITION. WHEN WIPER SWITCH IS PLACED IN THE "INT" MODE, THE MOTOR'S OSCILLATING PARK SWITCH CONTACTS ARE AT GROUND, AND GOV. RELAY IS ENERGIZED. CURRENT FLOWS FROM FUSE PANEL, THROUGH WIPER SWITCH, ACROSS ENERGIZED CONTACTS IN GOV. TO WIPER MOTOR'S LOW SPEED BRUSH. THE MOTOR ROTATES 1/10 OF A CYCLE. THE OSCILLATING PARK SWITCH CONTACTS THEN CHANGE FROM GROUND TO RUN (B+) AND MOMENTARILY AFTER THEY CHANGE POSITION THE RELAY IN GOV. DE-ENERGIZES. A SECOND PATH TO WIPER MOTOR IS COMPLETED AS ILLUSTRATED BY ARROWS ON THE CIRCUIT DIAGRAM. THE MOTOR ROTATES THROUGH REMAINING 9/10 OF ONE REVOLUTION. WHEN THE OSCILLATING PARK SWITCH CONTACTS AGAIN TOUCH GROUND (PARK), MOTOR WILL PARK. THE GOVERNOR'S ELECTRONIC CIRCUIT DELAYS ENERGIZING OF THE RELAY UNTIL THE CIRCUIT TIMES OUT. THEN GOV. RELAY ENERGIZES AND LOW-SPEED INTERVAL CYCLE IS REPEATED.

FIGURE 7 – (ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION).



INTERVAL WIPER TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN THE INTERVAL POSITION FOR WIPER MOTOR TEST.

A. SEPARATE 4-WAY CONNECTOR AT THE MOTOR APPROXIMATELY 1/8" TO ALLOW VOLTAGE CHECKS. CHECK FOR VOLTAGE ON #58 CIRCUIT. IF VOLTAGE IS ON #58 CIRCUIT, USE A JUMPER WIRE AND ELECTRICALLY GROUND MOTOR CASE. IF MOTOR RUNS, REPAIR MOTOR GROUND. IF MOTOR DOES NOT RUN, REPLACE MOTOR.

B. IF VOLTAGE IS ON #63 AND #28 CIRCUITS, (WIPERS ARE OUT OF PARK) BUT NO VOLTAGE ON #58 CIRCUIT, REPLACE GOVERNOR. IF WIPERS ARE IN PARK, GROUND CONTROL CIRCUIT #28A AT WIPER SWITCH. IF NO VOLTAGE ON #58 CIRCUIT, REPAIR GOVERNOR GROUND CIRCUIT OR REPLACE THE WIPER SWITCH. IF NO VOLTAGE ON #58 CIRCUIT, REPLACE THE GOVERNOR.

C. IF WIPER MOTOR IS OUT OF PARK POSITION AND THERE IS VOLTAGE ON CIRCUIT #63 BUT NOT ON #28, REPLACE WIPER MOTOR.

D. IF NO VOLTAGE ON CIRCUIT #63 TRACE CIRCUIT BACK TO SOURCE TO DETERMINE PROBLEM.

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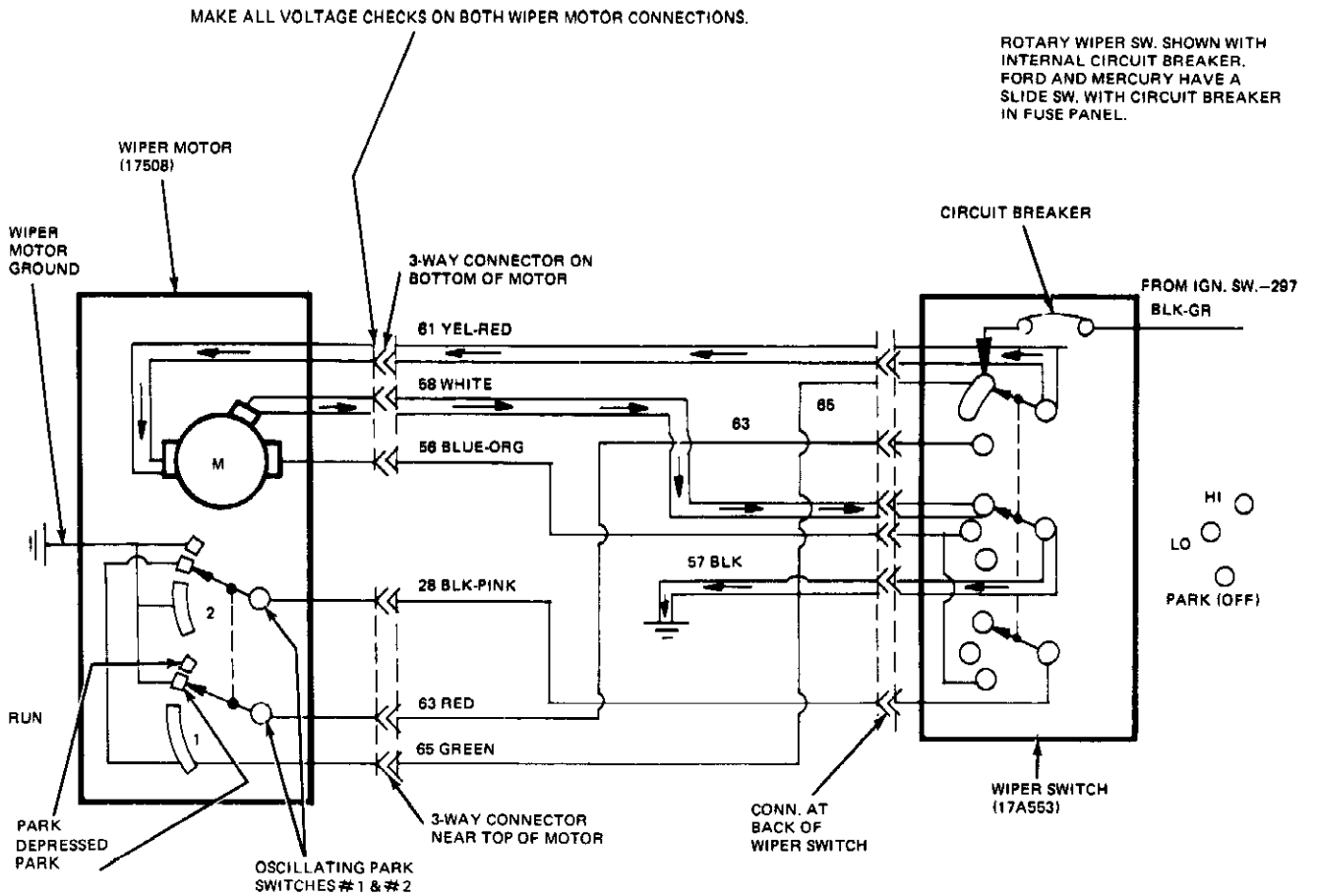
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WINDSHIELD WIPER SYSTEM "B" MOTOR – NON-INTERVAL SELECT

COUGAR–LTD II–MARK V–THUNDERBIRD–LINCOLN–FORD–MERCURY–RANCHERO

HI-SPEED OPERATION – PLACE WIPER SWITCH INTO "HI" POSITION, CURRENT FLOW IS FROM IGN. SWITCH THROUGH CIRCUIT BREAKER, AND INTO #65 CIRCUIT AT WIPER SWITCH, ACROSS WIPER SWITCH CONTACTS INTO #61 CIRCUIT TO WIPER MOTOR COMMON BRUSH. ACROSS MOTOR ARMATURE AND OUT #58 CIRCUIT (WHITE) TO WIPER SWITCH. ACROSS WIPER SWITCH CONTACTS TO GROUND. (MOTOR GROUND IS NOT UTILIZED FOR RUN CIRCUITS).

(ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION START AT CIRCUIT BREAKER)



HI-SPEED TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN THE "HIGH" POSITION FOR ALL WIPER MOTOR OPERATION TESTS.

A. IF VOLTAGE IS ON THE #61 CIRCUIT, WITH THE WIPER SWITCH IN THE HI POSITION, USE A JUMPER WIRE AND ELECTRICALLY GROUND THE #58 CIRCUIT. IF THE MOTOR RUNS, REPAIR THE WIPER SWITCH GROUND CIRCUIT OR REPLACE THE WIPER SWITCH. IF THE MOTOR DOES NOT RUN, REPAIR MOTOR PER SECTION 35-60-16. (IF BRUSHES ARE REQUIRED, BRUSH AND END PLATE ASSY IS 17B583).

B. IF VOLTAGE IS ON THE #65 CIRCUIT ONLY, REPLACE THE WIPER SWITCH.

C. IF NO VOLTAGE ON #65 CIRCUIT, TRACE THE CIRCUIT BACK.

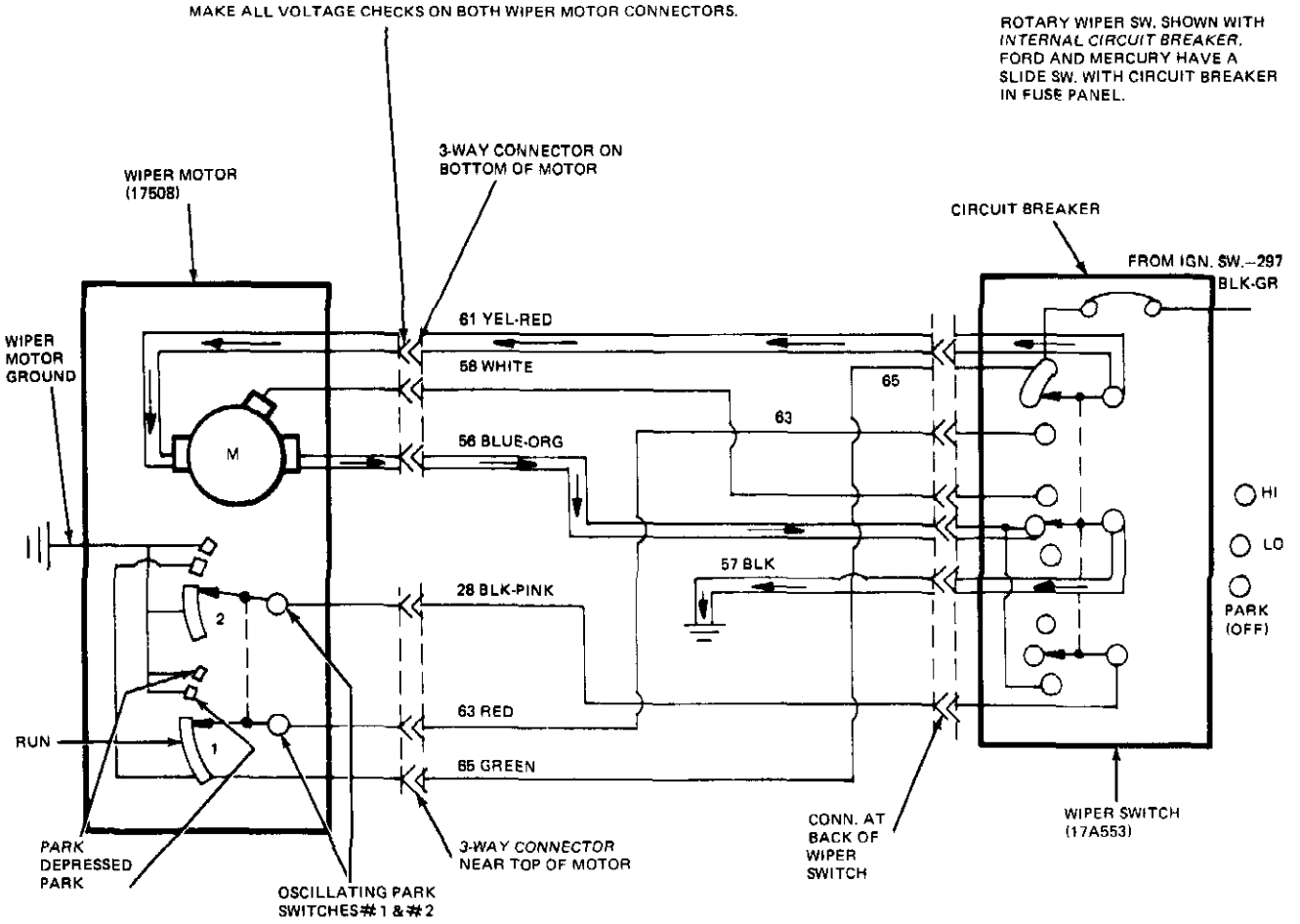
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WINDSHIELD WIPER SYSTEM "B" MOTOR – NON-INTERVAL SELECT

COUGAR–LTD II–MARK V–THUNDERBIRD–LINCOLN–FORD–MERCURY–RANCHERO

LOW-SPEED OPERATION – PLACE WIPER SWITCH INTO THE "LOW" POSITION. CURRENT FLOW IS FROM THE IGN. SWITCH THROUGH CIRCUIT BREAKER, AND INTO THE #65 CIRCUIT. ACROSS WIPER SWITCH CONTACTS INTO #61 CIRCUIT TO WIPER MOTOR COMMON BRUSH. ACROSS MOTOR ARMATURE AND OUT #56 CIRCUIT (BLUE-ORG) TO THE WIPER SWITCH. ACROSS THE WIPER SWITCH CONTACTS TO GROUND. (THE MOTOR GROUND IS NOT UTILIZED FOR RUN CIRCUITS.)

(ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION START AT CIRCUIT BREAKER).



LOW-SPEED TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN THE "LOW" POSITION FOR ALL WIPER MOTOR OPERATION TESTS.

A. IF VOLTAGE IS ON THE #61 CIRCUIT WITH THE WIPER SWITCH IN THE LOW POSITION, USE A JUMPER WIRE AND ELECTRICALLY GROUND THE #56 CIRCUIT. IF THE MOTOR RUNS, REPAIR WIPER SWITCH GROUND CIRCUIT OR REPLACE THE WIPER SWITCH. IF THE MOTOR DOES NOT RUN, REPAIR MOTOR PER SECTION 35-60-16. (IF BRUSHES ARE REQUIRED: BRUSH AND END PLATE ASSY. IS 17B583.)

B. IF VOLTAGE IS ON THE #65 CIRCUIT ONLY, REPLACE WIPER SWITCH.

C. IF NO VOLTAGE ON #65 CIRCUIT, TRACE THE CIRCUIT BACK.

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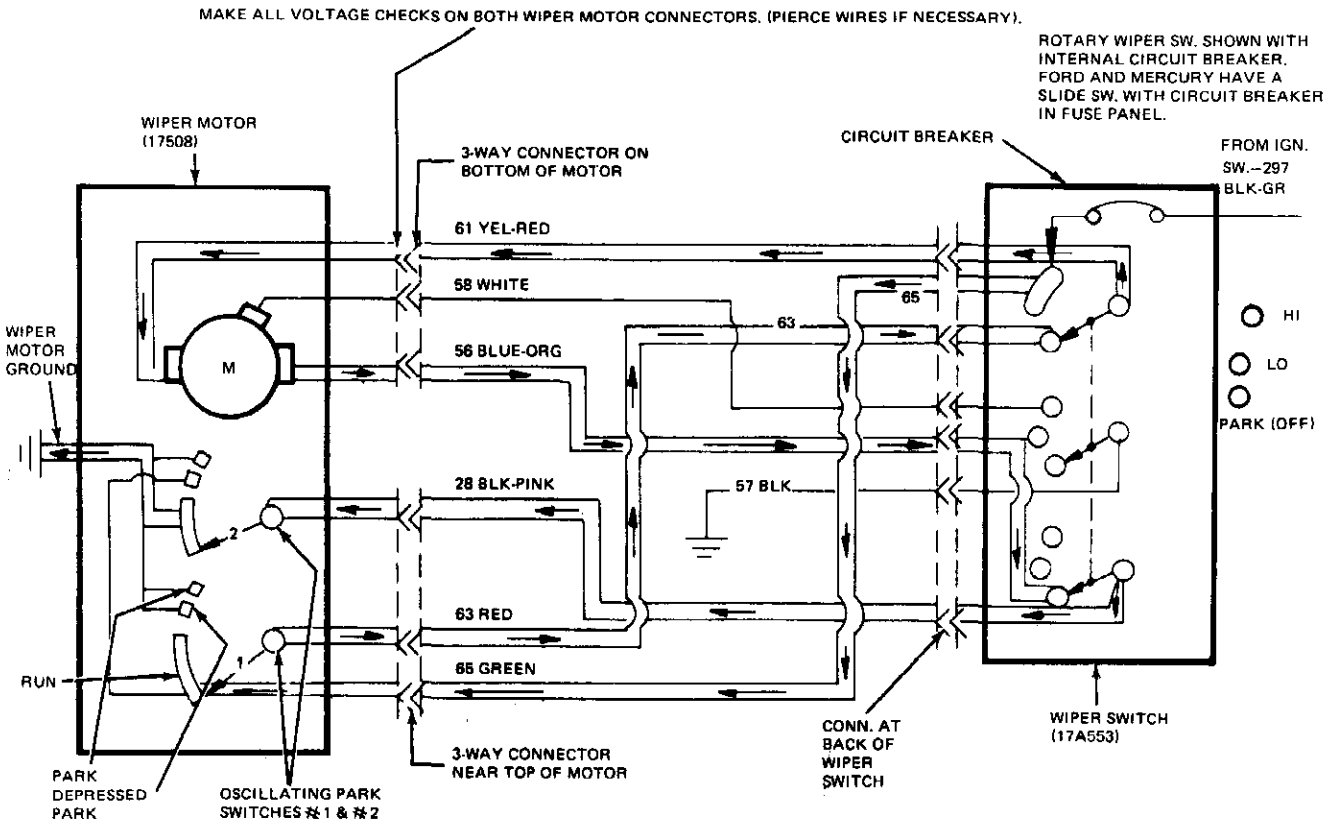
WINDSHIELD WIPER SYSTEM "B" MOTOR -- NON-INTERVAL SELECT

COUGAR–LTD II–MARK V–THUNDERBIRD–LINCOLN–FORD–MERCURY–RANCHERO

PARK CIRCUIT OPERATION – DURING NORMAL RUNNING OF MOTOR (HIGH & LOW SPEEDS), TWO SETS OF MOTOR PARK SWITCH CONTACTS ATTACHED TO THE #28 AND #63 CIRCUITS INSIDE THE MOTOR OSCILLATE BETWEEN THE (RUN CONTACTS) AND (DEPRESSED PARK CONTACTS) WHEN THE MOTOR ARMATURE IS ROTATING. THE (PARK CONTACTS) OF BOTH SWITCHES #1 & #2 ARE NOT UTILIZED UNTIL THE MOTOR HAS STOPPED AT THE END OF THE DEPRESSED PARK CYCLE.

WHEN THE WIPER SWITCH IS TURNED "OFF" CURRENT FLOWS FROM THE #65 CIRCUIT, THROUGH THE #1 WIPER MOTOR PARK SWITCH CONTACTS (RUN) TO THE #63 CIRCUIT, THROUGH THE WIPER SWITCH TO #61 CIRCUIT (COMMON BRUSH), ACROSS THE MOTOR ARMATURE AND OUT THE #56 CIRCUIT (LOW BRUSH), INTO THE WIPER SWITCH AND OUT THE #28 CIRCUIT, THROUGH THE #2 WIPER MOTOR PARK SWITCH CONTACTS (RUN) WHICH ARE AT GROUND. THE MOTOR CONTINUES TO RUN UNTIL THE WIPER BLADES REACH THE LOW END OF THEIR STROKE. THE #1 SET OF CONTACTS CHANGE TO GROUND AND #2 SET OF CONTACTS CHANGE TO B+. THIS WILL STOP THE MOTOR'S FORWARD ROTATION AND START THE MOTOR ROTATING FOR THE DEPRESSED PARK (HIDDEN WIPERS) POSITION.

(ARROWS INSIDE DOUBLE LINE DENOTE *CURRENT FLOW DIRECTION START AT CIRCUIT BREAKER*).



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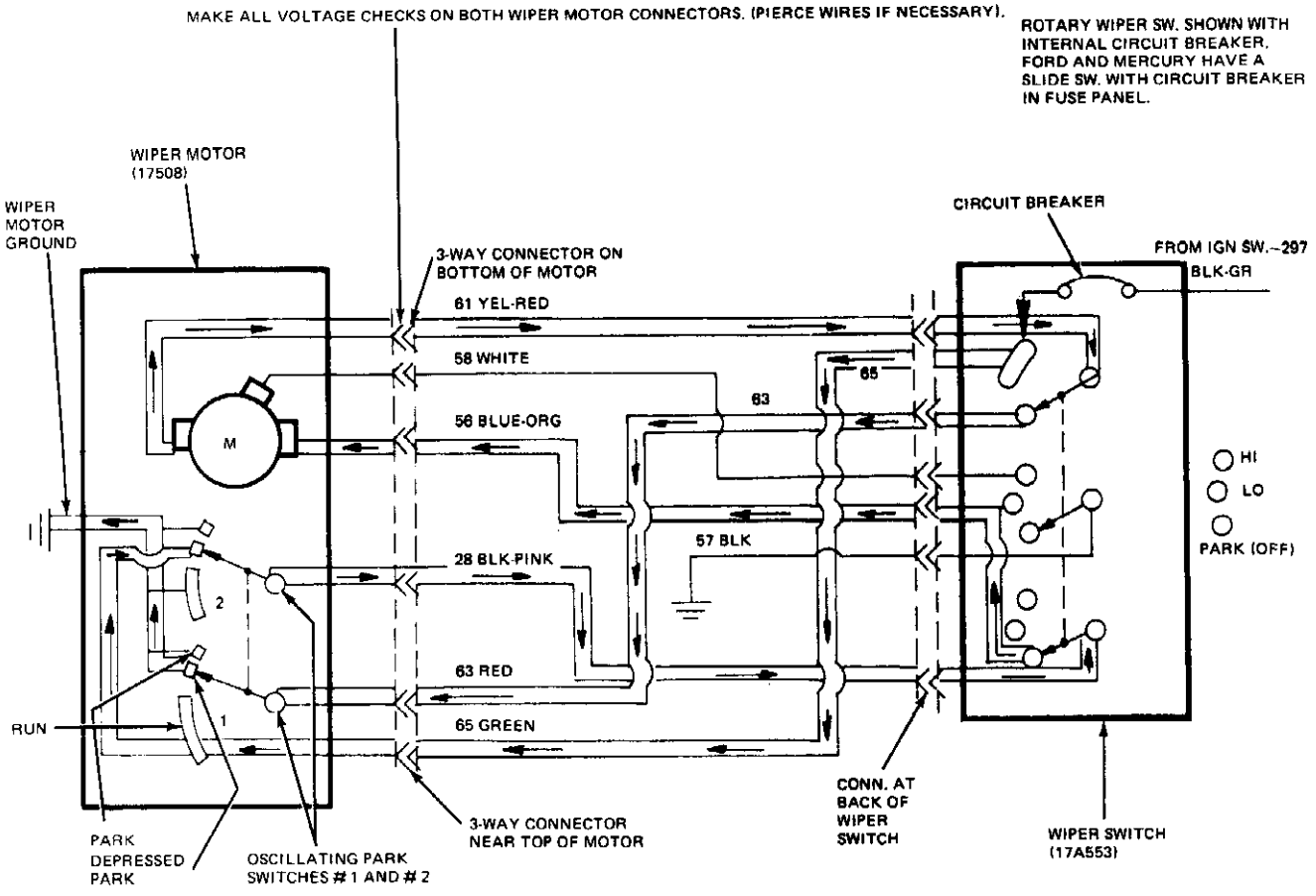
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WINDSHIELD WIPER SYSTEM "B" MOTOR – NON-INTERVAL SELECT

COUGAR–LTD II–MARK V–THUNDERBIRD–LINCOLN–FORD–MERCURY–RANCHERO

DEPRESSED PARK POSITION – WITH # 1 SET OF CONTACTS AT GROUND AND # 2 CONTACTS AT B+ (DEPRESSED PARK POSITION). CURRENT FLOWS IN THE OPPOSITE DIRECTION THROUGH THE MOTOR ARMATURE AND THE WIPER BLADES START TO GO INTO THE DEPRESSED PARK POSITION. CURRENT FLOWS FROM # 65 CIRCUIT (B+) ACROSS THE WIPER MOTOR # 2 POINTS INTO # 28 CIRCUIT TO THE WIPER SWITCH. OUT THE WIPER SWITCH ON # 56 CIRCUIT TO THE MOTOR LOW BRUSH, ACROSS THE ARMATURE AND OUT # 61 CIRCUIT (COMMON BRUSH) TO THE WIPER SWITCH. THROUGH THE WIPER SWITCH TO # 63 CIRCUIT AND # 1 WIPER MOTOR PARK SWITCH CONTACTS WHICH ARE NOW AT GROUND. WHEN THE WIPER BLADES REACH THE LOW END OF THE HIDDEN PARK POSITION, THE # 1 AND # 2 PARK CONTACTS ARE MOVED TO WIPER MOTOR GROUND (PARK POSITION) AND THE MOTOR AND BLADES STOP IN THE HIDDEN PARK POSITION.

(ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION START AT CIRCUIT BREAKER)



PARK TEST

NOTE: IGNITION SWITCH MUST BE "ON" FOR ALL WIPER MOTOR OPERATION TESTS.

IF WIPERS STOP ANYWHERE ON WINDSHIELD AND/OR DO NOT DEPRESS TO HIDDEN PARK POSITION WHEN TURNED "OFF" (HI AND LO SPEEDS O.K.).

A. CHECK FOR VOLTAGE ON # 65 MOTOR CIRCUIT. IF NO VOLTAGE, TRACE CIRCUIT BACK. IF # 65 MOTOR CIRCUIT HAS VOLTAGE, PERFORM STEP "B".

B. CHECK # 63 MOTOR CIRCUIT FOR VOLTAGE. IF # 63 MOTOR CIRCUIT HAS VOLTAGE–LOCATE AND REPAIR OPEN GROUND CIRCUIT. (INCLUDE # 2 CONTACTS IN WIPER MOTOR PARK SWITCH AS PART OF GROUND CIRCUIT). IF # 63 MOTOR CIRCUIT DOES NOT HAVE VOLTAGE, PERFORM WIPER MOTOR COVER AND SWITCH TEST AS SHOWN IN SECTION 35-60-16.

C. IF COVER AND SWITCH TEST ARE O.K., THEN THE SYSTEM HAS AN OPEN GROUND CIRCUIT THROUGH WIPER SWITCH OR WIPER MOTOR DEPRESSED PARK OUTPUT ARM ASSEMBLY IS FAULTY.

1. IF WIPER MOTOR CAN BE HEARD TO RUN FOR A FEW MOMENTS AFTER WIPER SWITCH IS TURNED TO "OFF", REPAIR WIPER MOTOR OUTPUT ARM ASSEMBLY PER SECTION 35-60-16, 17, 18.

2. IF WIPER MOTOR STOPS RUNNING THE INSTANT WIPER SWITCH IS TURNED "OFF," REPAIR OPEN GROUND CIRCUIT OR REPLACE WIPER SWITCH (17A553).

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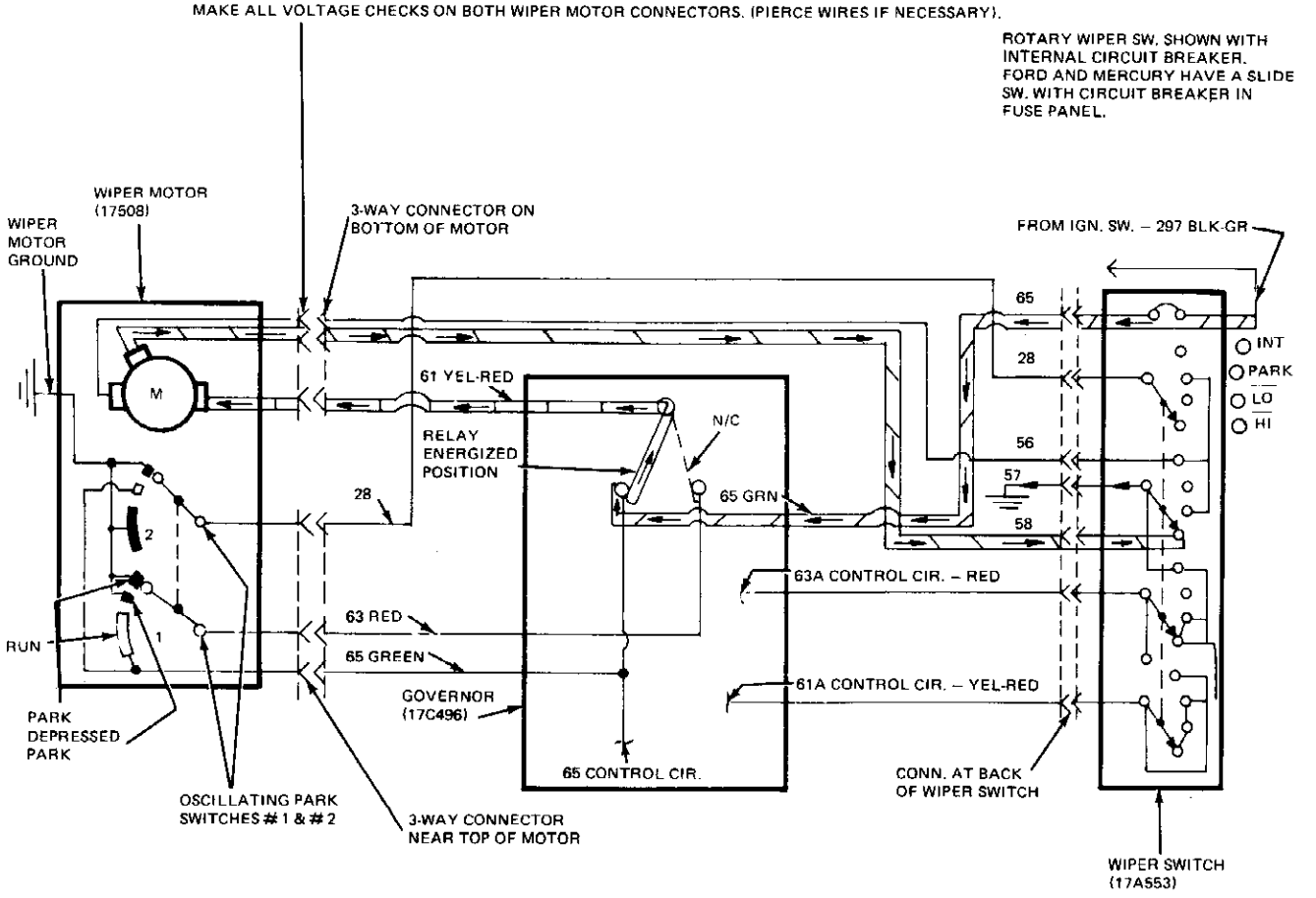
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WINDSHIELD WIPER SYSTEM "B" MOTOR – INTERVAL SELECT

COUGAR–LTD II–MARK V–THUNDERBIRD–LINCOLN–FORD–MERCURY–RANCHERO

HI-SPEED OPERATION – PLACE WIPER SWITCH INTO "HI" POSITION. CURRENT FLOW IS FROM IGN. SWITCH TO CIRCUIT BREAKER, ACROSS CIRCUIT BREAKER AND DOWN #65 CIRCUIT (GREEN), DIRECTLY TO GOVERNOR ENERGIZED RELAY POINT. UP ENERGIZED RELAY POINTS AND DOWN #61 CIRCUIT TO WIPER MOTOR COMMON BRUSH. ACROSS MOTOR ARMATURE AND OUT #58 CIRCUIT (HI BRUSH) TO WIPER SWITCH. ACROSS WIPER SWITCH CONTACTS TO GROUND. (THE MOTOR GROUND IS NOT UTILIZED FOR RUN CIRCUITS).

(ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION).



HI-SPEED TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND THE WIPER SWITCH IN "HIGH" POSITION FOR ALL WIPER MOTOR OPERATION TESTS.

A. IF VOLTAGE IS ON THE #61 MOTOR CIRCUIT, WITH THE WIPER SWITCH IN THE "HI" POSITION, USE A JUMPER WIRE AND ELECTRICALLY GROUND THE #58 MOTOR CIRCUIT. IF THE MOTOR RUNS, REPAIR THE WIPER SWITCH GROUND CIRCUIT OR REPLACE THE WIPER SWITCH. IF THE MOTOR DOES NOT RUN, REPAIR MOTOR PER SECTION 35-60-16, 17, 18.

B. IF VOLTAGE IS ON THE #65 MOTOR CIRCUIT ONLY, ELECTRICALLY GROUND CONTROL CIRCUITS #61A & 63A NEAR THE WIPER SWITCH. IF #61 MOTOR CIRCUIT NOW HAS VOLTAGE, PERFORM STEP "A". IF MOTOR CIRCUIT #61 DOES NOT HAVE VOLTAGE, REPLACE GOVERNOR.

C. IF NO VOLTAGE ON #65 CIRCUIT, TRACE THE CIRCUIT BACK.

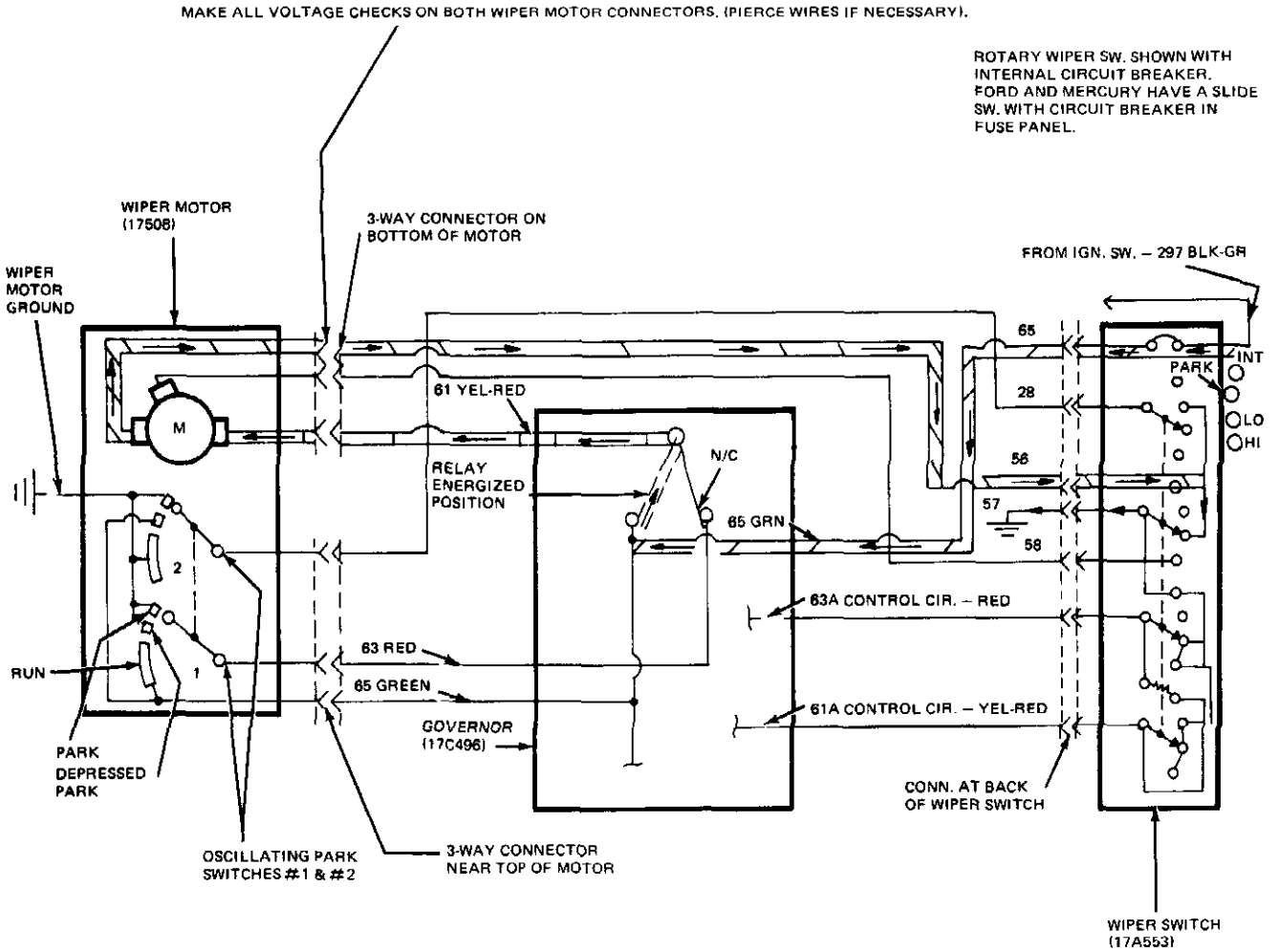
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WINDSHIELD WIPER SYSTEM "B" MOTOR – INTERVAL SELECT

COUGAR–LTD II–MARK V–THUNDERBIRD–LINCOLN–FORD–MERCURY–RANCHERO

LOW-SPEED OPERATION – PLACE THE WIPER SWITCH INTO THE "LOW" POSITION. CURRENT FLOW IS FROM THE IGN. SWITCH TO THE CIRCUIT BREAKER, ACROSS THE CIRCUIT BREAKER AND DOWN THE #65 CIRCUIT (GREEN), DIRECTLY TO THE GOVERNOR ENERGIZED RELAY CONTACT POSITION. UP THE ENERGIZED RELAY POINTS AND DOWN THE #61 CIRCUIT TO WIPER MOTOR COMMON BRUSH. ACROSS MOTOR ARMATURE AND OUT #56 CIRCUIT (BLUE-ORG) TO THE WIPER SWITCH. ACROSS THE WIPER SWITCH CONTACTS TO GROUND. (THE MOTOR GROUND IS NOT UTILIZED FOR RUN CIRCUITS).

(ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION)



LOW-SPEED TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND THE WIPER SWITCH IN "LOW" POSITION FOR ALL WIPER OPERATION TESTS.

A. IF VOLTAGE IS ON THE #61 MOTOR CIRCUIT WITH THE WIPER SWITCH IN THE "LOW" POSITION, USE A JUMPER WIRE AND ELECTRICALLY GROUND THE #56 MOTOR CIRCUIT. IF THE MOTOR RUNS, REPAIR WIPER SWITCH GROUND CIRCUIT OR REPLACE THE WIPER SWITCH. IF THE MOTOR DOES NOT RUN, REPAIR MOTOR PER SECTION 35-60-16, 17, 18. (IF BRUSHES ARE REQUIRED: USE PART 17B583).

B. IF VOLTAGE IS ON THE #65 MOTOR CIRCUIT ONLY, ELECTRICALLY GROUND CONTROL CIRCUITS #61A AND #63A NEAR THE WIPER SWITCH. IF MOTOR CIRCUIT #61 NOW HAS VOLTAGE, PERFORM STEP "A". IF MOTOR CIRCUIT #61 DOES NOT HAVE VOLTAGE, REPLACE GOVERNOR.

C. IF NO VOLTAGE ON #65 CIRCUIT, TRACE THE CIRCUIT BACK.

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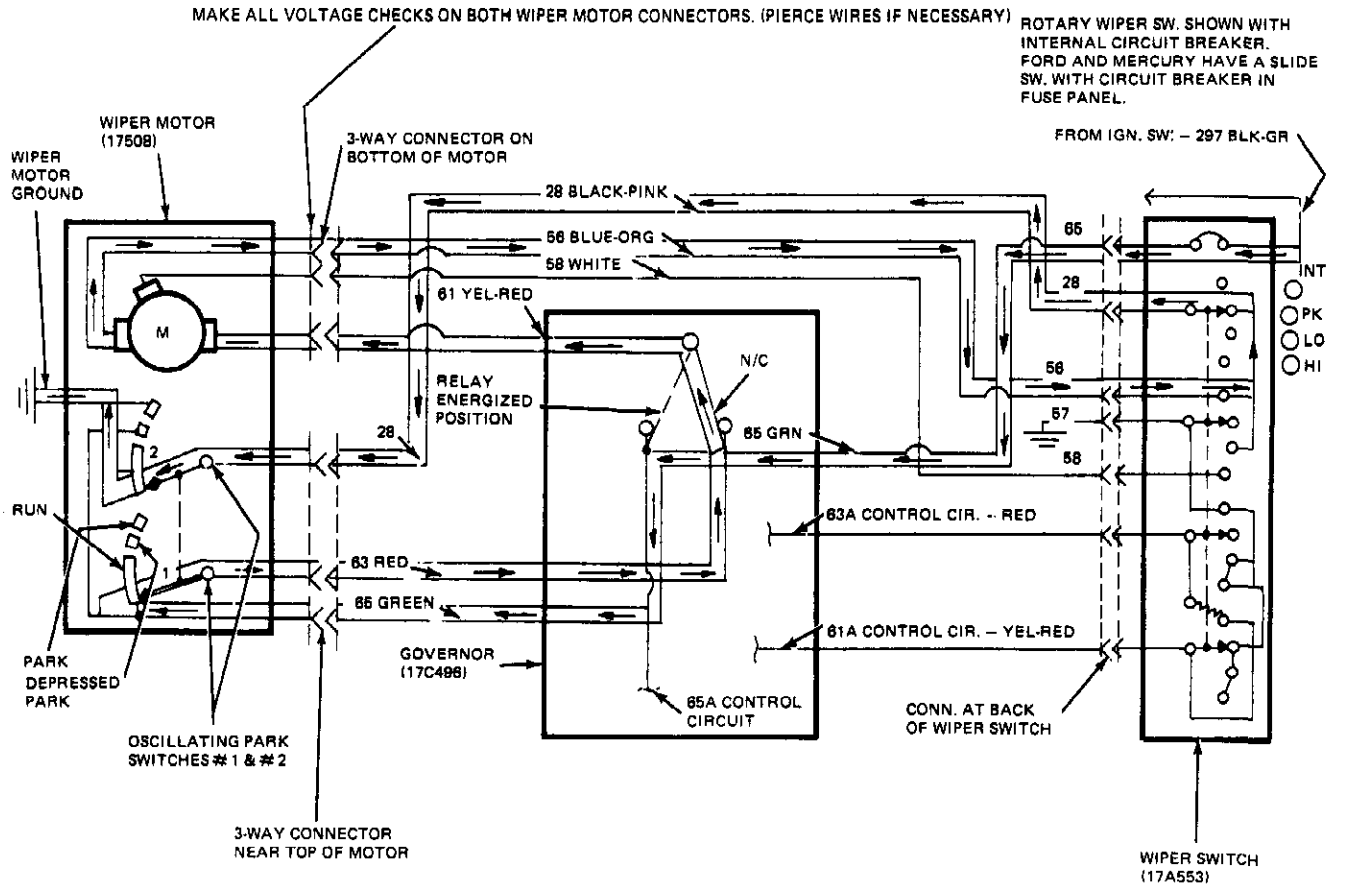
WINDSHIELD WIPER SYSTEM "B" MOTOR – INTERVAL SELECT

COUGAR–LTD II–MARK V–THUNDERBIRD–LINCOLN–FORD–MERCURY–RANCHERO

PARK CIRCUIT OPERATION – DURING NORMAL RUNNING OF MOTOR (HIGH & LOW SPEEDS), TWO SETS OF MOTOR PARK SWITCH CONTACTS ATTACHED TO THE #28 AND #63 CIRCUITS INSIDE THE MOTOR OSCILLATE BETWEEN THE (RUN CONTACTS) AND (DEPRESSED PARK CONTACTS) WHEN THE MOTOR ARMATURE IS ROTATING. THE (PARK CONTACTS) OF BOTH SWITCHES #1 & #2 ARE NOT UTILIZED UNTIL THE MOTOR HAS STOPPED AT THE END OF THE DEPRESSED PARK CYCLE.

WHEN THE WIPER SWITCH IS TURNED "OFF" CURRENT FLOWS FROM THE #65 CIRCUIT, THROUGH THE #1 WIPER MOTOR PARK SWITCH CONTACTS (RUN) TO THE #63 CIRCUIT, THROUGH THE GOVERNOR N/C RELAY CONTACTS, THROUGH THE WIPER SWITCH TO #61 CIRCUIT (COMMON BRUSH), ACROSS THE MOTOR ARMATURE AND OUT THE #56 CIRCUIT (LOW BRUSH), INTO THE WIPER SWITCH AND OUT THE #28 CIRCUIT, THROUGH THE #2 WIPER MOTOR PARK SWITCH CONTACTS (RUN) WHICH ARE AT GROUND. THE MOTOR CONTINUES TO RUN UNTIL THE WIPER BLADES REACH THE LOW END OF THEIR STROKE. THE #1 SET OF CONTACTS CHANGE TO GROUND AND #2 SET OF CONTACTS CHANGE TO B+. THIS WILL STOP THE MOTOR'S FORWARD ROTATION AND START THE MOTOR ROTATING FOR THE DEPRESSED PARK (HIDDEN WIPERS) POSITION.

(ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION)



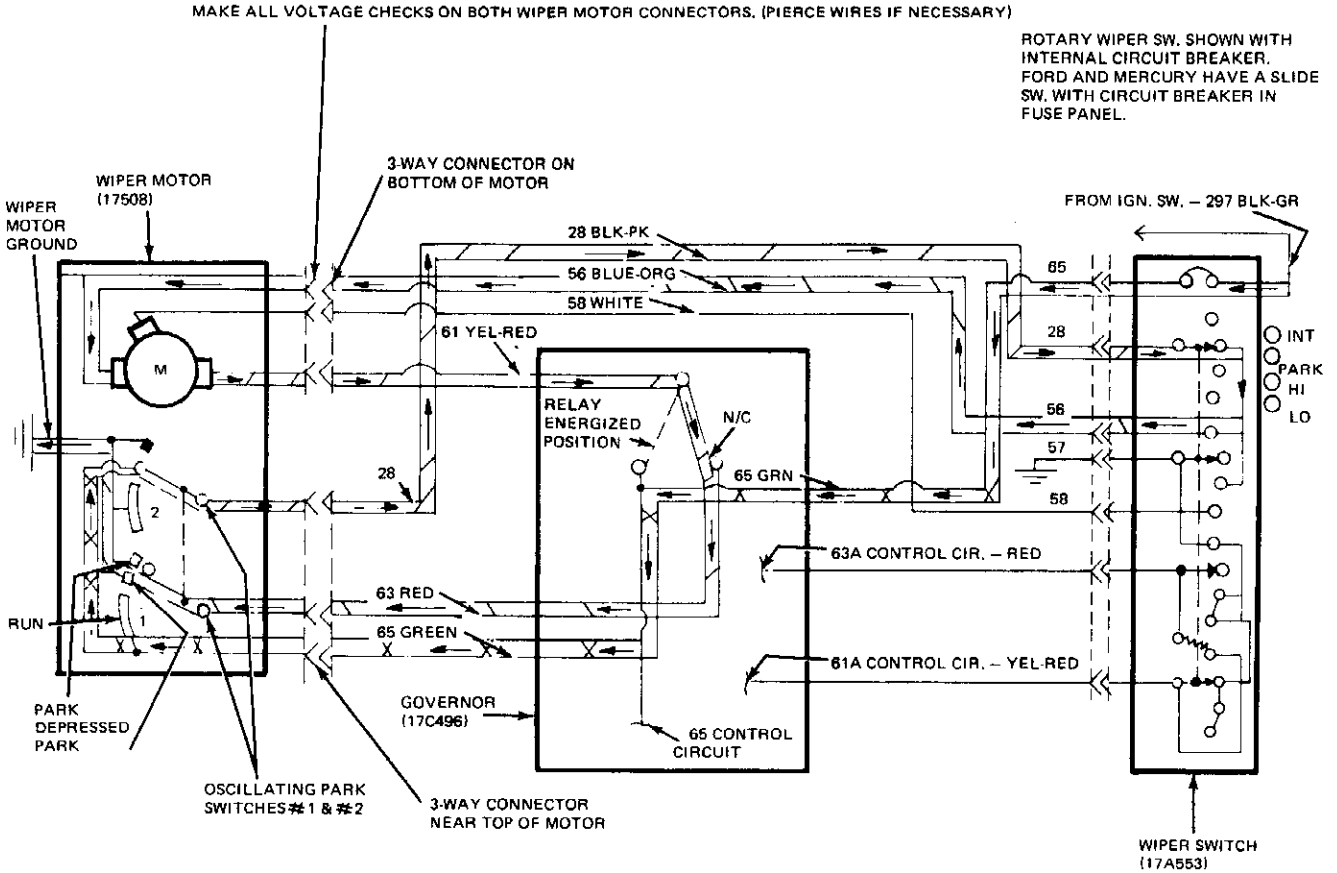
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WINDSHIELD WIPER SYSTEM "B" MOTOR – INTERVAL SELECT

COUGAR–LTD II–MARK V–THUNDERBIRD–LINCOLN–FORD–MERCURY–RANCHERO

DEPRESSED PARK POSITION – WITH #1 SET OF CONTACTS AT GROUND AND // 2 CONTACTS AT B+ (DEPRESSED PARK POSITION), CURRENT FLOWS IN THE OPPOSITE DIRECTION THROUGH THE MOTOR ARMATURE AND THE WIPER BLADES START TO GO INTO THE DEPRESSED PARK POSITION. CURRENT FLOWS FROM #65 CIRCUIT (B+) ACROSS THE WIPER MOTOR #2 POINTS INTO #28 CIRCUIT TO THE WIPER SWITCH. OUT THE WIPER SWITCH ON #56 CIRCUIT TO THE MOTOR LOW BRUSH, ACROSS THE ARMATURE AND OUT #61 CIRCUIT (COMMON BRUSH) TO THE GOVERNOR N/C RELAY CONTACTS. THROUGH THE GOVERNOR CONTACTS TO THE WIPER SWITCH. THROUGH THE WIPER SWITCH TO #63 CIRCUIT AND #1 WIPER MOTOR PARK SWITCH CONTACTS WHICH ARE NOW AT GROUND. WHEN THE WIPER BLADES REACH THE LOW END OF THE HIDDEN PARK POSITION, THE #1 AND #2 PARK CONTACTS ARE MOVED TO WIPER MOTOR GROUND (PARK POSITION) AND THE MOTOR AND BLADES STOP IN THE HIDDEN PARK POSITION.

(ARROWS INSIDE DOUBLE LINE DENOTE CURRENT FLOW DIRECTION)



PARK TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN THE "OFF" POSITION FOR ALL WIPER MOTOR OPERATION TESTS.

IF WIPERS STOP ANYWHERE ON WINDSHIELD AND/OR DO NOT DEPRESS TO HIDDEN PARK POSITION WHEN TURNED "OFF" (HI AND LOW SPEEDS O.K.)

A. CHECK FOR VOLTAGE ON #65 MOTOR CIRCUIT. IF NO VOLTAGE, TRACE CIRCUIT BACK. IF #65 MOTOR CIRCUIT HAS VOLTAGE, PERFORM STEP "B".

B. CHECK #63 MOTOR CIRCUIT FOR VOLTAGE. IF #63 MOTOR CIRCUIT HAS VOLTAGE–LOCATE AND REPAIR OPEN GROUND CIRCUIT. (INCLUDE #2 CONTACTS IN WIPER MOTOR PARK SWITCH AS PART OF GROUND CIRCUIT). IF #63 MOTOR CIRCUIT DOES NOT HAVE VOLTAGE, PERFORM WIPER MOTOR COVER AND SWITCH TEST AS SHOWN IN SECTION 35-60-16.

C. IF COVER AND SWITCH TEST ARE O.K. THEN THE FAULT IS AN OPEN GROUND CIRCUIT THROUGH WIPER SWITCH, INTERVAL SELECT GOVERNOR, OR WIPER MOTOR DEPRESSED PARK OUTPUT ARM ASSEMBLY.

1. IF WIPER MOTOR CAN BE HEARD TO RUN FOR A FEW MOMENTS AFTER WIPER SWITCH IS TURNED TO "OFF", REPAIR WIPER MOTOR OUTPUT ARM ASSEMBLY PER SECTION 35-60-16, 17, 18.

2. IF WIPER MOTOR STOPS RUNNING THE INSTANT WIPER SWITCH IS TURNED TO "OFF", DISCONNECT BOTH CONNECTORS TO WIPER MOTOR AND WITH A TEST LIGHT, CHECK FOR CONTINUITY THROUGH N/C GOVERNOR CONTACTS (DE-ENERGIZED), BETWEEN #63 CIRCUIT AND #61 CIRCUIT. IF NO CONTINUITY, REPLACE GOVERNOR ASSEMBLY. IF TEST LIGHT ILLUMINATES REPLACE WIPER SWITCH.

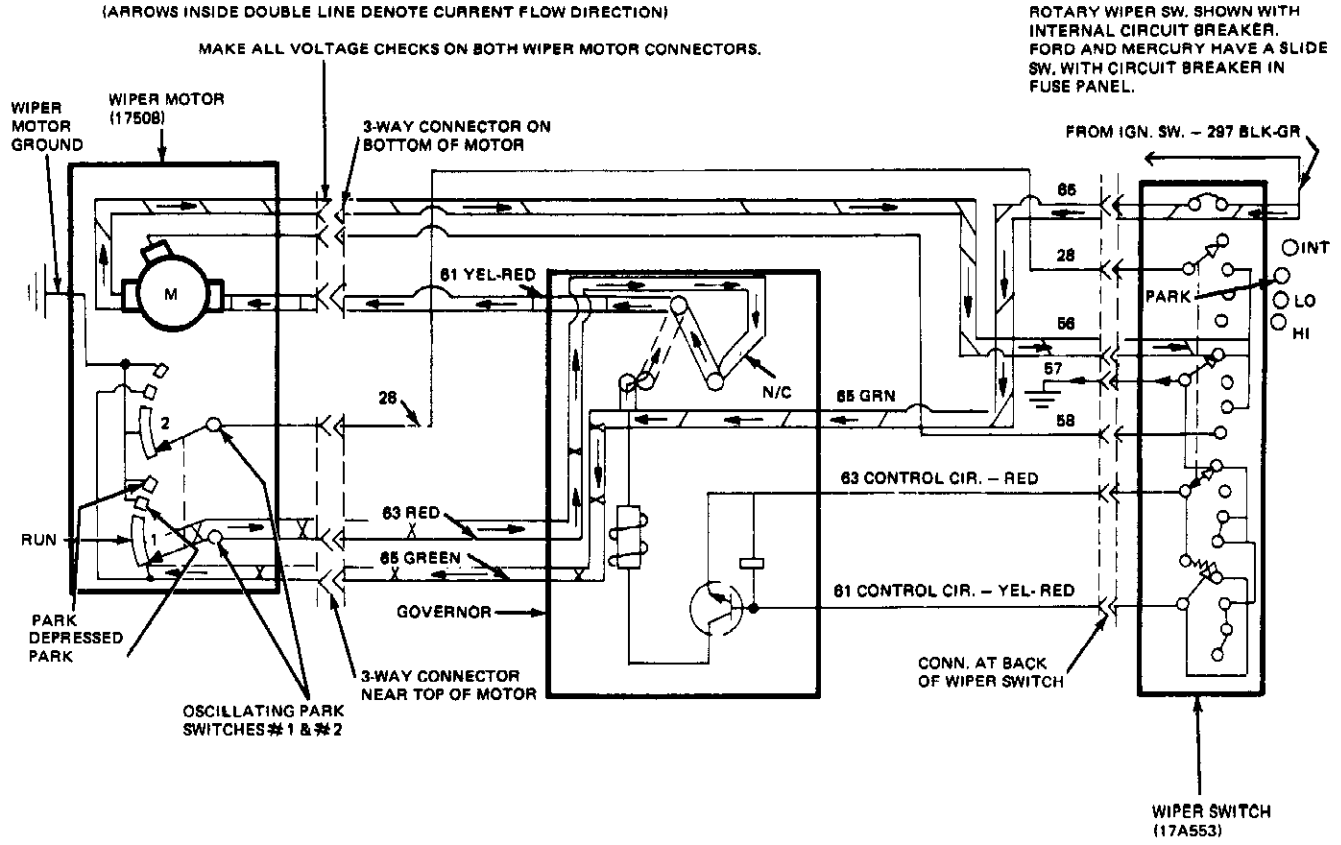
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WINDSHIELD WIPER SYSTEM "B" MOTOR – INTERMITTENT

COUGAR–LTD II–MARK V–THUNDERBIRD–LINCOLN–FORD–MERCURY–RANCHERO

INTERVAL SELECT OPERATION – THE INTERVAL MODE OF OPERATION IS A COMBINATION OF LOW SPEED AND A MODIFIED PARK OPERATION CONTROLLED IN A SEQUENTIAL MANNER BY THE INTERVAL SELECT GOVERNOR. ASSUME THE WIPERS ARE IN PARK POSITION. WHEN THE WIPER SWITCH IS PLACED IN THE "INT" MODE THE MOTOR OSCILLATING PARK SWITCH CONTACTS ARE AT GROUND AND THE GOVERNOR RELAY IS ENERGIZED TO CONNECT CIRCUITS #65 AND #61. CURRENT FLOW IS FROM THE #65 CIRCUIT, THROUGH THE ENERGIZED RELAY CONTACTS TO CIRCUIT #61, TO THE WIPER MOTOR COMMON BRUSH, ACROSS THE MOTOR ARMATURE, OUT THE WIPER MOTOR LOW SPEED BRUSH TO CIRCUIT #56, THROUGH THE WIPER SWITCH, TO CIRCUIT #57 WHICH IS GROUND. THE WIPER MOTOR STARTS TO ROTATE AT LOW SPEED. AS THE WIPER BLADES LEAVE THE "HIDDEN" PARK POSITION AND MOVE UP TO THE LOW END OF THE STROKE POSITION THE OSCILLATING PARK SWITCH CONTACT #1 OF THE WIPER MOTOR MOVES TO THE POSITION WHERE IT CONNECTS CIRCUITS #63 AND #65. CURRENT FLOWS FROM #65 CIRCUIT THRU #1 POINTS TO #63 CIRCUIT CAUSING THE GOVERNOR RELAY POINTS TO MOVE TO THE N/C POSITION (DE-ENERGIZED) MAKING THE CONNECTION BETWEEN CIRCUITS #63 AND #61. CURRENT CONTINUES TO FLOW TO WIPER MOTOR ARMATURE AS BEFORE EXCEPT CURRENT SOURCE IS NOW CIRCUIT #63 INSTEAD OF #65. THE MOTOR CONTINUES TO RUN IN LOW SPEED MODE UNTIL WIPER BLADES REACH THE "DOWN" END OF THE STROKE AT WHICH TIME #1 PARK SWITCH CONTACT MOVES TO GROUND CAUSING MOTOR TO STOP. NOW THE CONTROL CIRCUIT LEAVES THE GOVERNOR RELAY CONTACTS ON CIRCUIT #63 (WHICH IS NOW GROUND) UNTIL THE CONTROL CIRCUIT TIMES OUT. THEN THE CONTROL CIRCUIT CHANGES THE GOVERNOR RELAY CONTACTS TO THE #65 CIRCUIT (B+) AND LOW SPEED INTERMITTENT IS STARTED AGAIN.



INTERVAL TEST

NOTE: IGNITION SWITCH MUST BE "ON" AND WIPER SWITCH IN THE "INTERMITTENT" POSITION FOR ALL WIPER OPERATION TESTS.

A. IF THE MOTOR RUNS CONTINUOUSLY IN LOW SPEED WITH THE WIPER SWITCH IN MAXIMUM "INT" POSITION, CHECK THE #63 MOTOR CIRCUIT FOR VOLTAGE. IF NO VOLTAGE ON THE #63 MOTOR CIRCUIT, PERFORM WIPER MOTOR & SWITCH TEST AS SHOWN IN SECTION 35-60-16.

B. IF #63 MOTOR CIRCUIT HAS VOLTAGE, REPLACE GOVERNOR.

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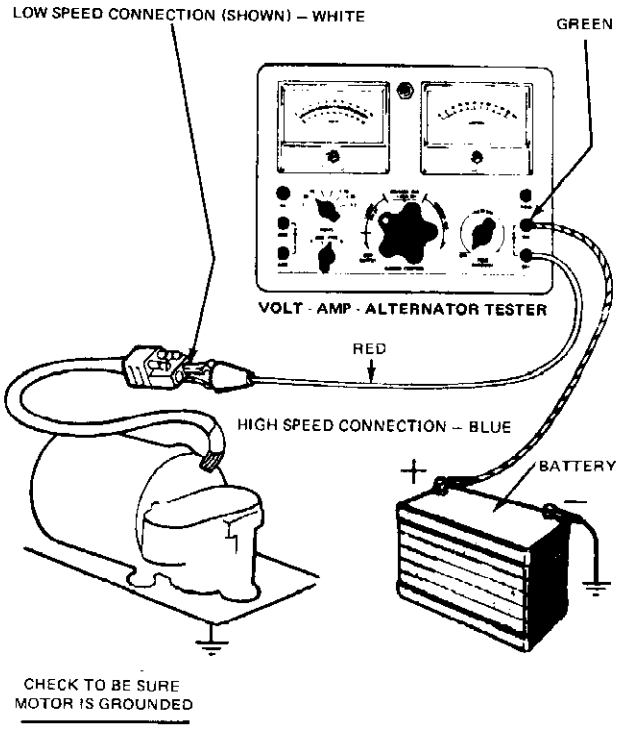


FIG. 1 Wiper Motor Current Draw Test Connections

TESTING

WIPER MOTOR CURRENT DRAW—NON-DEPRESSED PARK

Pinto, Bobcat, Fairmont, Zephyr, Mustang II, Granada, Monarch and Versailles

Disconnect the battery. Disconnect the linkage from the motor and disconnect the electrical plug to test the motor on the vehicle. Connect the green lead from the test equipment to the battery positive post (Fig. 1). Connect the positive (red) lead from the tester first to the low speed connection and then to the high speed connections at the connector plug as shown. In either case, the current draw should not exceed 3 amperes.

WIPER MOTOR CURRENT DRAW—DEPRESSED PARK

Ford, Mercury, LTD II, Cougar, Lincoln Continental, Thunderbird and Continental Mark V

The Windshield Wiper Motor Tests can be performed with the wiper motor installed in the vehicle with linkage disconnected or on the bench.

The motor terminals are too small to make the necessary test connections without using connector sleeves and wires between the motor terminals and the test equipment as shown in Fig. 2. The connector sleeves (available in Kit No. C4AZ-14294 or equivalent) should be crimped onto both ends of the wires.

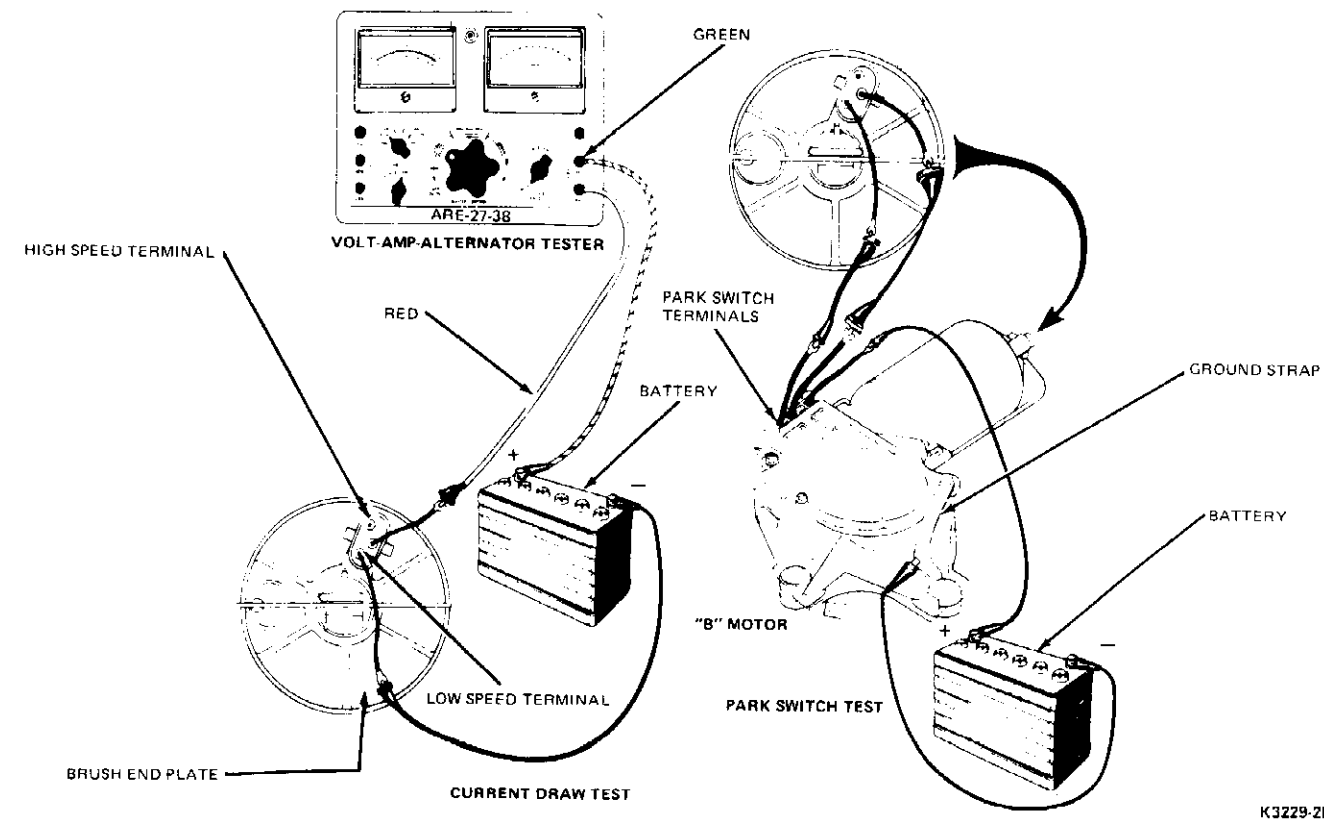


FIG. 2 Windshield Wiper Motor Tests—Depressed Park Type

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Connect the positive (red) lead from the test equipment to the center terminal on the motor end plate, and connect the green lead from the tester to the battery positive post (Fig. 2). Connect a jumper wire from the battery negative post to the low speed terminal on the motor end plate and read the current draw. Move the jumper wire from the low speed terminal to the high speed terminal, and read the high speed current draw. In either case, the current draw should not exceed 3.5 amperes. If the current draw does exceed 3.5 amperes, check the output arm and windlatch mechanism for binding or damage, before replacing the motor.

INTERMITTENT GOVERNOR

For component location of intermittent governor, refer to Fig. 3.

CIRCUIT BREAKER TEST

The circuit breaker is located in the wiper control switch, except Ford and Mercury which has an 8-1/4 amp circuit breaker in the fuse panel and Mustang II, Granada, Monarch, Versailles, Fairmont and Zephyr which has a 6-amp circuit breaker in the fuse panel.

All rotary pin terminal switches have a circuit breaker rating of 8-1/4 amps and all rotary blade terminal switches have a rating of 7 amps. All slide and column-mounted switches are without circuit breakers.

Two separate tests are necessary to check for correct circuit breaker operation. On Mustang II, Granada, Monarch, Ford, Mercury, Versailles, Fairmont and Zephyr, remove the circuit breaker from the fuse panel and connect the tester leads to the circuit breaker.

Test 1

1. Before connecting the switch to the volt-amp tester as shown in Fig. 4, short the tester leads together and adjust the current draw, until it equals the circuit breaker rating.
2. Connect the switch to the tester as shown in Fig. 4. Leave the switch connected to the tester for ten minutes. Hold the current reading on the ammeter at the rated current. If the circuit breaker opens during the ten minutes, replace the wiper switch assembly. On Mustang II, Ford, Mercury, Granada, Monarch, Versailles, Fairmont and Zephyr replace the circuit breaker.

Test 2

1. Short the tester leads together and adjust the current draw until it is twice the rated current.
2. Connect the switch as shown in Fig. 3. Hold the current reading on the ammeter at twice the rated current.

   The current reading on the ammeter should drop to zero within 30 seconds. If it takes longer than 30 seconds for the circuit breaker to open (current reading drops to zero), replace the wiper switch assembly. On Mustang II, Ford, and Mercury, replace the circuit breaker.

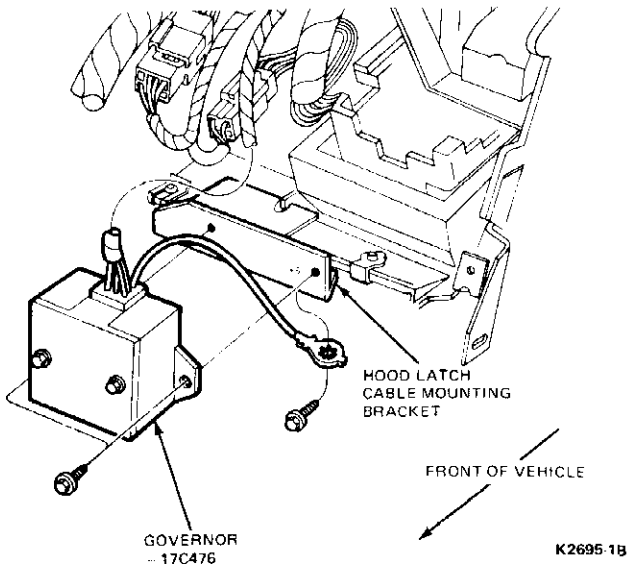


FIG. 3 Windshield Wiper Intermittent Governor

WIPER SWITCH CONTINUITY TEST

Check the continuity between the switch terminals as shown in Figs. 5 and 6. Either a self-powered test light or an ohmmeter can be used to test a standard two-speed switch. An ohmmeter must be used to test a switch used with the intermittent wiper system.

To detect marginal operation of the switch, rotate the switch control knob while each reading is being taken.

If the switch does not exhibit continuity as shown in Figs. 5 and 6, or if poor continuity exists in any switch position, replace the switch.

PARKING TEST—NON-DEPRESSED PARK

Pinto, Bobcat, Fairmont, Zephyr, Granada, Monarch, Versailles and Mustang II

Stop the wiper system with the ignition switch so that the wiper blades are not in park position. Connect jumper wires as shown in Fig. 7. The wipers should not run more than one full cycle and then park. If the motor will not park or will not run to park position, replace

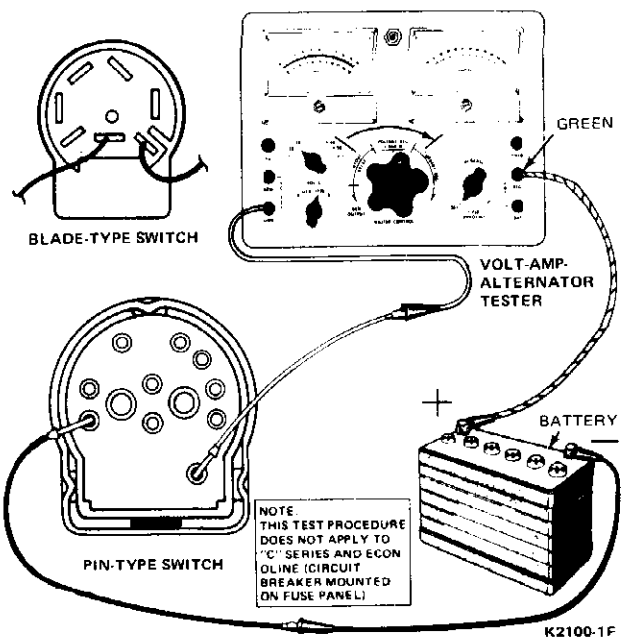
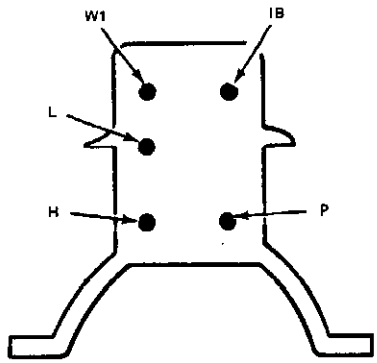


FIG. 4 Circuit Breaker Test

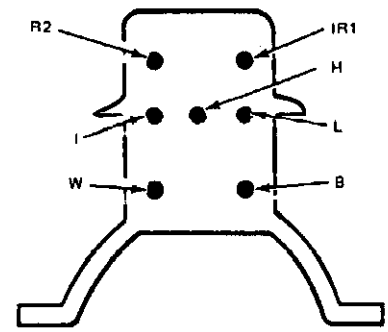
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FAIRMONT AND ZEPHYR



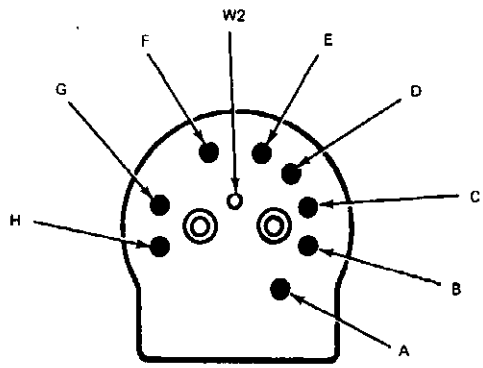
STANDARD

SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
OFF	P-L
LOW	B-L
HIGH	B-H
WASH	B-W



INTERVAL

SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
OFF	–
LOW	B-L
HIGH	B-H-L
INTERMITTENT	B-I VARIABLE RESISTANCE BETWEEN R1 AND R2: MIN. 300 MAX. 15,000
WASH	B-W

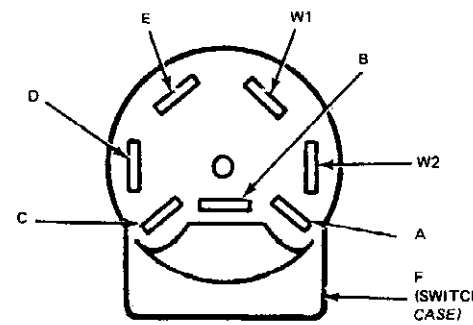


PIN-TYPE SWITCH
STANDARD EQUIPMENT (2-SPEED)

SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
OFF (PARK)	B-C A-H F-G
LOW	C-D A-G-H
WASH	W, -W2

INTERVAL

SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
OFF (PARK)	B-C A-H F-G
LOW	C-D-F-G A-H
HIGH	D-E-F-G A-H
INTERMITTENT	A-H C-D-F-G VARIABLE RESISTANCE BETWEEN F AND G: MIN. 100-900 OHMS MAX. 5600-8400 OHMS
WASH	W1-W2



BLADE-TYPE SWITCH (2-SPEED)

SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
OFF (PARK)	C-D A-B
LOW	A-B-C
HIGH	A-B-E
WASH	W1-W2

INTERVAL

SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
OFF (PARK)	A-B D-E
LOW	A-B D-E-F
HIGH	D-E-F A-B-C
INTERMITTENT	E-F A-B VARIABLE RESISTANCE BETWEEN D AND E: MIN. 480-720 OHMS MAX. 5600-8400 OHMS

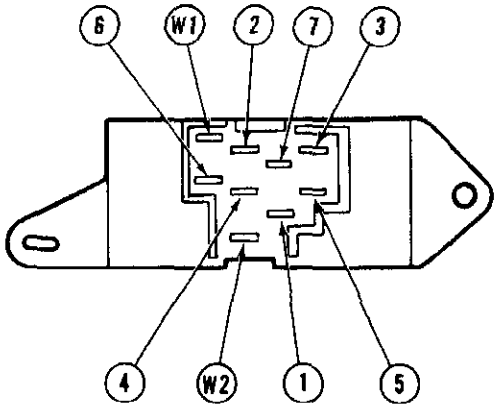
K2697-2L

FIG. 5 Wiper Switch Continuity Test

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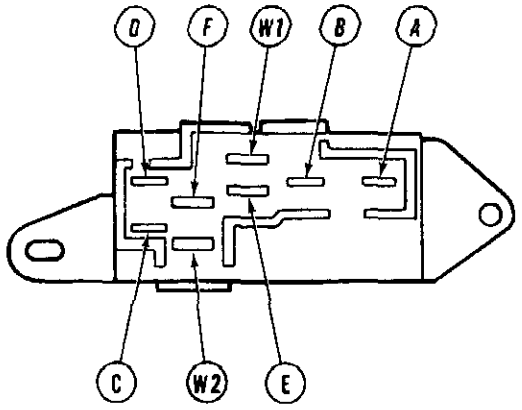
SLIDE WIPER/WASHER SWITCH CONTINUITY TEST

STANDARD SWITCH



SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
OFF	1-5, 3-7
LO	1-4, 2-7
HI	1-4, 2-6
WASH	W1-W2

INTERMITTENT SWITCH

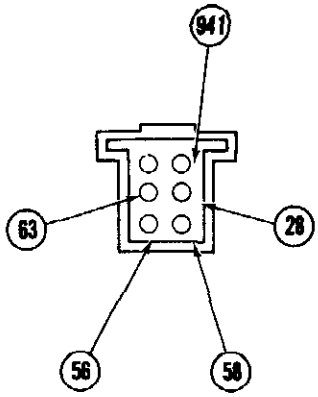


SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
OFF	A-E
INT.	B-E-F, *
LO	B-E-F-C
HI	D-B-F-C
WASH	W1-W2

* RESISTANCE BETWEEN TERMINALS F AND C VARIES FROM 500Ω ± 400 AT MIN. DWELL TO 8 TO 13 KΩ AT MAX. DWELL

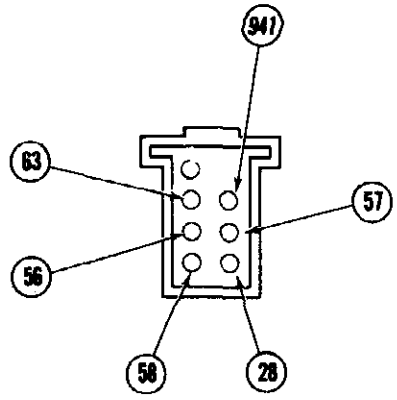
COLUMN-MOUNTED WIPER SWITCH CONTINUITY TEST

STANDARD



SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
OFF	28 AND 58
LOW	58 AND 63
HI	63 AND 56
WASH	941 AND 950

INTERVAL



SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
OFF	58 AND 63 – 28 AND 63*
INT	58 AND 63
LOW	58 AND 63 – 28 AND 57
HIGH	63 AND 56 – 28 AND 57
WASH	941 & 950

*RESISTANCE BETWEEN TERMINALS 63 AND 57, WITH THE SLIDE SWITCH IN THE OFF POSITION VARIES FROM 1500 Ω /3000 Ω AT MINIMUM DWELL TO 28,000 Ω /42,000 Ω AT MAXIMUM DWELL.

K3015-2E

FIG. 6 Windshield Wiper/Washer Switch Continuity Test

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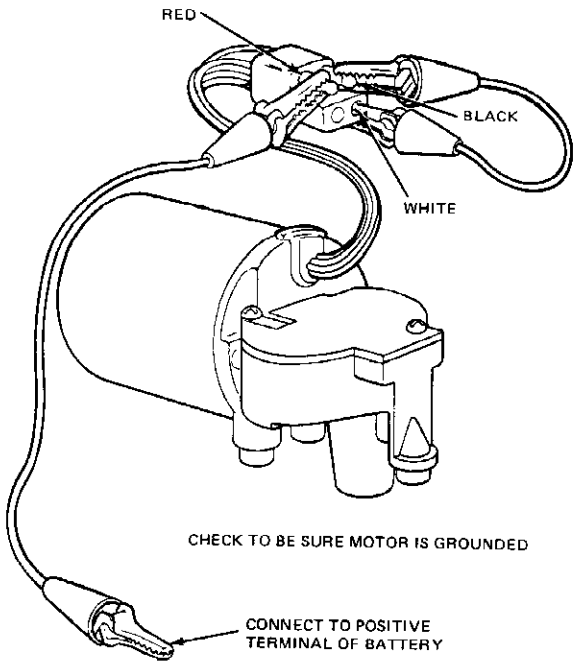


FIG. 7 Parking Test—Non-Depressed Park

the motor. If the motor stops, check the windshield wiper manual control switch and the wiring for continuity.

PARKING TEST—DEPRESSED PARK

Ford, Mercury, LTD II, Cougar, Lincoln Continental, Thunderbird and Continental Mark V

After the current Draw Test, the leads should be disconnected from the motor, so that the output arm stops approximately 90 degrees past the park position for this test.

Using the appropriate connector sleeves and wires, make electrical connections to the motor from a 12-volt battery as shown in Fig. 2. With this hookup, the motor output arm should move in the following cycle:

Rotate in the normal direction.

Reverse direction of rotation for approximately 10 degrees to 15 degrees.

Stop rotating while the crank pin is moved radially outward in a semicircular motion.

Stop in the final park position with the current draw going to zero.

If the output arm rotates in the reverse direction more than 15 degrees or if the motor stalls or jams while the output arm is rotating in the reverse direction, replace the arm and windlatch assembly with the appropriate kit.

If the motor does not run or does not park, check the wiring connections at the motor before removing the motor from the vehicle.

For any other deviation from the above cycle, replace the gear cover and switch assembly with the appropriate kit.

ADJUSTMENTS

ARM AND BLADE ASSEMBLY

Remove the arm and blade assemblies from the pivot shafts. See Removal and Installation. Turn on the wiper switch, allow the motor to move the pivot shafts three or four cycles, and then turn off the wiper switch. This will place the pivot shafts in park position.

Install the arm and blade assemblies on the pivot shafts to dimension X, as shown in Fig. 8. See Removal and Installation. Dimension X is the distance between the centerline of the blade saddle and the edge of the glass on LTD II, Ford, Mercury, Thunderbird, Continental Mark V, Cougar and Lincoln Continental. On Monarch, Granada, Fairmont, Zephyr, Versailles Pinto, Bobcat and Mustang II, dimension X is the distance between the windshield lower moulding or weatherstrip and the blade saddle centerline. The value of dimension X for each carline is given in Fig. 9.

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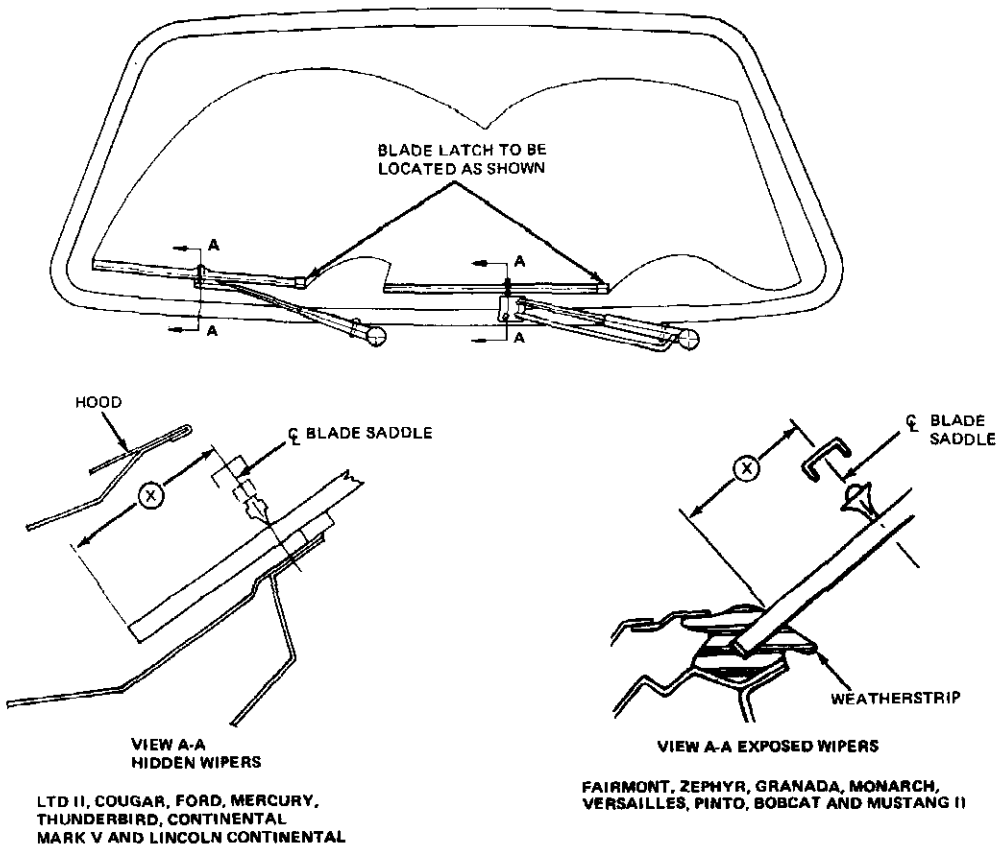


FIG. 8 Adjustment of Wiper Arm and Blade Assembly

Car Line	Dimension x (inches)	
	Drivers Side	Passenger Side
Cougar and LTD II (Depressed Park) Thunderbird	1/4 to 1-5/8	0 to 1-3/8
Fairmont, Zephyr	2.00 to 3.20	2.30 to 3.50
Mustang II	2-1/8 to 3-1/4	2-1/4 to 3-1/2
Ford, Meteor, Mercury	0.00 to 1.38	0.00 to 1.38
Continental Mark V	+1 to -1/4	+1 to -1/4
Lincoln Continental	0.00 to 1.38	0.00 to 1.38
Pinto, Bobcat	2.38-3.38	2.5-3.5
Granada, Monarch, Versailles	2.50 to 3.75	2.00 to 3.25

CL1389-2H

FIG. 9 Values of Dimension X for Correct Arm and Blade Assembly Adjustment

REMOVAL AND INSTALLATION

WIPER MOTOR

When installing the drive arm to a new motor, be sure to follow the instructions included in the new motor kit.

The internal permanent magnets used in the *wiper motor are a ceramic (glass-like) material.* Care must be exercised in handling the motor to avoid damaging the magnets. The motor must not be struck or tapped with a hammer or other object.

Ford, Mercury, LTD II, Cougar, Lincoln Continental, Thunderbird and Continental Mark V—Depressed Park

Removal

1. Disconnect the battery ground cable.
2. Remove the wiper arm and blade assemblies from the pivot shafts.
3. Remove the left cowl screen for access through the cowl opening.
4. Disconnect the linkage drive arm from the motor output arm crankpin by removing the retaining clip.
5. From the engine side of the dash, disconnect the two (push-on) wire connectors from the motor.
6. Remove the three bolts that retain the motor to the dash and remove the motor. If the output arm catches on the dash during removal, hand turn the

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arm clockwise, so that it will clear the opening in the dash.

Before installing the motor, be sure that the output arm is in park position.

Granada, Monarch, and Versailles—Non-Depressed Park

Removal

1. Disconnect the battery ground cable.
2. Remove instrument panel pad (8 screws).
3. Remove speaker mounting bracket (3 screws). Disconnect speaker and remove.
4. Remove defroster nozzle and air distribution duct (4 screws).
5. Remove interlock module from bracket (2 screws) and disconnect multiple connector.
6. *Remove motor bracket to cowl bolts and drive arm* clip.

Installation

1. Transfer the drive arm and motor bracket (1 nut).
2. Install motor, including arm and clip, and connect electrical lead.
3. Install interlock module to bracket (2 screws) and connect air distribution duct and defroster nozzle.
4. Position speaker and bracket assembly. Install with 3 screws and connect speaker lead.
5. Reinstall instrument panel pad (8 screws) and connect battery cables.
6. Test wiper motor operation.

Fairmont and Zephyr

1. Disconnect the battery ground cable.
2. Remove left-hand wiper arm from pivot shaft and lay on cowl top grille.
3. Remove cowl top grille screws.
4. Raise forward left-hand corner of cowl top grille for access to linkage drive arm.
5. Disconnect the linkage drive arm from motor output crank arm pin by removing retaining clip.
6. Disconnect wiper motor wire connector.
7. Remove bolts that retain motor to cowl panel and remove motor.
8. To install, reverse above procedure.

Pinto, Bobcat and Mustang II

Removal

1. Loosen the two nuts and disconnect the wiper pivot shaft and link assembly from the motor drive arm ball (Pinto and Bobcat only). A link retaining clip is used on the Mustang II only.
2. Remove three motor attaching screws and lower the motor away from under the left side of the instrument panel.
3. Disconnect the wiper motor wires and remove the motor.

Installation

1. Position the wiper motor under the instrument panel and connect the motor wires.
2. Position the wiper motor to the dash panel and install the three attaching screws. Tighten the screws to 5-7 ft-lbs. torque.
3. Position the wiper pivot shaft and link assembly to the motor drive arm ball, and tighten the two nuts. Tighten the nuts to 15-30 in-lbs. (Pinto and Bobcat only). On the Mustang II only, install the retaining clip.
4. Test the wiper motor operation.

INTERMITTENT GOVERNOR

To locate the intermittent governor on: (a) Continental Mark V, remove the instrument panel pad as outlined in group 45; (b) Lincoln Continental, Ford, Mercury, Granada, Monarch, Versailles, Fairmont and Zephyr, reach behind the left side of instrument panel; (c) Pinto and Bobcat, *remove fuse panel bracket (governor mounted on* back side); (d) Cougar, LTD II and Thunderbird, remove two screws from under center of panel and lower governor.

WIPER SWITCH

Ford and Mercury

Disconnect the battery ground cable. Remove the wiper/washer and the headlamp switch control knobs. Remove the headlamp switch bezel. Remove the trim panel retaining screw and remove the panel. Remove the two wiper/washer switch retaining screws and pull the switch assembly rearward. Disconnect the multiple connector at the rear of the switch and remove the switch.

To install, connect the multiple connector to the rear of the switch. Position the switch and install the two retaining screws. Position the trim panel and install the retaining screw. Install the headlamp switch bezel. Install the wiper/washer and the headlamp switch control knobs and connect the battery ground cable. Check the operation of the switch.

Continental Mark V

Disconnect the battery ground cable and remove the cluster finish panel, as outlined in Group 33, Part 50. Remove the wiper switch mounting plate, and disconnect the switch and cigar lighter wiring. Remove the nut that attaches the switch to the mounting plate.

To install, position the switch to the mounting plate and install the attaching nut. Connect the switch and cigar lighter wiring, position the switch and bracket assembly and install the retaining screws. Install the instrument cluster finish panel and connect the battery ground cable.

Lincoln Continental

Disconnect the battery ground cable and remove the switch knob (Fig. 10). Remove the bezel nut, pull out the switch from underneath the panel, and remove the connector.

To install, connect the connector to the switch, position the switch and install the bezel nut. Then, install the switch knob, connect the battery ground cable and check the operation of the switch.

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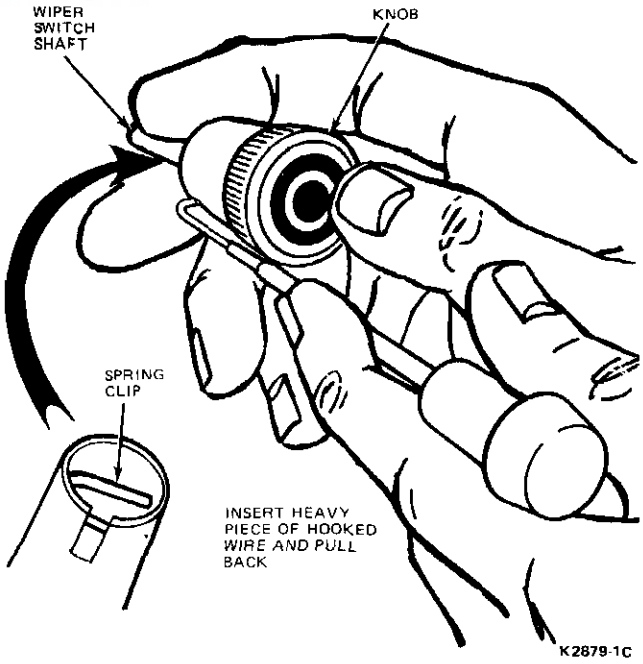


FIG. 10 Wiper Switch Knob Removal

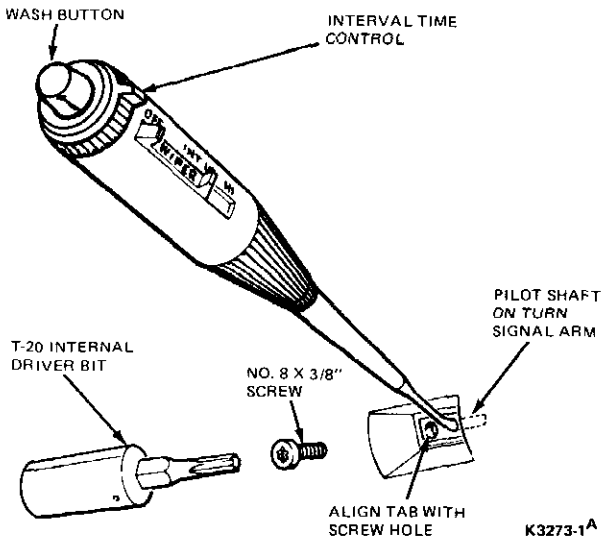


FIG. 11 Wiper Switch Removal

Thunderbird, Cougar and LTD II

Disconnect the battery ground cable and remove the switch knob (see Fig. 10). Remove the bezel nut, pull the switch assembly out of the mounting hole, and remove the connector.

To install, connect the connector to the wiper switch. Be sure that the main wiring harness shield is trapped between the switch and the instrument panel. Position the switch and install the bezel nut. Install the switch knob and connect the battery ground cable.

Pinto and Bobcat

Remove the instrument cluster, as outlined in Group 33, Part 50. Remove the windshield wiper control knob as shown in Fig. 10. Remove the switch bezel nut, unplug the connector from the switch and remove the switch.

To install, plug the connector on the switch, position the switch to the instrument panel and install the bezel nut and switch knob. Install the instrument cluster.

Fairmont and Zephyr

Remove the split steering column cover retaining screws. Separate the two halves and remove the wiper switch two retaining screws. Disconnect the electrical connector. To install, reverse removal procedure.

Mustang II, Granada, Monarch, Versailles, Fairmont and Zephyr

The windshield wiper switch turn signal arm assembly can be removed from the steering column with a No. T-20 internal driver bit, allen wrench or equivalent as a substitute tool to remove the retaining screw (See Fig. 11).

To reinstall, insert the pilot shaft in the turn signal switch. Align the bottom tab with the screw hole and install the screw. Tighten screw to 35-50 in-lbs torque.

The wiper/washer switch is an integral part of the turn signal arm and cannot be repaired separately.

Removal

1. Insert a screwdriver in the locking tabs and twist while pulling the connector apart as illustrated in Fig. 13. Repeat procedure on the opposite side of the connector and separate connector.
2. Take out two lower instrument panel screws as illustrated in Fig. 12 and remove lower instrument panel shield.
3. Remove two steering column cover screws and separate the steering column cover halves.
4. Pull the wiring cover from the bottom and remove it.
5. Insert a screwdriver under the wiring shield as shown in Fig. 12 and push the tang to remove shield.

ARM AND BLADE ASSEMBLY

NOTE: To prevent glass and/or paint damage, do not pry arm from pivot with metal or sharp tool.

Mustang II

The windshield wiper arm installation is shown in Fig. 13.

Swing the arm and blade assembly away from the windshield. While holding the assembly in this position, pull the arm off the pivot shaft, using Tool No. AT-2 or equivalent.

To install, hold the arm and blade assembly in the swing out position with the tool and push the arm onto the pivot shaft.

When installing the arm, be sure that it is adjusted to the proper dimension.

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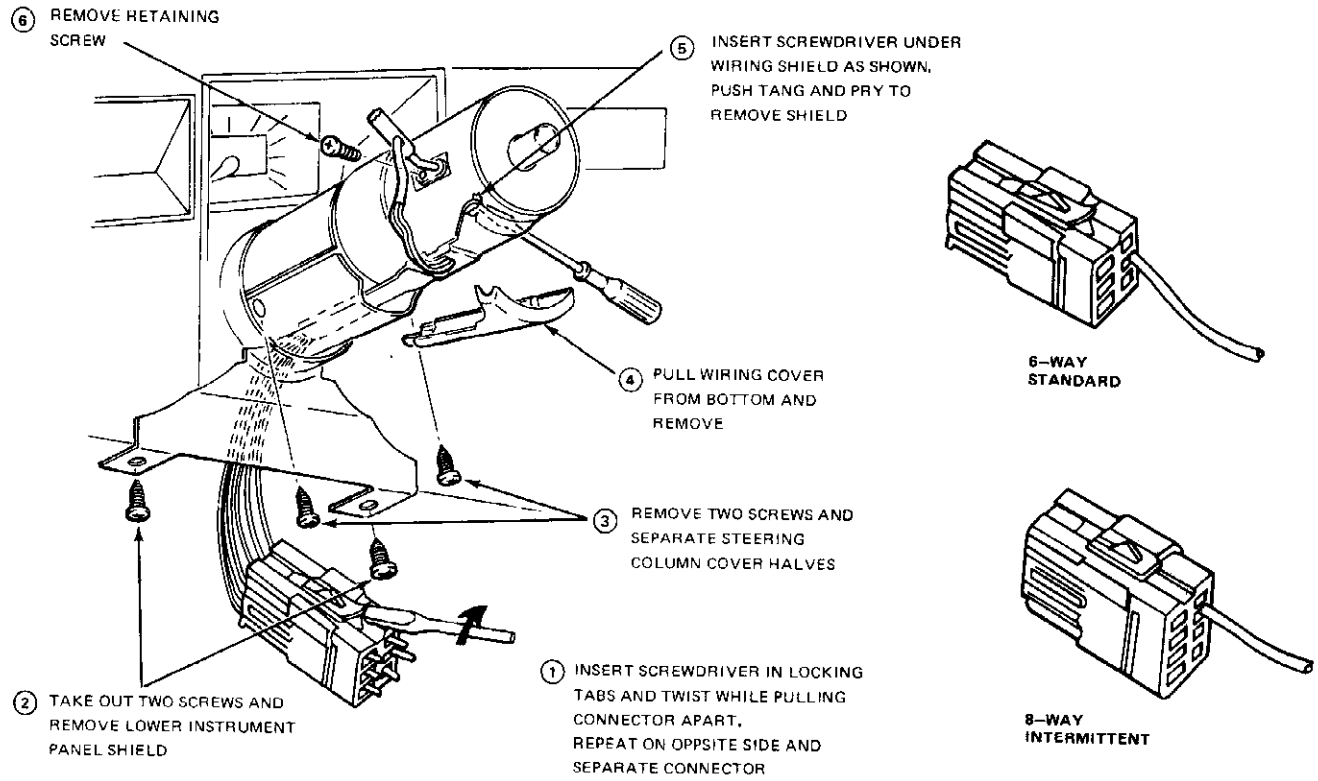


FIG. 12 Windshield Wiper Switch Removal—Mustang II, Granada, Monarch, Fairmont and Zephyr

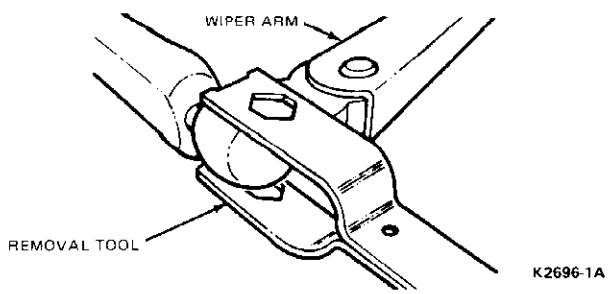


FIG. 13 Wiper Arm Removal – Mustang II

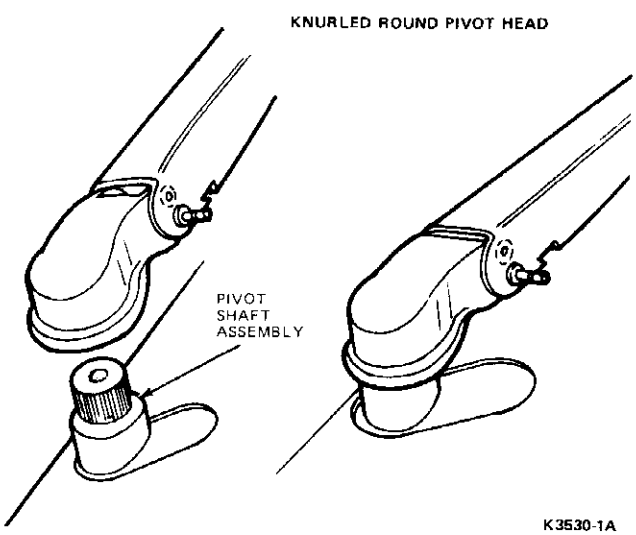


FIG. 14 Wiper Arm Removal—Pinto and Bobcat

Pinto and Bobcat

To remove the arm and blade assembly from the pivot shaft, swing the arm and blade away from the windshield and a 3/32 inch pin through the pin hole. Swinging the assembly away from the windshield will release the spring-loaded attaching clip in the arm from the pivot shaft. Inserting the pin will hold it in released position. The arm can now be pulled off the pivot shaft. **Do not pry off with a screwdriver.**

Leave the pin in the arm until after installation. A new service replacement arm comes with a pin already installed to hold it in released position.

When installing the assembly, be sure that the pivot shaft is in park position and that the blade assembly is positioned to the correct dimension as outlined in Adjustment. Push the arm onto the pivot shaft. Lock the arm to the pivot shaft by removing the pin. Refer to Fig. 14.

LTD II, Cougar, Ford, Mercury, Lincoln Continental, Thunderbird, Continental Mark V, Granada, Monarch and Versailles

Raise the blade end of the arm off of the windshield and move the slide latch (Fig. 15) away from the pivot shaft. This will unlock the wiper arm from the pivot shaft and hold the blade end of the arm off of the glass at the same time. The wiper arm can now be pulled off of the pivot shaft without the aid of any tools.

To install, position the auxiliary arm (if so equipped) over the pivot pin, hold it down and push the main arm head over the pivot shaft. Be sure that the pivot shaft is in park position, refer to Adjustments, and that the blade assembly is positioned to the correct dimension.

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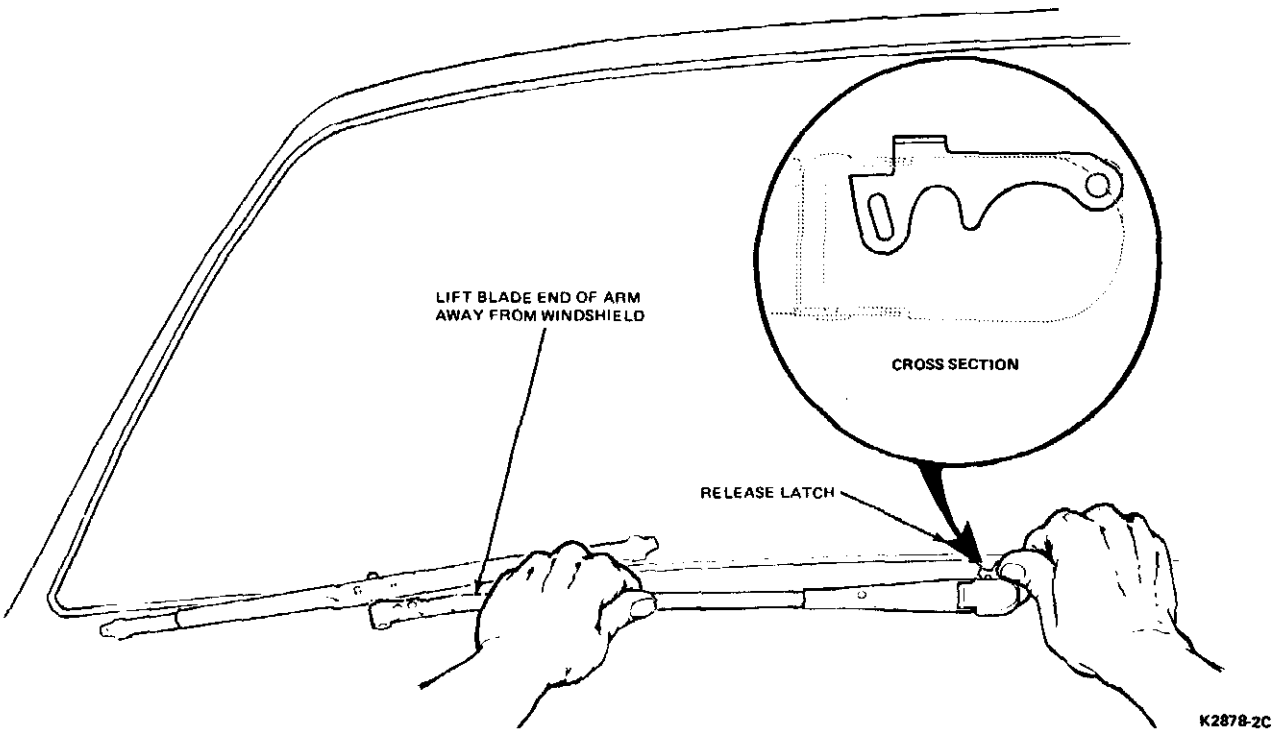


FIG. 15 Installation of Arm and Blade Assembly to Pivot Shaft—Ford, Mercury, Lincoln Continental, LTD II, Thunderbird, Continental Mark V, Cougar, Granada, Monarch and Versailles

Hold the main arm head onto the pivot shaft while raising the blade end of the wiper arm and push the slide latch into the lock under the pivot shaft. Then, lower the blade to the windshield. If the blade does not touch the windshield, the slide latch is not completely in place.

Fairmont and Zephyr

1. To remove blade assembly from wiper arm, pull up on spring lock and pull blade assembly from pin. Be sure the spring lock is not bent.
2. To engage, push the blade assembly onto the pin, so that the spring lock engages the pin. Be sure the blade assembly is securely attached to the pin.

AUXILIARY ARM—DRIVER'S SIDE ONLY

LTD II, Cougar, Ford, Mercury, Lincoln Continental, Thunderbird, Continental Mark V, Granada, Monarch and Versailles

The auxiliary arm is held on the pin by the shoulder of the main arm. Remove the main wiper arm and the auxiliary arm assembly.

BLADE ASSEMBLY TO WIPER ARM

We will use the first letter of the manufacturer's trade name to indicate the type of blade.

T blades come in two types. With a bayonet type, the blade saddle slides over the end of the arm and is engaged by a locking stud. With a side saddle pin type, a pin on the arm indexes into the side of the blade saddle and engages a loaded spring.

Bayonet Type

To remove a T-type blade, press down on the arm to unlatch the top stud. Depress the tab on the saddle (Fig. 16) and pull the blade from the arm.

To install a new blade assembly, slide the blade saddle over the end of the wiper arm so that the locking stud snaps into place. Be sure the blade is securely attached to the arm.

Side Saddle Pin Type

To remove a pin type T-type blade, insert an appropriate tool into the spring release opening of the blade saddle, depress the spring clip and pull the blade from the arm (Fig. 17).

To install, push the blade saddle onto the pin, so that the spring clip engages the pin (Fig. 17). Be sure the blade is securely attached to the arm.

RUBBER ELEMENT TO WIPER BLADE

The rubber element in all blades can be replaced.

T—Type

At one end of the rubber blade element, locate a notch approximately one inch from the end. Stand assembly on a firm surface with notched end up. Grasp frame and push down until blade assembly is tightly bowed. Then twist. The blade element will snap out of retaining tabs. Lift wiper assembly and slide blade element down the frame until the notch lines up with

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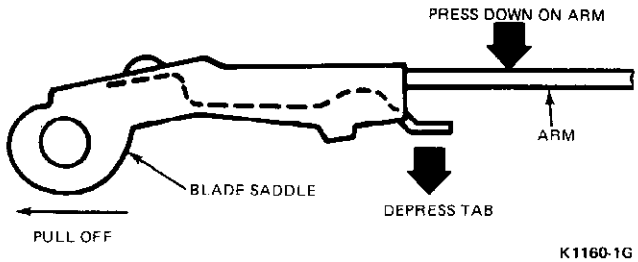


FIG. 16 T Blade—Bayonet Type Removal

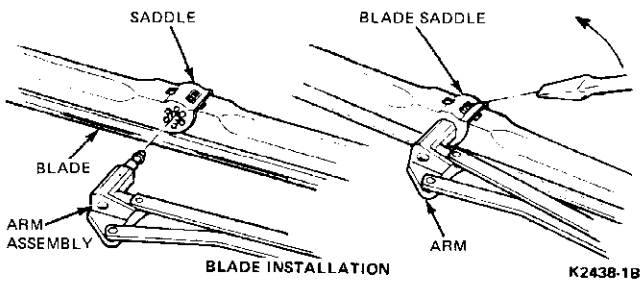


FIG. 17 T Blade—Pin Type Removal

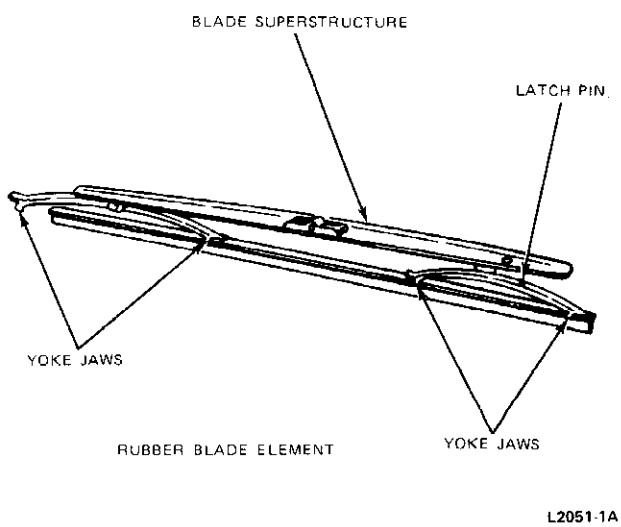


FIG. 18 Rubber Element Replacement

the locking tabs. Twist and the blade element will slip out. To install, reverse above procedure. See Fig. 18.

PIVOT SHAFT AND LINK ASSEMBLY

Ford, Mercury and Lincoln Continental

Removal

1. Disconnect the battery and remove the windshield wiper arm and blade assemblies from the pivot shafts.
2. Remove the cowl screens (center and left hand only), for access to the linkage.
3. Disconnect the left linkage arm from the drive arm by removing the clip.
4. Remove the three bolts retaining the left pivot shaft assembly to the cowl, and remove the left arm and pivot shaft assembly through the cowl opening.
5. Disconnect the linkage drive arm from the motor crank pin by removing the clip.
6. Remove the three bolts that connect the drive arm pivot shaft drive arm and right arm as an assembly.

Installation

1. When installing the pivot shaft assembly retaining bolts, tighten them to 3-7 ft-lbs torque. When installing the linkage connecting clips, be sure to force the clip locking flange into locked position, as shown in Fig. 19.

Pinto, Bobcat and Mustang II Without A/C

Removal

1. Remove the windshield wiper arms and blades from the pivot shafts.
2. Loosen two nuts retaining the wiper pivot shaft and link assembly to the motor drive arm ball.
3. Remove screws attaching each pivot shaft (Fig. 20).
4. Remove the pivot shaft and link assembly from under the left side of the instrument panel.

Installation

NOTE: Apply a 3/16 inch bead of sealer around each screw and main pivot stem before installing gasket.

1. Cement the gaskets to the pivots.
2. Position the pivot shaft and link assembly to the vehicle, and install the three attaching screws at pivot (Fig. 20). Tighten the screws to 3-6 ft-lbs torque.
3. Position the pivot shaft and link assembly to the motor drive arm ball, and tighten the two retaining nuts.
4. Install the wiper arms and blades on pivot shaft.

Pinto and Bobcat With A/C

The blower motor and housing will have to be removed to gain access to the wiper pivot and link assembly. Refer to Group 36 for blower motor and housing removal and installation.

After removing the blower motor and housing, follow the procedure outlined above for pivot and link assembly removal and installation.

LTD II, Thunderbird and Cougar

Removal

1. Open the hood, disconnect the battery ground cable and remove the wiper arm and blade assemblies from their pivot shafts.
2. Remove the cowl top left vent screen (4 retaining drive pins).
3. Remove the drive arm to pivot retaining clip.
4. Remove the three retaining screws from each pivot and remove the pivot shaft and link assembly.

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5. Transfer the right pivot, if necessary, by removing the connecting clip (the left pivot is part of the link assembly).

Installation

1. Position the pivot shaft and link assembly in the cowl, install the pivot shaft retaining screws and tighten to 3-7 ft-lbs torque.
2. Position the left link on the motor drive arm and install the connecting clip. Be sure to force the clip locking flange into locked position, as shown in Fig. 19.
3. Install the wiper arms and blades.
4. Check the wiper operation.
5. Install the cowl top vent screen and secure with four drive pins (Cougar only).

Continental Mark V

Removal

1. Disconnect the battery and remove the wiper arm and blade assemblies from the pivot shafts.
2. Remove the cowl top (left and center) retaining screws.
3. Disconnect the linkage drive arm from the motor by removing the retaining clip.
4. Remove the pivot shaft retaining bolts and remove the linkage and pivot shaft assemblies. Be sure to force the linkage connecting clip into the locked position, as shown in Fig. 19, (when installing).

LEFT PIVOT SHAFT ASSEMBLY

Granada, Monarch and Versailles

The instrument cluster must be removed for access to the left pivot shaft and link.

Remove the wiper arm and blade assembly from the pivot shaft. Working through the cluster opening, disconnect both pivot shaft links from the motor drive arm by removing the retaining clip. Remove the three bolts that retain the left pivot shaft assembly to the cowl, and take the left pivot shaft and link assembly out through the cluster opening.

NOTE: For pivot shafts using leather gaskets for sealing, apply a 3/16" bead of sealer around each screw and main pivot stem before installing gasket. A mastic-type gasket is required with the new pivot shaft with small rills or beads around each screw hole. See Fig. 21.

Fairmont and Zephyr

Removal

1. Disconnect the battery and remove the wiper arm and blade assemblies from the pivot shafts.
2. Remove the cowl top retaining screws.
3. Disconnect the linkage drive arm from the right drive arm by removing the retaining clip.
4. Remove the pivot shaft retaining screws and remove the linkage and pivot shaft assemblies. Be sure to force the linkage connecting clip into the locked position (Fig. 19).

RIGHT PIVOT SHAFT ASSEMBLY

Granada, Monarch and Versailles

Disconnect the battery and remove the wiper arm and blade assembly from the pivot shaft.

If the vehicle is equipped with air conditioning, the right duct assembly will have to be removed for access to the right pivot shaft. Unclip the duct from the right connector and slide the left end out of the plenum chamber. Lower the duct assembly out from under the instrument panel.

From under the instrument panel, disconnect first the left, and then the right pivot shaft link from the motor drive arm, by removing the retaining clip. Reaching between the utility shelf and the instrument panel, remove the three bolts that retain the right pivot shaft and link assembly to the cowl. Lower the assembly out from under the instrument panel.

NOTE: Apply a 3/16 inch bead of sealer around each screw and main pivot stem before installing gasket. After installing the pivot shaft and link assembly to the cowl, be sure that the right pivot shaft link is connected to the motor drive arm before connecting the left link. Be sure that the connecting clip is in locked position, as shown in Fig. 19.

When installing the right duct on air conditioned vehicles, insert the end without the clip into the plenum chamber and fasten the clip end to the right connector.

FAIRMONT AND ZEPHYR

Removal

1. Disconnect the battery and remove the wiper arm and blade assemblies from the pivot shafts.
2. Remove the cowl top retaining screws.
3. Disconnect the linkage drive arm from the motor and the left drive arm by removing the retaining clips.
4. Remove the pivot shaft retaining screws and remove the linkage and pivot shaft assemblies. Be sure to force the linkage connecting clip into the locked position (see Fig. 19).

COVER AND SWITCH—DEPRESSED PARK

Use a battery-powered test light or ohmmeter.

1. Check motor housing for ground. If no ground check park switch cover screws for tightness and/or repair motor ground strap.
2. Go to 3-way connector near top of motor and green wire motor terminal. Remove 3-way connector and shift it out of the way. Connect an external ground wire to marked terminal on wiper motor (green wire). Check remaining two terminals for continuity. If both terminals do not have continuity, repair wiper motor park switch.

LIFTGATE WIPER MOTOR AND BRACKET

Fairmont and Zephyr

Removal and Installation

1. Assure ignition switch is in OFF position.
2. Remove wiper arm and blade assembly and pivot shaft attaching nut.

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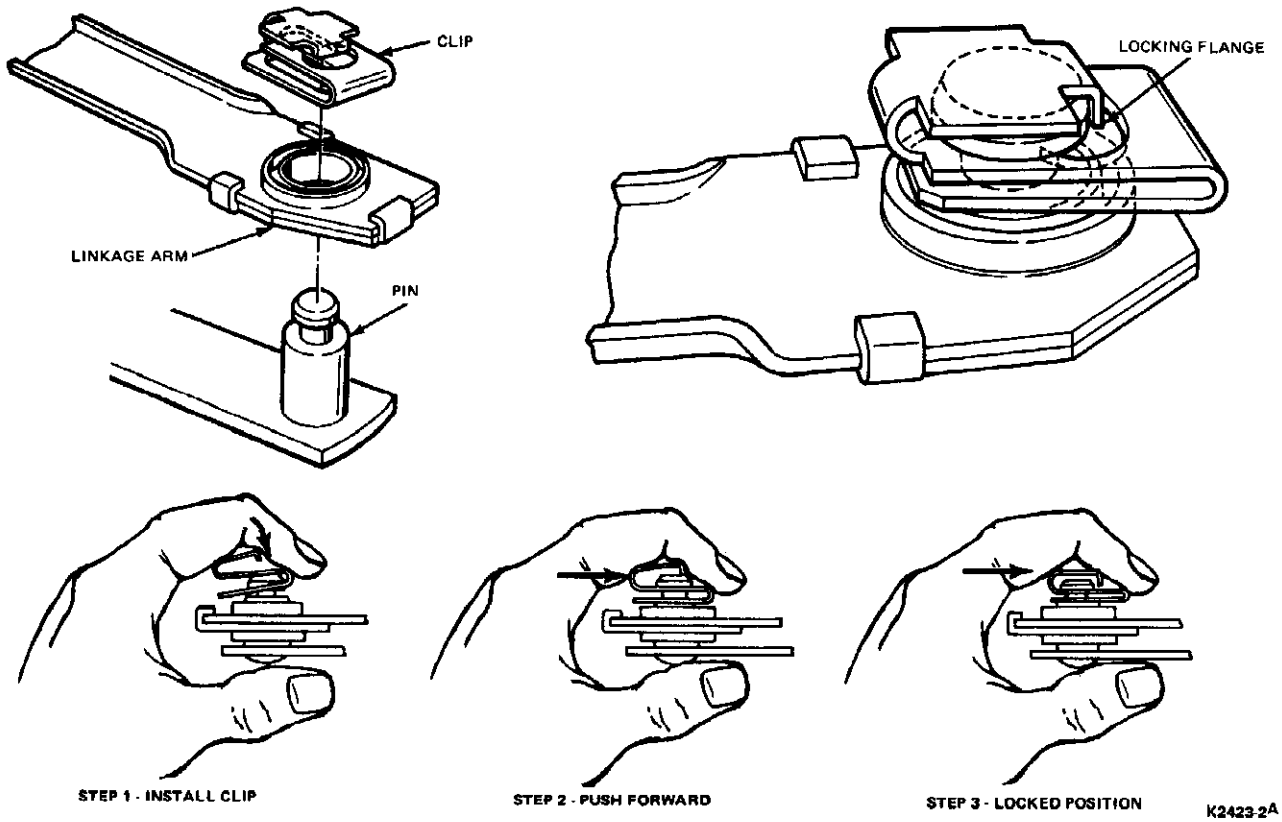


FIG. 19 Installation of Wiper Arm Connecting Clips—If So Equipped

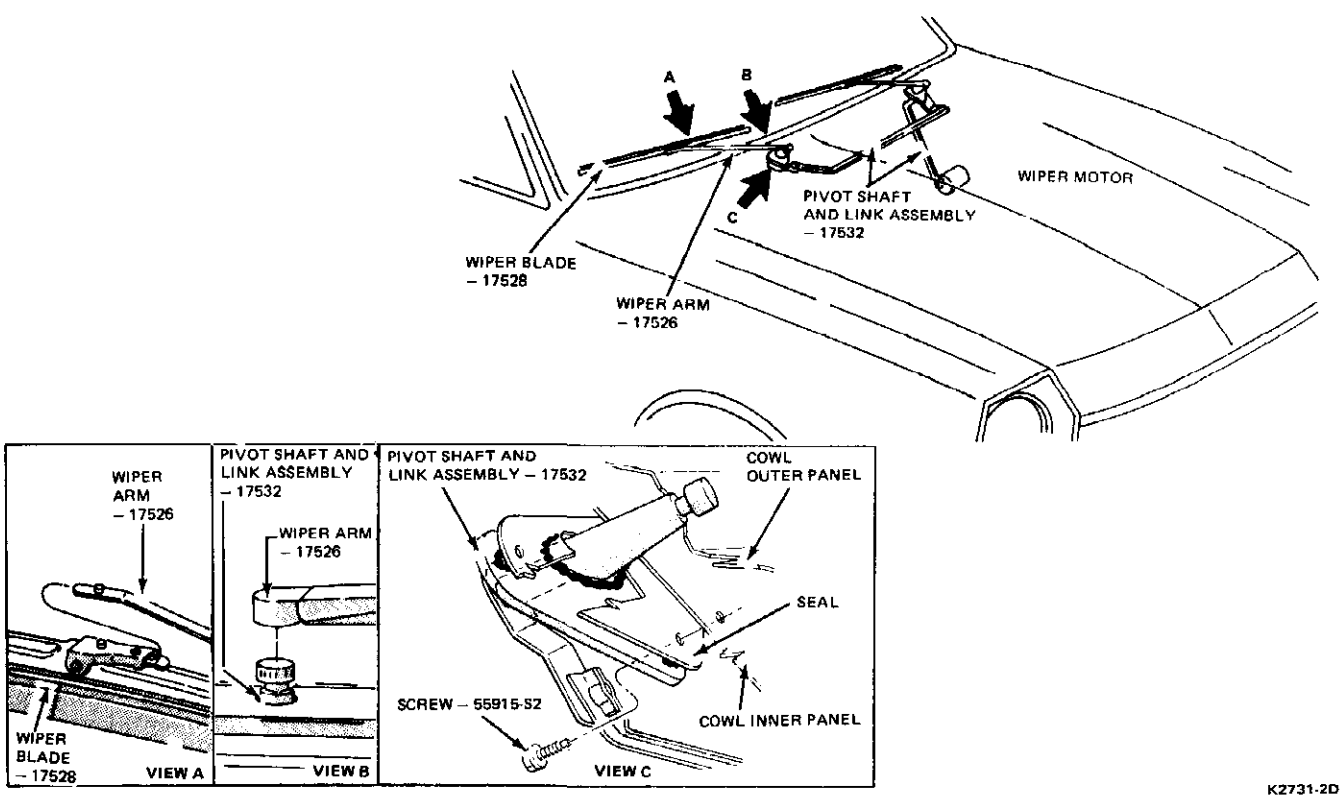
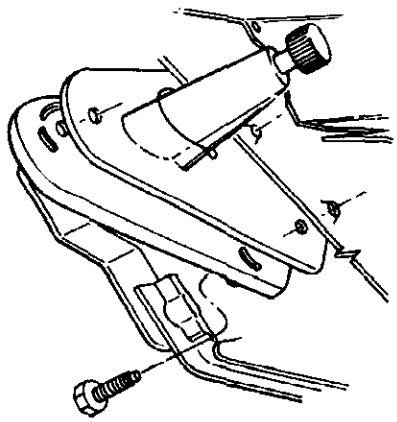


FIG. 20 Pivot Shaft and Link Assembly—Pinto and Bobcat Without A/C

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K3276-1B

FIG. 21 Pivot Shafts With Mastic Type Gaskets

3. *Remove license plate housing attaching screws from* liftgate inner panel.
4. Swing license housing outward at bottom, then down. Disconnect license lamp wiring. Remove housing.
5. Disconnect wiring harness from wiper motor.
6. Remove locking clip from wiper linkage. Pry off linkage arm with screwdriver. Remove linkage. Remove wiper motor and bracket through license *housing opening.*
7. For installation, reverse above procedure.

DISASSEMBLY AND ASSEMBLY

The wiper motor is not serviced in a complete assembly or in individual parts, but in kits of the major sub-assemblies. Removal and installation procedures are given here for the kits.

The internal permanent magnets used in the wiper motor are a ceramic (glass-like) material. Care must be exercised in handling the motor to avoid damaging the magnets. The motor must not be struck or tapped with a hammer or other object.

COVER AND SWITCH—DEPRESSED PARK

Ford, Mercury, Cougar, Lincoln Continental, Thunderbird, Continental Mark V and LTD II

Remove the four cover retaining screws to remove the assembly. Replace with the appropriate kit. Be sure to reassemble the ground strap under the cover screw. Use the new screws supplied with the kit and tighten to 15-25 in-lb torque.

BRUSH END PLATE—DEPRESSED PARK

Ford, Mercury, Lincoln Continental, Thunderbird, Continental Mark V, LTD II and Cougar

Carefully observe the original position of the bale retainer and pry it off with a screwdriver. Remove the end plate and plug. Replace it with the appropriate kit.

When installing the end plate, use a fine wire probe through the hub opening to position the brushes on the commutator. Rotate end plate to position the key in the notch and assemble the plug. Reinstall the bale retainer carefully with a screwdriver to avoid overbending.

OUTPUT ARM AND WINDLATCH—DEPRESSED PARK

Ford, Mercury, Lincoln Continental, Thunderbird, Continental Mark V, LTD II and Cougar

Removal

1. With a sharp pointed tool, puncture and pry off the soft plastic plug from the upper surface of the arm (Fig. 22).
2. Remove the retaining bolt from the shaft, being certain not to rotate the shaft.
3. Remove the arm from the shaft with a suitable *puller (Fig. 23). Do not attempt* to drift the arm from the shaft.
4. Note the correct positioning of the windlatch in its guide for proper reassembly (Fig. 24). Lift the plastic windlatch out of the integral cover plate and guide.
5. Unclip the windlatch spring from the guide and *remove it (Fig. 25).*

Installation

1. Snap the windlatch spring in place (Fig. 25).
2. Parts in the kits are supplied with a special water wash resistant lubricant. Do not remove the lubricant and do not add any lubricant. Position the windlatch in the integral cover plate and guide, as shown in (Fig. 25).
3. Position the arm and cam assembly on the shaft, so that the locating marks are aligned (Figs. 26 and 27). (Note that the service replacement arm (Fig. 27) comes with the cam pin engaged in the detent.) Therefore, when installed with the correct cam-to-

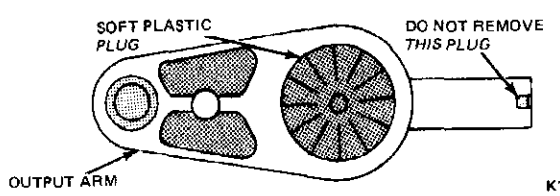


FIG. 22 Output Arm with Plastic Plug Installed

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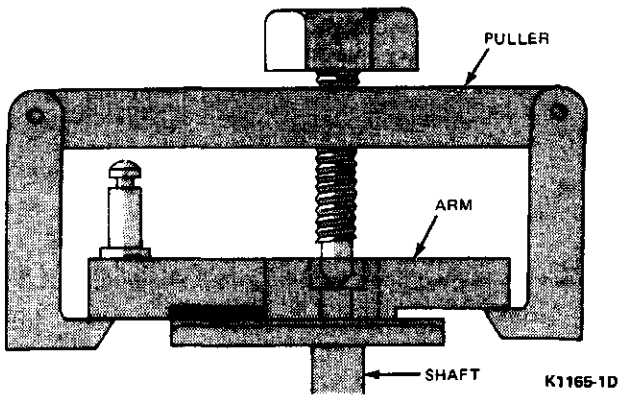


FIG. 23 Output Arm Removal

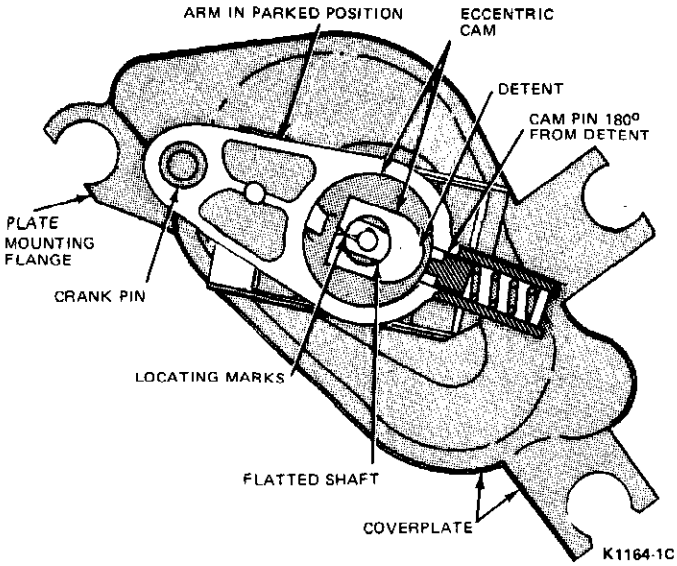


FIG. 26 Output Arm in Parked Position

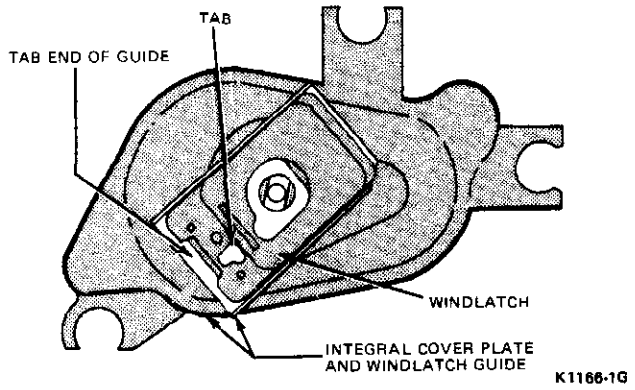


FIG. 24 Windlatch Installation

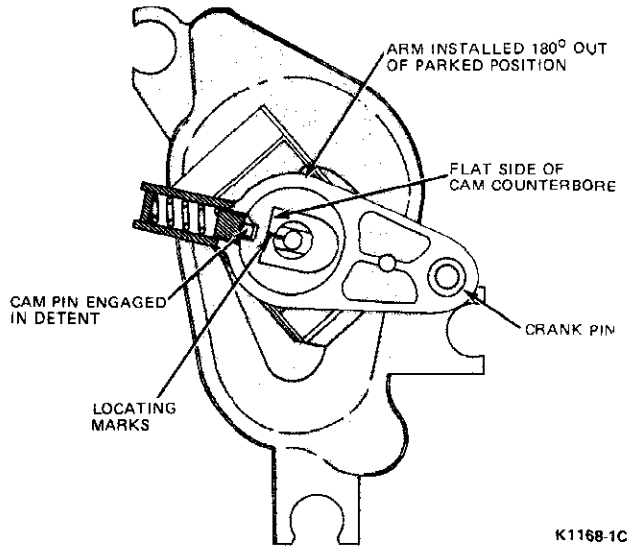


FIG. 27 Service Replacement Arm Installation

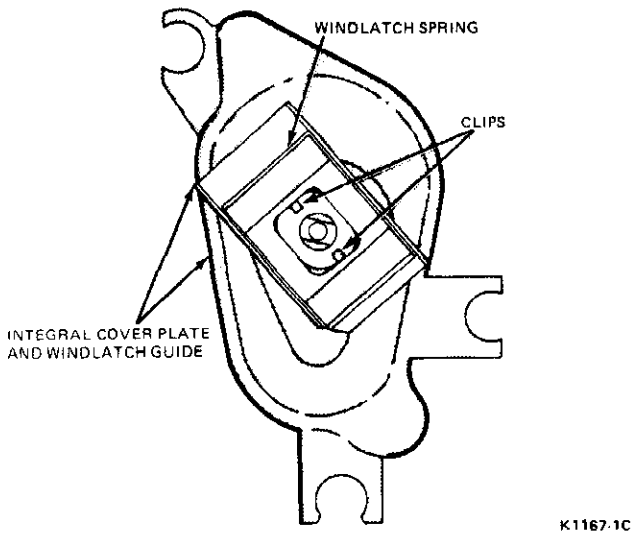


FIG. 25 Windlatch Spring Installation

shaft relationship (marks aligned), the arm will be 180 degrees out of parked position. It will be returned to park position when you perform the final step of this procedure.

4. Draw the arm and cam assembly onto the output shaft with the retaining screw, applying 8-10 ft-lb of torque. Before tightening the screw, however, slide the windlatch it its guide to make sure that the upstanding tab clears the underside of the arm as it is being drawn onto the shaft.
5. Install a new soft plastic plug (Fig. 22).
6. Make sure that the output arm is in park position (Fig. 26), as outlined in the following procedure.

Before attempting to install the motor in the vehicle, be sure that the output arm is in the park position, as shown in Fig. 26. If it is not in park position, as in the case of the service replacement (Fig. 27), proceed as follows:

a. Place the motor on the left fender near the feed wires at the dash panel.

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b. Temporarily connect the motor to the feed wires (2 plugs).

c. Ground the motor by connecting a jumper wire from the ground strap to the body.

d. Move the control switch lever in the vehicle to operate the motor. The output arm and cam will move together in clockwise rotation.

e. Allow the arm and cam to move at least one full revolution, and then move the control switch to off position. This will cause the motor output arm to proceed through the following cycle: Rotate in the normal direction; reverse direction of rotation for approximately 10 degrees to 15 degrees; stop rotating while the crank pin moves radially outward in a semi-circular motion and stop in the final park position (Fig. 27).

WIPER MOTOR—NON-DEPRESSED PARK

Mustang II, Pinto, Bobcat, Granada, Monarch, Fairmont, Zephyr and Versailles

Disassembly

1. Remove the gear cover retaining screws and cover (Fig. 28).
2. Remove the idler gear by pressing shaft with retainer out of the motor housing.
3. Remove the motor through bolts, motor round case, switch terminal insulator sleeve, and armature. **Remove armature shaft end play spring. Do not pound the motor case magnet assembly as the ceramic magnets may be damaged.**
4. Mark the position of the output arm with respect to the output shaft for assembly. Remove the output arm retaining nut, output arm, wave washer, flat washer, O-ring, leaf spring, output gear/shaft assembly, and parking switch lever and parking switch lever plate.
5. Remove the brushes, brush spring, and wire harness.
6. Remove the brush plate and switch assembly and remove the switch contact to parking lever pin from the gear housing.

Assembly

It is essential that the idler gear shaft with the push-nut be reset to the original, proper depth in the gear housing. Refer to kit for instructions.

1. Place the housing on a flat surface, with the inside of the housing facing up.
2. Position the parking switch lever and lever plate with the cam rider pointing toward the gear housing output shaft hole.
3. Apply a film of Sun Prestige grease or equivalent to the output gear teeth and shaft bearing surface. Insert the shaft in the bearing. Make certain that the parking switch lever is clear of the cam and gear assembly.
4. Place the spacer washer and spring washer on the shaft, position the output arm on the shaft in the marked position, from which it was removed, and install the mounting nut. Apply ample Sun Prestige Grease or equivalent under idler gear onto bottom of idler shaft.
5. After installing idler gear on shaft, insert shaft through park lever and plate. Use a drift and hammer to lightly tap the gear and pinion shaft to

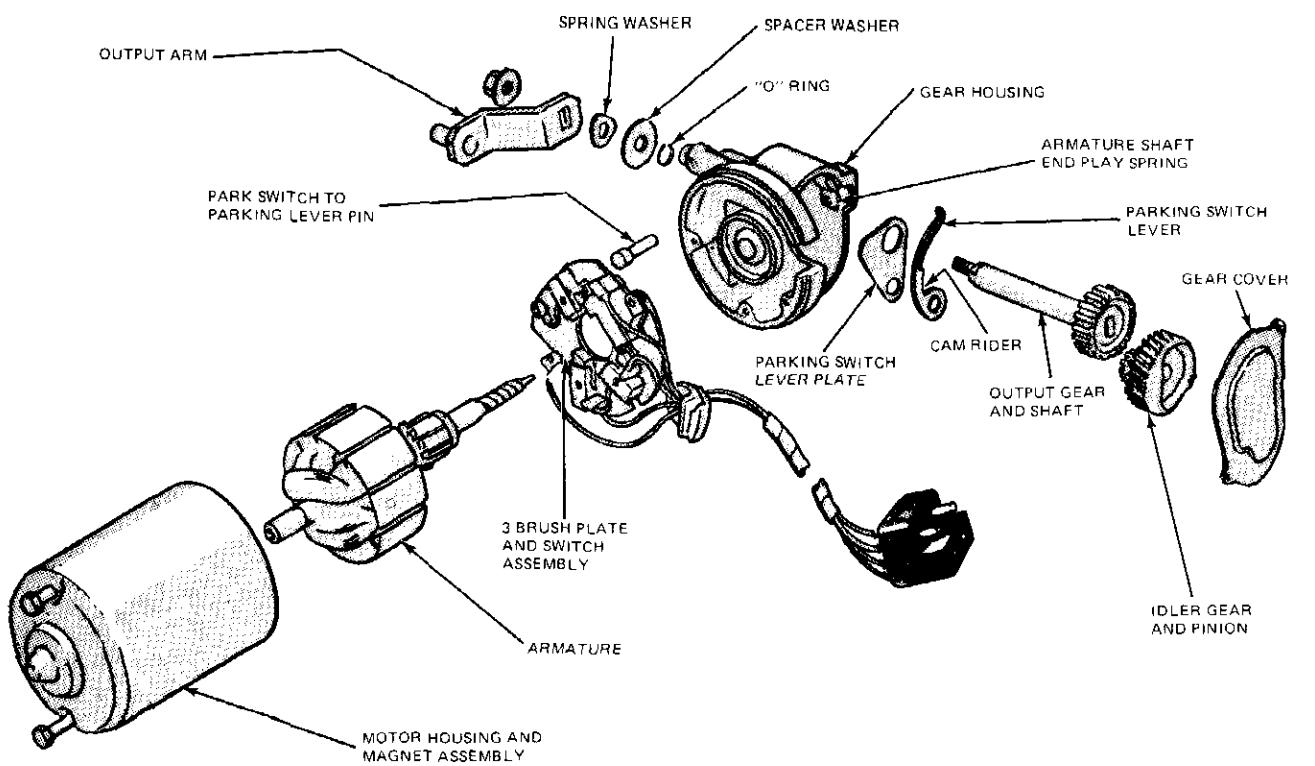


FIG. 28 Disassembled Wiper Motor

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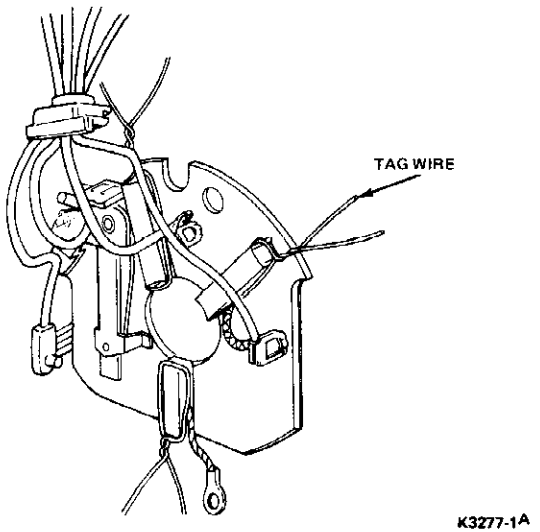


FIG. 29 Three-Brush Plate and Switch Assembly

proper depth. (Do not allow push-nut to put a pre-load on gear. A .001-.020 in. clearance is required.)

6. Position the brush springs and brushes in the holders and wrap wire around them to hold them in the fully retracted position. Push the insulated brush connector into the switch terminal. See Fig. 29.
7. Place the switch contact to parking lever pin in the gear housing. Position the brush plate assembly to the housing and install the retaining screws.
8. Apply Sun Prestige grease or equivalent to the ball bearing in the end of the armature shaft. Position the armature shaft in the gear housing and remove the brush retracting wires.
9. Holding the armature in position, install the motor case and magnet assembly, and through bolts. Align indicator marks on motor case and gear box housing before inserting through bolts.
10. Apply Sun Prestige grease or equivalent to the worm gear and pinion and idle gear. Install end play spring in housing.
11. Apply a generous amount of Sun Prestige grease or equivalent to the area around the end of the armature shaft. Install the gear housing cover.

Cleaning and Inspection

1. Clean the gear housing of all old grease. Do not allow any cleaning fluid to contact the armature shaft and output shaft bearings.
2. Wipe all other parts with a clean cloth.
3. Inspect the gear housing for cracks or distortion. Replace a cracked or distorted housing.
4. Check all shafts, bushings, and gears for scored surfaces. Replace damaged parts, and add new grease to the housing and gears.

SPECIFICATIONS

ELECTRIC WINDSHIELD WIPER MOTOR AND SWITCH TEST CURRENT LIMITS

Motor Type	Motor Current Draw Test	Circuit Breaker/Switch Low Current Pass Test	Circuit Breaker/Switch High Current Pass Test
Non-Depressed Park	2.5 amperes	7 amperes **6 amperes	14 amperes **12 amperes
Depressed Park	3.5 amperes	8.25 amperes	16.5 amperes

*Motor maximum current when operated without linkage attached. **Mustang II.

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DETROIT IRON

Windshield Washers

PART 35-70

Applies to All Models

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TESTING	
Washer Pump Current Draw	70-1
ADJUSTMENTS	
Washer Nozzle	70-2
REMOVAL AND INSTALLATION	
Motor, Seal and Impeller Assembly	70-2
Washer Nozzle	70-2
Washer Pump	70-2

CL2304-2B

DESCRIPTION AND OPERATION

WASHER SYSTEM

The washer system consists of a control switch, integral with the wiper motor control switch, reservoir, motor assembly and the necessary hoses, nozzles and attaching parts.

For diagnostic chart on windshield washers, refer to Diagnosis in Part 35-60.

TESTING

WASHER PUMP CURRENT DRAW

Attach the leads of the Volt-Amp Tester as shown in Fig. 1. The current draw should not exceed four amps, or indicate less than two amps, while the washer pump motor is pumping fluid.

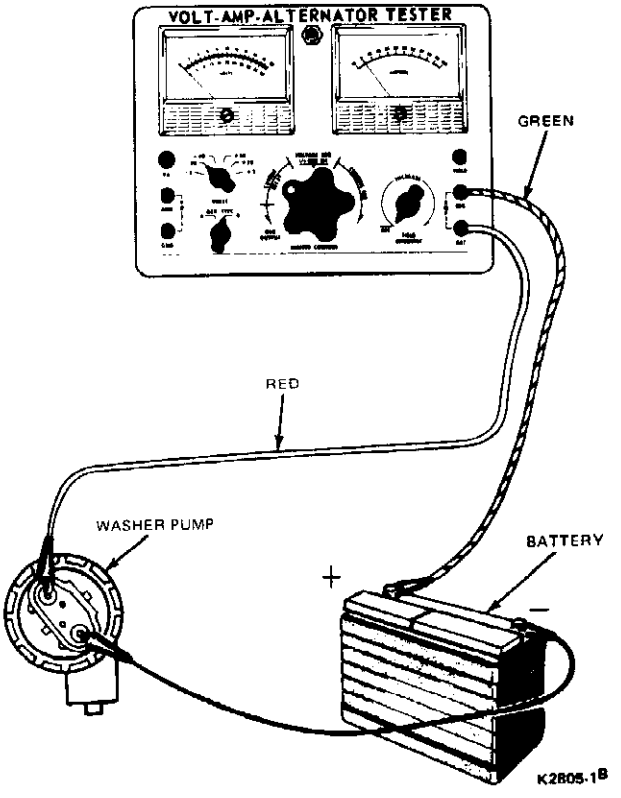


FIG. 1 Washer Pump Current Draw Test

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ADJUSTMENTS

WASHER NOZZLE

Pinto, Bobcat, Fairmont, Zephyr, Granada, Monarch and Versailles

Use a pair of needle nose pliers and very carefully bend the nozzle. Care is necessary to prevent crimping the nozzle jet openings.

FORD, MERCURY, LINCOLN CONTINENTAL, THUNDERBIRD, CONTINENTAL MARK V, LTD II, AND COUGAR

These nozzles are mounted on the windshield wiper arms and are non-adjustable.

REMOVAL AND INSTALLATION

WASHER PUMP

To remove the electric windshield washer reservoir and motor assembly from the vehicle, disconnect the lock-tab wire connector (use a small screwdriver to unlock tabs) and hose, remove the retaining screws and lift the assembly from the left fender apron (or radiator support). Disconnecting the hose will drain the reservoir. The washer reservoir and cover assembly are serviced separately. The motor, retaining ring, seal and pump impeller assembly are also serviced separately.

MOTOR, SEAL AND IMPELLER ASSEMBLY

1. Remove reservoir assembly from vehicle. Disconnect electrical plug and hose.
2. Using a small bladed screwdriver, pry out retaining ring (Fig. 2).

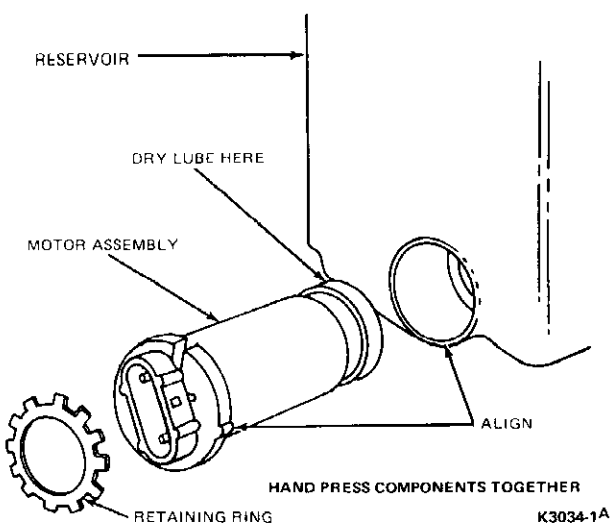


FIG. 2 Windshield Washer Motor Replacement

3. Using pliers to grip one wall around the electrical terminals (Fig. 3), pull out the motor, seal and impeller assembly. If the impeller and seal come off when the motor is pulled, they can be reassembled. Make certain the reservoir pump chamber is free of foreign material prior to re-installing the old motor in the new reservoir.
4. Before installing the assembly, lubricate the outside diameter of the seal (Fig. 2), with a dry lubricant such as powdered graphite. This will prevent the seal from sticking to the wall of the reservoir motor cavity and make assembly easier.

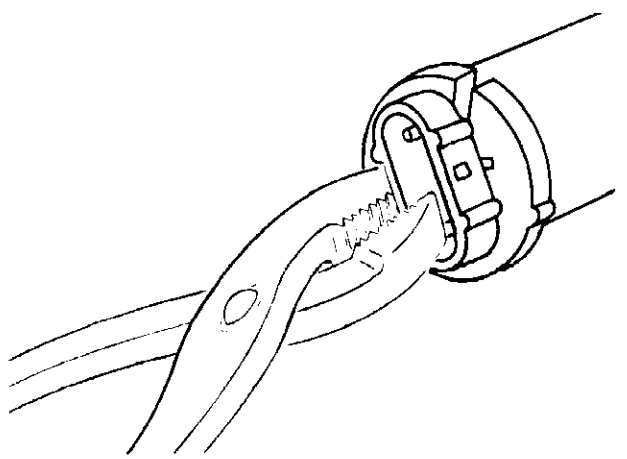


FIG. 3 Disassembling Motor, Seal and Impeller Assembly

5. Align small projection on the motor end cap with the slot in the reservoir (Fig. 2), and assemble so that the seal seats against the bottom of the motor cavity.
6. Using a 1" socket (preferably 12 point) hand press retaining ring securely against motor end plate.
7. Connect electrical plug and hose and replace the reservoir assembly in the vehicle.
8. Fill the reservoir and operate the washer system.
9. Check for leaks and align the cowl-mounted jets if necessary. CAUTION: Do not operate pump until fluid is added to reservoir.

WINDSHIELD WASHER NOZZLE

Ford, Mercury, Lincoln Continental, Thunderbird, Continental Mark V, LTD II and Cougar

Windshield washer nozzles are attached to the wiper arms, allowing the spray pattern to follow the wiper arms as they move over the windshield.

Remove the windshield wiper arm as outlined in Part 35-60, and remove the washer hose from the connector. Refer to Fig. 4, for Removal and Installation Procedures.

FAIRMONT AND ZEPHYR

1. Remove both wiper arms.

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DETROIT IRON

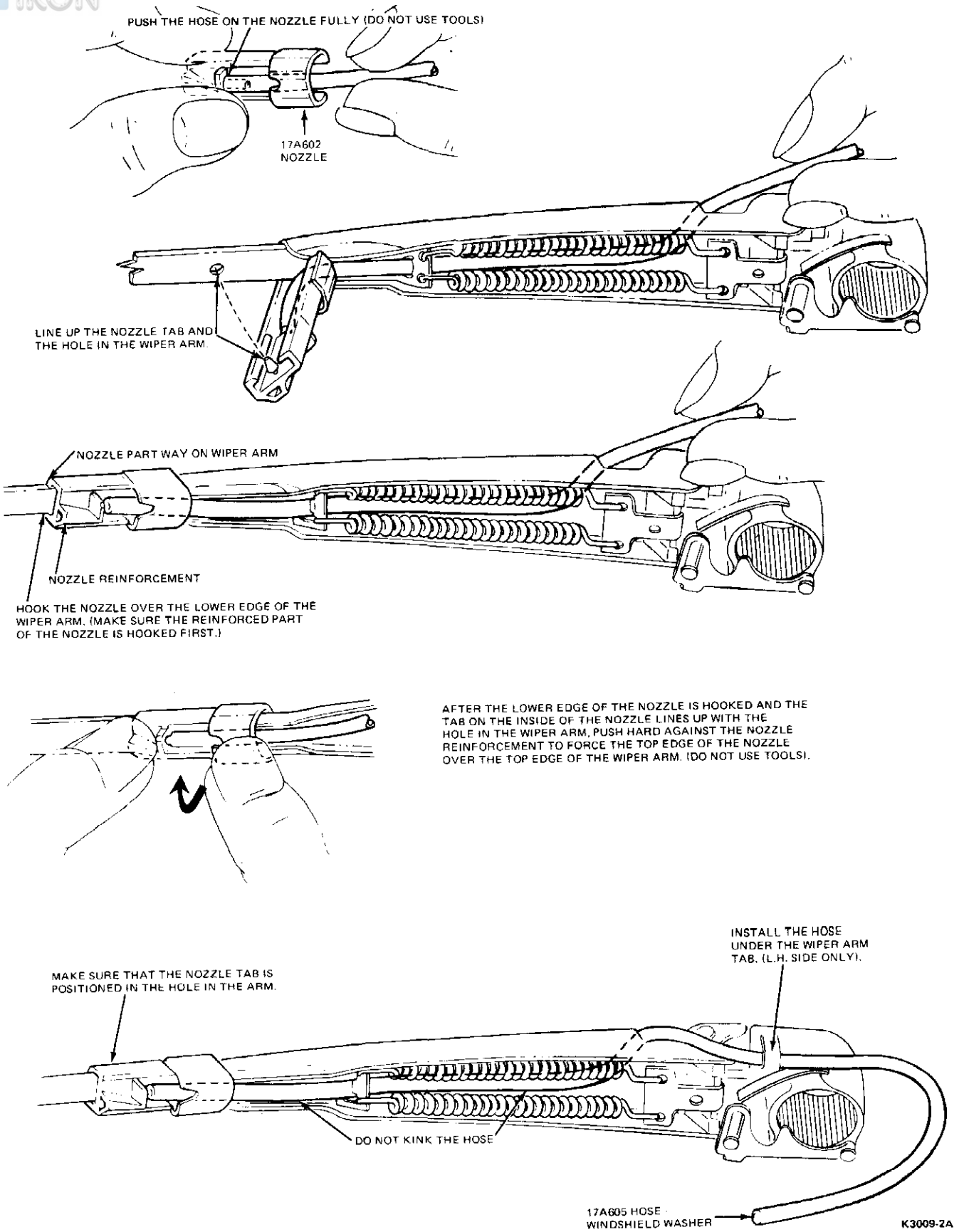


FIG. 4 Windshield Washer Hose and Nozzle Installation—Typical

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2. Remove washer nozzle from underside of wiper arm. Insert a screwdriver between arm and nozzle and twist to disengage locking tabs.
3. Remove seven screws from cowl top grille.
4. Raise cowl top grille for access to nozzle hose.
5. Disengage nozzle hose retaining clips and grommets and remove hose from tee.
6. To install nozzle and hose assembly, reverse above procedure.

NOTE: See Fig. 5 for nozzle configuration for R.H. LTD II, Thunderbird and Cougar. Procedures for Removal and Installation are same as in Fig. 4.

Soap may be used to install washer hose to washer nozzle, for ease of installation. The hose must be kept taut when routing (as shown in Fig. 4) and inspected for cracks before installing the wiper arm.

Pinto, Bobcat, Mustang II, Granada, Monarch and Versailles.

Removal

1. Open the hood. Remove the nozzle assembly bracket retaining screw from the cowl top grille panel.
2. Carefully slide the nozzle assembly out of its locating hose in the top grille panel.
3. Remove the nozzle assembly from the washer hose.

Installation

1. Attach the washer hose on the nozzle assembly.
2. Position the nozzle assembly through its locating hole. The nozzle opening should position itself at the third (inboard) cowl top grille panel opening. A small hooked tool can be used if necessary to help position the nozzle through the cowl top grille opening.
3. Install the nozzle bracket retaining screw.

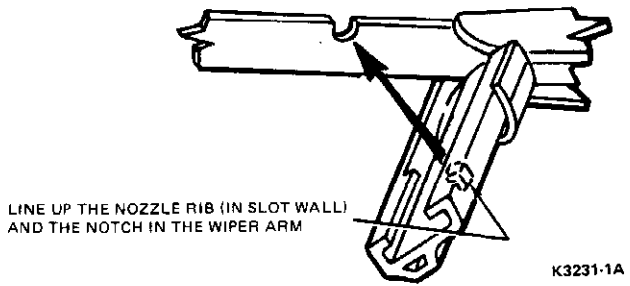


FIG. 5 R.H. Windshield Washer Nozzle Installation—LTD II, Thunderbird and Cougar

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Horns

PART 35-80

Applies to All Models

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Horn Switch	80-1
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CL2305-2B

DESCRIPTION AND OPERATION

HORN SYSTEM

The Pinto, Bobcat, Mustang II, Fairmont, Zephyr, Granada and Monarch and most models of the LTD II, Cougar and low series Ford car lines have a single low pitch horn.

The Lincoln Continental, Continental Mark V, Mercury, Thunderbird, Cougar XR-7, high-series Ford and Granada and Monarch Ghias are equipped with a pair of tuned horns. The Versailles has a third horn. The horn switch closes the circuit to the horns without the use of a relay. One of the horns has a high-pitched tone, the other a low-pitched tone.

Vehicles equipped with a speed control have a relay in the circuit.

HORN SWITCH—BASE PINTO (BUTTON)

The base Pinto uses a straight spoke steering wheel with a pressure-sensitive horn switch in the center of the wheel. The pressure switch consists of two copper rings separated by insulators with two wires attaching to the steering wheel horn terminals. If the switch needs to be replaced, the entire horn switch and trim cover assembly will have to be replaced.

HORN SWITCH—BASE/DELUXE HORN PAD

All Except Thunderbird, Lincoln Continental and Continental Mark V

The base/deluxe uses pressure-sensitive switches at each end of the center spokes. Each switch starts at the ribs and extends toward the center to the curved portion of the pad. The pressure switches consist of copper contacts separated by insulators with two wires attaching to the steering wheel horn terminals (see Fig. 1). If the switch needs to be replaced, the entire horn switch and trim cover assembly must be replaced.

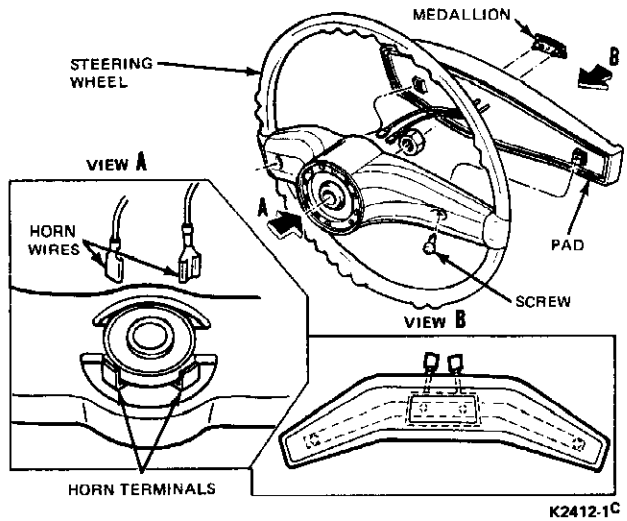


FIG. 1 Typical Two Spoke Wheel and Horn Switch

HORN SWITCH—LUXURY AND SPEED CONTROL HORN PADS

Ford, Mercury, LTD II, Cougar, Granada, Monarch, Versailles, Thunderbird, Lincoln Continental and Continental Mark V

The luxury and speed control horn pads use a spring-loaded horn bar which runs the length of the spoke. The horn switch consists of two copper strips separated by springs with two (three for speed control) wires attaching to the steering wheel horn terminals. If the switch needs to be replaced, the entire horn switch and trim cover, except for the lower woodgrain applique insert, must be replaced (See Fig. 2).

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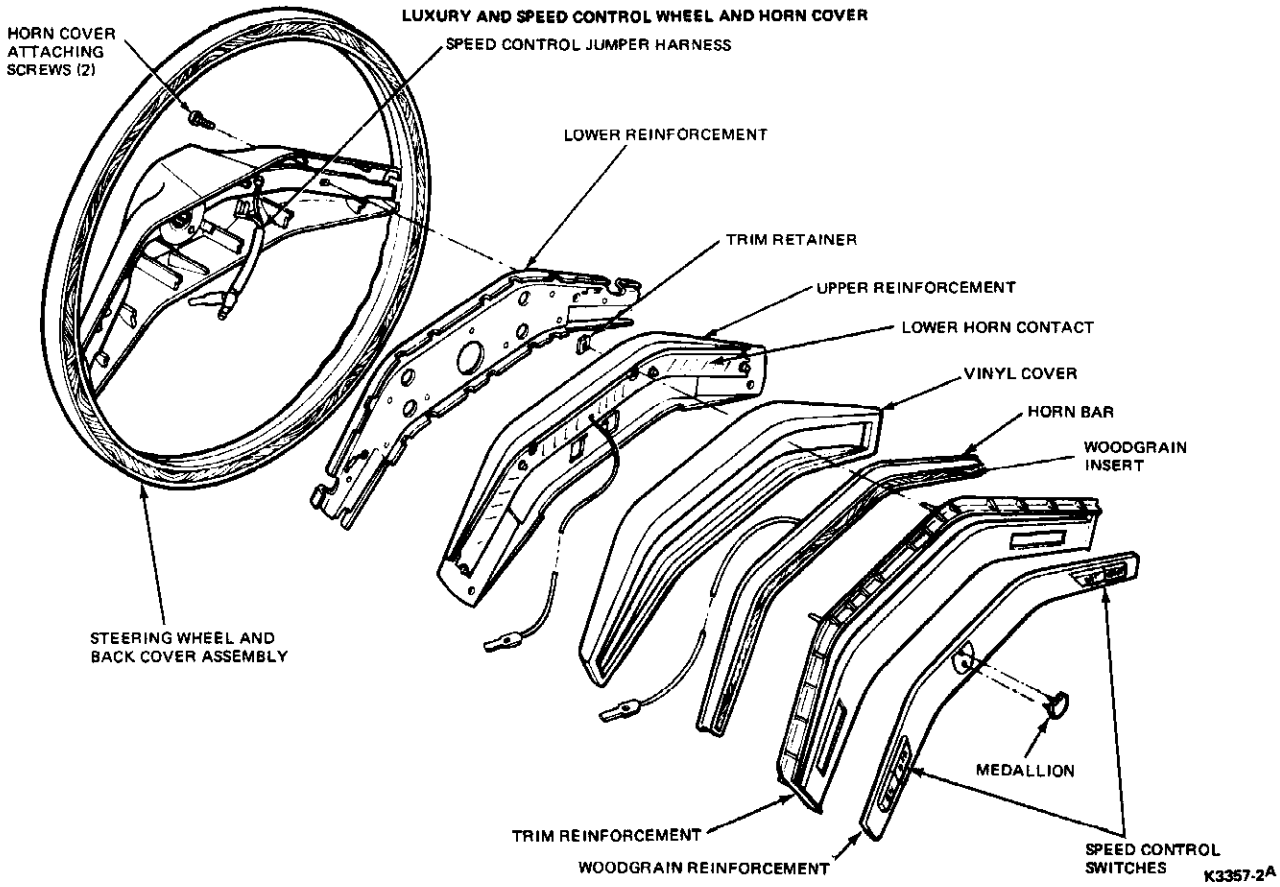


FIG. 2 Luxury and Speed Control Wheel and Horn Cover

TESTING AND ADJUSTMENTS

WITH EQUIPMENT

Connect a voltmeter and ammeter to the horn and to the vehicle battery. Attach a wire between the positive (+) terminal of vehicle battery and the horn as shown in Fig. 3. If current reads zero amperes, (open circuit) turn the adjusting screw counterclockwise until meter indicates 5.0-5.5 amperes, then secure. If current is greater than 5.5 amperes, turn adjusting screw clockwise until reading is 5.5 amperes, then secure. If 5.0-5.5 amperes limit cannot be met, remove horn and replace.

WITHOUT EQUIPMENT

Connect a wire between the negative (-) terminal of the battery as shown in Fig. 3. Connect another wire from the horn to the positive (+) terminal of the battery. If the horn does not sound **and** there is no evidence of a spark at the battery terminal, turn the adjusting screw counterclockwise 1/4 turn minimum to 3/8 turn maximum, then secure. If horn does not function after adjustment, remove and replace.

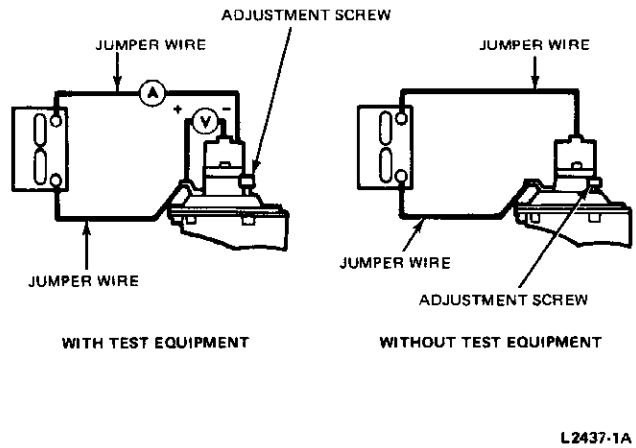


FIG. 3 Horn Current Test

REMOVAL AND INSTALLATION

HORN

Disconnect the horn wire from the terminal and remove the mounting bolt. When installing a horn and bracket assembly, tighten the mounting bolt to 12-18 ft-lb.

HORN MOUNTING LOCATION

The horn and bracket assembly on all vehicles except Lincoln Continental, Continental Mark V, Pinto and Bobcat are mounted in the forward part of the engine compartment, usually in the area of the left fender

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apron. The Lincoln Continental, Continental Mark V, Pinto, and Bobcat mounting locations are on the right side of the engine compartment.

BUTTON-BLOW HORN—PINTO ONLY

Grip the horn button and exert counterclockwise pressure to release the button from the wheel. Disconnect the horn wires from the wheel terminals. If the switch needs replacement, the entire horn switch and trim cover (button) assembly must be replaced. To install, connect the horn wires to the terminals in the wheel. Position the button so the slots in the button align with the (3) plastic studs in the wheel. Align the horn button notch with the locator boss on the wheel. Exert clockwise pressure to lock the button to the wheel.

PAD BLOW HORNS

Ford, Mercury, Granada, Monarch, Versailles, LTD II, Mustang, Cougar, Fairmont, Zephyr, Pinto and Bobcat

Remove the retaining screw from the underside of each spoke and lift off the pad, switch/trim cover and medallion as an assembly. Disconnect the horn wires from the terminals. If the switch needs replacement, separate the medallion and the horn switch/trim cover assembly from the pad (Fig. 1). Install a new horn switch/trim cover assembly to the pad with the switch wires going through the hole at the top of the switch indent in the pad. Install the medallion to the switch/trim cover and pad assembly. Connect the two-wire (push on) connectors to the terminals and install the entire assembly to the steering wheel with the wire hole in the indent to the top. Install the retaining screw from the underside of each spoke. Tighten the retaining screws 2-7 in-lb torque. For speed control switch removal and installation, refer to Part 37-01.

HORN RELAY

Vehicles Equipped With Speed Control

The horn relay is mounted to the speed control amplifier bracket under the instrument panel. Remove the screws retaining the amplifier and bracket assembly to the dash lower assembly and remove. Pull the connector plug from the relay, remove the bolt and nut retaining the relay to the amplifier bracket and remove the relay. Plug in the new relay, mount the relay to the amplifier bracket, and mount the entire assembly to the dash.

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Ventilating, Heating and Air Conditioning

GROUP 36

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CL2333-2B

Ventilating Systems

PART 36-01

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CL2334-2B

All heating systems and all heater-A/C systems perform the greater part of the ventilation function integrally with the heating or cooling functions. Those components of the ventilation system that are integral with a heater assembly or with a heater-A/C assembly are covered in the appropriate Shop Manual Part in this Group. This Shop Manual Part covers only those components of the ventilation system that are not integral with a heater or heater-A/C assembly.

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DETROIT IRON

DESCRIPTION AND OPERATION

FRONT AIR VENTS

Ford and Mercury

The ventilation air ducts are located in the right and left cowl panels and are accessible for service by removing the cowl trim panels. The air vent grilles are an integral part of the trim panels.

When the vehicle is in motion, outside air enters the vehicle through the cowl air intake immediately forward of the windshield, down the right and left cowl side panels and through the air ducts, into the passenger compartment.

The vent air doors are balanced doors in the side cowl assemblies, controlled by Bowden cables. These cables are not adjustable. Pull the control knobs for outside air; push in to close the vents. The location of the vents and control knobs is shown in Fig. 1.

LTD II, Thunderbird and Cougar

The body ventilation air ducts allow outside ram air to be discharged through two air registers in the instrument panel as well as to the floor area. When the control knobs are pushed in, the cowl vent ducts are closed; pulled out, air is discharged through the registers. With the controls in mid (detent) position, most of the air is discharged to the floor with a small amount through the registers. Moving the controls from the mid (detent) position to the full open position gradually increases the amount of discharge air through the registers as it decreases the amount of air to the floor area (Fig. 2).

The right register is a horizontal register with vertical louvers that can be moved from side to side. The register can be pivoted up and down for vertical air distribution. The louvers can be closed by moving them to the left. The left register is a ball type register which can be rotated as required for air distribution and for shut-off (Fig. 3).

Granada, Monarch, Fairmont and Zephyr

The body ventilation ducts have been designed to discharge ram air through two air registers in the instrument panel, as well as to the floor area. When the controls are pushed in, the cowl vent inlet ducts are closed; pulled out, air is discharged to the floor with a small amount through the registers. Moving the controls from the mid-position to the full open position gradually increases the percent of discharge air through the registers as it decreases the amount of air to the floor area (Fig. 4).

The right register is a vertically-mounted type with horizontal louvers that can be moved up and down. The register can be pivoted from side to side for horizontal air distribution. The louvers can be closed by moving them upward.

The left register is a horizontally-mounted type with vertical louvers that can be moved from side to side. The registers can be pivoted up and down for vertical air distribution. The louvers can be closed by moving them to the left.

Pinto and Bobcat

Outside ram air enters through the cowl top grille and flows into the left and right cowl vent ducts. The right vent is attached to the heater assembly; the left vent is separate from the heater. Both vents operate in the same way. A left and right control knob operates a door in the left and right vent duct, respectively, to control air discharge (Figs. 5 and 6). The control knobs have three positions: pushed in, the cowl vent doors are closed; in mid-position (detent), about 25 percent of the air discharges through the registers in the instrument panel and 75 percent to the floor; and pulled out, the doors deflect all the air to the registers. The right vent door should be closed when operating the heating system.

Mustang II

Outside ram air enters through the cowl top grille and flows into the left and right cowl vent ducts. The right vent is attached to the heater assembly; the left vent is separate from the heater. Both vents operate in the same way. A left and right control knob operates a door in the left and right vent duct, respectively, to control air discharge (Fig. 7). The control knobs have three positions. Pushed in, the cowl vent doors are closed. Pulled out, the doors are wide open allowing all the air to discharge through the registers. In the mid-position, part of the air is discharged to the floor and part passes through the registers. Moving the controls from mid-position to the full open position gradually increases the flow of air through the registers as it decreases the flow to the floor. The right vent door should be closed when operating the heating system.

PRESSURE RELEASE GRILLES

Pressure release grilles are installed on the quarter pillars of some models to assist body ventilation (Fig. 8). Air pressure in the passenger compartment passes under the rear seat into the luggage compartment. Since the quarter pillar weatherstripping is inboard of the registers, the air from the luggage compartment exhausts through the registers.

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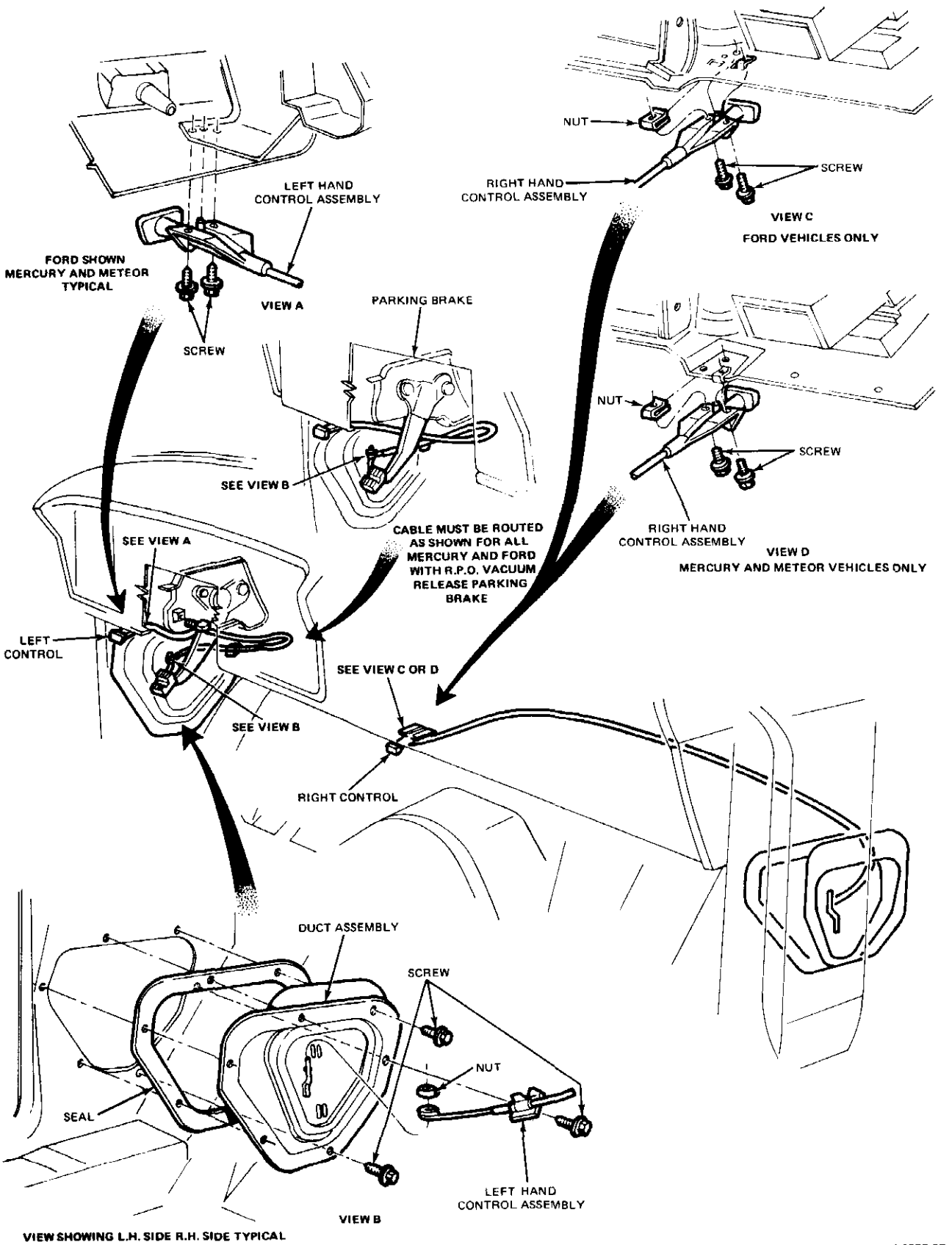


FIG. 1 Fresh Air Ventilation Ducts—Ford and Mercury

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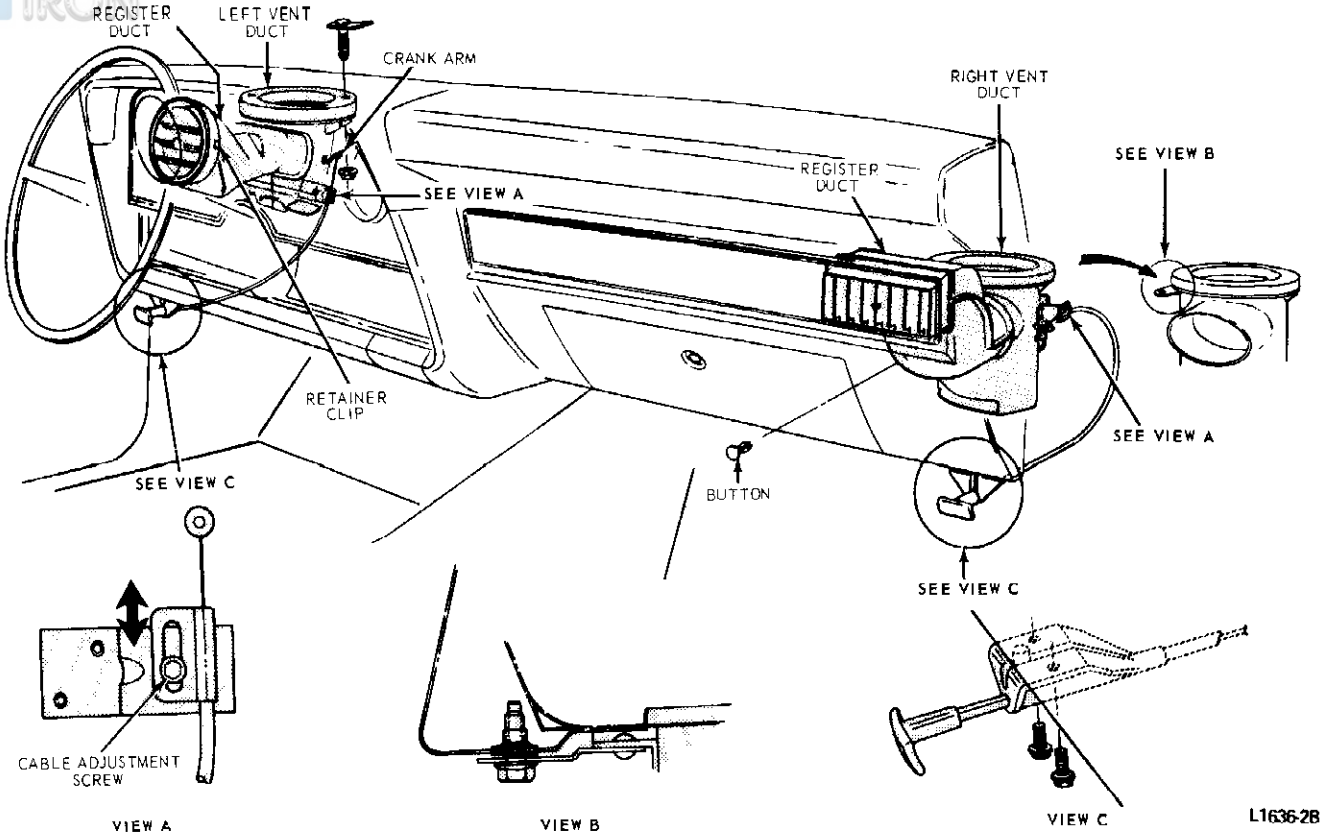


FIG. 2 LTD II, Thunderbird and Cougar Hi-Lo Ventilation System

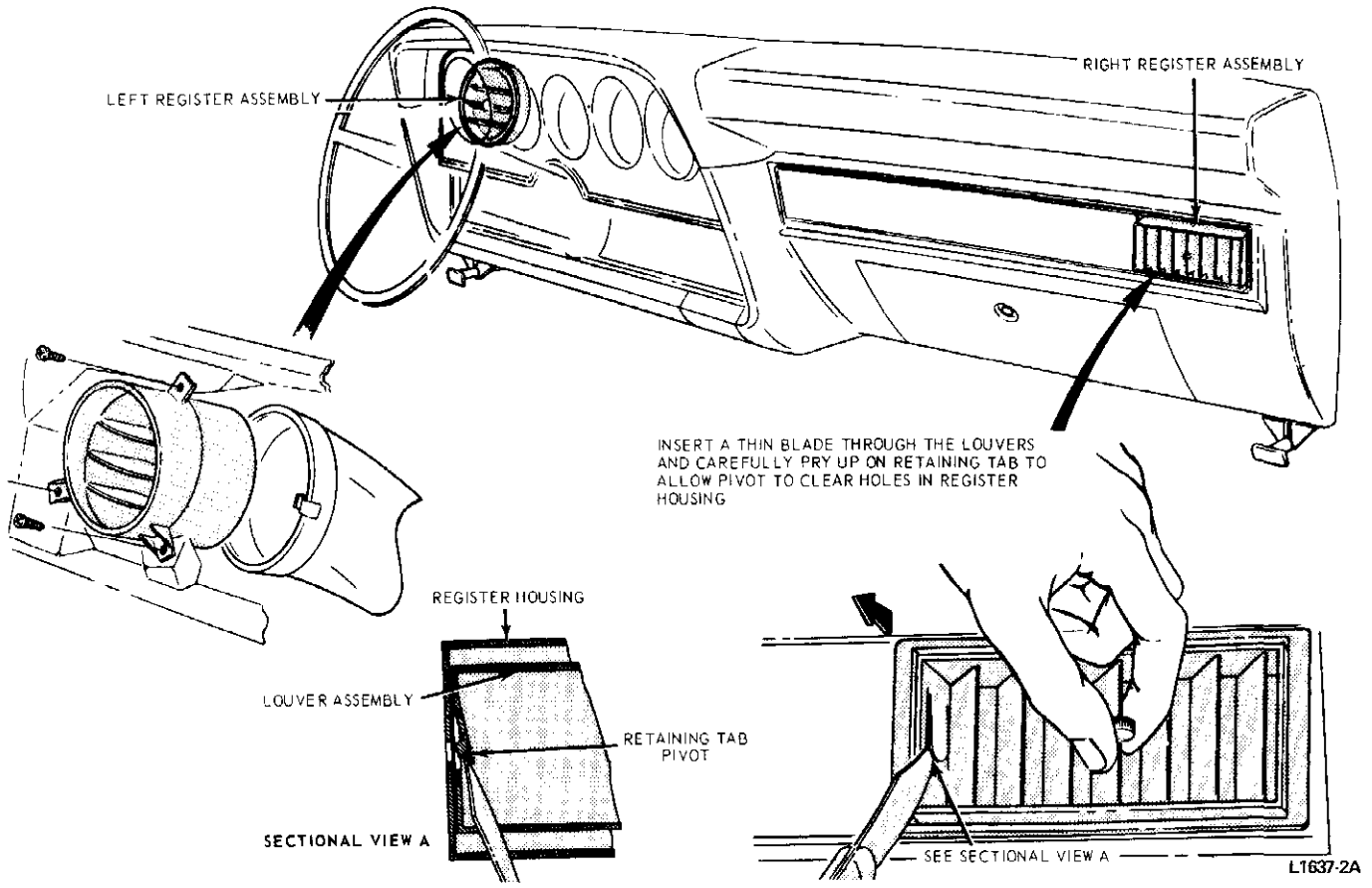


FIG. 3 Vent Register Removal—LTD II, Thunderbird and Cougar

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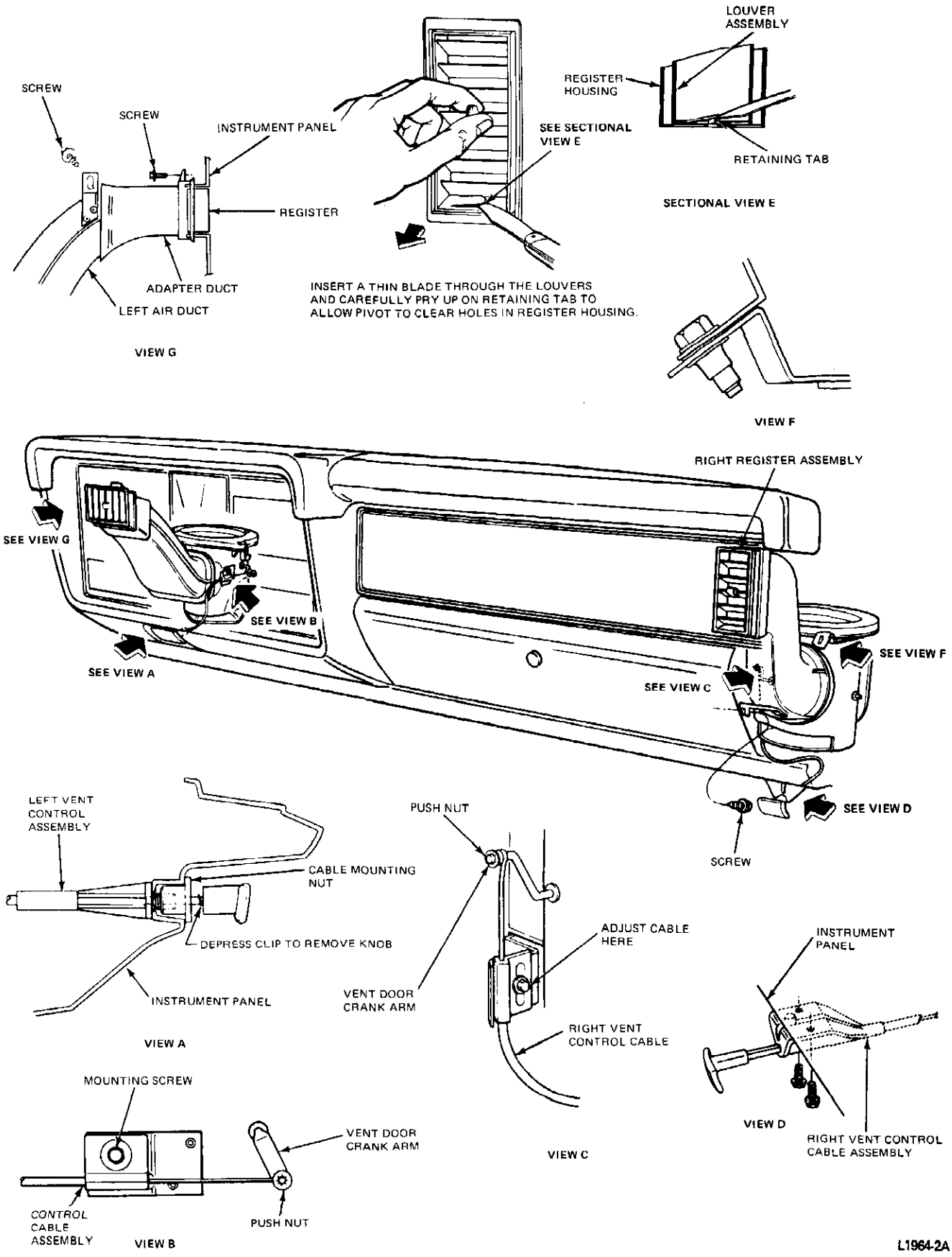


FIG. 4 Hi-Lo Ventilation System—Granada, Monarch, Fairmont and Zephyr

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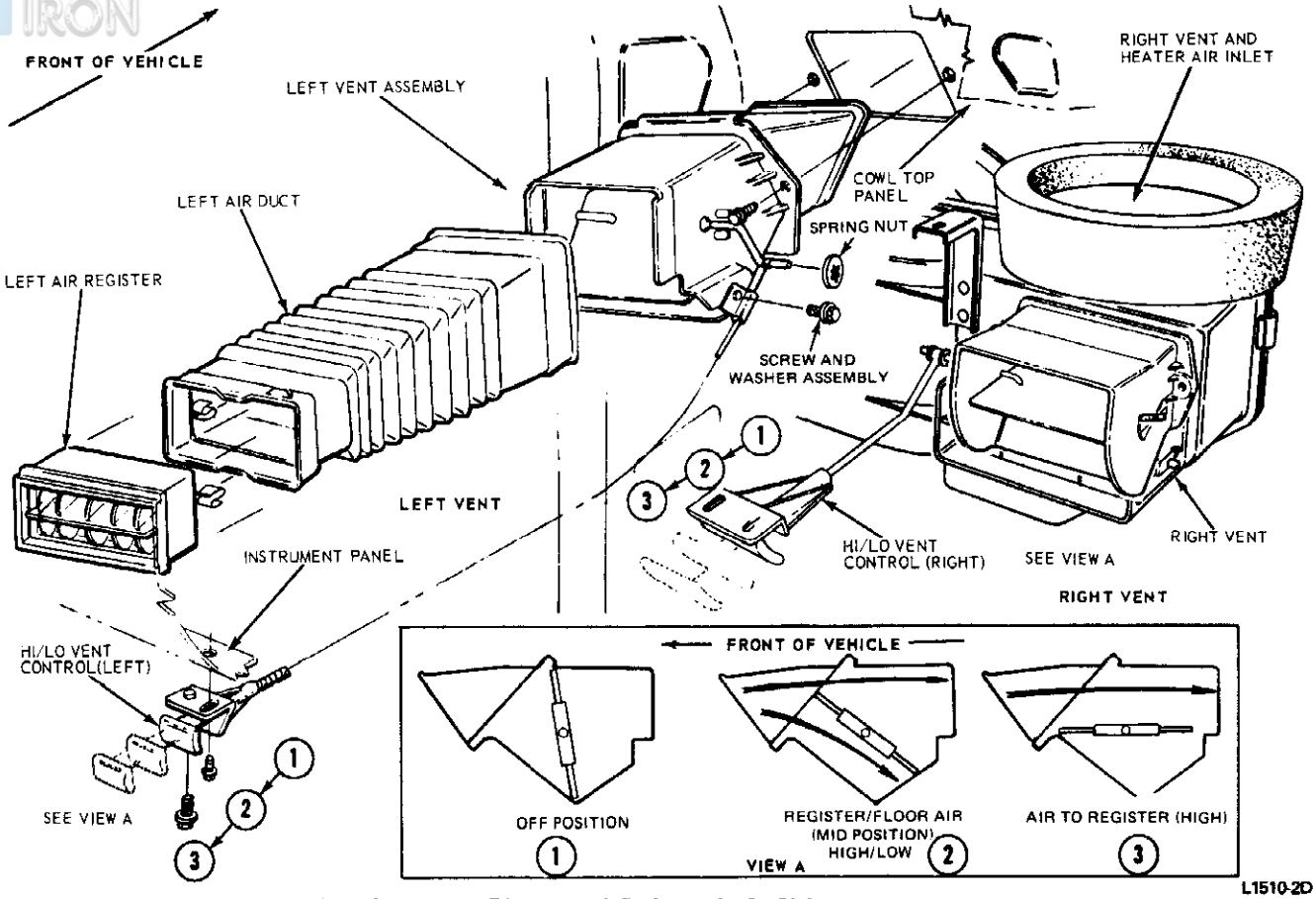


FIG. 5 High/Low Ventilation System—Pinto and Bobcat-Left Side

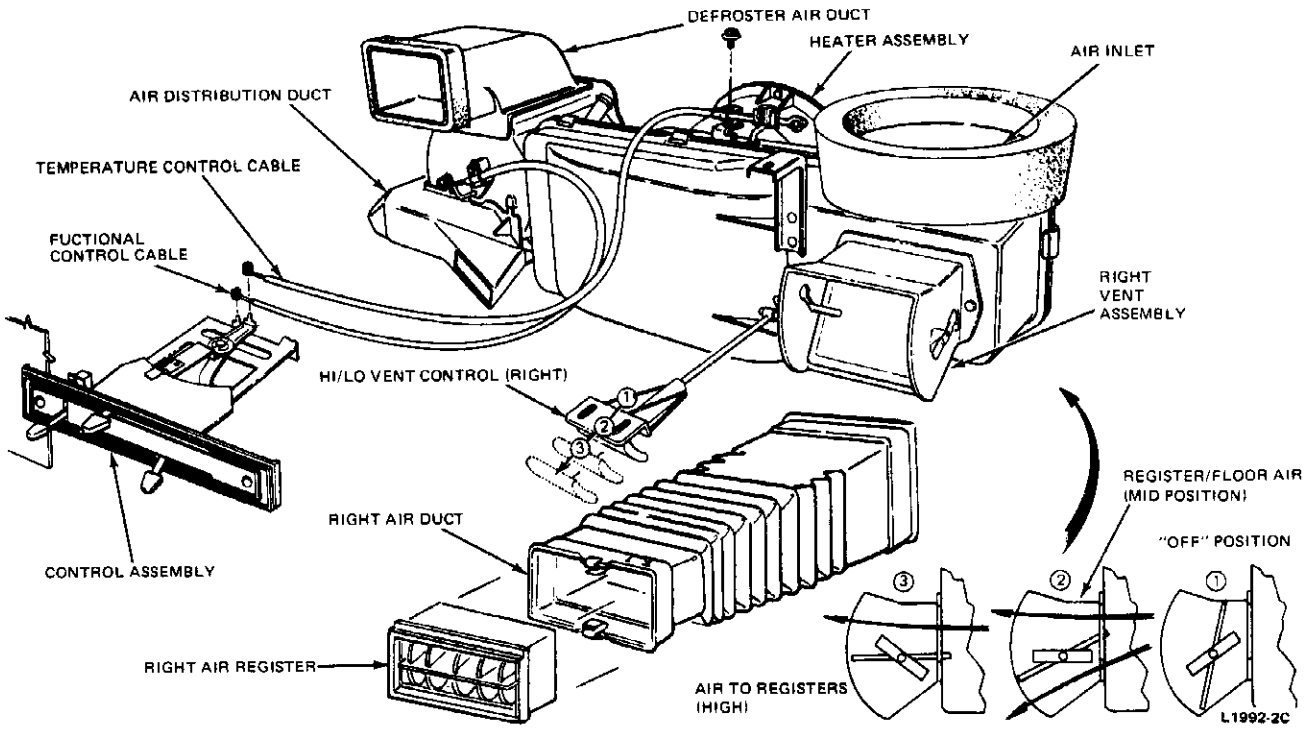


FIG. 6 High/Low Ventilation System—Pinto and Bobcat-Right Side

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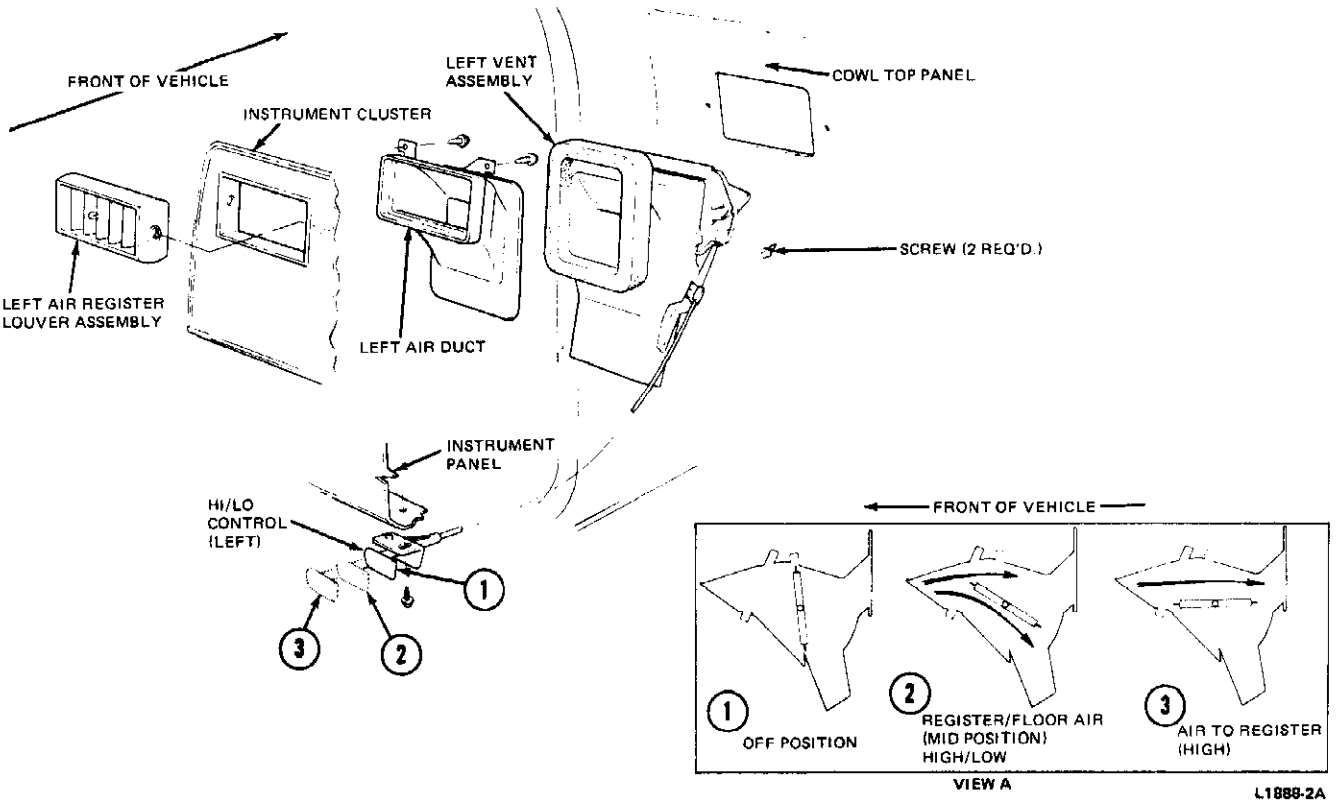


FIG. 7 High/Low Ventilation System—Mustang II—Left

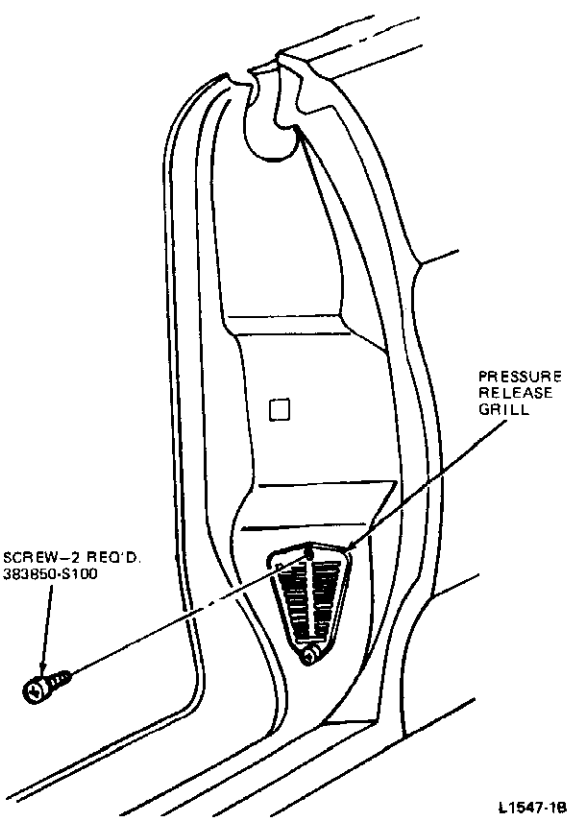


FIG. 8 Typical Pressure Release Grilles

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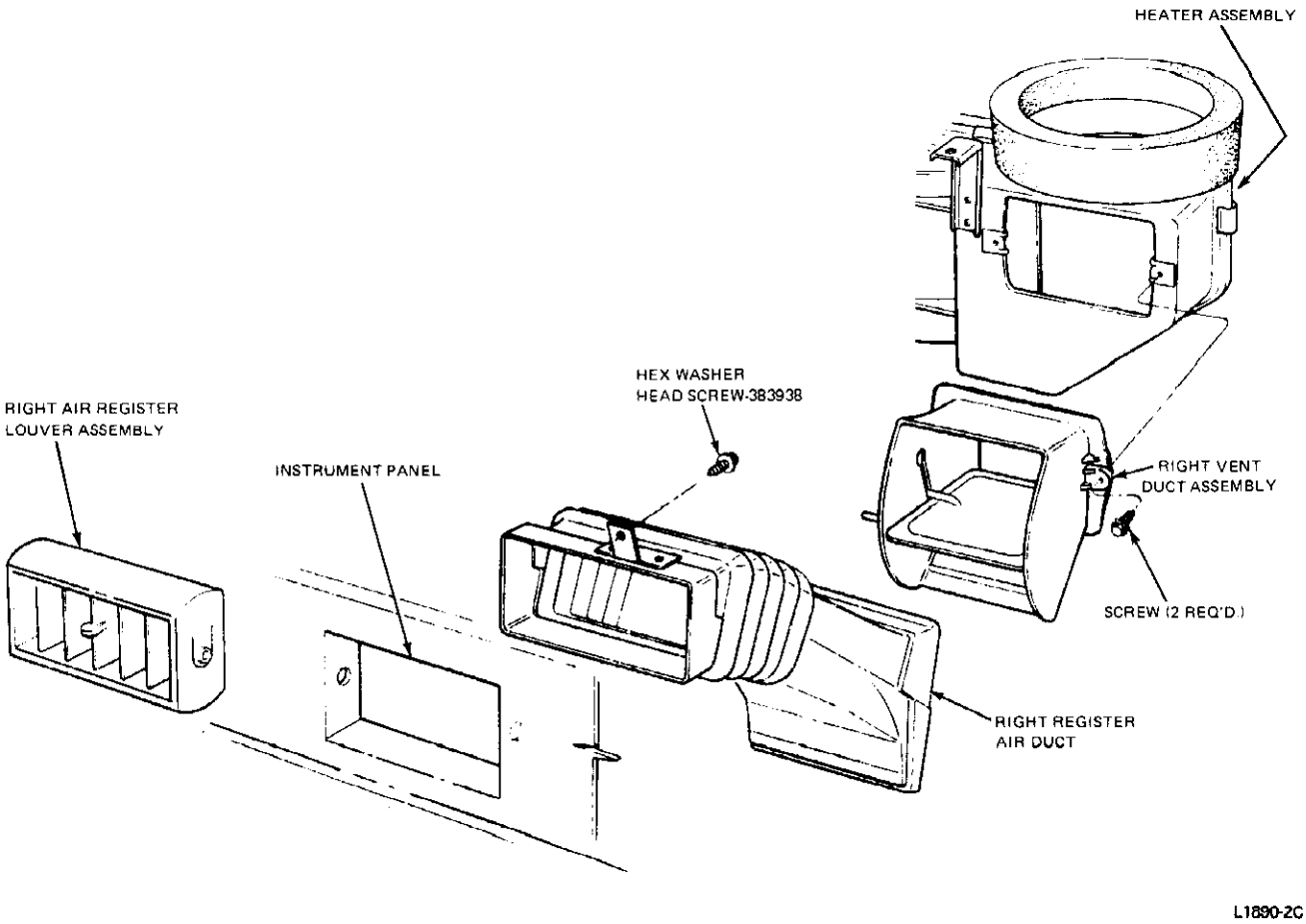


FIG. 9 High/Low Ventilation System—Mustang II—Right

ADJUSTMENTS

AIR VENT CABLE

LTD II, Thunderbird and Cougar

Loosen the Bowden cable housing retaining screw at the vent crank arm (View A, Fig. 2). Move the cable housing back and forth until the vent is closed when the control knob is 1/16 to 1/8-inch from the pushed-in position; then, tighte.. the screw.

Mustang II

Loosen the high/low vent control mounting bracket screens. Move the cable bracket back and forth until the vent is closed when the control knob is 1/16" to 1/8" from pushed-in position; then, tighten the retaining screws (Figs. 7 and 9).

Pinto and Bobcat

Loosen the high/low vent control mounting bracket screws, move the cable housing bracket back and forth until the vent is closed when the knob is 1/16 to 1/8 inch from the in-position, then tighten the retaining screws (Figs. 5 and 10).

Fairmont and Zephyr

The left and right vents are controlled in the same manner but, the cables are self-adjusting.

Granada and Monarch

The right vent cable is adjusted by shifting the cable housing in the mounting bracket located near the air door crank arm. Loosen the mounting screw, hold the door in the full closed position and shift the cable until the operating knob is 1/16" to 1/8" from the bracket. Tighten screw. See Fig. 4.

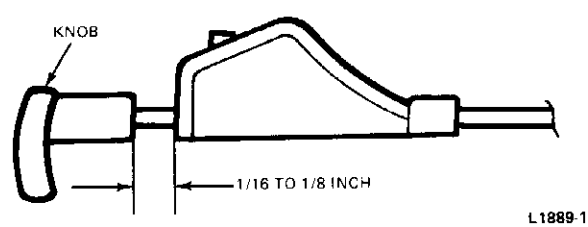


FIG. 10 Air Vent Cable Adjustment—Pinto, Bobcat, Granada and Monarch

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REMOVAL AND INSTALLATION

MUSTANG II

Vent Duct—Left

1. Disconnect the vent control from the instrument panel (Fig. 7).
2. Remove the two vent-to-cowl top panel mounting screws, separate the vent assembly from the air duct and remove the vent assembly.
3. To remove the air duct, remove the air duct-to-instrument panel retaining screws.
4. If the air duct was removed, place it in position and install the two air duct-to-instrument panel retaining screws. Position the vent assembly in place and install the two vent assembly-to-cowl top panel retaining screws.
5. Connect the vent control to the instrument panel.

Vent Duct—Right

1. Disconnect the right vent control from the instrument panel. Remove the air duct-to-instrument panel retaining screw and the vent duct-to-heater retaining screws (Fig. 9).
2. Compress the air duct and remove the vent and duct as an assembly. Separate the air duct from the vent.
3. To install the assembly, install the air duct on the vent duct assembly and place in position.
4. Install the air duct-to-instrument panel retaining screw and the vent duct-to-heater retaining screws.
5. Connect the right vent control to the instrument panel.

Louver Assembly

Pry on the end pivot with a thin blade to separate the pivot from the pivot hole and pull the barrel assembly out of the instrument panel as shown in Fig. 11.

The barrels can be installed in one way only because of the size of the two pivots and retaining holes.

LTD II, THUNDERBIRD AND COUGAR

Left Vent Assembly

1. Disconnect the left vent control cable from the crank arm.
2. Remove the three duct-to-upper cowl mounting stud nuts.
3. Separate the vent duct from the left register air duct and remove the vent duct.

Right Vent Assembly

1. Remove the glove box.
2. Remove the button that locks the register duct to the vent duct.
3. Remove the right register air duct.
4. Disconnect the right vent control cable from the instrument panel.
5. Remove one duct-to-heater attaching screw.
6. Remove the duct-to-upper cowl mounting screw. Slide the duct downward to disengage the S-clips and remove the vent duct.

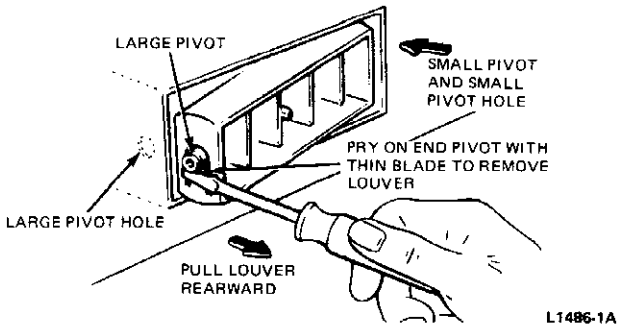


FIG. 11 Louver Assembly—Mustang II

Vent Registers

The left register can be removed from the instrument panel by first removing the cluster trim bezel. Remove three hex head screws and pull the register ball and housing rearward (Fig. 3).

The right outboard louver assemblies can be removed from the instrument panel as shown in Fig. 3. Insert a thin blade through the louvers and carefully pry upon the two retaining tabs to allow the pivoting retaining tabs to clear the holes in the panel. Then pull the louvers rearward.

PINTO AND BOBCAT

Vent Duct—Right

Disconnect the right vent control from the instrument panel, remove the glove box, collapse the duct and remove it. When installing, be sure to engage the duct properly in the S-clips (Fig. 6).

Vent Duct—Left

1. Disconnect the left vent control from the instrument panel (Fig. 5).
2. Remove the two left vent-to-cowl top panel mounting screws, compress the air duct, and remove the vent and duct as an assembly.
3. Separate the air duct from the vent.
4. When installing, be sure to position the S-clips properly between the duct and the register.

Registers—Left and Right

1. The register housing is secured to the instrument panel by three locking tabs, two on the upper and one on the lower side of the housing. Unlock the three tabs and pull the register out of the instrument panel as shown.
2. The louver assembly pivots on two retainers each, having two tabs that engage corresponding rectangular holes in the register housing (Fig. 12).

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Unlock the four tabs by pushing each one down and inboard of the rectangular holes (Fig. 12).

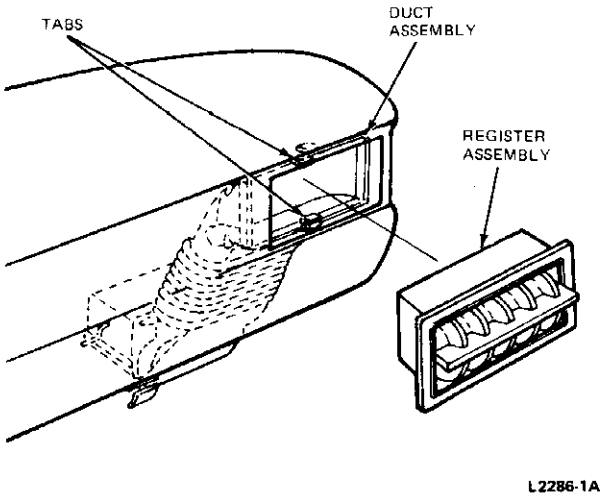


FIG. 12 Air Register Removal and Installation—Pinto and Bobcat

3. Carefully slide the two retainers and louver assembly out of the housing, and separate the retainers from the louver assembly. See Fig. 12.
4. When installing, be sure that the louvers are positioned as shown for proper air deflection. Install the retainers to the pivot pins on the louver assembly, and carefully slide the assembly into the housing, so that the retainer tabs seat firmly into the rectangular holes in the housing.

GRANADA, MONARCH, FAIRMONT AND ZEPHYR

Left Vent Assembly (Fig. 4)

1. Remove the screws locking the left register air connector duct and the vent duct together.
2. Disconnect the left vent control cable from the air door crank arm. Remove the wiring harness from the clip on the inboard side of the duct.
3. Remove the three (3) duct-to-upper-cowl mounting stud nuts.
4. Separate the vent duct from the left register air duct and remove the vent duct assembly.
5. Install the assembly by reversing the above procedure.

Right Vent Assembly (Fig. 4)

1. Remove the glove box.
2. Remove one screw securing the register duct bracket to the lower instrument panel rail.
3. Remove one screw securing the register duct to the instrument panel register housing.
4. Remove right register air duct.
5. Disconnect the right vent control cable from the air door crank arm.
6. Remove one duct-to-heater attaching screw.
7. Remove duct-to-upper-cowl mounting screw.
8. Slide the vent duct out of the clips on the heater assembly and remove the vent duct.
9. To install, reverse the above procedure.
10. Adjust right vent cable.

Vent Registers (Fig. 4)

1. Insert a thin blade through the louvers and carefully pry upon the two retaining tabs to allow pivots to clear holes in panel, then pull louvers rearward. Install by snapping back into position. See View E, Fig. 4.

REGISTERS (LUXURY TRIM)

On vehicles equipped with luxury trim, the air registers are the same as those used with air conditioning. See the air conditioning section for the specific vehicle.

PRESSURE RELEASE GRILLES

The pressure release grilles used on some vehicles are retained to the quarter pillar either by two screws or by two retaining tabs at the top and one screw at the bottom (Fig. 8).

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Heating System General Service

PART 36-10

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CL2335-2B

GENERAL INFORMATION

HEATING SYSTEMS AND CONTROL DOORS

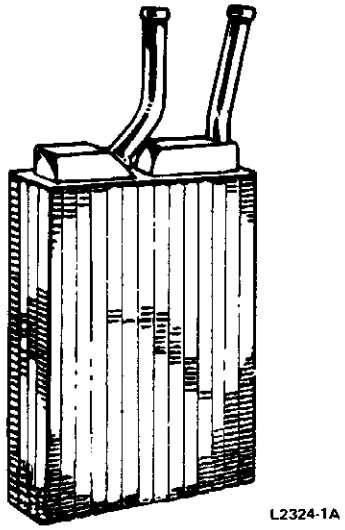
Outside air comes through an opening at the upper cowl and into the right duct of the heater assembly. All heater assemblies contain a heater core, through which flows hot water from the engine, and a blower. The air (forced by blower or ram effect) passes through and/or around the heater core and discharges through various outlets.

Several doors determine the amount of air that goes through the heater core and the particular outlet(s) through which it discharges. The number of doors used and the manner in which they are actuated differ according to the particular vehicle model. Some models have as many as five doors and one water valve; some have only two doors. Some doors are actuated by a vacuum motor; some by a cable. In all cases, the cables and motors are controlled by either one or two control levers (functional or temperature).

Each door or valve and the vacuum motor or cable that controls it has been assigned a code number which relates directly to its function in the system. These code numbers are used in illustrations and procedures throughout this group.

HEATER CORES (Fig. 1)

The heater core in current use consists of a number of flat, hollow, metal ribbons that are corrugated to take maximum advantage of engine coolant flow. Its size and location vary with vehicle application. On some vehicles, it will be found in the evaporator case in the engine compartment. In others, under the instrument panel adjacent to the plenum chamber.



L2324-1A

FIG. 1 Heater Core—Typical

SAFETY PRECAUTIONS

Whenever components in the engine compartment or instrument panel areas are being serviced, the battery ground cable must be disconnected to eliminate the possibility of electrical shorts, burned-up wiring, and dangerous fires. Extreme care must be exercised when performing electrical tests where the battery must be connected to operate the system.

Carbon monoxide is colorless, odorless and dangerous. If it is necessary to operate the engine with the car in a closed area such as a garage, always use an exhaust collector to vent the exhaust gasses outside the closed area.

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DETROIT IRON OFFICIAL LICENSED PRODUCT

DIAGNOSIS

COMPLAINT

Insufficient, erratic, or not heat or defrost

Possible Cause	Checks and Corrections
Low radiator coolant due to: • Coolant leaks • Engine overheating	Check radiator cap pressure. Replace if below minimum pressure. Fill to level. Pressure test for engine cooling system and heater system leaks. Repair as required.
	Remove bugs, leaves, etc. from radiator or condenser fins. Check for: Loose fan belt Sticking thermostat Incorrect ignition timing Water pump impeller damage Restricted cooling system Repair as required.
Loose fan belt Thermostat	Replace if cracked or worn and/or adjust belt tension. Check coolant temperature at radiator filler neck. If under 170°F, replace thermostat. See Group 27 for complete testing.
Plugged or partially plugged heater core	Clean and backflush engine cooling system and heater core.
Loose or improperly adjusted control cables	Adjust to specifications.
Vacuum hoses crossed, collapsed, or kinked (if applicable)	Check to see if door vacuum motors respond properly to movements of the Functional Control Lever and the Temperature Control Lever. Visually check vacuum hoses, and repair as required.
Air flow control doors sticking or binding	Check to see if door vacuum motors respond properly to movements of Functional and Temperature Control Levers. If hesitation in movement is noticed, disconnect vacuum motor arm from door crank arm, and move crank arm by hand. Repair sticking or binding door as required.
Vacuum motor diaphragm or hose leaks (if applicable)	Disconnect multiple vacuum connector from back of control head, and check each connector opening with hand operated vacuum pump. If one line leaks vacuum, test motor by itself before replacing. (Be careful of vacuum hoses that operate two motors at same time.) Repair vacuum hose(s), or replace vacuum motor as required.

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COMPLAINT

Insufficient, erratic, or no heat or defrost

Possible Cause	Checks and Corrections
Sticking heater water valve (if applicable)	Vacuum check with hand vacuum pump. Replace if required.
Kinked, clogged, collapsed, soft, swollen, or decomposed engine cooling system or heater system hoses	Replace damaged hoses and backflush engine cooling system, then heater system, until all particles have been removed.
Blocked air inlet	Check cowl air inlet for leaves, foreign material, etc. Remove as required.
Right vent open	Close vent. Replace binding cable and/or adjust cable for proper operation.

CL2329-2A

COMPLAINT

Too much heat

Possible Cause	Checks and Corrections
Loose or improperly adjusted control cables	Adjust as specified.
Sticking water valve (if applicable)	Vacuum check with hand vacuum pump. Replace if required.
Vacuum not available to close water valve (if applicable)	Check vacuum system with hand vacuum pump from control connector. Repair tubing, or replace damaged components as required.

COMPLAINT

Air flow changes direction when vehicle is accelerated

Possible Cause	Checks and Corrections
Vacuum system leak (if applicable)	Check vacuum system with hand vacuum pump from control head connector. Repair tubing, or replace damaged components as required.

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CONDITION

Air comes out of defroster outlet in any function control lever position.

Possible Cause	Checks and Corrections
Vacuum system (this indicates a very bad leak, and is usually easy to locate)	*Listen for vacuum system leak.* Look for disconnected vacuum hose connector. Use hand-operated vacuum pump, and check vacuum motors for diaphragm leak. Also check for leaking check valve, and leaking vacuum reservoir tank. Repair hoses, or replace components as required.

CONDITION

Cowl ventilation system leaks air

Possible Cause	Checks and Corrections
Vent door open	Check operation of door for proper adjustment, kinked, or binding door. Repair as required.

CONDITION

Blower does not operate properly

Possible Cause	Check and Corrections
Blower motor	*Run jumper wires (same size as blower wire) from battery* terminal to connector on blower motor. Check ground lug for proper contact. Repair ground or replace blower as required.
Blower resistor	Check continuity of resistors for opens or shorts (self-powered test light). Repair or replace as required.
Blower wire harness	Check for proper installation of harness connector terminal connectors. Check wire-to-terminal continuity. Check continuity of wires in harness for shorts, opens, abrasion, etc. Repair as required.
Blower switch(s)	Check blower switch(s) for proper contact. Replace switch(s) as required.

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TESTING

The following tests may be made on the heater: burned out fuses, loose wire connections, damaged wires, or collapsed hoses. Loose defroster ducts and air leaks in the body may be determined by visual inspection of the parts.

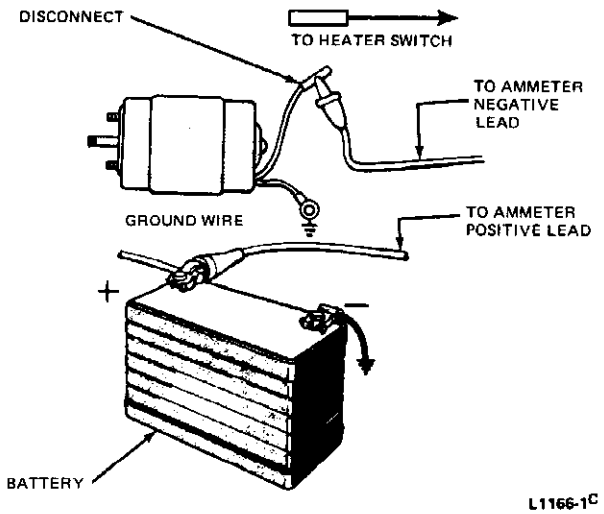


FIG. 2 Heater Blower Motor Current Draw Test

LOOSE BLOWER TEST

Turn on the heater switch and listen for the sound of the motor. If only a hum is heard, the blower is loose on the motor shaft.

BLOWER SWITCH CONTINUITY TEST

Refer to appropriate electrical schematic. Check for continuity between connected terminals as shown on the schematic. Check terminal continuity at every lever position. The light should go on for each connected pair of terminals.

There should be no continuity between the battery terminal and the switch case.

OPEN CIRCUIT TEST

On all electrical circuits, continuity must exist from the source of power (battery), to the unit where the power is used, and back up to the source of power (ground). A check at each connection in a circuit, starting at the battery, will locate an open circuit or will show that the circuit is complete.

An ohmmeter or self-powered test light connected at any two points of a circuit with the power removed from the circuit, will show if the circuit between the two connections is open or continuous.

If the meter does not move or has a light movement (high resistance), the circuit may have a poor connection or broken wire. If the bulb does not light, the circuit is open.

If the meter movement is great or full (low resistance), the circuit is complete. If the bulb lights, the circuit is continuous.

HEATER BLOWER MOTOR CURRENT DRAW TEST

This test will determine if the blower motor is operating properly. Connect a 0-10 ammeter as shown in Fig. 2. The blower motor will operate the control switch, and the current drawn by the motor will be indicated on the ammeter. Current draw should be to specification.

PLUGGED HEATER CORE TEST

Check to be sure the engine coolant is to the proper level, then start the engine and temporarily remove the outlet heater hose from the water pump. Very little or no flow of water from the core outlet indicates that the core is plugged.

BLEEDING AIR FROM HEATER CORE

Check to be sure the engine coolant is to proper level, then start the engine and remove the hose at the pump. Allow any trapped air to flow out. When a continuous flow of coolant is obtained, reconnect the hose to the water pump.

HEATER WATER VALVE TESTS

Before testing, check for proper coolant level, coolant temperature, and fan belt tension. Also look for coolant leaks or plugged hoses or heater core. Correct any defects before proceeding with the water valve tests.

TEST NO. 1

The simplest test is to use a hand-vacuum pump.

1. Disconnect the vacuum line and attach a vacuum pump to the vacuum motor vacuum connection.
2. When vacuum is applied and released, the arm of the vacuum motor should move freely in both directions without sticking.
3. Make sure there is full travel of the arm. This can be checked by manually pushing the arm to make sure the valve is fully seated.
4. Check for any possible leak of the vacuum diaphragm.
5. If the valve does not operate as described, it should be replaced.

TEST NO. 2

Another method that can be used to test the water valve in a heater system is as follows: Set the temperature control lever at WARM. Then, with the function control lever at HEAT position, run the engine until the water is warm.

Under these conditions, warm air should flow from the floor outlets.

If the air is not warm, check the water control valve. Disconnect the 1/8 inch green vacuum hose from the valve and install a vacuum gauge (tee) between the hose and the valve. Observe whether a vacuum signal is available. If not, (0 Hg. reading) and no heat is noted, the water control valve is not operating properly or the

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heater core is restricted. If a vacuum is observed, refer to the vehicle applications section on Vacuum Systems for corrective action.

HEATER WATER VALVE VACUUM SWITCH

Some applications use a water valve vacuum switch to send vacuum to the water valve vacuum motor to close the water valve. A plunger in the switch is actuated by the movement of the crank arm with the temperature control lever.

HEATER WATER VALVE VACUUM SWITCH ADJUSTMENT

1. Make sure that the temperature control cable (connects the temperature control lever to the temperature blend door) is properly adjusted.
2. Move the temperature control lever to the COOL position.
3. If the water valve vacuum switch plunger is not fully depressed, adjust the switch as follows:
   a. Loosen the adjusting screws.
   b. Move the switch against the temperature blend door crank arm until the plunger is fully depressed.
   c. Tighten the adjusting screws.

HEATER CORE TESTS

SYSTEM INSPECTION

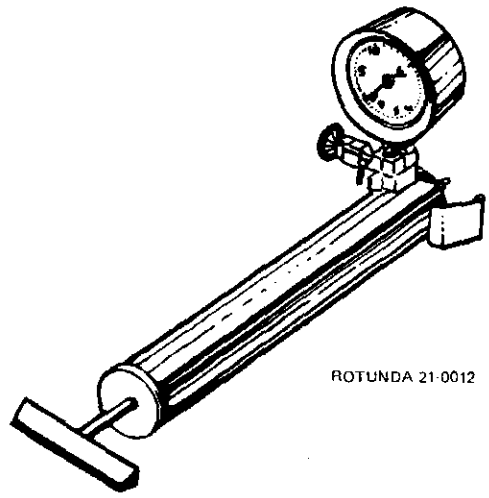
Check the heater system thoroughly for:

1. Loose hose clamps.
2. Kinked or collapsed heater connector tubes.
3. Kinked, split or leaking vacuum hoses.
4. Properly adjusted temperature control cable.
5. Proper water valve operation.

TESTING HEATER CORE IN VEHICLE

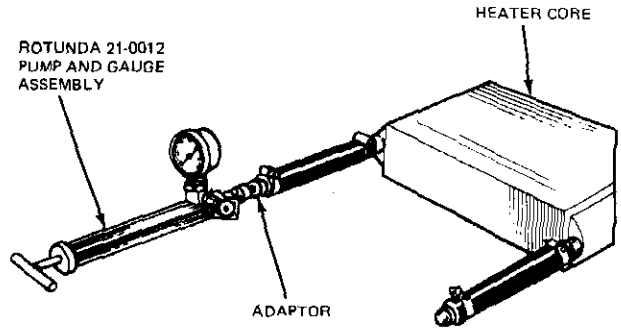
1. Drain the engine coolant.
2. Disconnect the inlet hose at the engine fitting.
3. Disconnect the outlet hose in the engine compartment.

   NOTE: The core must remain full of coolant. Any loss must be made up with water prior to performing the test. Be sure all hoses are filled with water and no air is trapped in the core or hoses. **No leakage should exist in the air test pump assembly.**
4. Attach an air pump and gauge assembly (Fig. 3) to either the inlet hose or to the outlet hose.
5. Fill the other hose with water and plug the end.
6. Apply 30 psi of air to the core and record the time of pressure loss on the gauge. A good core will hold 30 psi pressure indefinitely. If the pressure drops, the core must be repaired or replaced.



L2326-1A

FIG. 3 Air Pump and Gauge Assembly



L2327-1A

FIG. 4 Heater Core Bench Test

NOTE: Make sure that all hose clamps are tight so that no leaks, other than core leaks, are indicated on the gauge.

BENCH TEST

1. Remove the heater core from the vehicle.
2. Attach an air pump and gauge assembly, as shown in Figure 4, and plug the other hose.
3. Submerge the heater core in water, apply 30 psi of air pressure to the core, and mark the area of the leak.
4. Repair the core and test for leaks.
5. Remove the test equipment, install the core in the vehicle, and connect the hoses.

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Ford and Mercury Heating System

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CL2336-2B

DESCRIPTION AND OPERATION

SYSTEM OPERATION AND CONTROL DOORS

The heating system contains a heater core through which flows hot water from the engine, a water valve which controls water flow through the core tubes, a blower, and three air valves or doors.

Outside air is drawn into the system through the cowl air intake into the blower housing. From the blower housing, the air is forced through and/or around the heater core, mixed in the plenum chamber, and then discharged through the defroster outlets, the floor ducts or the vent registers (Fig. 1). The air valves or doors determine the amount of air that goes through the heater core and the particular outlet(s) through which it discharges.

Each door, the water valve, and the vacuum motor or cable that actuates it has been assigned a code number which relates directly to its function in the system. These code numbers are used in illustrations and procedures throughout this group to identify the function and control of each valve or door.

CONTROL ASSEMBLY

The control assembly is located in the instrument panel to the right of the steering column. It contains a blower system off-on switch combined with a two-port vacuum control valve, a three-position blower speed control switch, a function control lever, a temperature control lever, an illumination bulb and, if so equipped, a jewel-type bulb with accessory switch for heated rear window or defogger (Fig. 2).

The functional control lever actuates:

1. The blower system off-on switch, which is connected in series with the three-position blower speed control switch (Fig. 2).
2. The vacuum control valve which connects vacuum to the vent door (6) motor and the water valve (4) motor.
3. The cable that controls the heat/defrost (7) door (Fig. 1).

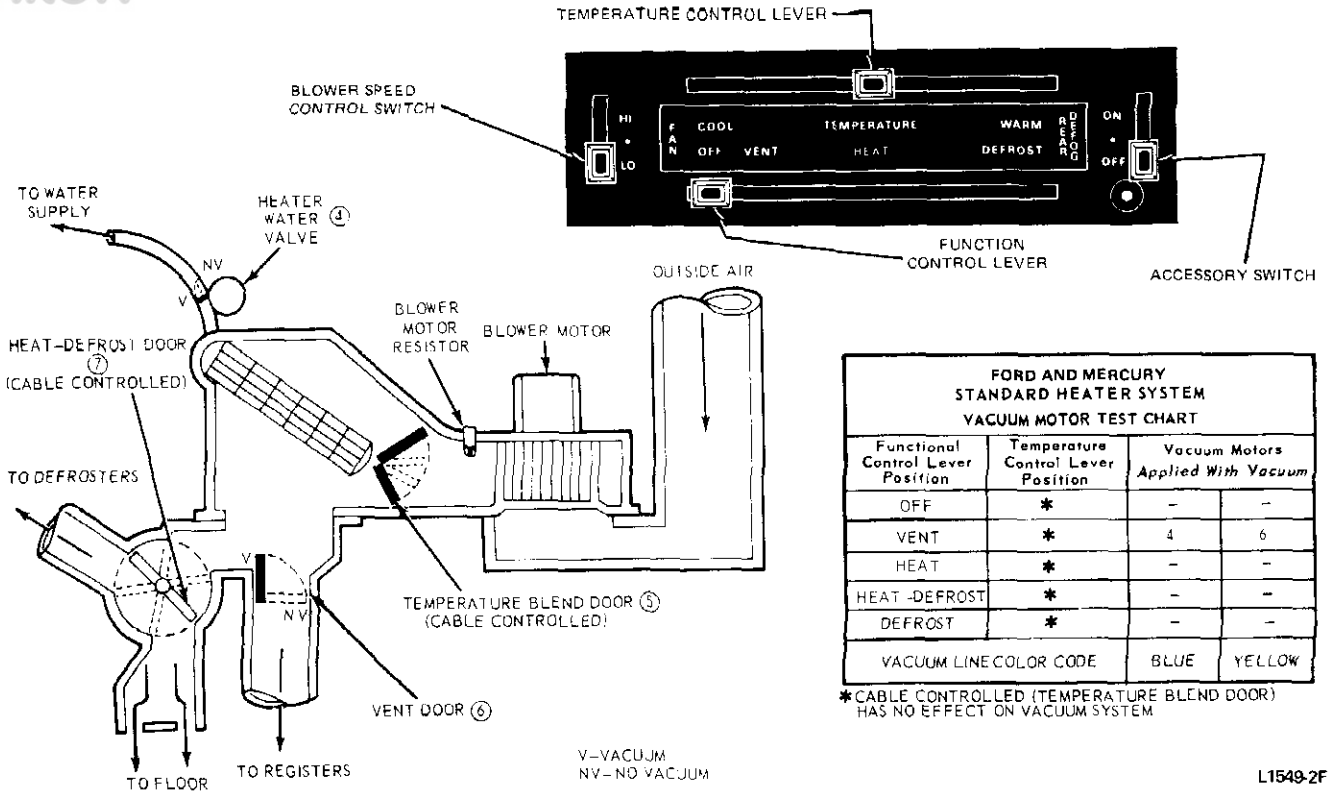
The temperature control lever actuates the cable that controls the temperature blend (5) door (Fig. 1).

TEMPERATURE CONTROL LEVER OPERATION

Setting the temperature control lever at COOL position (Fig. 1) causes the (5) door to block off passage of the air through and direct it around the heater core into the plenum chamber (unheated). Moving the lever to WARM position causes the (5) door to direct all the air through the heater core and into the plenum chamber (heated). At various positions between COOL and WARM, part of the air goes through the core to be heated and part by-passes the core and blends with the heated air as it passes into the plenum chamber. Thus the temperature of the heated air can be regulated as required.

After the air enters the plenum chamber, its discharge flow is controlled by the function control lever.

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FORD AND MERCURY
STANDARD HEATER SYSTEM
VACUUM MOTOR TEST CHART

Functional Control Lever Position	Temperature Control Lever Position	Vacuum Motors Applied With Vacuum	
OFF	*	–	–
VENT	*	4	6
HEAT	*	–	–
HEAT -DEFROST	*	–	–
DEFROST	*	–	–
VACUUM LINE COLOR CODE		BLUE	YELLOW

*CABLE CONTROLLED (TEMPERATURE BLEND DOOR) HAS NO EFFECT ON VACUUM SYSTEM

FIG. 1 Control Setting Schematic and Vacuum Application Chart

FUNCTION CONTROL LEVER OPERATION

Discharge Air Flow

Setting the function control lever (Fig. 1) to OFF position closes the (cable controlled) heat/defrost (7) door to shut off passage of air to the floor and defroster outlets, and also closes the power vent (6) door (no vacuum) to prevent air passage through the registers. Thus the flow of outside air from the heater core is closed off or blocked in the plenum chamber.

In VENT position: the power vent (6) door is open to the registers (vacuum); the water valve (4) is closed to water flow through the heater core (vacuum); and the heat/defrost (7) door is opened **slightly** by the cable. Most of the air discharges through the registers with a small bleed to the floor and defrosters.

In all other positions of the function control lever (OFF, HEAT or DEFROST), the (6) door is closed (no vacuum) preventing passage of air to the registers; and the (4) valve is open (no vacuum) allowing flow of water through the heater core.

Moving the lever to HEAT position closes the power vent (6) door (no vacuum) and opens the heat/defrost (7) door to full heat position. All the air (except a small bleed to the defrosters) now discharges through the floor outlets.

Moving the functional control lever between HEAT and DEFROST positions provides modulated control from minimum to maximum defrost, as required.

Blower Operation

The function control lever controls the blower system off-on switch (Fig. 2) which connects battery current to the blower through the speed control switch and resistor assembly (mounted on the front surface of the heater case).

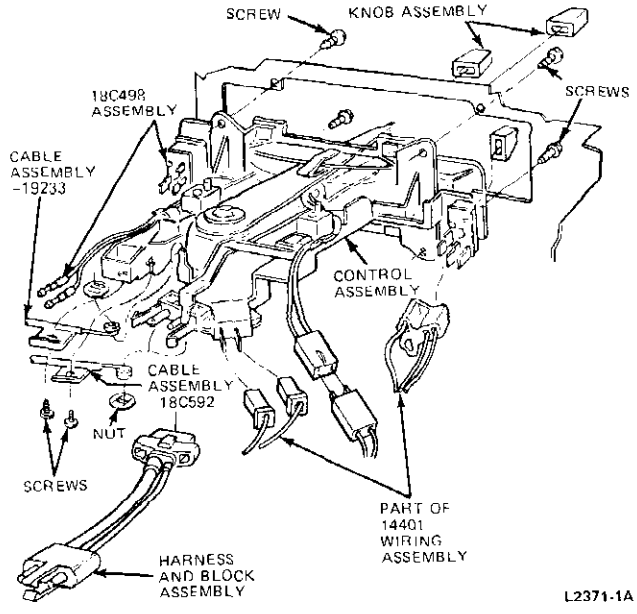


FIG. 2 Heater and Defroster

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In the OFF position, the function control lever opens the system off-on switch to stop current flow to the three-position blower speed control switch (blower stops). As soon as the lever is moved from OFF position to the right (one detent position), it closes the off-on switch to bring current to the blower speed control switch whose sole function is to regulate blower speed through the resistor. From this point on through VENT, HEAT and DEFROST positions, the blower is always running in one of the three speeds as determined by blower speed control switch setting.

POWER VENT FEATURE

The two rectangular registers in the right and left ends of the instrument panel can be pivoted up or down, and the vertical vanes moved from right to left for air deflection (Fig. 3). The registers are closed by moving the vanes inboard. The Mercury **left** register can be pivoted from side to side and the horizontal vanes can be moved up and down for air deflection. The registers are closed by moving the vanes upward.

Fresh air power ventilation can be obtained by setting the **temperature control** lever to COOL and the **function control** lever to VENT position. For normal driving conditions, leave the blower speed control switch at LO (Fig. 2). For city traffic or slow driving, move the switch to medium or HI.

TESTING

VACUUM CONTROL SYSTEM OPERATION

The test chart in Fig. 1 will determine which vacuum motors should be functioning with applied vacuum during the various function control lever positions. The temperature control lever controls the temperature blend (5) door and has no connection with the vacuum system. Check for proper operation by following the chart and testing the system as follows:

1. Connect a vacuum gauge in the vacuum supply (black) line between the check valve and the vacuum selector valve.
2. Move the function control lever to the first position listed on the test chart (OFF) in Fig. 1.
3. Start the engine and let it run until a good vacuum reading shows on the gauge. Turn the key quickly to the ACCESSORY position and observe the gauge to see if vacuum is maintained or lost. The first control position listed on the chart (OFF, Fig. 1) indicates that no vacuum should be applied to either of the motors. Therefore, if the gauge shows a vacuum loss, there is a leak in the vacuum supply line or at the check valve. If the vacuum reading is maintained, the system is OK up to the vacuum control valve. To isolate the problem, proceed to next listed control position.
4. For the second position on the chart (Fig. 1), move the functional control lever to VENT. Start the engine again, turn the key quickly to the ACCESSORY position, and watch the gauge. The second position in the chart on Fig. 1 (VENT) indicates that vacuum should be applied to the motor at the heater water valve (4) and at the vent (6) door. If the gauge indicates a vacuum loss there is a leak at one or both of the motors or in the lines (yellow or blue) between the vacuum control valve and motor. Make the necessary repairs or replacements to correct the vacuum leak. If the vacuum reading is maintained, proceed with Step 5 which follows.
5. Check the motor or door that could be causing the complaint. For example: No air comes out of the registers when the function control lever is in VENT position. Reference to the schematic in Fig. 1 would indicate that the No. 6 door is not opening to the registers.

Disconnect the yellow vacuum line at the No. 6 door vacuum motor and connect it to a vacuum gauge. Again, check the vacuum reading (lever at VENT) by starting the engine, building up a vacuum, and quickly turning the key to ACCESSORY position. A zero vacuum reading indicates that the line to the motor is plugged or kinked. If vacuum is indicated, either the door is restricted or the motor should be replaced.

ADJUSTMENTS

FUNCTION CONTROL CABLE

1. Hold the control lever in OFF position (Fig. 2) to make sure that it does not move during cable adjustment.
2. At the plenum chamber (No. 7 door), loosen the cable flag-to-bracket mounting screw in the slot, and slide the cable flag in the bracket groove until the heat-defrost (7) door is in the fully closed position (crank arm all the way to the right). Leave a 1/8-inch clearance between the function control lever and the end of the slot in the control.
3. Lock the adjustment into place by tightening the mounting screw.

TEMPERATURE CONTROL CABLE

1. Move the temperature control lever to the WARM position (Fig. 2), but leave a 1/8-inch clearance between the lever and the right end of the slot in the control. This clearance is necessary to insure full heat position.
2. At the heater case (No. 5 door), loosen the cable flag-to-mounting bracket screw in the slot, and slide the cable flag in the bracket groove until the (5) door crank arm is in full left position. Be sure that this adjustment is made with the temperature lever in full heat position, as described in Step 1.
3. Lock the adjustment into place by tightening the mounting screw.

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REMOVAL AND INSTALLATION

CONTROL ASSEMBLY

1. Disconnect the battery ground cable.
2. Remove the knobs from the blower speed control, function control and temperature control levers. If so equipped, remove the knob from the accessory switch control lever.
3. Remove the two mounting screws on the control panel applique.
4. Disconnect the two control cables from their respective levers at the rear of the control (Fig. 2).
5. Remove the four control head mounting nuts from the front of the control assembly.
6. Slide the control assembly forward out of the engine side of the instrument panel and carefully lower it from the instrument panel.
7. Disconnect the electrical connectors from the blower off-on switch, the speed control switch, the illumination bulb and, if so equipped, the jewel-type bulb and accessory switch (Fig. 2).
8. Disconnect the vacuum harness from the vacuum control valve. The control assembly can now be removed.
9. When installing the assembly, adjust the two control cables as described under Adjustments.

CONTROL SWITCHES AND VACUUM VALVE

1. Remove the control assembly from the instrument panel as described in the foregoing procedure.
2. To remove either the speed control switch or the accessory switch, disassemble the switch mounting bracket from the control assembly (1 screw, Fig. 2).
3. To remove the off-on switch and vacuum control valve assembly remove the two mounting bracket screws.

DEFROSTER NOZZLES

The defroster nozzles are accessible by removing the instrument panel pad. To remove the left nozzle, it is also necessary to loosen the Y-brace forward of the instrument cluster. Remove two defroster-to-panel mounting screws and one defroster-to-defroster duct attaching screw to remove each nozzle. Separate each air duct from the defroster nozzles and remove the nozzles upward through the pad opening (Fig. 4).

PLENUM CHAMBER

It is necessary to remove the lower finish panel from the instrument panel in order to remove the plenum chamber from the vehicle. Remove the defroster nozzles (Fig. 4) and disconnect the register center air duct assembly (Fig. 3). Remove the mounting stud nuts from the engine side of the dash panel (Fig. 4) and remove the plenum chamber from the passenger side of the dash panel.

POWER VENT AIR DUCTS

To remove the air ducts, first remove the instrument panel pad (Group 45) and the lower finish panel from the instrument panel. Remove the attaching screws and remove the ducts as shown in Fig. 3.

REGISTER LOUVER BARRELS

Pry on the end pivot with a thin blade to separate the pivot from the pivot hole and pull the barrel assembly out of the instrument panel as shown in Fig. 5.

The barrels can be installed in one way only because of the size of the two pivots and retaining holes.

HEATER CORE

The heater core is located in the left side of the case which is mounted on the engine side of the dash panel. To remove, drain the cooling system and disconnect the heater hoses from the heater core. Then, remove the core cover and gasket, and slide the heater core and mounting seals out of the case (Fig. 6).

BLOWER MOTOR AND WHEEL ASSEMBLY

The heater case assembly is located on the engine side of the dash panel to the right of the centerline. The blower motor and wheel is located in the right side of the case to the right of the hood hinge under the right front fender. It is necessary to cut out an access opening in the right front fender apron to service the blower motor and wheel assembly.

1. Disconnect the blower motor lead wire (orange) at the rear of the hood right hinge (Fig. 7).
2. Remove the ground wire (black) mounting screw from the upper cowl. Pull both wires out of the clip at the resistor.
3. Remove the right front tire and wheel assembly.
4. Locate the access opening area shown in View A, Fig. 8 and clean this area of the fender apron.
5. Drill a 1-inch hole tangent to the centerline of the bead using the drill dimple provided in the apron 1/2 inch from the centerline of the bead (View B, Fig. 8). **Take precautions necessary to prevent damaging the heater case by drill push-through or over-travel.**
6. Cut out the access opening along the centerline of the bead with aircraft snips. Smooth any rough metal edges. **To avoid damaging the heater case, do not use a sabre saw or similar tool.**
7. Remove the four blower motor mounting plate screws (Fig. 7) and disconnect the cooler tube from the motor. Carefully move the motor and wheel assembly forward out of the heater case through the access hole (Fig. 8). If only the motor is being serviced, remove the motor from the wheel and install the replacement unit to the wheel.
8. Procure a cover plate, Ford Part No. 18A475 or equivalent. Position the cover plate over the access opening and drill eight 1/8-inch holes in the apron. Use the eight holes in the cover as a template (View C, Fig. 8). To protect the heater case, place a metal shield between the fender apron and the case while drilling.
9. After installing the motor cooling tube, apply rope sealer to the motor mounting plate (Fig. 7) and install the blower motor and wheel as an assembly.

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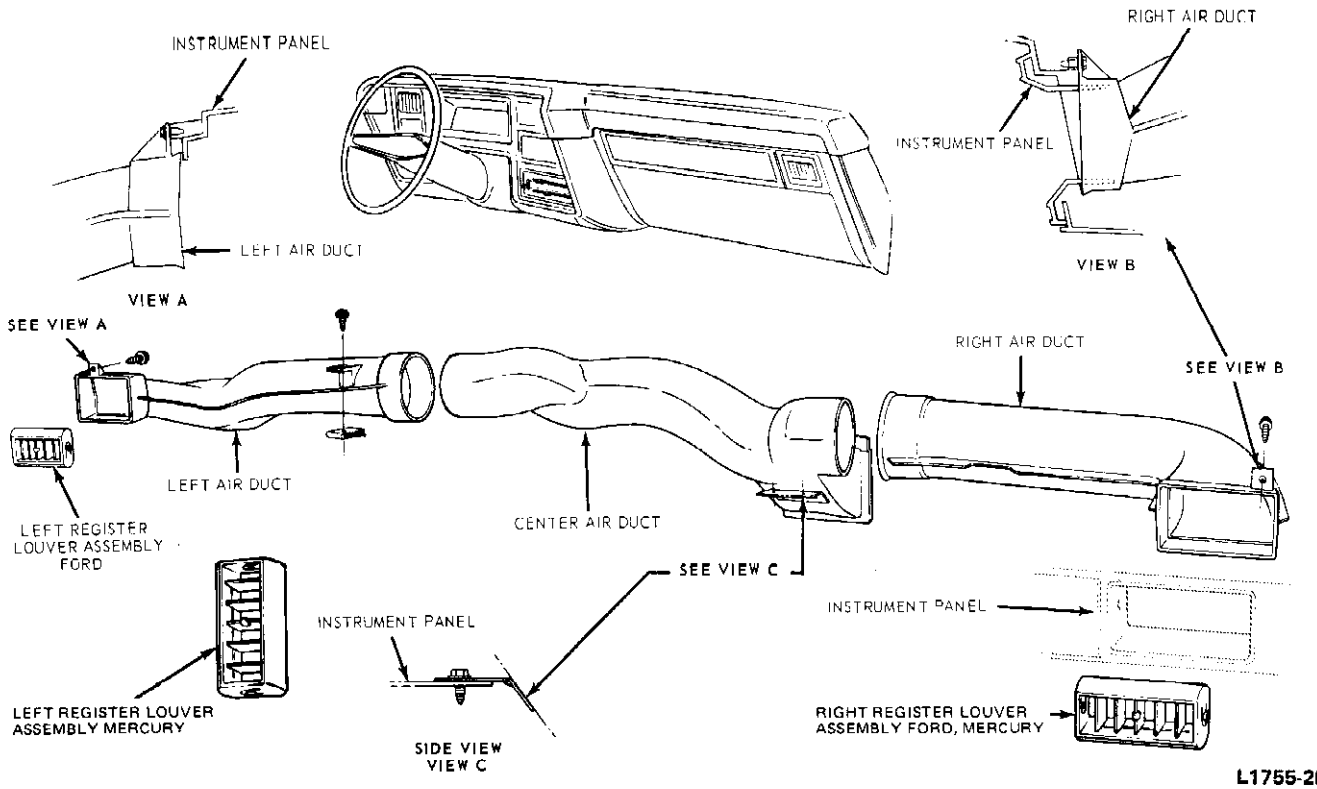


FIG. 3 Power Ventilation System

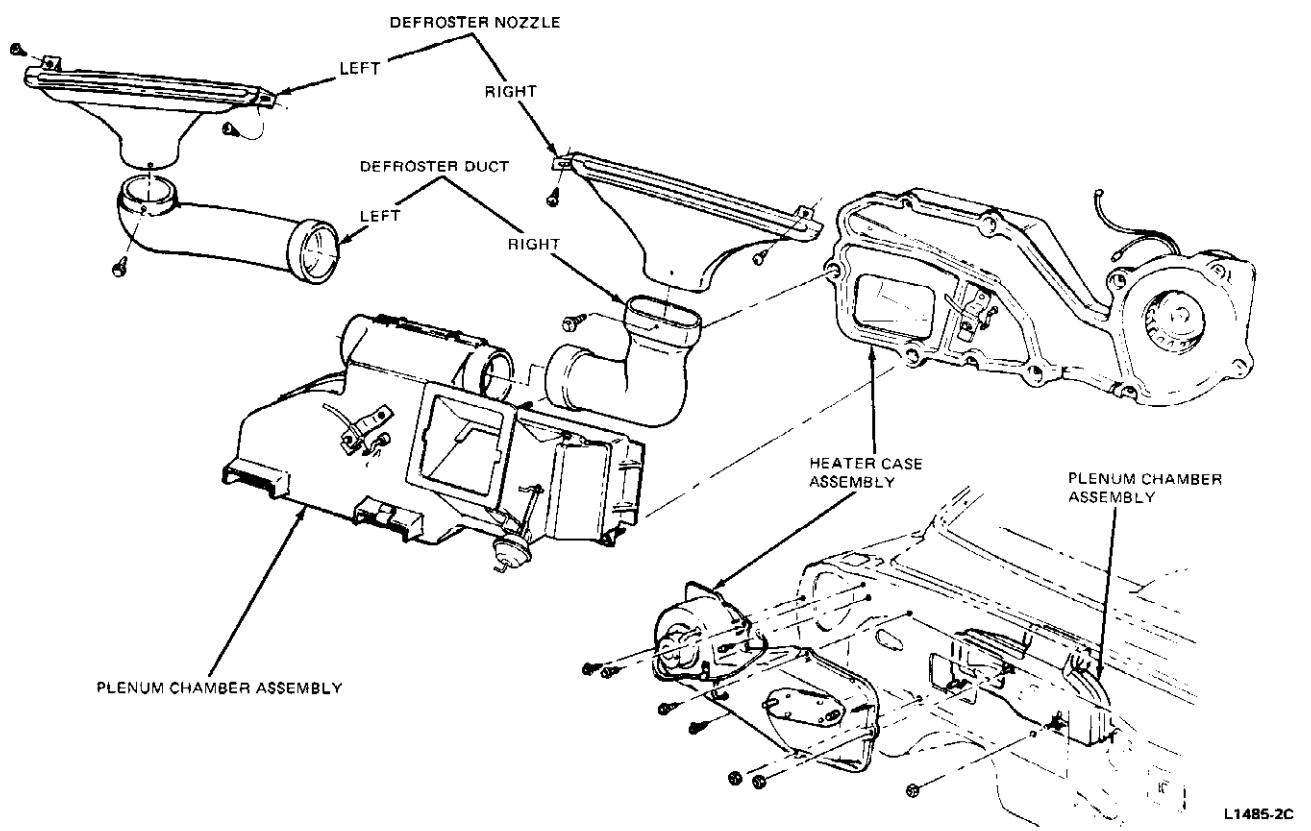


FIG. 4 Heater System—Ford

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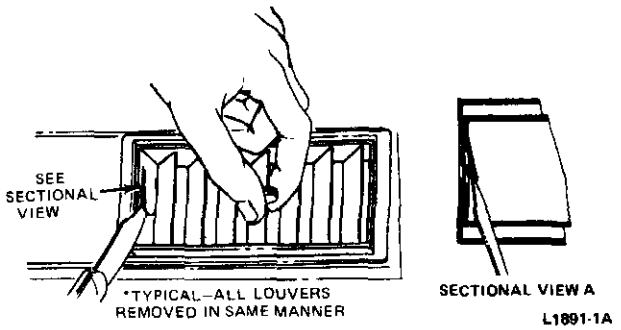


FIG. 5 Register Louver Barrel

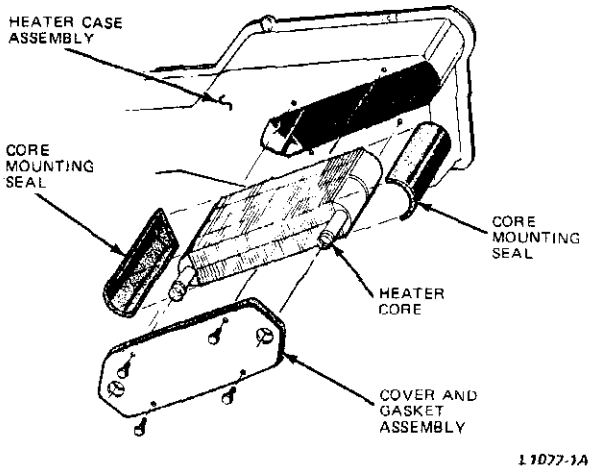


FIG. 6 Heater Core Removal

10. Route the lead wire and the ground wire through the clip on the resistor; connect the lead wire (orange) to the harness and the ground wire (black) to the cowl (1 screw).
11. Apply rope sealer around the edge of the access cover and position the cover on the fender apron. Secure the cover to the apron with eight self-tapping, round washer head (No. 8-15 x 1/2) screws (View D and Section A-A, Fig. 8).
12. Install the wheel and tire assembly.

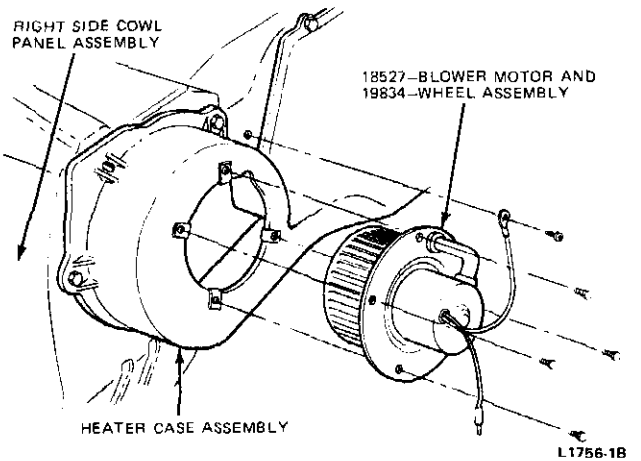


FIG. 7 Blower Motor and Wheel Assembly Installation

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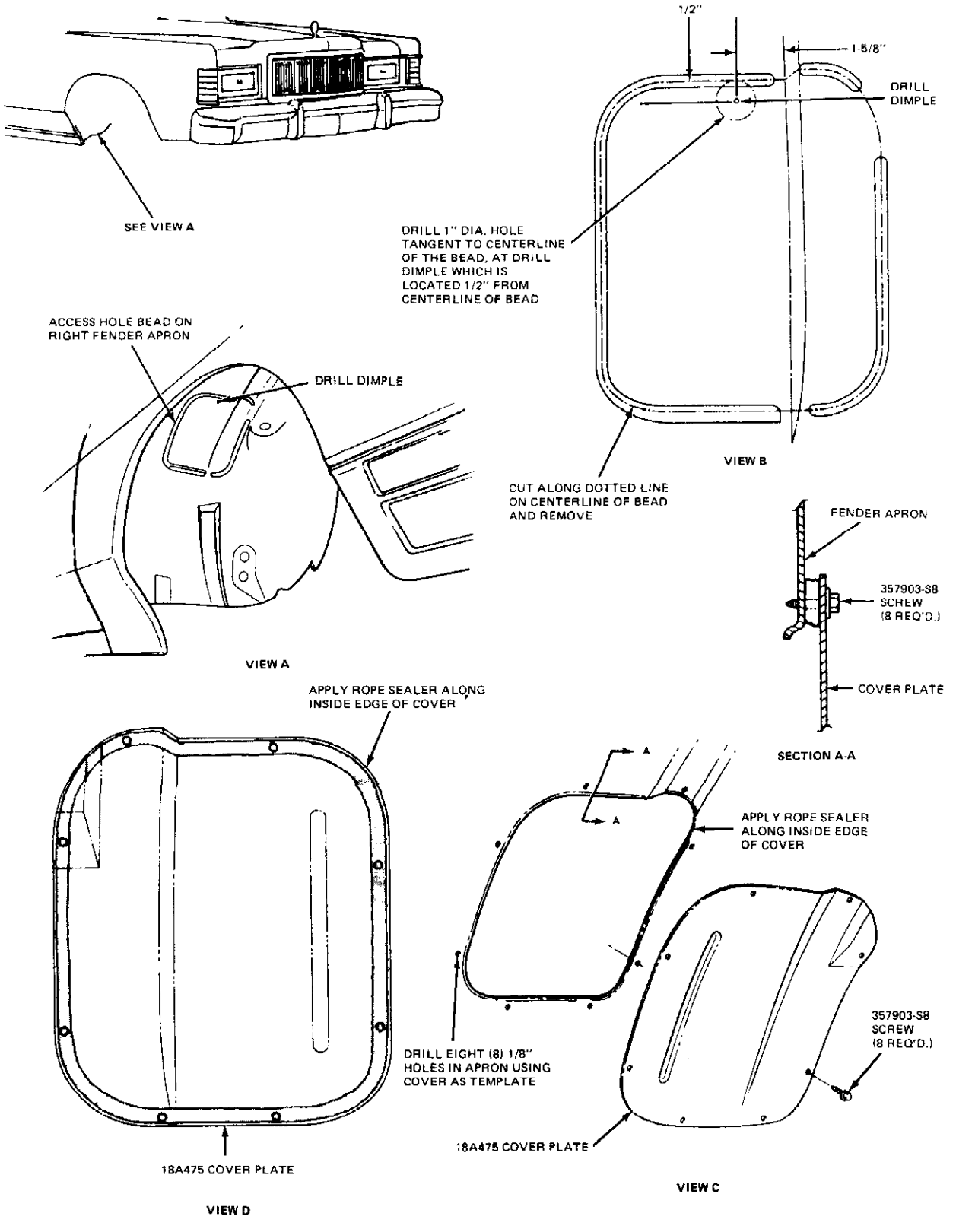


FIG. 8 Blower Access Hole in Fender

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SPECIFICATIONS

Average Blower Motor Current Draw Current at 12.8 Volts

Low —3 amps. **Medium** —5.5 amps. **High** —9 amps. Circuit Protection—15 amp. Fuse.

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Cougar, LTD II and Thunderbird Heating System

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CL2337-2B

DESCRIPTION AND OPERATION

For an explanation of the control door code numbers used in this Part, refer to General Information in Part 36-10.

AIR FLOW

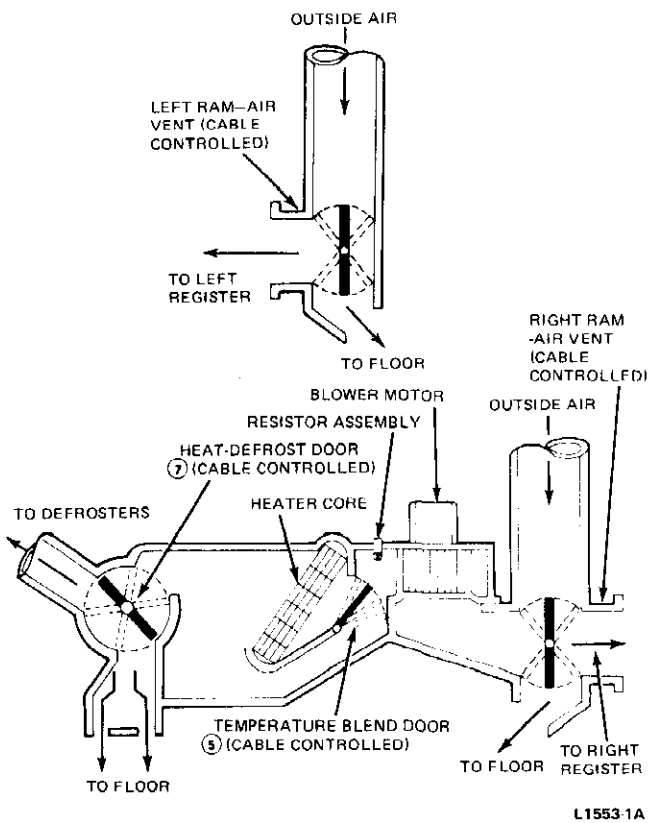
The heater assembly is a blend air system, receiving outside air through an opening in the right vent duct, which is connected directly to an opening in the upper cowl. Outside air is drawn into the system from the cowl through the right vent duct into the blower housing, forced through and/or around the heater core, mixed, and then discharged through outlets in the discharge air duct to the floor area or through the defroster outlets (Fig. 1).

CONTROL ASSEMBLY

The control assembly is located in the instrument panel to the left of the steering column. The control assembly contains a system off-on switch, a three-position blower switch, a temperature control lever, a function control lever and an illumination bulb (Fig. 2). The function control lever operates both the system off-on switch and a cable connected to the heat-defrost (7) door (Fig. 1). The system control integrated off-on switch is connected in series with the three-position blower switch and a resistor assembly located in the heater case assembly. The temperature control lever is connected by a cable to the temperature blend (5) door (Fig. 1).

TEMPERATURE CONTROL LEVER OPERATION

The air temperature is controlled by the position of the temperature blend door located between the blower and heater core in the heater case. As the temperature control lever (Fig. 2) is moved from COOL to WARM, a control cable moves the blend (5) door (Fig. 1) from minimum heat to full heat position to modulate the air flow through and/or around the heater core. The air through the core and the air through the by-pass chamber is then mixed as it enters the plenum chamber.



L1553-1A

FIG. 1 Heater and Vent System Schematic

FUNCTION CONTROL LEVER OPERATION

In OFF position, the function control lever opens the circuit to the blower switch (blower stops) and closes the heat-defrost (7) door restricting all air flow through the plenum (Fig. 1). As soon as the lever is moved from OFF position to the right about 1/2-inch, it closes the off-on switch to bring current to the blower switch whose sole function is to regulate blower speed through the resistor. From this point on through HEAT and DEFROST positions, the blower is always running in one of the three speeds as determined by blower switch setting.

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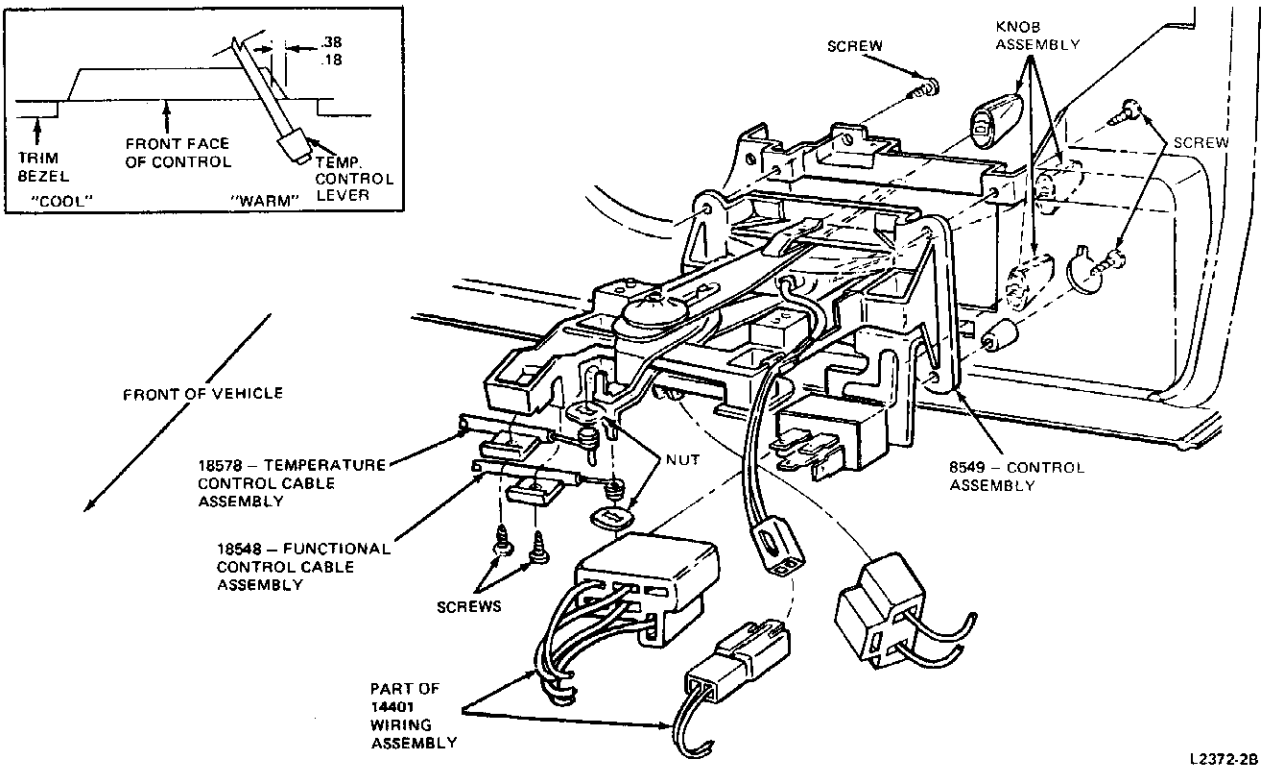


FIG. 2 Heater Control Assembly

In HEAT position, the lever moves the (7) door to discharge the air through the air distribution duct to the floor area (Fig. 1). In DEFROST position, the air is discharged to the windshield through the defroster nozzle. Air flow can also be modulated in direct proportion to the control setting between HEAT and DEFROST positions.

ADJUSTMENTS

FUNCTION CONTROL (OFF-FLOOR-DEFROST CABLE)

1. Place the lever in the OFF position.
2. Loosen the screw that retains the cable to the heater case (Fig. 3, View A) and rotate the door crank arm to the full counterclockwise position.
3. Move the control lever back far enough to provide 3/16-inch clearance between the lever and the edge of the slot, making sure that the (5) door does not move.
4. With the door crank arm and the lever in these positions, tighten cable to the heater retaining screw to 20 in-lbs torque.

TEMPERATURE CONTROL CABLE

1. Move the temperature control lever to the WARM end of the slot.
2. Loosen the screw that retains the cable to the heater case, and rotate the (5) door crank arm to the full clockwise position (Fig. 3).
3. Move the control lever back far enough to provide 3/16-inch clearance between the lever and the edge of the slot, making sure that the (5) door does not move.
4. Tighten the cable retaining screw to 20 in-lbs torque.

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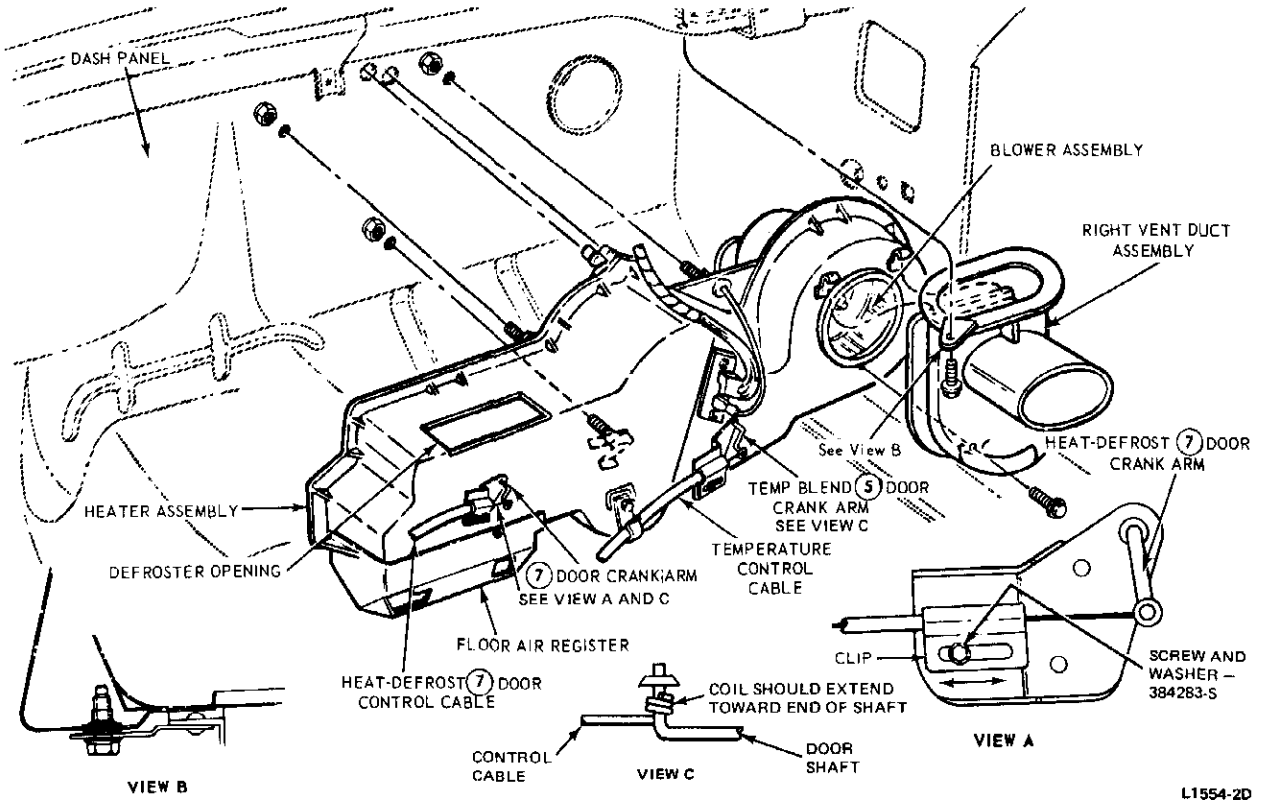


FIG. 3 Heater Assembly

REMOVAL AND INSTALLATION

HEATER CONTROL ASSEMBLY

1. Disconnect the battery ground cable.
2. Remove the knobs from the function, temperature and blower switch control levers.
3. Disconnect the cable end at each control lever (one nut for each lever), and separate the cables from the control head (one screw and retaining clip for each cable), as shown in Fig. 2.
4. Remove the four control assembly-to-instrument panel retaining screws, and move the control back toward the engine side of the instrument panel.
5. Disconnect the electrical wiring connectors from the blower switch, the system off-on switch, the accessory switch if so equipped, and the illumination bulb. Then, lower the control assembly and remove it from under the instrument panel.
6. When installing the assembly, be sure that the wires and cables are properly connected. After installation, adjust the cables as outlined in the Adjustment section.

DEFROSTER NOZZLE

1. Remove the instrument panel upper finish panel.
2. Remove the two screws that hold the defroster left outlet (Fig. 4) to the cowl inner panel.
3. Remove the clip that holds the defroster nozzle to the heater plenum (Fig. 4).
4. Remove the two screws that hold the defroster right outlet to the cowl inner panel.
5. Carefully remove the nozzle assembly upward through the opening in the instrument panel.

HEATER ASSEMBLY

Removal

1. *Drain the cooling system.*
2. Disconnect both heater hoses at the dash. Position or plug the hoses so that the coolant will not drain out.
3. Remove the nuts retaining the heater assembly to the dash.
4. Disconnect the control cables at the No. (5) and (7) door crank arms (Fig. 3).
5. Disconnect the wires from the resistor, and disconnect the blower motor wires.
6. Remove the glove box.
7. Remove the two bolts and nuts retaining the right air duct control to the instrument panel. Remove the screws retaining the right air duct and remove the duct assembly.
8. Remove the heater assembly to a bench.

Installation

1. Position the heater assembly in the vehicle and install the retaining nuts.
2. Connect the heater hoses.
3. Connect the motor and resistor leads.

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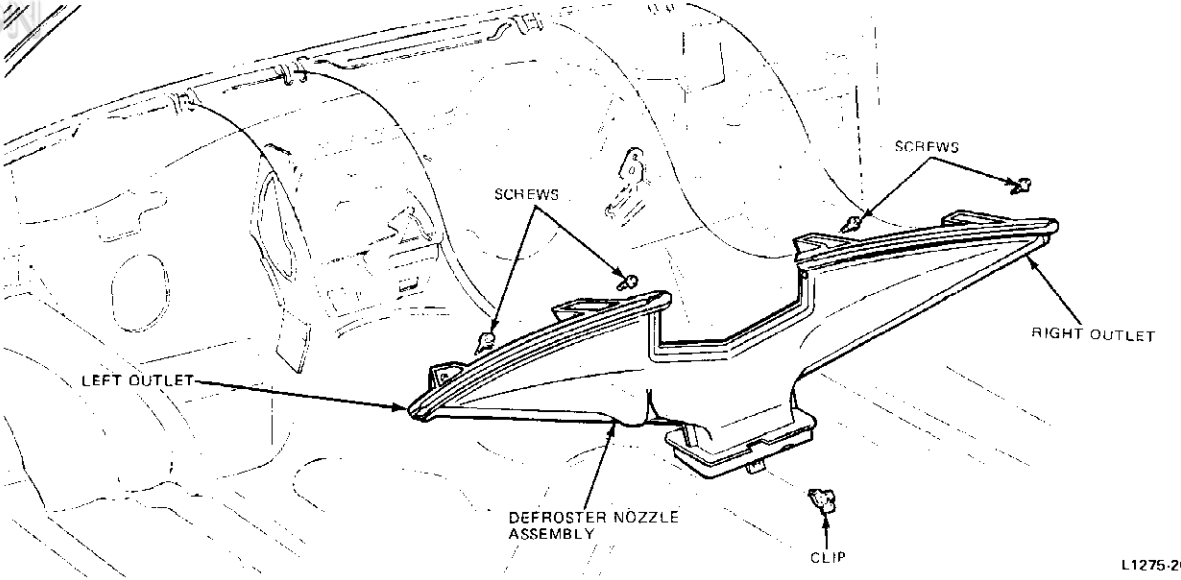


FIG. 4 Defroster Nozzle

4. Connect the temperature and function control cables to the No. (5) and (7) door crank arms respectively (Fig. 3). Adjust the cables as outlined in the Adjustment section.
5. Install the right air duct, and install the control cable to the instrument panel.
6. Install the glove box, and fill the cooling system.

HEATER CORE

1. Remove the heater assembly from the vehicle as outlined in the preceding procedure and place it on a bench.
2. Remove the heater core cover and pad and slide the core out of the case (Fig. 5).
3. If the core is being replaced, transfer the polyurethane pads from the old to the new core when installing the core in the case.

HEATER BLOWER MOTOR AND WHEEL ASSEMBLY

1. Remove the heater assembly from the vehicle, as outlined in this section, and place it on a bench.
2. Remove the four mounting screws and remove the blower motor and wheel assembly from the blower scroll (Fig. 5).
3. When installing the blower motor and wheel assembly, match the alignment holes as shown in Fig. 5. Install the motor ground screw to the mounting plate.

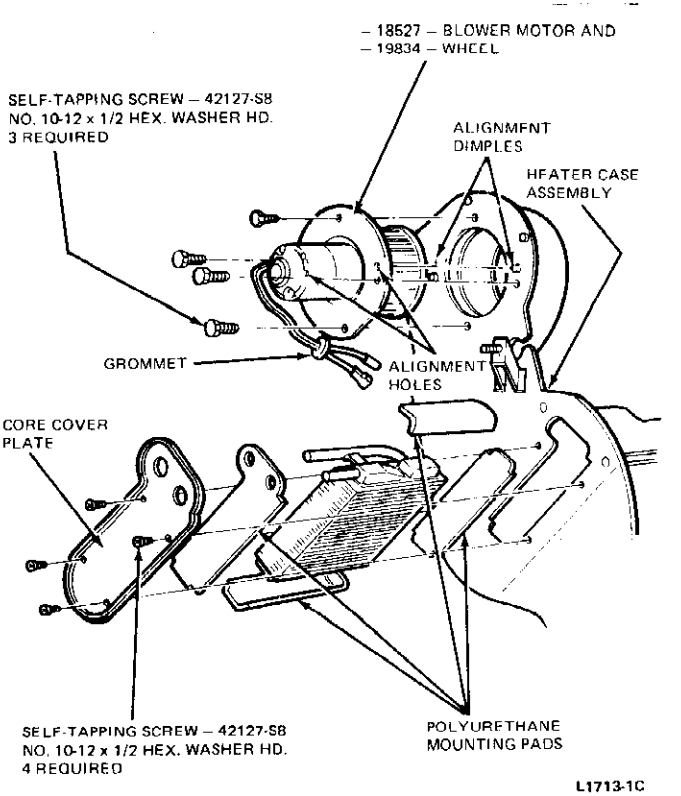


FIG. 5 Heater Blower Motor and Core Assemblies

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SPECIFICATIONS

HEATING SYSTEM SPECIFICATIONS	
Blower Motor Current Draw at 12.8 Volts . . . . 7 to 9 Amps on High Blower	Control Illumination
Protection Device	LTD II, Cougar and Thunderbird . . . . . One 1 CP No. 161 Bulb
LTD II, Cougar and Thunderbird . . . . . 20 Amp Fuse in Fuse Panel	

CL1556-2G

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DETROIT IRON

Fairmont and Zephyr Heating System

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CL2576-2A

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DESCRIPTION AND OPERATION

HIGH/LOW VENTILATION SYSTEM (FIG. 1)

Two openings in the upper cowl force or ram the outside air, from the forward motion of the vehicle, into the top of the left and right ventilator assemblies (Fig. 2). The amount of air flow may be increased by opening the side ventilation louvers (if so equipped) or by slightly opening a side window of the vehicle.

LEFT VENTILATION

The left ventilator assembly, register duct and register assembly are independent from the heater system. Together, they provide outside air to the driver's side of the passenger compartment from the left register assembly in the instrument panel (high), or to the floor (low) from the lower opening in the ventilator assembly.

Left Ventilation Control

Controlled by a non-adjustable control cable assembly mounted on the lower edge of the instrument panel, the left ventilator control door can be infinitely positioned from (Fig. 3):

1. Closed to outside air.
2. Proportioned air between left instrument panel register and floor.
3. Maximum air through the left instrument panel register only.

Left Ventilator Assembly

Three mounting stud nuts secure the left ventilator assembly (Fig. 9), with its polyurethane foam gasket, against an opening in the left upper cowl. Another polyurethane foam gasket on the register outlet of the left ventilator assembly prevents air leakage at the left register duct and limits the amount of air leakage behind the instrument panel.

Left Register Duct

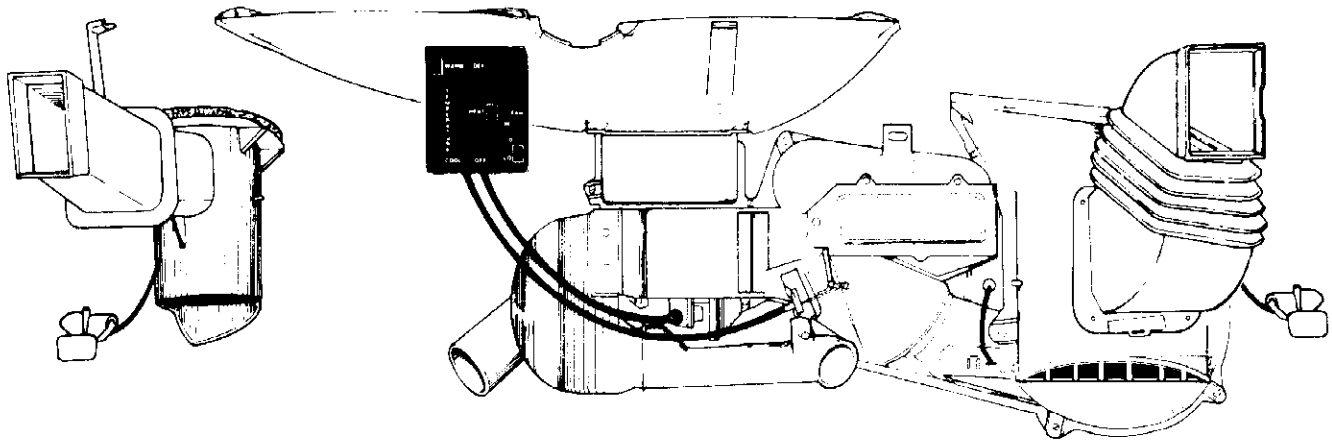
The left register duct provides a path for the outside air to flow between the left ventilator assembly and the instrument panel register (Fig. 9). Its mounting bracket is secured to the top of the instrument panel with one retaining screw. The instrument panel pad must be removed for access to the mounting bracket retaining screw (Fig. 14).

Left Register Assembly

Upper and lower retaining tabs vertically lock the left register assembly into the register housing of the instrument trim panel (Fig. 13). The retaining tabs allow the register assembly to swivel and direct the outside ram air from side to side. The louvers of the register assembly permit closing of the register or controlling the upward and downward air distribution.

RIGHT VENTILATION

Outside air ventilation for the right side of the passenger compartment is controlled in the same manner as for the left side (Fig. 3). The right side, however, also provides outside air for the heater case assembly when the right ventilation control lever is pushed IN to the CLOSED position. **NOTE: THE RIGHT VENTILATOR CONTROL DOOR MUST BE CLOSED FOR MAXIMUM HEATER PERFORMANCE.**



L2577-2A

FIG. 1 Heater and High/Low Ventilation System

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Right Outside Air Inlet Duct

The right outside air inlet duct (Fig. 29) is secured to the top of the blower housing portion of the heater case assembly with two retaining screws. A polyurethane foam gasket, on top of the duct opening, seals the outside air inlet opening in the right upper cowl. The heater case assembly must be removed for access to the two outside air inlet duct-to-heater case retaining screws.

Right Ventilator Assembly

The right ventilator assembly (Fig. 11) is removable and is secured to the heater case assembly and outside air inlet duct with four retaining screws. It must be removed from the vehicle, to provide clearance for removal and installation of the heater case assembly.

Right Register Duct

The right register duct provides a path for the outside air to flow between the right ventilator assembly and the instrument panel register. Its mounting bracket is secured to the lower edge of the instrument panel with one retaining screw (Fig. 11). The mounting bracket retaining screw must be removed and the register duct pulled back toward the instrument panel to provide clearance for removal and installation of the right ventilator assembly.

A polyurethane foam gasket on the inlet surface of the right register duct provides a seal between the register duct and the right ventilator assembly to prevent air leakage behind the instrument panel.

Right Register Assembly

Upper and lower retaining tabs vertically lock the right register assembly in the register housing of the right instrument panel trim applique (Fig. 13). The retaining tabs allow the register assembly to swivel and direct the outside air from side to side. The louvers of the register assembly permit closing of the register or controlling the upward and downward air distribution.

HEATER SYSTEM

AIR FLOW

The heater assembly is a blend-air system receiving outside air through an opening in the top of the right ventilator assembly (Fig. 4), when the ventilator control door is in the closed position.

NOTE: The right ventilator control door must be closed for maximum heater performance.

A blower motor and wheel assembly draws outside air into the system from an opening in the upper cowl, then through the right ventilator assembly and into the blower wheel housing. From there the blower wheel forces the air through and/or around the heater core. The outside air and heated air then blend together prior to distribution out of the heater floor distribution outlets, to the floor area, or out of the defroster outlets, onto the windshield.

TEMPERATURE CONTROL

A Temperature Blend Door (Fig. 5), as its name implies, directs the outside air to flow through the heater core for heating, or to by-pass the heater core for cooling the vehicle. It is controlled between COOL and WARM by the Temperature Lever of the Control Assembly, located in the center of the instrument panel.

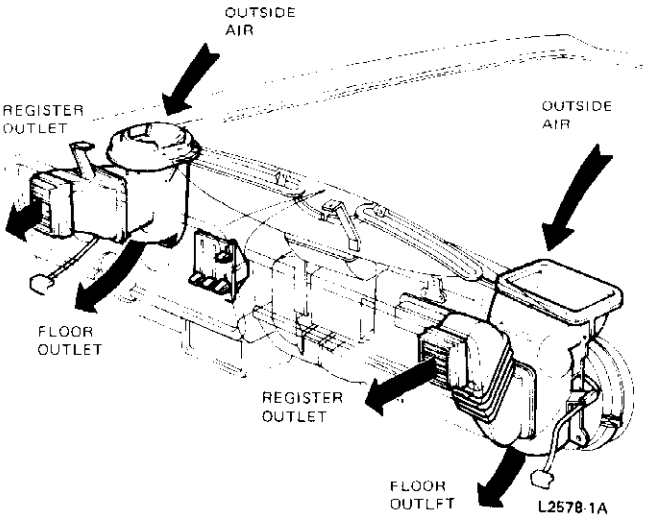


FIG. 2 Ventilation System Air Distribution

A cable assembly connects the Temperature Control Lever to the Temperature Blend Door. When the Temperature Control Lever is in the COOL position, the Temperature Blend Door directs the outside air to by-pass the heater core and it remains COOL. When the Temperature Control Lever is in the WARM position, the Temperature Blend Door directs the outside air through the heater core where it is heated.

Positioning the Temperature Lever in any position between COOL and WARM causes the Temperature Blend Door to direct more or less outside air through or around the heater core for whatever proportion of heat or outside air cooling the driver desires.

When the air leaves the area of the heater core and Temperature Blend Door, it blends together as it approaches the Heat-Defrost Door for distribution.

AIR DISTRIBUTION

The blended warm and cool outside air is distributed to either the defroster outlets or to the floor distribution outlets by positioning the Heat-Defrost Door (Fig. 5).

The cable assembly connects the Heat-Defrost Door with the Function Control Lever in the Control Assembly. When the Function Control Lever is in the OFF position, the Heat-Defrost Door blocks all passage of air to the distribution outlets.

As the Function Control Lever is moved toward the HEAT position, air flow gradually increases to full air flow from the floor heat distribution outlets. A small amount of air will also be released to the windshield from the defroster outlets.

When the Function Control Lever is moved from HEAT to the DEFROST (DEF) position, the amount of air flow from the floor heat distribution outlets will gradually reduce and the amount of air flow from the defroster outlets will increase.

With the Function Control Lever in DEFROST (DEF), all of the air will be discharged from the defroster outlets onto the windshield.

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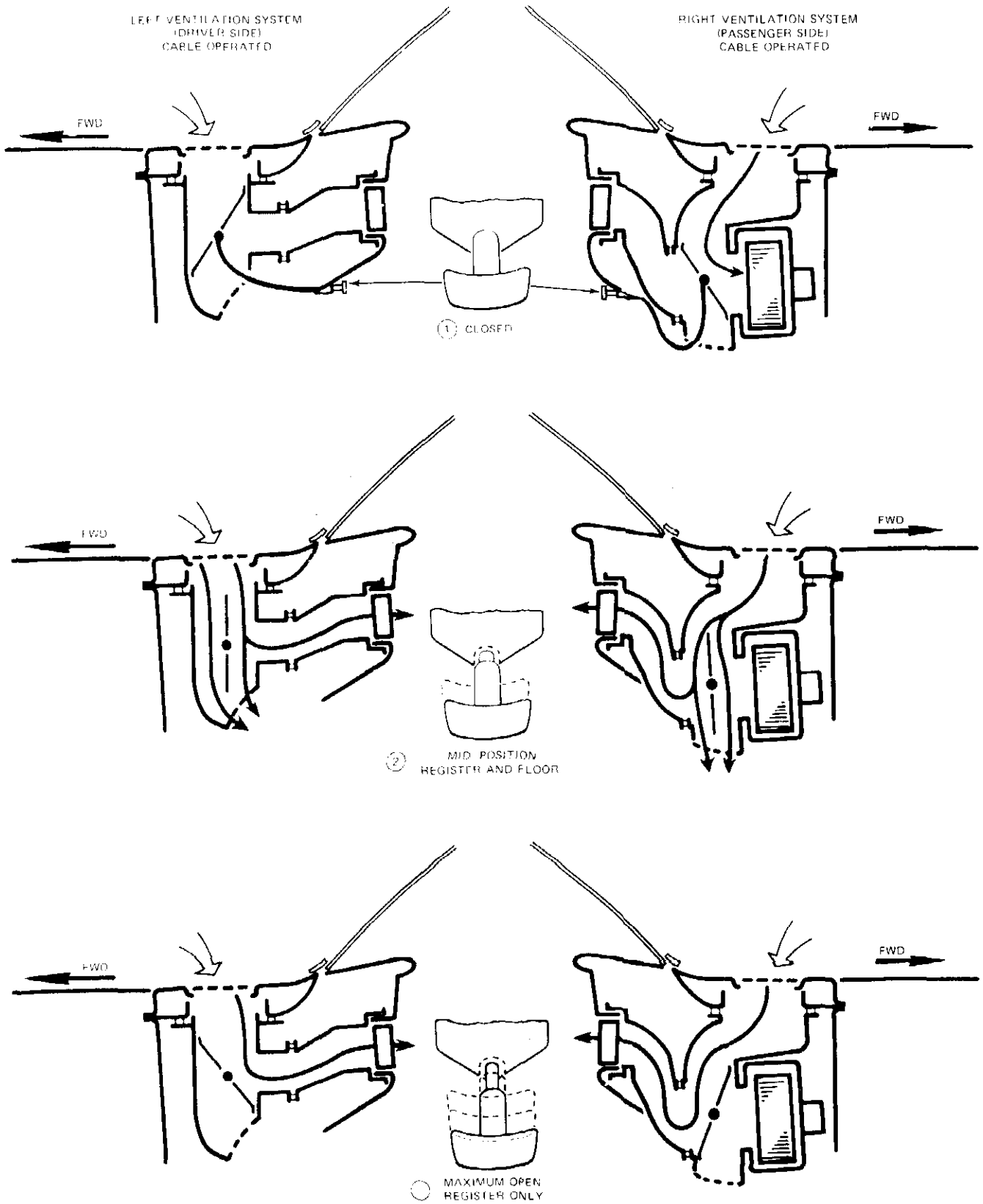


FIG. 3 Left and Right High/Low Ventilation Air Flow

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BLOWER (FAN) CONTROL

System ON-OFF Switch

Power to the blower motor is provided by a system ON-OFF slide switch, located on the back of the Function Control Lever (Fig. 16). The switch contacts close when the Function Control Lever is moved from OFF to approximately midway between OFF and HEAT. It remains closed throughout the rest of the Function Control Lever travel. The system ON-OFF switch completes the power circuit between the fuse panel and the Blower (fan) Speed Switch, located in the Control Assembly (Fig. 6).

Blower Speed Control

Blower motor speed is controlled by a three position switch (Lo, Medium and HI), identified by the word FAN on the face of the control assembly. Its purpose is to provide a current path through or around the resistor coils of the resistor assembly, until full current flow is available to the blower motor (Fig. 6).

With the switch in the LO position, current flow to the blower motor is restricted by the two resistor coils in the resistor assembly.

When the switch is moved to the center (Medium) position, one of the resistor coils is by-passed out of the circuit and current flow to the blower motor is restricted by only one resistor.

In the HI position, the blower speed switch provides a current path around both resistors and full current (power) is available for the blower motor to operate at full speed.

TESTS

Refer to the Heater System Electrical Wiring Diagram and Continuity Tests (Fig. 6), Heater System Air Flow (Fig. 5) and heater hose routing illustrations (Figs. 26,27 and 28) for additional heater system information.

BLOWER MOTOR

Voltage Test

1. Connect the positive leads (+ red) of the voltmeter to the blower motor connector terminal at the resistor assembly (261A orange w/black stripe), as shown in Fig. 7.
2. Connect the negative lead (- black) of the voltmeter to a good frame ground.
3. Position the Temperature Control Lever in the mid-position for an average air flow around and through the heater core.
4. Position the Function Control Lever in the HEAT position to turn the blower motor ON and to obtain maximum air flow.
5. Turn the ignition switch to the ON position.
6. With a fully charged battery, blower voltage should be within the specified range for each blower switch position as indicated in the blower switch chart of the electrical wiring diagram (Fig. 6).

Current Draw Test

1. Disconnect the blower motor connector (261A orange w/black stripe) from the spade terminal of the resistor assembly (Fig. 7).
2. Connect the positive ammeter lead clip to the male, blower motor spade terminal connector on the resistor assembly.
3. Insert a male spade terminal (-14294-J Faston Tab) into the female spade terminal connector on the blower motor lead (Fig. 6). Connect the negative ammeter lead clip onto end of the male spade terminal.
4. Position the Temperature Control Lever in the mid-position for an average air flow around and through the heater core.
5. Position the Function Control Lever in the HEAT position to turn the blower motor ON and to obtain maximum air flow.
6. Turn the ignition switch to the ON position.
7. With a fully charged battery, the blower motor current (amps.) should be approximately as indicated for each blower speed shown in the blower switch chart of the electrical wiring diagram (Fig. 6).

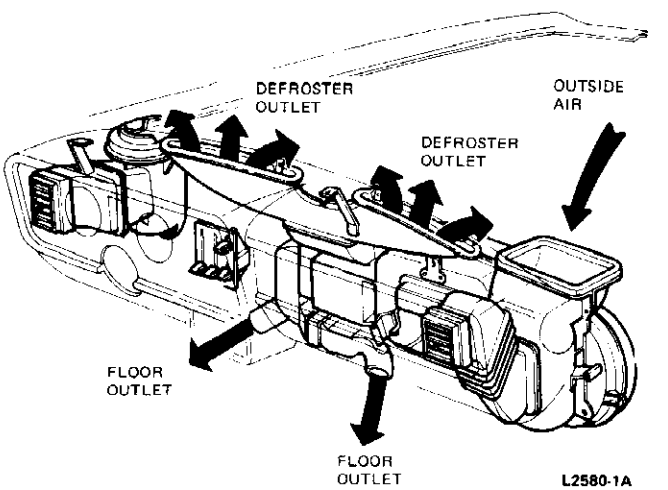


FIG. 4 Heater System Air Distribution

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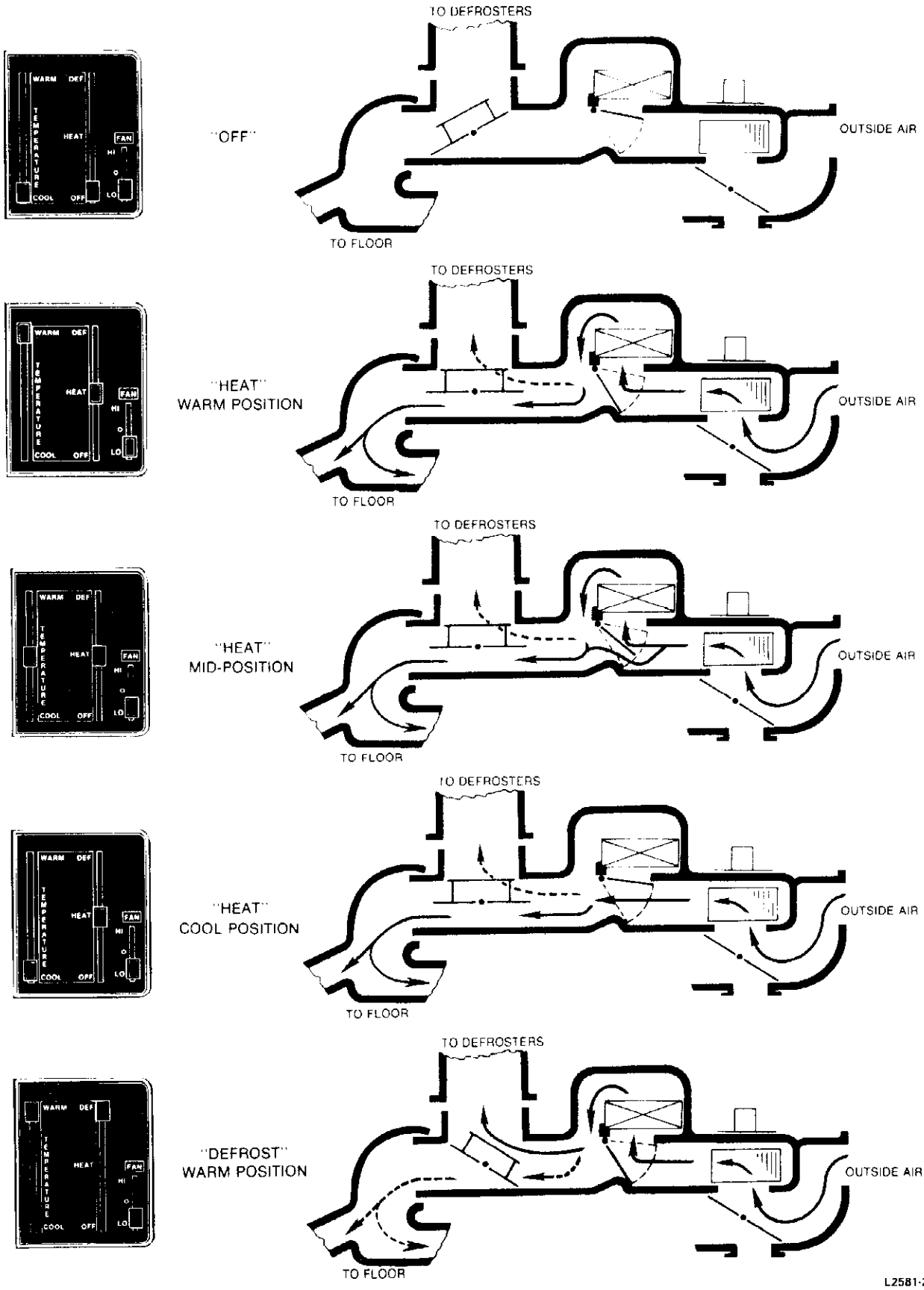
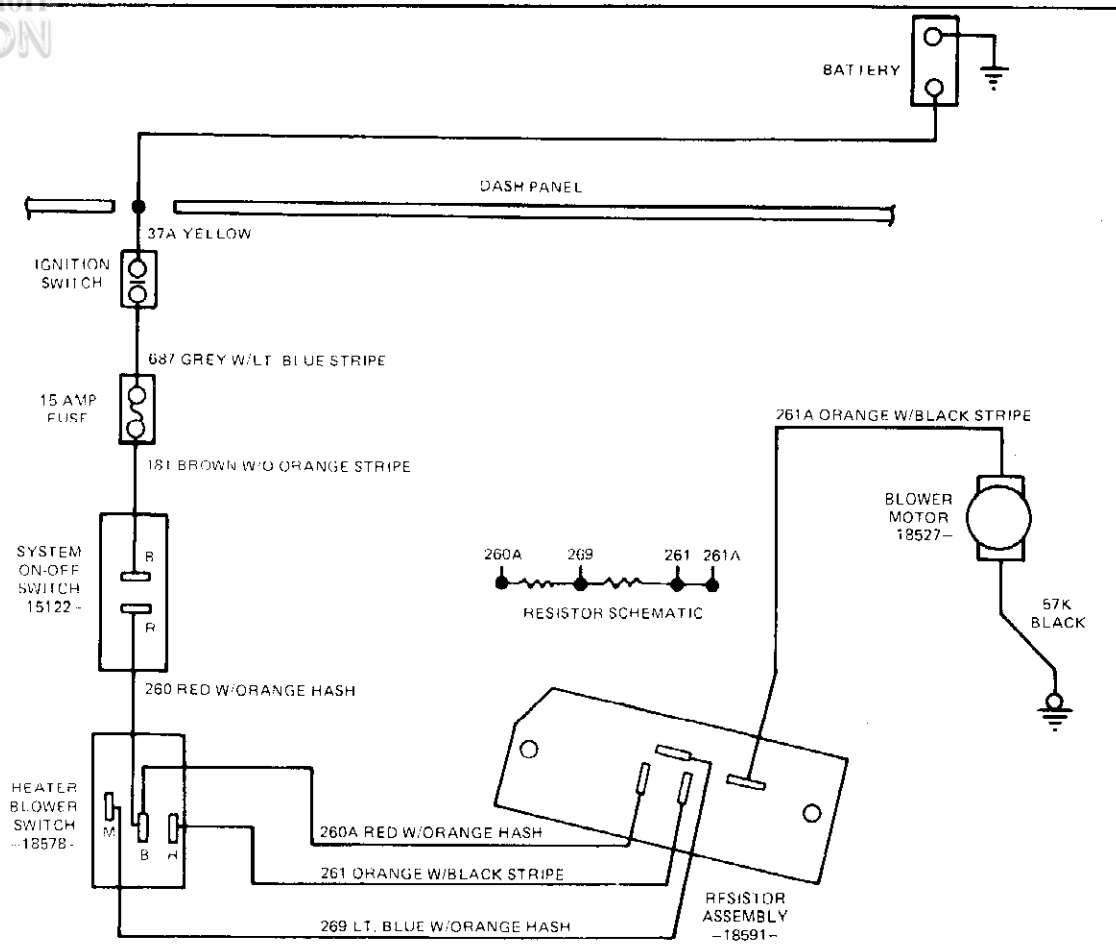


FIG. 5 Heater System Air Flow

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SYSTEM ON-OFF SWITCH -15122-			
SWITCH SCHEMATIC	TERMINAL CONNECTIONS		
	OFF	HEAT	DEFROST
B R	NONE	B-R	

HEATER BLOWER SWITCH -18578-			
BLOWER SPEED	TERMINAL CONNECTIONS	CURRENT IN CAR (AMPS.)	BLOWER VOLTAGE
LOW	NONE	3.6	4.6
MEDIUM	M-B	5.3	7.4
HIGH	M-B-H	8.5	12.8

L2582-2A

FIG. 6 Heater System Electrical Wiring Diagram and Continuity Test

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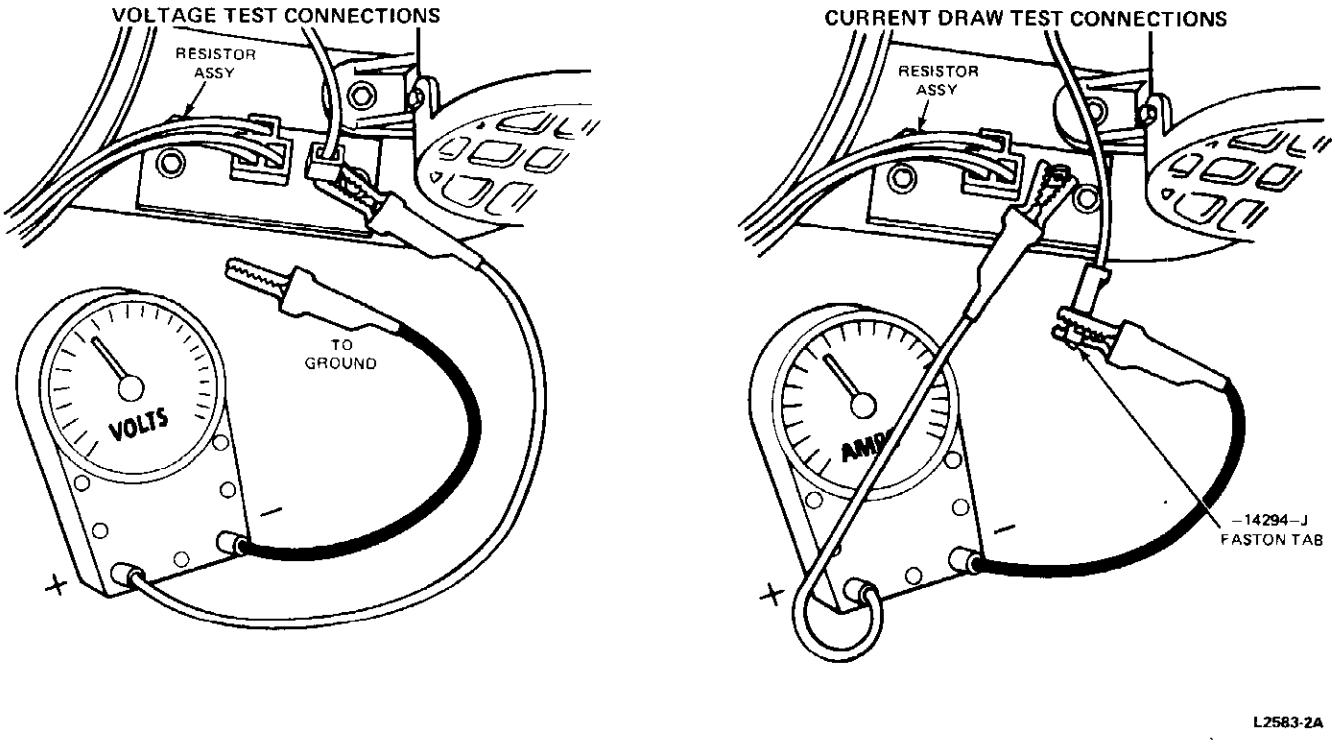


FIG. 7 Blower Motor Voltage and Current Draw Test Connections

ADJUSTMENTS

CONTROL CABLES

Function and/or Temperature Control Cables

The function and temperature control cables are self-adjusting with the movement of the respective control levers to the top of the slot(s) (WARM and DEF) in the face of the control assembly. To prevent kinking of the control cable wire, a pre-set adjustment should be made before attempting to perform the self-adjustment operation. The pre-set adjustment may be performed either in the vehicle, with the cable installed or before installation.

CABLE PRE-SET AND SELF-ADJUSTMENT

Before Installation

1. Insert the blade of a small pocket screwdriver into the wire and loop (crank arm end) of the respective function or temperature control cable as shown in Fig. 8.
2. Grip the self-adjusting cable attaching clip with pliers and slide it down the shaft (away from the end loop) approximately one inch.
3. Install the cable assembly. Refer to control assembly and function and/or temperature Control Cable Removal and Installation procedure and Figs. 16 and 17.
4. Move the control lever(s) to the top of the slot (temperature WARM-Function DEF) to position the self-adjusting clip.
5. Check for proper control operation.

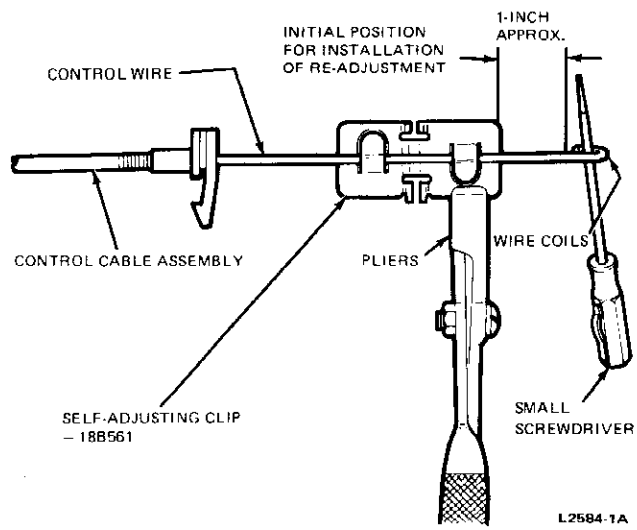


FIG. 8 Control Cable Pre-Set Adjustment

After Installation

1. Move the control lever (temperature or function control) to the COOL (temperature lever) and/or OFF (function lever) position.
2. Hold the crank arm firmly in position, insert the blade of a small pocket screwdriver into the wire loop, as shown in Fig. 8, and pull the cable wire through the self-adjusting clip until there is a space of approximately one inch between the clip and the wire end loop.

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3. Move the control lever(s) to the top of the slot (temperature WARM-function DEF) to position the self-adjusting clip.
4. Check for proper control operation.

LEFT AND RIGHT VENTILATOR CONTROL CABLES

The left and right ventilator control cables are non-adjustable.

REMOVAL AND INSTALLATION

LEFT OR RIGHT VENTILATOR CONTROL CABLE ASSEMBLY

Removal

1. Remove the retaining screws (2) securing the ventilator control cable lever assembly to the lower edge at the instrument panel.
2. Remove the push nut from the door crank arm.
3. Remove the control cable housing-to-ventilator bracket retaining screw (1) and remove the control cable assembly from the ventilator assembly.

Installation

1. Align the cable housing mounting tab with the ventilator bracket, install the cable loop on the door crank arm and secure with a new push nut.
2. Align the hole of the cable housing mounting tab with the hole in the ventilator bracket assembly, install the retaining screw (1) and tighten to specification.
3. Position the control cable lever housing onto the lower edge at the instrument panel, aligning the locater tab with the tab slot of the instrument panel.
4. Install the control cable lever housing retaining screws (2) and tighten to specification.
5. Check the ventilator door for proper operation.

LEFT VENTILATOR ASSEMBLY

Removal

1. Remove the retaining screws (2) securing the ventilator control cable lever assembly to the lower edge at the instrument panel (Fig. 9).
2. Remove the retaining stud nuts (3) securing the ventilator assembly to the upper cowl and remove the ventilator assembly.
3. Remove the push nut from the door crank arm.
4. Remove the control cable housing retaining screw (1) and remove the control cable assembly from the ventilator assembly.

Installation

1. Align the cable housing mounting tab, install the cable loop on the door crank arm and secure with a new push nut (Fig. 9).
2. Align the hole of the cable housing mounting tab with the hole in the bracket assembly, install the retaining screw (1) and tighten to specification.
3. Position the ventilator assembly over the opening in the upper cowl and onto the retaining studs (3).
4. Install the retaining stud nuts (3) to secure the ventilator assembly to the upper cowl. Tighten the stud nuts to specification.
5. Position the control cable lever housing onto the lower edge at the instrument panel, aligning the locatortab with the tab slot of the instrument panel.

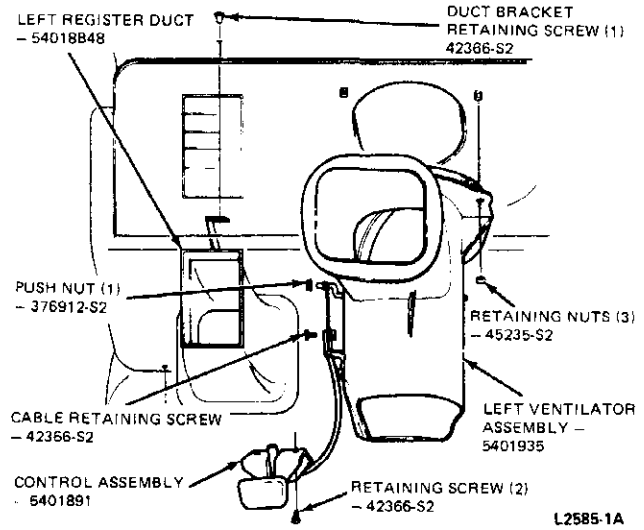


FIG. 9 Left Ventilator and Register Duct Removal

6. Install the control cable lever housing retaining screws (2) and tighten to specification.
7. Check the ventilator door for proper operation.

LEFT VENTILATOR DOOR

Removal

1. Remove the left ventilator assembly as outlined in the procedure.
2. Position the door for convenient access to the retaining screw (1) securing the door on the crank arm shaft, and remove the retaining screw (Fig. 10).
3. Slide the door off the loop of the crank arm shaft and remove from the top of the ventilator housing.

Installation

1. Position the door crank arm to align with the V-slot of the control cable housing mounting bracket.
2. Slide the door into the top of the ventilator housing and position the pocket of the door mounting bracket over the loop of the crank arm shaft.
3. Install the door retaining screw (1) and tighten to specification.
4. Install the ventilator assembly as outlined in the procedure.

LEFT REGISTER DUCT

Removal

1. Remove the left ventilator assembly. Refer to procedure and Fig. 9.
2. Remove the instrument panel pad. Refer to procedure and Fig. 14.

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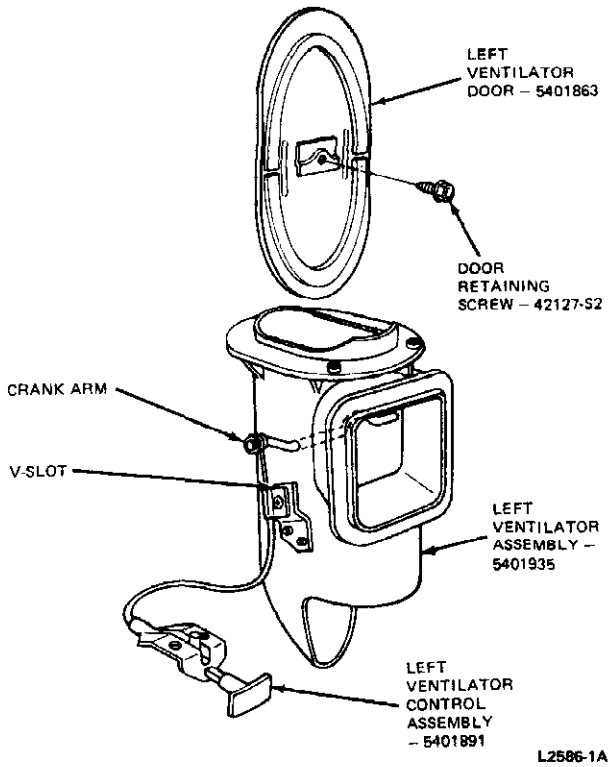


FIG. 10 Left Ventilator Door Removal

3. Remove the register duct bracket retaining screw (1) located on top of the instrument panel and on the left side nearest the windshield.
4. Disengage the register duct from the register opening, behind the instrument panel and remove from under the instrument panel.

Installation

1. Position the register duct onto the register opening, behind the instrument panel as shown in Fig. 9.
2. Align the hole of the register duct bracket with retaining screw hole at the top of the instrument panel.
3. Install the register duct bracket retaining screw (1) and torque to specification.
4. Install the instrument panel pad. Refer to procedure and Fig. 14.
5. Install the left ventilator assembly. Refer to procedure and Fig. 9.

RIGHT VENTILATOR ASSEMBLY

Removal

1. Remove the retaining screw (1) securing the right register duct mounting bracket to the lower edge of the instrument panel (Fig. 11).
2. Remove the retaining screws (2) securing the ventilator control cable lever assembly to the lower edge of the instrument panel.
3. Remove the glovebox liner for access to the ventilator upper left retaining screw.
4. Remove the plastic rivets (2) securing the grille to the ventilator floor outlet opening and remove the grille from the bottom of the ventilator assembly as shown in Fig. 12, for access to the lower right ventilator assembly retaining screw.
5. Remove right register duct and register assembly (refer to procedures) for access to the upper right ventilator retaining screw. Use long extension *through register opening.*
6. Remove the retaining screws (4) securing the ventilator assembly to the blower housing portion of the heater case assembly.
7. Slide the ventilator assembly to the right and then down to remove from under the instrument panel.
8. Remove the push nut from the door crank arm.
9. Remove the control cable housing retaining screw (1) and remove the control cable assembly from the ventilator assembly.

Installation

1. Align the control cable housing mounting tab, install the cable loop on the door crank arm and secure with a new push nut.
2. Align the hole of cable housing mounting tab with the hole in the bracket assembly, install the retaining screw (1) and tighten to specification.
3. Slide the ventilator up and to the left to position the ventilator assembly into the blower housing of the heater case assembly (Fig. 11).
4. Install the retaining screws (4) to secure the ventilator assembly on the blower housing and tighten to specification.
5. Position the grille over the floor outlets opening and install new plastic rivets (2), or No. 10 x 1/2 inch sheet metal screws, to secure the grille onto the ventilator assembly.
6. Reinstall right register duct and register assembly. Refer to procedures.
7. Position the control cable lever housing onto the lower edge of the instrument panel, aligning the locator tab with the tab slot of the instrument panel.
8. Install the control cable lever housing retaining screws (2) and tighten to specification.
9. Align the hole of the right register duct mounting bracket with the hole in the lower edge of the instrument panel and install and tighten the retaining screw (1) to specification.
10. Check the ventilator door for proper operation.
11. Install the glovebox liner.

RIGHT VENTILATOR DOOR

Removal

1. Remove the plastic rivets (2) securing the grille to the ventilator floor outlet opening and remove the grille from the bottom of the ventilator assembly as shown in Fig. 12.
2. Position the door for convenient access to the retaining screw (1) securing the door on the crank arm shaft and remove the retaining screw.
3. Slide the door off the loop of the crank arm shaft and remove from the floor outlet opening of the ventilation assembly.

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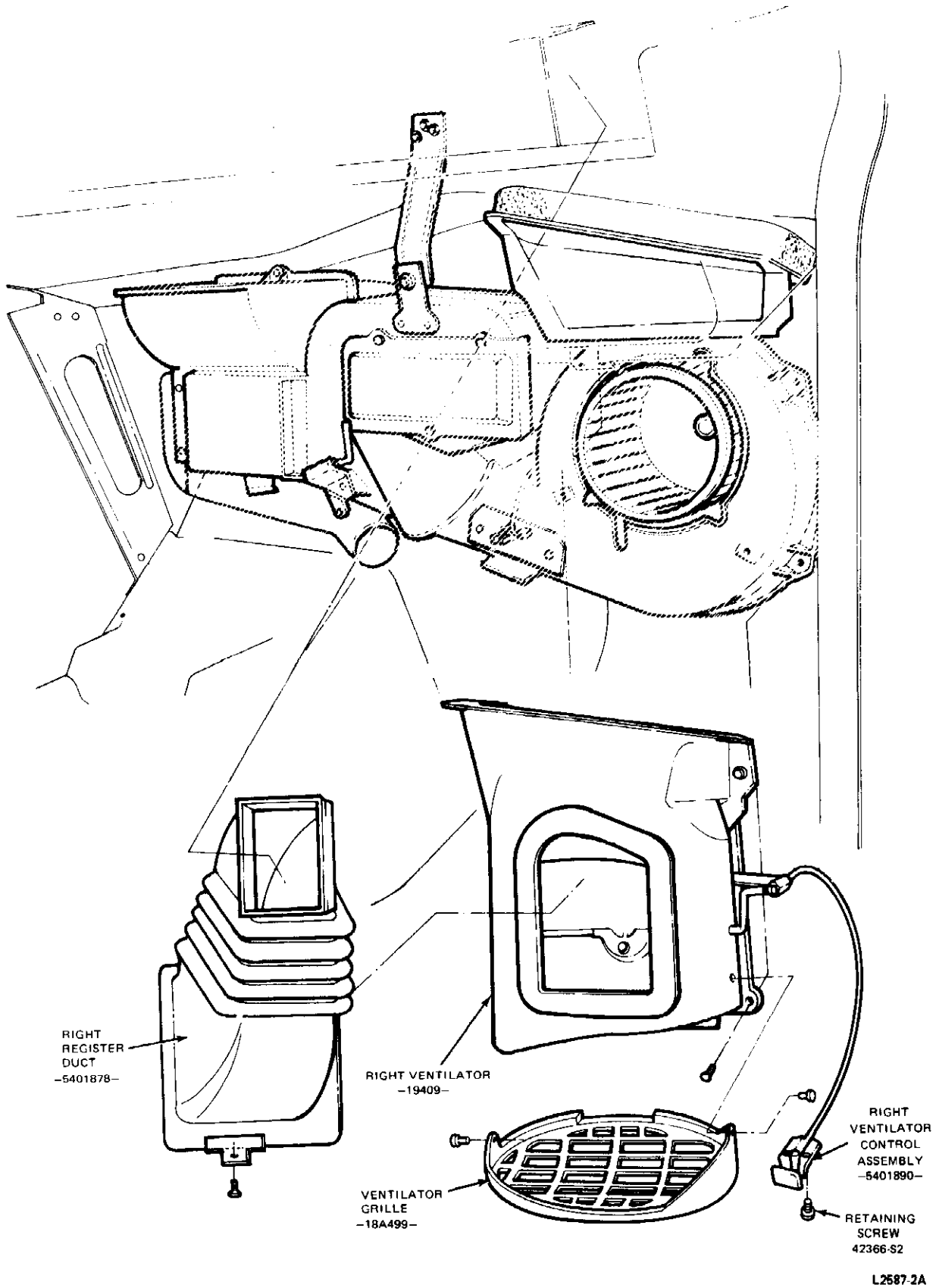


FIG. 11 Right Ventilator and Register Duct Removal

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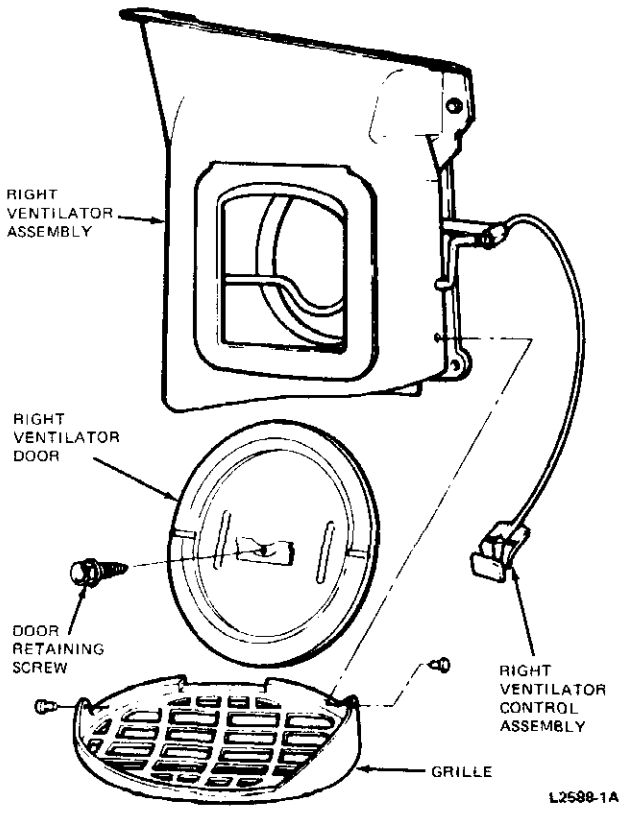


FIG. 12 Right Ventilator Door Removal

Installation

1. Slide the door into the floor outlet opening of the ventilator housing (Fig. 12) and position the pocket of the door mounting bracket over the loop of the crank arm shaft.
2. Install the door retaining screw (1) and tighten to specification.
3. Position the grille over the floor outlet opening and install new plastic rivets (2) to secure the grille onto the ventilator assembly.

RIGHT REGISTER DUCT

Removal

1. Remove the glovebox liner.
2. Remove the register duct bracket retaining screw (1) on the lower edge of the instrument panel.
3. Disengage the register duct from the register outlet opening and remove through the glovebox opening.

Installation

1. Position the register duct over the register outlet opening behind the instrument panel (Fig. 11).
2. Install the register duct bracket retaining screw (1) and tighten to specification.
3. Install the glovebox liner.

REGISTER ASSEMBLY

Removal

1. Insert a thin blade under the retaining tab (Fig. 13) and pry the retaining tab toward the louvers until the retaining tab pivot clears the hole in the register opening.
2. Pull the register assembly end out from the housing only enough to prevent the pivot from going back into the pivot hole.
3. Repeat Step 1 for the other retaining tab and pull the register assembly from the register opening.

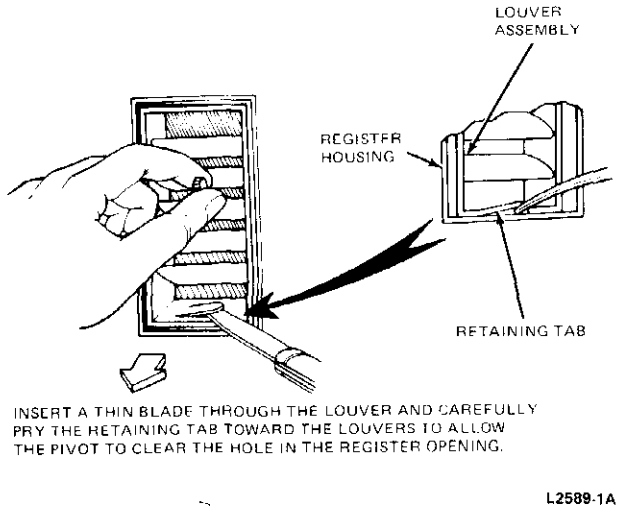


FIG. 13 Instrument Panel Register Removal

Installation

The pivots on each end of the register assembly are different diameters and therefore determine the installed position of the register assembly.

1. Position the register assembly into the opening with the largest diameter pivot near the largest pivot hole.
2. Depress the retaining tabs, push the register assembly into the register opening and engage the retainer tab pivots in the pivot holes.

INSTRUMENT PANEL PAD

Removal

1. Remove the retaining screws (3) securing the top edge of the instrument cluster trim panel and remove the instrument cluster trim panel. Refer to Fig. 14.
2. Remove the retaining screws (2) securing the left side instrument panel pad retaining tabs to the instrument panel, in the upper right and left corners of the instrument panel cluster area.
3. Remove the retaining screws (2) securing the right side instrument panel pad retaining tabs to the instrument panel, located in the two openings at the top edge of the right instrument panel trim applique, above the glove box.
4. Using a magnetic or locking tang-type phillips screwdriver, remove the retaining screws (2) securing the leading edge of the instrument panel pad to the defroster openings.

CAUTION: CARE SHOULD BE TAKEN TO PREVENT RETAINING SCREW LOSS IN THE DEFROSTER OUTLET OPENINGS. DAMAGE TO

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THE PLENUM DOORS MAY OCCUR, RESULTING IN CASE ASSEMBLY REMOVAL AND DISASSEMBLY FOR PROBLEM CORRECTION.

5. Raise the overhanging brow edge of the instrument panel pad, to clear the retaining tabs, and pull rearward to remove from the top of the instrument panel.

Installation

1. Position the instrument panel pad onto the top of the instrument panel with the leading edge inserted below the lower edge of the windshield trim and the overhanging brow slightly elevated above the instrument panel. Refer to Fig. 14.
2. Align the defroster opening retaining screw holes (2) and lower the overhanging brow edge until the retaining tab and screw openings align with their respective retaining screw holes (7).
3. Using a magnet or locking tang-type phillips screwdriver, loosely install the instrument panel pad retaining screws (2) in the retaining screw holes of the defroster outlet openings.

CAUTION: CARE SHOULD BE TAKEN TO PREVENT RETAINING SCREW LOSS IN THE DEFROST OUTLET OPENINGS. DAMAGE TO THE PLENUM DOORS MAY OCCUR, RESULTING IN CASE ASSEMBLY REMOVAL AND DISASSEMBLY FOR PROBLEM CORRECTION.

4. Loosely install the right side instrument panel pad retaining screws (2) in the retaining tab slots at the top edge of the right instrument panel trim applique, above the glove box.
5. Loosely install the left side instrument panel pad retaining screws (2) in the retaining tab slot openings in the upper right and left corners of the instrument panel cluster area.
6. Secure the instrument panel pad in position by tightening the retaining screws (6) described in Steps 3, 4 and 5 to specifications.
7. Install the lower locking tabs (4) of the instrument cluster trim panel into the tab slots at the lower edge of the instrument panel cluster area and press the instrument cluster trim panel into position.
8. Install the instrument cluster trim panel retaining screws (3) in the holes (3) at the top edge of the instrument cluster trim panel and tighten to specifications.

CONTROL ASSEMBLY

Removal

1. Remove retaining screws (3) securing the top edge of the instrument cluster trim panel and remove the instrument cluster trim panel for access to the control assembly. Refer to Fig. 15.
2. Remove retaining screws (4) securing the control assembly to the instrument panel and pull the control rearward from the instrument panel for access to the electrical wire harness connectors and the control housing attachments.
3. Disengage the function and temperature control cable assemblies from the heater case assembly. Refer to Function and/or Temperature Control cable removal procedure and Fig. 17.

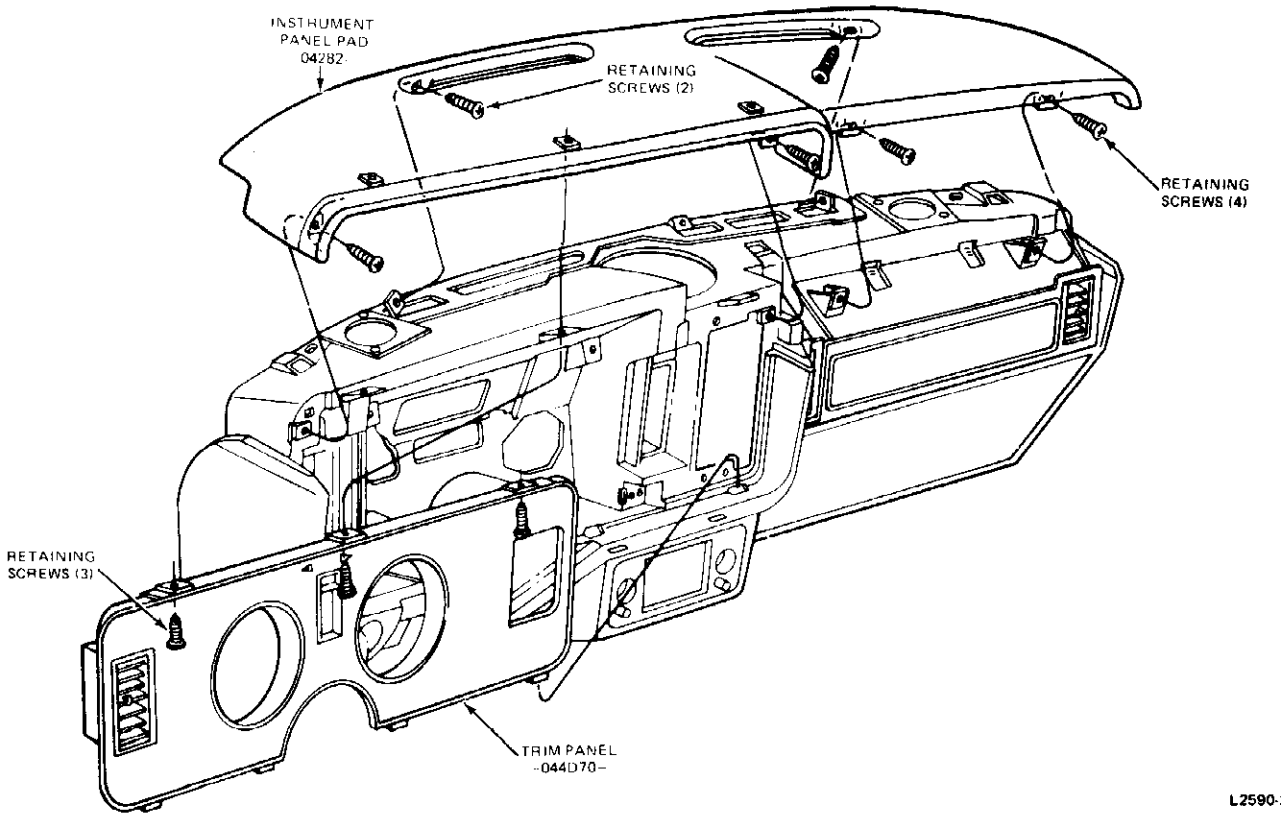


FIG. 14 Instrument Panel Pad Removal

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4. Disconnect the blower speed switch, system on-off switch and the control illumination wire harness connectors.
5. Remove the control assembly with the control cables.
6. Depress the locking tang (white) on the end of the function control cable housing and disengage the function control cable and housing assembly from the function lever tang and the frame of the control assembly (Fig. 16).
7. Depress the locking tang (black) on the end of the temperature control cable and housing assembly from the temperature lever tang and frame of the control assembly.

Installation

1. Slip the end wire loop of the temperature control cable and housing assembly (black) over the tang on the rear of the temperature control lever (Fig. 16). The wire loop coil should face outward, away from the base of the tang on the temperature control lever. Then, slide the cable housing end into the bracket of the control assembly frame until the locking tang snaps into position.
2. Repeat Step No. 2 for connection of the function control cable and housing assembly (white).
3. Feed the control cables through the panel opening and position the control assembly near the instrument panel opening (Fig. 15).
4. Connect the wire harness connectors for the control illumination, system on-off switch and the blower speed switch.
5. Align the alignment tabs (upper and lower) on the back of the control assembly with the hole (upper) and slot (lower) of the instrument panel and position the control assembly onto the instrument panel (Fig. 15).
6. Install the control assembly retaining screws (4) and tighten to specification.
7. Install the lower locking tabs (4) of the instrument cluster trim panel into the tab slots at the lower edge of the instrument panel cluster area and press the instrument cluster trim panel into position.
8. Install the instrument cluster trim panel retaining screws (3) in the holes at the top edge of the instrument cluster trim panel and tighten to specification.
9. Install the function and temperature control cable assemblies on the heater case assembly. Refer to procedure and Fig. 17.
10. Test the system for proper operation.

SYSTEM ON-OFF SWITCH ASSEMBLY

Removal

1. Remove the Control Assmebly from the instrument panel. Refer to procedure and Fig. 15.
2. Disconnect the wire harness connector from the system on-off switch.
3. Remove the system on-off switch retaining screws (2), securing the switch to the Control Assembly, and remove the switch assmebly (Fig. 16).

Installation

1. Align the Function Control Lever tab with the slot of the system on-off switch and position the system on-off switch assembly on the locator pins of the Control Assembly (Fig. 16).
2. Install the system on-off switch retaining screws (2) and tighten to specification.
3. Connect the system on-off switch wire harness connector and check for proper operation.
4. Install the Control Assembly in the instrument panel. Refer to procedure and Fig. 15.

BLOWER SWITCH ASSEMBLY

Removal

1. Remove the Control Assembly from the instrument panel. Refer to procedure and Fig. 15.
2. Disconnect the wire harness connectors from the rear of the blower switch.
3. Use a screwdriver to disengage the tang of the blower speed switch control knob and remove the control knob from the shaft (Fig. 16).
4. Remove the retaining screw (1) securing the blower switch assembly to the back of the Control Assembly and remove the switch assembly.

Installation

1. Insert the switch shaft into the slotted opening and position the blower switch onto the locator pin on the back of the control assembly (Fig. 16).
2. Install the switch retaining screw (1) and tighten to specification.
3. Connect the blower switch wire harness connector and check the switch for proper operation.
4. Install the control knob on the shaft of the blower switch assembly.
5. Install the control assembly in the instrument panel. Refer to procedure and Fig. 15.

FUNCTION AND/OR TEMPERATURE CONTROL CABLES

Removal

1. On the heater case cable housing mounting brackets (Fig. 17), raise the control cable housing locking tang (function cable, white-temperature cable, black) and slide the end of the cable housing out of the U-shaped slot of the cable housing mounting bracket.
2. Slide the self adjusting cable attaching clip off of the end of the crank arm.
3. Perform Steps 1, 2, 4, 5, 6 and/or 7 of the control assembly removal procedure to disengage the function (white) and/or temperature (black) control cable assemblies from the control assembly.

Installation

1. Perform Steps 1 and/or 2 then, 3 through 8 of the Control Assembly Installation procedure.
2. On the heater case (Fig. 17), slide the self adjusting cable attaching clip over the end of the door crank arm until it seats on the tab stop.
3. Slide the cable housing end slots into the cable housing mounting bracket U-shaped slot (function

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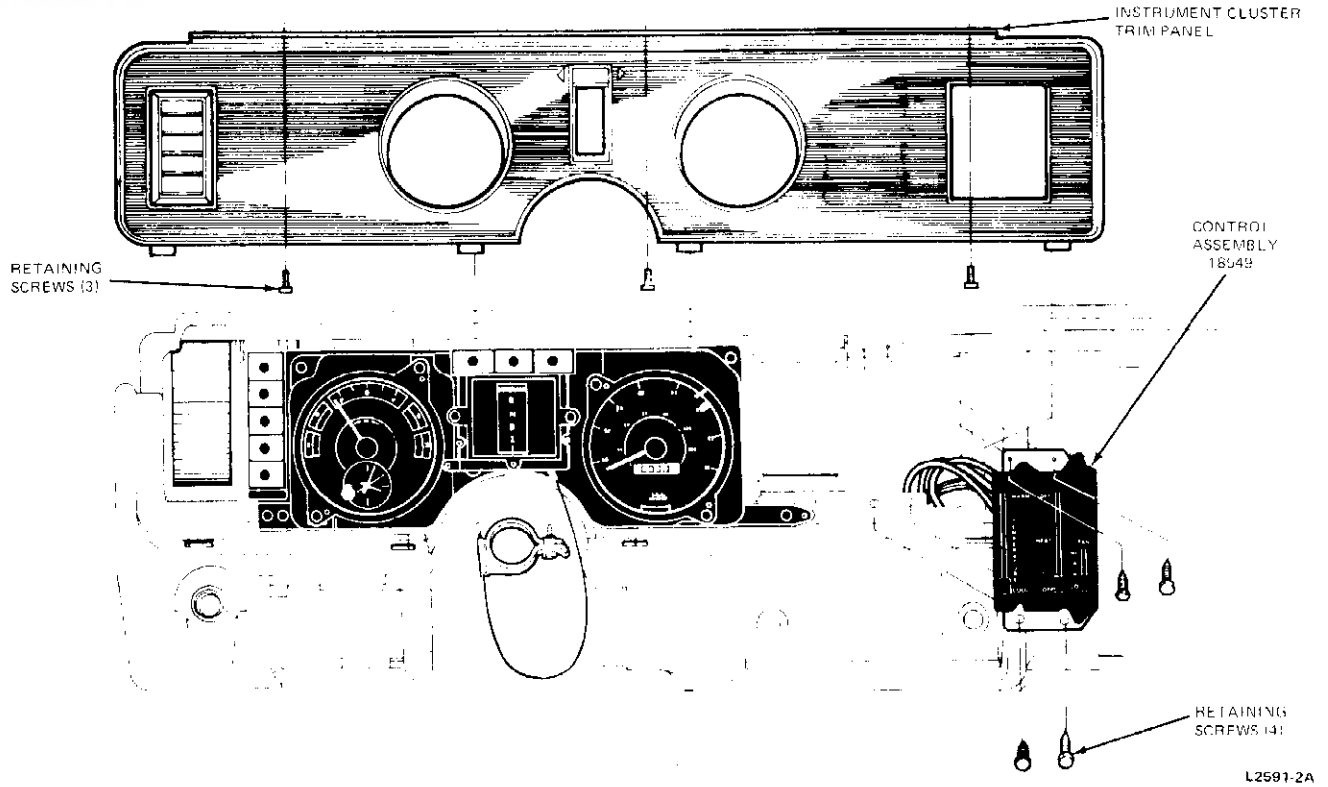


FIG. 15 Control Assembly Removal

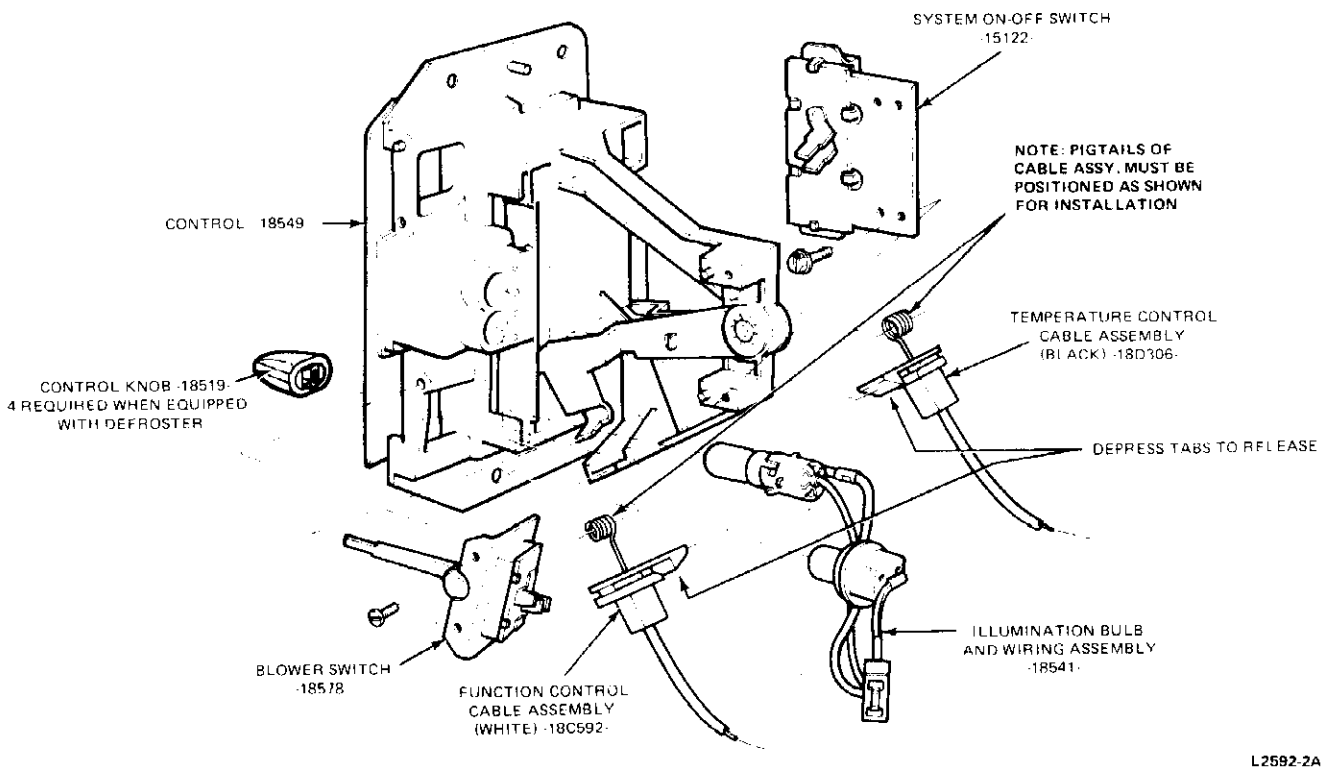


FIG. 16 Control Assembly Disassembled

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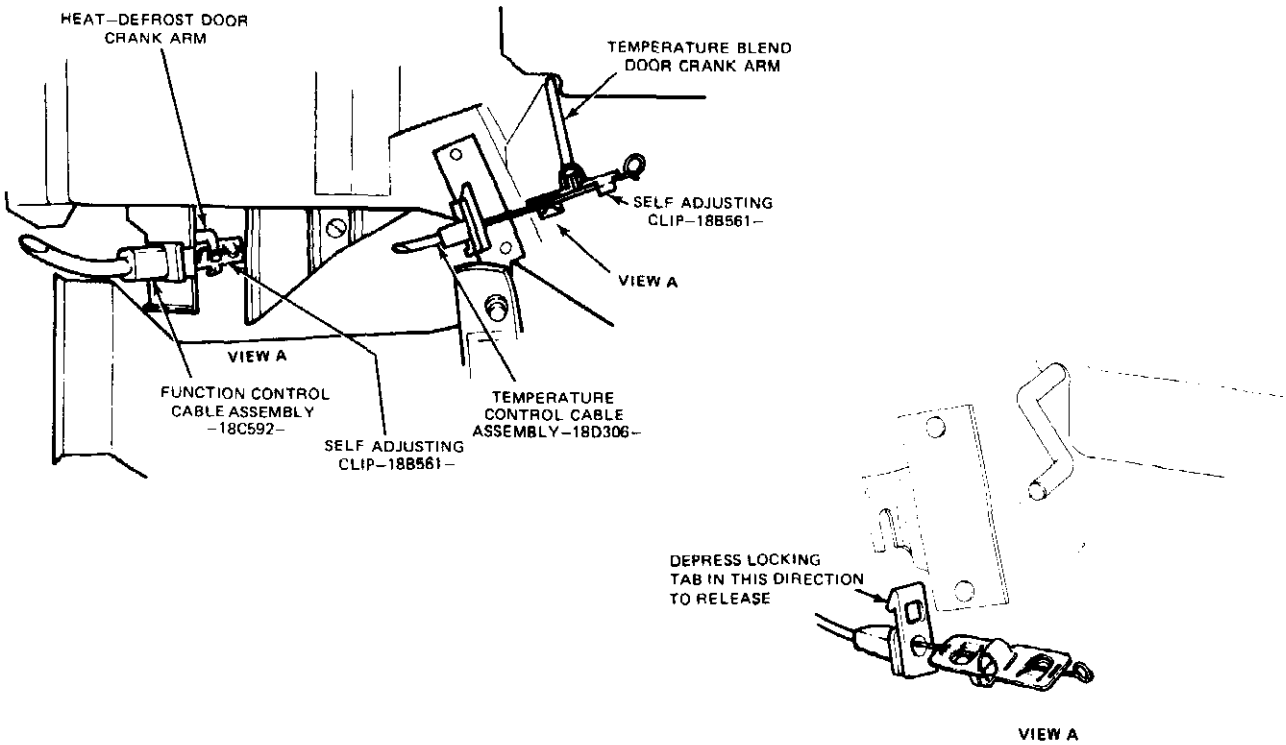


FIG. 17 Function and Temperature Control Cable—Removal

cable, white-temperature cable, black) until the locking tang snaps into position.

4. Follow the control cable adjustment procedure to adjust the temperature and/or function control cable.
5. Test the system for proper operation.

HEATER BLOWER RESISTOR ASSEMBLY

Removal

1. Disconnect the two wire harness connectors (Fig. 18).
2. Remove the resistor assembly retaining screws (2) securing the resistor board to the heater case assembly.
3. Remove the resistor assembly.

Installation

1. Apply rope sealer to the outer edge of the resistor board to prevent air leakage (Fig. 18).
2. Position the resistor assembly onto the resister opening of the heater case assembly.
3. Install the resistor assembly retaining screws (2) and tighten to specification.
4. Install the two wire harness connectors and test blower for proper operation.

BLOWER ASSEMBLY

Removal

1. Remove the right ventilator assembly. Refer to procedure and Fig. 11.
2. Disconnect the blower lead wire (orange/black stripe) connector from spade terminal of the resistor assembly and push it back through the hole in the case (Fig. 19).
3. Remove the right side cowl trim panel for access to the blower ground terminal lug (black) and remove the ground terminal lug retaining screw.
4. Remove the blower motor flange retaining screws (3) from inside the blower housing.
   NOTE: The blower wheel may be removed for improved access. Refer to procedure and Fig. 20.
5. Remove the blower motor from the housing.

Installation

1. Insert the blower motor wires through the opening at the back of the housing and position the blower motor mounting flange onto the locator pins (2) of the blower housing.
2. Install the blower flange retaining screws (Fig. 19) and tighten to specification.
3. Install the blower wheel on the shaft of the blower motor. Refer to procedure and Fig. 20.
4. Position the ground terminal lug, install the ground terminal lug retaining screw and tighten to specification.
5. Install the right side cowl trim panel.
6. Route the blower power lead wire (orange/black stripe) through the hole in the center of the case and install the connector on the spade terminal of the resistor assembly.
7. Install the right ventilator assembly. Refer to procedure and Fig. 11.
8. Test the blower for proper operation.

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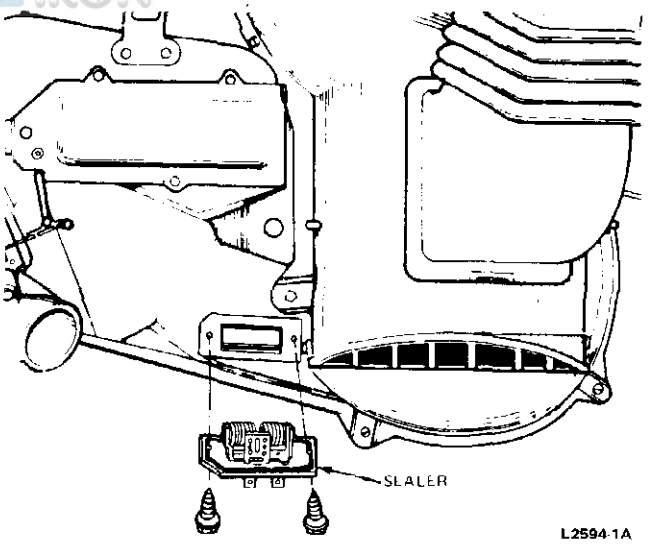


FIG. 18 Resistor Assembly Removal

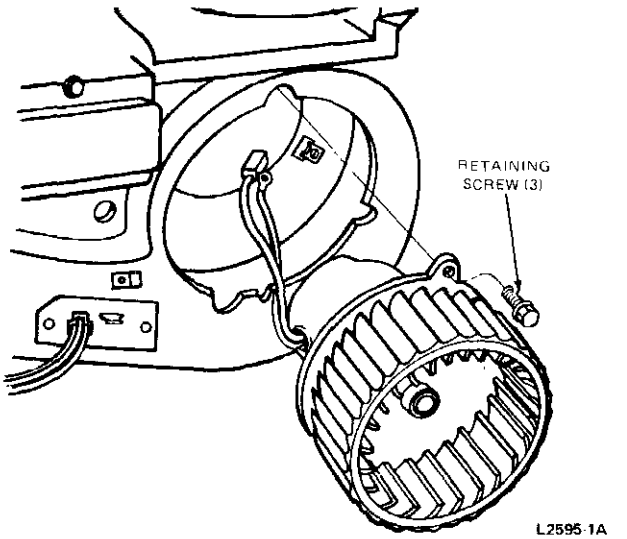


FIG. 19 Blower Motor and Wheel Assembly Removal

BLOWER WHEEL

Removal

1. Remove the right ventilator assembly. Refer to procedure and Fig. 11.
2. Remove the hub clamp spring from the wheel hub. Refer to Fig. 20.

   Note: Hose clamp pliers for flat spring type clamps will simplify this operation.
3. Slide the blower wheel from the motor shaft.

Installation

1. Align the flat surface on the ID of the blower wheel hub with the flat surface of the motor shaft (Fig. 20).
2. Slide the blower wheel onto the motor shaft until it is fully seated.
3. Using flat spring type hose clamp pliers, install a new hub clamp spring. Position clamp 90 degrees to flat on shaft. NOTE: DO NOT RE-USE THE OLD HUB CLAMP SPRING.
4. Check to be sure the wheel rotates freely in the housing.
5. Install the right ventilator assembly. Refer to procedure and Fig. 11.
6. Check wheel rotation to be sure wheel does not contact the air inlet ring on the ventilator assembly.
7. Test system for proper operation.

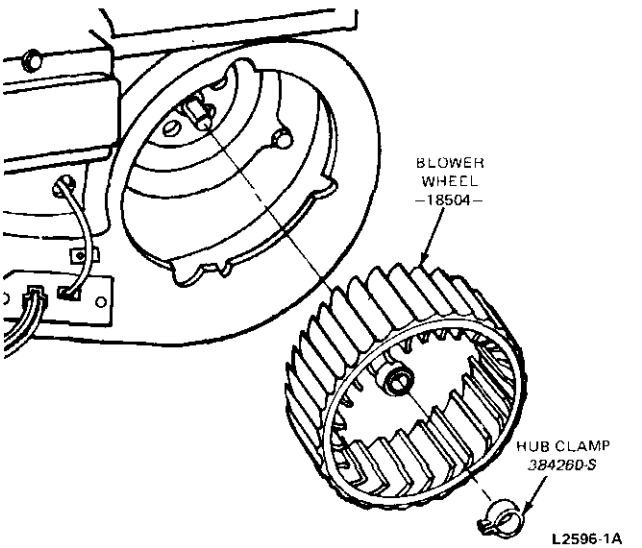


FIG. 20 Blower Motor Wheel Removal

HEATER CORE

Removal

1. Loosen radiator cap, open the radiator drain cock and partially drain coolant from engine cooling system to drain heater core. Close the radiator drain cock.
2. Loosen heater core inlet and outlet heater hose clamps (Fig. 26, 27 or 28) and disconnect the heater hoses from the heater core tubes. Cap the heater core tubes to prevent spilling coolant in the passenger compartment.
3. Remove glove box liner for access to heater core cover.
4. Remove instrument panel-to-cowl brace retaining screws (2) and remove brace.
5. Move temperature control lever to warm position.
6. Remove heater core cover retaining screws (4) as shown in Fig. 21.
7. Remove heater core cover through the glove box opening.
8. From the engine compartment, loosen the heater case assembly mounting stud nuts (3) as shown in Fig. 22.
9. Push heater core tubes and seal toward the passenger compartment to loosen the heater core assembly from the heater case assembly.
10. Remove the heater core from the heater case assembly by withdrawing through the glove box opening (Fig. 21).

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Installation

1. Align heater core with the heater case opening (with core tubes on top) and slide the heater core into the heater case assembly (Fig. 21).
2. Position the heater core cover onto the opening of the case assembly and install core cover retaining screws (4). Tighten cover retaining screws to specifications.
3. Fighten the heater case assembly mounting stud nuts (3) to specification (Fig. 22).
4. Install instrument panel-to-cowl brace and retaining screws (2). Tighten screws to specification.
5. Install the glove box liner.
6. Remove heater core tube plugs, if applicable and install the heater hoses onto the heater core tubes. Position and tighten the heater hose clamps to specification (Fig. 26, 27 or 28).
7. Refill cooling system to proper level and recheck the coolant level after operating the engine.
8. Check for proper heater temperature and function.

HEATER CASE ASSEMBLY

Removal

1. Remove right register assembly, register duct and right ventilator assembly. Refer to removal procedures and Figs. 11 and 13.
2. Remove the floor heat duct assembly from heater case assembly. Refer to floor heat duct assembly removal procedure and Fig. 23.
3. Remove glovebox and door.
4. Remove instrument panel-to-cowl brace retaining screws (2) and remove brace.
5. Remove the nut (1) securing the heater case mounting bracket to the heater case-to-cowl mounting bracket (Fig. 22).
6. Disconnect the temperature and function control cables from their respective control crank arms. Refer to procedure and Fig. 17.
7. Disconnect the 14401 wire harness electrical connector from the resistor assembly.
8. Remove the right side cowl trim panel and remove the screw (1) securing the blower ground terminal lug to the body ground.

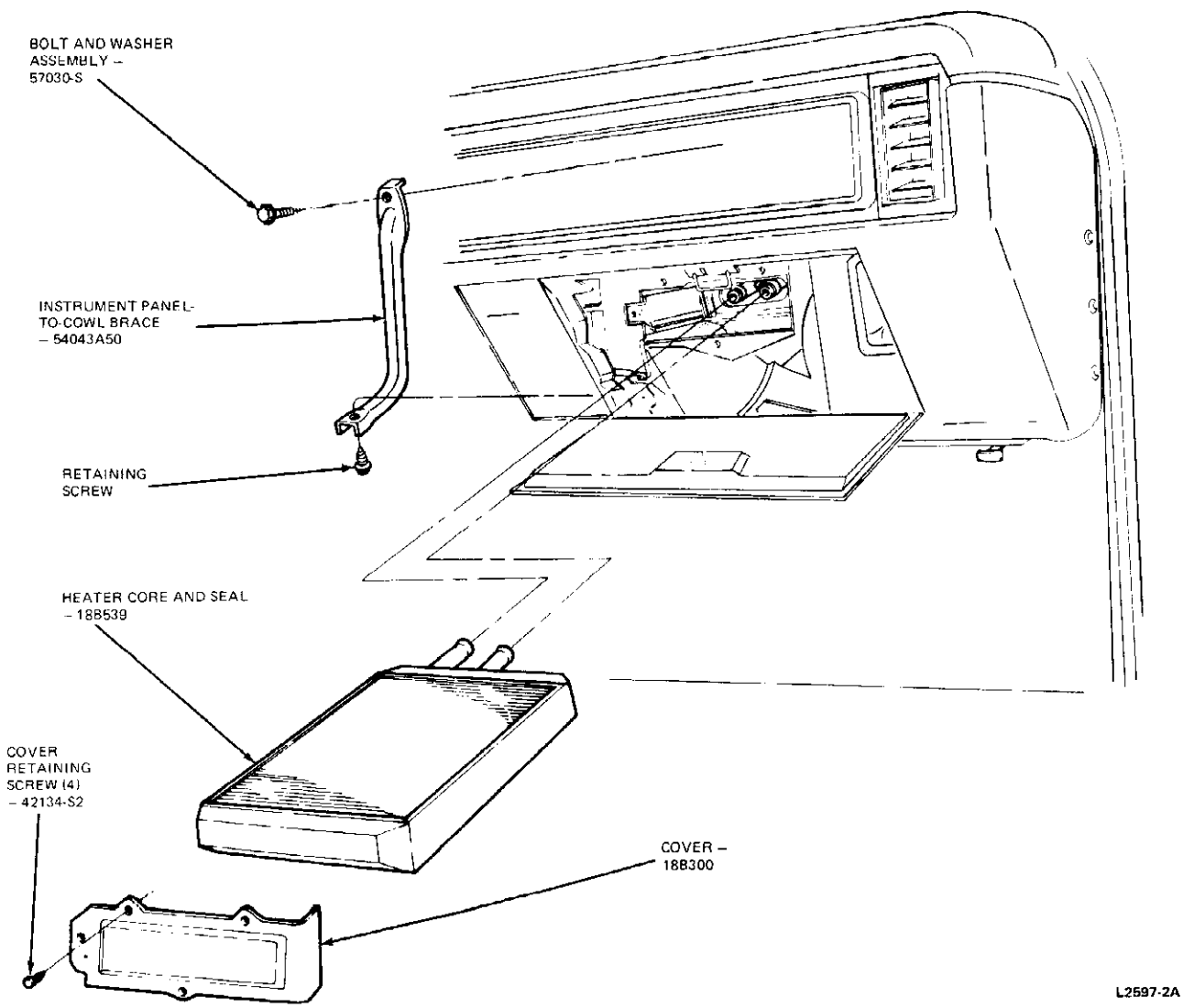


FIG. 21 Heater Core Removal

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9. Remove the radiator cap, open the radiator drain cock and partially drain the engine coolant to drain the heater core. Close the radiator drain cock.
10. Loosen heater hose clamps and disconnect the heater hoses from the heater core tubes. Cap the core tubes to prevent the spilling of coolant in the passenger compartment.
11. Remove the heater case assembly-to-dash panel mounting stud nuts (3) as shown in Fig. 22.
12. Remove the heater case assembly from the vehicle.

Installation

1. Position the heater case assembly so that the mounting studs (3) protrude through the dash panel mounting holes. Loosely install mounting stud nuts (Fig. 22).
2. Hang the heater case mounting bracket over the stud on the heater case-to-cowl mounting bracket and install and tighten the retaining nut (1) to specification.
3. Install instrument panel-to-cowl brace and retaining screws (2) and tighten screws to specification.
4. Install glovebox.
5. Tighten the heater case assembly-to-dash panel mounting stud nuts (3) to specification.
6. Connect heater hoses to core tubes and tighten hose clamps to specification (Figs. 26, 27 or 28).
7. Refill cooling system with specified coolant to proper coolant level and install the radiator cap.
8. Connect the 14401 wire harness electrical connector to the spade terminals (3) of the resister assembly.
9. Position the blower ground terminal lug on the body frame hole and install and tighten the ground lug retaining screw (1) to specification.
10. Install the right side cowl trim panel.
11. Connect the temperature and function control cables to their respective door crank arms (Fig. 17).
12. Install the floor heat duct assembly. Refer to the floor heat duct installation procedure and Fig. 23.
13. Install the right ventilator assembly, right register duct and register assembly. Refer to the installation procedures and Figs. 11 and 13.
14. Start the engine and recheck for proper coolant level.

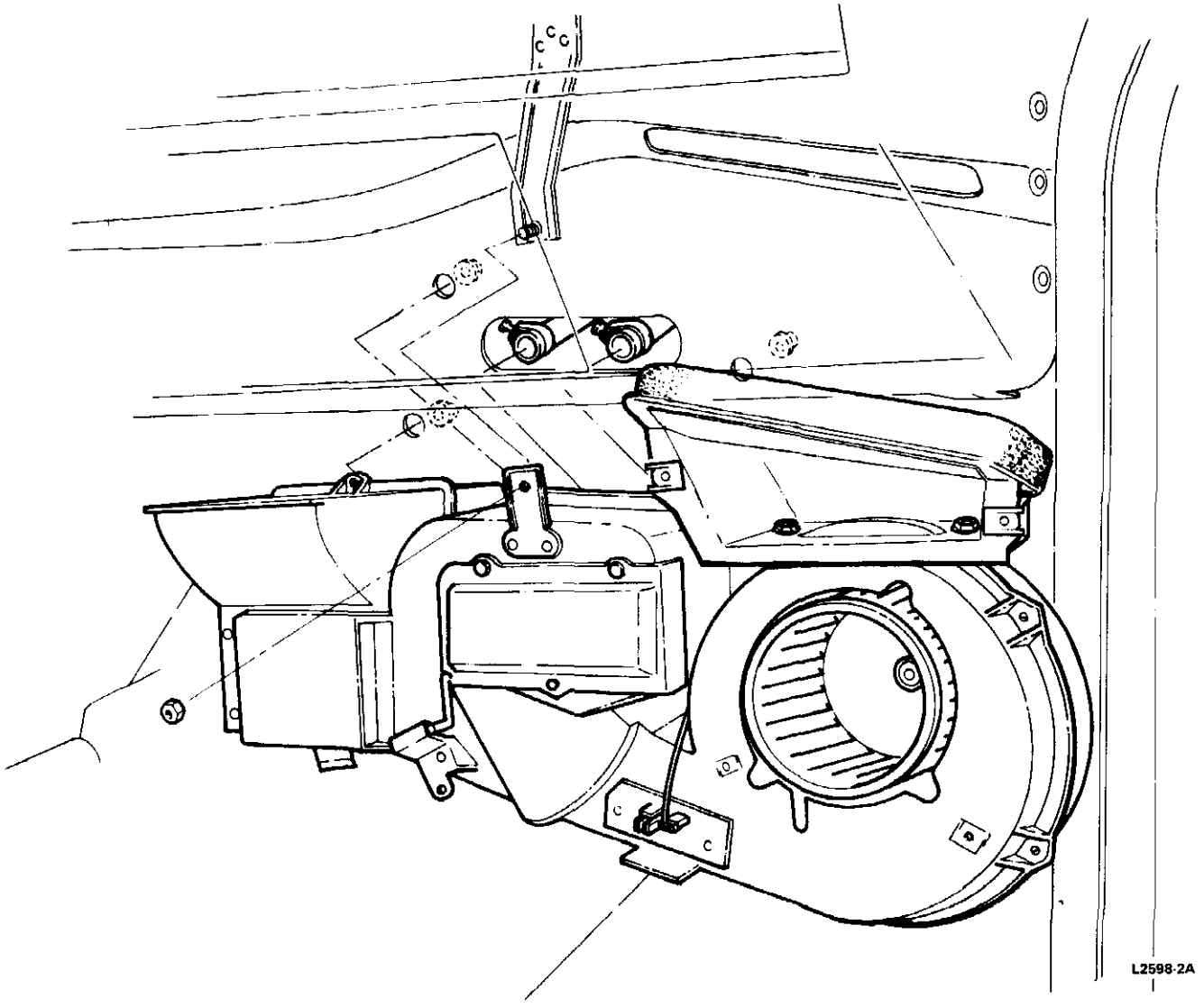


FIG. 22 Heater Case Assembly Removal

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15. Test the heater system for proper operation.

FLOOR HEAT DISTRIBUTION DUCT ASSEMBLY

Removal

1. Remove the retaining screw (1) securing the right half of the floor heat distribution duct assembly to the temperature control cable housing mounting bracket (Fig. 23).
2. Slide the right half of the floor heat distribution duct assembly toward the right (passenger side) of the vehicle and remove.
3. Remove the retaining screws (2) securing the left half of the floor heat distribution duct to the heater case assembly.

   NOTE: IF THE VEHICLE IS EQUIPPED WITH ANY RADIO OTHER THAN THE STANDARD AM RADIO, IT WILL BE NECESSARY TO REMOVE THE RADIO TO PROVIDE CLEARANCE FOR THE REMOVAL OF THE LEFT HALF OF FLOOR HEAT DISTRIBUTION DUCT.
4. Slide the left half of the floor heat distribution duct toward the left (driver side) of the vehicle and remove.

Installation

1. Position the left half of the floor heat distribution duct onto the left end opening of the heater case assembly (Fig. 23). Be sure the floor heat distribution duct is fully engaged in the retaining clip on the heater case opening near the dash panel.
2. Install the retaining screws (2) and secure the left half of the floor heat distribution duct to the heater case assembly. Tighten the retaining screws to specification.
3. Position the right half of the floor heat distribution duct onto the end opening of the left half of the floor heat distribution duct.
4. Install the retaining screw (1) and secure the right half of the floor heat distribution duct bracket to the temperature control cable housing mounting bracket. Tighten the retaining screw to specification.
5. Install the radio (if applicable).

DEFROSTER NOZZLE ASSEMBLY

Removal

1. Remove the heater case assembly. Refer to procedure and Fig. 22.
2. Remove the instrument panel pad. Refer to procedure and Fig. 14.
3. Remove the retaining screws (5) securing the defroster nozzle assembly and brace to the instrument panel (Fig. 24).
4. Remove the defroster nozzle from under the instrument panel.

Installation

1. Position the defroster nozzle assembly under the instrument panel onto the outlet openings at the instrument panel (Fig. 24).
2. Install the retaining screws (5) which secure the defroster nozzle assembly and brace to the instrument panel. Tighten the retaining screws to specification.
3. Install the heater case assembly. Refer to procedure and Fig. 22.
4. Install the instrument panel pad. Refer to procedure and Fig. 14.
5. Check system for proper defroster operation.

TEMPERATURE BLEND DOOR

Removal

1. Remove the heater core as outlined in procedure and shown in Fig. 21.
2. Remove the heater core support channel from the heater core opening (Fig. 25).
3. Disengage the temperature control cable self adjusting clip from the door crank arm.
4. Disengage the temperature blend door crank arm from the case at the lower left corner of the heater core opening.
5. Remove the temperature blend door from case assembly through the heater core opening.

Installation

1. Insert the temperature blend door assembly through the heater core opening and insert the end of the shaft into the shaft journal of the case assembly (Fig. 25).
2. Snap the crank arm end of the shaft into the opening at the lower left corner of the heater core opening.
3. Install the heater core support channel, the heater core and core cover.
4. Engage the end of the crank arm into the slot of the self adjusting clip on the temperature control cable.
5. Check for proper operation.

HEAT-DEFROST DOOR

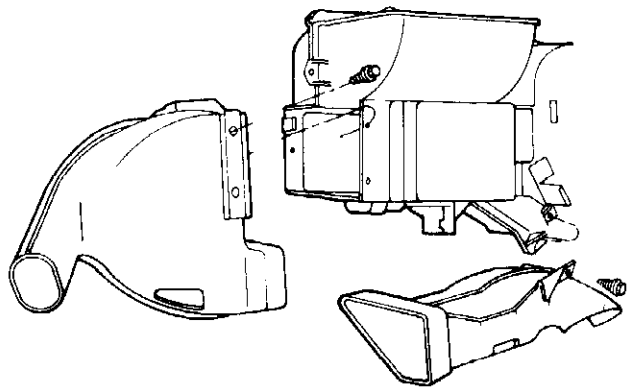
Refer to Heater Case Removal and Installation (Fig. 22) and Disassembly and Assembly procedure and Fig. 29 for removal of the Heat-Defrost Door.

HEATER HOSES

Refer to Figs. 26, 27 and 28 for engine compartment heater hose routings.

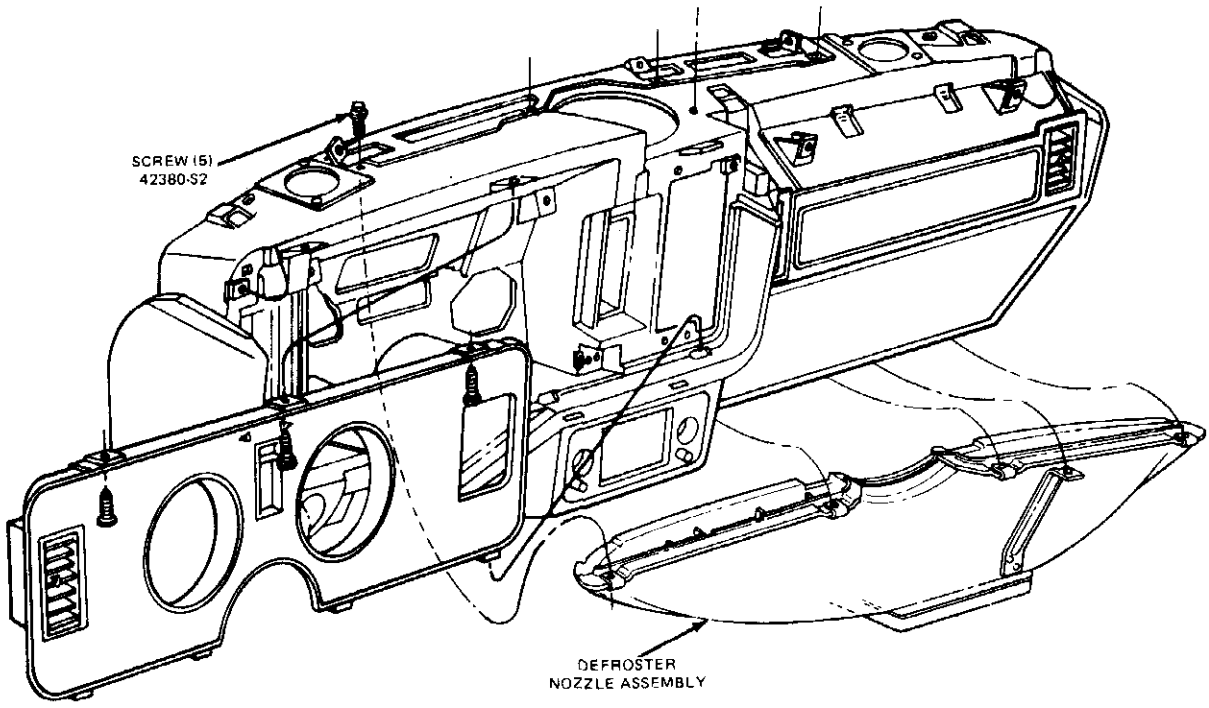
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DETROIT IRON



L2599-1A

FIG. 23 Floor Heat Distribution Duct Assembly Removal



L2600-2A

FIG. 24 Defroster Nozzle Removal

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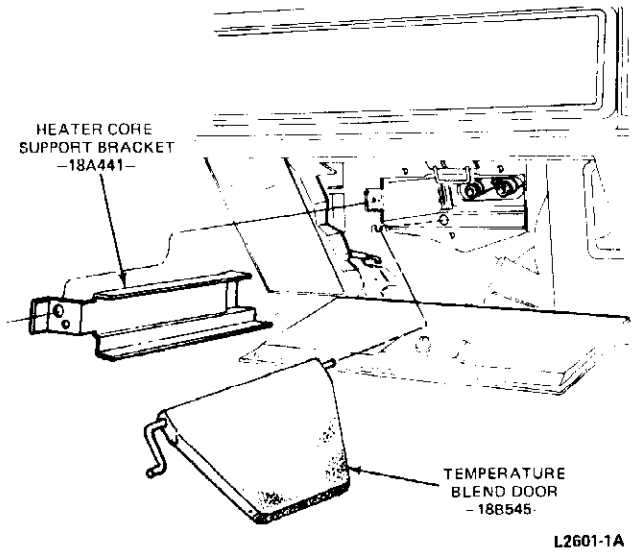


FIG. 25 Temperature Blend Door Removal

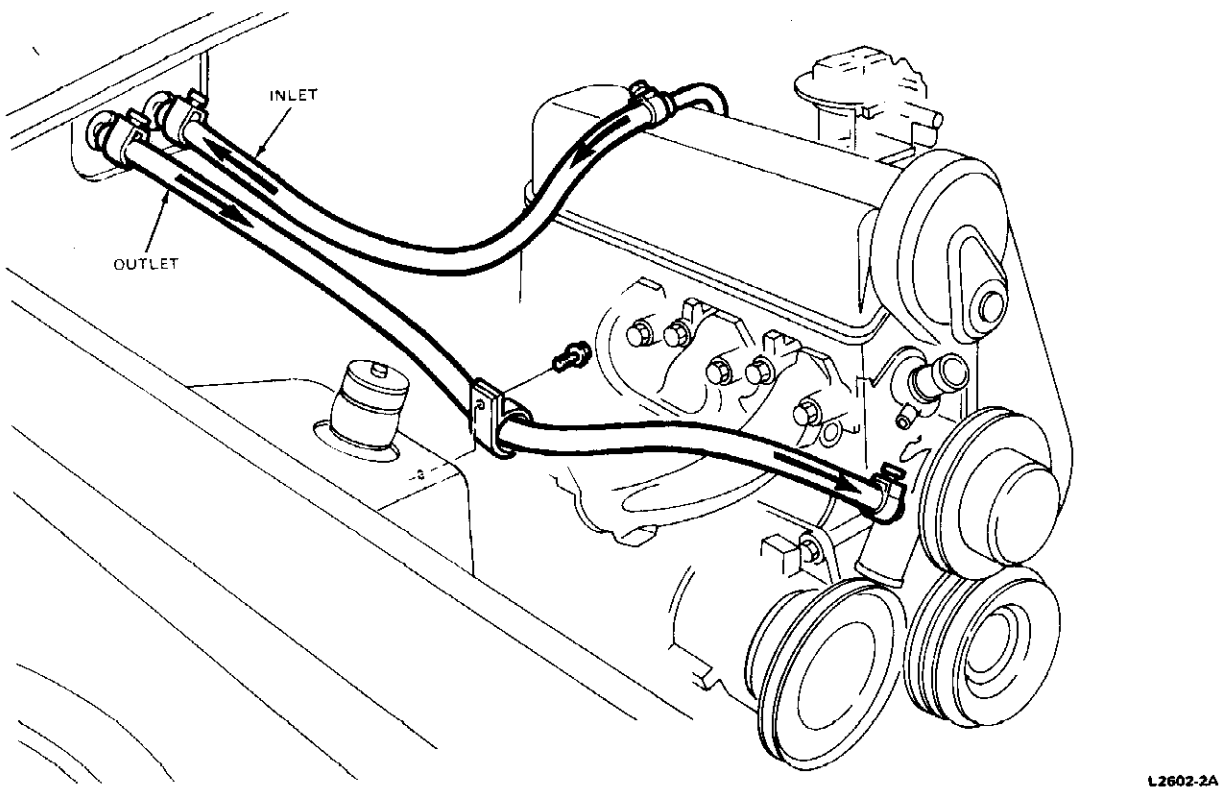


FIG. 26 Heater Hose Routing—2.3L I-4 Engine

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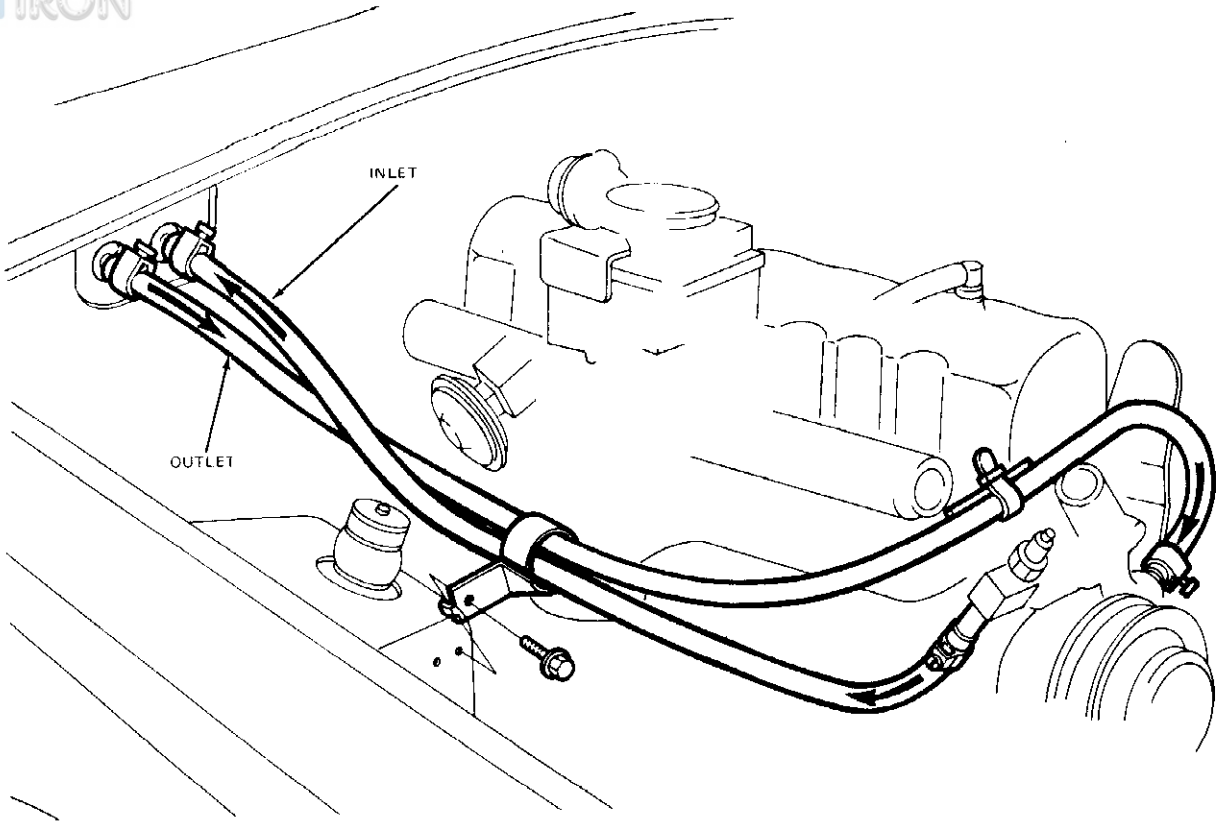


FIG. 27 Heater Hose Routing—3.3L (200 CID) I-6 Engine

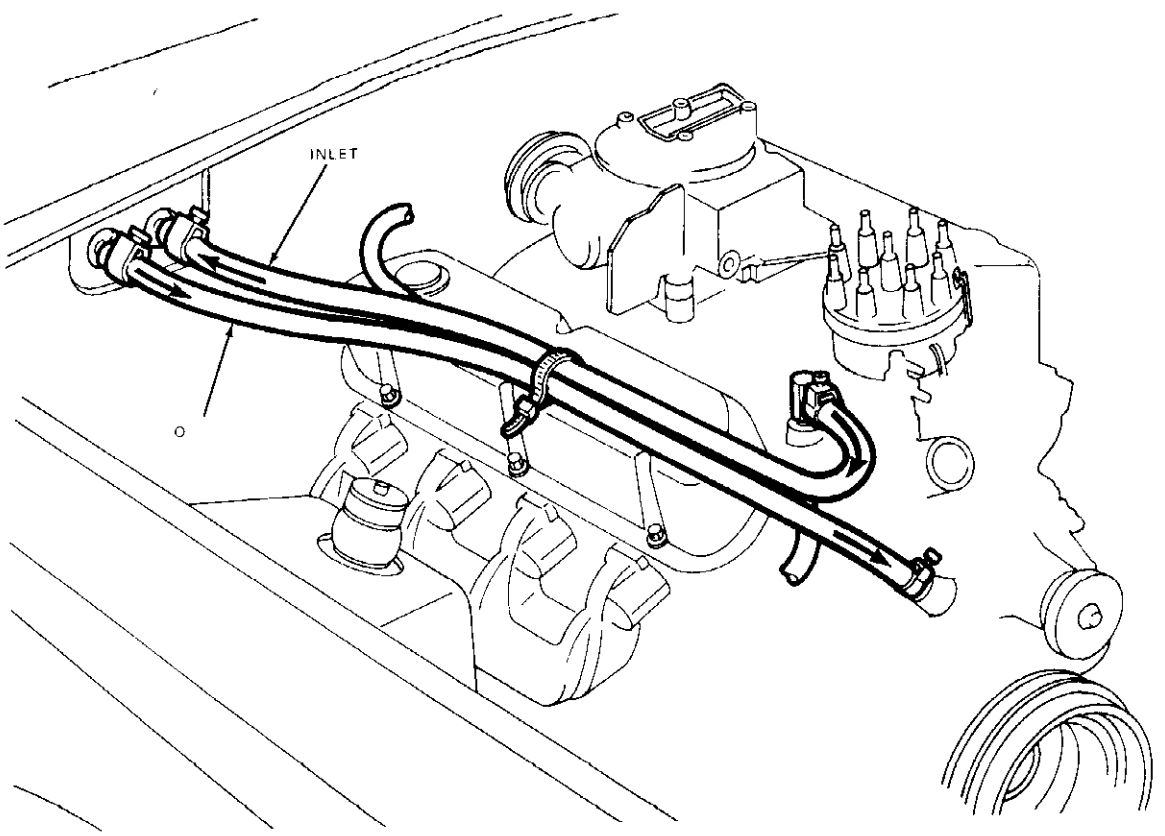


FIG. 28 Heater Hose Routing—5.0L (302 CID) V-8 Engine

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DISASSEMBLY AND ASSEMBLY

HEATER CASE ASSEMBLY

Disassembly

1. Remove the retaining screws (2) securing the outside air inlet duct to the heater case assembly, and remove the duct from the heater case assembly (Fig. 29).
2. Disconnect the blower motor power lead wire connector (orange/black stripe wire) from the terminal of the resistor assembly and pull back through the center hole of the case assembly.
3. Remove the retaining screws (2) securing the resistor assembly to the heater case assembly and remove the resistor assembly.
4. Remove the heater core cover retaining screws (4) and remove the cover.
5. Remove the heater core and the internal heater core support bracket.
6. Disengage the Temperature Blend Door crank arm shaft from the journal notch of the rear case half.
7. Remove the case half assembly screws (3) and retention clips (10) and separate the case halves.
8. Remove the blower motor flange retaining screws (3) and remove the blower motor and wheel assembly from the front case half.
9. Remove the Temperature Blend Door and Crank Arm Assembly from the front case half.
10. Remove the Heat-Defrost Door and Crank Arm Assembly from the front case half.

    NOTE: Wrap a short piece of tape on the crank arm to prevent loss of the bearing thrust washer.
11. Remove the metal Heat-Defrost separator plate from the front case half.

Assembly

1. Install the metal Heat-Defrost separator plate in the front case half.
2. Install the Heat-Defrost Door and Crank Arm Assembly in the front case half, with the bearing thrust washer positioned between the door and lower edge of the heater case (Fig. 29).
3. Install the Temperature Blend Door in the front case half, with the straight shaft end inserted into the bearing journal.
4. Insert the blower power and ground wire leads through the blower housing opening in the front case half. Position the blower mounting flange onto the locator pins (2) and install and tighten the blower motor mounting screws (3) to specification.
5. Position the rear case half onto the front case half. NOTE: MAKE CERTAIN THE LIP SEAL ON THE EDGE OF THE HEAT-DEFROST DOOR DOES NOT BECOME PINCHED BETWEEN THE CASE HALVES. Install the case half assembly screws (3) and retention clips (10) and tighten the assembly screws to specification.
6. Snap the crank arm end of the Temperature Blend Door Assembly into the journal notch in the lower left corner of the heater core opening.
7. Insert the heater core support bracket into the heater core opening. Position the straight end into the slot of the front case half and the bent flange end over the guide pin of heater core opening on the rear case half.
8. Align the heater core with the heater case opening (with core tubes on top) and slide the heater core into the heater case assembly.
9. Position the heater core cover onto the opening of the case assembly and install the core cover retaining screws (4). Tighten the cover retaining screws to specification.
10. Apply rope sealer to the outer edge of the resistor board to prevent air leakage.
11. Position the resistor assembly onto the resistor opening of the heater case and install and tighten the retaining screws (2) to specification.
12. Feed the blower power lead wire (orange/black stripe) through the center case hole and install the connector on the appropriate spade terminal of the resistor assembly.
13. Position the outside air inlet duct onto the heater case assembly and install and tighten the retaining screws (2) to specification.
14. Check for free operation of Heat-Defrost and Temperature Blend doors, and blower wheel prior to installation in the vehicle.

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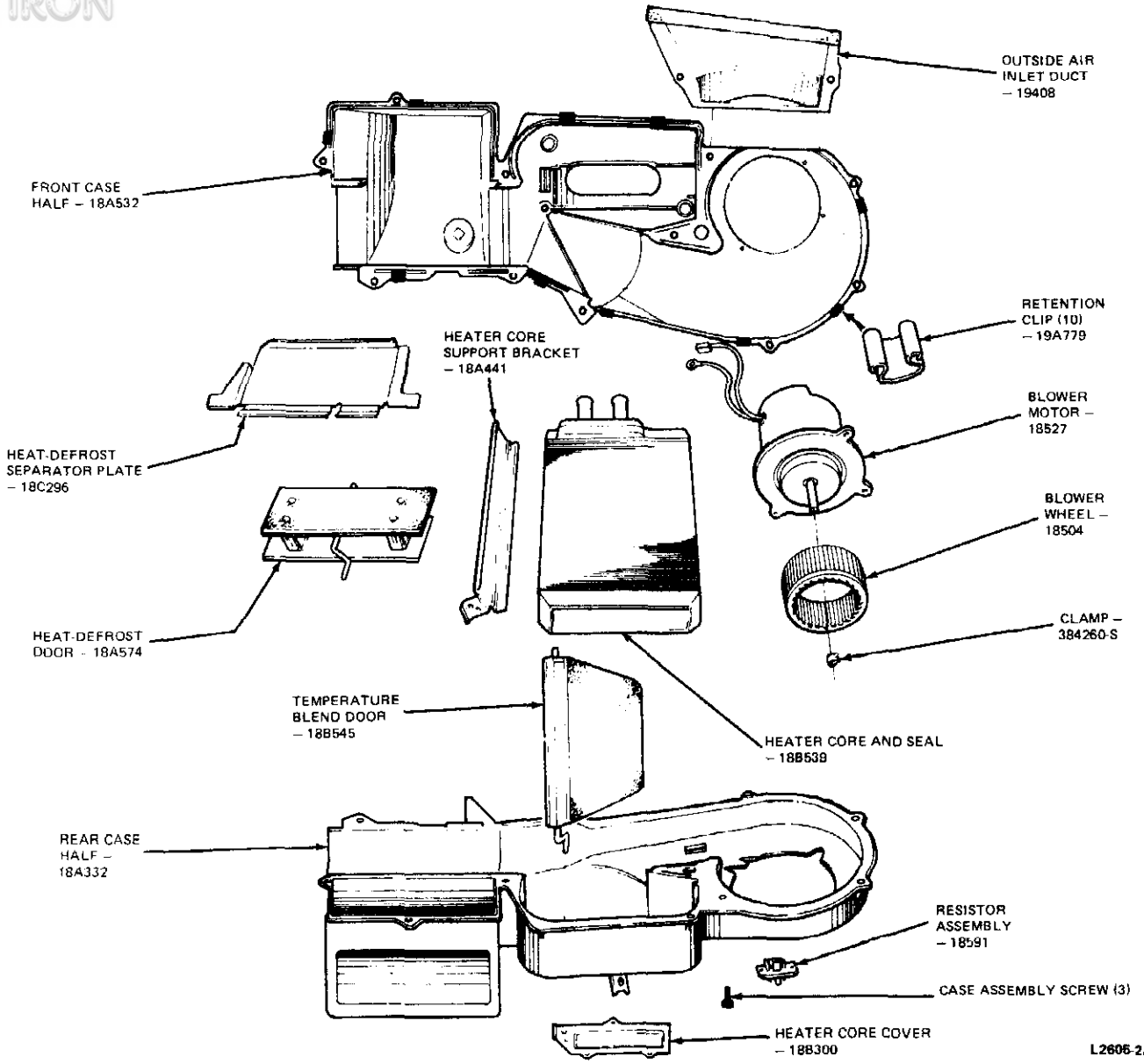


FIG. 29 Heater Case Disassembled

SPECIFICATIONS

HEATER SYSTEM ELECTRICAL

BLOWER MOTOR

Blower Speed	Current (Amps)	Voltage
LO	3.6	4.6
Medium	5.3	7.4
HI	8.5	12.8
Protective Device		15 Amp. fuse in fuse panel.

CL2606-2A

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Mustang II, Pinto and Bobcat Heating System

PART 36-14

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CL2339-2B

DESCRIPTION AND OPERATION

For an explanation of the control door code numbers used throughout this Part, refer to General Information in Part 36-10.

AIR FLOW

The blower motor in the Mustang II, Pinto and Bobcat heater assembly is located behind the heater core instead of in front of it.

Outside air enters the right duct of the heater assembly through the cowl opening. With the right air vent closed, the air is drawn through the (5) blend door opening(s) through and/or around the heater core into the blower housing (Fig. 1). The blower then forces the air into the plenum chamber where it discharges either through the defroster nozzle or the air distribution duct to the floor.

CONTROL ASSEMBLY

The system has only two doors: the temperature blend (5) door and the heat/defrost (7) door (Fig. 1). Both doors are cable controlled by levers in the control assembly (Fig. 2). The cable from the (5) door connects to the temperature control (upper) lever; the cable from the (7) door connects to the function control (lower) lever (Fig. 2).

The system off switch shuts the blower motor off when the function control lever is in the OFF position. The lever at the left end of the control head operates the blower switch which provides three blower speeds; low, medium and high.

TEMPERATURE CONTROL LEVER OPERATION

When the temperature control (upper) lever (Fig. 2) is set at COOL, the (5) door (Fig. 1) shuts off air passage to the heater core and by-passes it directly to the blower housing unheated.

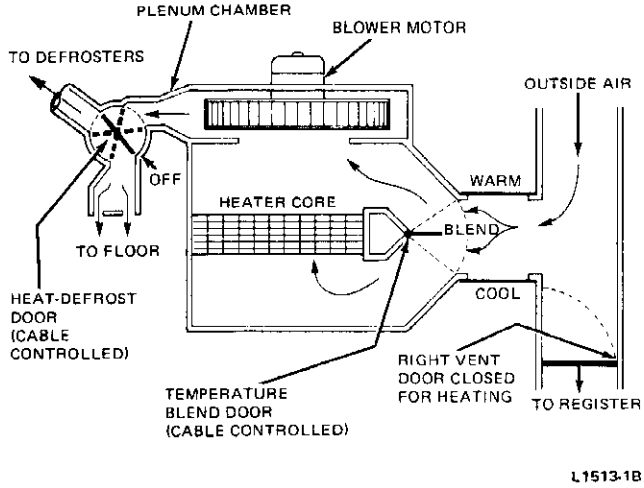


FIG. 1 Heater Air Flow

As the temperature control lever is moved from COOL to WARM, the control cable moves the blend (5) door (Fig. 1) from minimum heat to full heat position to modulate the air flow through and/or around the heater core. The air through the core and the air through the by-pass chamber is then mixed as it enters the blower housing.

At full WARM position, the by-pass to the blower is shut off, and all the air passes through the heater core to pick up maximum heat before entering the blower housing.

FUNCTION CONTROL LEVER OPERATION

The function control (lower) lever actuates a control cable connected to the heat-defrost (7) door in the plenum chamber (Fig. 2). In the OFF position, the door is closed blocking all air passage through the plenum (Fig. 1). In HEAT position, air is discharged through the

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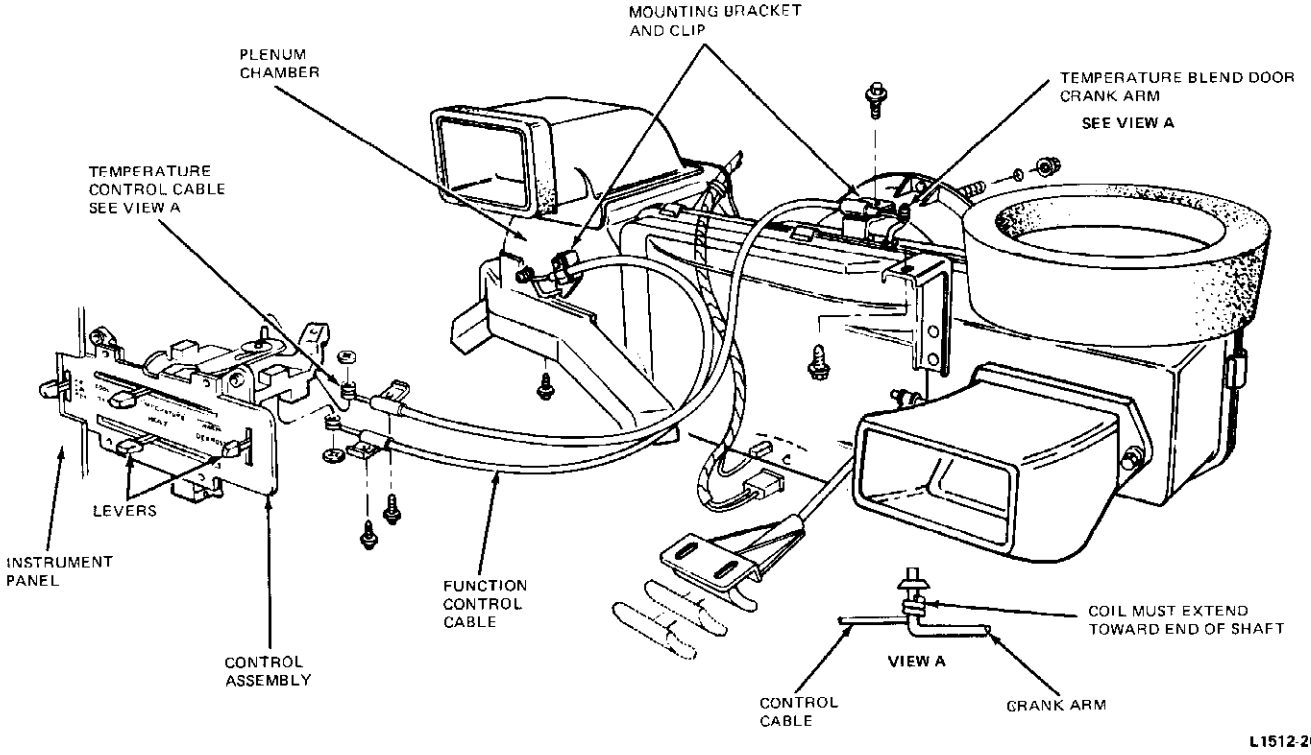


FIG. 2 Heater Control Cable Adjustments—Mustang II Shown

air distribution duct to the floor area. A small amount of air will be discharged through the defroster nozzle. In DEFROST position, air is discharged to the windshield through the defroster nozzle. A small amount of air is bled through the air distribution duct to the floor. Air flow can also be modulated in direct proportion to the control setting between HEAT and DEFROST positions.

A single defroster nozzle, connected to the top of the plenum chamber, distributes air through two openings in the forward instrument panel to the windshield.

ADJUSTMENTS

FUNCTION CONTROL CABLE

1. Loosen the function control cable mounting screw (Fig. 2).
2. Move the function control lever to DEFROST position. Leave a 1/8-inch gap on the Mustang II or a 1/4-inch gap on the Pinto and Bobcat between the lever and the end of the slot.
3. Place the (7) door crank arm in the DEFROST position and tighten the screw (Fig. 2).

TEMPERATURE CONTROL CABLE

1. Loosen the temperature control cable mounting screw (Fig. 2).
2. Move the temperature control lever to the full WARM position (right end of control slot), and then back it off 1/8 inch on the Mustang II or 1/4 inch on the Pinto and Bobcat.
3. Move the (5) door crank arm toward the mounting bracket (Fig. 2), and tighten the screw.

REMOVAL AND INSTALLATION

CONTROL CABLES

Pinto and Bobcat

1. Remove the two control assembly-to-instrument panel mounting screws, and pull the control assembly from the panel.
2. Remove the screw and two push nuts that retain the two cables to the control assembly and disconnect the cable(s) from the control lever(s) (Fig. 3).
3. To remove the function control cable, remove the push nut and screw that connects the cable to the (7) door, and pull the cable out.

To gain access to the temperature control cable connections, open the glove box door and reach through the glove box opening. Remove the push nut and screw

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that connects the cable to the (5) door, and pull the cable out.

4. When installing, first connect the cables(s) to the control assembly, push the cable(s) through the opening and install the control assembly to the instrument panel. Then connect the cable(s) to the (5) and/or (7) door. Adjust the cable as outlined under ADJUSTMENTS.

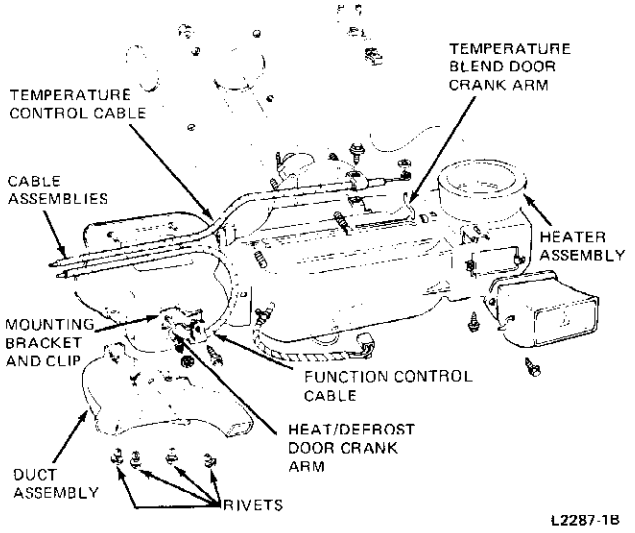


FIG. 3 Heater Control Cable Adjustments—Pinto and Bobcat

Mustang II

1. Remove the push nuts and screws that retain the cables to the control head.
2. To remove the function control cable, remove the push nut and screw that connects the cable to the (7) door, and pull the cable out (Fig. 2).
3. To install, connect the cables to the (5) and/or (7) door, leaving the attaching screws loose. Attach the cables to the control head. Adjust the cables as outlined under ADJUSTMENTS.

CONTROL ASSEMBLY

Pinto and Bobcat

1. Remove the two control head-to-instrument panel mounting screws from the face of the assembly.
2. Pull the control assembly out of the opening in the instrument panel, and then disconnect the switch lead wires and illumination lamp lead wire.
3. Remove the screw and push nut that retains the cables to the control assembly. Disconnect the cables from the control levers and remove the control (Fig. 3).
4. When installing the control assembly adjust both cables as outlined in the Adjustment Section.

Mustang

1. Remove the lower instrument panel to control support bracket mounting screw.
2. Remove the two control mounting screws from front of instrument panel. Lower the control assembly from under panel.
3. Disconnect the electrical connectors from the blower switch, system off switch and illumination bulb harness.
4. Disconnect the electrical connectors from the defogger switch and warning lamp, if so equipped.
5. Disconnect the function control cable and temperature control cable from the control head and remove the control head assembly.
6. When installing the control assembly adjust both cables as outlined in the Adjustment Section.

HEATER SWITCH

Pull the knob off the switch lever, and remove the two control head-to-instrument panel screws and the bracket screw on the Mustang II. Pull the control head out of the panel for access, disconnect the switch lead wire, and remove the switch from forward side of the control (one screw).

DEFROSTER NOZZLE

The defroster air duct has to be removed before the nozzle can be removed. The air duct is attached to the top of the plenum chamber by a snap rivet at the front and two tabs at the rear (Fig. 4). Remove the snap rivet and move the air duct back into the defroster nozzle to disengage it from the tabs on the plenum chamber. Now, tilt the forward edge of the duct up and forward to disengage it from the nozzle, and remove it from the left side of the heater assembly.

On the Pinto and Bobcat, the defroster nozzle is retained by four mounting tabs integral with the instrument panel flange. These tabs are twisted to retain the defroster nozzles to the instrument panel. They must be straightened to remove the nozzles and twisted during installation. Lower the nozzle rearward to clear the plenum chamber and remove it.

HEATER CASE ASSEMBLY

1. Drain the engine coolant, and disconnect the battery.
2. Disconnect the blower motor ground wire (black) at the engine side of the dash panel.
3. Disconnect the heater hoses at the engine block.
4. Remove the four heater assembly-to-dash panel mounting nuts from the engine side of the dash panel.
5. From inside the vehicle, remove the glove box.
6. Remove the mounting bracket clips and disconnect the control cables from the (5) and (7) door crank arms (Fig. 2). Disconnect the motor lead wire from the resistor (Fig. 3).
7. Remove the radio for access as outlined in Group 35.
8. From inside the vehicle, remove the snap rivet that attaches the forward side of the defroster air duct to the plenum chamber (Fig. 4). Move the air duct back into the defroster nozzle to disengage it from the tabs on the plenum chamber. Now, tilt the forward edge of the duct up and forward to disengage it from the nozzle, and remove it from the left side of the heater assembly.

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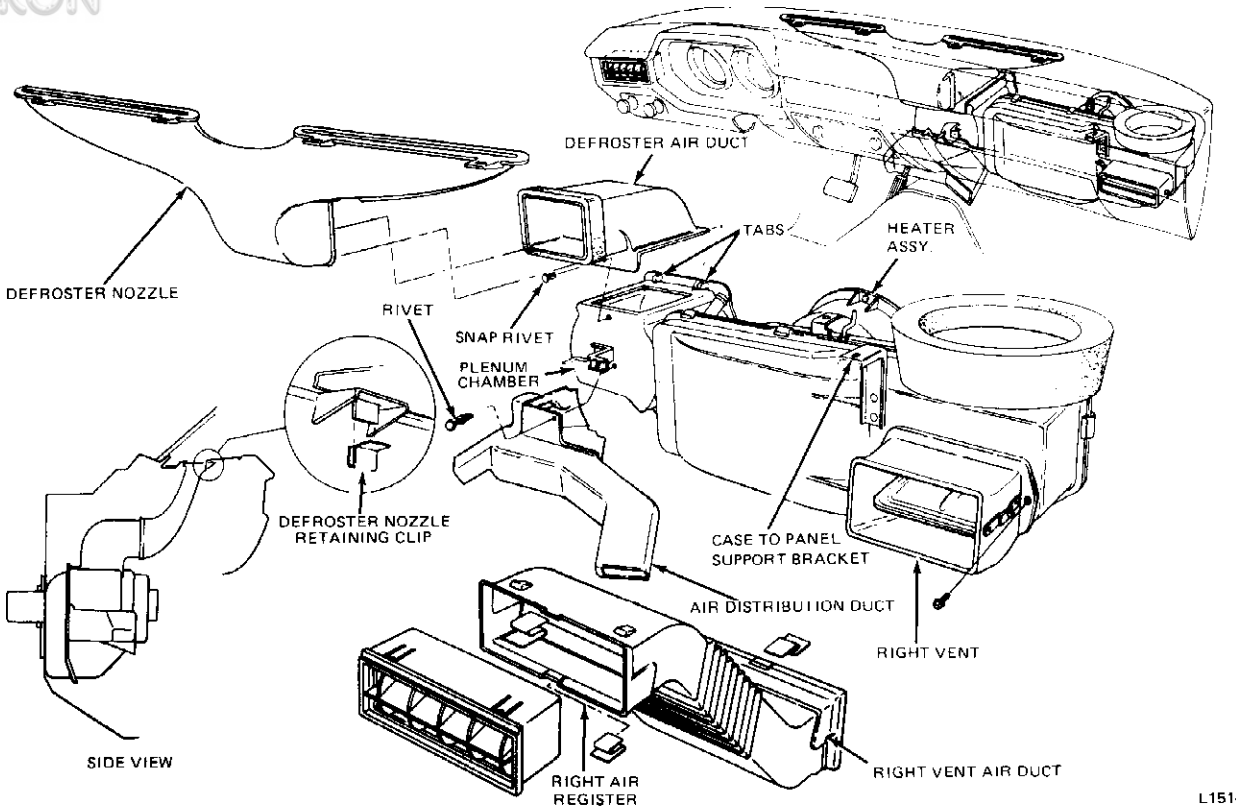


FIG. 4 Heating System—Pinto and Bobcat Shown

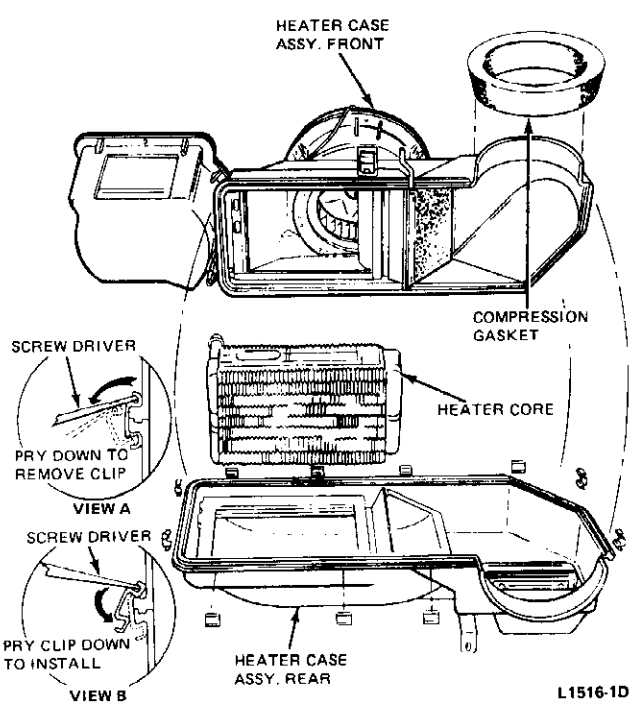


FIG. 5 Heater Core Removal

9. Remove the heater case-to-instrument panel support bracket mounting screw (Fig. 4), and pull the heater case away from the dash panel. At the same time, pull the two heater hoses in through the dash panel. Then, disconnect the hoses from the heater core tubes, and remove the heater case assembly from the vehicle.
10. After installing the heater case assembly, be sure to adjust the control cables as outlined in Section 3. Then install the radio (Group 35).

HEATER CORE

1. Remove the heater case assembly from the vehicle as outlined in the foregoing procedure.
2. Remove the compression gasket at the cowl air inlet.
3. Remove the eleven clips from around the front and rear case flanges (View A, Fig. 5), and separate the front and rear halves of the case.
4. Lift the heater core from the front half of the case (Fig. 5).
5. When installing, assemble the two halves of the case as shown in View B, Fig. 5.

BLOWER MOTOR AND WHEEL ASSEMBLY

1. Remove the heater case assembly from the vehicle as outlined in this section.
2. Disconnect the blower motor lead wire (orange) from the resistor (Fig. 6).
3. Remove the four blower motor mounting plate nuts and remove the motor and wheel assembly from the heater assembly (Fig. 6).

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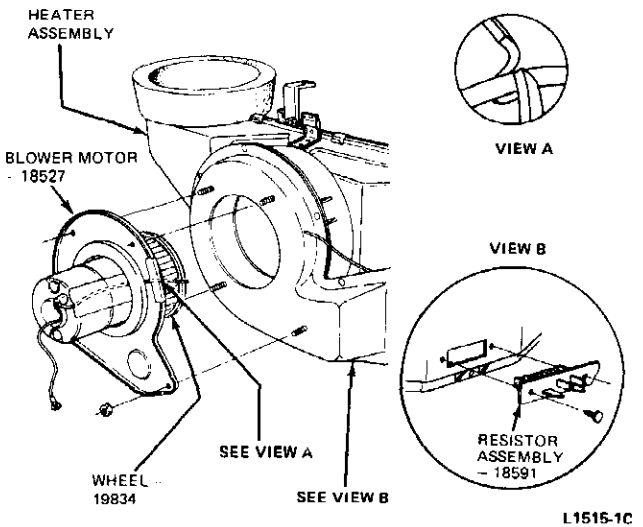


FIG. 6 Blower Motor and Wheel Assembly

BLOWER MOTOR RESISTOR

The resistor is mounted on the lower part of the heater case just above the passenger's feet (Fig. 6). To replace, disconnect two push-on connectors and remove two retaining screws.

SPECIFICATIONS

Blower Motor Current Draw:

Low 7 volts, 4 amps max.
Medium 9 volts, 5 amps max.
High 12.8 volts, 7 amps max.

Protective Device is 15 amp Fuse in Fuse Panel

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Granada and Monarch Heating System

PART 36-16

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Air Flow	16-1
Function Control Lever Operation	16-1
Temperature Control Lever Operation	16-1
ADJUSTMENTS	
Function Control Cable	16-3
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Blower Motor and Wheel Assembly	16-4
Control Assembly	16-3
Defroster Nozzle	16-4
Heater Assembly	16-3
Heater Core	16-4
SPECIFICATIONS	16-4

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DESCRIPTION AND OPERATION

The Granada and Monarch heater system is an independent case type, wherein the entire heater installation is contained in a single case attached to the passenger compartment side of the dash panel. The blower is located upstream of the heater core.

AIR FLOW

The heater assembly is a blend-air system receiving outside air through an opening in the right vent duct, which is, in turn, connected directly to an opening in the upper cowl. Outside air is drawn into the system from the cowl through the right vent duct, into the blower housing, forced through and/or around the heater core, mixed, and then discharged through outlets in the discharge air duct to the floor area or through the defroster outlets to the windshield. Refer to the airflow charts in Fig. 1. With this system, the right vent control must be pushed in for heater operation.

TEMPERATURE CONTROL LEVER OPERATION

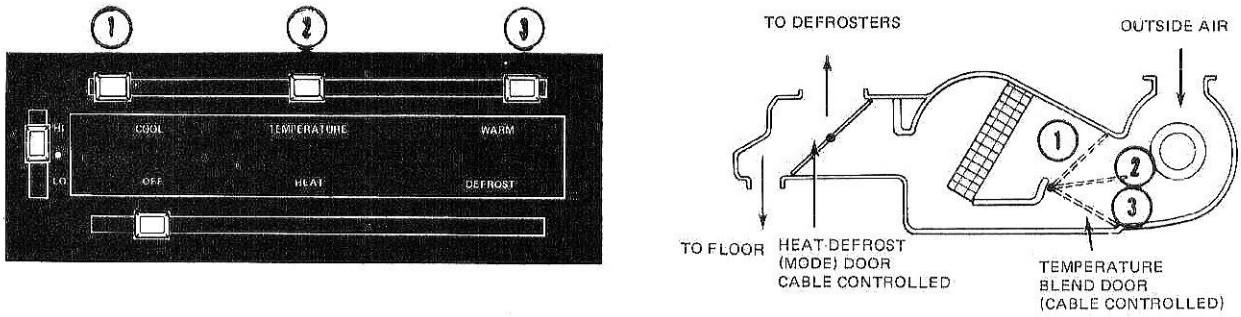
The air discharge temperature is controlled by the position of the Temperature Blend Door located between the blower and the heater core in the heater case. As the Temperature Control Lever is moved from COOL to WARM, a control cable attached to the lever moves the Temperature Blend Door, (Fig. 1) from minimum to full heat position, directing the airflow through and/or around the heater core. The air flowing through the core and the by-pass chamber is then mixed in the plenum chamber and discharged into the vehicle.

FUNCTION CONTROL LEVER OPERATION

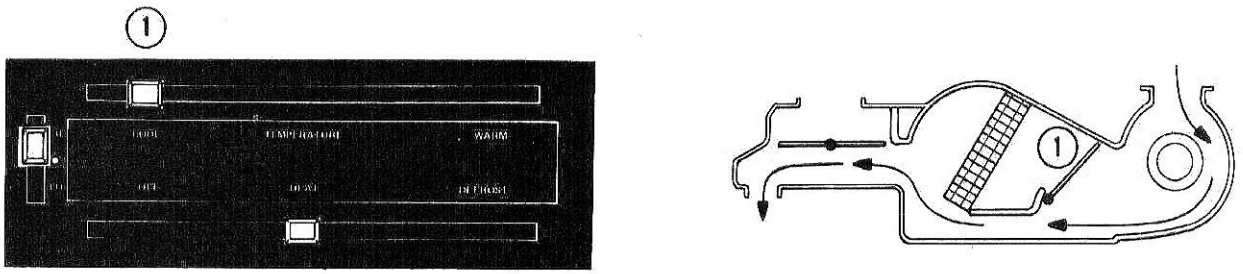
The Function Control Lever actuates a cable connected to the Heat-Defrost Door in the plenum chamber. In the OFF position, the door is closed, preventing airflow through the plenum. In HEAT position, air is discharged through the air distribution duct to the floor area. Air flows to the windshield through the defroster nozzle in DEFROST position. Airflow to the floor and the windshield can be modulated in direct proportion to the control setting between HEAT and DEFROST (Fig. 1).

A single defroster nozzle connected to the top of the plenum chamber distributes air through two openings in the forward instrument panel to the windshield (Fig. 2)

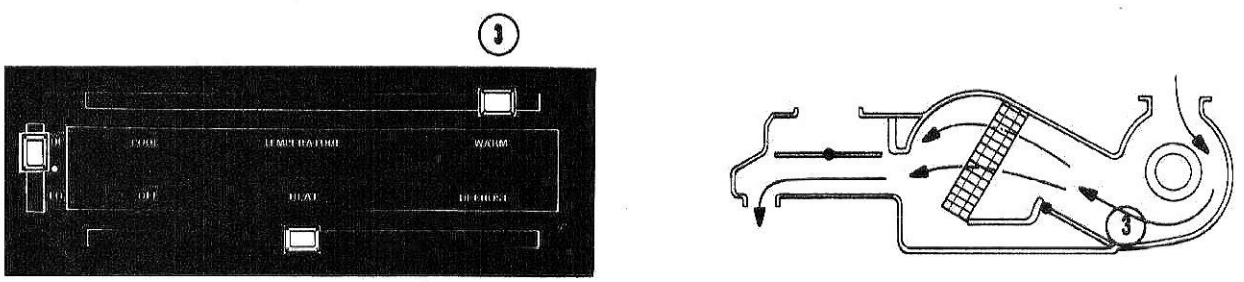
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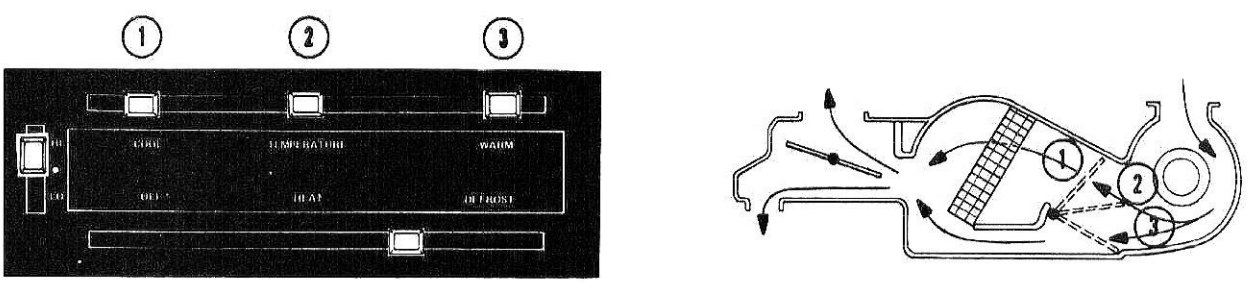
CONTROL IN "OFF" POSITION



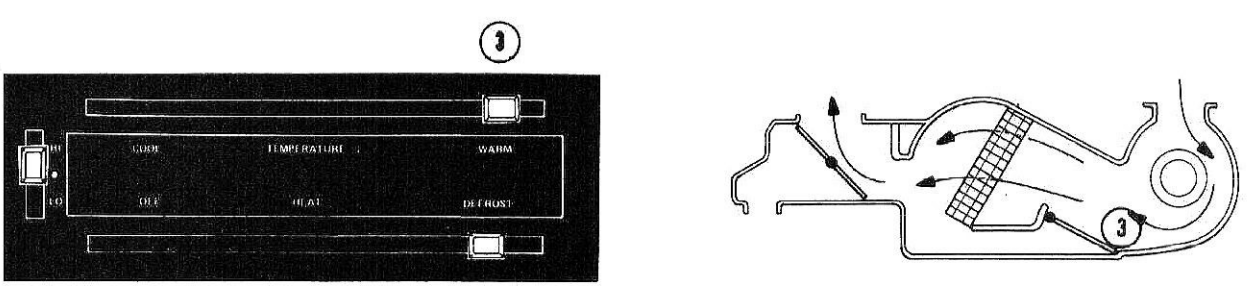
MINIMUM "HEAT" POSITION



MAXIMUM "HEAT" POSITION



MODULATED "HEAT-DEFROST" POSITION



MAXIMUM "DEFROST" POSITION

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FIG. 1 Heating System Air Flow

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ADJUSTMENTS

TEMPERATURE CONTROL CABLE

Adjust the Temperature Control Cable in the following manner:

1. With the cable housing to heater attaching screw loose, rotate the temperature door to the full clockwise (left) position (Fig. 2).
2. Push the Temperature Control Lever to the WARM side, allowing a gap of 3/16 inch between the lever and the end of the slot.
3. Tighten the cable housing to heater attaching screw. Torque to 20 in-lb maximum.
4. Check for and insure full travel of the blend door.

FUNCTION CONTROL CABLE

Adjust the Function Control Cable in the following manner:

1. With the cable housing to heater attaching screw loose (Fig. 2), rotate the Heat-Defrost Door crank arm to the full clockwise (left) position.
2. Push the Function Control Lever to the DEFROST position, allowing a gap of 3/16 inch between the lever and the end of the slot.
3. With the door crank arm and the lever in these positions, tighten the attaching screw. Torque to 20 in-lbs maximum.

REMOVAL AND INSTALLATION

CONTROL ASSEMBLY

1. Remove windshield wiper, light switch, and radio control knobs.
2. Remove the light switch control bezel.
3. Remove three screws at the top of the cluster applique and pull the lower edge of the applique rearward to disengage four (4) snap-in retainers.
4. Remove the temperature and function control cables from the control head (Fig. 3).
5. Remove four (4) screws from the face of the control assembly.
6. Disconnect the electrical wiring connectors from the blower switch, system off-on switch, accessory switch, if so equipped, and the illumination bulb (Fig. 3).
7. Remove the control head from the rear of the instrument panel.
8. To install, reverse the above procedure and adjust the control cables as required.

HEATER ASSEMBLY (FIG. 2)

1. Drain the cooling system.
2. Disconnect the two heater hoses from the heater core tubes at the dash panel. Position or plug the hoses so that the coolant will not drain out.
3. Remove the glove box.

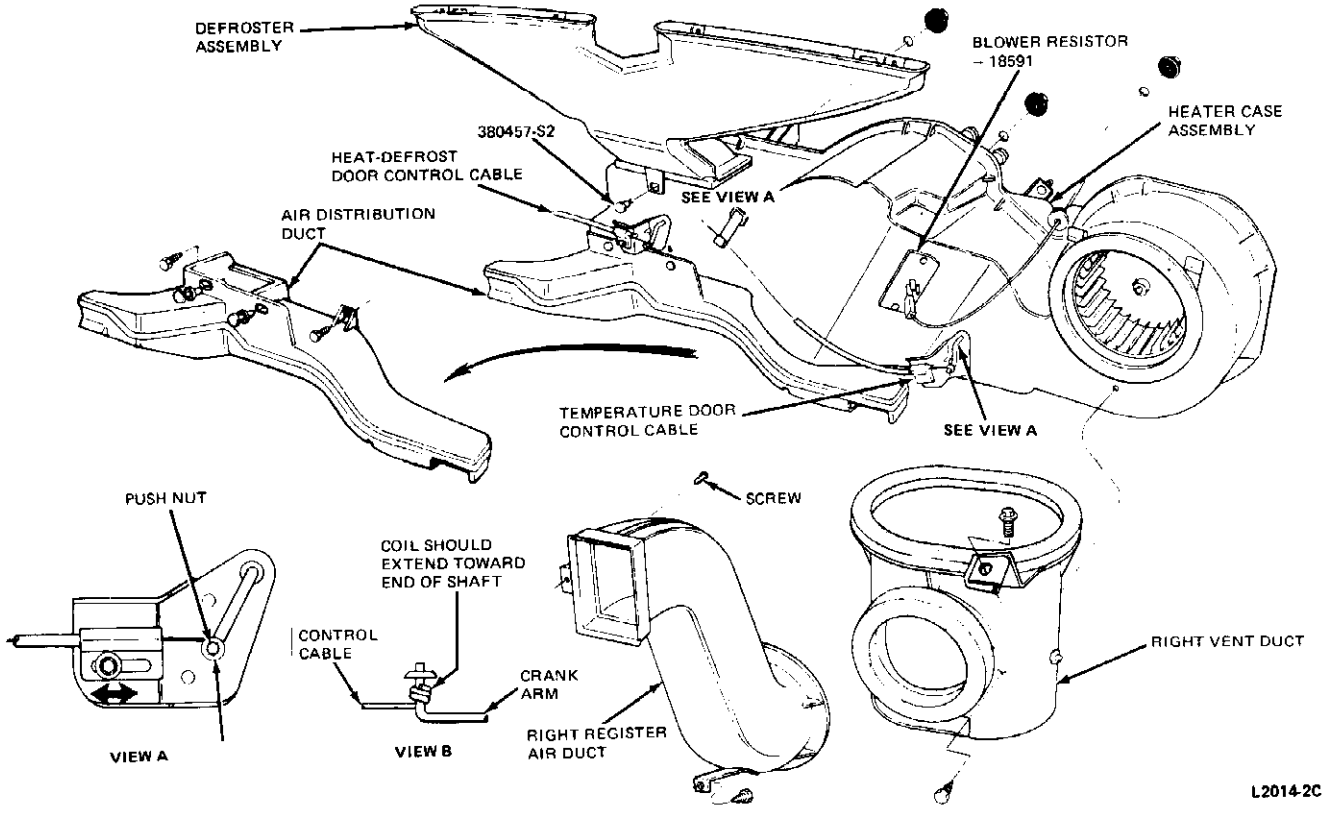


FIG. 2 Heater and Defroster Assembly

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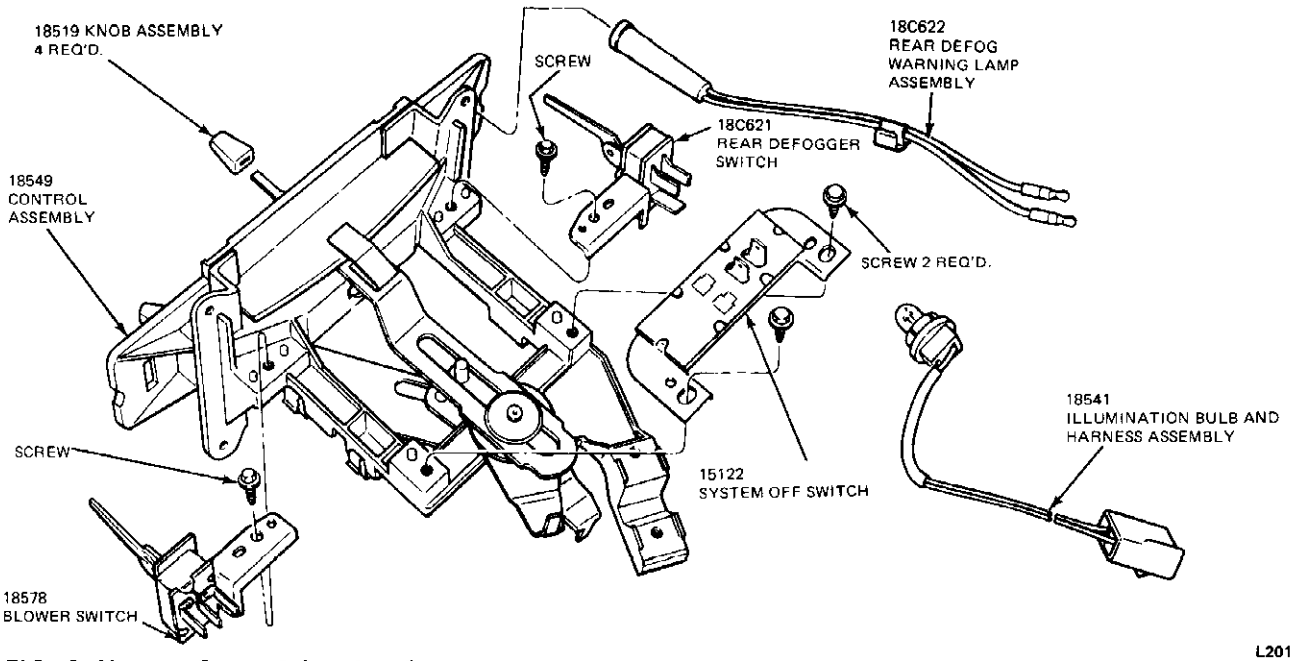


FIG. 3 Heater Control Service Components

4. Remove the right register air duct.
5. Remove the floor discharge duct assembly. Remove the clip securing the defroster nozzle to the heater.
6. Disconnect the two air door control cables from the heater case and doors. Remove the right vent cable bracket from the instrument panel.
7. Disconnect the electrical connector from the resistor assembly.
8. Remove the vent duct-to-upper-cowl mounting bolt.
9. Remove the three (3) heater case to dash panel mounting stud nuts and remove the heater case and vent duct as an assembly.
10. To install, reverse the above procedure. Adjust the control cables.

HEATER CORE

1. Remove the heater assembly from the vehicle as described in the preceding procedure and place it on a bench.
2. Remove the heater core cover and pad and slide the core out of the case (Fig. 4).
3. If the core is being replaced, transfer the butyl rubber pads to the new core (Fig. 4).

BLOWER MOTOR AND WHEEL ASSEMBLY

1. Remove the heater assembly from the vehicle as described in the preceding procedure and place it on a bench.
2. Remove the four (4) mounting screws and slide the blower motor and wheel assembly from the blower scroll in the case (Fig. 4).
3. To install, reverse the above procedure. Attach the ground wire as shown in Fig. 4.

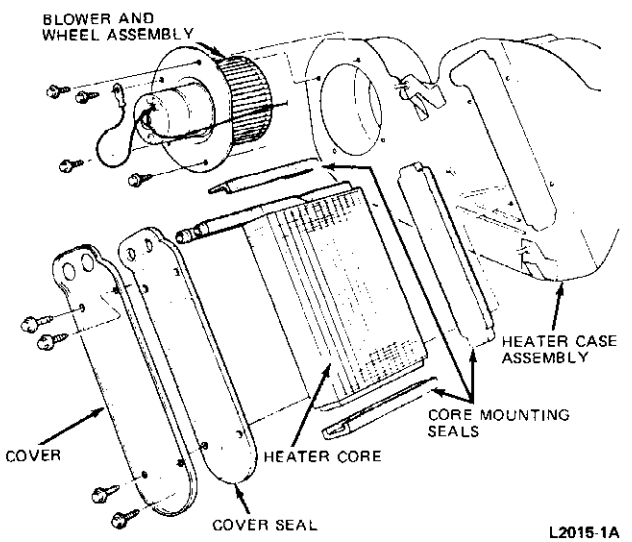


FIG. 4 Blower Motor and Heater Core Removal

DEFROSTER NOZZLE

1. Remove the upper instrument panel finish panel.
2. Remove the radio speaker or instrument panel to cowl brace.
3. Remove two (2) screws from the left defroster outlet.
4. Remove two (2) screws from the right defroster outlet.
5. Remove one clip holding the defroster nozzle to the heater case.
6. Carefully move defroster nozzle upward through opening in instrument panel.
7. To install, reverse the above procedure.

HEATING SYSTEM – GRANADA AND MONARCH

Blower Motor Current Draw			
At 12.8 Volts	7 to 9 Amps on High Blower	Fan Illumination	0.70 CP No. 1445 Bulb
Protection Device	15 Amp Fuse in Fuse Panel	Control Illumination	0.75 CP No. 1892 Bulb

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Air Conditioning Basic Theory

PART 36-31

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BASIC PRINCIPLES	
Effect of Pressure on Boiling or Condensation	31-2
Heat Transfer	31-1
Latent Heat of Vaporization	31-1
DIAGNOSIS	31-3

CL2341-2B

BASIC PRINCIPLES

Car Air Conditioning is the cooling or refrigeration of the air in the passenger compartment. Refrigeration is accomplished by making practical use of three laws of nature. These laws of nature and their practical application are outlined in the following paragraphs.

HEAT TRANSFER

If two substances of different temperature are placed near each other, the heat in the warmer substance will always travel to the colder substance until both are of equal temperature. For *example, a cake of ice in an ice box does not* communicate its coldness to the bottle of milk standing nearby. Rather, in obedience to nature's law, the heat in the warm milk automatically flows into the ice which has a lesser degree of heat. In order to determine the amount of heat that transfers from one substance to another, science has established a definite standard of measurement called the British Thermal Unit or BTU. One BTU is the amount of heat required to raise the temperature of one pound of water 1 degree F. For example, to raise the temperature of one pound of water from 32 degrees F to 212 degrees F, one BTU of heat must be added for each degree rise in temperature or a total of 180 BTU's of heat. Conversely, in order to lower the temperature of one pound of water from 212 degrees F to 32 degrees F, 180 BTU's of heat must be removed from the water.

LATENT HEAT OF VAPORIZATION

When a liquid boils (changes to a gas) it absorbs heat without raising the temperature of the resulting gas. When the gas condenses (changes back to a liquid), it gives off heat without lowering the temperature of the resulting liquid.

For example, place one pound of water at 32 degrees F in a container over a flame. With each BTU of heat that the water absorbs from the flame, its temperature rises 1 degree F. Thus, after it has absorbed 180 BTU's of heat, the water reaches a temperature of 212 degrees F. Here the law of nature is encountered. Even though the flame continues to give its heat to the water, the temperature of the water remains at 212 degrees F. The water, however, starts to boil or change from the liquid to the gaseous state, and it continues to boil until the water has passed off into the atmosphere as vapor. If this vapor were collected in a container and checked with a thermometer, it also would show a temperature of 212 degrees F. In other words, there was a rise of only 180 degrees F (from 32 to 212) in the water and vapor temperature even though the flame applied many more than 180 BTU's of heat. In this case, the heat is absorbed by the liquid in the process of boiling and disappears in the vapor. If the vapor were brought in contact with cool air, the hidden heat would reappear and flow into the cooler air as the vapor condensed back to water. Scientists refer to this natural law as the latent (hidden) heat of vaporization.

Water has a latent heat of vaporization of 970 BTU's and a boiling point of 212 degrees F. This means that 1 pound of water at 212 degrees F will absorb 970 BTU's of heat in changing to vapor at 212 degrees F. Conversely, the vapor will give off 970 BTU's of heat in condensing back to water at 212 degrees F.

This tremendous heat transfer, that occurs when a liquid boils or a vapor condenses, forms the basic principle of all conventional refrigeration systems.

For a liquid to be a good refrigerant, the amount of heat that it absorbs when vaporizing is not the only factor. It must also have a low boiling point. That is, the temperature at which it boils must be lower than the substance to be cooled. To illustrate with water, place a bottle of milk at room temperature (70 degrees F) next to boiling water (212 degrees F). The heat would flow

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from the (higher temperature) water to the (lower temperature) milk. The milk would be heated rather than cooled, because the boiling point of water is too high.

In order to make practical use of the heat transfer that takes place when a liquid boils, we must choose a liquid with a low boiling point. Refrigerant 12 is the liquid most commonly used in automotive air conditioning systems because it boils at 21.7 degrees F below zero in an open container. Here is a liquid that boils or vaporizes well below passenger compartment temperatures and, in vaporizing, will absorb tremendous amounts of heat without getting any warmer itself.

EFFECT OF PRESSURE ON BOILING OR CONDENSATION

The saturation temperature (the temperature where boiling or condensation occurs) of a liquid or vapor increases or decreases, according to the pressure exerted on it.

In any Ford air conditioning system, liquid refrigerant (R-12) is stored in the receiver under high pressure (Fig. 1). When the liquid R-12 is released into the evaporator by the expansion valve, the resulting decrease in pressure and partial boiling lowers its temperature to its new boiling point. As the R-12 flows through the evaporator, passenger compartment air passes over the outside surface of the coils. As it boils, the R-12 absorbs heat from the air and thus cools the passenger compartment. The heat from the passenger compartment is absorbed by the boiling refrigerant and hidden in the vapor. The refrigeration cycle is now under way. To complete the cycle, the following remains to be done:

1. **Dispose of the heat in the vapor.**
2. **Convert the vapor back to liquid for re-use.**
3. **Return the liquid to the starting point in the refrigeration cycle.**

The compressor (Fig. 1) performs these functions. It pumps the refrigerant vapor (containing the hidden heat) out of the evaporator and forces it under high pressure into the condenser which is located in the outside air stream at the front of the car. The increased pressure in the condenser raises the R-12 condensation or saturation temperature to a point higher than that of the outside air. As the heat transfers from the hot vapor to the cooler air, the R-12 condenses back to a liquid. The liquid under high pressure now returns to the reservoir where it is stored for re-use.

It may seem difficult to understand how heat can be transferred from a comparatively cooler car passenger compartment to the hot outside air. The answer lies in the difference between the refrigerant pressure that exists in the evaporator and the pressure that exists in the condenser. In the evaporator, the expansion valve reduces the pressure and the boiling point below the temperature of the passenger compartment. Thus, heat transfers from the passenger compartment to the boiling refrigerant. In the condenser, the compressor raises the condensation point above the temperature of the outside air. Thus, the heat transfers from the condensing refrigerant to the outside air. The expansion valve and the compressor simply create pressure conditions that permit the laws of nature to function.

Refer to Part 36-32 for information on types of refrigerant systems.

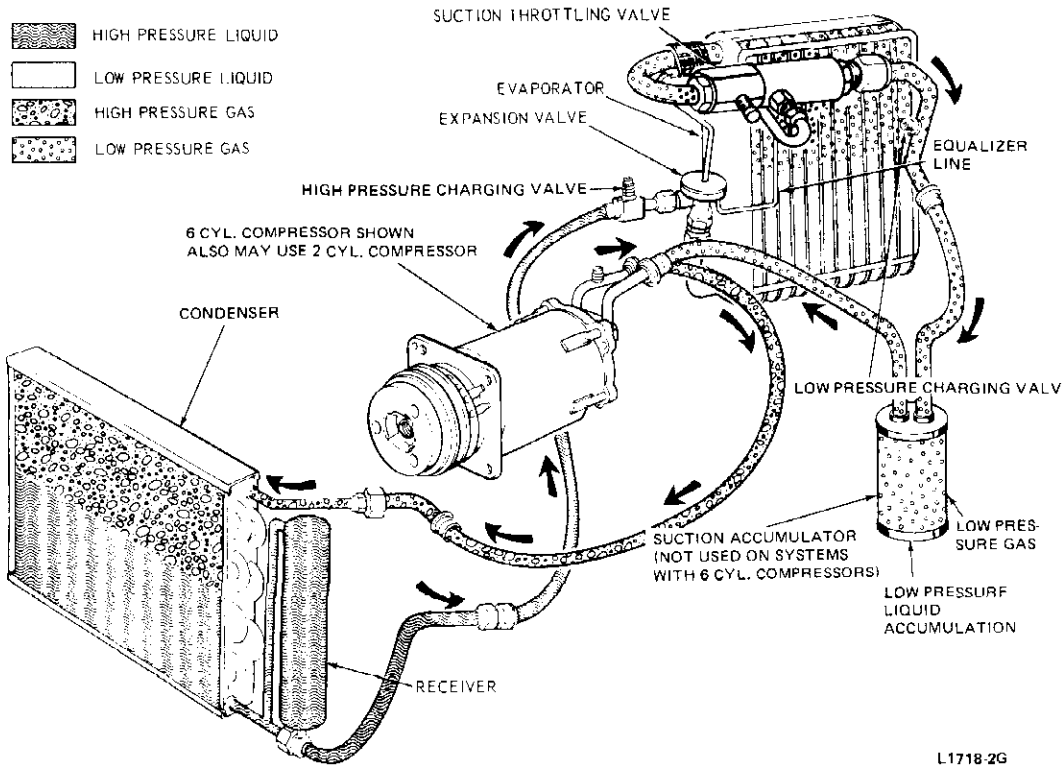
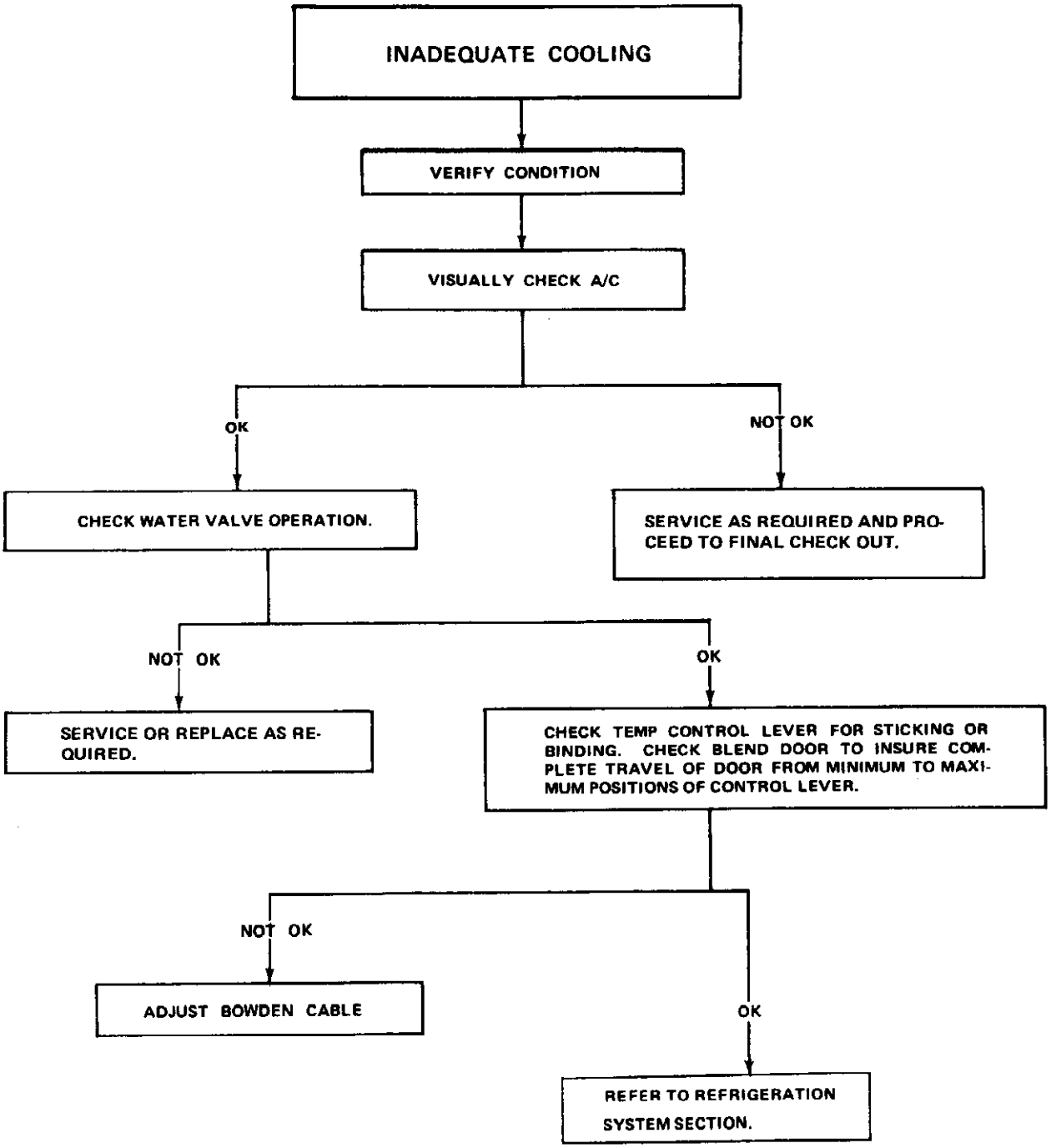


FIG. 1 Typical A/C Basic Suction Throttling Valve Type

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A/C General Service — Refrigerant Systems

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CL2342-2B

This Part covers the refrigerant system of all vehicles.

Reference both to this Part and to the Part covering the pertinent vehicle system is necessary for complete coverage.

DESCRIPTION AND OPERATION (FIGS. 1 THROUGH 5)

RECEIVER-DEHYDRATOR UNIT

The air conditioning system stores the liquid Refrigerant-12 under pressure in a combination receiver and dehydrator (Fig. 1). The pressure in the receiver normally varies from about 120 to 300 psi, depending on the surrounding air temperature and compressor speed.

The dehydrator removes any traces of moisture from the system. Even small amounts of moisture will cause trouble.

EVAPORATOR UNIT

When the system is in operation, liquid Refrigerant-12 flows from the receiver dehydrator unit through a flexible hose to the expansion valve and from there into the evaporator where it evaporates at a reduced pressure, and cools the evaporator. Outside or recirculating air is blown through the evaporator fins and is thus cooled and dehumidified. A liquid bleed line (leading to the suction side of the suction throttling valve) allows refrigerant to by-pass the evaporator to cool the compressor under low load or low charge conditions. A calibrated pressure differential valve controls the flow through the bleed line.

EXPANSION VALVE (FIG. 1)

The expansion valve meters refrigerant into the evaporator according to cooling requirements.

EXTERNAL EQUALIZED EXPANSION VALVE

With this expansion valve, refrigerant flow is controlled by evaporator outlet temperature and suction pressure. A bulb clamped to the evaporator outlet senses evaporator outlet temperature and a capillary tube bulb attached to the suction throttling valve outlet senses suction pressure. Increased evaporator outlet temperature opens the expansion valve and increased suction pressure closes the expansion valve. The expansion valve is calibrated to provide the correct flow based on evaporator pressure and outlet temperature.

BY-PASS ORIFICE (BPO) EXPANSION VALVE

The BPO expansion valve is similar to the external equalized expansion valve except it senses evaporator pressure instead of suction pressure. Internal passages replace the external equalizer capillary. To prevent the expansion valve from closing entirely under low load conditions, the valve seat has been notched.

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DETROIT IRON

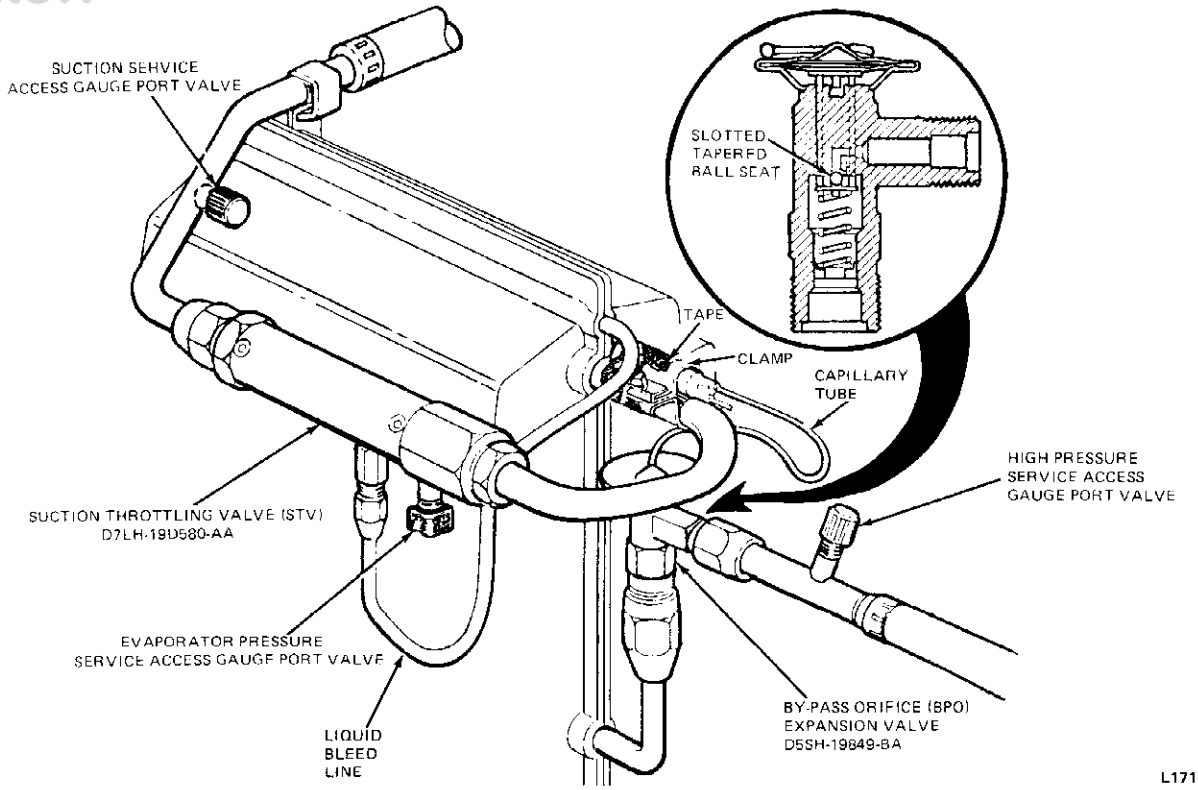


FIG. 1 Expansion Valve and Suction Throttling Valve

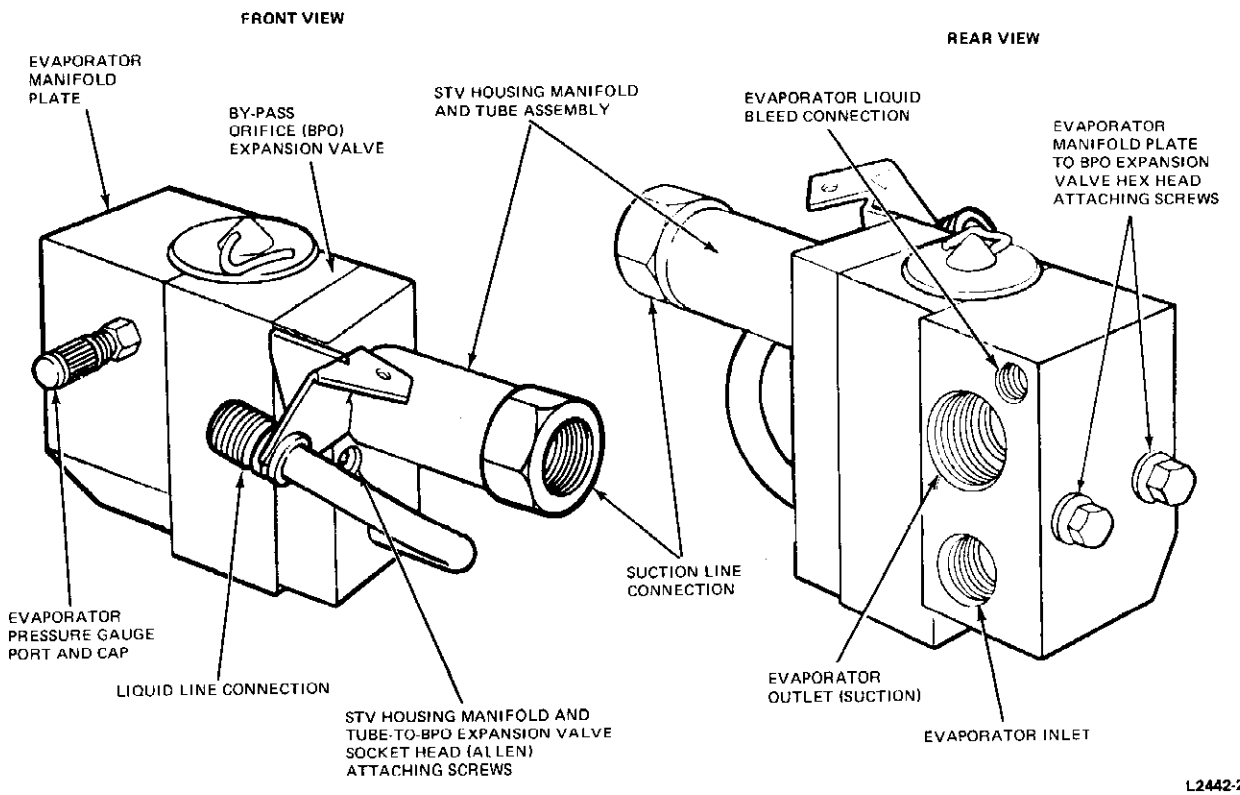
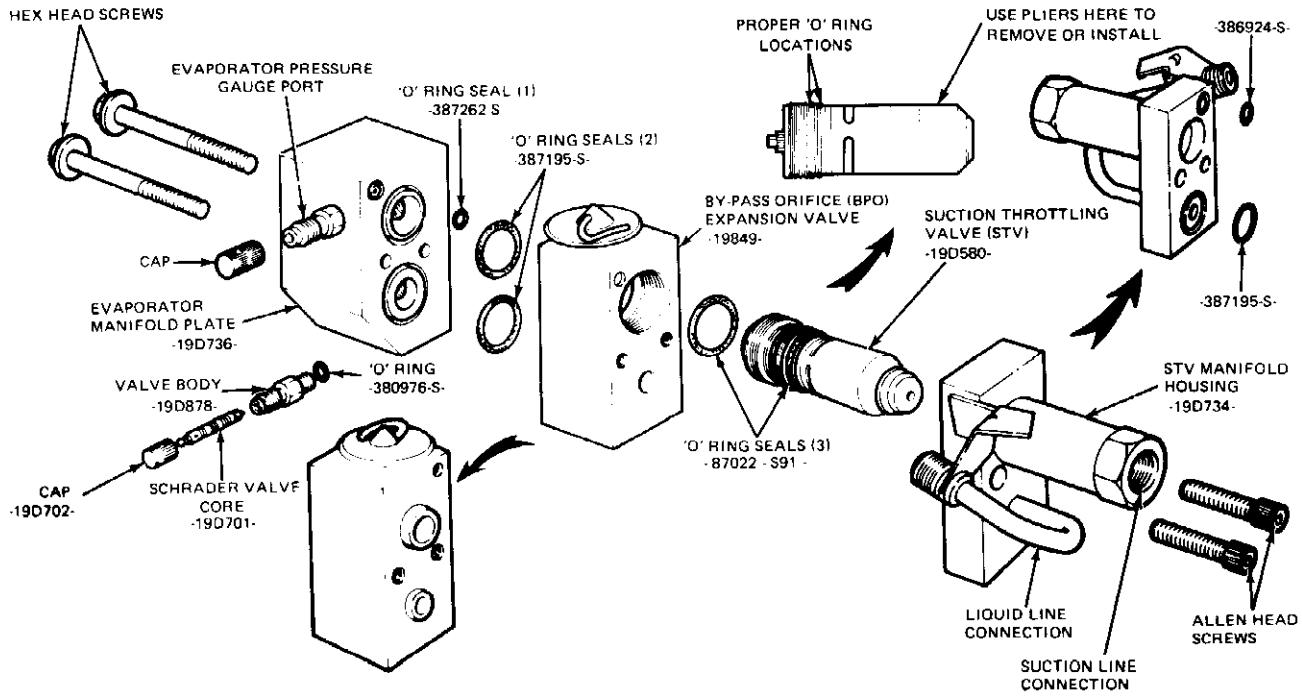


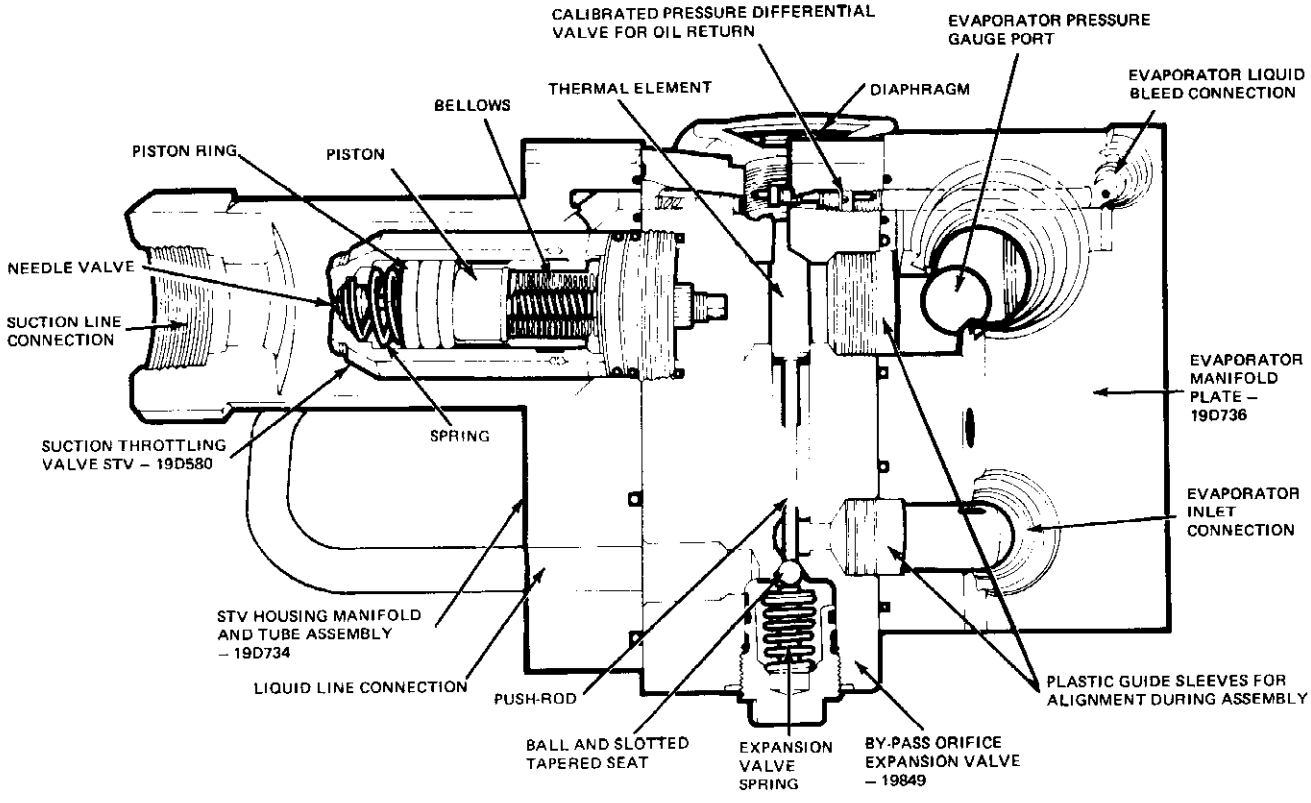
FIG. 2 By-Pass Orifice (BPO) Combination Valve Assembly—Front and Rear

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FIG. 3 By-Pass Orifice (BPO) Combination Valve Disassembled



L2444-2A

FIG. 4 By-Pass Orifice (BPO) Combination Valve Assembly—Cut-Away View

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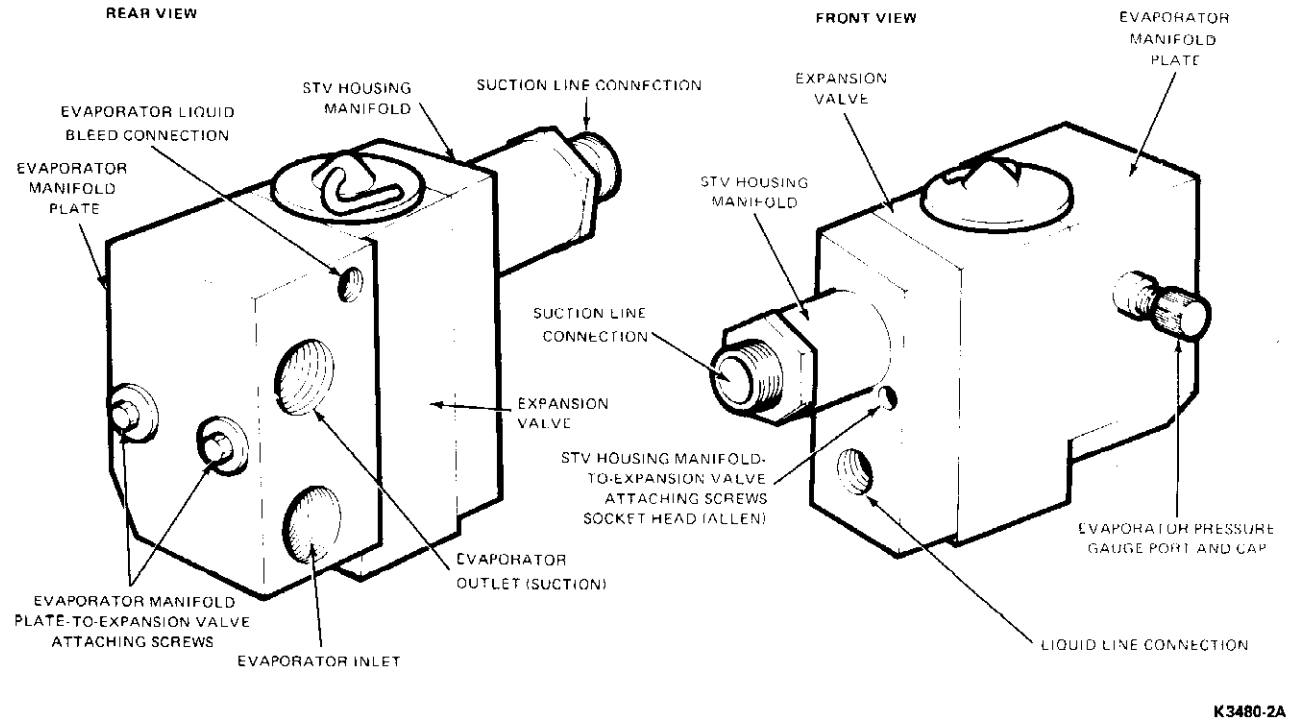


FIG. 5 Combination Valve—Front and Rear—Pinto, Bobcat, Mustang II

SUCTION THROTTLING VALVE

The suction throttling valve controls suction pressure in the evaporator to prevent ice or frost from blocking the flow of air through the heat exchanging surfaces of the evaporator. Since gauge readings change as altitude changes, acceptable ranges are shown in the normal evaporator pressure gauge readings v/s altitude chart.

EXTERNAL EQUALIZED COMBINATION VALVE

This combination valve includes an externally equalized block-type expansion valve and a suction throttling valve cartridge. Evaporator outlet temperature and suction pressure are sensed internally, eliminating the need for the temperature sensing bulb and equalizer capillary tube. The evaporator liquid bleed line attaches to the combination valve manifold. Internal passages direct the flow to the suction side of the STV. The pressure differential valve is installed in the expansion valve passage. System operation is the same as the external equalized system with separate expansion valve and STV. The external equalized block expansion valve is identified by part number and by its gold color. It is not interchangeable with the by-pass orifice block type expansion valve (silver colored).

BY-PASS ORIFICE (BPO) COMBINATION VALVE

This combination valve includes a by-pass orifice block-type expansion valve and a suction throttling valve cartridge. Evaporator outlet temperature and evaporator pressure are sensed internally, eliminating the need for the capillary and bulb.

In the Fairmont/Zephyr application the expansion valve block attaches directly to the evaporator, eliminating the manifold used on other applications. In Granada/Monarch and Versailles applications, the evaporator liquid bleed passages are internal as in the external equalized combination valve. The Fairmont and Zephyr combination valve has an external line leading to the suction side of the STV. The pressure differential valve is installed in the fitting on the STV housing. System operation is the same as the BPO system with separate expansion valve and STV. The by-pass orifice block type expansion valve is identified by part number and by its silver color. It is not interchangeable with the external equalized block type expansion valve (gold colored).

COMPRESSOR UNIT

The refrigerant leaves the suction throttling valve as a low pressure gas.

The compressor pumps the refrigerant from the suction throttling valve into the top of the condenser located in front of the radiator.

The compressor maintains the refrigerant at a high pressure in the condenser and receiver.

The six-cylinder, Frigidaire-type compressor is covered in Part 36-34 of this manual.

The two-cylinder-type compressor is covered in Part 36-35 of this manual.

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CONDENSER

The air conditioning condenser, located in front of the radiator, receives heated and compressed refrigerant gas from the compressor.

As the refrigerant gas flows down through the condenser, it is cooled by air passing between the sections of the condenser. The cooled, compressed refrigerant gas condenses to liquid refrigerant which then flows into the receiver.

MAGNETIC CLUTCH AND AMBIENT TEMPERATURE SWITCH

The compressor clutch and the compressor are off when the system selector lever is in the OFF, ECONOMY VENT, HI-LO (except ATC) or HEAT positions. In all other positions of the system selector lever, the clutch will be engaged or disengaged, depending upon ambient temperature. At ambient temperatures above 50°F. maximum, the ambient switch located in front of the condenser will close to complete the circuit to the compressor clutch. Below 35°F. minimum, the ambient switch will be open and the compressor cannot operate.

The ambient switch requires at least 10 minutes exposure to the surrounding temperature prior to checking for correct switch function; either open or closed.

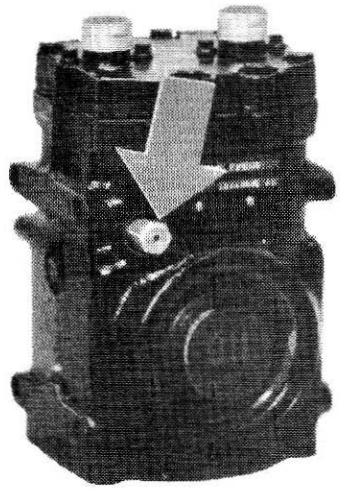
HIGH PRESSURE RELIEF VALVE

Under extreme pressure conditions, the valve will open allowing refrigerant vapor to escape. In this way the excessive pressure that might damage the compressor is relieved.

With six-cylinder compressors, the valve is located in the manifold at the rear of the compressor. With two-cylinder compressors, the valve is located on the compressor block (Fig. 6).

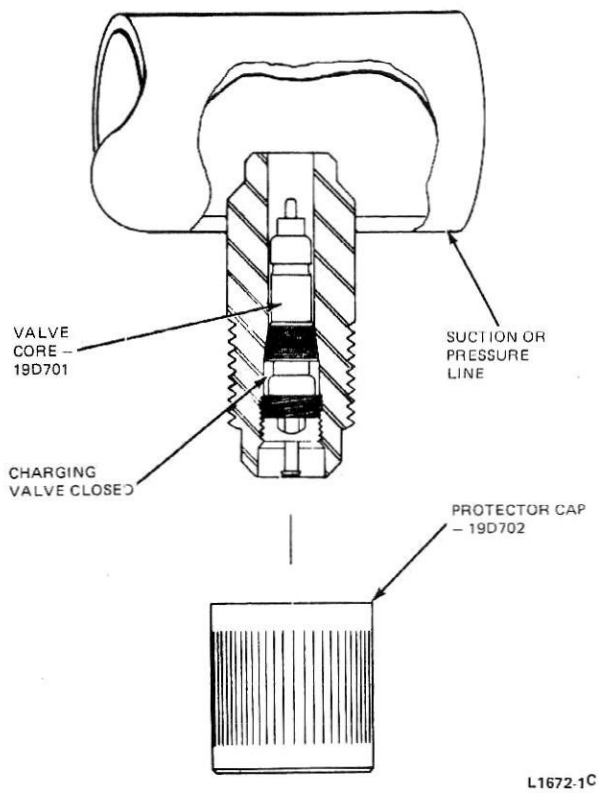
SERVICE ACCESS GAUGE PORT VALVES

These valves are similar to a tire valve (Figs. 7 and 8). The gauge port in the high pressure line (from compressor to condenser) allows access to the high pressure side of the system for attaching a service hose and pressure gauge. The gauge port in the low pressure line (from evaporator to condenser) allows access to the low pressure side of the system for attaching a service hose and pressure gauge (Figs. 7 and 8).



L1721-1A

FIG. 6 High Pressure Relief Valve



L1672-1C

FIG. 7 Disconnected Gauge Set from Service Access Gauge Port Valve

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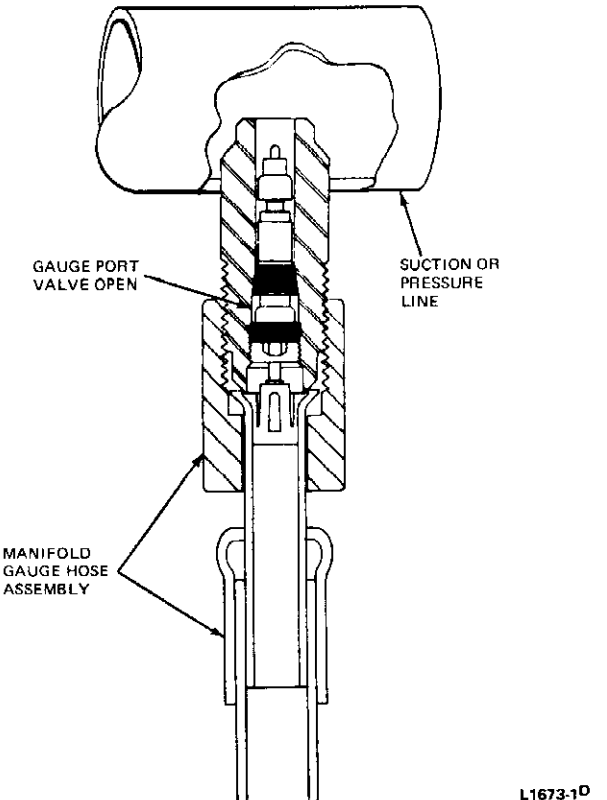
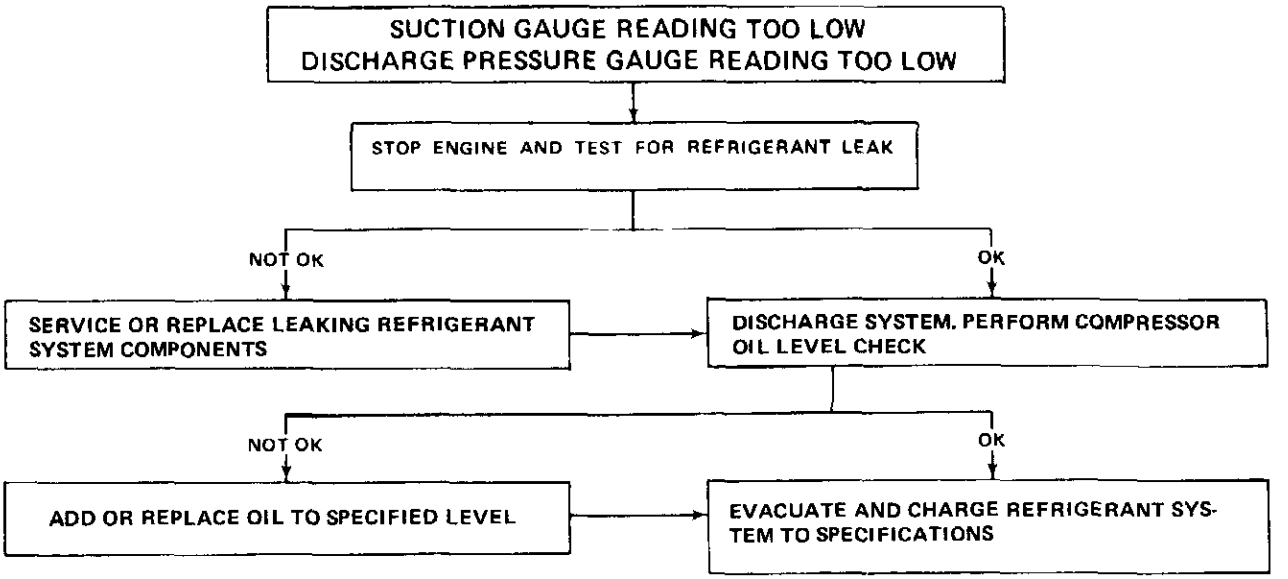
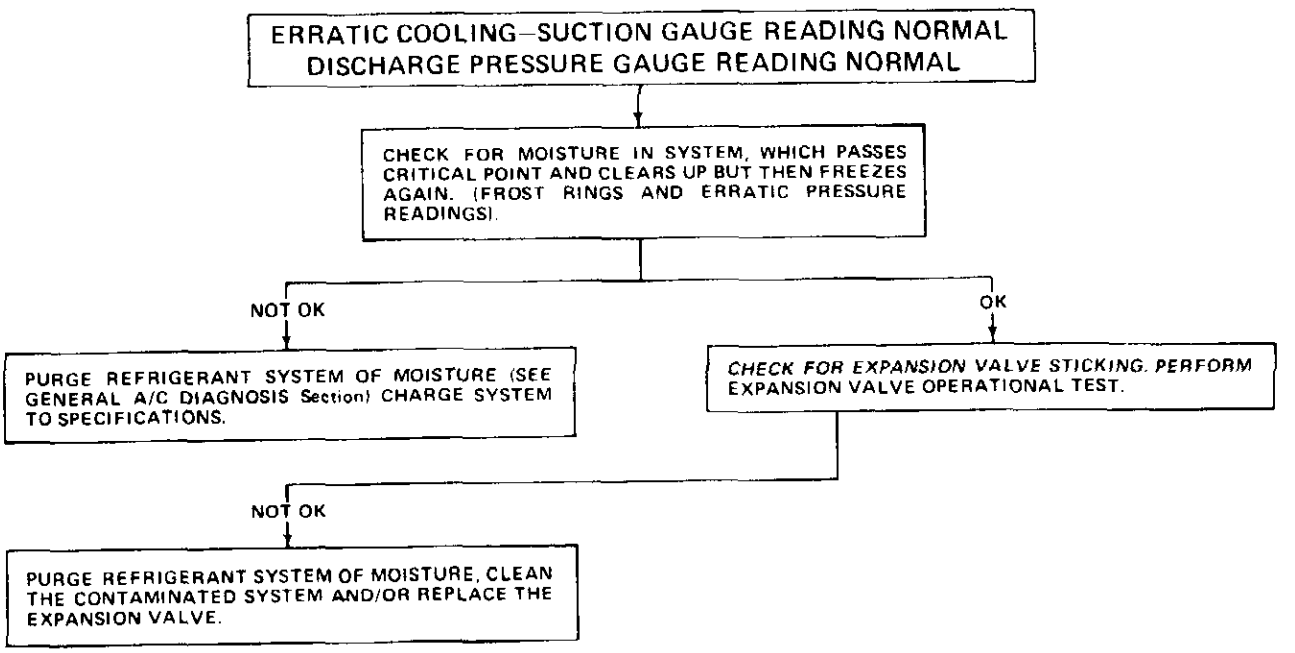


FIG. 8 Gauge Set Connected to Service Access Gauge Port Valve

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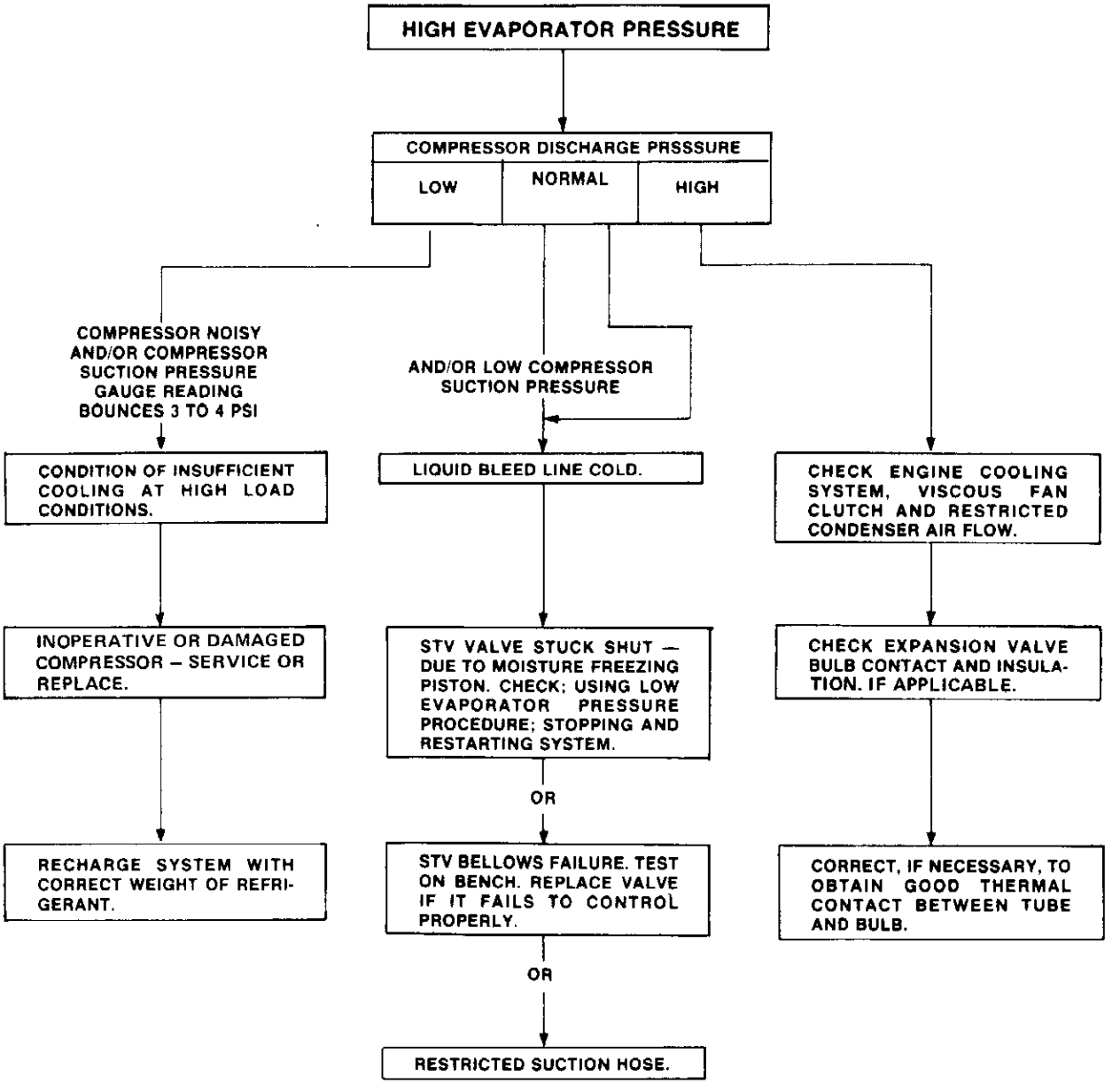




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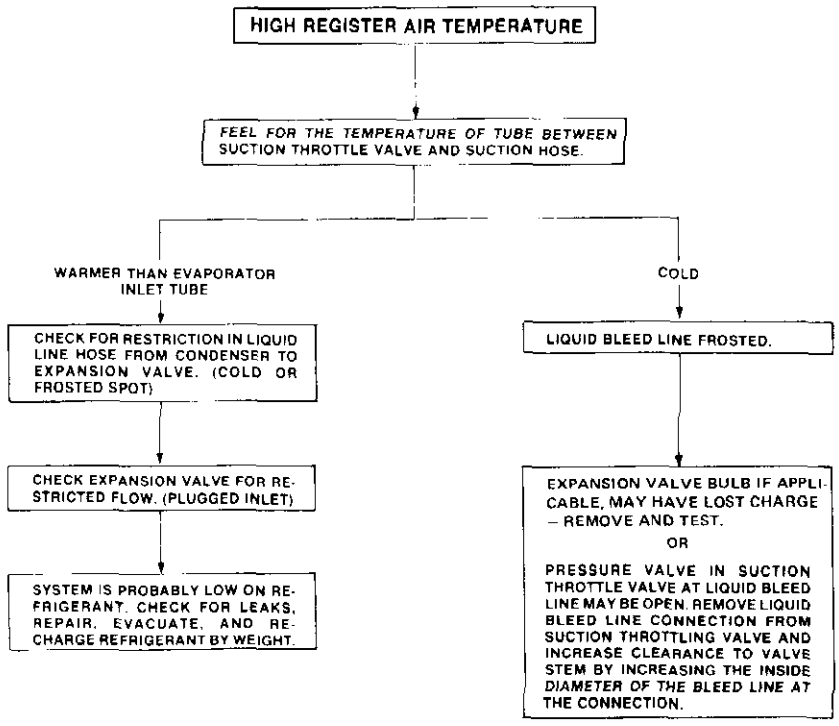
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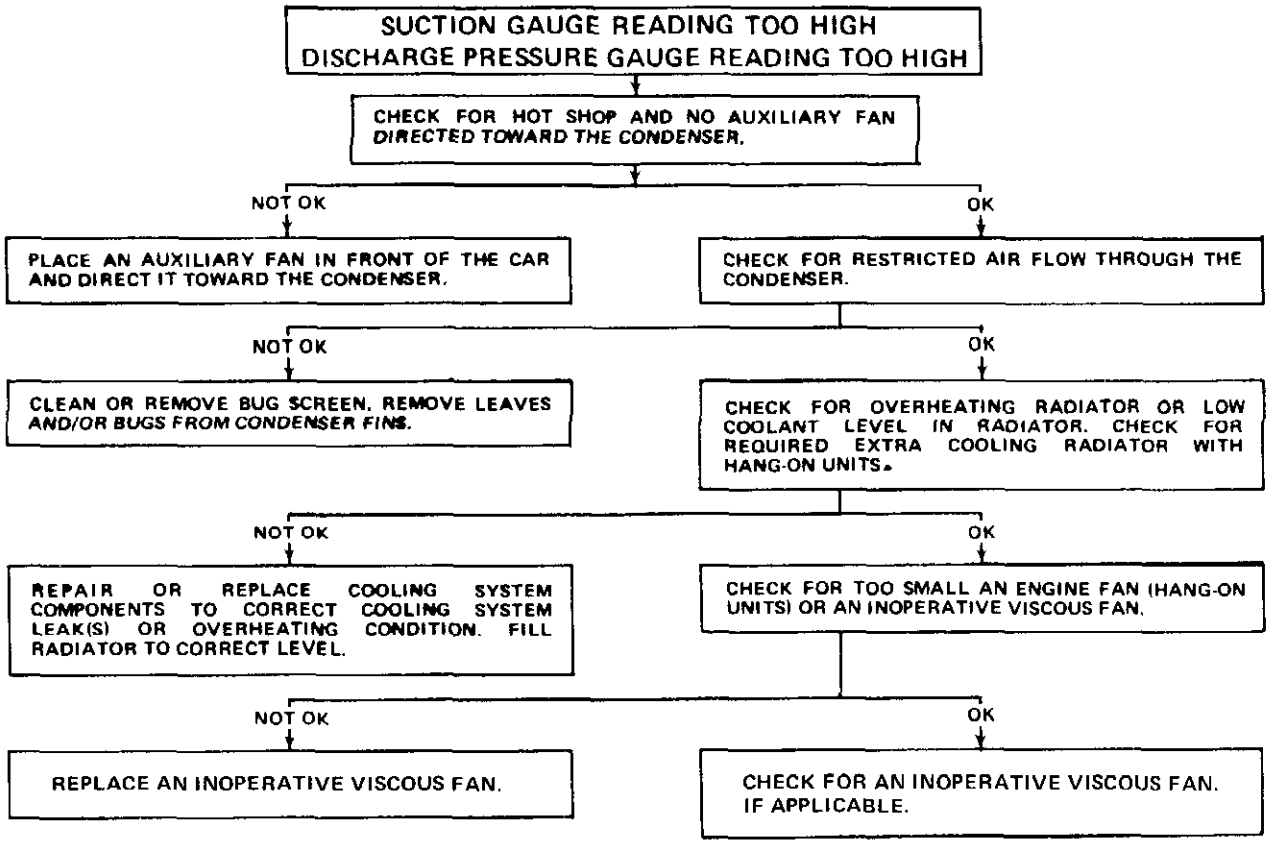


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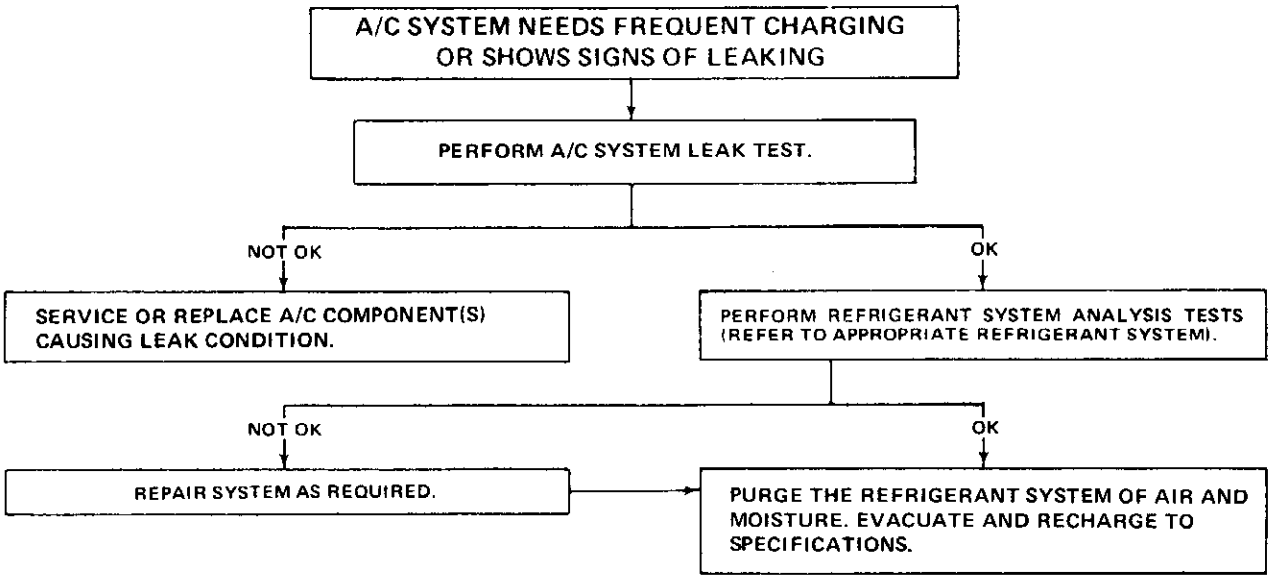


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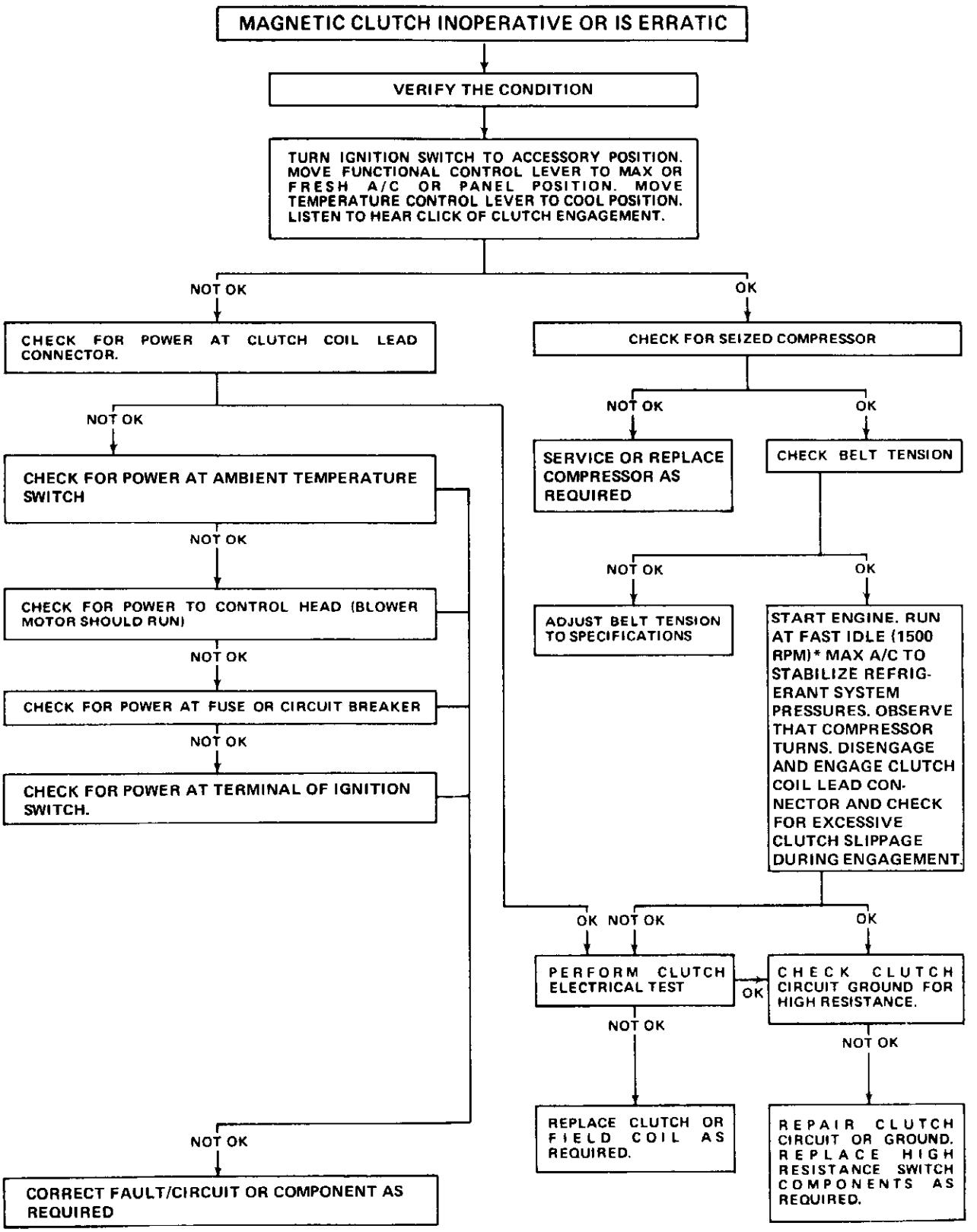
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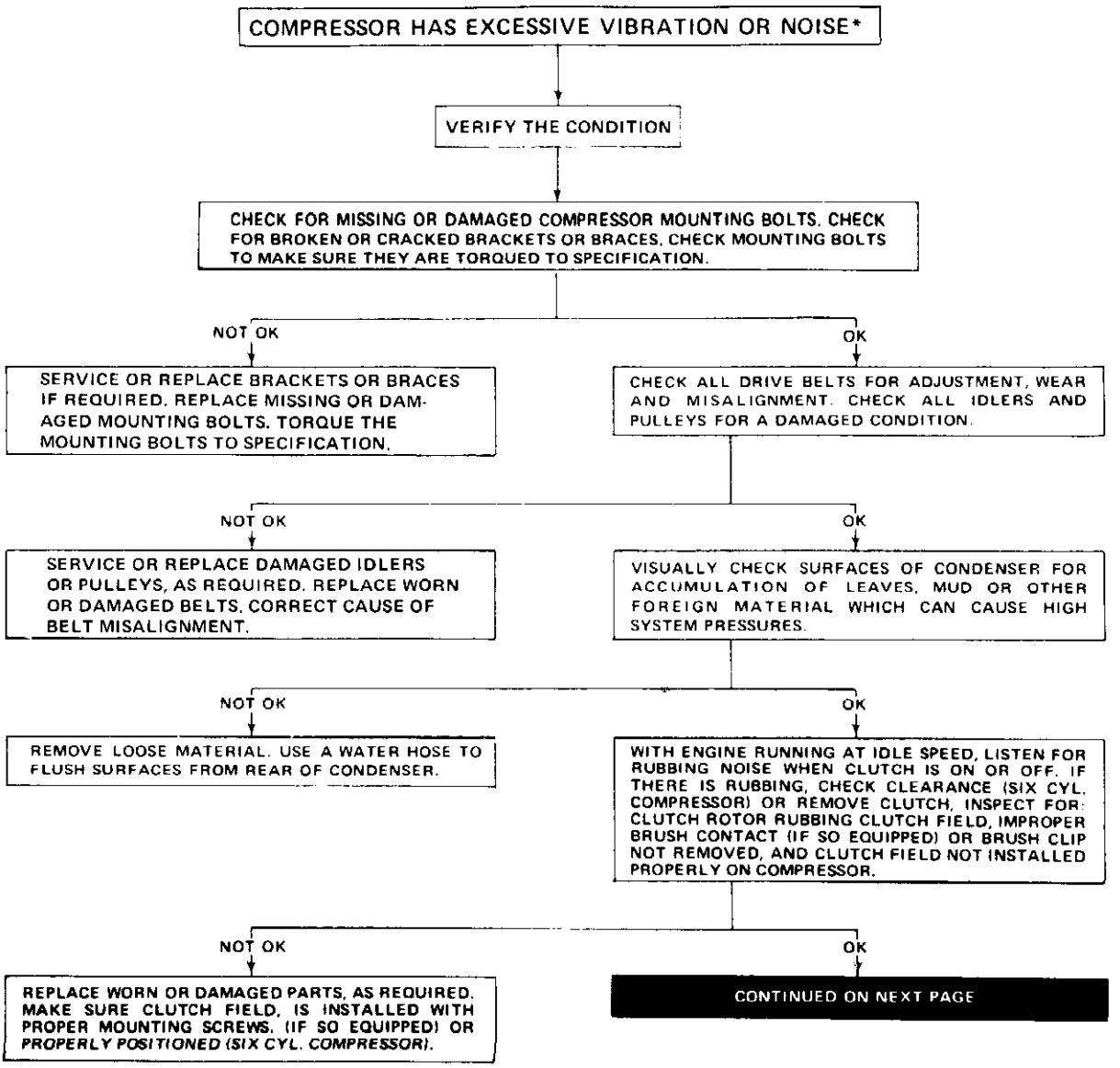
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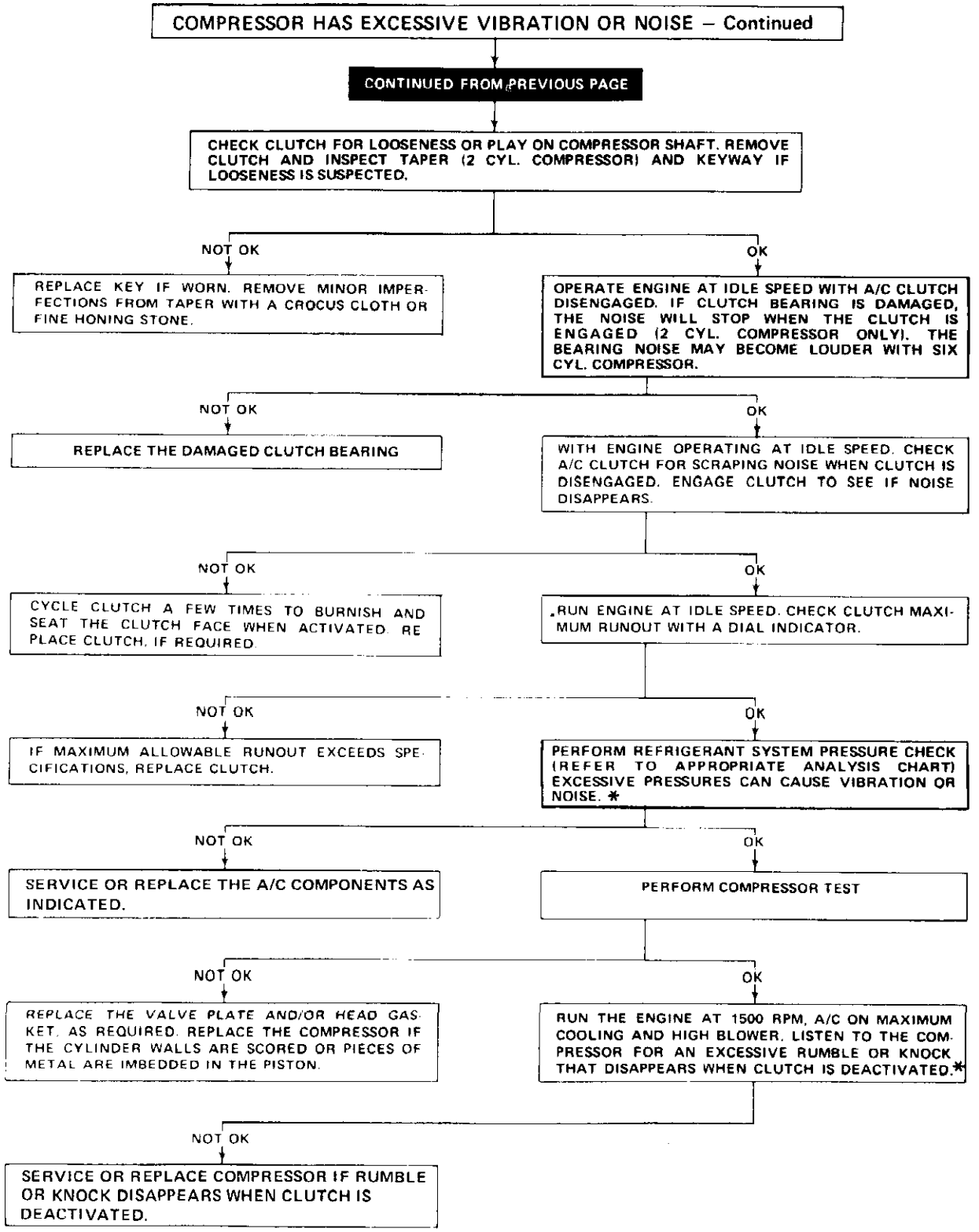
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*SOME NOISE AND VIBRATION IS NORMAL IN ALL AIR CONDITIONING SYSTEMS. HIGH TEMPERATURES AND PROGRESSIVELY INCREASED SYSTEM PRESSURES WILL INCREASE THE NOISE AND VIBRATION LEVEL. THIS IS A NORMAL CONDITION. COMPARISON AND EXPERIENCE WITH AIR CONDITIONING SYSTEMS UNDER VARIOUS OPERATING CONDITIONS WILL TELL THE TECHNICIAN WHICH SYSTEMS ARE NOT CONFORMING TO THE NORMAL PUMPING SOUND AND VIBRATION PATTERNS MADE BY A PROPERLY FUNCTIONING COMPRESSOR.

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TESTING

ATTACHING THE MANIFOLD GAUGE SET

When performing any of the various tests, test equipment must be connected to the system. If charge station-type equipment is used, follow the instructions of the manufacturer.

To attach a manifold gauge set to the system proceed as follows:

1. Remove the caps from the high and low pressure charging valves in the high and low pressure lines at the compressor.
2. Turn both manifold gauge valves fully clockwise to close the gauge set to the center outlet hoses.
3. If the gauge hoses do not have the valve opening pins in them, install fitting adaptors T71P-19703-S and R on the manifold gauge low and high pressure hoses.
4. Connect the high and low pressure gauge hoses with adaptors, to the respective high and low pressure gauge port at the compressor.

CHECKING FOR LEAKS

Attach the manifold gauge set. Leave both manifold gauge valves at the maximum clockwise (closed) position. Both gauges should show approximately 60 to 80 pounds pressure at 75 degrees F with the engine not running. If very little or no pressure is indicated, leave the vacuum pump valve closed, open the Refrigerant-12 tank valve, and set the low pressure (suction) manifold gauge valve to the counterclockwise position. This opens the system to tank pressure. Check all connections, and the compressor head gasket, oil filler plug, and shaft seal for leaks, using a good refrigerant leak detector.

With a flame-type detector (Fig. 9), avoid inhaling the fumes from the leak detector. The smaller the flame the more sensitive it is to leaks. Therefore, to insure accurate leak indication keep the flame as small as possible. The copper element must be red hot. If it is burned away, replace the element. Hold the open end of the hose just below each suspected leak point for two or three seconds. The flame will normally be almost colorless. The slightest leak will be indicated by a bright green blue color to the flame. Be sure to check the manifold gauge set and hoses for leaks as well as the rest of the system.

If the surrounding air is contaminated with refrigerant gas, the leak detector will indicate this gas all the time. Good ventilation is necessary to prevent this situation. A fan, even in a well ventilated area, is very helpful in removing small traces of refrigerant vapor.

Another testing device can be used to detect leaking refrigerant gas. This device is called the Electronic Leak Detector (Fig. 10). The controls of the Electronic Leak Detector are an on/off control knob and a toggle-type sensitivity switch (search and pinpoint), also a flexible sensing probe.

The Electronic Leak Detector is operated by turning the control knob clockwise until a steady ticking sound

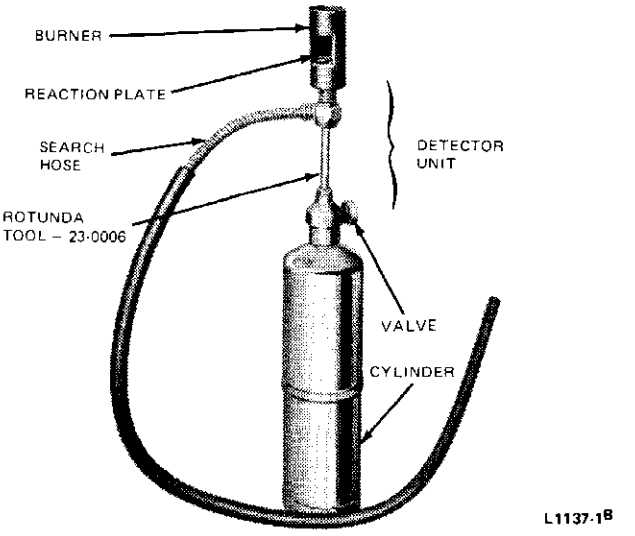


FIG. 9 Flame Type Leak Detector

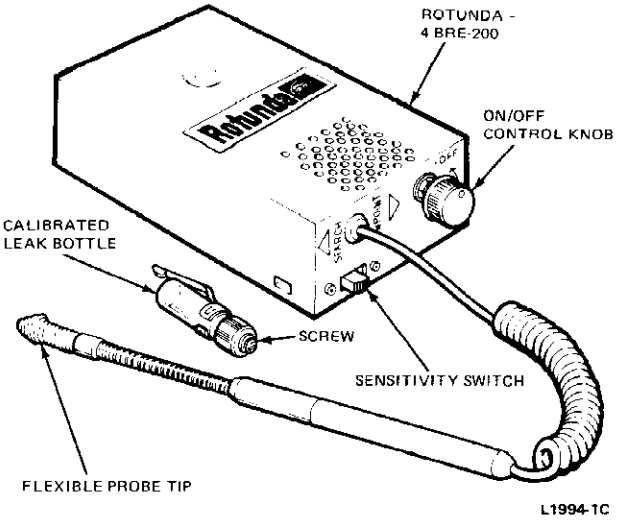


FIG. 10 Electronic Leak Detector

is audible. The toggle switch is placed in the search position. Then move the probe at about one inch per second in the suspected area. When escaping refrigerant gas is located, the ticking signal will increase. If the gas is relatively concentrated the signal will be increasingly shrill. If you are unable to tell exactly where the leak is, move the toggle to the pinpoint position and adjust the control knob to the steady ticking position. Now search in the concentrated area again. The pinpoint setting will de-sensitize the probe tip and allow you to find the leak exactly.

To test the Electronic Leak Detector:

1. Remove the screw from the top of the calibrated leak bottle.
2. Bring the probe tip near the top of the leak bottle and the instrument will respond to the refrigerant gas by quickening the ticking signal to a squeal.

CAUTION: Be sure to remove only the screw from the calibrated leak bottle. The refrigerant spilled on fingers could cause frostbite.

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AIR CONDITIONER PERFORMANCE TEST

The pressures developed on the high pressure (discharge) and low pressure (suction) side of the compressor indicate whether or not the system is operating properly.

Attach the manifold gauge set. Set both manifold gauge valves at the maximum clockwise, or closed position.

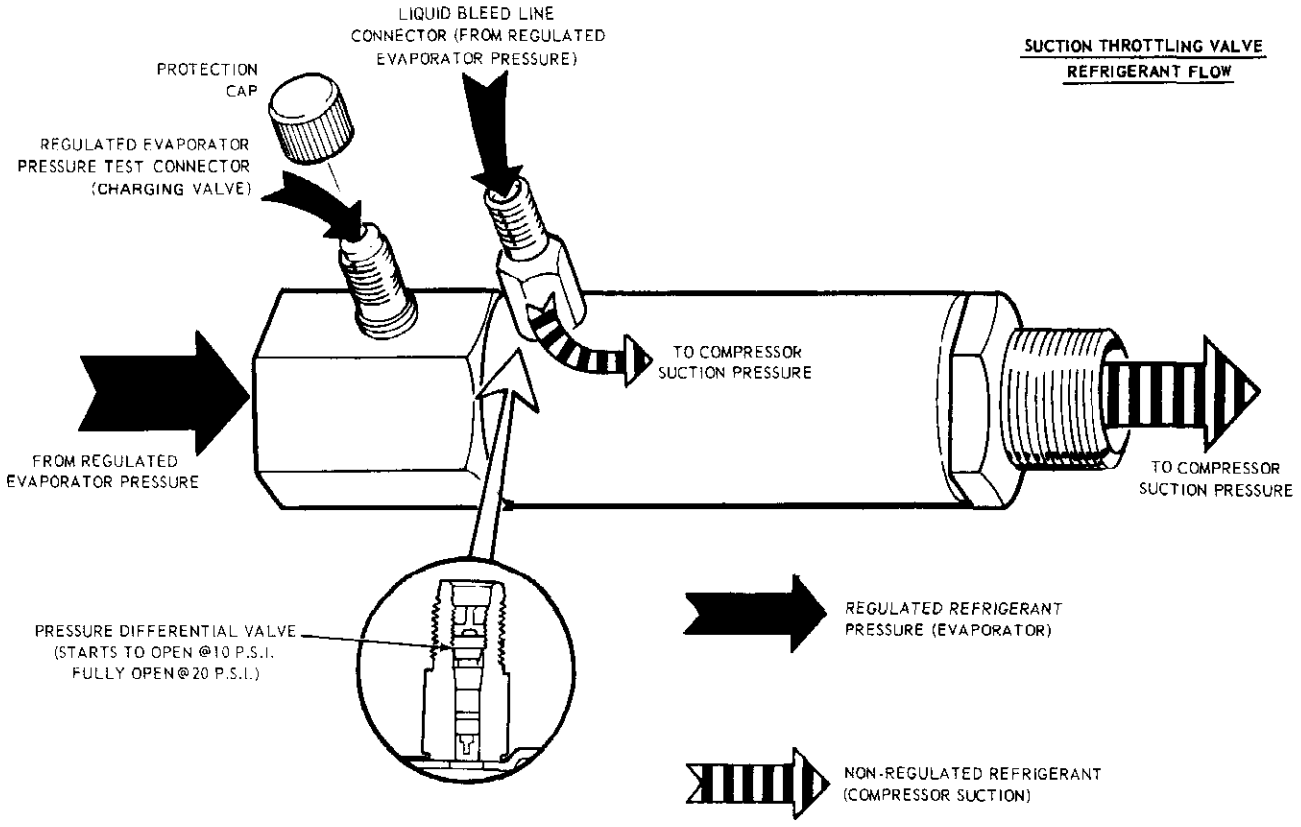
Check the system pressures with the engine running at 1100-1300 rpm, all controls set for maximum cooling, and the front of the car at least 5 feet from any wall. The actual pressures indicated on the gauges will depend on the temperature of the surrounding air and the humidity. Higher air temperatures along with high humidity, will give higher system pressures. At idle speed and a surrounding air temperature of 110 degrees F, the high pressure may go as high as 300 pounds or more.

If it becomes necessary to operate the air conditioner under these conditions, keep the high pressure down with a fan directed at the condenser and radiator.

The low pressure gauge should indicate 5 to 20 psi; the high pressure gauge should indicate 120 to 180 psi at 70 to 80 degrees F.

SUCTION THROTTLING VALVE

1. Connect the manifold gauge set into the system and connect a separate pressure gauge to the evaporator gauge connection on the suction throttling valve (Fig. 11).



SUCTION THROTTLE VALVE PRESSURE/ALTITUDE CHART

ALTITUDE OF TEST SITE (FEET)	REQUIRED GAUGE READING $^{-1\ psi}_{+2\ psi}$
0 FEET (Sea Level)	28.5
1000 FEET	29.0
2000 FEET	29.5
3000 FEET	30.0
4000 FEET	30.5
5000 FEET	31.0
6000 FEET	31.4
7000 FEET	31.8
8000 FEET	32.3
9000 FEET	32.7
10,000 FEET	33.2

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FIG. 11 Suction Throttling Valve and Pressure/Altitude Chart

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2. Perform the air conditioner performance test as outlined in the foregoing procedure. Make any repairs indicated by the test.
3. After operating the system for 10 to 15 minutes, be sure that normal operating pressures are indicating on the manifold gauge set (low pressure gauge 10 to 20 psi and high pressure gauge 120-180 psi). Then check the reading on the evaporator gauge.
4. Any gauge used to check the evaporator pressure at the suction throttling valve will be affected by atmospheric pressure, whereas the pressure within the valve itself remains unaffected. To compensate for this, use of the pressure-altitude chart in Fig. 9 will give the required gauge reading for correct evaporator pressure at a given altitude.
5. If the valve does not show the specified reading, check the gauge calibration.

RECEIVER DRYER TEST

The receiver-dryer should be replaced if it has been damaged in an accident, leaks, or has become restricted or clogged. Do not attempt to repair the receiver-dryer. It is a refrigerant storage area, filter, and a moisture collecting device. If there is any indication of moisture or contamination in any of the components, or if the outlet connection is cool, the receiver-dryer should be replaced.

MAGNETIC CLUTCH TEST

Disconnect the magnetic clutch wire at the bullet connector, and connect it to the negative lead of an ammeter. Connect the positive lead of the ammeter to the battery positive terminal. The magnetic clutch should pull in with a distinct click and the current reading on the ammeter should be to specification.

REFRIGERANT SERVICE

DISCHARGING THE SYSTEM

When replacing any component in the air conditioning system, the system must be discharged. To discharge the system proceed as follows:

1. Remove the caps from the high and low charging valves in the high and low pressure lines (Figs. 12 or 13).
2. Turn both manifold gauge valves fully clockwise to close the gauge set to the center outlet hoses.
3. If the gauge set hoses do not have the gauge port actuating pins, install fitting adapters T71P-19703-S and R on the manifold gauge low and high pressure hoses.
4. Connect the high and low pressure gauge hoses with adapters, to the respective high and low pressure gauge port (Fig. 12). *Some vehicles do not* have a service access gauge port valve. On these vehicles, connect the manifold gauge set low pressure hose to the evaporator service access gauge port valve. A special adaptor (Tool No. T77L-19703-A) is required to attach the manifold gauge set to the high pressure service access gauge port valve.
5. Place the open end of the center hose in a garage exhaust outlet.
6. Slowly depressurize the refrigeration system by opening the low pressure gauge valve a slight amount and allowing the refrigerant to discharge slowly from the system.
7. After the system is nearly discharged, open the high pressure gauge valve very slowly to avoid losing an excessive amount of refrigerant oil and allow any refrigerant remaining in the compressor and high pressure line to discharge.

EVACUATING THE SYSTEM

1. Discharge the system as described in the preceding procedure.

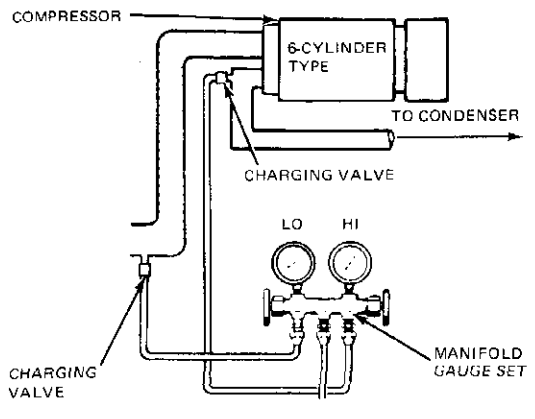


FIG. 12 Service Connections for System with Six-Cylinder Compressor

2. Attach a tank of Refrigerant-12 and a vacuum pump to the manifold gauge set. Make certain the Refrigerant-12 tank valve is tightly closed.
3. Open both manifold gauge set valves.
4. Run the vacuum pump until the low pressure gauge reads 25 inches and as close to 30 inches of vacuum as possible. Continue vacuum pump operation for 10 minutes. If there has been a parts replacement continue vacuum pump operation for an additional 20-30 minutes. Turn off the pump and close both gauge valves.

CHARGING THE SYSTEM

1. Discharge and evacuate the system as outlined in the preceding procedures.
2. Leave the vacuum pump valve closed.
3. Set the low pressure (suction) manifold gauge valve at the full counterclockwise or open position.

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4. Set the high pressure (discharge) manifold gauge valve at the full clockwise or closed position.
5. Open the Refrigerant-12 tank valve to allow refrigerant to enter the system, and observe the gauges. When both gauges reach 60 to 80 pounds at approximately 75 degrees F, shut off the tank valve.
6. Perform the leak test with the leak detector.
7. Set the A/C controls for maximum cooling.
8. Start the engine and open the Refrigerant-12 tank valve again to prevent drawing vacuum on the suction side.
9. With the engine running at 1500 rpm, complete charging the system until the specified weight of refrigerant has entered the system.
10. If the refrigerant will not enter the system due to low temperature, it may be necessary to place the Refrigerant-12 tank in a container of hot water at about 150 degrees F. This will increase the Refrigerant-12 pressure and force the gas from the tank during charging. **Never heat the Refrigerant-12 tank with a torch. A dangerous explosion may result.**
11. During the charging, the high pressure (discharge) side may build up to an excessive value. This can be caused by an overcharge of refrigerant, or an overheated engine, in combination with high surrounding temperatures. Never allow the high pressure to exceed 240 pounds while charging. If it does, stop the engine, determine the cause, and correct it.
12. After the proper charge has been made, close the Refrigerant-12 tank valve, and check the system pressures for proper operation. (Low pressure **suction** gauge 4-25 psi; high pressure **discharge** gauge 120-210 psi at 70 to 90 degrees F ambient.)
13. After satisfactory operation has been achieved, disconnect the manifold gauge set high and low pressure hoses from the charging valves.
14. Install caps on the gauge ports and the manifold gauge set lines.

CHARGING FROM SMALL CONTAINERS

Refrigerant-12 is available in fourteen-ounce cans. **Do not open the high pressure (discharge) gauge valve on the manifold because the container can explode.**

1. A special valve and valve retainer is required for connecting the small can to the A/C system. Attach the valve retainer to the can by engaging the three tabs of the retainer to the lip at the top of the can. Turn the valve assembly into the threaded hole in the center of the valve retainer. In containers where the center of the can is deeply recessed, a washer should be inserted before installing the valve.
2. Connect the manifold gauge set to the system (Fig. 11 or 12). Connect the hose (normally connected to the large Refrigerant-12 tank) to the special valve on the small can. **Make sure that the valve is closed (full clockwise position).**
3. Once the can is connected, charge the system as outlined in the foregoing procedure. When the can is empty, close the valve and remove the empty can. Connect a new can, open the valve again and continue charging until the specified weight of Refrigerant-12 has entered the system. When you need a half pound of refrigerant such as with a 2 1/2-pound charge capacity, stop charging from one can when extreme cold is felt or a mist appears half-way down the can. Weigh the can to make sure one-half pound of refrigerant is installed.

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DETROIT IRON

Six — Cylinder Compressor

PART 36-34

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CL2343-2B

DESCRIPTION AND OPERATION

The compressor mainshaft is driven by a belt from the crankshaft pulley. Three double-acting pistons, positioned axially around the compressor shaft, operate in a front and rear cylinder assembly. The pistons are actuated by a swash plate that is pressed on the compressor shaft. The swash plate changes the rotating action of the shaft to provide a reciprocating driving force to each of the three pistons. This driving force is applied, through the shoes and balls, to the midpoint of each of the double ended pistons. The mainshaft also drives the oil pump which is located in cavities in the cylinder rear head.

Reed-type suction and discharge valves are mounted in valve plates between the cylinder assembly and the head at each end of the compressor. The heads are connected with each other by gas-tight passageways which direct refrigerant gas to a common output.

A magnetic clutch is used to drive the compressor shaft. When voltage is applied to the clutch coil, the clutch plate and hub assembly, (which is solidly coupled to the compressor shaft) is drawn by magnetic force rearward toward the pulley which rotates freely on the front head casting. The magnetic force locks the clutch plate and pulley together as one unit. The compressor shaft then turns with the pulley. When voltage is removed from the clutch coil, springs in the clutch plate and hub assembly move the clutch plate away from the pulley and the clutch plate and compressor shaft cease to rotate.

MAINTENANCE

ADDING OIL

The six-cylinder compressor uses TL4538 Texaco 525 viscosity refrigerant oil (D1VY-19577-A) or equivalent. An oil charge of 10-1/2 fluid ounces is required. It is important that only the specified type and quantity of oil be used in the compressor. If there is a surplus of oil in the system, too much oil will circulate with the refrigerant, causing the cooling capacity of the system to be reduced. Too little oil will result in poor lubrication of the compressor.

When it is necessary to replace a component of the refrigeration system, certain procedures must be followed to assure that the total oil charge in the system is correct after the new part is on the car. When the compressor is operated, oil gradually leaves the compressor and is circulated through the system with the refrigerant. Eventually a balanced condition is reached in which a certain amount of oil is retained in the compressor and a certain amount is continually circulated. If a component of the system is removed after the system has been operated, some oil will go with it. To maintain the original total oil charge, it is necessary to compensate for this by replacing the oil in the new replacement part.

The procedures for replacing oil are as follows:

COMPRESSOR ONLY

1. Idle engine for 10 minutes at 1,000-1,500 rpm at maximum cooling and high blower speed to allow oil to distribute itself in the system in a normal manner.
2. Discharge the system and remove the compressor from the vehicle. Remove the drain plug and pour the oil into a measuring container. **Make a note of the amount of drain oil then discard it.**
3. A new six cylinder replacement compressor is shipped containing 10-1/2 fluid ounces. This oil should also be drained.

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4. If the oil drained from the removed compressor measured less than 4 ounces, replace 6 ounces of new oil in the replacement compressor.
5. If the oil drained from the removed compressor measured between 4 and 6 ounces, the oil is properly distributed throughout the system. Simply replace an equal amount of new oil in the replacement compressor.
6. If the oil drained from the removed compressor measured 6 ounces or more, replace **only** 6 ounces of new oil in the replacement compressor.

Replacing Components

Whenever replacing a component of the air conditioning system, add measured quantities of 525 viscosity refrigeration oil to the component to assure that the total oil charge in system is correct before unit is operated.

Oil should be added to replacement components as follows:

Evaporator: Add 3 fluid ounces.

Condenser: Add 1 fluid ounce.

Receiver: Add 1 fluid ounce.

Condenser and Receiver Assembly: Add 2 fluid ounces.

Oil should be poured directly into the replacement component. If an evaporator is installed, pour oil into inlet pipe with pipe held vertically so oil will drain into core.

If any other components, such as valves or hoses are replaced, no additional oil is necessary.

REMOVAL AND INSTALLATION

COMPRESSOR

Removal

1. *Discharge the refrigeration system* as outlined in Part 36-32.
2. Loosen the capscrew that retains the hose connector plate to the rear of the compressor (Fig. 1). As the screw is being loosened, work the high and low pressure hose fittings back and forth to break the seal and carefully bleed off any pressure remaining in the compressor. **High pressure may still exist at the discharge fitting. If this pressure is released too rapidly, there will be a considerable discharge of refrigerant and oil.**
3. *Immediately cover the compressor openings with* the pressure test plate, Tool T71P-19703-Q, as shown in Fig. 2. **Make sure that the plate is properly positioned on the rear surface of the compressor flush against the seals to make a complete seal.**
4. Disconnect the compressor clutch coil wiring connector.

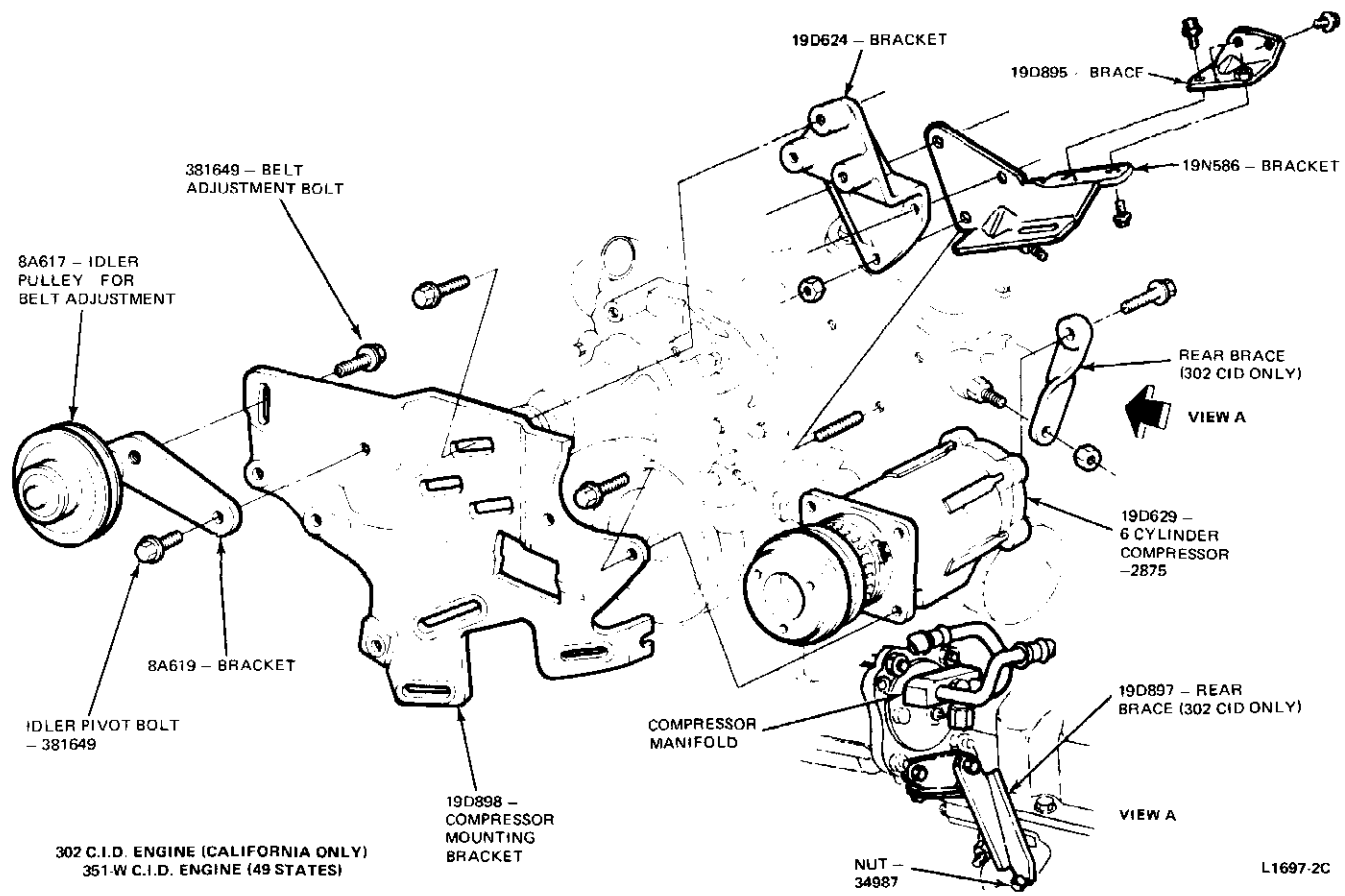


FIG. 1 Compressor Installation and Belt Adjustment

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5. Loosen the three belt tension adjusting screws (Fig. 1), and rotate the compressor and bracket assembly in the front slot to disengage the belt.
6. While supporting the weight of the compressor, remove the three belt tension adjusting screws (they are also mounting screws).
7. Lower the compressor and then carefully lift the compressor (with front and rear brackets attached) up between the power steering pump and fender apron and out of the engine compartment.
8. Drain all oil from the compressor into a clean dry container, and replace the drain plug. Measure the amount of oil drained. See Adding Oil.

Installation

Before installing a new compressor, rotate compressor shaft four or five times. This permits proper lubrication of compressor seal over all its surface. Before compressor clutch is mounted to the new compressor, wipe the front face of the compressor thoroughly with a clean dry cloth and, if necessary, clean front of compressor with a solvent to remove any excess oil. Cleaning compressor in this manner will prevent any oil from being thrown onto the clutch surfaces which would cause slippage and eventual clutch damage.

Indicate the amount of refrigerant charge specified for the system on the plate provided for this information on the new compressor. Follow the procedure for replacing oil in the new compressor as explained under Adding Oil.

1. Carefully install the compressor with the pressure test plate (T71P-19703-Q) and the front and rear brackets installed on compressor. Lower compressor into the engine compartment between the power steering pump and the fender apron.
2. Position the compressor so that its front and rear bracket screw holes are aligned with the holes in the large mounting bracket, and install the three belt tension adjusting (mounting) screws (Fig. 1). The screws should be snug but not torqued until after the belt is installed and adjusted.
3. For a 460 engine, install the compressor belt and adjust the tension with a flex handle having 1/2-inch drive. Insert the 1/2-inch drive in the belt tensioning pry bar slot (Fig. 1) and move the compressor toward or away from the engine to obtain the specified belt tension. Use Tool T63L-8620-A to measure the belt tension. After obtaining the specified belt tension (see Specifications), tighten the three adjusting screws.
4. Remove the pressure test plate Tool T71P-19703-Q from the rear of the compressor very slowly to bleed off any pressure. **New compressors are charged with a mixture of nitrogen, refrigerant and 10-1/2 fluid ounces of 525 viscosity refrigerant oil. If the cover is removed too rapidly, the oil will be blown out violently with the sudden release of pressure.**
5. Connect the wiring connector to the clutch coil.
6. Evacuate and charge the system as outlined in Part 36-32 under Refrigerant Service.
7. Check the system operation and test for leaks.

CLUTCH ASSEMBLY

HUB AND DRIVEN PLATE

Removal

1. Remove the compressor from the vehicle as outlined in the preceding procedure.
2. Install the compressor and clutch assembly into the holding fixture T57L-500-A or equivalent (Fig. 2) or a fabricated fixture (Fig. 3).
3. Hold the clutch hub with T70P-4067-A wrench or an oil filter removing strap and, using a special thin

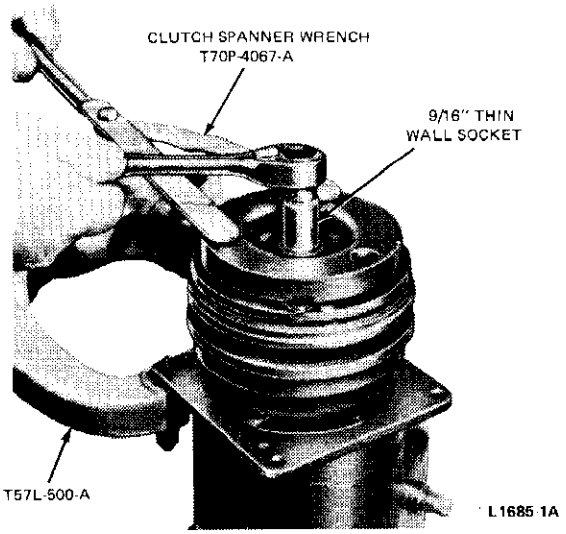


FIG. 2 Removing Lock Nut

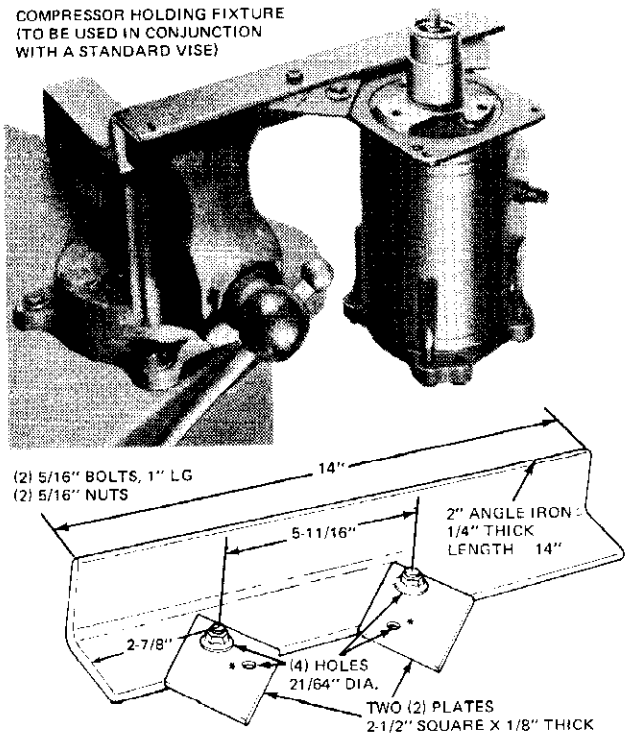


FIG. 3 Fabricated Holding Fixture

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wall 9/16-inch socket, remove hub and driven plate assembly lock nut from shaft (Fig. 2).

4. Remove hub and driven plate assembly retainer ring, using standard snap ring pliers. Remove spacer (Fig. 4).
5. Screw the threaded hub puller T71P-19703-E into the hub of the driven plate. Hold the main body of the tool with the wrench and turn the forcing screw clockwise to remove the driven plate (Fig. 5).
6. Remove the tool from the hub of the driven plate.
7. Remove the hub and driven plate assembly key from the shaft.

Installation

1. Insert the square drive key into the slot in the shaft so that it projects approximately 3/16 inch out of the end of the keyway slot (Fig. 6). Wedge into the keyway with slight pressure. The key is slightly curved to provide wedge action.
2. Align the keyway in the hub with the keyway in the shaft. **To avoid internal damage to the compressor, do not drive or pound on hub and driven plate assembly or on the end of the shaft. If proper tools to remove and replace clutch parts are not used, it is possible to disturb the position of the swash plate (keyed to mainshaft) resulting in compressor damage.**
3. Position the hub and driven plate assembly into the compressor front end casting.
4. Position the driven plate installing Tool T71P-19703-F on the threaded end of the shaft. This tool has a right hand thread on the body (Fig. 7).
5. Using one wrench on the end of the tool body and another wrench on the hex nut, tighten the nut so as to press the hub and driven plate assembly onto the shaft until there is approximately a 3/32-inch space between the frictional faces of the clutch plates.
6. Remove the installing tool.
7. Install the hub spacer washer and the retainer snap ring (Fig. 4).

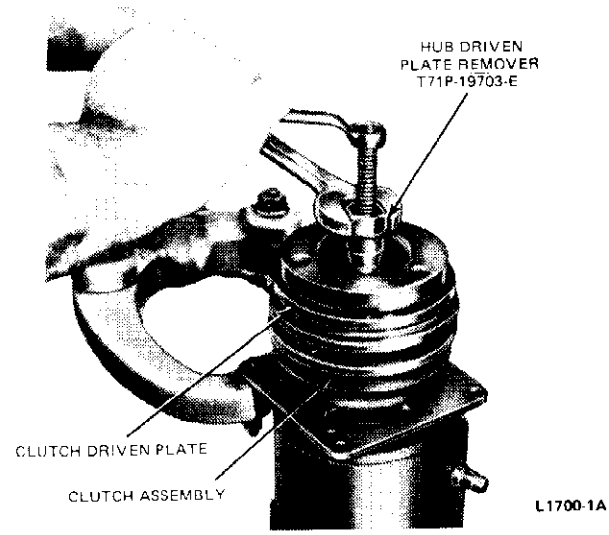


FIG. 5 Removing Hub and Driven Plate

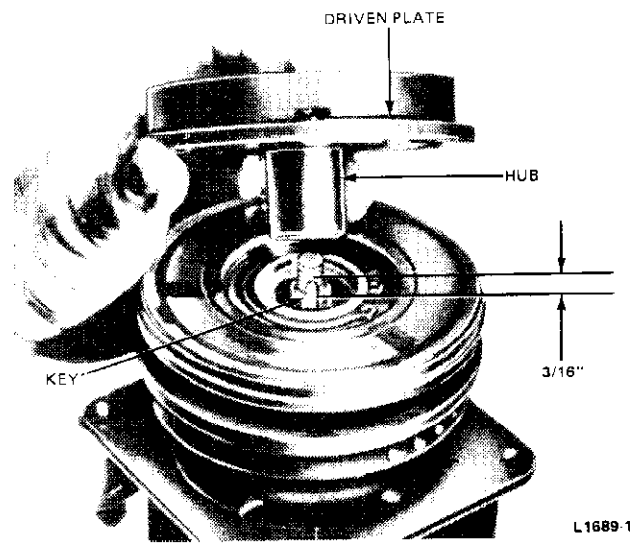


FIG. 6 Aligning the Driven Plate Key

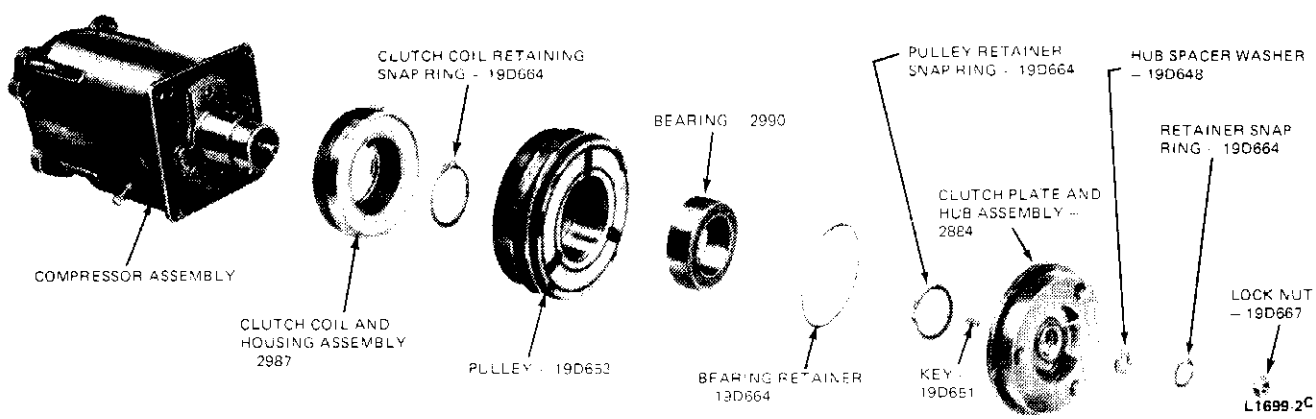


FIG. 4 Clutch and Pulley Disassembled

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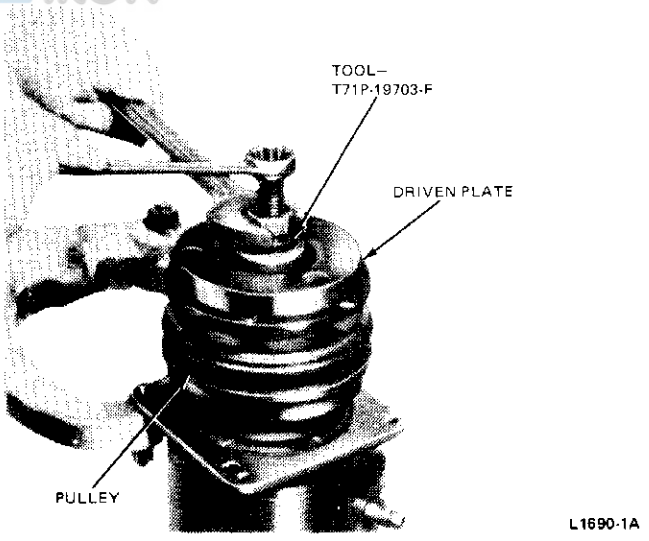


FIG. 7 Installing the Driven Plate

8. Again, position the driven plate installing Tool T71P-19703-F on the threaded end of the shaft and continue pressing the driven plate assembly on the shaft until the spacer washer seats against the shoulder of the shaft.
9. Install the retainer snap ring with the flat side toward the hub spacer washer.
10. Install a new lock nut, using a special thin wall 9/16-inch socket. Tighten to 15 ft-lbs torque. The air gap between the friction faces of pulley and driven plate should now be between .022-.057-inch clearance (Fig. 8).
11. Remove the compressor and clutch assembly from the holding fixture. **After the compressor is installed, the engine at idle and the system is operating satisfactorily, cycle the clutch (by turning air conditioning off and on) at least 20 times at approximately one-second intervals to SEAT or RUN-IN the mating parts of the clutch.**

PULLEY AND/OR BEARING ASSEMBLY

Removal

1. Remove the hub and driven plate assembly as outlined in the foregoing procedure.
2. Remove the pulley assembly retainer ring, using standard snap ring pliers (Fig. 9).
3. Place T71P-19703-N puller pivot over the compressor shaft and remove the pulley assembly, using T71P-19703-B pulley remover (Fig. 10).
4. Remove the pulley and the puller pivot.
5. Remove the pulley bearing wire retainer ring with an awl or a small screwdriver (Fig. 9).
6. Remove the ball bearing assembly, using T71P-19703-D bearing remover and handle to press out the bearing (Fig. 11).

Installation

If the existing pulley and the driven plate and hub assembly are to be reused, clean the drive faces on each part with alcohol or similar solvent. If these parts show evidence of warpage due to overheating, they should be replaced (Fig. 12).

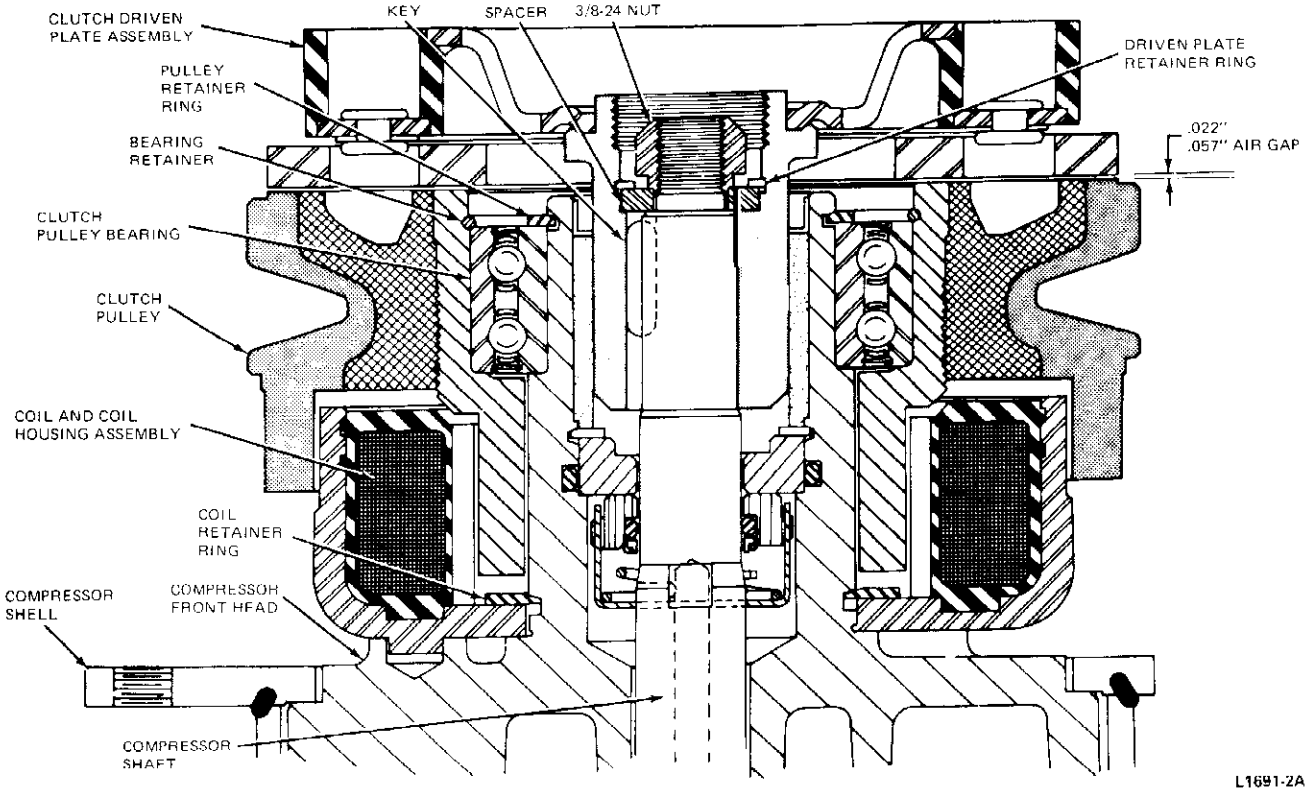


FIG. 8 Clutch and Pulley Assembly Cross Sectional View

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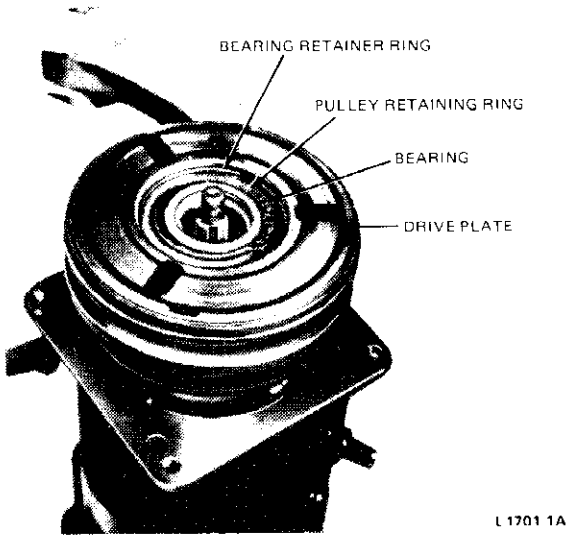


FIG. 9 Location of Bearings and Retainers

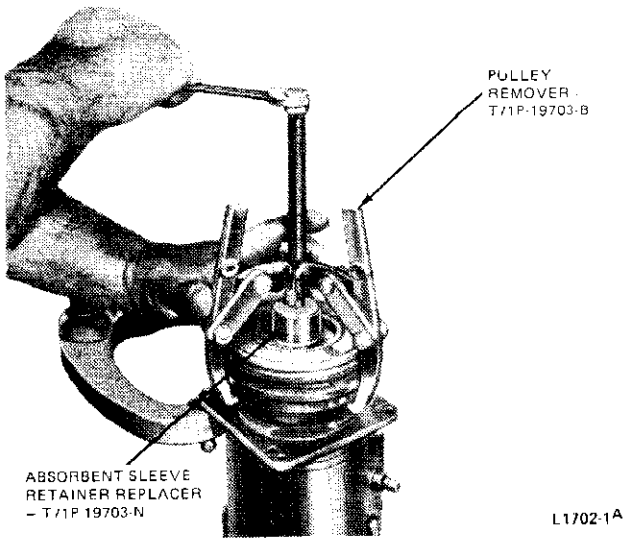


FIG. 10 Removing Pulley Assembly

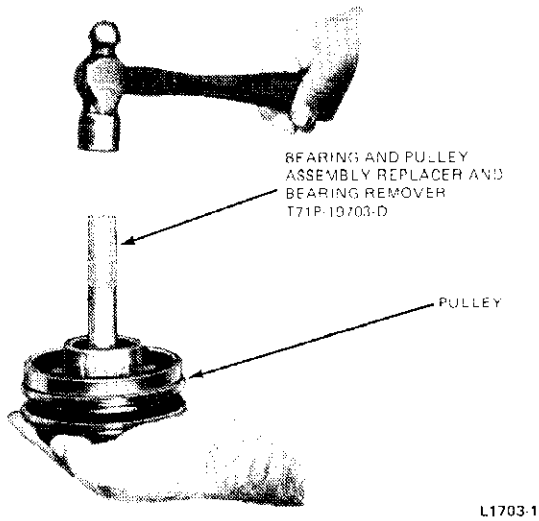


FIG. 11 Removing the Bearing from the Pulley

1. When replacing a new ball bearing assembly into the pulley, use T71P-19703-D pulley bearing installer (Fig. 13).
2. Replace the pulley assembly wire retainer ring in the pulley (Fig. 9).
3. Press or tap the pulley and bearing assembly on the neck of the compressor, using T71P-19703-D (Fig. 14).
4. The pulley should rotate freely.
5. Install pulley snap ring retainer, using standard snap ring pliers. Assure installation of snap ring by tapping with bearing installer tool T71P-19703-D.
6. Install the hub and driven plate assembly as outlined in the foregoing procedure.

CLUTCH COIL AND HOUSING ASSEMBLY

Removal

1. Remove the hub and driven plate assembly and the pulley and bearing assembly as outlined in the two preceding procedures.
2. Note the position of the electrical terminals, and scribe the location of the coil housing terminals on the compressor body.
3. Using standard snap ring pliers, remove coil housing retainer ring (Fig. 4).
4. Remove the coil housing assembly.

Installation

1. Position the clutch coil on the compressor front head casting, so that the electrical terminals are in their proper location as previously scribed on the compressor body. **Make certain that the coil is properly seated on the dowels.**
2. Replace the coil retainer ring with the flat side of the ring facing the coil (Fig. 4). Use standard snap ring pliers.
3. Install first the pulley and bearing assembly and then the hub and driven plate assembly as outlined in the two preceding procedures.

COMPRESSOR SHAFT SEAL

LEAK DETECTION

A shaft seal should not necessarily be changed because of an oil streak on the components. The seal is designed to seep some oil for lubrication purposes. Only change a shaft seal when a leak is detected by the following procedure:

Be sure there is refrigerant in the system. This can be determined by feeling the suction line (suction throttling valve to compressor line) while operating the compressor. Cooling of the line indicates refrigerant in the system.

Turn off the engine.

Blow off compressor clutch area with compressed air. Blow out clutch vent holes to completely remove all freon and oil accumulations (Fig. 15).

Allow the car to set for 5 minutes without operating the compressor.

Rotate the compressor clutch driven plate by hand until one of the vent holes is at the lower port of driven

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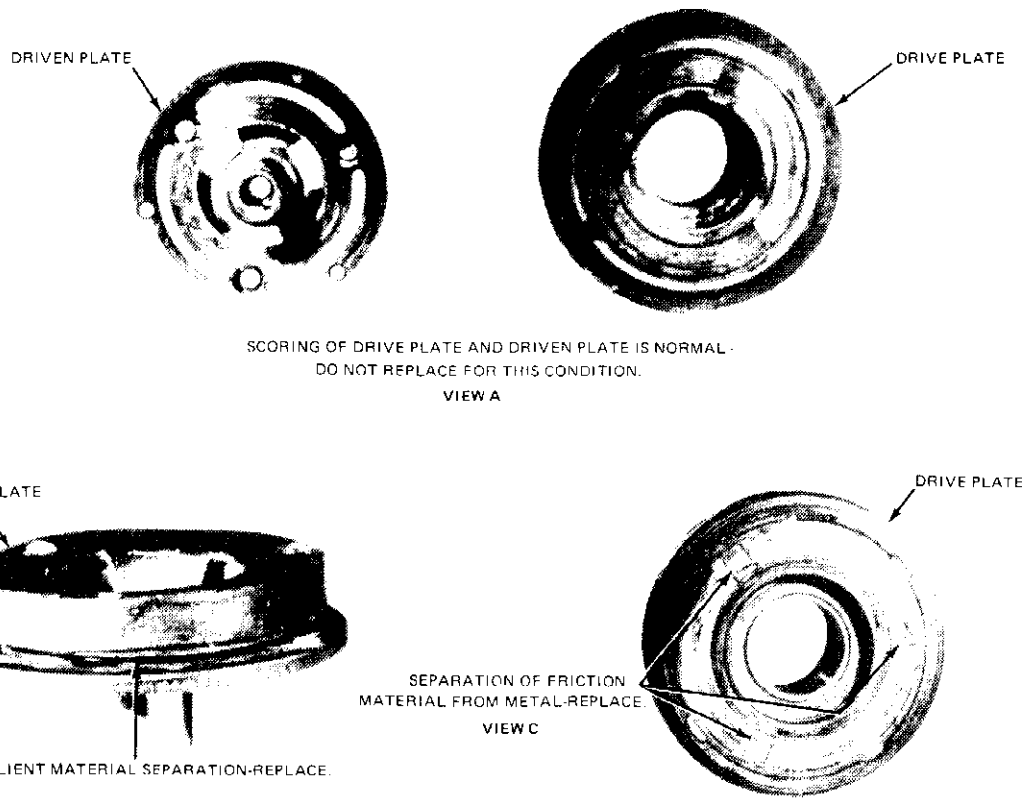


FIG. 12 Clutch Hub and Pulley Inspection

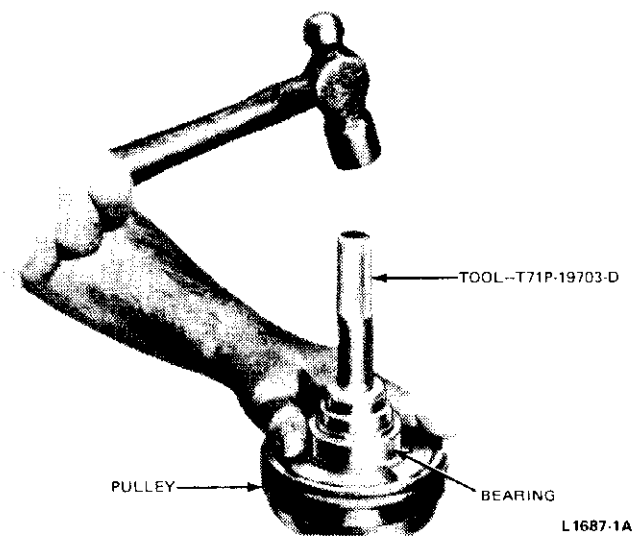


FIG. 13 Installing Bearing in Pulley

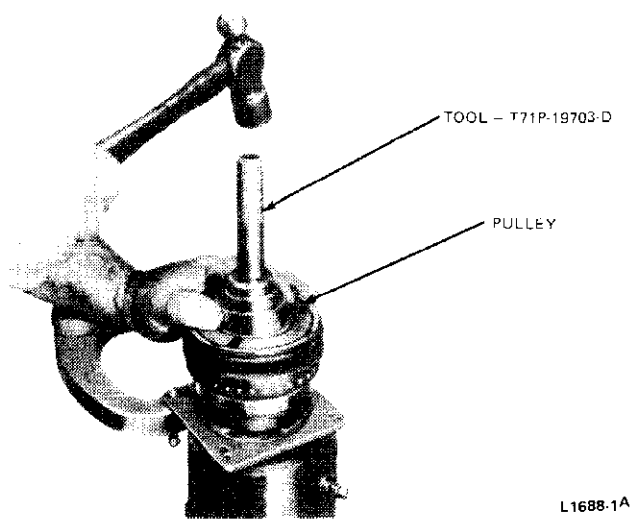


FIG. 14 Installing Pulley and Bearing Assembly on Compressor

plate. Using a leak detector, sense through vent hole at lower port of driven plate only.

Some compressor shaft seal leaks may be the result of mispositioning of the swash plate (wobble plate) on the compressor shaft. The mispositioning of the swash plate may be caused by improper procedures used during pulley and driven plate removal, pounding, collisions or dropping the compressor. If the swash plate is mispositioned, the carbon face of the shaft seal assembly may not contact the seal seat and the rear thrust races and bearing may be damaged.

If there appears to be insufficient air gap between the drive and driven plates, dislocation of the shaft should be suspected. If the carbon seal is not seating against the seal seat, it will not be possible to evacuate the system completely as outlined under evacuating the system.

To check for proper positioning of the swash plate on the shaft, remove the clutch driven plate and measure the distance between the front head extension and the flat shoulder on the shaft as shown in Fig. 15. To measure this distance, use a wire gauge; the clearance should be between .029 and .073 inch. If the shaft has been pushed back in the swash plate (measurement greater than .073 inch), disassemble the

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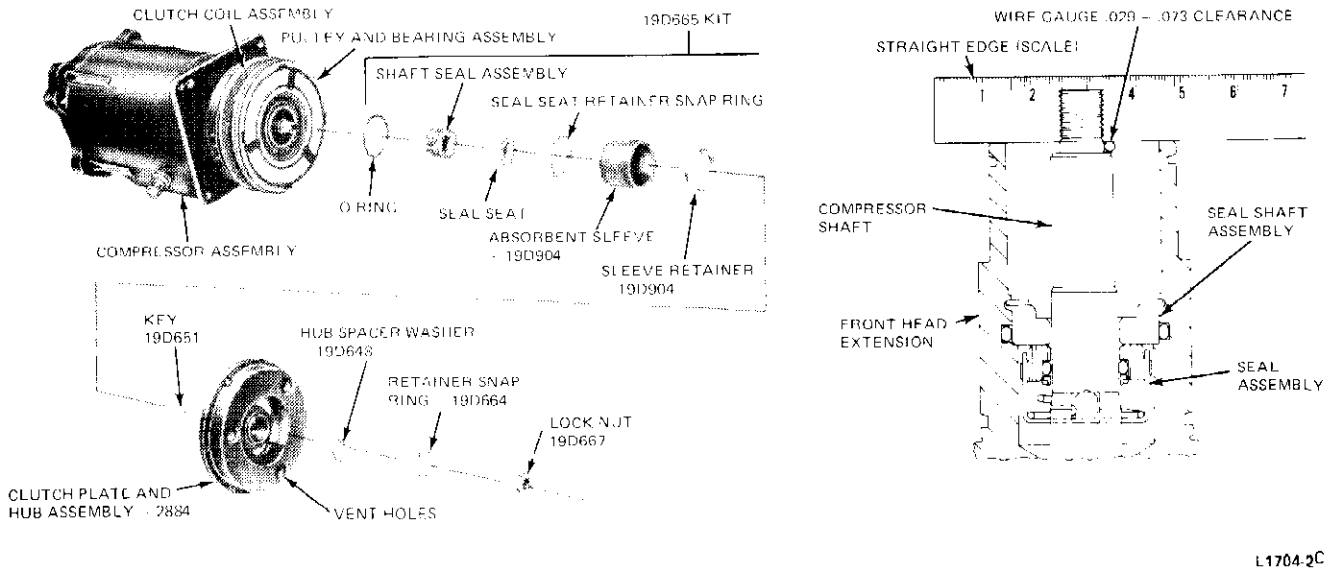


FIG. 15 Compressor Shaft, Seal and Clutch Components

compressor and replace the cylinder and shaft assembly.

Removal

1. Remove the compressor from the car as outlined in this section.
2. Remove the clutch plate and hub assembly from the compressor as outlined in this section.
3. Remove the clutch hub assembly key from the shaft.
4. Pry out the sleeve retainer with a screwdriver and remove the absorbent sleeve (Fig. 15). Remove the seal seat retainer ring with T71P-19703-T or Snap-On pliers PRA-25.
5. Thoroughly clean the inside of the compressor neck, the shaft, and the exposed portion of the seal seat of any dirt or foreign material. This is absolutely necessary to prevent any such material from getting into the compressor.
6. Remove the ceramic seal by rotating clockwise with Tool T71P-19703-M as shown in Fig. 16. Remove the seal seat O-ring from inside the compressor neck with tool T71P-19703-C.
7. Insert Tool T71P-19703-G on top of seal. Rotate tool clockwise while forcing tool downward until tool engages tangs of seal. Remove seal by lifting tool out of compressor neck (Fig. 17).
8. Recheck the shaft and inside of the compressor neck and be sure that these areas are perfectly clean before installing the new parts.

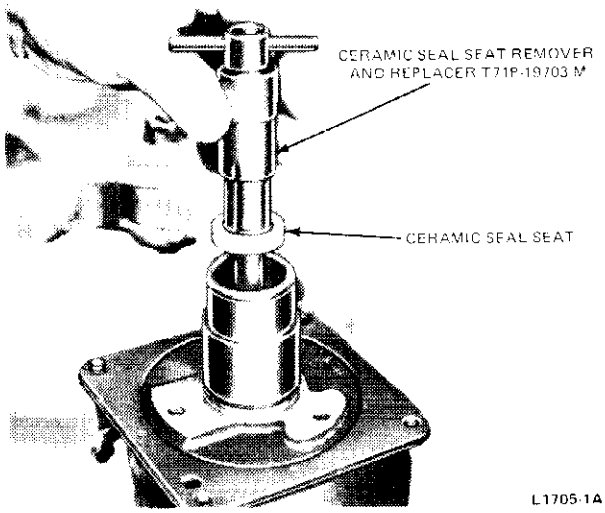


FIG. 16 Removing or Installing the Ceramic Seal Seat

Installation

1. Coat the new seal seat O-ring with clean 525 viscosity compressor oil and install it in the groove inside the compressor neck, using Tool T71P-19703-J guide, T71P-19703-K sleeve and T71P-19703-L O-ring installer as shown in Fig. 18, View A, B and C.
2. Coat the O-ring and seal face of the new seal assembly with clean compressor oil and carefully engage the seal assembly onto the locking tangs of Tool T71P-19703-G (Fig. 17). Place Tool T71P-19703-H (shaft seal protector) over the end of the shaft and slide the seal down the shaft, turning the tool and applying light pressure until the seal

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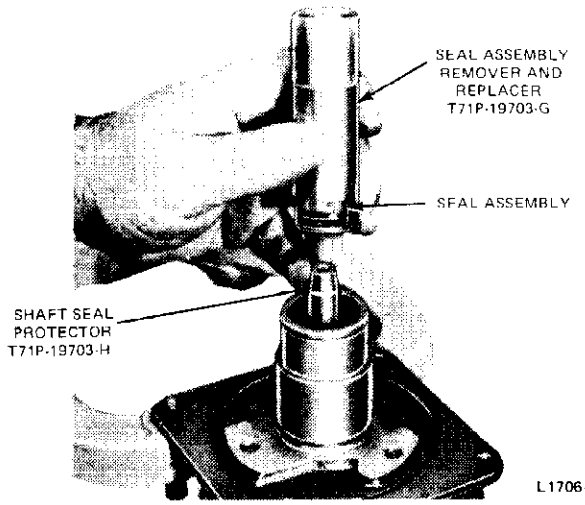


FIG. 17 Removing or Installing the Seal

assembly engages the flats on the shaft and is seated in place. Rotate the tool slightly to release from the seal and remove tool (Fig. 17).

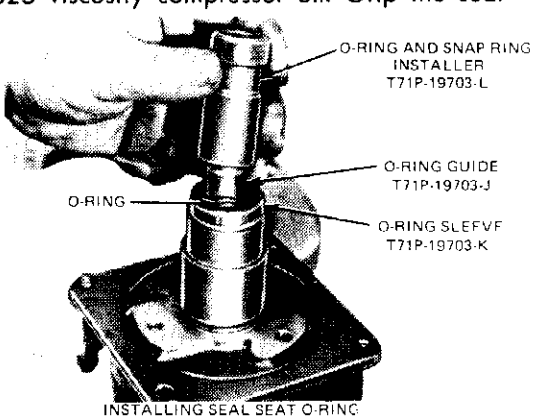
3. Coat the seal face of the ceramic seal seat with clean 525 viscosity compressor oil. Grip the seal seat with Tool T71P-19703-M (Fig. 16); and push it into place so as not to disturb the O-ring. Remove the tools.

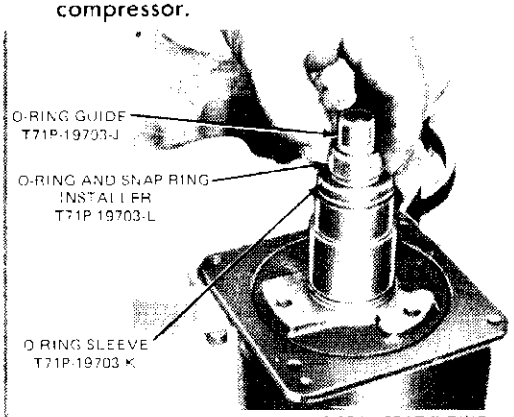
4. Using standard Tool T71P-19703-T or Snap-On snap-ring pliers (PRA25), install the new snap ring so that the flat face of the ring is against the seal seat (View A, Fig. 18). Tool T71P-19703-L may be used to depress the retainer ring, so that it will snap into place. **Do not try to install the ring by bumping or tapping it; such a procedure could crack the seal seat.** Remove Tool T71P-19703-H from the end of the shaft.

5. With Tool T71P-19703-Q (Pressure Test Plate) and O-rings installed on compressor, leak test the compressor shaft seal as follows:

   a. Using the manifold gauge set, connect the center hose to an R-12 drum and the other two hoses with adapter T71P-19703-R and -S to the high and low pressure Schrader valves (Fig. 19). Make sure that the compressor oil drain plug is up to prevent losing oil.

   b. With the high pressure valve and the low pressure valve open, allow refrigerant vapor to flow into the compressor.





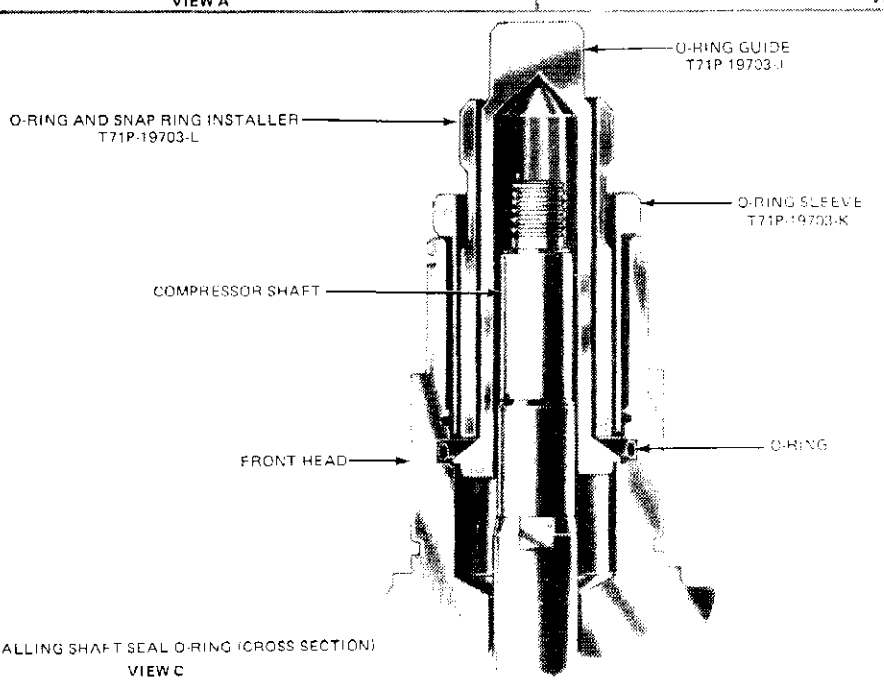


FIG. 18 Installing the Shaft Seal O-Ring

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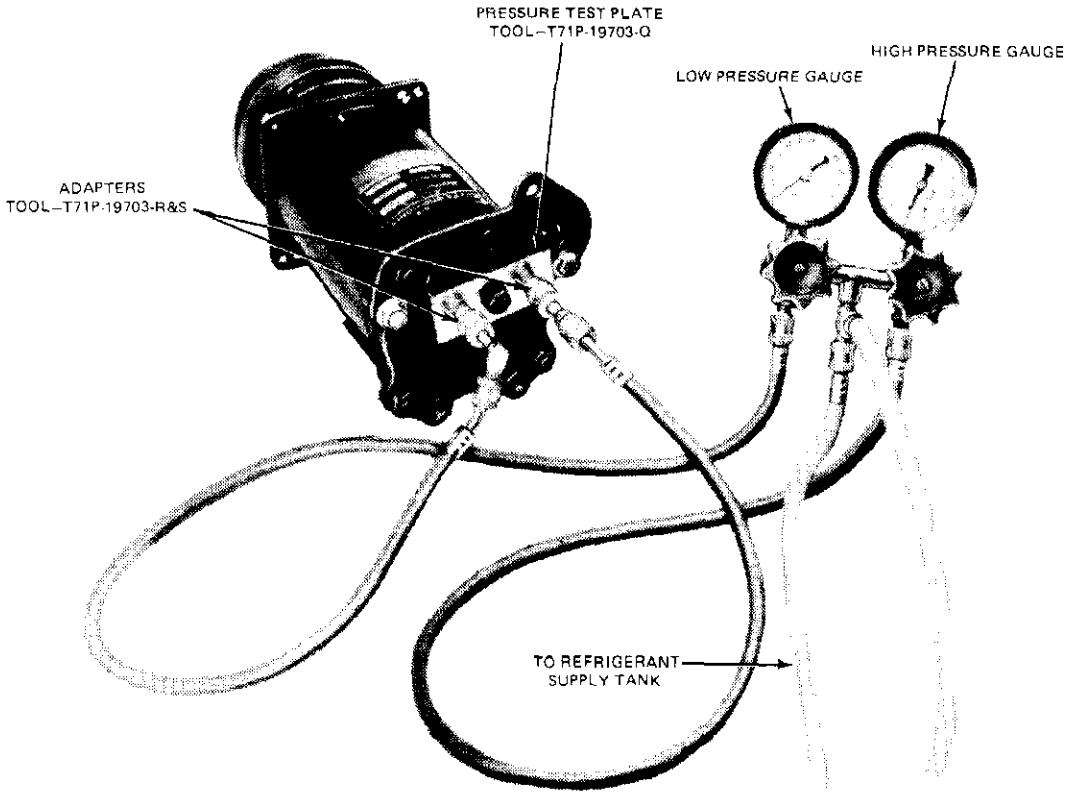


FIG. 19 Leak Testing Compressor Shaft Seal

c. Open the oil plug fitting in the compressor housing and allow air to exhaust until refrigerant vapor starts to flow from the fitting.

d. Close the oil plug fitting and allow the drum pressure to stabilize in the compressor.

e. Temporarily install the shaft nut and, with the compressor in horizontal operating position (oil sump down), rotate the compressor shaft several times in normal direction of rotation by hand.

f. Leak test the seal with a leak detector. Correct any leak that may exist.

g. Remove the gauge set, cap the fittings on Tool T71P-19703-Q, and then check and add oil, if necessary, as outlined under Maintenance.

6. Install the absorbent sleeve by rolling the material into a cylinder, overlapping the ends and slipping the sleeve into the compressor neck with the overlap toward the top of the compressor. With a small screwdriver or Tool T71P-19703-C, carefully spread the sleeve to remove the overlap so that in the final position the ends of the sleeve will butt at the top vertical centerline (View A and B, Fig. 20).

7. Position the absorbent sleeve metal retainer so that its flange face will be against the front end of the sleeve. Use Tool T71P-19703-N to install the retainer (View A and C, Fig. 20). Press or tap the tool with a mallet until the outer edge of the retainer is recessed approximately 1/32 inch from the face of the compressor neck.

8. Install the clutch and hub assembly on the compressor as outlined in this section.

9. Install the compressor on the vehicle.

10. Evacuate, charge and leak test the system, as outlined in Part 36-32 under Refrigerant Service.

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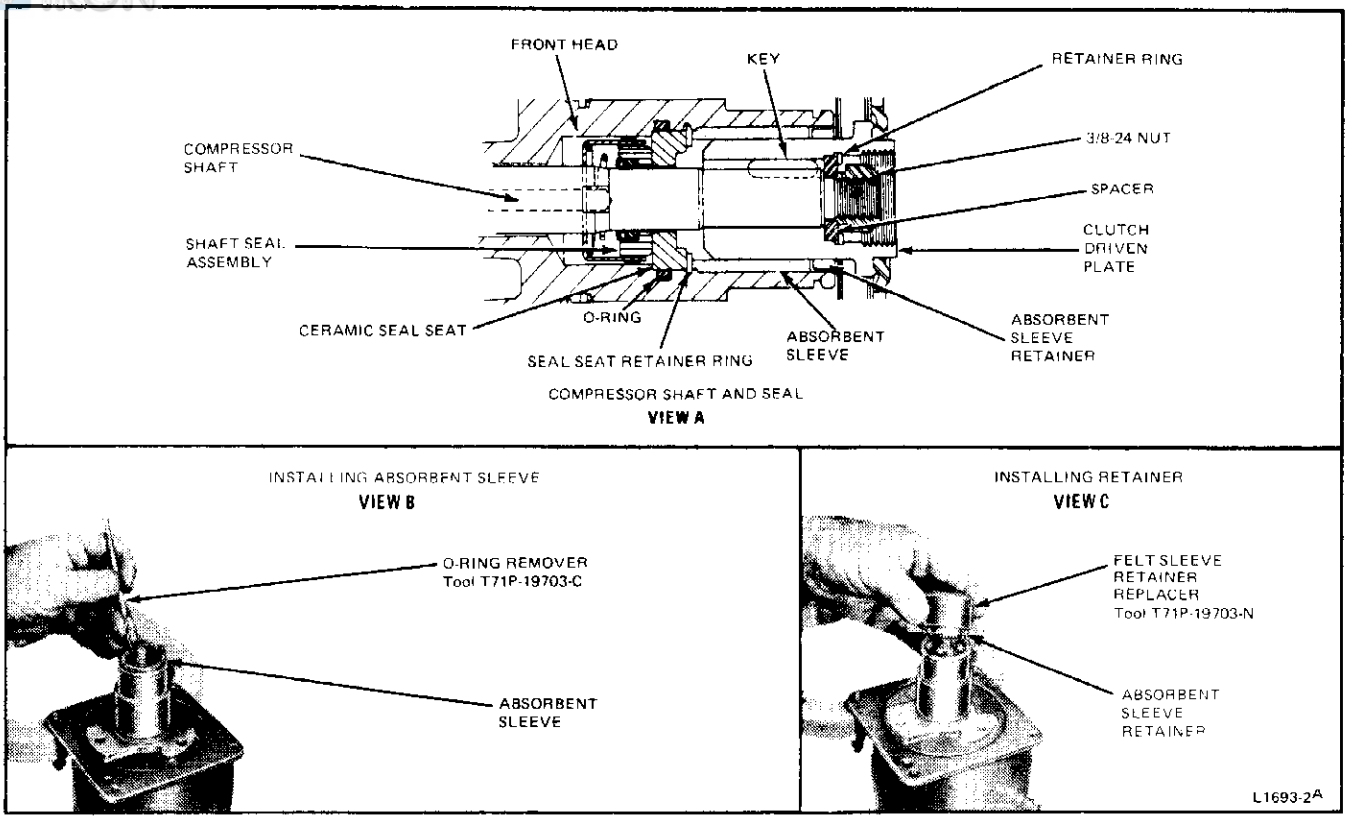


FIG. 20 Compressor Shaft and Seal, Absorbent Sleeve and Retainer

MAJOR REPAIR OPERATIONS

COMPRESSOR

Disassembly

1. Remove the compressor from the car and the clutch assembly from the compressor as described under Removal and Installation.
2. Remove the shaft seal as described under Removal and Installation.
3. Invert the compressor and holding fixture so that the front end of the compressor shaft is down. **Additional oil may leak from the compressor at this time. All oil must be drained into a container so that total amount can be measured. A liquid measuring cup may be used for this purpose. Drained oil should then be discarded.**
4. Remove four lock nuts from the threaded studs on the compressor shell and remove the rear head (Fig. 21). Tap uniformly around the rear head if the head is binding.
5. Wipe excess oil from all sealing surfaces on the rear head casting webs, and examine the sealing surfaces (Fig. 22). If any damage is observed, head should be replaced.
6. Remove suction screen and examine for any damage or contamination. Clean or replace if necessary.
7. Paint an identifying mark (Prussian blue or other suitable marking material may be used) on exposed face of the oil pump inner and outer gears and then remove the gears. Identifying marks are to assure that the gears, if reused, will be installed in identical position.
8. Remove and discard the rear head-to-shell O-ring.
9. Carefully remove the rear discharge valve plate assembly. Use two small screwdrivers under the reed retainers and pry up on the assembly (Fig. 23). Do not position the screwdrivers between the reeds and reed seats.
10. Examine the valve reeds and seats. Replace the entire assembly, if any reeds or seats are damaged.
11. Using two small screwdrivers, carefully remove the rear suction reed. Do not pry up on the horseshoe shaped reed valves (Fig. 21).
12. Examine the reeds for damage, and replace if necessary.
13. Using oil pick-up tube remover (T71P-19703-C, Fig. 24) remove the oil pick-up tube. Remove the O-ring from the oil inlet.
14. Hold the rear end of the compressor assembly with one hand and invert the compressor and holding fixture. Hold the front head and carefully lower the internal mechanism away from shell and front head (View A, Fig. 25). **Do not tap on end of compressor shaft to remove internal mechanism. If mechanism will not slide out of compressor shell, tap on front head with a plastic hammer.**
15. Rest the compressor shell on its side and push the front head assembly through the compressor shell,

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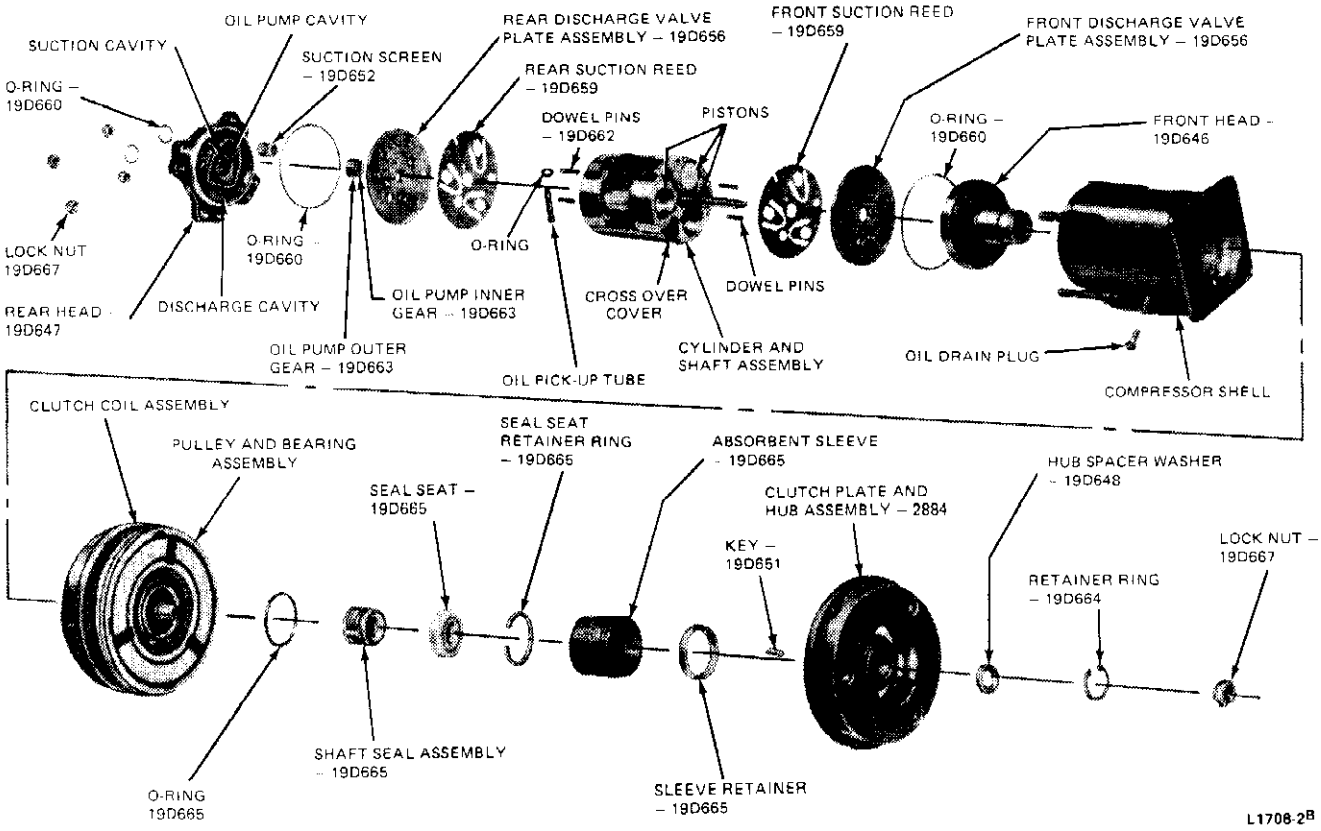


FIG. 21 Compressor Disassembled

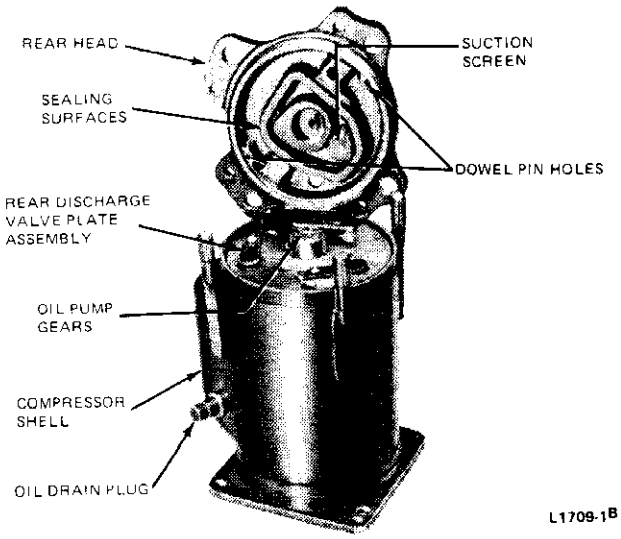


FIG. 22 Rear Head Removed

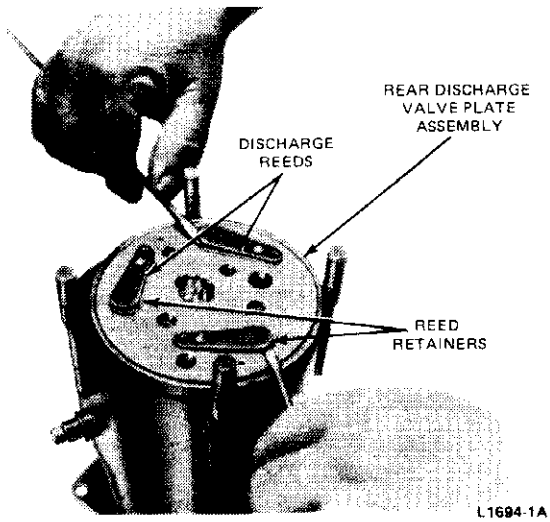


FIG. 23 Removing Rear Discharge Valve Plate

being careful not to damage sealing areas on the inner side of the front head. Discard the O-ring. **It may be necessary to tap on the outside of the front head, using a plastic hammer, to overcome friction of the O-ring seal between the front head and the compressor shell.**

16. Wipe excess oil from the sealing surfaces on the front head casting webs and examine the sealing surface. If any damage is observed, the head should be replaced.
17. Remove the front discharge valve plate assembly and the front suction reed plate (Fig. 25). Examine the reeds and seats. Replace if necessary.
18. Remove the suction cross-over cover by prying with a screwdriver between the cylinder casting and cover (Fig. 21). Examine the internal mechanism for any obvious damage. If the internal mechanism has sustained major damage due to loss of compressor oil, it is necessary to replace the cylinder and shaft assembly.
19. If broken parts or metal particles are found when the compressor is disassembled, replace the receiver-dehydrator assembly.

Assembly

1. Install the suction cross-over cover in the cylinder and shaft assembly (Fig. 21), and place the

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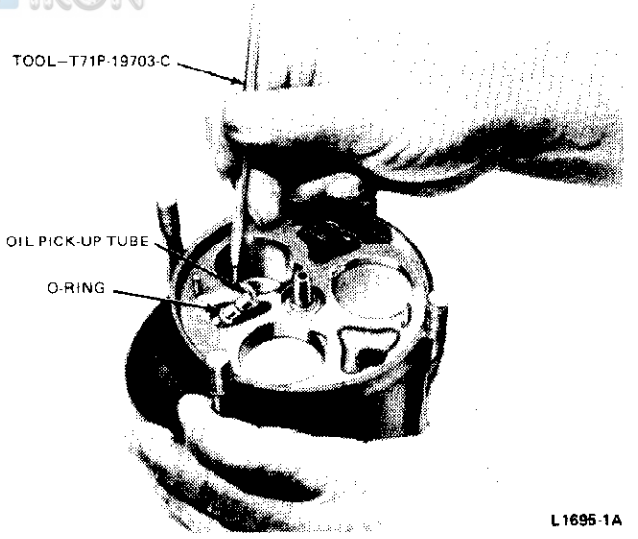


FIG. 24 Removing Oil Pick-Up Tube

assembly on a support block in which a hole is bored for receiving the end of the shaft.

2. Install the front suction reed plate on the cylinder front half. Align the suction ports, oil return slot, and the discharge cross-over tube with dowel pins.
3. Install the front discharge valve plate assembly, aligning the holes with the dowel pins and proper openings in the front suction reed plate (View A, Fig. 26). **Front discharge plate has a large diameter hole in the center (View B, Fig. 26).**
4. Coat the sealing surfaces on webs of the compressor front head casting with 525 viscosity compressor oil.
5. Determine the exact position of the front head casting in relation to the dowel pins on the internal mechanism. Mark the position of the dowel pins on sides on internal mechanism. Mark position of dowel pins on sides of front head assembly and on sides of internal mechanism with Prussian blue. Carefully lower front head casting into position (Fig. 26), making certain that the sealing area around the center bore of the head assembly does not contact the shaft as head assembly is lowered. **Do not** rotate the head assembly to line up with the dowel pins. This would cause the sealing areas to contact the reed retainers.
6. Generously lubricate the angled groove at the lower edge of the front head casting with 525 viscosity compressor oil and install a new O-ring in the groove.
7. Coat the inside machine surfaces of the compressor shell with 525 viscosity compressor oil, and position the shell on the internal mechanism, resting on the O-ring seal.
8. Using the flat side of a small screwdriver, gently press the O-ring in around the circumference of the internal mechanism, until the compressor shell slides down over the internal mechanism. As the shell slides down, align the oil sump with the oil intake tube hole (View A, Fig. 25).
9. Holding the support block, invert the assembly and place it in the holding fixture with the front end of the shaft down. Remove the support block.

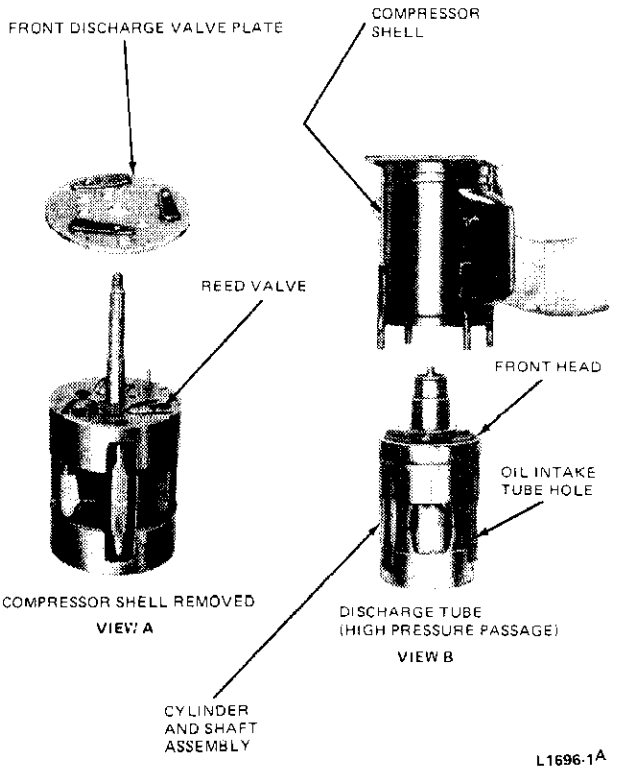


FIG. 25 Front Discharge Valve Plate and Reed Valve

10. Install new dowel pins in the cylinder rear half, if previously removed.
11. Install a new O-ring in the oil pick-up tube cavity.
12. Lubricate the oil pick-up tube and install it in the cavity, rotating the compressor mechanism to align the tube with the hole in the shell baffle (Fig. 24).
13. Install the rear suction reed over the dowel pins with slot toward the sump.
14. Install the rear discharge valve plate assembly over the dowel pins with the reed retainers up.
15. Position the oil pump inner gear over the shaft with the previously applied identification mark up.
16. Position the oil pump outer gear over the inner gear with the previously applied identification mark up. When standing facing the oil sump, position the outer gear so that it meshes with the inner gear at the 9 o'clock position and the cavity between the gear teeth is at the 3 o'clock position (Fig. 22).
17. Generously oil the rear discharge valve plate assembly around outer edge where the large diameter O-ring will be placed. Oil the valve reeds, pump gears, and the area where the sealing surface will contact the rear discharge valve plate.
18. Lubricate the new head-to-shell O-ring and install it on the rear discharge valve plate, in contact with the shell.
19. Install the suction screen in the rear head casting, using care not to damage the screen.
20. Coat the sealing surface on the webs of compressor rear head casting with 525 viscosity compressor oil.
21. Install the rear head assembly over the studs on the compressor shell. The two lower threaded

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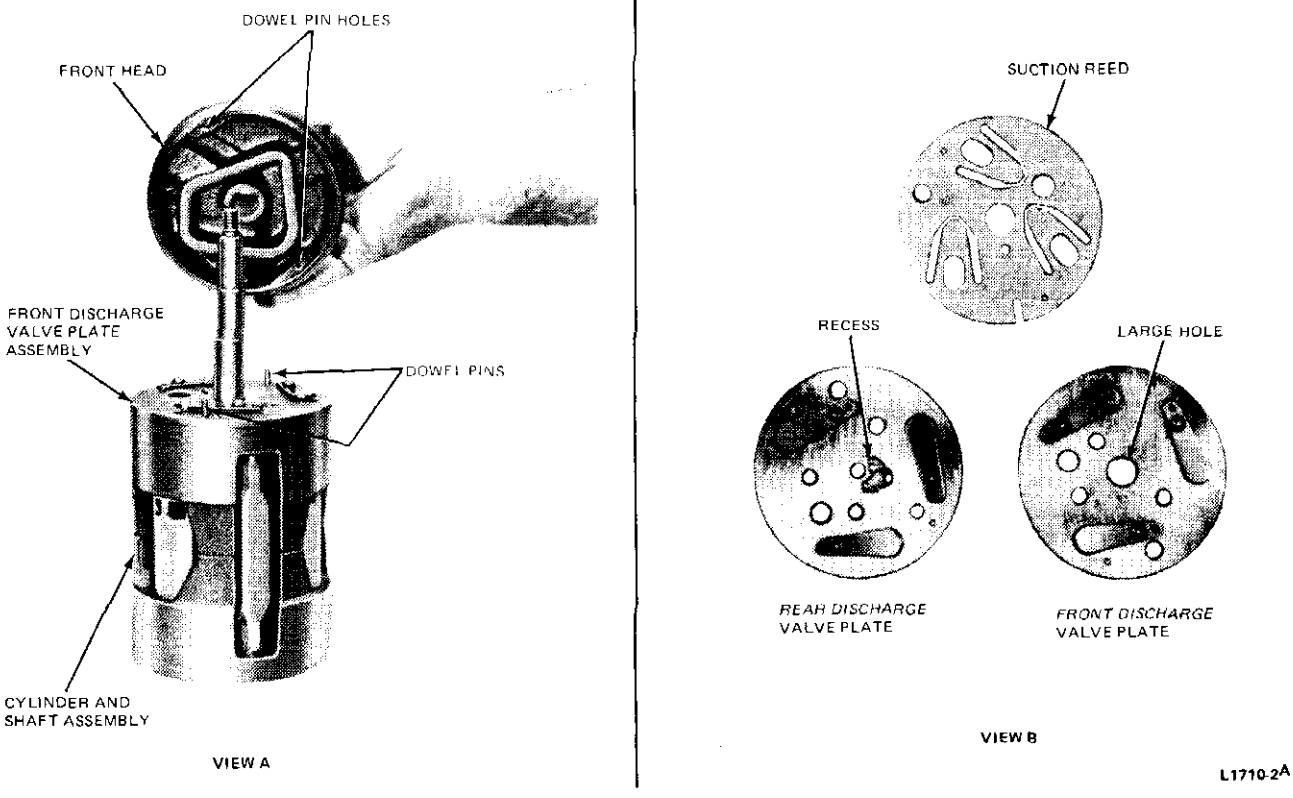


FIG. 26 Front Head Assembly

compressor mounting holes should be in alignment with the compressor sump. Make certain that the suction screen does not drop out of place when lowering the rear head into position. **If the rear head assembly will not slide down over the dowels in the internal mechanism, twist the front head assembly back and forth very slightly by hand until the rear head drops over the dowel pins.**

22. Install the nuts on the threaded shell studs and tighten evenly to 20 ft-lbs torque using a 0-25 ft-lbs torque wrench.
23. Invert the compressor in the holding fixture and install the shaft seal, as described under Removal and Installation.
24. Install compressor clutch assembly, as described under Removal and Installation.
25. Add 525 viscosity compressor oil, as described under Adding Oil.
26. Check for external and internal leaks, as described in the following procedure.

COMPRESSOR LEAK TESTING EXTERNAL AND INTERNAL

1. Rotate the clutch hub clockwise several turns to pick oil up from the sump and carry it to the piston rings and oil seals.
2. Install pressure test plate, T71P-19703-Q on the rear head of the compressor (View A, Fig. 27).
3. Attach the center hose of a manifold gauge set to a refrigerant drum standing in an upright position.
4. Connect the high and low pressure lines with adapters T71P-19703-R and -S to their corresponding fittings on the test plate.
5. Open the low pressure gauge valve, the high pressure gauge valve, and the valve on the refrigerant drum to allow the refrigerant vapor to flow into the compressor.
6. Using a leak detector, check for leaks at the oil *drain fitting, compressor rear head seal, compressor* front head seal, and compressor shaft seal. After checking, shut off the manifold gauge valves.
7. If an external leak is present, perform the necessary corrective procedures and repeat steps one through six to make certain that the leak has been corrected before proceeding with steps eight through twelve to check for internal leaks.
8. Disconnect the manifold gauge hoses from the test plate.
9. Connect the low pressure hose of the manifold gauge set to the high pressure fitting on the pressure test plate, T71P-19703-Q (View B, Fig. 27).
10. Open the low pressure control valve to allow refrigerant vapor to flow into the compressor.
11. Observe the reading on the pressure gauge; then close the valve. If the gauge reading drops to ten pounds or under in 30 seconds or less, it indicates that the compressor is leaking internally, at one or more of the following points:
    a. Reed Valves.
    b. Sealing surfaces at rear head, or sealing surfaces on front head.

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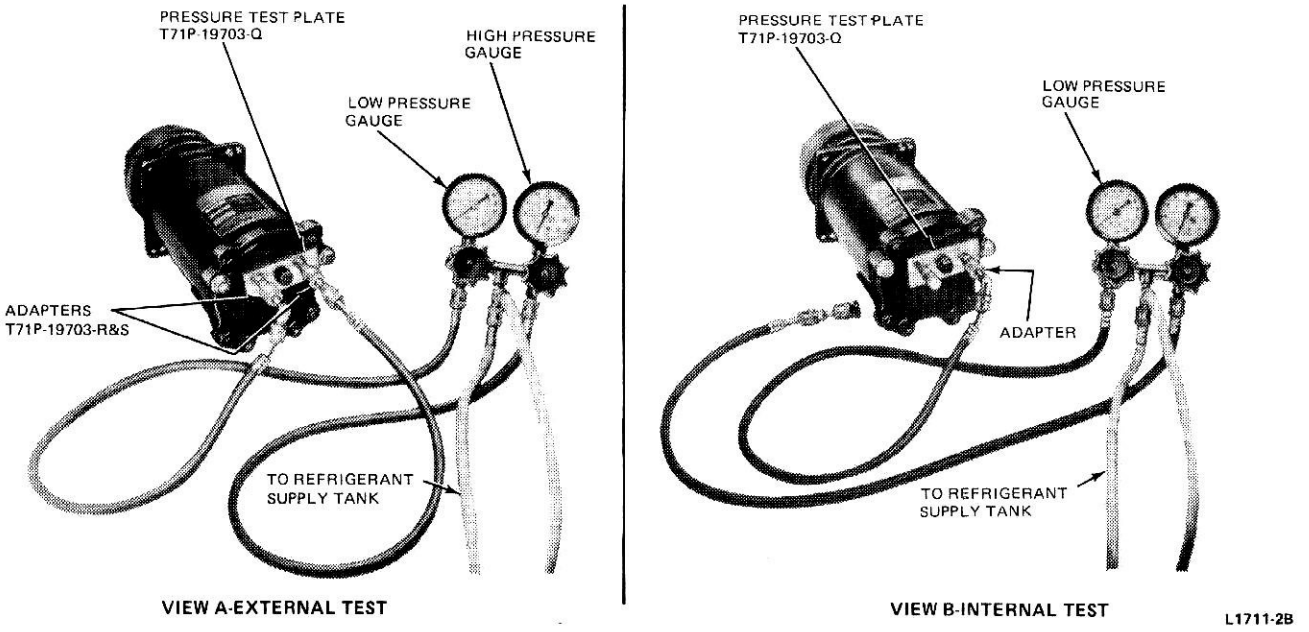


FIG. 27 Testing Compressor for External and Internal Leaks

c. Cross-over tube.

d. Raised section on cylinder face.

12. If a leak is indicated in step eleven, perform the necessary corrective procedures to eliminate the internal leak and repeat steps one through eleven to make certain that the external and internal leaks are corrected. If no leak was indicated, proceed with step thirteen.
13. Disconnect the hoses from test plate.
14. If the test was performed with the compressor in the car, remove the pressure test plate from compressor. If it was performed on the bench, leave the test plate on until after the compressor is installed in the car.

SPECIFICATIONS AND SPECIAL SERVICE TOOLS

COMPRESSOR SPECIFICATIONS

OIL	BELT ADJUSTMENT		
Capacity ..... 10-1/2 Fluid Ounces Specification ..... TL 4538 Texaco 525 Viscosity Ford Part No. D1VY-19577-A	Minimum Operating Tension (1) (Hot Only)	Installation Tension	
		Used Belt (2)	New Belt
	Predelivery only ..... 90 lbs. After Predelivery ..... 70 lbs.	110 lbs.	140 lbs.

(1) Check only after engine has been operating for at least ten minutes.

(2) Any belt that has operated for ten minutes or more is considered a used belt.

CL1752-2A

SPECIAL TOOLS

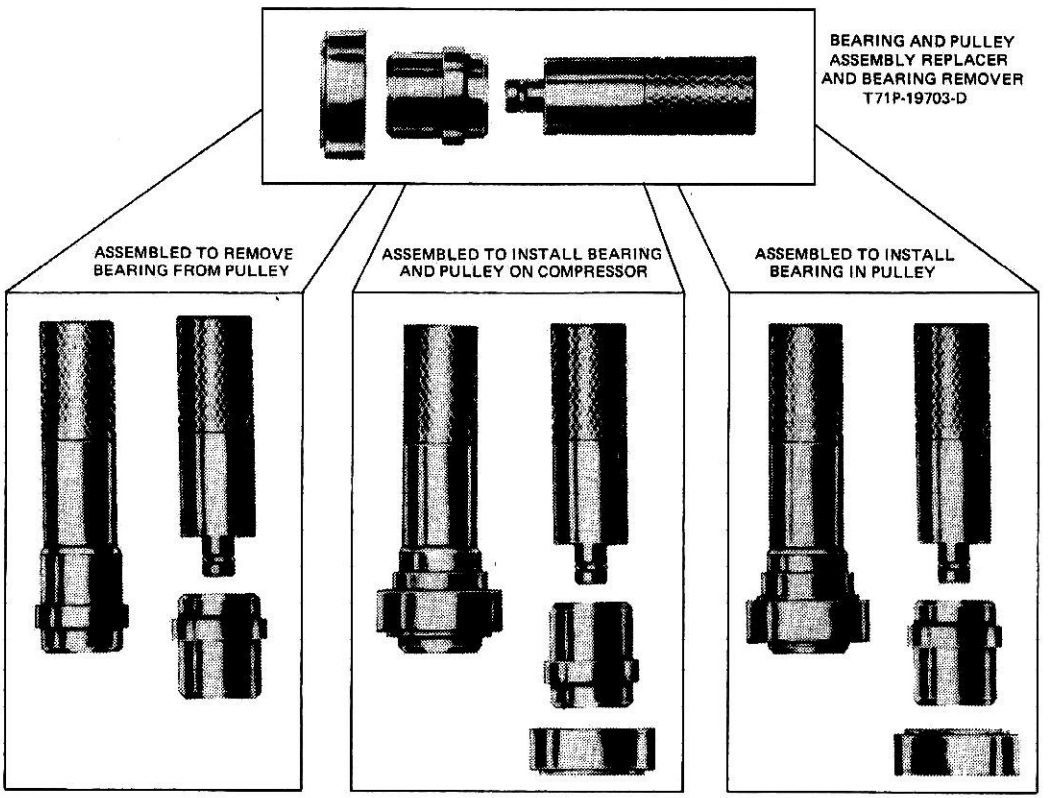
The special tools required for servicing the six-cylinder compressor are listed in Fig. 28. All of the tools are illustrated in the foregoing Sections. For clarity, however, the functions of T71P-19703-D bearing and pulley assembly replacer and bearing remover is illustrated in Fig. 29.

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TOOL NUMBER	DESCRIPTION	TOOL NUMBER	DESCRIPTION
T71P-19703-B	PULLEY PULLER	T71-P19703-L	"O" RING AND SNAP RING REPLACER
T71P-19703-C	"O" RING REMOVER	T71P-19703-M	CERAMIC SEAL REMOVER AND REPLACER
T71P-19703-D	BEARING AND PULLEY ASSEMBLY REPLACER AND BEARING REMOVER	T71P-19703-N	FELT SLEEVE RETAINER REPLACER
T71P-19703-E	HUB DRIVEN PLATE REMOVER	T71P-19703-P	TOOL BOX
T71P 19703 F	HUB DRIVEN PLATE REPLACER	T71P-19703-Q	PRESSURE TEST PLATE
T71P 19703-G	SEAL ASSEMBLY REMOVER AND REPLACER	T71P-19703-R	90° ADAPTER
T71P 19703-H	SHAFT SEAL PROTECTOR	T71P-19703-S T71P 19703 T	STRAIGHT ADAPTER SNAP RING TOOL
T71P-19703-J	"O" RING GUIDE	T70P-4067-A	CLUTCH SPANNER WRENCH
T71P-19703-K	"O" RING SLEEVE	T57L-500-A	HOLDING FIXTURE

CL1723-2B

FIG. 28 Special Tool List for Six-Cylinder Compressor



L1724-2B

FIG. 29 Special Tool T71P-19703-D

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Two — Cylinder Compressor

PART 36-35

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Oil Leakage Through O-Ring	35-1
Oil Leakage Through Bellows	35-1
Refrigerant-12 — Leakage	35-1
REMOVAL AND INSTALLATION	
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Clutch Bearing	35-6
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CL2344-2B

TESTING

CRANKSHAFT SEAL LEAK TEST

The cross sectional view in Fig. 1 shows the design and the components of the seal assembly. Oil leak problems can be identified by observing the three possible leakage paths shown in Fig. 2.

OIL LEAKAGE PAST CARBON RING

Oil leakage through the carbon ring forming a streak or drip pattern as shown in the left illustration of Fig. 2 is considered normal. However, if oil is present on the surface of the compressor beyond the clutch or has sprayed on the hood and surrounding brackets, the leakage is excessive. Replace the seal assembly.

OIL LEAKAGE THROUGH O-RING

Leakage through the O-ring type gasket on the cover plate (center illustration, Fig. 2) indicates possible cracked, pinched, or split O-ring or loose mounting screws. Check the screws for good condition and proper torque as follows:

Tecumseh—4 1/2 - 6 1/2 ft-lbs

York—5-7 ft-lbs.

If there is heavy oil discharge with screws of good condition and correct torque, replace the oil seal assembly.

OIL LEAKAGE THROUGH DAMAGED BELLOWS

Oil will leak through the rubber bellows as shown in the right illustration of Fig. 2, if the bellows distorts or cracks due to heat. A large discharge of oil on the front of the compressor beyond the clutch indicates this type of leakage. Replace the oil seal assembly.

REFRIGERANT-12 LEAKAGE

Observe Safety Precautions outlined in Part 36-31.

Refrigerant-12 leakage through any part of the seal can be determined only by a leak detector. Be sure to

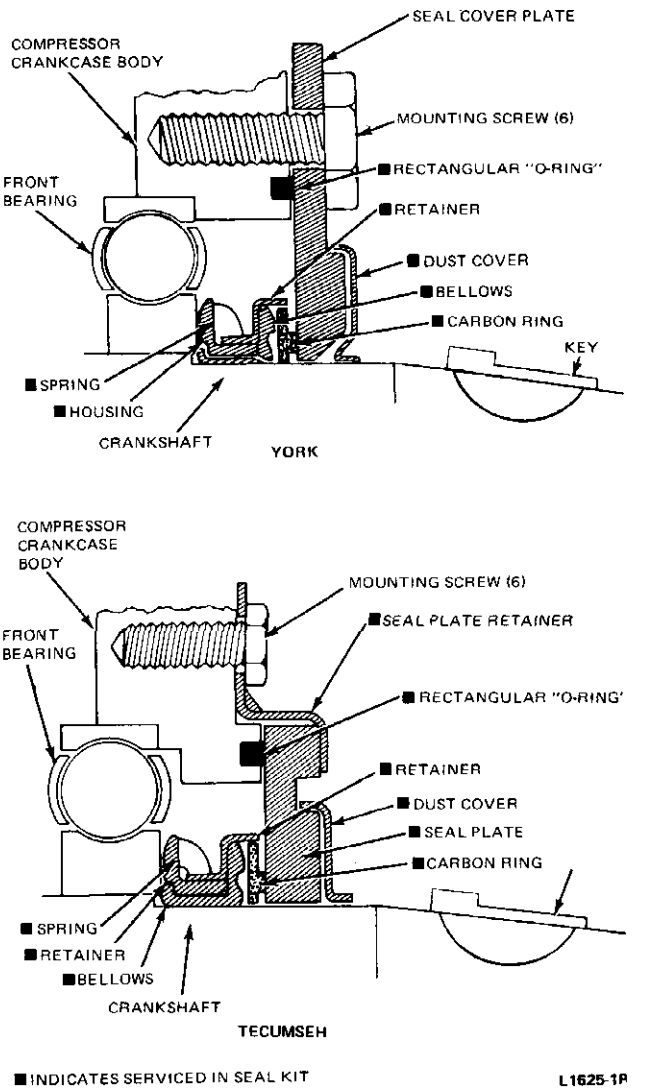


FIG. 1 Compressor Oil Seal Cross Sectional View

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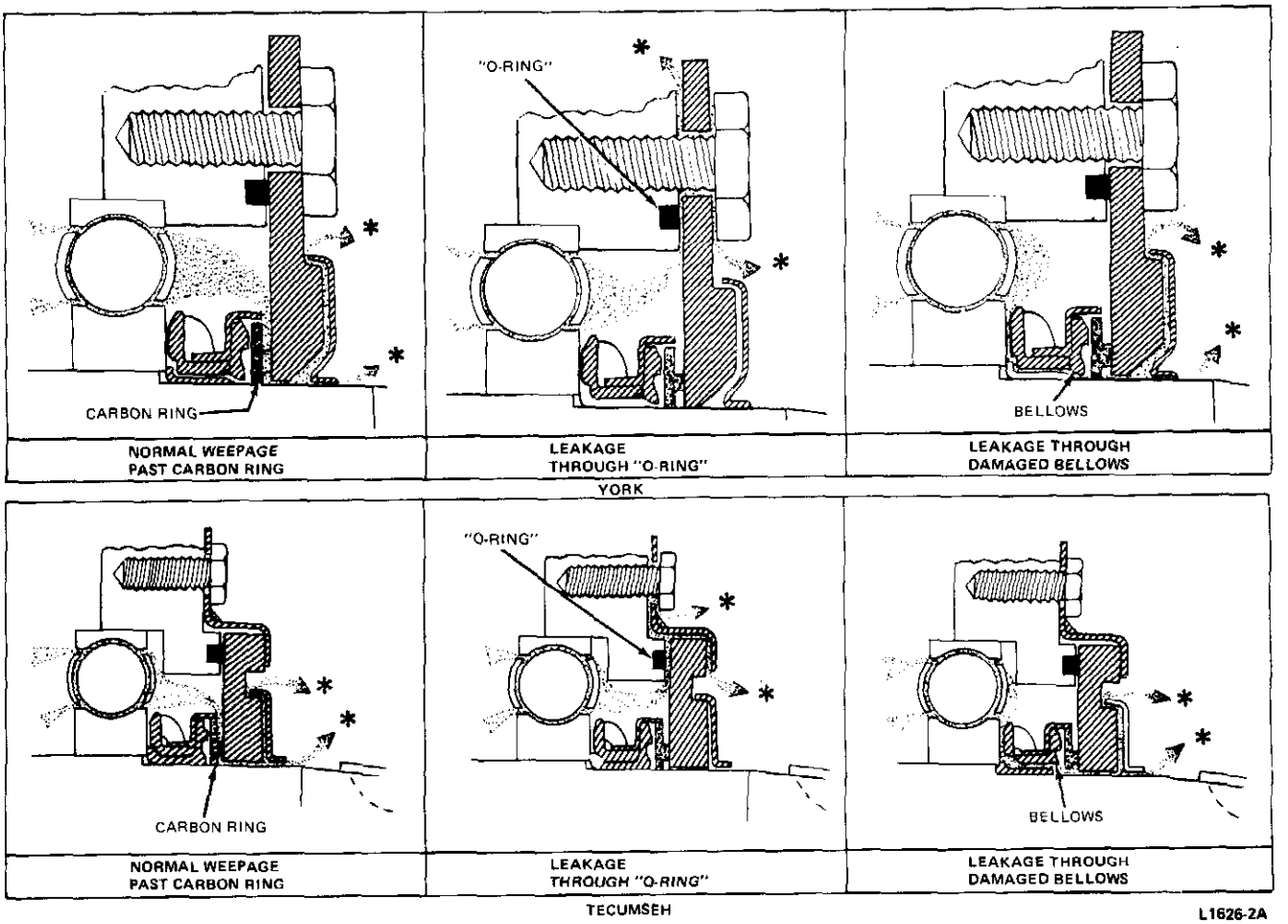


FIG. 2 Oil Leakage Paths Compressor Oil Seal

wipe all the oil away from the seal area before using the leak detector, because the oil may contain refrigerant which would give erroneous readings. If refrigerant leakage at the seal exceeds 1 oz. per year, replace the seal as outlined under Removal and Installation.

If no leak is found at the compressor crankshaft seal, thoroughly check all system fittings and lines for leaks.

COMPRESSOR OIL LEVEL CHECK

Observe Safety Precautions outlined in Part 36-31.

Under normal conditions, when the air conditioning system is operating satisfactorily, the compressor oil level need not be checked. There is no place for the oil to go except inside the sealed system. When the engine is first started, some of the oil will be pumped into the rest of the refrigerant system. After several minutes of operation, most of the oil is returned to the compressor crankcase. **Check the compressor oil level only if any portion of the refrigerant system is being replaced, or if there was a leak in the system and the refrigerant is being replaced.**

1. After the system has been charged, operate the system for about ten minutes or until the pressures have been stabilized in a surrounding temperature of 60 degrees or above.
2. Stop the engine. With Schrader or equivalent type service valves, discharge the entire system (Part 36-32).
3. Remove the oil filler plug from the compressor. Insert a flattened 1/8-inch diameter rod (Fig. 3) in the oil filler hole until it bottoms. The rod or dipstick fashioned for the particular compressor (Figs. 4 or 5) should be used. **The dipstick must be wiped completely clean before insertion.** If necessary, **slightly** rotate the compressor crankshaft by hand so that the dipstick will clear the crankshaft.

On horizontally mounted compressors, the oil check hole is located on the side of the crankcase that faces up. On the opposite or downward side, there is a corresponding boss provided on the inner wall as an alternate oil check hole for a different mounting. When checking the oil level on such a compressor, angle the dipstick so that it bottoms against the lower side of the crankcase and not against the boss.

4. Pull out the dipstick, and check the oil indication. It should show at least the minimum amount of oil as indicated in Figs. 4 and 5. **If the oil level is low,** add oil, (Ford Part No. C9AZ-19577-A or equivalent). **If too much oil is indicated proceed as follows:**
   a. Draw out all of the oil using a trap similar to that shown in Fig. 3, or remove the compressor from the vehicle and pour the oil out of the crankcase.
   b. Add approximately 4 oz. of oil to the crankcase, and replace the filler plug. Reinstall the compressor, if it was removed.
5. Replace the oil filler plug. Evacuate and charge the system.

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DETROIT IRON

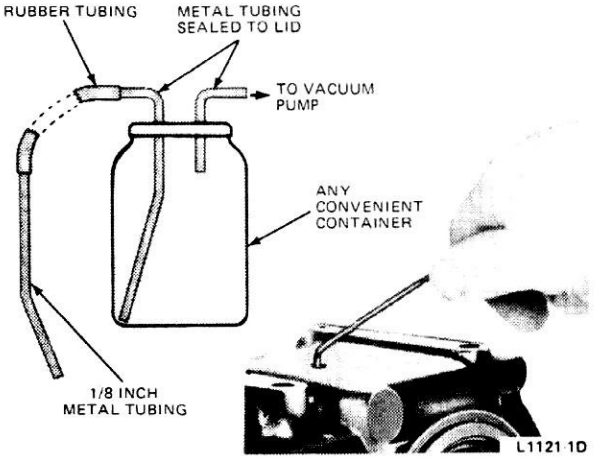


FIG. 3 Compressor Oil Level Check and Oil Trap

6. Check the compressor filler plug area for leaks with a leak detector.

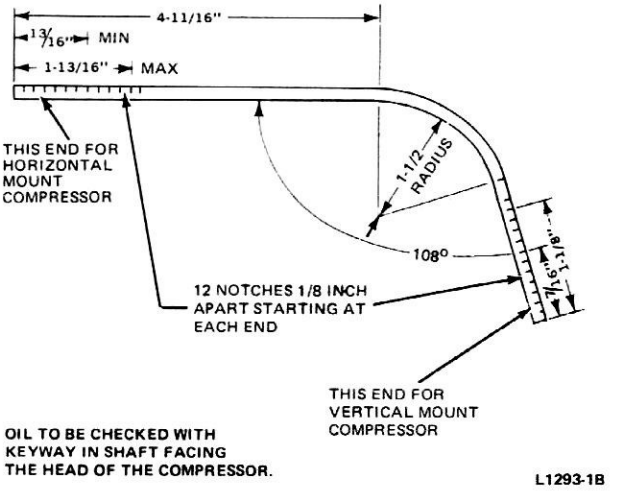


FIG. 4 York Compressor Oil Level Dipstick

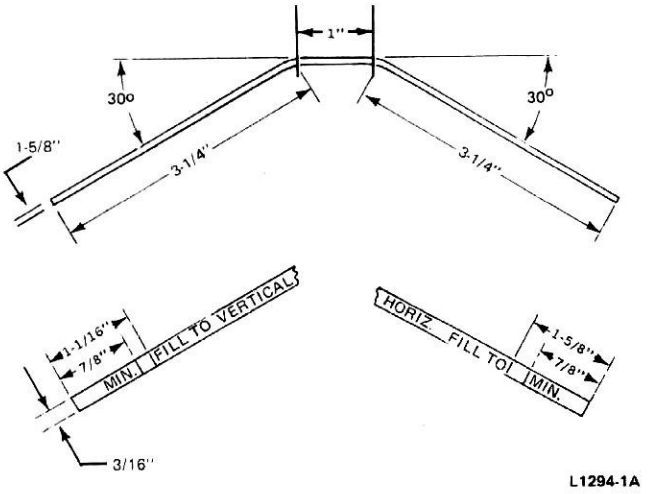


FIG. 5 Tecumseh Compressor Oil Level Dipstick

REMOVAL AND INSTALLATION

COMPRESSOR

All compressor replacement operations, except belt replacement, can be performed only after the unit has been relieved of its refrigerant charge. For units with Schrader-type service valves, discharge the entire refrigerant system (Part 36-32). Observe the Safety Precautions outlined in Part 36-31.

To reduce the amount of time to make a compressor replacement, the service compressors are dehydrated and the proper amount of the specified refrigerant oil is in the crankcase when received.

When replacing a compressor, first check the oil level in the old compressor. Then remove oil from the new compressor in an amount that will make the new compressor oil level the same as that in the old compressor. This procedure will keep the amount of oil in the system constant. Failure to use this procedure is the most common reason for excessive oil in the crankcase. Refer to Compressor Oil Level Check, under Testing in this Part.

Removal

1. Discharge the system (Part 36-32) and disconnect the two hoses from the compressor.
2. Energize the clutch and loosen and remove the clutch mounting bolt.
3. Install a 5/8-11 bolt in the clutch drive shaft hole. With the clutch still energized, tighten the bolt to loosen the clutch from the shaft. Disconnect the clutch wire at the bullet connector.
4. Loosen the idler pulley or alternator and remove the drive belt and the clutch, then remove the mounting bolts and the compressor.

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Installation

Before installing the compressor, carefully remove any burrs or dirt that may be on the compressor shaft. The shaft must be dry and brightly polished.

1. Mount the clutch on the shaft and install the mounting screw and washer finger-tight. Place the compressor on the mounting bracket and install the four mounting bolts finger-tight.
2. Connect the clutch wire, energize the clutch and torque the clutch mounting bolt to 15-23 ft-lbs. Tighten the compressor mounting bolts into the compressor to specification.
3. Install the belt and adjust and tighten the idler pulley.
4. When Schrader-type service valves are used, connect the two hoses to the compressor; and then evacuate, charge, and leak test the system as outlined in Part 36-32.

VALVE PLATE AND HEAD GASKET

The procedure for replacing a blown head gasket is identical to the procedure for replacing the valve plate except that the old valve plate is used. If a broken valve plate has caused the cylinder walls to become scored or has imbedded pieces of metal in the pistons, the compressor should be replaced.

Removal-All Compressors

1. Discharge the system (Schrader Valves—Part 36-32). Observe Safety Precautions outlined in Part 36-31. Place a clean drip pan under the horizontally mounted compressor.
2. Remove the cylinder head bolts.
3. Remove the valve plate and cylinder head from the compressor by tapping upward with a fiber hammer on the overhanging edge of the valve plate.
4. Remove the valve plate from the cylinder head by holding the head and tapping against the valve plate.
5. Remove the drip pan from under the horizontally mounted compressor. Then, remove all particles of gasket, dirt and foreign material from the surface of the cylinder head and cylinder face. **Be extremely careful not to scratch or nick the mating surfaces or any edges.**

Installation (York Compressor Fig. 6)

1. Apply a thin film of clean refrigeration oil to each side of the valve plate gasket (Fig. 6).
2. Place the new valve plate gasket in position on the crankcase, so that the crankcase dowel pins go through the dowel pin holes in the gasket (Fig. 6).
3. Place the valve plate in position on the cylinder, so that the dowel pins go through the dowel pin holes (Fig. 6).
4. Apply a light film of clean refrigeration oil on each side of the cylinder head gasket. Then, place the gasket and cylinder head on the cylinder with the dowel pins inserted into the dowel pin holes in the gasket and head.
5. Insert the two longer cap screws in the two center holes of the cylinder head. Then, insert the remaining cap screws in the holes around the edge of the cylinder head. The four 12-point head screws should be inserted into the four holes closest to the service ports.
6. Tighten all head cap screws until they contact the head. Then, torque the two center screws to 15-23 ft-lbs.
7. Tighten the remaining cap screws in a pattern so that the cap screws diagonally opposite each other are evenly tightened to 15-23 ft-lbs. After the cylinder head has been installed 1/2 hour, retorque the head bolts to 15-23 ft-lbs.
8. Inspect the top of the cylinder head service valve ports to be sure that they are free of nicks and imperfections. Connect the service valves with new O-rings to the correct compressor ports and torque to specification. Then, check the compressor oil level and add or remove oil as required. (See Compressor Oil Level Check in this Part.) Evacuate and charge the system, whichever is applicable.

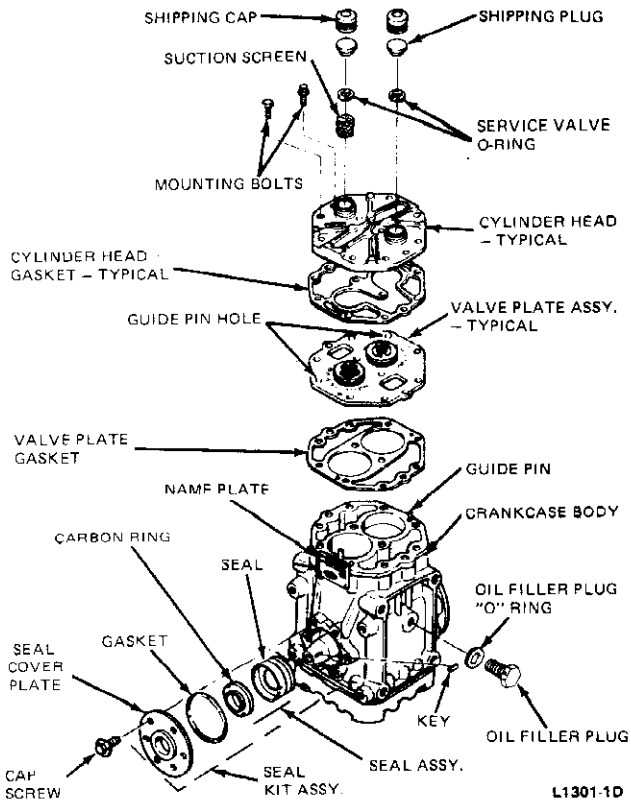


FIG. 6 York Compressor Disassembled

Installation (Tecumseh Compressor Fig. 7)

1. Apply a thin film of clean refrigeration oil to each side of the valve plate gasket (Fig. 7).
2. Place the new valve plate gasket on the crankcase cylinder face and align the bolt holes.
3. Place the valve plate on the valve plate gasket, so that the letter "S" (stamped on the valve plate) is on the same side of the crankcase as the word SUCTION. Align the bolt holes.
4. Apply a thin film of clean refrigeration oil on each side of the head gasket.
5. Place the head gasket on the valve plate with the largest hole of the gasket over the largest hole of

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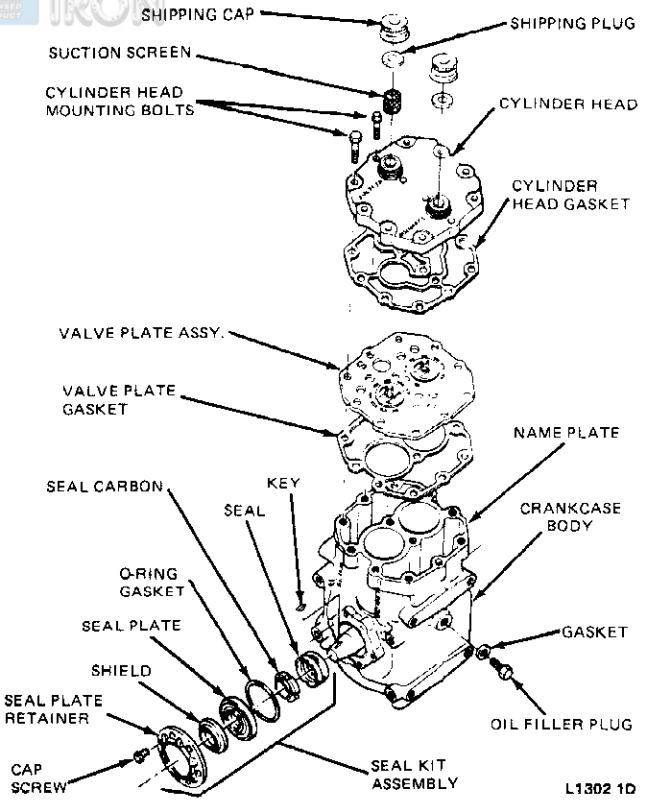


FIG. 7 Tecumseh Compressor Disassembled

the valve plate. Line up the holes of the gasket with those of the valve plate.

6. Position the cylinder head on the compressor. **The word SUCTION on the head must be up and on the same side as the word SUCTION on the compressor crankcase.**
7. Align the bolt holes of the cylinder head, gaskets and valve plate with the holes in the compressor crankcase.
8. Install the cylinder head attaching bolts in the bolt holes. The four 12-point head bolts must be inserted in the four holes nearest the head service ports.
9. Tighten the bolts until they contact the top surface of the cylinder head. Then, tighten the head bolts in a sequence, so that the bolts diagonally opposite each other are evenly tightened to a torque of 20-24 ft-lbs.

   After the cylinder head has been installed 1/2 hour, retorque the head bolts to 20-24 ft-lbs.
10. Inspect the top of the cylinder head service valve ports to be sure that they are free of nicks and imperfections.

    Connect the service valves with new O-rings to the correct compressor ports and torque to specification.
11. Check the compressor oil level and add or remove oil as required. (See Compressor Oil Level Check in this Part.) Evacuate and charge the system.

CRANKSHAFT SEAL

Removal-All Compressors

Observe the Safety Precautions outlined in Part 36-31.

1. Discharge the system (Part 36-32). Loosen and remove the belt.
2. Remove the clutch (see Clutch Removal in this Part) and remove the Woodruff key. Carefully remove the secondary dust shield so as to avoid marring the shaft.
3. Carefully remove all accumulated dirt and foreign material from the seal plate and surrounding area of the compressor, and position a small drain pan beneath the seal plate.
4. Remove the seal plate cap screws, and gently remove the plate and gasket. Do not mar or scratch the sealing surfaces, or the polished shaft surface.
5. Remove the carbon seal ring and seal housing assembly from the crankshaft. A disassembled view of the crankshaft seal assembly is included in Figs. 6 and 7.
6. Make certain that the shaft, the seal plate and the compressor gasket surfaces are completely clean.
7. Check the face of the crankshaft front bearing journal in the seal housing to make certain that there are no nicks or burrs. Check the crankshaft surface to be sure it is not damaged. Check all parts of the seal assembly to be sure that they are not damaged.
8. Inspect the compressor internal components for damage.

Installation-Tecumseh Compressor

1. Wash the new seal assembly components in clean refrigeration oil.
2. Coat the exposed surface of the crankshaft with clean refrigeration oil.
3. Place the seal (Fig. 7) over the compressor shaft with the end that fits the carbon ring facing out.
4. Position the carbon ring over the shaft and to the seal. The raised rim of the carbon ring must face outward.
5. Insert the O-ring in the crankcase mating surface for the seal plate.
6. Position the seal plate, shield and seal plate retainer to the compressor crankcase and align the cover attaching screw holes. Push the seal plate retainer against the mating surface of the crankcase and install the six attaching screws. Torque the screws in a circular sequence to 54-78 in-lbs.
7. Rotate the shaft by hand 15 to 20 revolutions to seat the seal.
8. Make certain that there are no burrs or dirt on the compressor shaft. Install the key and magnetic clutch on the shaft.
9. Install the belt and adjust the tension to specifications.
10. Check the compressor oil level (See Testing in this Part).

Installation-York Compressor

1. Wash the new seal assembly components in clean refrigeration oil.
2. Position the seal over the end of the shaft with the carbon ring retainer facing out. Move the seal in

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and out on the shaft a few times to insure a good seal between the seal and the shaft.

3. Push the seal all-the-way on the shaft.
4. Place the carbon ring (Fig. 6) over the shaft and in the seal ring retainer. The polished surface of the carbon ring must face out and the lugs must engage the ring retainer and be fully seated.
5. Apply a light film of clean refrigeration oil on the matching faces of the crankcase and seal cover plate. Then, place the gasket in position on the crankcase face.
6. Place the seal cover plate in position (Fig. 6), with the polished side facing the carbon ring. Then, install the cap screws. Tighten the cap screws evenly while turning the crankshaft. Be sure that the clearance between the crankshaft and the hole in the seal cover plate is even all around the shaft. If the clearance is not equal all around the shaft, gently tap the seal face into position until the clearance is equal. Then, tighten diagonally opposite cover plate cap screws evenly to 7-13 ft-lbs (large seal) and 5-7 ft-lbs (small seal).
7. Make certain that there are no burrs or dirt on the compressor shaft. Install the key and magnetic clutch on the shaft.
8. Install the belt and adjust the tension to specification.
9. Check the compressor oil level (See Testing in this Part).

CLUTCH

Removal

1. Loosen and remove the belt.
2. Energize the clutch and loosen and remove the clutch mounting bolt.
3. Install a 5/8-11-bolt in the clutch drive shaft hole. With the clutch still energized, tighten the bolt to loosen the clutch from the shaft, then remove the magnetic clutch.

Installation

1. Carefully remove any burrs or dirt that may be on the compressor shaft. The shaft must be dry and brightly polished. Install the clutch, the clutch mounting bolt, and the washer.
2. Energize the clutch, and torque the bolt to specification.
3. Install and adjust the belt.

CLUTCH BEARING

When installing a new bearing, extreme care must be taken to support the bearing and the clutch assembly so as not to place any pressure on the balls of the bearing.

The following procedure should be rigidly adhered to during bearing replacement. Any exceptions due to clutch design are noted. Refer to Fig. 8.

Removal

1. Remove the clutch assembly from the compressor shaft as outlined in the preceding procedure.

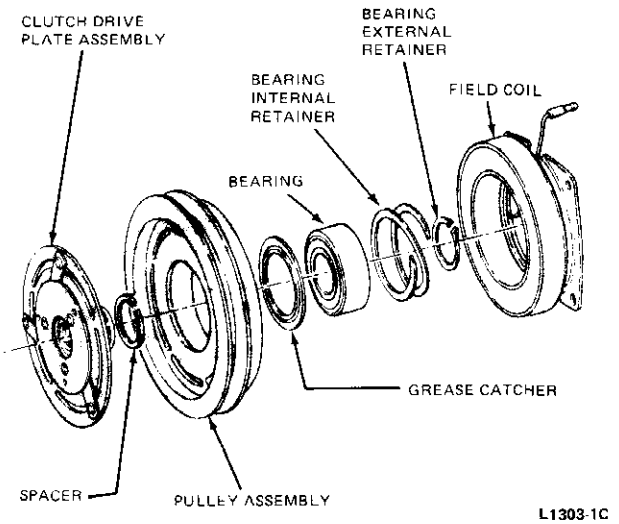


FIG. 8 A/C Clutch Assembly

2. With the clutch assembly face down, remove the external bearing retainer from the drive plate shaft.
3. Support the clutch, face down, by the outer edge so as to clear the drive plate. Insert a 5/8-11-inch bolt through the drive plate shaft and hand tighten the bolt.
4. Smoothly apply enough pressure on the bolt to free the shaft from the bearing inner race, then, remove the drive plate assembly. Before proceeding, check the drive face plate for any excessive warping or breakage. Replace the entire clutch assembly if any damage is evident.
5. Remove the **internal** bearing retainer from the pulley assembly. Support the pulley assembly, face up, by the bearing bore making certain that there is no interference when the bearing is pressed out. With a suitable plug, force the bearing out of the pulley assembly by the inner race. The plug should clear the metal grease catcher, but do not remove the grease catcher from the pulley assembly.

Installation

Before installing the bearing, be sure that all bearing contact surfaces are clean.

1. Support the pulley assembly face down, near the bearing bore, but do not support it by the sides of the pulley grooves as this may bend the pulley assembly.
2. Press a new bearing into the bearing bore by the outer race. **Do not press the bearing in by the inner race.**

   Pressure should be uniform and in line with the axis of the bearing bore. Replace the **internal** bearing retainer.
3. Support the pulley assembly, face up, by the bearing inner race. Insert a 5/8-11-inch bolt into the front of the drive face plate and carefully press the shaft into the bearing inner race, exerting pressure on the bolt. Be certain that the shaft is in line with the axis of the bearing bore.
4. Replace the **external** bearing retainer onto the drive plate shaft. Rotate the pulley relative to the

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drive plate to make certain that there is free rotation and there is not looseness of the assembly before installing the clutch onto the compressor.

5. Install the clutch assembly on the compressor shaft.

ADJUSTMENTS

DRIVE BELT

Adjust the belt by repositioning the idler pulley if so equipped. Otherwise, follow this procedure.

1. Loosen the alternator-to-brackets attaching bolts.
2. Install the tension gauge on the compressor clutch drive belt. Move the alternator toward or away from the engine until the specified belt tension is obtained. Remove the gauge. Tighten the alternator bolts. Install the tension gauge and check the belt tension.

SPECIFICATIONS

TWO-CYLINDER A/C COMPRESSOR SPECIFICATIONS

Torque Limits (Ft-Lbs)

Description	Tecumseh	York
Cylinder Head	20-24	15-23
Front Seal Plate	54-78 In-Lb	7-13 (large seal) 5-7 (small seal) (5)
Service Valve (Tube-O)	20 ± 10	20 ± 10
Mounting Bolt	20-30	20-30
Oil Filler Plug	18-22	4-11
Clutch Mounting	20-30	20-30
Base Plate		14-22
Back Plate		9-17
Pressure Relief Valve	8-10	4-11

Compressor Oil Capacities (1)

	Vertical	Horizontal
Tecumseh (2) (11 Fluid Ounces)	7/8 Inch Min. 1-3/8 Inch Max.	7/8 Inch Min. 1-5/8 Inch Max.
York (2) (10 Fluid Ounces)	7/8 Inch Min. 1-1/8 Inch Max.	13/16 Inch Min. 1-3/16 Inch Max.

(1) Use ESA-M2C31-A (Ford Part No. C9AZ-19577-A) oil.

(2) Do not add oil if dip stick indicates proper level of oil between minimum and maximum.

If dip stick is below minimum level, add oil to minimum oil level only.

BELT ADJUSTMENT

Minimum Operating Tension (Hot Only) (3)

Predelivery Only	After Predelivery
90 lbs.	70 lbs.

Installation Tension

Used Belt (4)	New Belt
110 lbs.	140 lbs.

Belt Tension Tool	T63L-8620-A
Compressor Clutch Run-Out	1/32 Inch Maximum

(3) Check only after engine has been operating for at least ten minutes.

(4) Any belt that has operated for ten minutes or more is considered a used belt.

(5) Small seal plate has 1/4-inch screws.

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Granada and Monarch Heater — Air Conditioner System

PART 36-40

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DESCRIPTION AND OPERATION

The Granada and Monarch heater—air conditioning system is an independent case type, wherein the principal parts of the system are all housed in a single case attached to the passenger compartment side of the dash panel. The blower is located upstream of the evaporator and heater cores. The unit is a fresh air type with provision for recirculating interior air for rapid cooling when required.

The control head used is the Universal type, similar to other Ford manually controlled A/C systems. This model uses an improved snap-lock feature for retaining the electrical connectors, as do all other Universal Control heads.

Vertical vanes in the left instrument panel register can be moved from side to side and pivoted up and down for air distribution. They are moved to the right to minimize air flow. Horizontal vanes in the two center registers and the right register can be moved up and down and pivoted side to side for air distribution. These vanes are moved upward to close or minimize air flow.

SYSTEM OPERATION

In all Function Control (Air Control) Lever positions but OFF and A/C (with the temperature control lever in maximum cool position) outside air is drawn directly into the system from the cowl air intake by the blower motor and wheel. The air is then forced through the evaporator core, and, depending on the position of the Temperature Blend Door, is forced through and/or around the heater core into the distribution ducts to the instrument panel registers, defroster nozzles or floor discharge duct, depending on the setting of the Function Control (Air Control) Lever.

Refer to the Air Flow Schematic and Vacuum Control Charts in Fig. 1 and electrical wiring diagram shown in Fig. 16.

CONTROLS

Function Control (Air Control) Lever

The Function Control (Air Control) Lever (see FIG. 2) actuates a 9-port vacuum selector that controls the vacuum motors of the Heat-Defrost Door and the A/C Defrost Door. It also operates the blower off-on switch and activates the A/C clutch circuit in the A/C, DEFOG and DEFROST positions. Selections of all positions except OFF and A/C will vent the vacuum motor of the outside-recirculating air door and thus open the system to outside air. This occurs regardless of the Temperature Control Lever position.

Compressor clutch engagement is dependent upon an ambient temperature cut-off switch and the Function Control Lever position. The clutch will engage when the Function Control Lever is in the A/C, DEFOG and DEFROST positions and the ambient air temperature is above 40°F to 55°F.

The blower motor runs at all times except when the Function Control Lever is in the OFF position. A separate four-position four-speed blower switch is used to regulate volume of air flow, but cannot turn the blower off.

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Temperature Control Lever

The Temperature Control Lever actuates a 3-port vacuum selector that is inter-connected with the Function Control Lever 9-port vacuum selector valve at the main vacuum connector (Fig. 3). It controls the outside—recirculating air door motor in OFF and A/C but is overridden by the Function Control Lever selector valve in all other positions. It also controls the water valve motor and the Temperature Blend Door; the latter by means of cable connected from the Temperature Control Lever to the temperature blend door crank arm.

In A/C, HI-LO, HEAT, DEFOG and DEFROST positions, the water valve opens (hot water to heater core) when the Temperature Control Lever has moved approximately 1/2 inch to the right of the extreme left position. The water valve will close when the Function Control Lever is in ECONOMY VENT or OFF positions, regardless of the Temperature Control Lever setting, due to the venting action of the Function Lever, 9-port vacuum selector valve.

The system will be in the recirculating (inside) air position when the Temperature Control Lever is in the COOL position and the Function Control Lever is in the OFF and A/C positions. When in A/C position, when the Temperature Control Lever has moved approximately 1 inch to the right of the extreme left position, the system operates with outside air.

Blower Switch

The blower switch is located on the left side of the control head assembly.

Water Valve

The water valve is located in the engine compartment in the heater core inlet water line, near the dash panel.

Resistor Assembly

The resistor assembly is located on the top surface of the upper evaporator case, near the blower motor.

The resistor assembly also contains a thermal limiter which is used as a temperature protecting fuse. The thermal limiter is located a pre-set distance from the resistor coils (Fig. 5). If the temperature of the thermal limiter reaches 300°F (149°C), the limiter contacts will open interrupting the blower motor circuit for all blower speeds except high blower.

EVAPORATOR CASE ASSEMBLY

The evaporator case assembly (Figs. 4 and 6) is located under the instrument panel to the right of the vehicle center line. The blower motor and wheel are located in the scroll portion of the evaporator assembly on the right side of the evaporator case.

The blower motor and wheel can be serviced by removing the bolts at the lower edge of the instrument panel at the right cowl side and at the brace below the glove box. Refer to Removal and Installation for complete instructions.

AIR DISTRIBUTION DUCTS AND REGISTERS

The air distribution ducts (Fig. 4) are of a conventional design and the one-piece plenum provides accessibility for heater core removal without disturbing the evaporator case (Fig. 6).

Combination Valve

This valve (Fig. 7) combines the functions of the Thermal Expansion Valve and the Suction Throttling Valve. Much of the plumbing formerly associated with these two valves has been eliminated. The combination valve is non-adjustable.

For testing, the same basic procedures apply for on-the-car diagnosis. Generally, system test performed on the car, before any parts are removed, will be all that is needed to determine the proper operation of this combination valve.

The following are functions of the new valve:

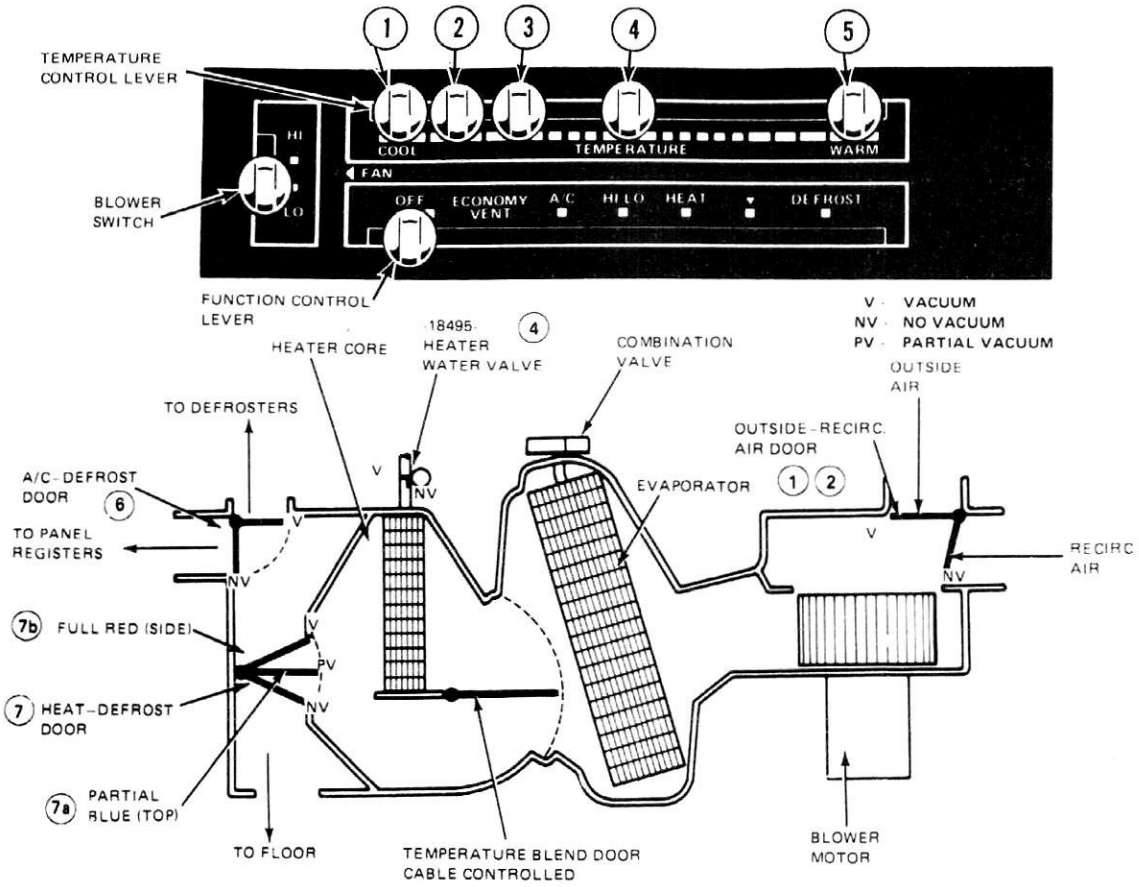
1. The expansion valve must regulate the flow of liquid refrigerant during A/C operation.
2. The suction throttling valve maintains evaporator pressure above 28.5 psi to prevent condensate water from freezing on the evaporator core. Compressor suction pressure will always be less than the evaporator pressure, the amount depending on compressor speed and system heat load at the time the readings are taken. A defective compressor may not be able to pull-down the suction pressure to the control pressure range of the STV.
3. The pressure differential valve is a Schrader type valve that has been calibrated to open at a pressure range of 10 to 20 psi. Its function is to by-pass oil laden refrigerant around the restriction formed when the STV is closed (due to reduced heat load on A/C system) and thereby provide an assured oil return to the compressor. Under high heat loads this valve has no function since ample refrigerant is moving through the compressor suction line back to the compressor. Substitution of a Schrader valve core from one of the gauge port valves could result in compressor damage by oil starvation because the substituted valve core would never open. The calibrated pressure differential valve core is supplied installed in the expansion valve service part to make improper substitutions unlikely.

The functions of the Thermal Expansion Valve and the Suction Throttling Valve have been combined into one unit for improved reliability through simplicity and rugged interconnecting plumbing.

The expansion valve is a modification of the type that has been used for several years. The thermal element is part of the push-rod mechanism and not a bulb at the end of the tube connected to the top of the diaphragm. Liquid refrigerant is controlled by the push-rod forcing the ball off of its seat and the coil spring exerting pressure on the ball to keep the ball on its seat. Push-rod pressure is high only when suction temperature and pressure are high.

The suction throttling valve is the same mechanism used inside past model STV assemblies but with a threaded attachment and "O" ring seals. Its purpose is to control suction pressure in the evaporator to prevent ice or frost from blocking the flow of air through

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MANUAL A/C-HEATER SYSTEM VACUUM MOTOR TEST CHART

FUNCTION CONTROL LEVER POSITION	TEMPERATURE CONTROL LEVER POSITION	VACUUM MOTORS APPLIED WITH VACUUM				
		OUTSIDE-RECIRC	WATER VALVE	A/C-DEFROST	HEAT-DEFROST	
					PARTIAL	FULL
OFF	Any Position	1 - 2	4	–	7a	7b
ECONOMY VENT	Any Position	–	4	6	–	–
A/C *	Cool - 1	1 - 2	4	6	–	–
	Cool - 2	1 - 2	–	6	–	
	Cool - 3 Temp - 4 Warm - 5	–	–	6	–	–
HI - LO	Cool - 1	–	4	6	7a	–
	Cool - 2	–	–	6	7a	
	Cool - 3 Temp - 4 Warm - 5	–	–	6	7a	
HEAT	Cool - 1	–	4	–	7a	7b
	Cool - 2	–	–	–	7a	7b
	Cool - 3 Temp - 4 Warm - 5	–	–	–	7a	7b
▽ (DEFOG) *	Cool - 1	–	4	–	7a	
	Cool - 2	–	–	–	7a	
	Cool 3 - Temp - 4 Warm - 5	–	–	–	7a	
DEFROST *	Cool - 1	–	4	–	–	
	Cool - 2	–	–	–	–	
	Cool - 3 Temp - 4 Warm - 5	–	–	–	–	
VACUUM LINE COLOR CODE		WHITE	GREEN	YELLOW	BLUE (TOP)	RED (SIDE)

* COMPRESSOR CLUTCH ENGAGED WHEN AMBIENT CUT-OFF SWITCH IS CLOSED
– NO VACUUM

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FIG. 1 Manual A/C-Heater System Air Flow Schematic and Vacuum Control Chart

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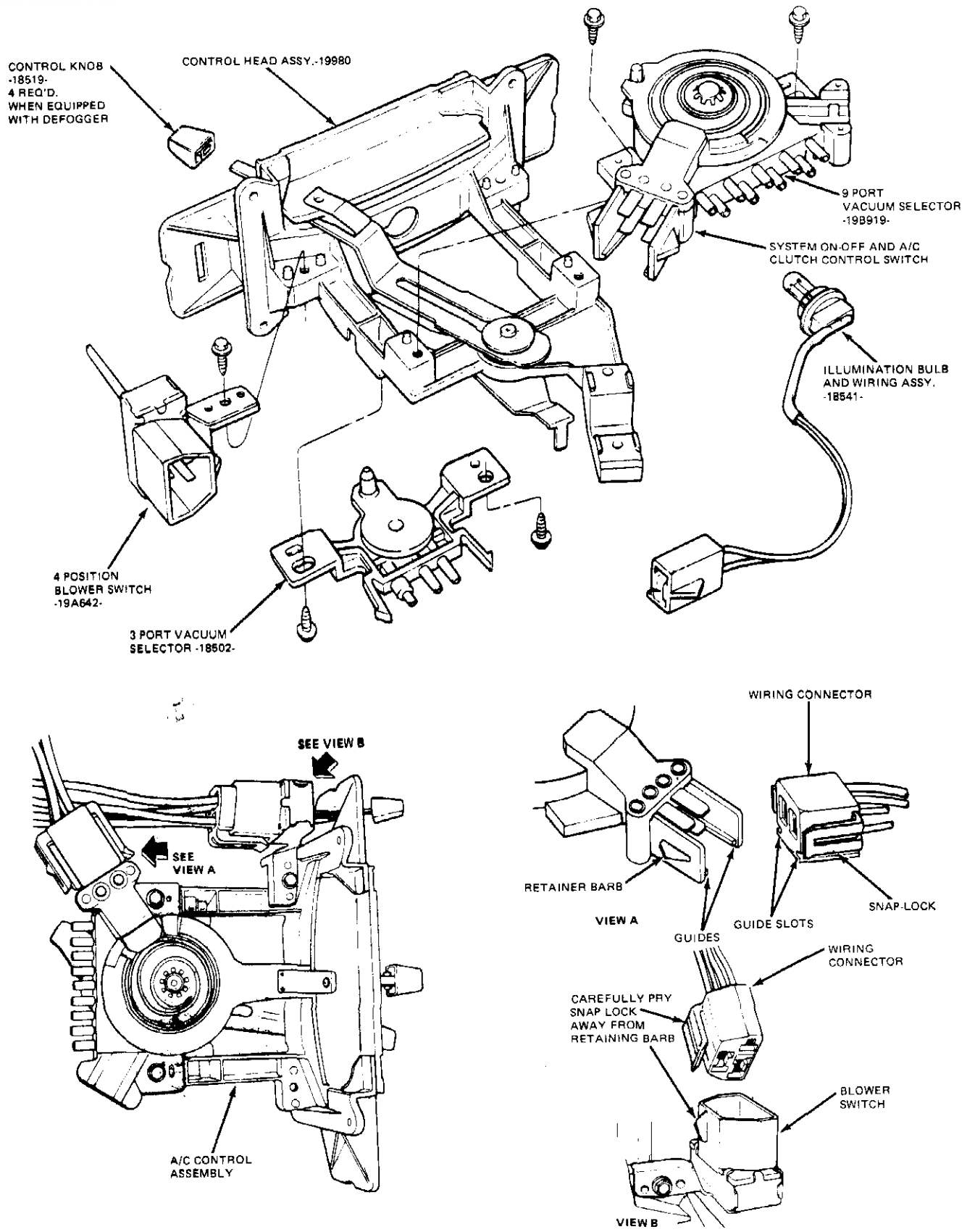
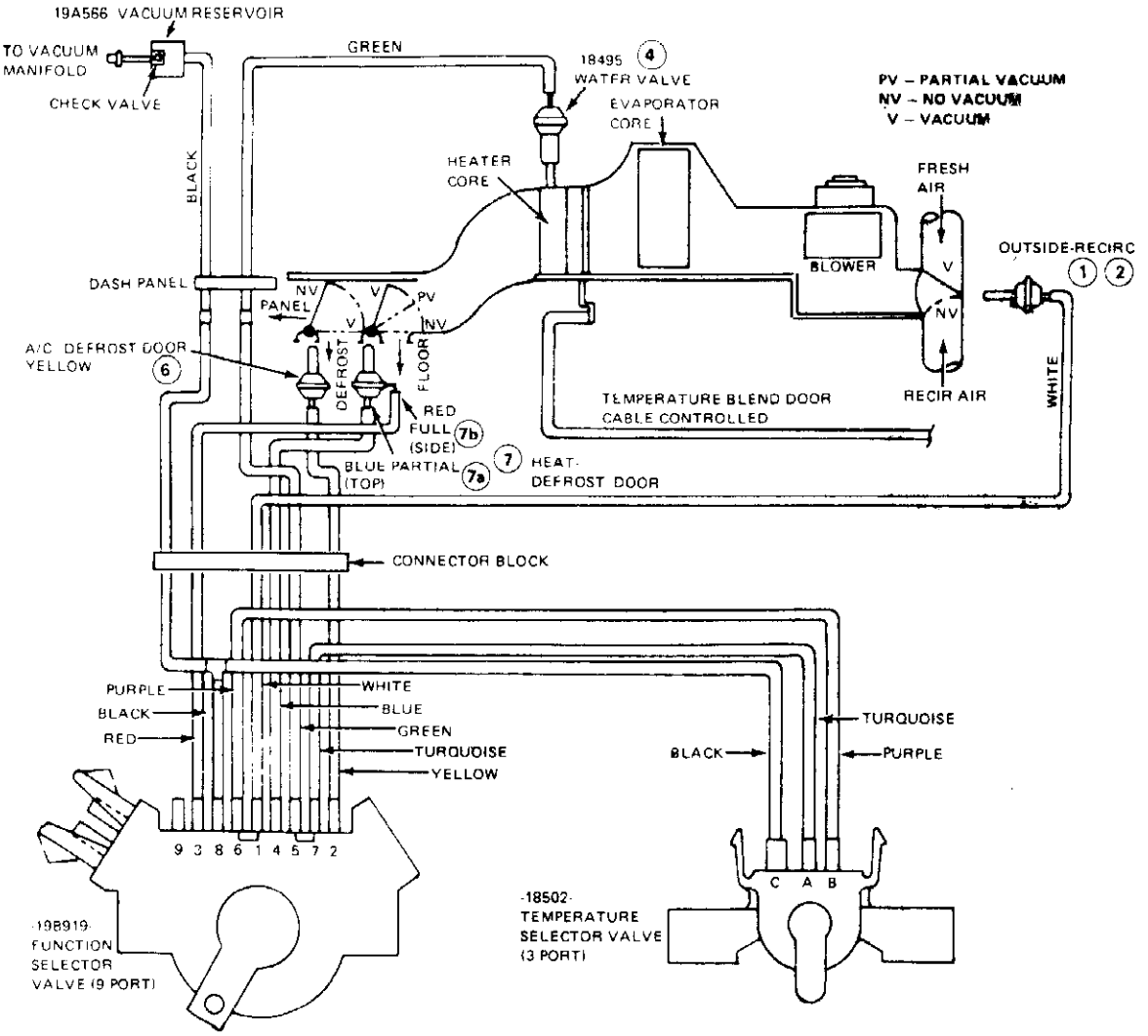


FIG. 2 Manual A/C Control Assembly—Granada and Monarch

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TEMP SELECTOR VALVE LEVER POSITIONS						HOSE COLOR
PORT	FUNCTION	COOL		TEMPERATURE	WARM	
C	Source	V	V	V	V	Black
A	Water Valve	V				Turquoise
B	Outside-Recirc	V	V			Purple

PORT	FUNCTION	FUNCTION SELECTOR VALVE LEVER POSITIONS							HOSE COLOR
		OFF	ECONOMY VENT	A/C	HI-LO	HEAT	▽ DEFOG	DEFROST	
1	Outside Recirc.	V		To 6					White 1-2
2	A/C - Defrost		V	V	V				Yellow 6
3	Full Heat - Defrost	V				V			Red 7b
4	Partial Heat - Defrost	V			V	V	V		Blue 7a
5	To Water Valve	V	V	To 7	To 7	To 7	To 7	To 7	Green 4
6	From Temp Selector Port B	Seal	Seal	To 1	Seal	Seal	Seal	Seal	Purple
7	From Temp Selector Port A	Seal	Seal	To 5	To 5	To 5	To 5	To 5	Turquoise
8	Source	V	V	V	V	V	V	V	Black
9	NOT USED IN THIS SYSTEM								

V VACUUM BLANK ATMOSPHERE

L2384-2A

FIG. 3 Manual A/C-Heater System Vacuum Schematic and Selector Test

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the heat exchanging surfaces of the evaporator. Gauge pressure at sea level is specified at 28.5 psi. The pressure reading is higher at higher altitudes because of gauge error not because of a change in pressure inside of the evaporator. See Diagnosis Manual or Shop Manual for gauge pressure vs. altitude chart. Suction "throttling" starts when the compressor suction pressure is decreasing below the pressure setting of the valve. Compressor suction pressure can continue to drop but evaporator pressure is held steady by the controlling or "throttling" action of the STV.

Figs. 8 and 9 show the combination valve location with 4.1L (250 CID) engines and 5.0L (302 CID) engines.

REFRIGERANT CHARGING VALVES

Two service access valves for charging the refrigeration system with R-12 are located in the refrigerant lines. One valve is in the suction line close to the compressor. The other is in the discharge line near the compressor.

VACUUM MOTORS

The outside-recirculating air door motor is located forward of the recirculating air inlet duct (Fig. 10). It can be serviced by removing two screws and a clip attaching the motor arm to the air door crank arm. The clip can be removed after removing the vacuum motor mounting screws by moving the motor link to the right.

The A/C Defrost door motor and Heat/Defrost door motors can be reached from under the instrument panel.

The vacuum-controlled water valve is located in the engine compartment near the dash panel and is readily accessible for service.

COMPRESSOR ASSEMBLY 6-CYLINDER ENGINE

The compressor and clutch assembly is mounted in a vertical position on the forward right side of the engine (Fig. 11).

COMPRESSOR ASSEMBLY 8-CYLINDER ENGINES

The compressor and clutch assembly is mounted horizontally on the forward left side of the engine (Fig. 12).

AMBIENT AIR TEMPERATURE SWITCH

The ambient air temperature switch is located on the hood support vertical bracket in front of the condenser (Fig. 13). The switch is a temperature sensitive, snap-action unit installed in the compressor clutch circuit to prevent unneccessary compressor operation at low temperatures. It closes the circuit to the clutch at 50°F maximum and opens the circuit at 35°F minimum with a minimum differential of 3°F between opening and closing temperatures.

ADJUSTMENTS

TEMPERATURE CONTROL CABLE

1. Loosen the temperature control cable mounting screw.
2. Move the temperature control lever all the way to the left.
3. Move the temperature blend door crank arm to maximum cool position (clockwise).
4. With the temperature lever and temperature door held in their respective positions, tighten the cable mounting screw to 20 in. lbs. torque.

REMOVAL AND INSTALLATION (FIG. 14)

CONTROL HEAD ASSEMBLY (FIG. 2)

1. Disconnect vacuum harness at inline connector.
2. Remove vacuum connector from 9-port selector valve.
3. Remove the control cable from the control head (one screw, one pushnut).
4. Disconnect the electrical connectors from the blower and clutch switches. Refer to Fig. 2 for disconnect procedure used on snaplock connectors. Disconnect the illumination bulb wiring.
5. Disconnect the wiring from the defogger switch and indicator lamp (jewel), if so equipped.
6. Remove the light switch knob and bezel and the windshield wiper switch and radio knobs.
7. Remove the three screws securing the cluster applique at the top and pull the applique rearward to disengage four (4) snap-in clips along the lower edge.
8. Remove the four (4) screws holding the control head assembly to the instrument panel. Move the control assembly forward and out of the instrument panel.
9. To install, reverse the above procedure. Adjust the temperature control cable if necessary.

EVAPORATOR CASE ASSEMBLY (FIG. 6)

Observe Safety Precautions outlined in Part 36-31.

1. Drain the engine coolant, discharge the refrigerant from the A/C system and disconnect the battery.
2. Disconnect the two heater hoses (two clamps) from the heater core tubes at the dash panel. Plug the core tubes to prevent coolant leakage during core removal.

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3. Disconnect the vacuum supply hose from the water valve and the system supply hose from the in-line connection at the supply tank. Push the vacuum line grommet inward through the dash panel. Remove the sight shield and brackets from instrument panel.
4. Remove the heat distribution duct from the evaporator assembly two (2) screws; one (1) clip.
5. Remove tunnel to cowl brace (left of evaporator plenum assembly), if so equipped. Refer to Defroster Nozzle Removal and Installation and remove the defroster nozzle.
6. Remove the glove box liner (five screws).
7. Disconnect the vacuum hoses from the A/C-Defrost and A/C-Heat door vacuum motors. Remove the clip attaching the vacuum harness to the plenum. Disconnect the vacuum harness at the in-line connector to the control vacuum harness.
8. Remove the two (2) nuts securing the Heat/Defrost door vacuum motor to the plenum and swing the vacuum motor rearward on the crank arm.
9. Remove the control cable from the evaporator case (one screw, one pushnut).
10. Loosen the right door sill scuff plate, right "A" pillar trim panel, and remove the right cowl side trim panel.
11. Remove the right lower instrument panel to cowl side bolt and just loosen the right upper instrument panel to cowl upper bolt.
12. Remove the cowl to lower instrument panel brace. Disconnect the evaporator mid-case to cowl mounting strap at the cowl. Leave the strap loosely attached to the evaporator.
13. Remove two (2) screws securing the plenum to the left mounting bracket. Remove two (2) screws and three (3) clips securing plenum to evaporator case.
14. Raise the plenum to clear the tabs on the top of the evaporator case. Move the plenum to the left and position it on the floor tunnel, free of the evaporator case.
15. Remove the heater core from the evaporator case by pulling on the tab of the rear heater core gasket.
16. Disconnect the wiring harness from the resistor assembly and the blower motor.
17. Remove the right courtesy lamp from the instrument panel clip.
18. Remove three (3) right evaporator-to-dash-panel nuts in engine compartment.
19. Remove the right evaporator-to-cowl bracket bolt.
20. Pull the evaporator case away from the dash panel and raise the plenum end while pulling the blower end downward. Swing the plenum end of the case to the right and pull the case rearward under the instrument panel rail. **Extreme care must be taken when pulling back on the instrument panel to prevent cranking the plastic panel. Aged or cold instrument panels may crack more easily.**

As the evaporator case clears the panel edge, swing the plenum end of the case back to the left and lift unit out of the car.

Cover the front edge of the evaporator case to prevent scratching the instrument panel when removing or installing the case.

EVAPORATOR CORE (FIG. 5)

1. Remove the evaporator case following the instructions given above.
2. With the evaporator case placed on a bench, remove the blower motor and wheel assembly (four (4) screws).
3. Remove the recirculating air inlet duct (four (4) screws).
4. Remove the eight (8) upper to lower case attaching screws and two clips.
5. Separate the evaporator core tube to dash seal from case surface.
6. Remove the lower half of the evaporator case.
7. Remove the evaporator core from the upper case.
8. To install the evaporator core, reverse the above procedure with the following added instructions:

   The evaporator core tube to dash seal must be re-cemented to the evaporator case.

   Be sure that the heater core tube to dash seal is positioned properly during installation.

   Install new O-rings on the manifold plate. Always dip the new O-rings in refrigerant oil before installing.

   Evacuate and charge the refrigerant system with Refrigerant 12 following the procedure given in Part 36-32. System capacity is given in the Specifications section of this Part.

HEATER CORE (FIG. 5)

The refrigerant system components and Refrigerant 12 charge do not have to be disturbed when removing and installing the heater core.

1. Drain the engine coolant and disconnect the battery ground cable.
2. Disconnect two (2) heater hose clamps at the dash panel in the engine compartment. Plug the core tubes to prevent coolant leakage during removal.
3. Remove the heat distribution duct from the evaporator assembly (two screws, one clip).
4. Remove the seat belt interlock module and bracket.
5. Remove the glove box liner and sight shields.
6. Loosen the right door sill scuff plate, right "A" pillar trim cover and remove the right cowl side trim panel.
7. Loosen instrument panel to right cowl side bolt and remove the instrument panel brace bolt at the lower rail, below the glove box.
8. Remove tunnel-to-cowl brace (left of evaporator plenum assembly), if so equipped. Refer to Defroster Nozzle Removal and Installation and remove the defroster nozzle.
9. Disconnect the vacuum hoses from the A/C-Defrost and Heat/Defrost door motors. Remove the screw from the clip holding the vacuum harness to the plenum.

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10. Remove two (2) Heat/Defrost door mounting nuts and swing the motor rearward on the door crankarm.
11. Remove two (2) screws attaching the plenum to the left mounting bracket. Then remove the two (2) screws and two clips securing the plenum to the evaporator case.
12. Raise the plenum to clear the tabs on the top of the evaporator case.
13. Move the plenum to the left as far as possible, (approximately 4 inches) pulling rearward on the instrument panel to gain clearance. **Take extreme care when pulling back on the instrument panel to avoid cracking the plastic panel.**

    NOTE: There is very little clearance between the plenum and the wiper motor assembly.
14. Pull the heater core to the left using the tab molded into the rear heater core seal. As the rear surface of the heater core clears the evaporator case, pull the core rearward and downward to clear the instrument panel.
15. Reverse the above procedure to install the core.

    NOTE: Before installing the core, make sure that the heater core tube to dash panel seal is in place between the evaporator case and the dash panel.

DEFROSTER NOZZLE (FIG. 4)

1. Remove the instrument panel crash pad.
2. Remove the radio speaker or panel to cowl brace.
3. Remove the four (4) nozzle to cowl bracket mounting screws.
4. Lift the defroster nozzle upward through the crash pad opening.
5. To install, reverse the above procedure. Be sure to check that the nozzle mates properly to the plenum opening.

BLOWER MOTOR AND WHEEL (FIG. 15)

1. Disconnect the ground cable from the battery.
2. Loosen the right door sill scuff plate, right "A" pillar trim cover and remove the right cowl side trim panel.
3. Remove the right lower instrument panel to cowl side bolt.
4. Remove the cowl to lower instrument panel brace bolt.
5. Disconnect the wiring harness connectors from the blower motor.
6. Remove the blower motor and wheel assembly from the scroll (four (4) screws). It is necessary to pull rearward on the lower edge of the instrument panel to gain clearance.

    Take extreme care when pulling back on the instrument panel to avoid cracking the plastic panel.
7. To install the blower and wheel, reverse the above procedure.

CONDENSER (FIG. 16)

1. Discharge the refrigerant system.
2. Remove the lower hood lock and vertical support brace.

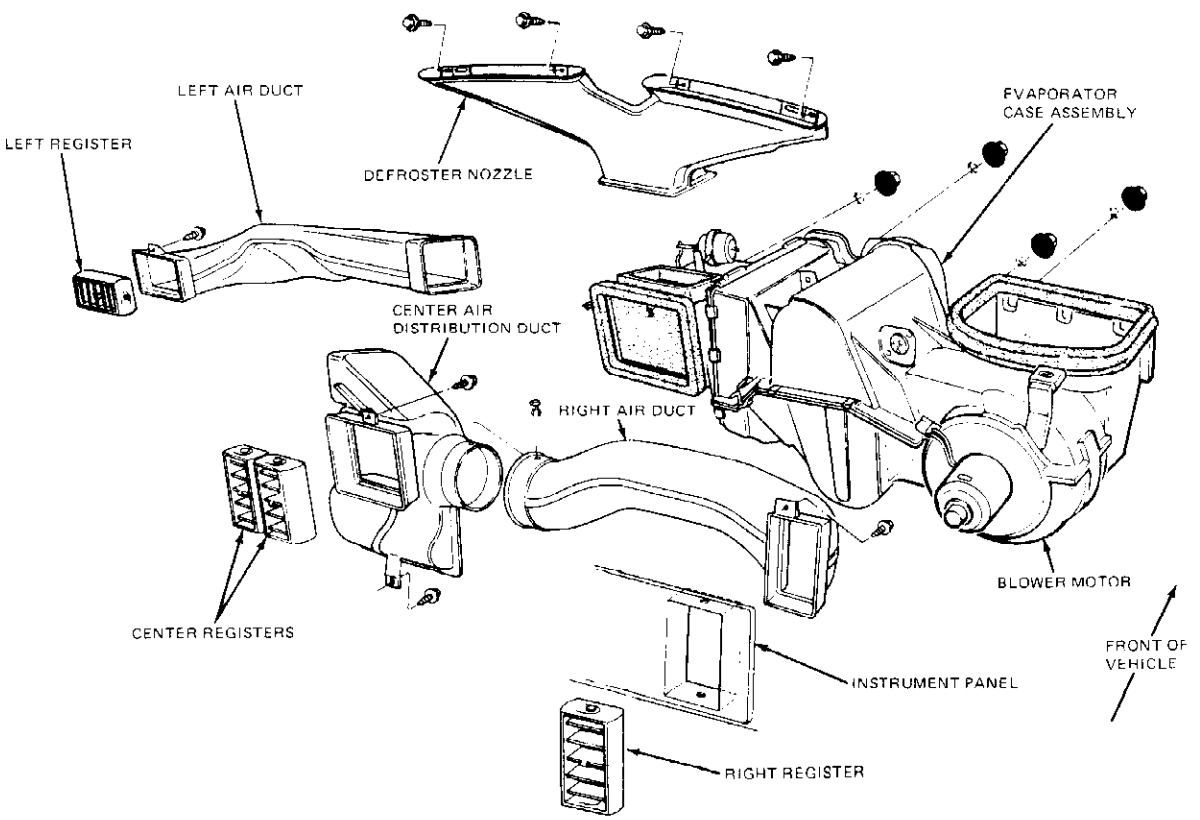


FIG. 4 Air Distribution Ducts Granada and Monarch

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3. Disconnect the ambient air temperature switch.
4. Disconnect the liquid and discharge lines at the fittings on the left side of the radiator support.
5. Remove the four (4) condenser mounting screws and move the condenser upward and out of vehicle.
6. To install, reverse the above procedure. Install new O-rings in the refrigerant line connections, being sure to dip the rings in refrigerant oil before installing.
7. Evacuate and recharge the refrigerant system with Refrigerant 12 following the procedure given in Part 36-32. System capacity is given in the Specifications Section of this Part.

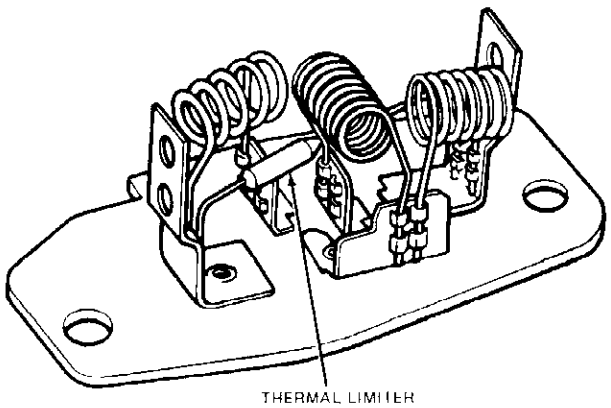


FIG. 5 Thermal Limiter Resistor Assembly

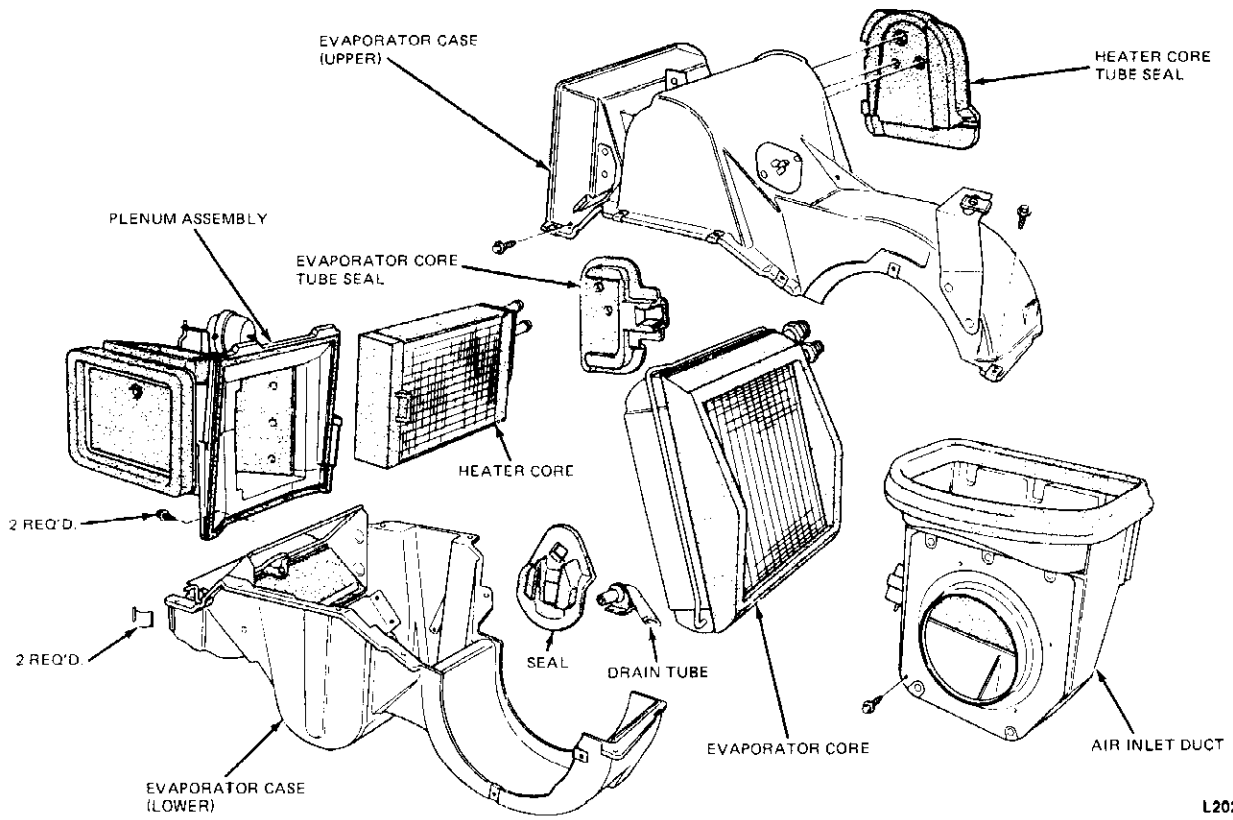


FIG. 6 Evaporator Case Assembly—Granada and Monarch

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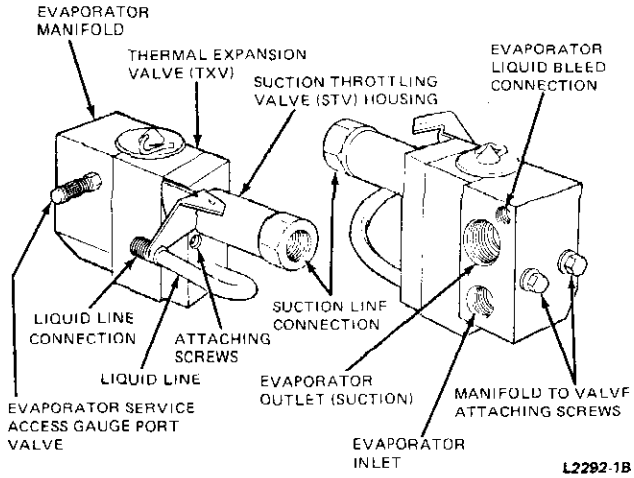


FIG. 7 Combination Valve

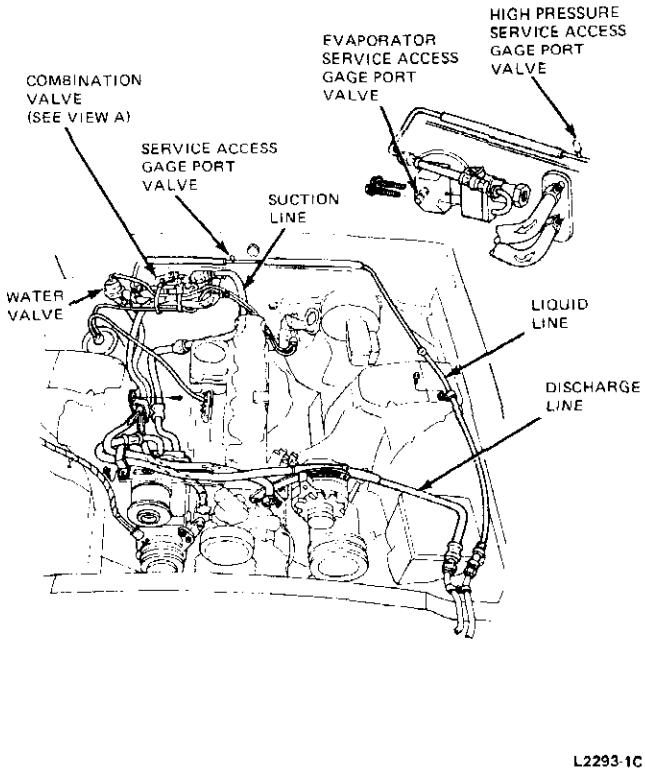


FIG. 8 Combination Valve with 4.1L (250 CID) Engine

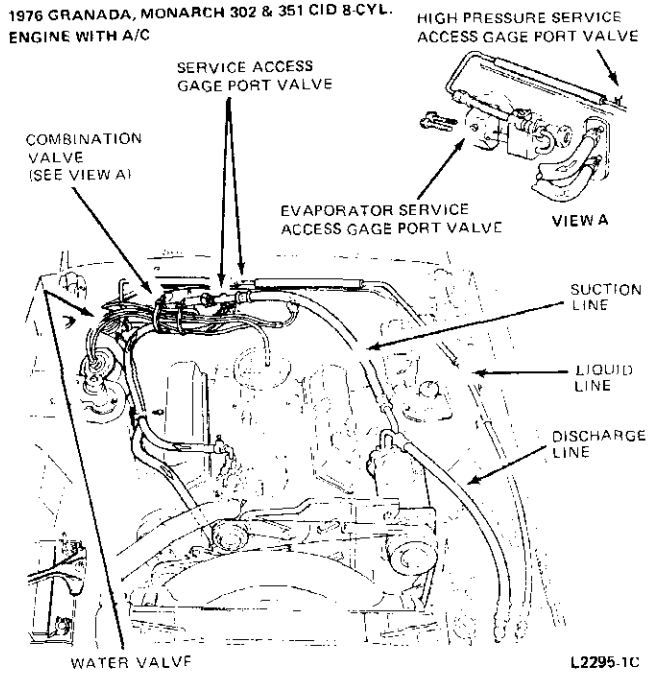


FIG. 9 Combination Valve with 5.0L (302 CID) Engines

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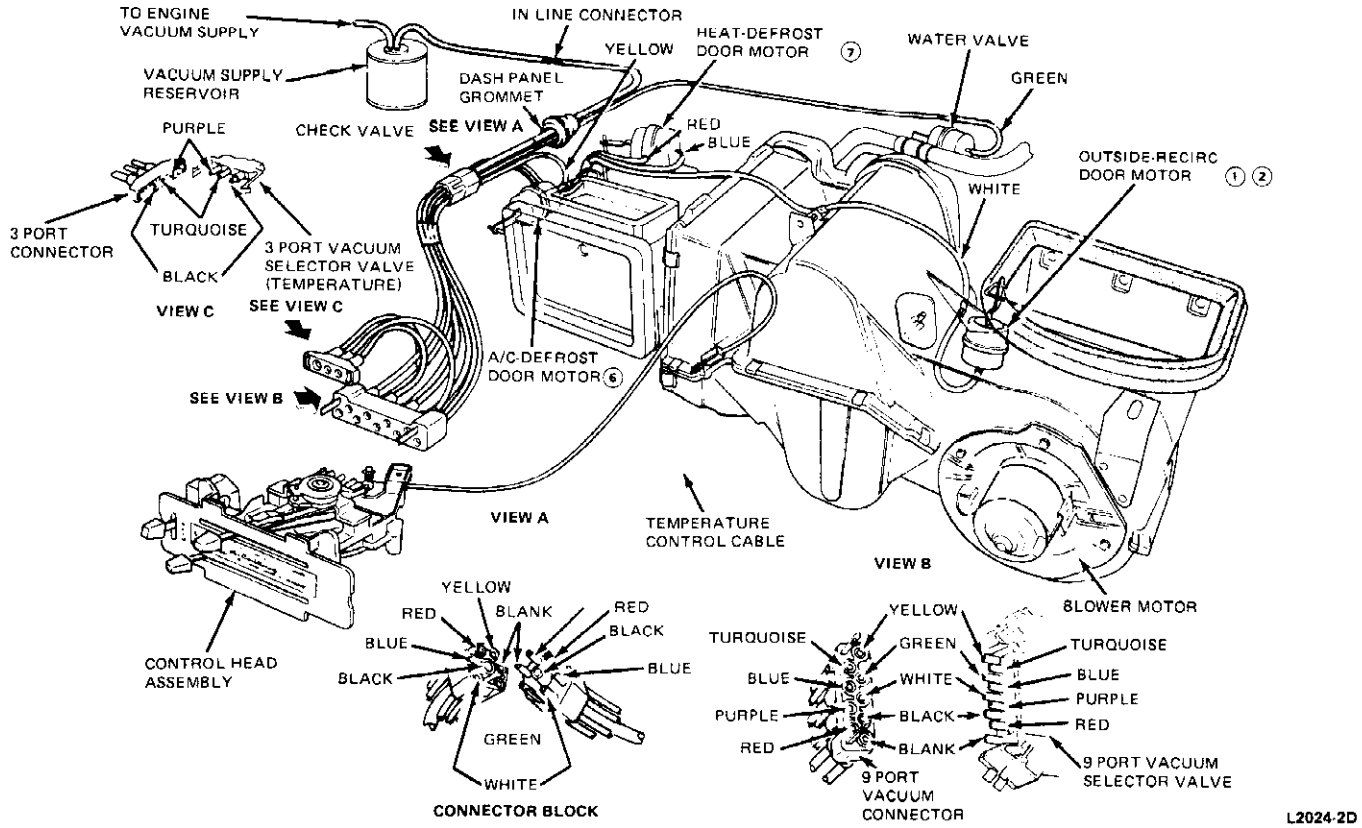


FIG. 10 Vacuum System Components—Granada and Monarch

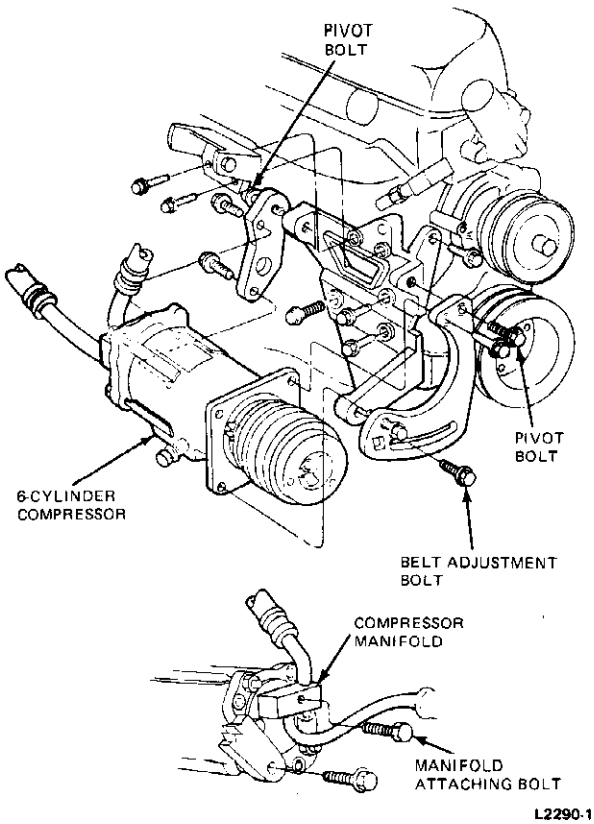


FIG. 11 Compressor Installation—3.3L and 4.1L (200-250) CID Engine

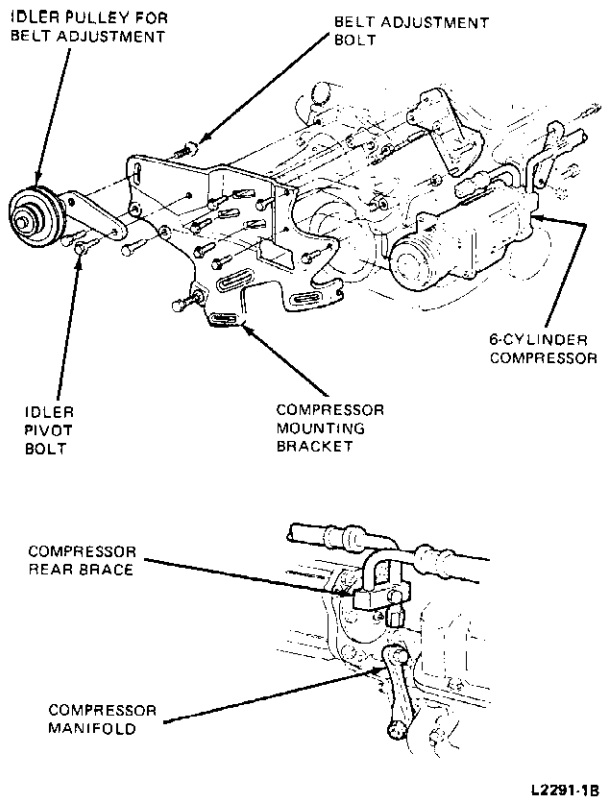


FIG. 12 Compressor Installation—5.0L (302 CID) Engines

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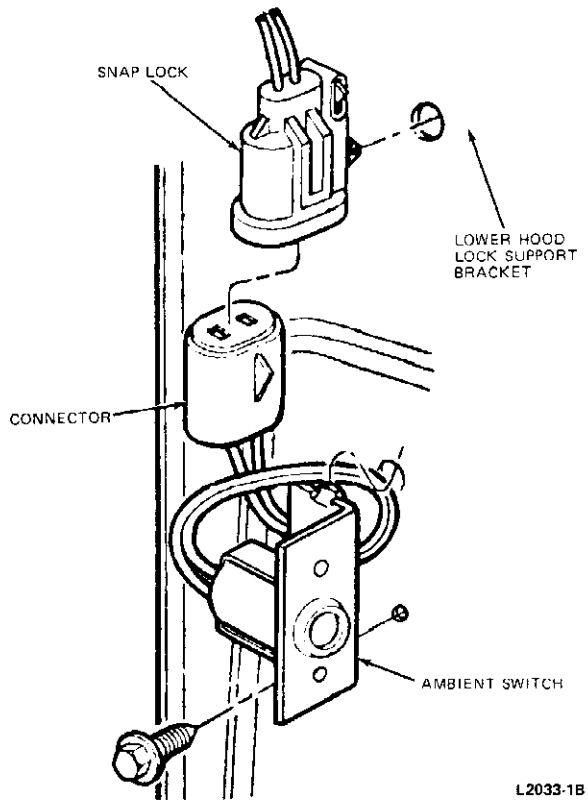


FIG. 13 Ambient Temperature Switch Installation

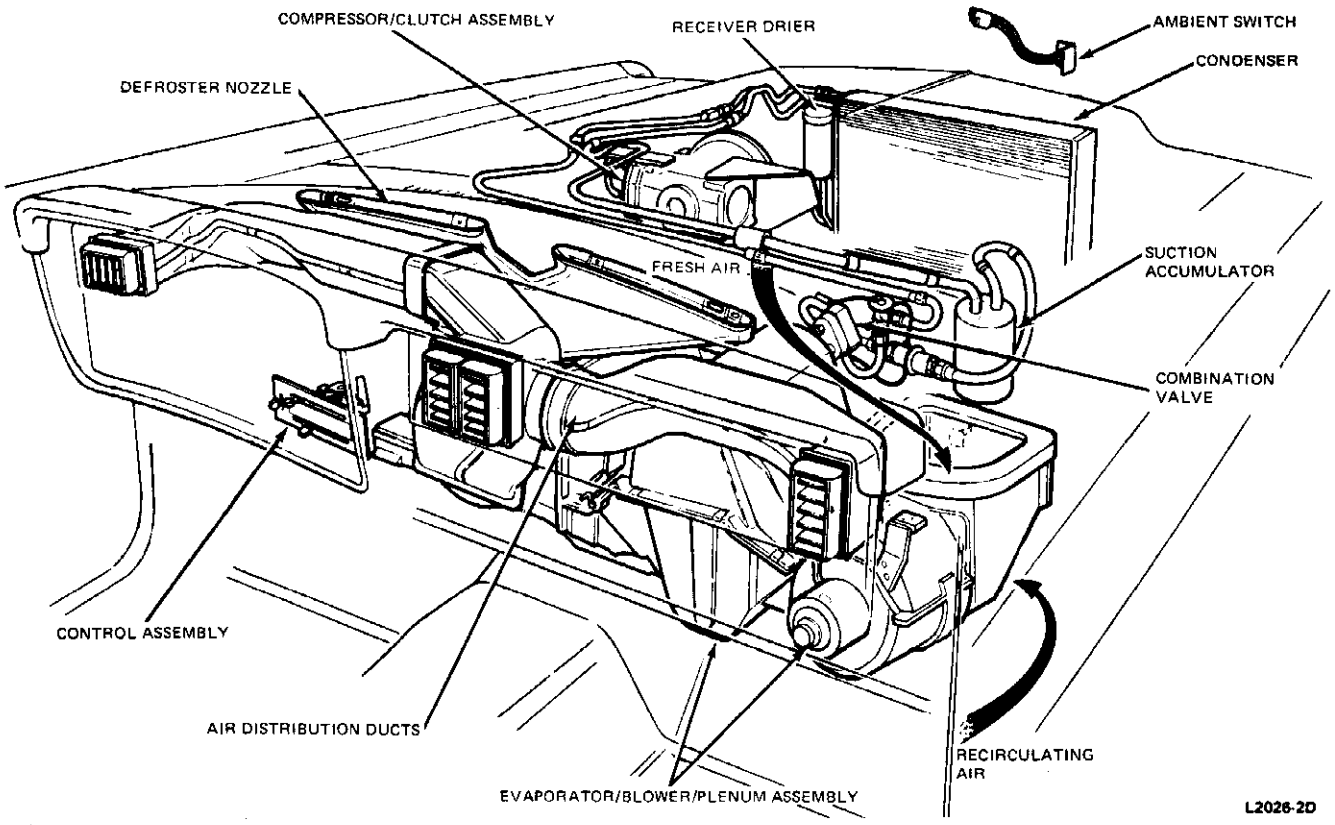


FIG. 14 A/C System Installation—Granada, Monarch

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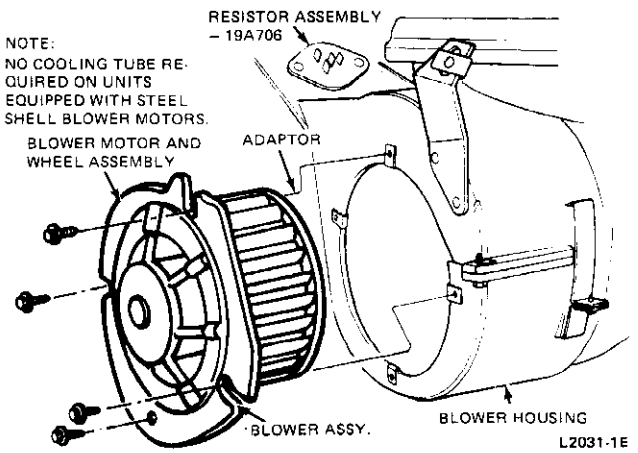


FIG. 15 Blower Motor and Wheel Installation—Granada and Monarch

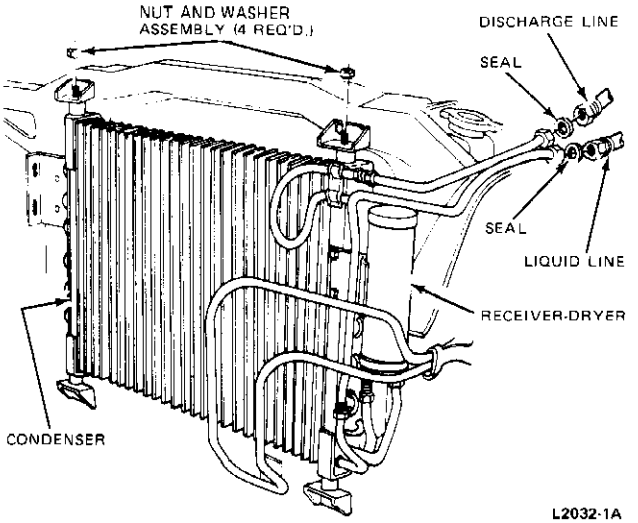
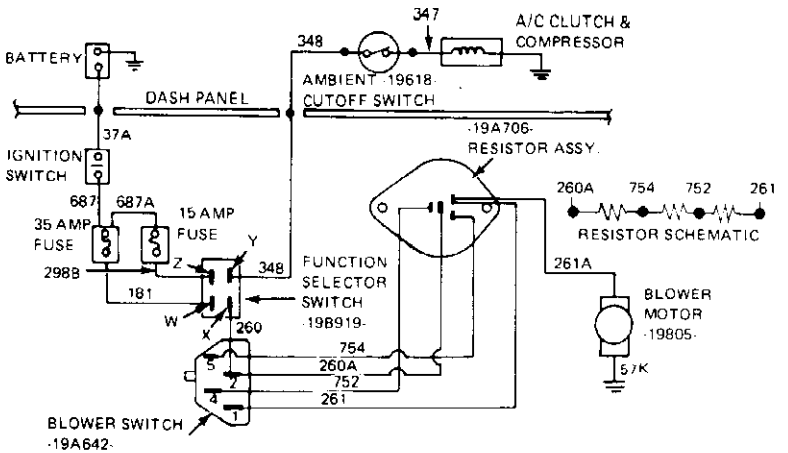


FIG. 16 Condenser and Receiver Installation—Granada and Monarch



FUNCTION SELECTOR SWITCH -19B919-							
SWITCH SCHEMATIC	TERMINAL CONNECTIONS						
	OFF	ECONOMY VENT	A/C	HI-LO	HEAT	▽ DEFOG	DEFROST
X W Y Z	None	W - X	W - X Y - Z	W X	W - X	W - X Y - Z	W - X Y - Z

BLOWER SWITCH -19A642-			
BLOWER SPEED	TERMINAL CONNECTIONS	CURRENT IN CAR (AMPS)	BLOWER VOLTAGE
Low	2	8	7.0 - 9.0
Med Low	2 - 5	11	9.0 - 11.5
Med High	2 - 4 - 5	20	11.5 - 13.0
High	2 - 1 - 4	25	13.0 - 14.8

CIRCUIT NO.	WIRE COLOR
37A	Yellow
57A	Black
181	Brown W/Orange Stripe
260A	Red W/Orange Hash
261A	Orange W/Black Stripe
347	Black W/Yellow Hash
348A	Lt. Green W/Purple Hash
687	Gray W/Lt. Blue Stripe
687A	Gray W/Lt. Blue Stripe
752	Yellow W/Red Dot
754	Lt. Green W/White Hash

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FIG. 17 Manual A/C-Heater System Electrical Wiring Diagram and Continuity Test

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SPECIFICATIONS

GRANADA AND MONARCH HEATER-A/C

Protection Device	Blower Motor A/C Clutch	35 Amp Fuse in Fuse Panel 15 Amp Fuse
Control Illumination		One 1 CP 161 Bulb
Ambient Temperature Switch		35 Minimum Opens 50 Maximum Closes

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Ford and Mercury Heater — Air Conditioner System

PART 36-41

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System Operation	41-1
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SUBJECT	PAGE
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DESCRIPTION AND OPERATION

SPLIT CASE ASSEMBLY—INTEGRAL BLOWER

The split case assembly, as the name implies, is divided into several parts. The evaporator case, which houses the evaporator, heater core and blower assembly, is located on the engine side of the dash panel to the right of the centerline.

The blower motor and wheel is at the extreme right side of the case under the front fender.

It is necessary to cut out an access opening in the right front fender apron to service the blower motor and wheel assembly.

The evaporator and heater core are accessible by removing the covers on the evaporator case assembly.

The plenum chamber is located under the instrument panel. Openings in the dash panel allow air to flow from the evaporator case into the plenum. Air flow through the system can be seen in Fig. 1.

In a typical operation, air is drawn into the system by the blower motor and wheel either through the cowl fresh air intake or through the recirculating air door in the right cowl side panel. The air then passes through the evaporator and/or around the heater core into the plenum. From this point it is carried by ducts to the several air outlets—panel, floor and defroster.

The Ford and Mercury integral air conditioning and heating system uses outside air through the damper door in the upper cowl, or recirculated air through the recirculating air door in the right cowl side panel. The control assembly is located in the instrument panel to the right of the steering column.

All instrument panel registers on the Ford and Mercury operate in the same manner. Move the center register louvers outboard to close; the right register louvers inboard to close; the Ford left outboard register louvers inboard, and the Mercury left outboard register louvers upward to close.

SYSTEM OPERATION (See Fig. 1)

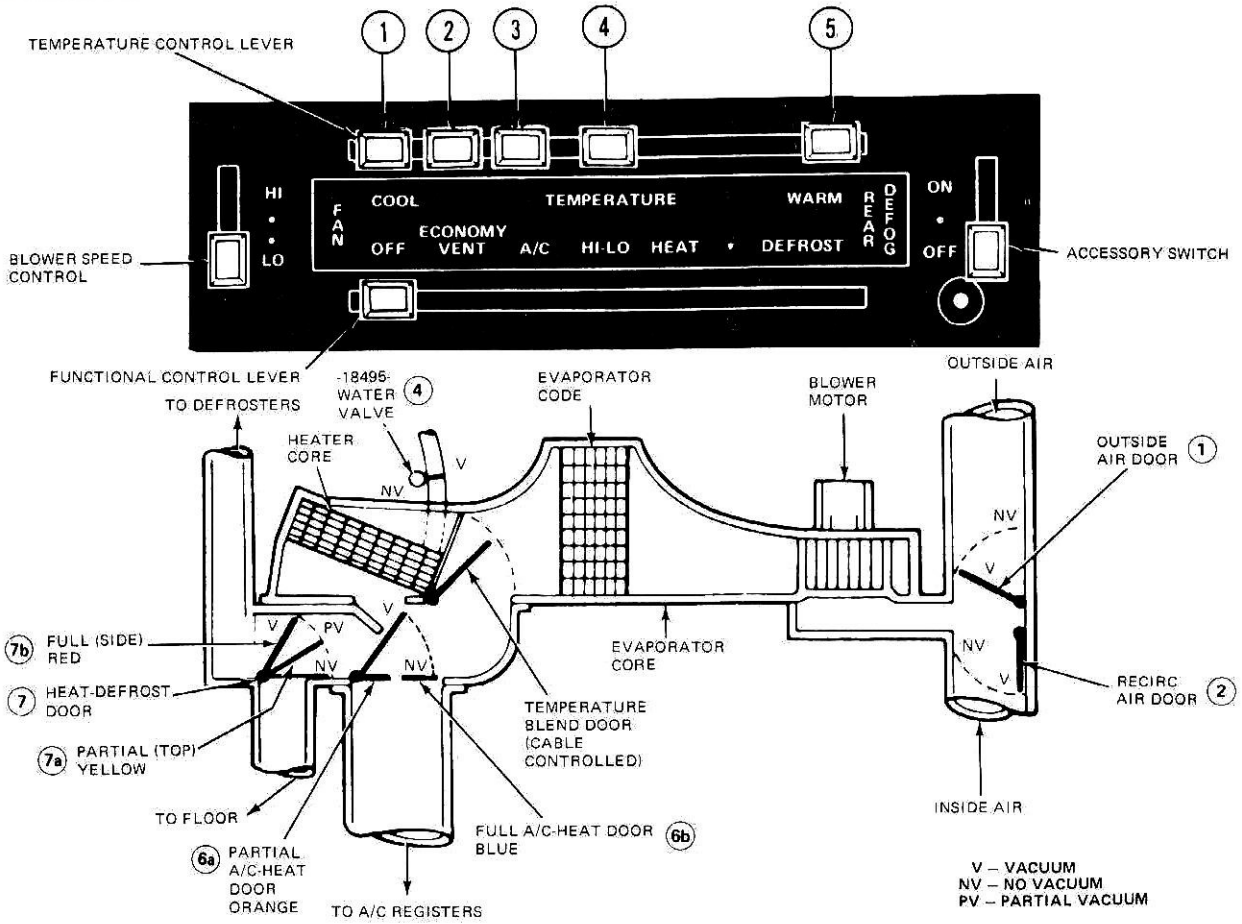
Air is drawn into the system by the blower motor and wheel from the cowl air intake, through the outside air door or through the recirculating air damper door in the right cowl side panel with the mode function control lever in A/C and the temperature lever in COOL position. The air is then forced through the evaporator core, and when the temperature blend door is in the MAXIMUM COOL position, the air by-passes the heater core. The blend door is operated by a control cable. The A/C-Heat doors, in the air conditioning position (full vacuum) allows cooled air to be discharged through the four registers with a small percentage going to the floor.

With the function control lever in OFF position, the outside air door is closed (vacuum), the water valve is closed (vacuum) and no air passes through the system. The blower is ON in all positions, except OFF position.

In ECONOMY VENT position, the outside air door is open (no vacuum), the water valve is closed (vacuum), the A/C-Heat doors are open (full vacuum) and air is discharged through the panel registers. Move the temperature control lever to COOL position for maximum ventilation through the panel registers. The A/C compressor does not operate in ECONOMY VENT position.

In A/C position, the A/C-Heat doors are positioned in the same as ECONOMY VENT. When the temperature control lever is in the COOL position, the outside air door is closed (vacuum) and the recirculating air door is open (vacuum). Maximum A/C performance is obtained in this position. In the A/C position, all air

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FORD AND MERCURY
MANUAL A/C-HEATER SYSTEM VACUUM MOTOR TEST CHART

FUNCTION CONTROL LEVER POSITION	TEMPERATURE CONTROL LEVER POSITION	VACUUM MOTORS APPLIED WITH VACUUM						
		OUTSIDE	RECIRC	WATER VALVE	A/C-HEAT		HEAT-DEFROST	
					PARTIAL	FULL	PARTIAL	FULL
OFF	Any Position	1	2	4	–	–	7a	7b
ECONOMY VENT	Any Position	–	–	4	6a	6b	7a	7b
A/C *	Cool - 1	1	2	4	6a	6b	7a	7b
	Cool - 2	1	2	–	6a	6b	7a	7b
	Cool 3 Temp - 4 Warm - 5	–			6a	6b	7a	7b
HI - LO	Cool - 1	–	–	4	6a	–	7a	7b
	Cool - 2	–	–		6a	–	7a	7b
	Cool - 3 Temp - 4 Warm - 5	–	–	–	6a	–	7a	7b
HEAT	Cool - 1	–	–	4	–	–	7a	7b
	Cool - 2	–	–	–	–	–	7a	7b
	Cool 3 Temp 4 Warm - 5	–	–	–	–	–	7a	7b
▽ (DEFOG) *	Cool - 1	–	–	4	–	–	7a	–
	Cool - 2	–	–	–	–	–	7a	–
	Cool - 3 Temp - 4 Warm - 5	–	–	–	–	–	7a	–
DEFROST *	Cool - 1	–	–	4	–	–	–	–
	Cool - 2	–	–	–	–	–	–	–
	Cool - 3 Temp - 4 Warm - 5	–	–	–	–	–	–	–
VACUUM LINE COLOR CODE		WHITE	WHITE	GREEN	ORANGE	BLUE	YELLOW (TOP)	RED (SIDE)

* COMPRESSOR CLUTCH ENGAGED WHEN AMBIENT CUT-OFF SWITCH IS CLOSED.
—NO VACUUM

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FIG. 1 Manual A/C Heater System Air Flow Schematic and Vacuum Control Chart

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comes out the panel registers, except for a slight floor bleed.

In the HI-LO position, the partial A/C-Heat and full Heat-Defrost doors in the plenum chamber are open (vacuum) and air is discharged through the air conditioning registers and also through the air outlets in the lower plenum to the floor area. Air flow through the heater core is controlled proportionate to the setting of the temperature blend door that controls the warm and cool air as it enters the plenum chamber. The compressor is inoperative.

In HEAT position, the A/C-Heat doors restrict air to the registers (no vacuum), the heat-defrost door is in the heat position (full vacuum) and warm air is discharged through the plenum air outlets to the floor with some defrost bleed.

In the DEFOG position between HEAT and DEFROST, the heat-defrost door is in the mid-position (partial vacuum) and warmed air is discharged through the defrosters and lower plenum floor outlets. The A/C compressor is "on" in DEFOG and DEFROST.

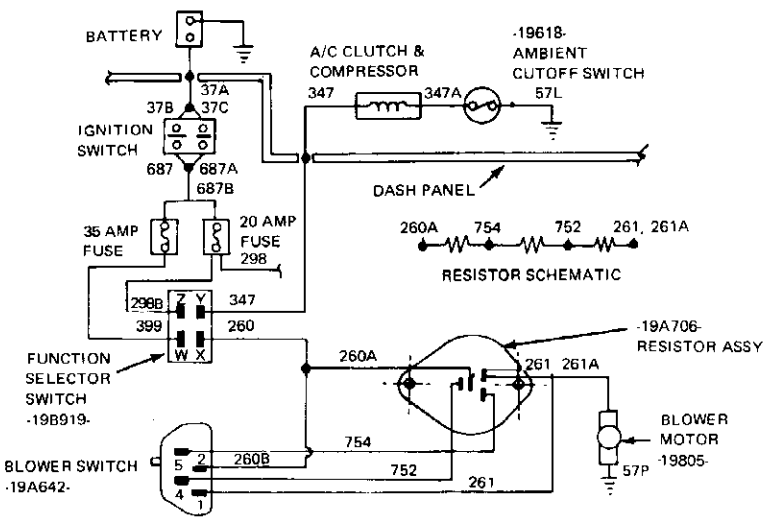
In DEFROST position, the A/C-Heat and heat-defrost doors are in defrost position (no vacuum) and air is discharged through the defrosters with some bleed air to the floor.

A four position blower switch and resistor assembly provides four blower speeds to control air volume. The master blower switch is mounted on the control assembly vacuum selector and is actuated when the function control lever is in all positions except OFF (Refer to Electrical Diagram, Fig. 2).

The air distribution plenum uses two A/C-Heat doors, operated by separate vacuum motors.

The blower motor is of a design, with flat block magnets located on the outside of the assembly (Figs. 3 and 17). Blower rotation is counterclockwise. Removal and installation of the motor requires cutting an access hole in the fender apron, as in previous years.

The blower and clutch circuits (Fig. 2) have been modified so that the compressor clutch is engaged in the Defog and Defrost positions as well as A/C. This



CIRCUIT NO.	WIRE COLOR
57P	Black
260A	Red W/Orange Hash
260B	Red W/Orange Hash
261A	Orange W/Black Stripe
298B	Purple W/Orange Hash
347	Black W/Yellow Hash
399	Brown W/Yellow Stripe
752	Yellow W/Red Dot
754	Lt. Green W/White Hash
37A	Yellow
37B-C	Yellow
687A	Grey W/Lt. Blue Stripe
687B	Grey W/Lt. Blue Stripe

FUNCTION SELECTOR SWITCH -19B919-							
SWITCH SCHEMATIC	TERMINAL CONNECTIONS						
	OFF	ECONOMY VENT	A/C	HI-LO	HEAT	DEFOG ▽	DEFROST
X W I Z Y	None	W - X	W - X Y - Z	W - X	W - X	W - X Y - Z	W - X Y - Z

BLOWER SWITCH -19A642-			
BLOWER SPEED	TERMINAL CONNECTIONS	CURRENT IN CAR (AMPS)	BLOWER VOLTAGE
Low	2	6	7.0 - 8.5
Med. Low	2 - 5	10	8.5 - 10.0
Med. High	2 - 4 - 5	17	10.0 - 12.5
High	2 - 1 - 4	28	12.5 - 14.8

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FIG. 2 Manual A/C-Heater System Electrical Wiring Diagram and Continuity Test

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feature gives the operator additional options for cooled air discharge other than the panel registers.

A six-cylinder compressor is now used on both car lines (Figs. 19 and 20).

The ambient air temperature switch closes on use above 50°F and opens at 35°F. min. and closes at 50°F. max. with a minimum differential of 3°F. between opening and closing temperature.

Posi-Grip vacuum hose retainers are removed and installed as shown in Fig. 12.

The Snap-Lock connectors used for positive wiring connector retention are removed as shown in Fig. 9.

SYSTEM COMPONENTS

Controls (See Fig. 4)

FUNCTION CONTROL (BOTTOM) LEVER

The function control lever actuates a 9 port vacuum selector that controls vacuum motors at the following doors: both A/C-heat doors, heat-defrost door, outside/recirc. air doors and the water valve and also controls the blower switch and activates the A/C clutch circuit in the A/C, DEFOG and DEFROST position. It will also activate the outside and recirculating doors to the outside air position, regardless of the temperature lever position, when in any position except A/C and ECONOMY VENT (Figs. 3 and 4).

A/C clutch operation is dependent upon an ambient temperature cut-off switch (Fig. 2) when the function control lever is in A/C, DEFOG and DEFROST position. The clutch will be off in all other lever positions and/or when the ambient temperature is below 35°F.

The blower motor runs at all times, except when the function control lever is in the OFF position. A separate four position, four speed blower motor switch is used to regulate the volume of airflow and cannot turn the blower off.

TEMPERATURE CONTROL (TOP) LEVER

The temperature lever actuates a control cable, which operates the temperature blend door and a 3 port vacuum selector that controls the outside air door, recirculating air door and water valve, via the 9-port vacuum selector valve which is actuated by the function control lever.

In the A/C position, the system operates in the recirculate (inside) air position when the temperature lever is in the COOL position. When the temperature lever has moved approximately one inch to the right from the extreme left (cool) position, the system operates in the fresh (outside) air position. The system will operate in the outside air position in the ECONOMY VENT, HI-LO, HEAT, DEFOG and DEFROST regardless of the temperature lever setting.

The water valve opens (hot water to heater core) when the temperature lever has moved approximately 1/2 inch to the right from the extreme left (cool) position. The water valve will close when the function control lever is in the OFF or ECONOMY VENT positions regardless of the temperature lever setting.

The blower switch is located at the left side of the control assembly.

The water valve is located in the engine compartment in the heater core inlet water hose near the dash panel (Fig. 3). The heater core outlet hose connects to the water pump.

Evaporator Case

The evaporator case assembly is located on the engine side of the dash panel to the right of the centerline. The blower motor and wheel is in the right side of the case under the right front fender (Fig. 5).

BY-PASS ORIFICE (BPO) EXPANSION VALVE REFRIGERANT SYSTEM

The By-Pass Orifice (BPO) Expansion Valve Refrigerant System was designed to improve the efficiency of the refrigerant system.

Its advantages are: Lower refrigerant system compressor loads and slightly improved fuel economy.

BY-PASS ORIFICE (BPO) EXPANSION VALVE

The By-Pass Orifice (BPO) Expansion Valve is the capillary tube type similar to those used on earlier refrigerant systems, except the tapered ball seat is slotted to prevent complete sealing of the liquid refrigerant inlet to the evaporator. The need for the external equalizer line is eliminated, as the BPO expansion valve is internally equalized through the passages around the push pins (Fig. 1). The slotted ball seat provides additional refrigerant and refrigerant oil flow to lubricate and cool the compressor, during minimum cooling requirement conditions, when the expansion valve is closed.

The By-Pass Orifice (BPO) Expansion Valve must regulate the flow of liquid refrigerant during cool-down (while the car enterior and evaporator core are cooling down). As the evaporator core temperature approaches 32°F., the Suction Throttling Valve begins to control refrigerant pressure.

SUCTION THROTTLING VALVE (STV)

The Suction Throttling Valve (STV) is the same used in current model refrigerant systems, except the equalizer line connection has been removed. Its purpose is to control suction pressure in the evaporator to prevent ice or frost from blocking the flow of air through the heat exchanging surfaces of the evaporator. Gauge pressure at sea level is specified at a minimum of 28.5 psi. The pressure reading is higher at higher altitudes because of gauge error, not because of a change in pressure inside the evaporator. Refer to the Pressure/Altitude Chart in Fig. 2.

Suction "throttling" starts when the compressor suction pressure decreases below the pressure setting of the valve. Compressor suction pressure can continue to drop but the evaporator pressure is held steady by the controlling or "throttling" action of the STV.

PRESSURE DIFFERENTIAL VALVE

A calibrated Pressure Differential Valve core is provided, in the liquid bleed line fitting, as a liquid refrigerant bleed circuit around the STV to assure oil return to the compressor when the STV is closed due to minimum heat loading of the A/C system. Refer to Fig. 2.

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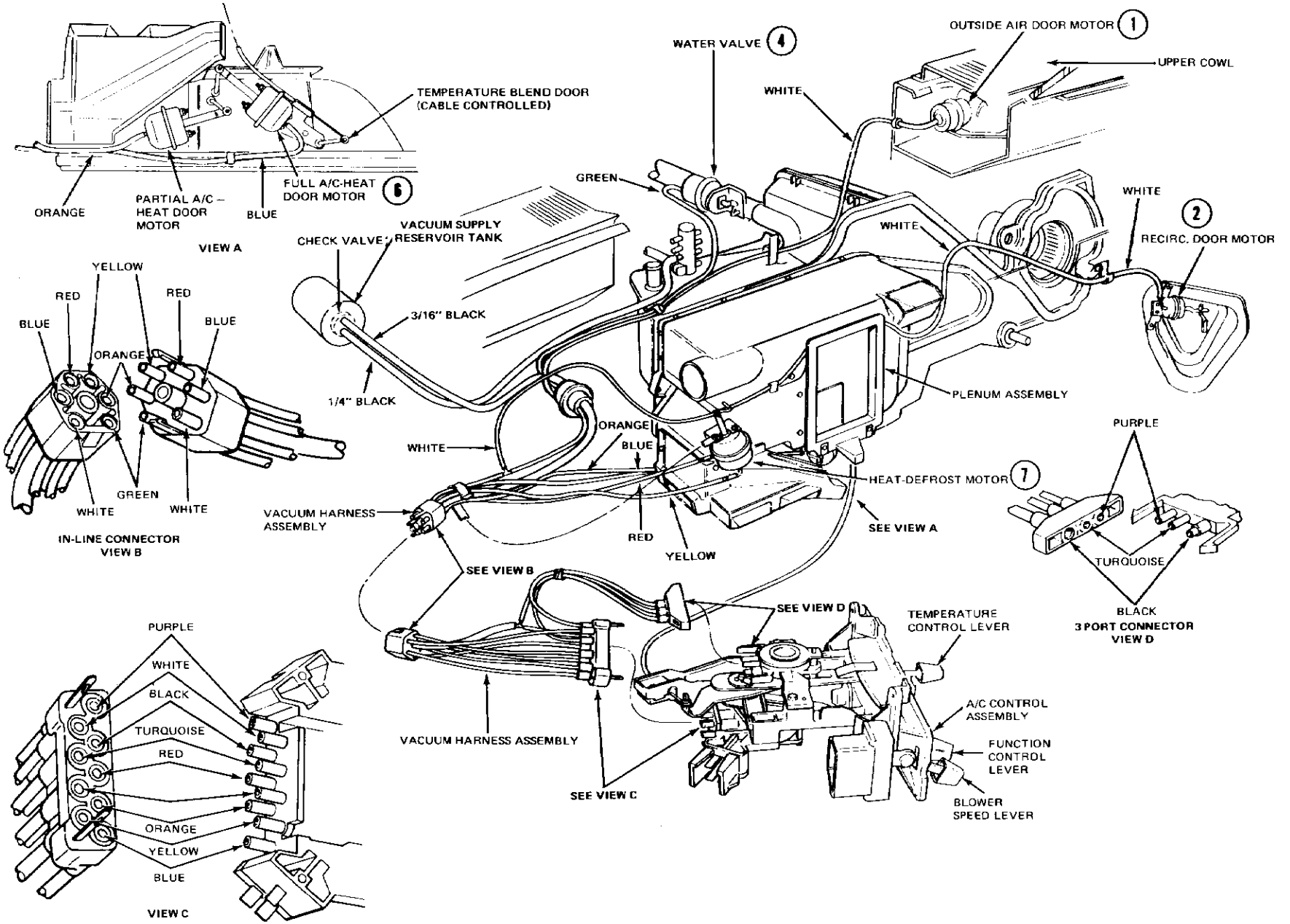
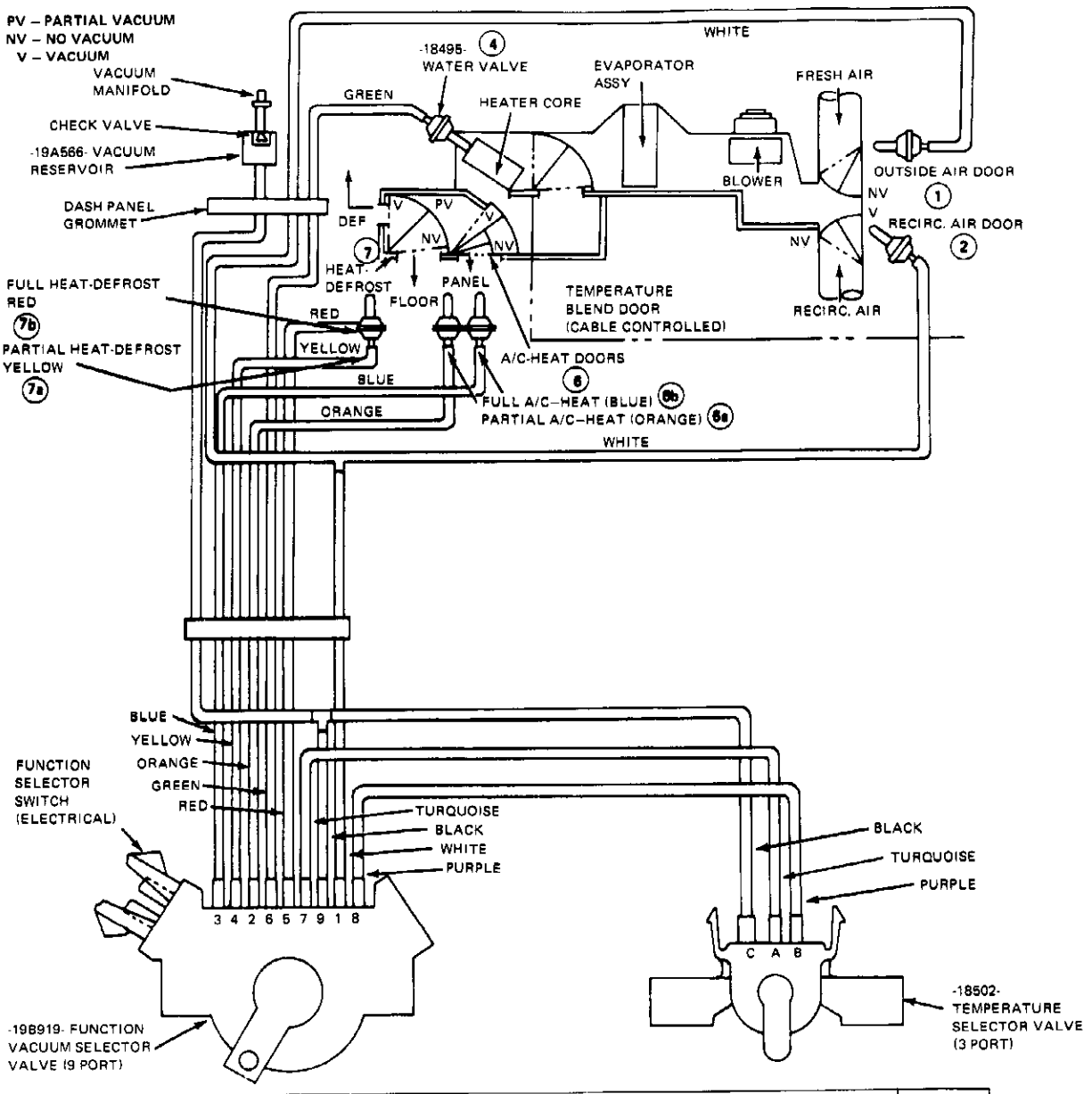


FIG. 3 Manual Heater—A/C System—Vacuum Controls Installation

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PORT	FUNCTION	FUNCTION SELECTOR VALVE POSITIONS							HOSE COLOR
		OFF	ECONOMY VENT	A/C	HI-LO	HEAT	▽ (DEFOG)	DEFROST	
1	Outside - Recirc.	V		To 8					White 1-2
2	Partial A/C-Heat		V	V	V				Orange 6a
3	Full A/C–Heat		V	V					Blue 6b
4	Partial Heat–Defrost	V	V	V	V	V	V		Yellow 7a
5	Full Heat-Defrost	V	V	V	V	V			Red 7b
6	To Engine Water Valve	V	V	To 7	To 7	To 7	To 7	To 7	Green 4
7	From Temp. Valve Port A	Seal	Seal	To 6	To 6	To 6	To 6	To 6	Turquoise
8	From Temp. Valve Port B	Seal	Seal	To 1	Seal	Seal	Seal	Seal	Purple
9	Source Vacuum	V	V	V	V	V	V	V	Black

PORT	FUNCTION	TEMPERATURE SELECTOR VALVE LEVER POSITIONS				HOSE COLOR
		COOL		TEMPERATURE	WARM	
C	Source Vacuum	V	V	V	V	Black
A	Water Valve	V				Turquoise
B	Outside - Recirc.	V	V			Purple

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FIG. 4 Manual A/C Heater System Vacuum Schematic and Selector Test

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The Pressure Differential Valve is a Schrader type valve that has been calibrated to open at a pressure range of 10 to 20 psi. Its function is to by-pass oil laden refrigerant around the restriction formed when the STV is closed (due to reduced heat load on the A/C system) and thereby provide an assured oil return to the compressor. Under high heat loads this valve is closed, since ample refrigerant is moving through the compressor suction line back to the compressor. Substitution of a Schrader type service access valve core from one of the gauge port valves is not permitted and would result in compressor damage by oil starvation because the substituted valve core would never open.

The calibrated Pressure Differential Valve Core is supplied installed in the liquid bleed line fitting of the Suction Throttling Valve and is not serviced separately.

INSPECTION AND ASSEMBLY REQUIREMENTS

O-ring seal surfaces must be free of dirt, lint, burrs and scratches.

All O-rings must be lubricated with clean refrigerant oil immediately prior to installation.

NOTE: At any time a hose or component connection leak is observed, tightening the connection will only stop the leak temporarily. To correctly repair the leak, the connector fitting must be separated, cleaned and a new O-ring installed. The O-ring and connector surfaces should be lubricated with clean refrigerant oil prior to assembly.

REFRIGERANT FLOW

1. Liquid refrigerant from the receiver/drier enters the high pressure liquid line fitting of the By-Pass Orifice (BPO) Expansion Valve.
2. During stabilized (vehicle shutdown) conditions, the pressure on the bottom of the Expansion Valve diaphragm rises above the pressure on the top of the diaphragm, closing the valve.
3. When the system is started, the pressure on the bottom of the diaphragm drops rapidly, allowing the valve to open and spew liquid refrigerant to the lower evaporator tube where it begins to vaporize.
4. The compressor suction draws the vaporized refrigerant out of the top of the evaporator at the outlet (top) tube where it passes, and the temperature is transferred to the bulb of the capillary tube which is clamped tightly on the tube.
5. Gas pressure in the capillary tube drops when cooled and the expansion valve starts to close. Its pressure rises with evaporator superheat and opens the expansion valve, allowing more refrigerant to flow.
6. Pressure differences, between the evaporator and compressor, force the Suction Throttling Valve control piston further into the valve cylinder. This allows the refrigerant to escape out of the internal side slots of the STV and enter the housing, or suction side, of the Suction Throttling Valve.
7. As the system operates, the temperature (and pressure) in the evaporator core begins to drop. If operating conditions (ambient temperature, vehicle speed, blower speed) permit the temperature of the core to approach the freezing point, the reduced pressure in the evaporator core allows the STV piston to move back and partially cover the side slots. This action "throttles" or restricts refrigerant flow through the STV and maintains the evaporator core pressure of 28.5 psi. This pressure for R-12 corresponds to a temperature of 32°F. The evaporator core is therefore kept above the temperature at which it would freeze the condensed moisture on its surface.
8. The liquid bleed line circuit parallels the Suction Throttling Valve. The Pressure Differential Valve, in the circuit (no replacement part available), starts to open when the suction pressure in the STV housing is 10 psi less than the evaporator pressure. It will fully open when the suction pressure is 20 psi less than the evaporator pressure.
9. The bottom of the pressure sensing diaphragm (on top of the expansion valve) internally senses the evaporator pressure through the internal passages around the ball and plate assembly push pins. As evaporator pressure is increased, the diaphragm flexes upward pulling the push pins away from the

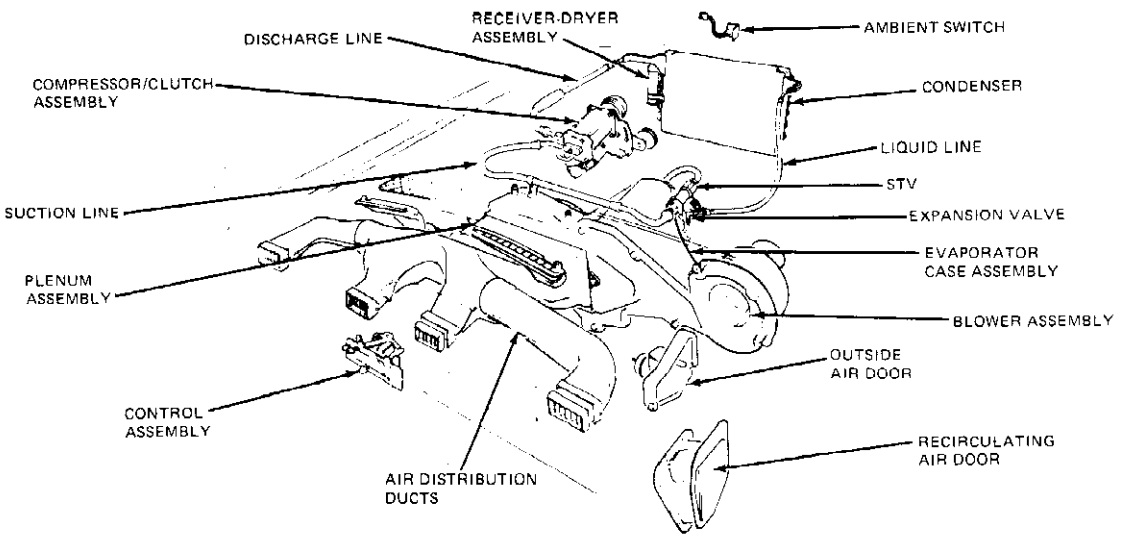
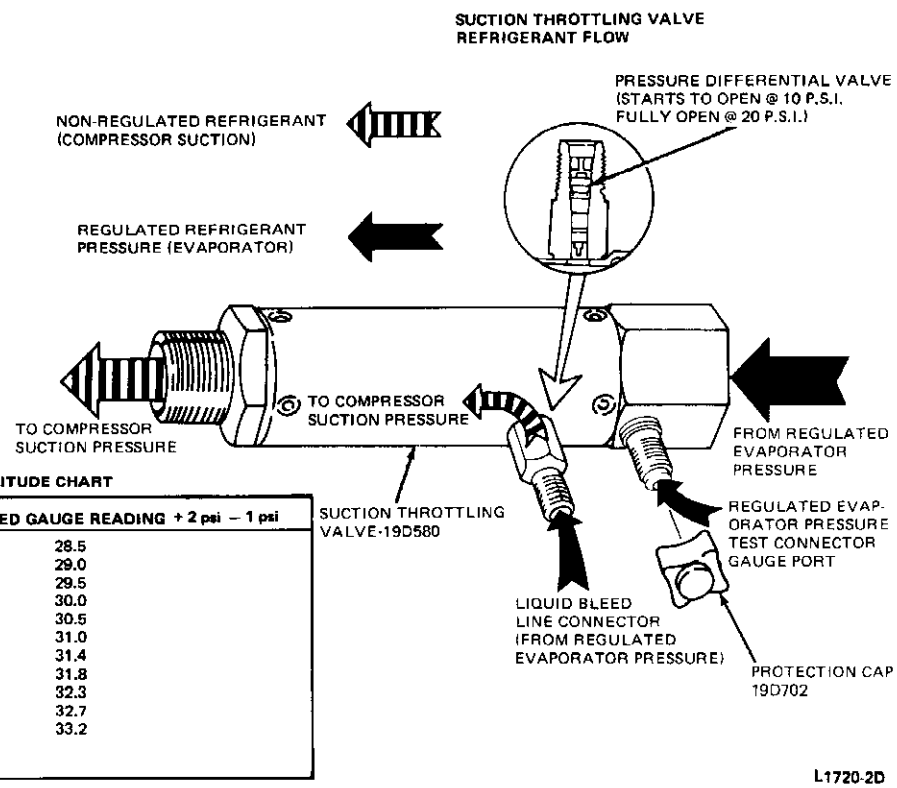


FIG. 5 Manual Heater—A/C System—Installation

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ball and plate assembly. The expansion valve spring forces the ball onto the slotted tapered seat and the liquid refrigerant flow is reduced. As the pressure is reduced, due to the restricted refrigerant flow, the diaphragm flexes downward again opening the expansion valve to provide the required controlled pressure and refrigerant flow condition.

10. Gas in the capillary tube bulb produces the required pressure on the top of the pressure sensing diaphragm. As the cool refrigerant passes through the evaporator outlet tube, the temperature is transferred to the bulb of the capillary tube and the gas above the diaphragm will contract and allow the expansion valve spring to close the expansion valve. When heat from the passenger compartment is absorbed by the refrigerant, it will cause the gas in the capillary tube to expand and the push pins will again force the expansion valve to open, allowing more refrigerant to flow so that more heat can be absorbed.



SUCTION THROTTLE VALVE PRESSURE/ALTITUDE CHART

ALTITUDE OF TEST SITE (FEET)	REQUIRED GAUGE READING + 2 psi — 1 psi
0 FEET (Sea Level)	28.5
1000 FEET	29.0
2000 FEET	29.5
3000 FEET	30.0
4000 FEET	30.5
5000 FEET	31.0
6000 FEET	31.4
7000 FEET	31.8
8000 FEET	32.3
9000 FEET	32.7
10,000 FEET	33.2

FIG. 6 By-Pass Orifice Type Suction Throttling Valve and Pressure Altitude Chart

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ADJUSTMENTS

TEMPERATURE CONTROL CABLE ADJUSTMENT

1. Loosen the cable housing attaching screw at the plenum bracket.
2. Move the temperature control lever to maximum COOL position.
3. Adjust the cable at bracket on plenum by sliding cable flag in bracket groove until the temperature door crank arm is in the full right position. Tighten the cable screw at the plenum bracket.

REMOVAL AND INSTALLATION

PLENUM CHAMBER

The plenum chamber is located under the instrument panel. Two rectangular openings in the dash panel allow air to flow from the evaporator case into the plenum. It is necessary to remove the instrument panel to remove the plenum (see Figs. 5 and 7).

DEFROSTER NOZZLES

The defroster nozzles are accessible by removing the instrument panel pad and loosening the Y-brace forward of the cluster to remove the left nozzle. Remove two defroster-to-panel mounting screws and one defroster-to-defroster duct attaching screw to remove each nozzle. Separate each air duct from the defroster nozzles and remove the nozzles upward through the instrument panel pad opening.

VACUUM MOTORS

The outside air damper door vacuum motor can be serviced by removing the cowl air intake screen under the hood (Fig. 8) and the recirculating air door motor by removing the right cowl trim panel. The vacuum controlled water valve is readily accessible in the engine compartment. (Refer to Fig. 3.) The A/C-Heat door vacuum motors and heat/defrost door motor on the bottom and left side of the plenum do not require removal of the instrument panel pad to gain access to the motors. Refer to Fig. 9 for removing vacuum and electrical connectors.

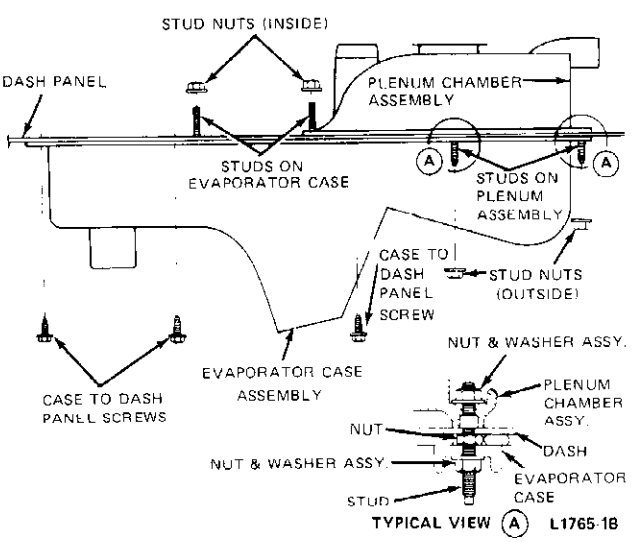


FIG. 7 A/C Heater System Dash Panel Attachments

CONDENSER AND RECEIVER ASSEMBLY

The condenser and receiver assembly is mounted to the radiator support with four ISO-mounts and is serviced by removing the radiator and sliding the condenser rearward through the radiator support (Fig. 10).

AIR CONDITIONING REGISTERS AND AIR DUCTS

Air Ducts

To remove the register air ducts, it is necessary to remove the instrument panel pad and instrument panel (refer to Figs. 11 and 12).

Register Louvers

With reference to Fig. 13, pry on the end pivot with thin blade to separate the pivot from pivot hole and pull the barrel assembly rearward from register housing.

The barrels can only be installed one way because of the sizes of the two pivots and retaining holes.

CONTROL ASSEMBLY

1. Remove A/C control knobs and accessory switch knob.
2. Remove applique covering the control assembly.
3. Remove the ash tray and ash tray support assembly.
4. Remove four (4) screws from face of control assembly.
5. Remove temperature control cable from control head.
6. Disconnect the vacuum harnesses from vacuum selectors.
7. Disconnect the electrical wiring connectors from blower switch, vacuum switch and illumination bulb.
8. Remove control head from rear of instrument panel.

To install, reverse the above procedure and adjust the temperature cable for proper output.

OUTSIDE AIR DOOR ASSEMBLY (See Fig. 8)

Removal

1. Raise hood and remove left screen from cowl top panel. View A.

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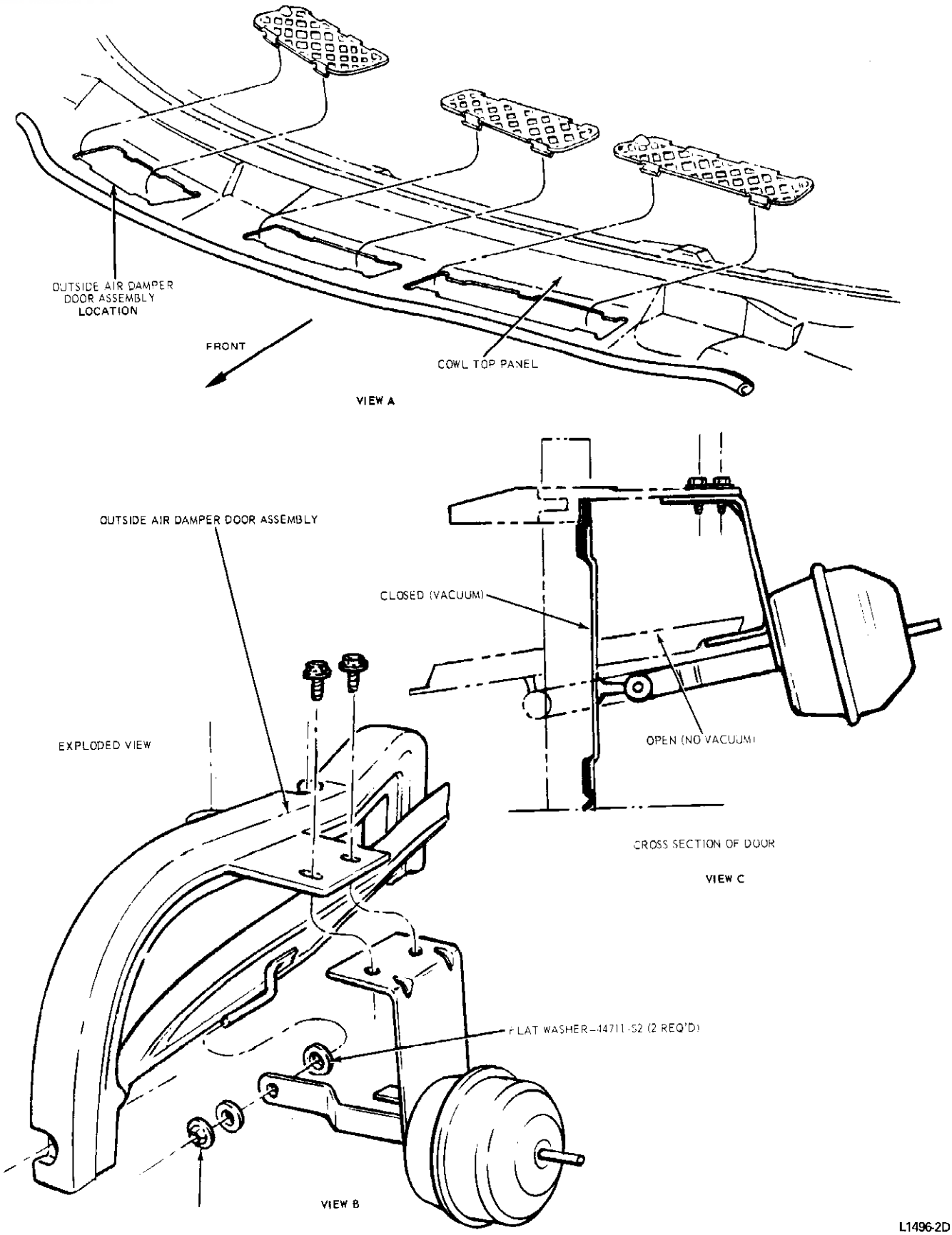


FIG. 8 Outside Air Door Assembly

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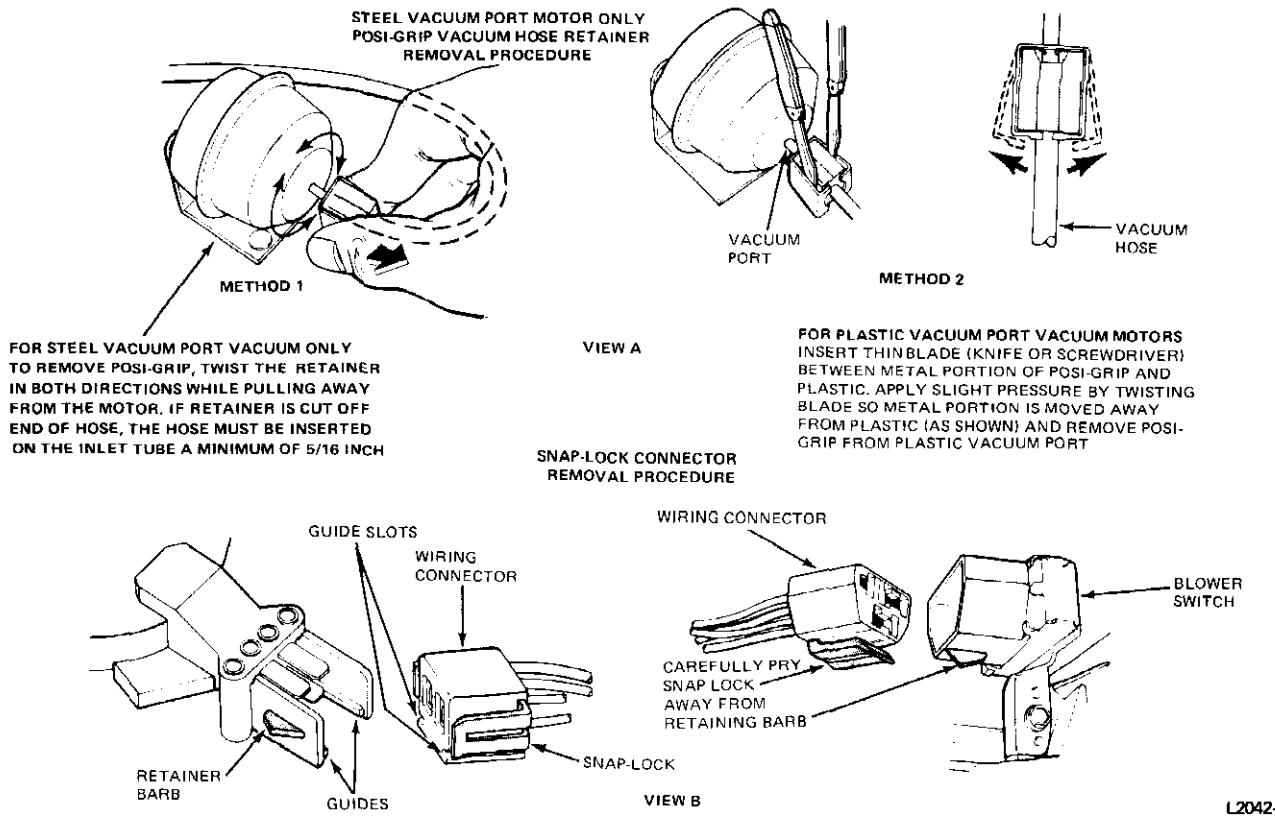


FIG. 9 Removing Vacuum and Electrical Connectors

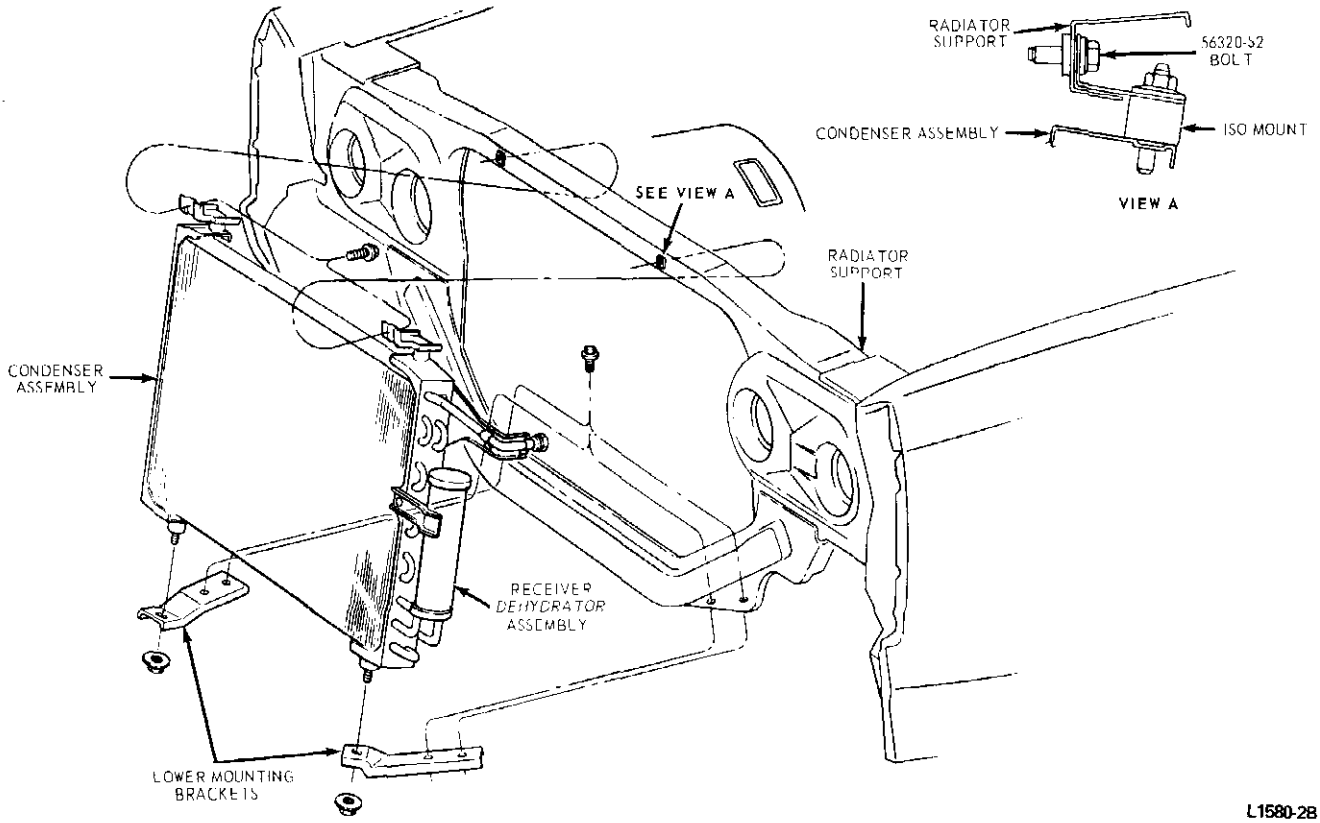


FIG. 10 Condenser and Receiver Assembly

2. Disconnect vacuum hose from outside air door vacuum motor.
3. Remove two (2) vacuum motor mounting plate screws. View B.
4. Remove two (2) air door to top cowl mounting screws.
5. Carefully remove spring clip and two flat washers from door crank arm and remove vacuum motor.

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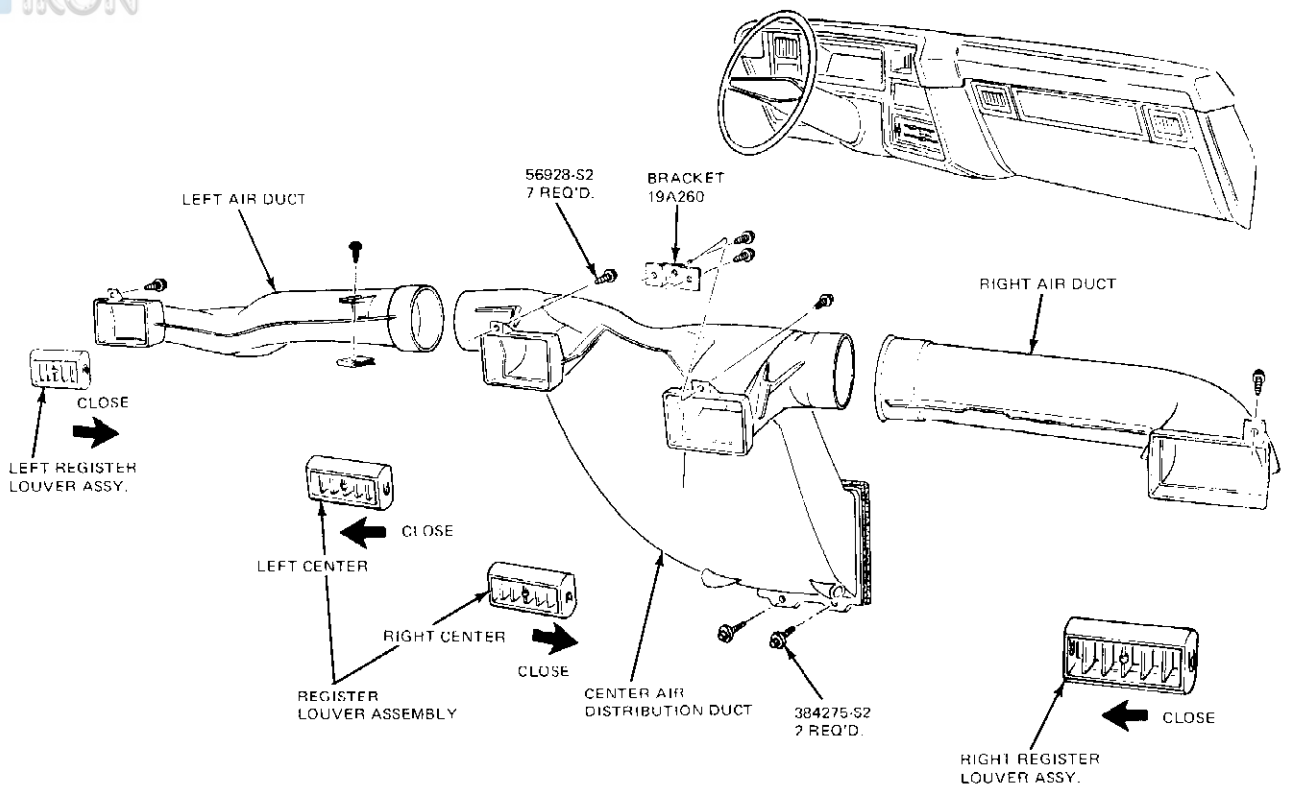


FIG. 11 Ford Air Ducts and Registers

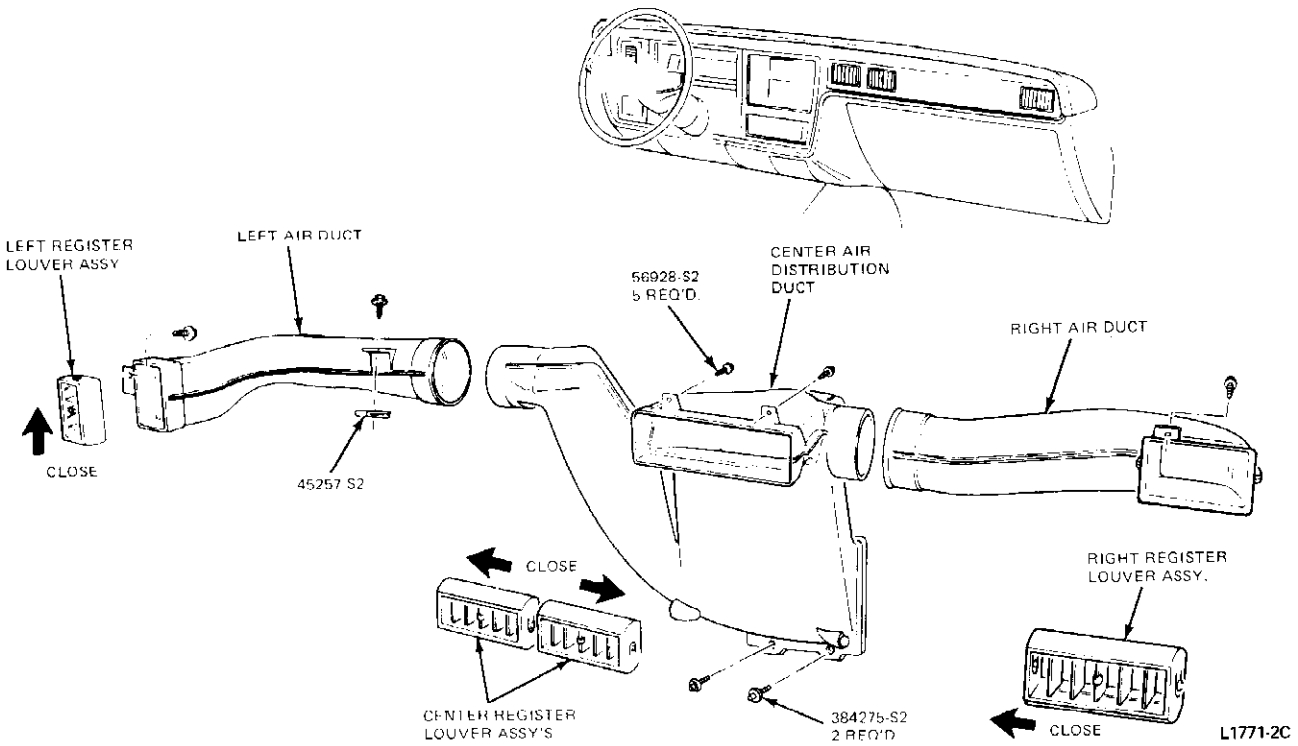


FIG. 12 Mercury Air Ducts and Registers

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6. Move air door assembly inboard and rotate door and frame assembly carefully to clear opening in cowl top panel.

Installation

1. Carefully insert air door and frame assembly into position in cowl top panel.
2. Install motor shaft on door crank arm as shown in View B.
3. Align air door frame mounting holes with two screw holes in cowl top panel.
4. Install air door frame mounting screws. Do not tighten screws.
5. Install vacuum motor mounting plate screws.
6. Tighten air door frame mounting screws.
7. Connect vacuum hose to motor.
8. Install cowl screen.

EVAPORATOR CORE (See Figs. 14 and 15)

NOTE: Observe Safety Precautions as outlined in Part 36-31.

1. Discharge refrigerant system (Part 36-32).
2. Disconnect suction line from STV and cap suction line and STV.
3. Disconnect liquid line from expansion valve and cap valve and liquid line.
4. Remove insulation tape from expansion valve capillary bulb. Disconnect capillary bulb from suction tube (2 clamps-2 screws).
5. Remove STV clamp (1 screw).
6. Remove liquid line support clamp (1 screw).
7. Remove four (4) right to left cover flange screws.
8. Remove five (5) cover to case mounting screws from left (inboard) cover and remove cover.

NOTE: A bead of rope sealer between the two covers must be replaced during installation.

9. Remove five (5) cover to case mounting screws from right (outboard) cover.
10. Pull evaporator core and right cover diagonally forward away from case.
11. Disconnect oil return line from STV.
12. Disconnect STV from evaporator core.
13. Remove right cover from core.
14. Disconnect expansion valve from evaporator core tube.
15. Remove core mounting gasket.

To Install, reverse the above procedure. Make sure all new O-ring seals are liberally lubricated with the specified refrigerant oil and the O-rings and expansion valve capillary bulb are positioned properly in their respective locations.

Evacuate and charge the refrigerant system with 4-1/4 plus 1/4 lbs, minus 0 lbs, of Refrigerant-12 (Part 36-32).

HEATER CORE (See Fig. 16)

1. Drain engine coolant.
2. Disconnect heater hoses from core tubes.
3. Remove heater core cover plate and gasket (7 screws).

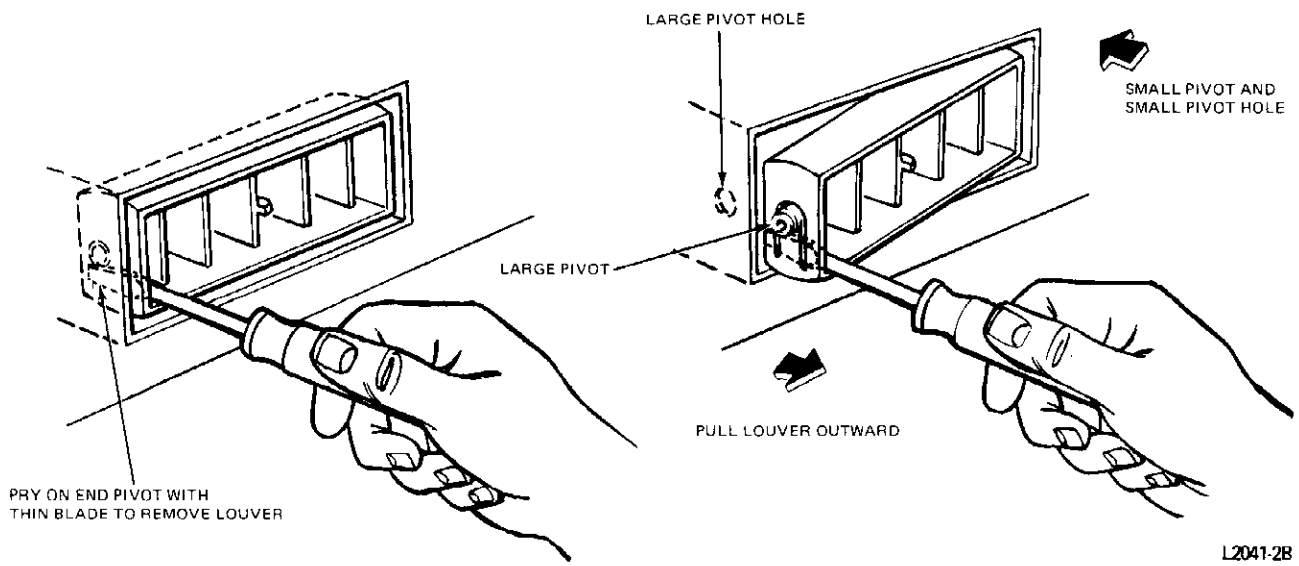


FIG. 13 Removing Louver Assemblies

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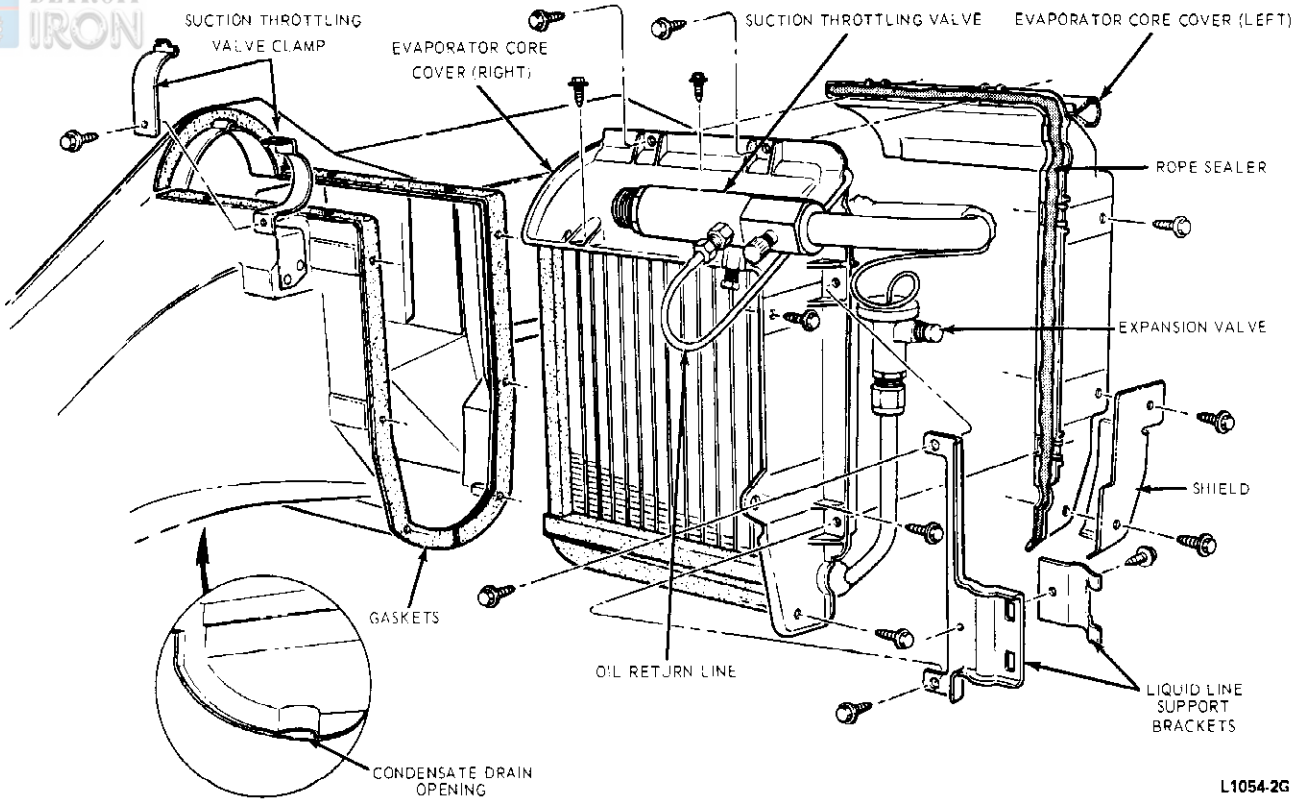


FIG. 14 Evaporator Core Removal

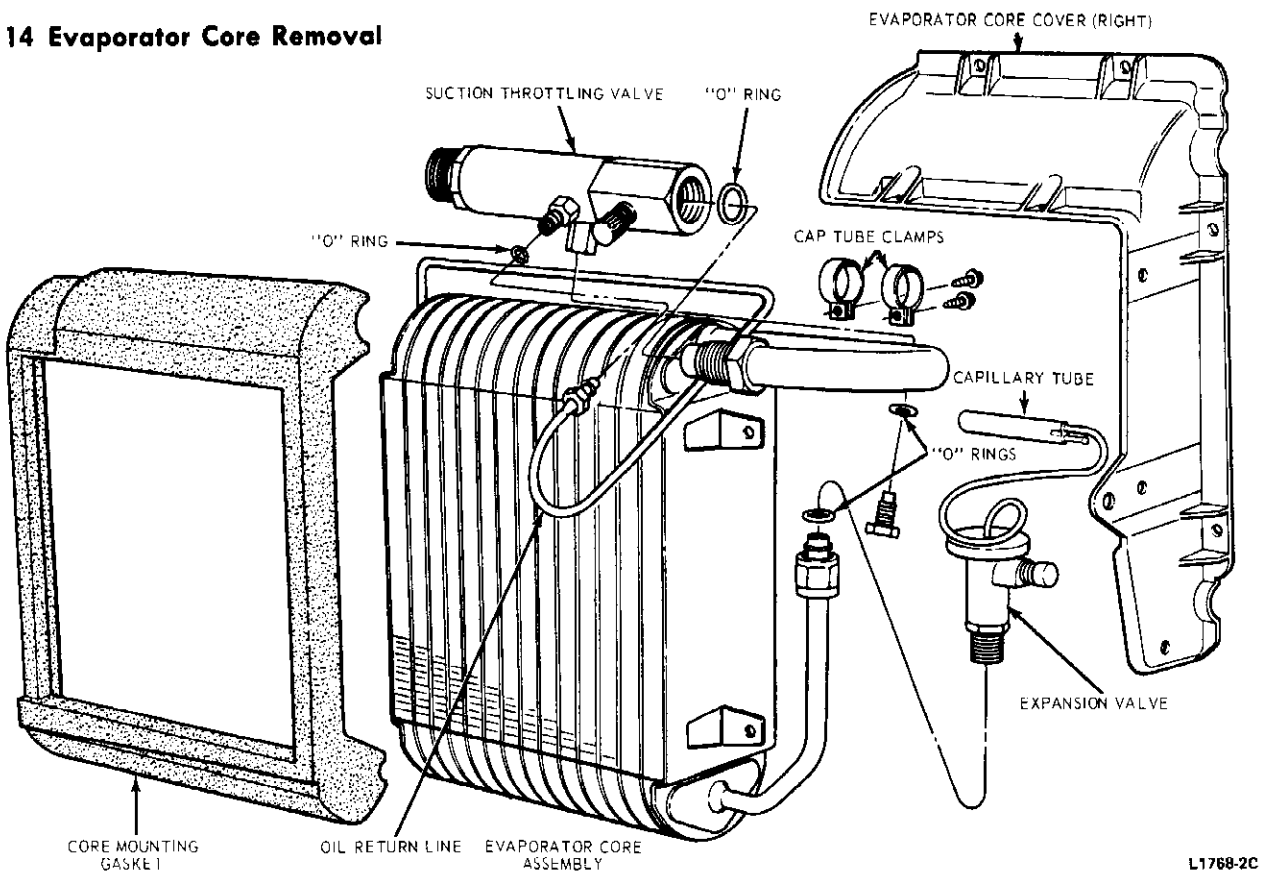


FIG. 15 Evaporator Core Disassembly

4. Pull heater core and mounting gasket up out of case.

5. Remove core mounting gasket.

Reverse the procedure to install core and check coolant level.

During core installation, make sure core and gasket seat firmly in case.

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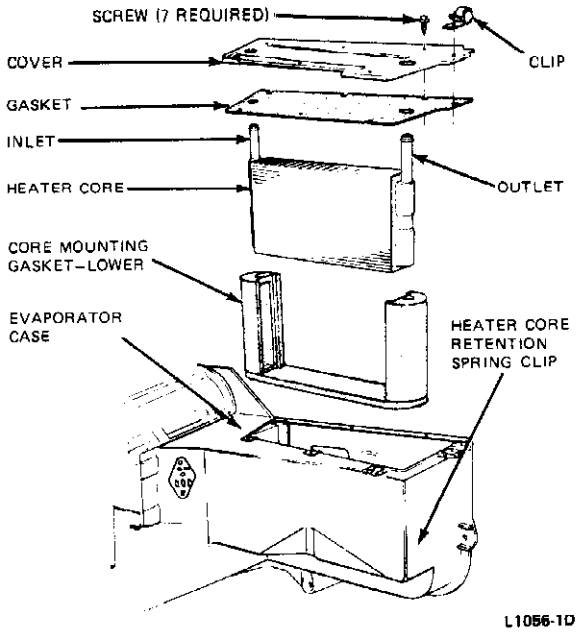


FIG. 16 Heater Core Removal

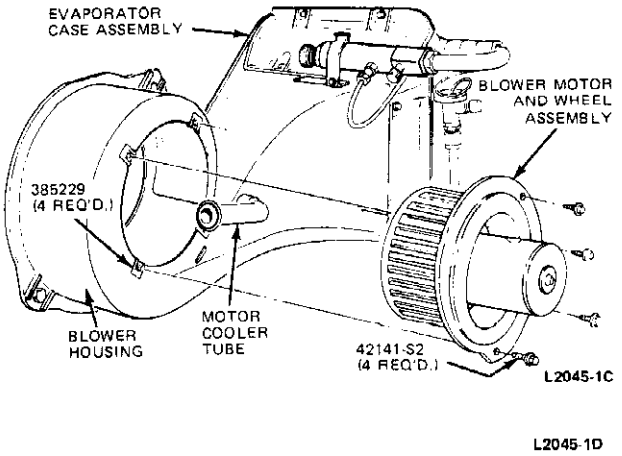


FIG. 17 Blower Motor and Wheel

BLOWER MOTOR AND WHEEL ASSEMBLY (FIG. 17)

1. Disconnect the ground cable from the battery.
2. Remove the right front tire and wheel assembly.
3. With reference to Fig. 18, locate the access opening area shown and clean this area of the apron.
4. Drill a 1-inch hole tangent to the centerline of the bead using the drill dimple provided in the apron 1/2 inch from the centerline of the bead.
5. Cut out the access opening along the centerline of the bead with aircraft snips. Smooth any rough metal edges.
6. Working through the access opening in the apron, remove the blower motor cooling tube from the motor.
7. Disconnect the blower motor connector from the wiring harness.
8. Remove four (4) blower motor mounting plate screws and carefully move the motor and wheel assembly forward out of the evaporator case through the access hole.
9. Procure a cover plate (Part No. D3AZ-18A475-A).
10. Position cover plate over access opening and drill eight (8) 1/8-inch holes in apron, using the 8 holes in the cover as a template. Protect the evaporator case with a metal shield during drilling operation to prevent damage to the case.
11. Apply rope sealer to the motor mounting plate and install blower motor and wheel as an assembly.
12. Replace the blower motor cooling tube in the cooling hole in the motor.
13. Reconnect the blower motor connector.
14. Reconnect battery ground cable and check function of blower motor.
15. Apply rope sealer to perimeter of the access cover and position the cover on the apron. Install cover with eight (8) 357903-S8 screws self-tapping round washer head (8-15 x 1/2 inch).
16. Replace tire and wheel assembly.

COMPRESSOR MOUNTING

All compressor-to-engine mounting braces and support brackets, idler clutch pulley and belt drive arrangements are shown in Figs. 19 and 20 Figs. 21 and 22 shown hose routings for the 5.8L, 6.6L and 7.5L (351, 400 and 460 CID) engines.

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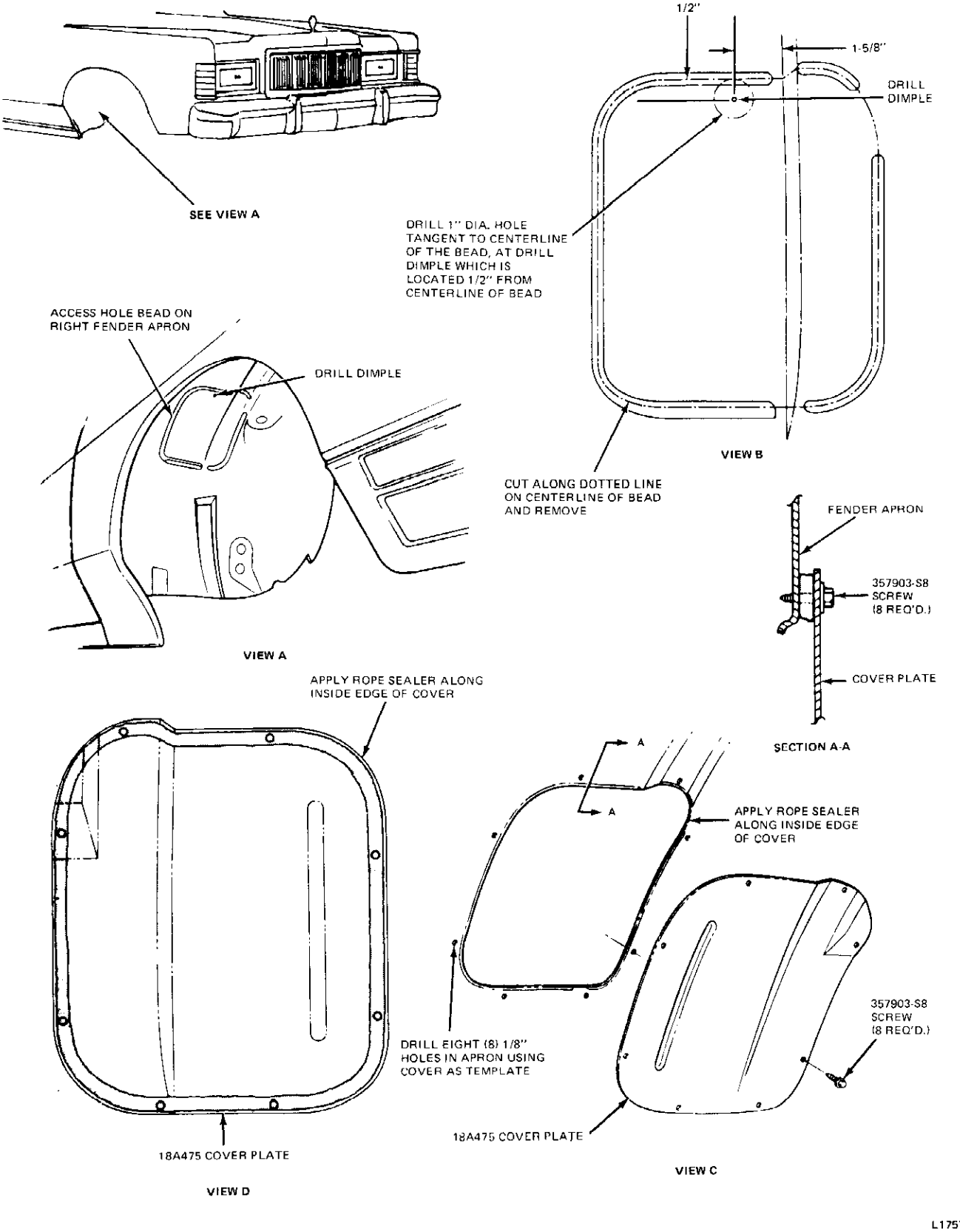


FIG. 18 Blower Access Hole in Fender

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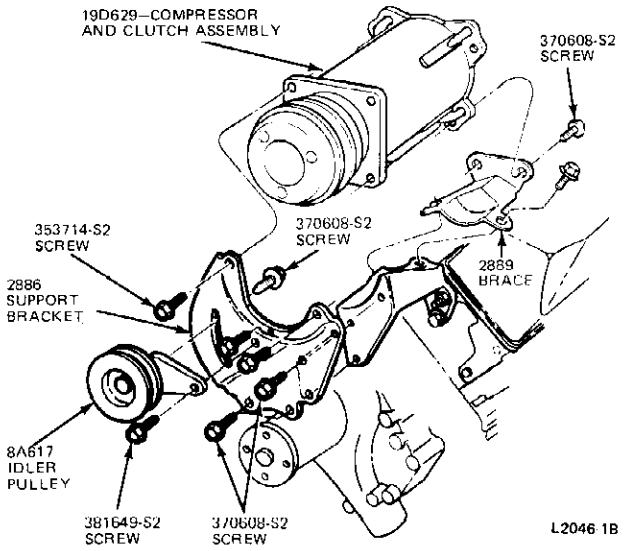


FIG. 19 Compressor Installation—5.0/5.8L (302/351W CID) Engines

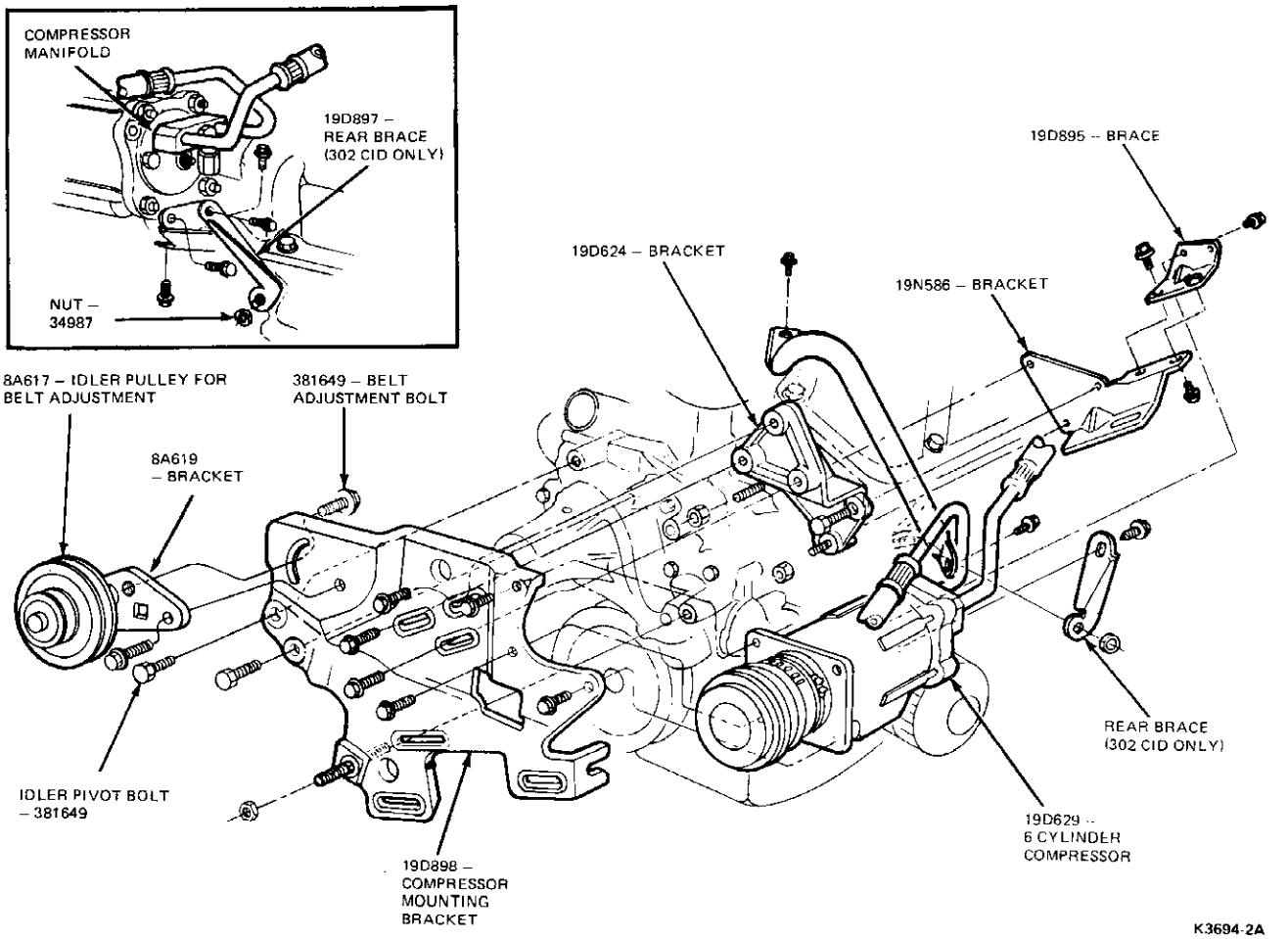


FIG. 20 Compressor Installation—5.8/6.6L (351M/400 CID) Engine

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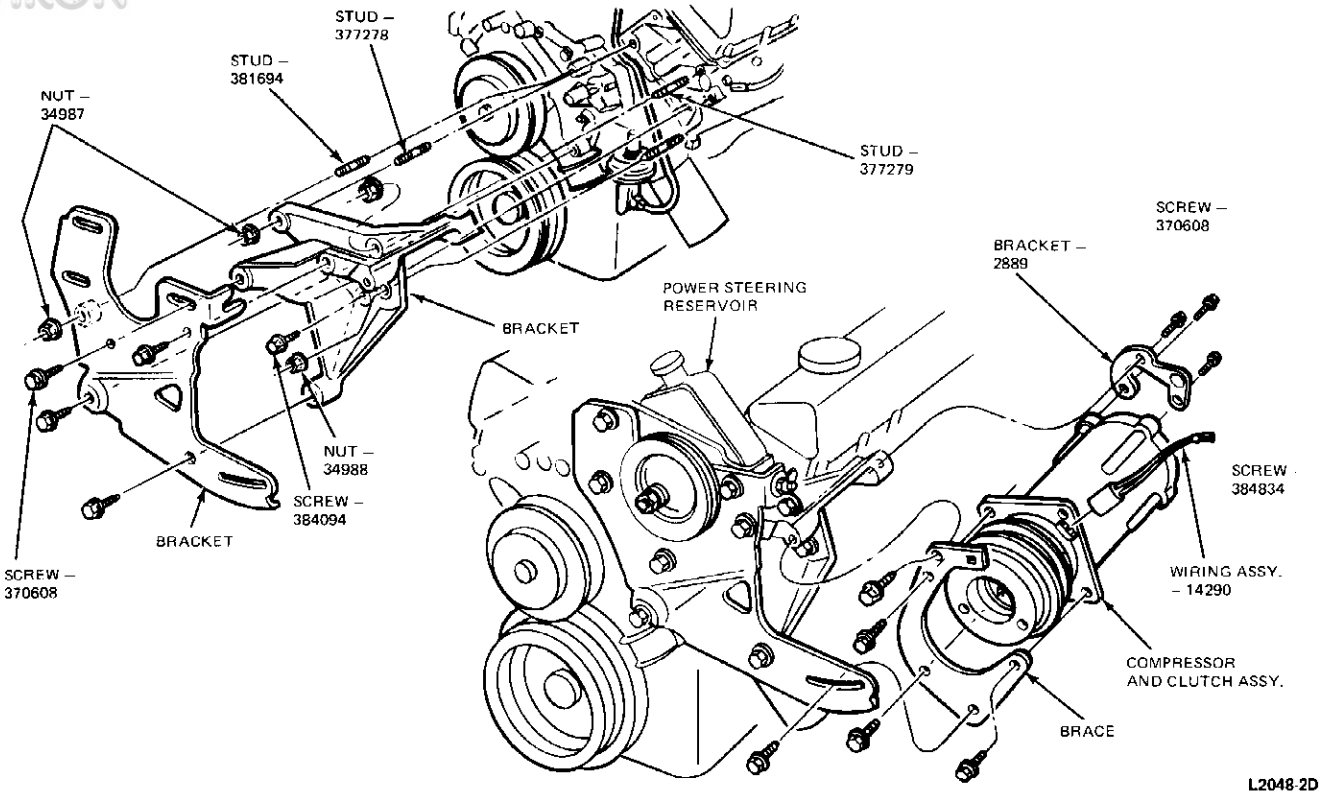


FIG. 21 A/C and Heater Hose Routing—7.5L (460 CID) Engine

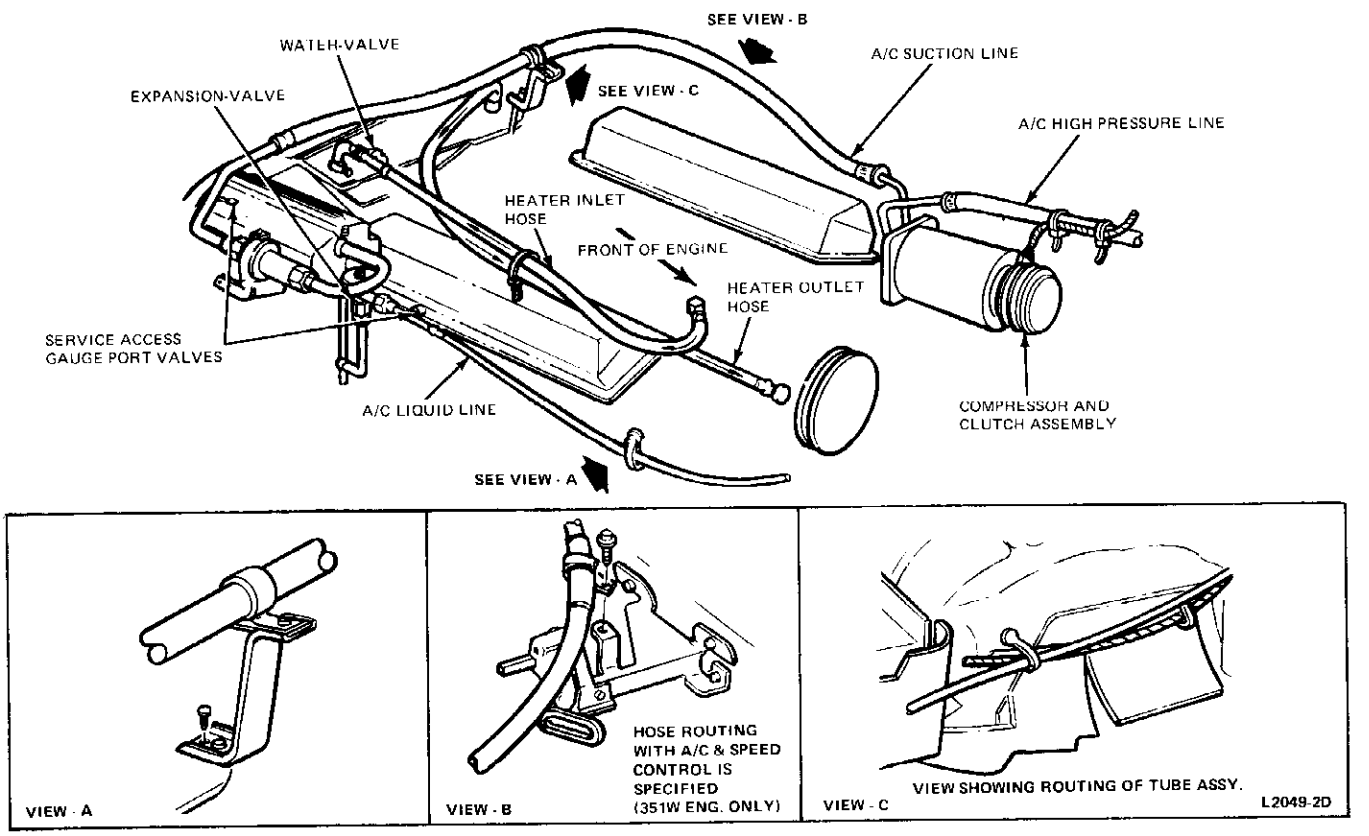


FIG. 22 A/C and Heater Hose Routing—7.5L (460 CID) Engine

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SPECIFICATIONS

FORD AND MERCURY MANUAL A/C-HEATER

Protective Device – 35 amp. fuse (blower) located in fuse panel. – 20 amp. fuse (clutch) located in fuse panel.	Blower Motor Current Draw @ 12.8 Volts – Low 6.0 amps. Medium Low 12.0 amps. Medium High 16.0 amps. High 24.0 amps.
Control Illumination – One 1 CP 161 bulb.	
Rear Defog Jewel Lamp – One .5 CP – D3AB-18C622-AA Lamp and Wiring Assembly	
Clutch Current Draw @ 12.8 Volts – 3.75 amps.	Refrigerant Charge – $4\frac{1}{2} \pm \frac{1}{4}$ lbs. (R-12)
Ambient Switch: Opens 35°F min. Closes 50°F max. 3°F minimum differential between opening and closing temperatures.	Compressor: Displacement – 12.6 cubic inch o Oil Capacity – Frigidaire – 10.5 oz. o 5.0L (302 CID) – 1.50:1 o 6.6L (400 CID) – 1.53:1 o 5.8L (351W CID) – 1.50:1 o 7.5L (460 CID) – 1.53:1 o 5.8L (351M CID) – 1.53:1

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DETROIT IRON

Fairmont and Zephyr Heater - Air Conditioner System

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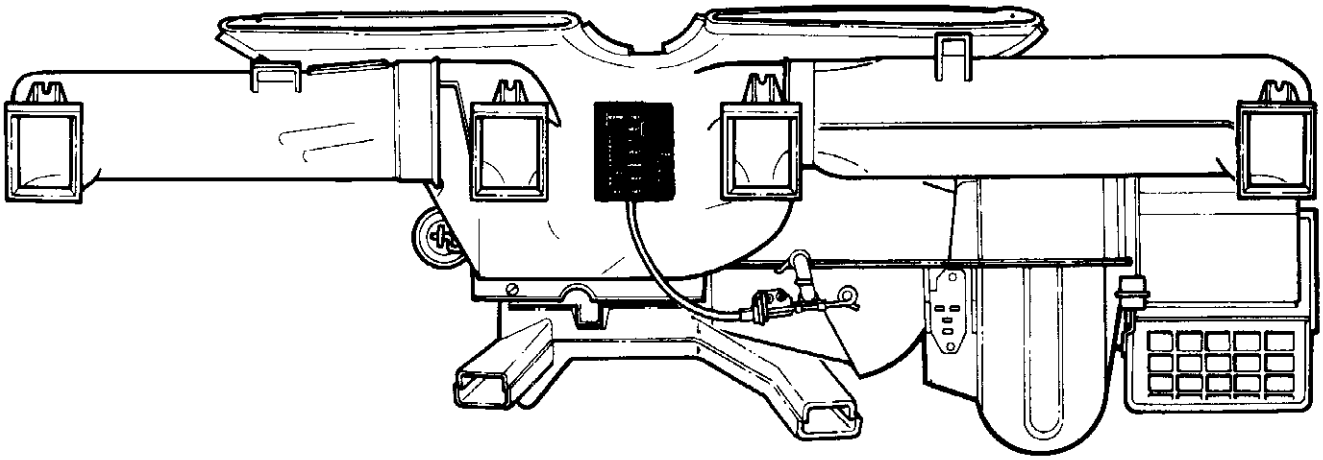
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DESCRIPTION AND OPERATION

SYSTEM OPERATION

The Manual A/C-Heater System is shown in Fig. 1. During system operation, air is drawn directly into the system by the blower motor and wheel from the cowl air intake, independent of the temperature lever position, in all function control lever settings except OFF and MAX A/C. In the MAX A/C position, air flow is from inside the vehicle through the recirculation duct. The air is then forced by the blower through the evaporator core and, depending on the setting of the TEMPERATURE lever, is forced through and/or around the heater core into the plenum. The air is then directed to the floor, defroster nozzles or the instrument panel registers depending on the position of the function control lever.

The volume of air flow through the system is controlled by a four position blower (FAN) switch. The blower (FAN) switch, used in conjunction with the resistor assembly, provides four blower speeds to control air flow through the A/C-heater assembly. The blower can be shut OFF only by moving the function control lever to OFF.



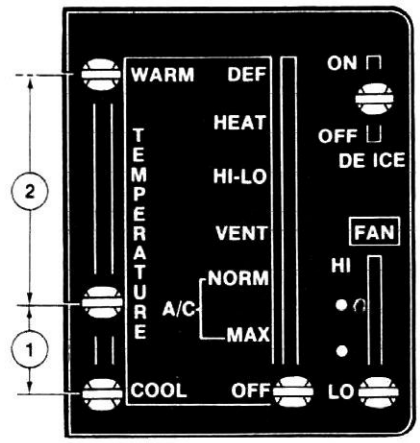
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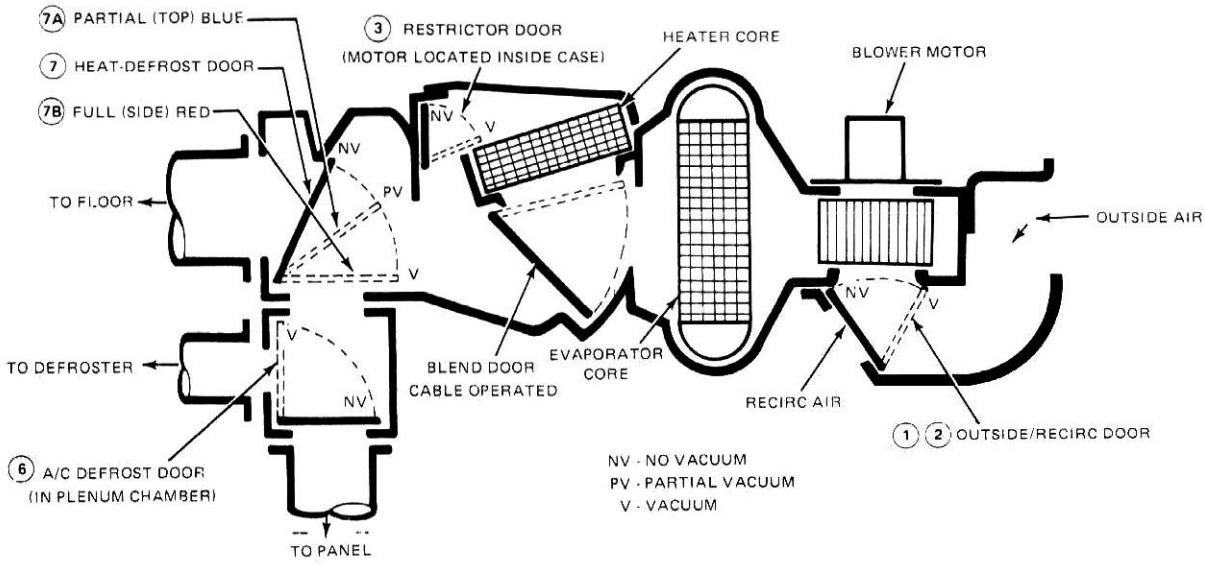
FIG. 1 Manual A/C—Heater System

SYSTEM AIR FLOW

The A/C-heater system air flow schematic and vacuum control chart is shown in Fig. 2. This chart shows the possible air flow routes and door positions. The vacuum control chart gives the vacuum applications for the different positions of the function and temperature control levers.

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1978 FAIRMONT AND ZEPHYR
MANUAL A/C-HEATER SYSTEM VACUUM MOTOR TEST CHART

FUNCTION CONTROL LEVER POSITION	TEMPERATURE CONTROL LEVER POSITION	VACUUM MOTORS APPLIED WITH VACUUM				
		OUTSIDE RECIRC. DOOR	RESTRICTOR DOOR	HEAT DEFROST DOOR		A/C-DEFROST DOOR
				PARTIAL	FULL	
OFF	ANY POSITION	1-2	—	7A	7B	6
A/C MAX	RANGE 1	1-2	3	—	—	6
	RANGE 2	1-2	—	—	—	6
A/C NORM	RANGE 1	—	3	—	—	6
	RANGE 2	—	—	—	—	6
VENT	RANGE 1	—	3	—	—	6
	RANGE 2	—	—	—	—	6
HI-LO	ANY POSITION	—	—	7A	—	6
HEAT	ANY POSITION	—	—	7A	7B	—
*DEFROST	ANY POSITION	—	—	—	—	—
VACUUM HOSE COLOR CODE		White	Green	Blue	Red	Yellow

*Compressor clutch engaged when ambient cut-off switch is closed.
— No Vacuum (atmosphere)

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FIG. 2 Manual A/C-Heater System Air Flow Schematic and Vacuum Control Chart

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AIR DISTRIBUTION

The distribution of air inside the vehicle is dependent on the position of the function control lever. Air can be distributed through the floor outlets, through the floor outlets and instrument panel registers, through the instrument panel registers only, and through the defroster nozzles (Fig. 3).

When the function control lever is in the OFF position, there is no air flow through the system because the blower is OFF. With the function control lever in MAX A/C, NORM A/C or VENT, air distribution is through the instrument panel registers (Fig. 4). When the function control lever is in the HI-LO position, air is distributed through the instrument panel registers and the floor outlets (Fig. 4). Moving the function control lever to HEAT distributes air flow out of the floor outlets with a small amount of air bled to the defroster nozzles (Fig. 5). With the function control lever in the DEF position, air distribution is from the defroster nozzles with a small amount of air bled to the floor outlets (Fig. 5).

TEMPERATURE CONTROL

Temperature is controlled by a cable operated air blend door and a vacuum operated restrictor door located within the evaporator case (Figs. 4 and 5). When the temperature control lever is in Range 1 shown in Fig. 2, the restrictor door is closed to stop air flow through the heater core. The air blend door can be closed to partially open, allowing only cooled or outside air to be discharged from the outlets, depending on the position of the temperature control lever.

When the temperature lever is moved to Range 2 shown in Fig. 2, the restrictor door is open allowing air flow through the heater core. Air flow is directed through and around the heater core for the desired temperature, depending on the position of the temperature control lever in Range 2.

FUNCTION CONTROL

The function control lever actuates an eight-port vacuum selector that controls air source intake and air distribution within the system. The function control lever also operates the blower ON-OFF switch and the A/C compressor clutch operating circuit. However, the actual turning ON or OFF of the compressor clutch is dependent on the position of the function control lever and the ambient cut-off switch. Both switches must be closed to energize the clutch for compressor operation (See Fig. 6).

BLOWER CONTROL

The blower speeds are controlled by a four position FAN switch and a resistor assembly located in the evaporator case downstream from the evaporator core. The switch is used to select low, two intermediate or the high fan speed. The fan is turned OFF by the function control lever when it is in the OFF position. This is accomplished by a switch integral with the control assembly. Contacts W and X, shown in the wiring diagram, are connected to the blower ON-OFF switch (Fig. 6).

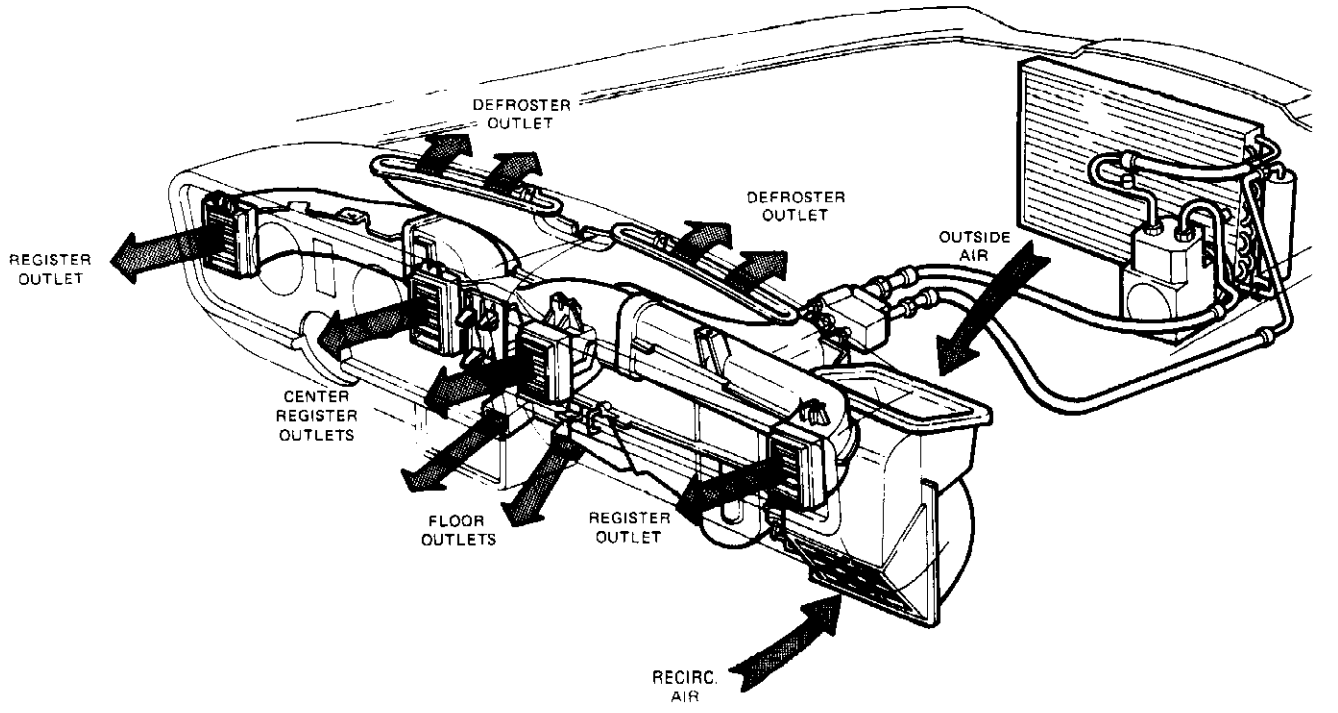


FIG. 3 Manual A/C-Heater System Air Distribution

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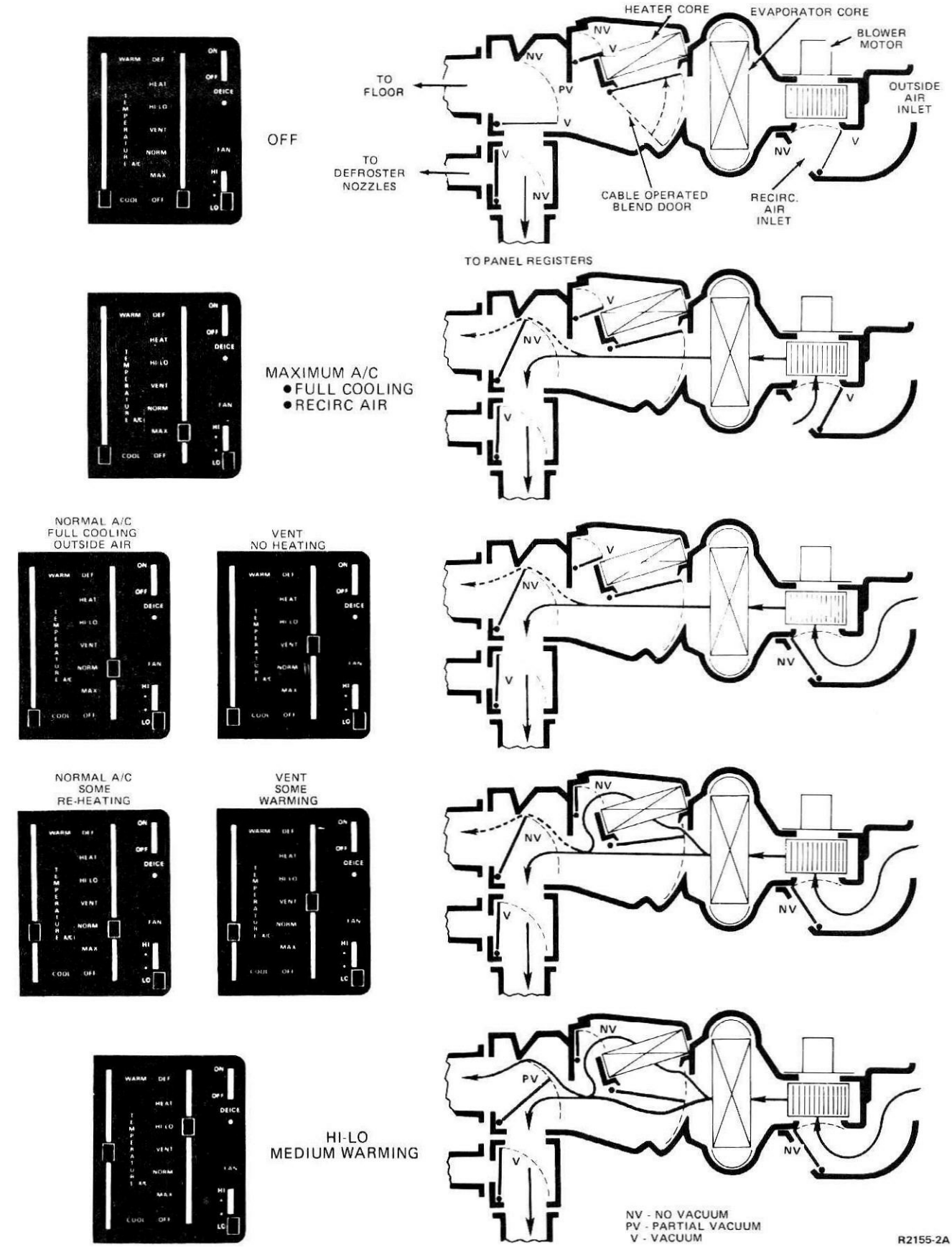


FIG. 4 Manual A/C Heater System Air Flow Chart 1

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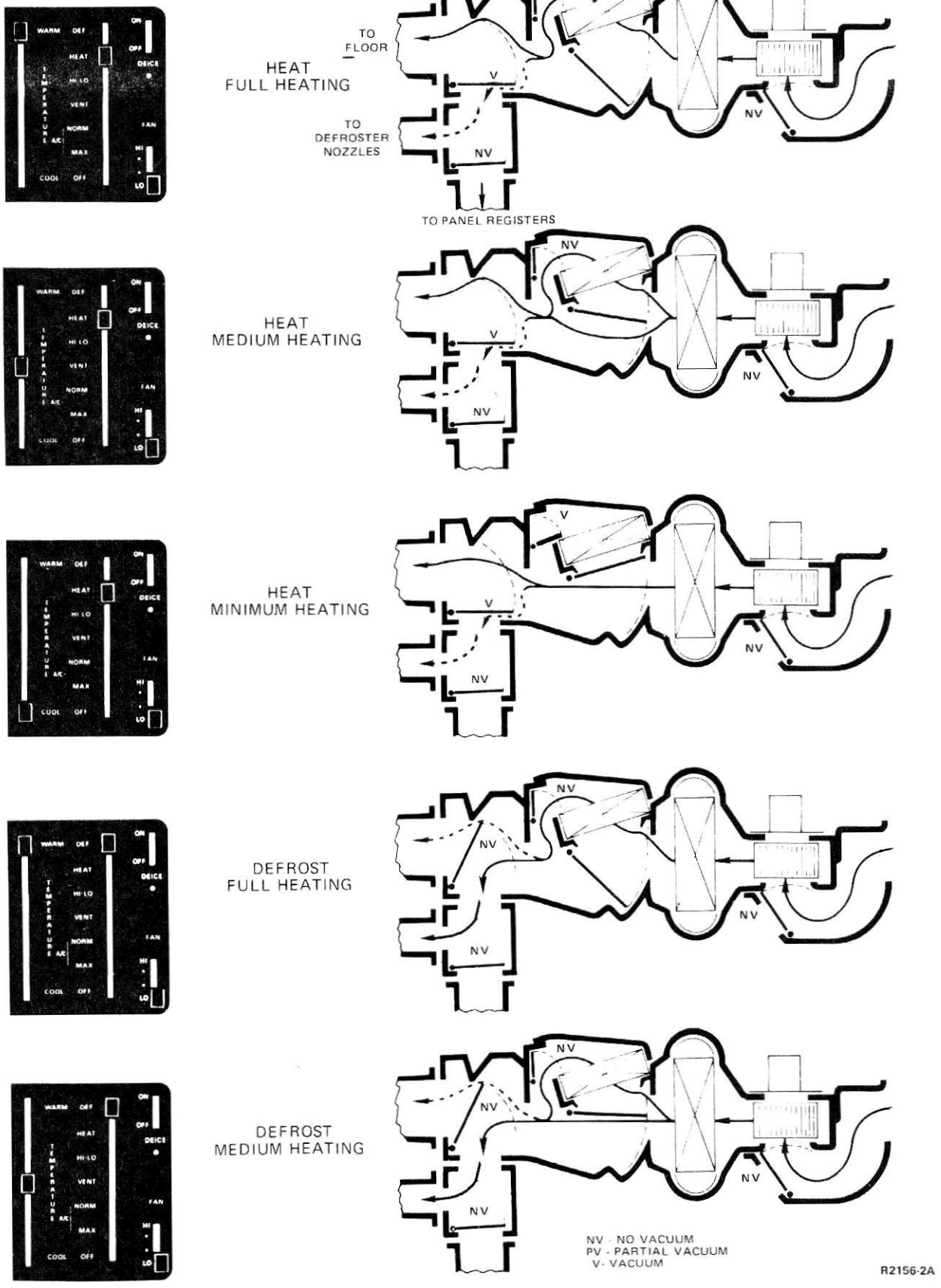
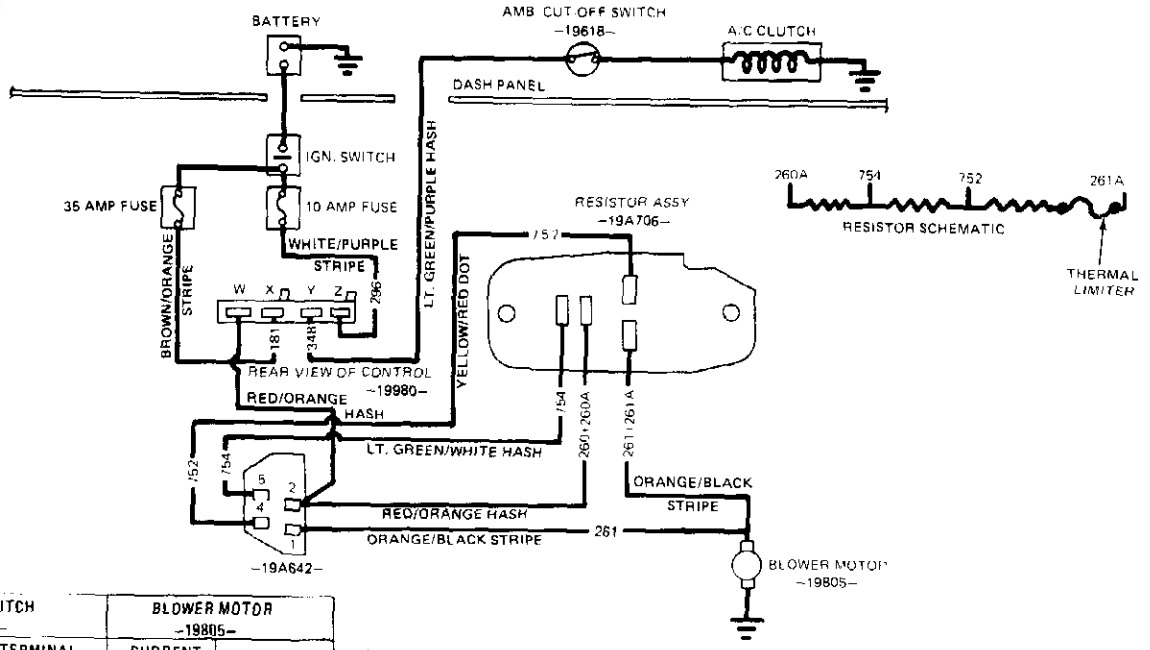


FIG. 5 Manual A/C Heater System Air Flow Chart 2

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BLOWER SWITCH -19A642-		BLOWER MOTOR -19805-	
BLOWER SPEED	TERMINAL CONTINUITY CONNECTIONS	CURRENT (AMPS) IN-CAR	VOLTAGE
LO	NONE	4	3.9
MED-LO	2–5	8	6.2
MED-HI	2–4–5	13	8.9
HI	1–2–4	23	12.8

FUNCTION SELECTOR SWITCH–19980–								
TERMINALS	AMP.	TERMINAL CONNECTIONS						
		OFF	MAX	NORM	VENT	HI-LO	HEAT	DEF
Y (A/C CLUTCH) Z (BATTERY)	4	NONE	Y-Z	Y-Z	NONE	NONE	NONE	Y-Z
W (BLOWER) X (BATTERY)	35	NONE	W-X	W-X	W-X	W-X	W-X	W-X

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FIG. 6 Manual A/C—Heater System Electrical Wiring Diagram and Continuity Test

SYSTEM COMPONENTS

EVAPORATOR CASE

The evaporator case assembly is located in the passenger compartment under the instrument panel on the right side (Fig. 1). It contains the evaporator and heater cores, the blower motor resistor, the cable operated air blend door, the restrictor door and the heat-defrost door. The vacuum motor for the restrictor door is located inside the evaporator case.

The evaporator case is attached to the vehicle dash panel with two self-tapping screws, two studs and nuts and a support bracket located over the evaporator core.

AIR INLET DUCT AND BLOWER HOUSING ASSEMBLY

The air inlet duct and blower housing assembly is located under the right side of the instrument panel and is attached to the evaporator case (Fig. 7) with one screw near the top and a stud and nut at the bottom. It is also attached to the cowl with a support bracket.

The air inlet duct contains the outside-recirc door and serves as the air passage to supply air to the blower for system operation. It is attached to the blower housing with two screws and three snap clips.

The blower assembly includes the blower housing, motor and wheel. It draws air from the air inlet duct and forces the air into the evaporator housing through the evaporator core. The blower motor should not be removed from the mounting flange because the position of the motor in the mounting flange is pre-set to prevent interference of the blower housing and blower wheel.

DEFROSTER NOZZLE AND REGISTER DUCTS

The defroster nozzle and register ducts are attached to the instrument panel with self-tapping screws (Fig. 8). The A/C-heat distribution duct is attached to the center register duct with four screws and it is held against the evaporator plenum to complete the air duct passages.

VACUUM MOTORS

Four vacuum motors are used in the A/C-heater system. One is used to operate the outside-recirculation door and is located on the air inlet duct behind the glove compartment. The motor opens the outside-recirc door to outside air with no vacuum.

The restrictor door vacuum motor is located inside the evaporator case near the heater core. This motor opens the restrictor door when there is no vacuum.

The A/C-defrost door vacuum motor is located on the left side of the A/C-heat distribution duct. This motor opens the A/C-defrost door for defroster operation when there is no vacuum.

The heat-defrost door vacuum motor is a dual diaphragm vacuum motor and is located on the left end of the evaporator case. Vacuum must exist at both diaphragm ports for full travel of the motor arm. Vacuum at the top or end port of the motor will give

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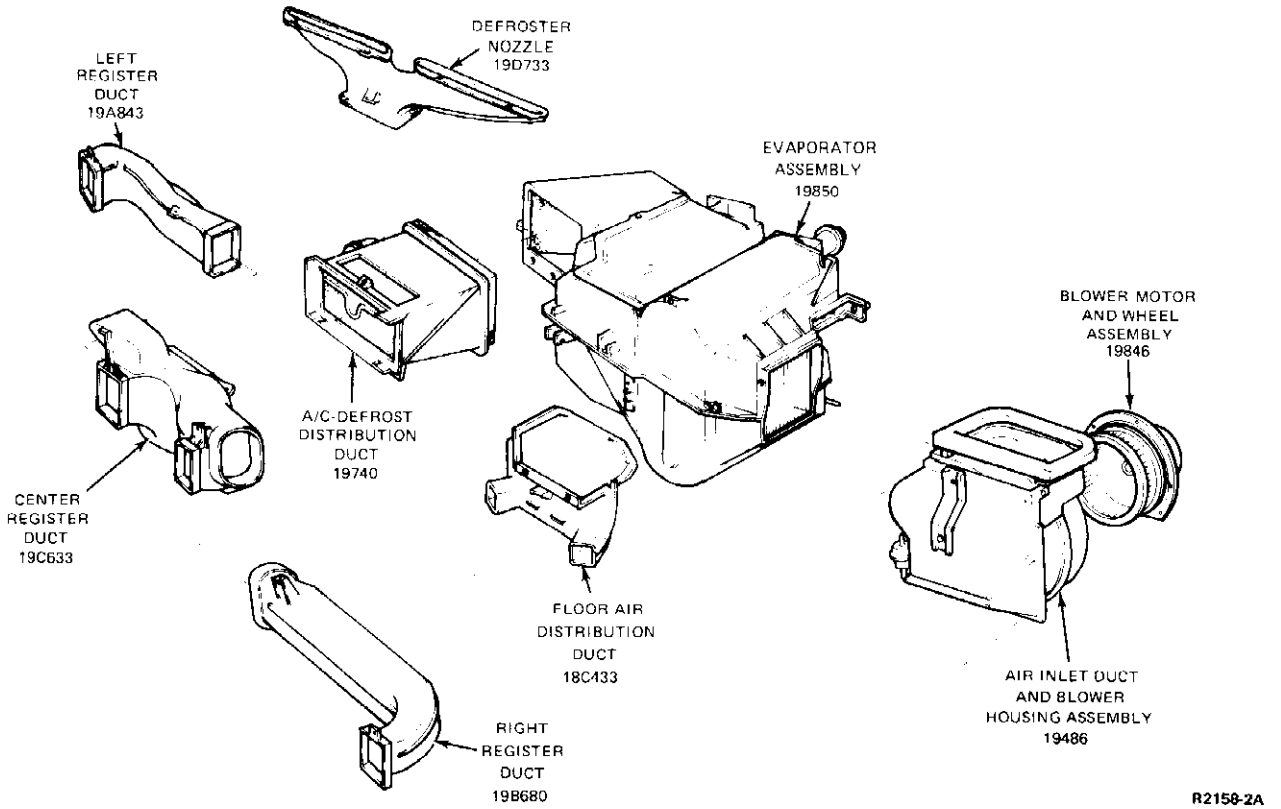


FIG. 7 Air Conditioner-Heater Assembly

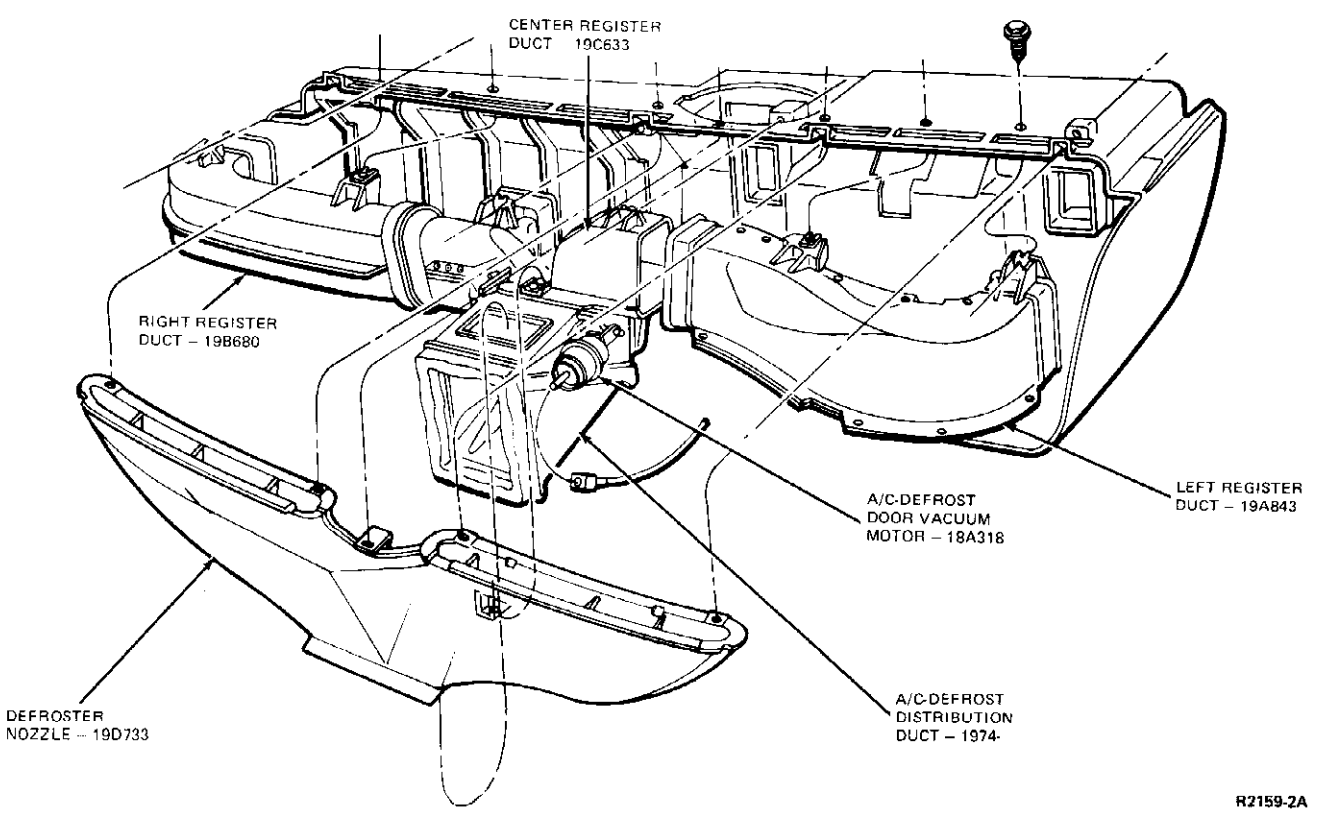


FIG. 8 Defroster Nozzle and Register Ducts Installation

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about half travel of the motor arm. If vacuum is applied to the side port only, motor operation is minimal. If the vacuum hoses to this motor are reversed, the vacuum motor will not operate properly when the function control lever is in the HI-LO position (Fig. 2).

ELECTRICAL SYSTEM

The electrical system consists of the blower motor, blower speed switch, blower ON-OFF and clutch switch (integral with the control assembly), blower resistor with a thermal limiter, ambient cut-off switch, the magnetic clutch and the fuses and wiring to complete the circuit (Fig. 6).

The blower motor is installed in the blower housing which is located behind the air inlet duct at the right end of the evaporator case. The motor and mounting flange are serviced as an assembly and should not be disassembled.

The blower (FAN) speed switch is mounted on the control assembly and, with the blower resistor, allows the selection of four blower speeds. This switch does NOT turn the blower OFF.

The blower motor resistor is installed in the side of the lower half of the evaporator case and is located behind the glove compartment. The resistor is used in conjunction with the blower speed switch to obtain the four blower speeds.

The resistor assembly also contains a thermal limiter which is used as a temperature protecting fuse. The thermal limiter is located a pre-set distance from the resistor coils (Fig. 9). If the temperature of the thermal limiter reaches 300°F(149°C), the limiter contacts will open interrupting the blower motor circuit for all blower speeds except high blower.

The ambient cut-off switch and the clutch switch are connected in series to control compressor operation. The ambient switch will openand close between 35°F minimum and 50°F maximum. The ambient cut-off switch is located behind the radiator grille on the right side and is bolted to the radiator support near the hood latch.

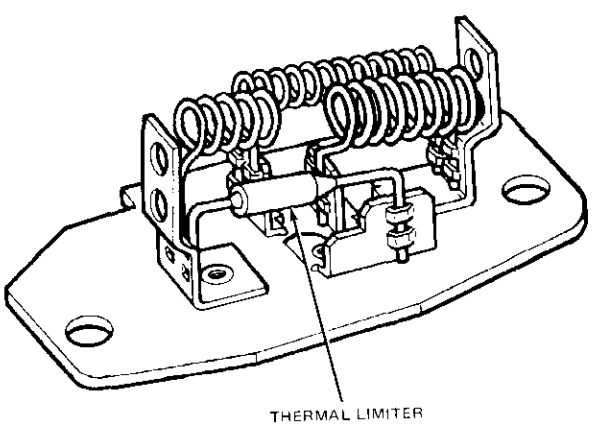


FIG. 9 Thermal Limiter Resistor Assembly

REFRIGERANT SYSTEM

The A/C-heater refrigerant system uses a By-pass orifice combination valve and a two cylinder compressor. The combination valve differs from the combination valve used on other systems in that it does not have a separate evaporator manifold plate. The evaporator tubes, except the liquid bleed line, attach directly to the expansion valve. The liquid bleed line attaches to a right-angle fitting on the STV housing. The service access gauge port valve is also on the expansion valve. A deflector is installed in the evaporator inlet tube at the expansion valve (Fig. 10) to reduce noise in the refrigerant system.

The service access gauge port valve located on the bottom side of the expansion valve is used to check the evaporator pressure. The high pressure service access gauge port valve is located in the liquid line near the expansion valve (Figs. 11, 12 and 13). This service access gauge port valve is the quick disconnect type and requires a special high pressure service access valve adaptor (Tool T77L-19703-A, Tool YT-367) when connecting a manifold gauge set to the valve.

COMBINATION VALVE

The combination valve is an assembly which combines the expansion valve, the suction throttling valve, and a service access gauge port valve into one integral unit (Fig. 14). It also has a STV manifold for attachment of the high pressure liquid line, the compressor suction line and the liquid bleed line. The combination valve mounts directly to the evaporator core tubes.

EXPANSION VALVE

The expansion valve is a by-pass orifice block type valve similar to that used on Granada and Monarch vehicles. The valve is machined to accommodate the evaporator core inlet and outlet fittings, eliminating the need for an evaporator manifold plate (Fig. 15).

The BPO type expansion valve may cause a hissing or boiling type sound after the system has been shut down. This condition is caused by stabilization of pressures within the system and is normal.

SUCTION THROTTLING VALVE

The suction throttling valve is the same mechanism used inside the individual STV assemblies, but has threads for attachment to the expansion valve body (Fig. 15). Its purpose is to control evaporator pressure to prevent ice or frost from blocking the flow of air through the heat exchanging surfaces of the evaporator. The gauge pressure at sea level must fall within the specified range as shown in Fig. 24. The pressure reading is higher at higher altitudes because of gauge error, not because of a change in pressure inside the evaporator.

Suction throttling starts when the compressor suction pressure decreases below the setting of the valve. Compressor suction pressure can continue to drop but the evaporator pressure is held steady by the controlling or throttling action of the STV.

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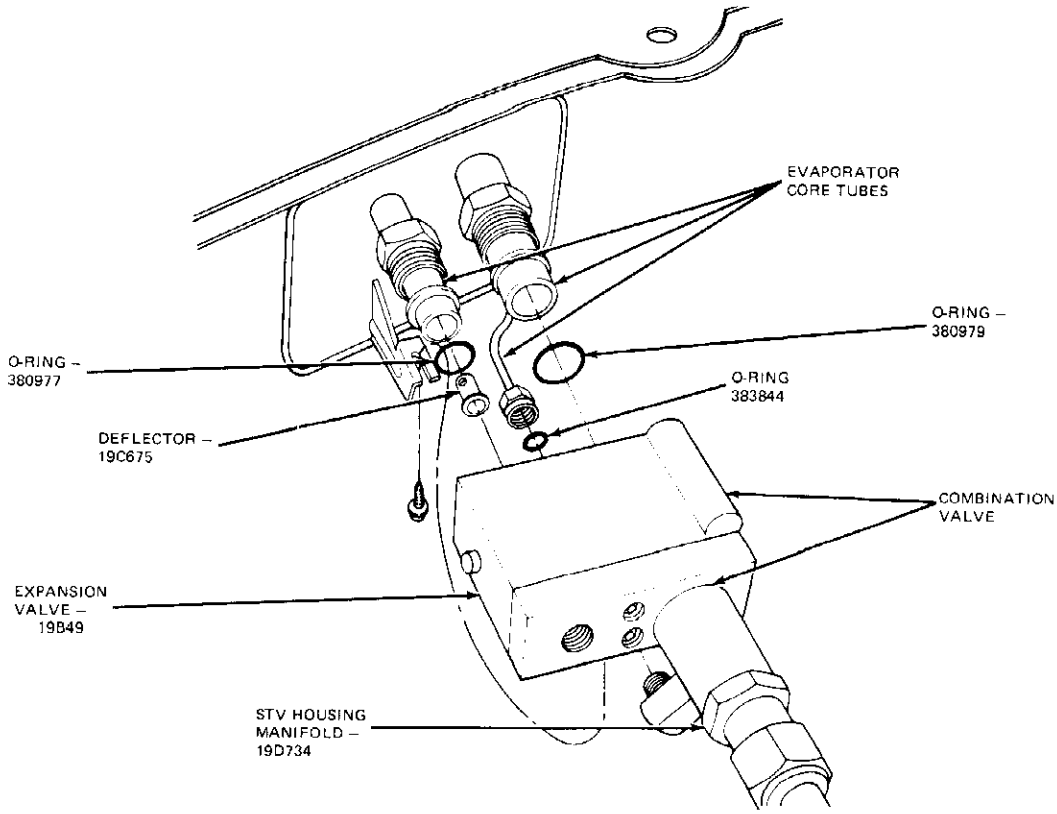


FIG. 10 Combination Valve Installation

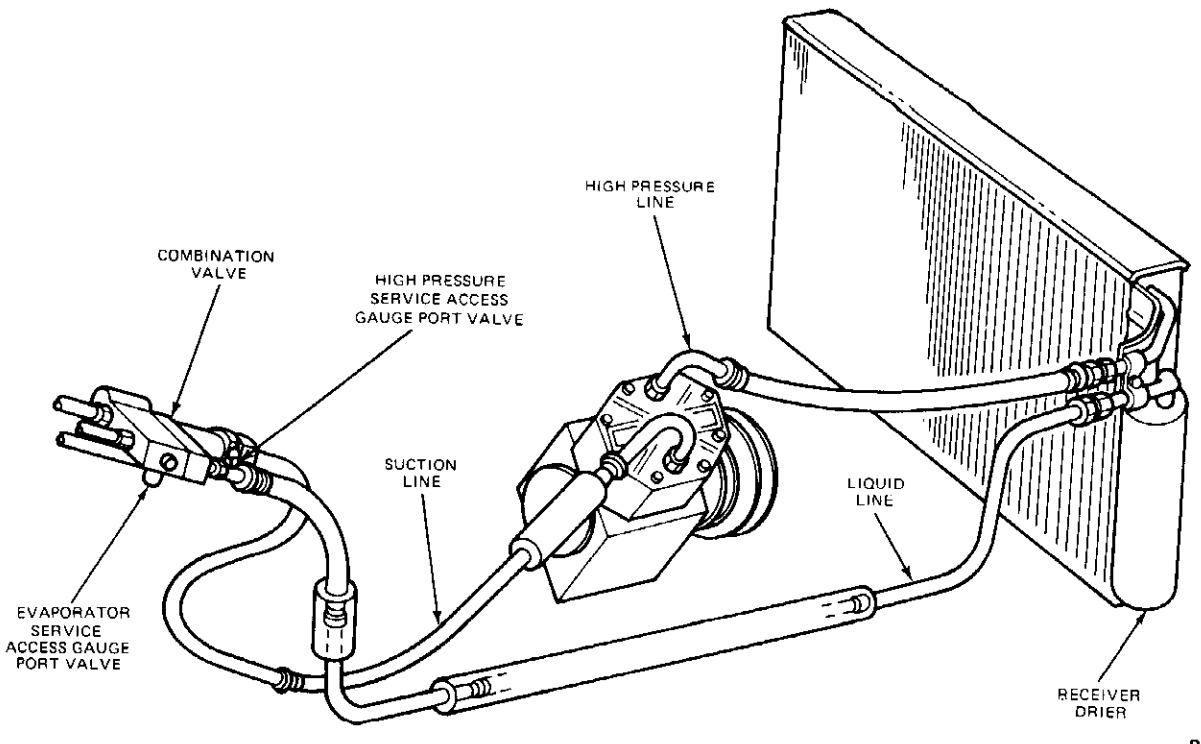


FIG. 11 Refrigerant Line Routing—2.3L Engine

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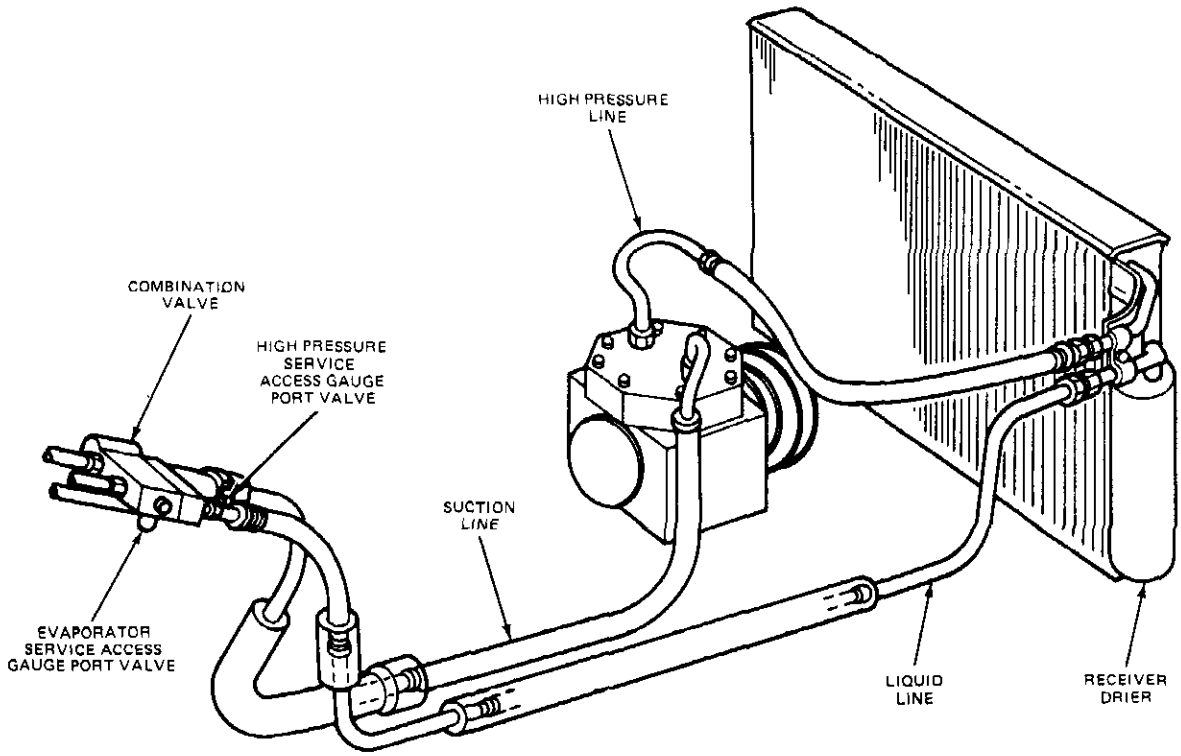


FIG. 12 Refrigerant Line Routing—3.3L (200 CID)—6-Cylinder Engine

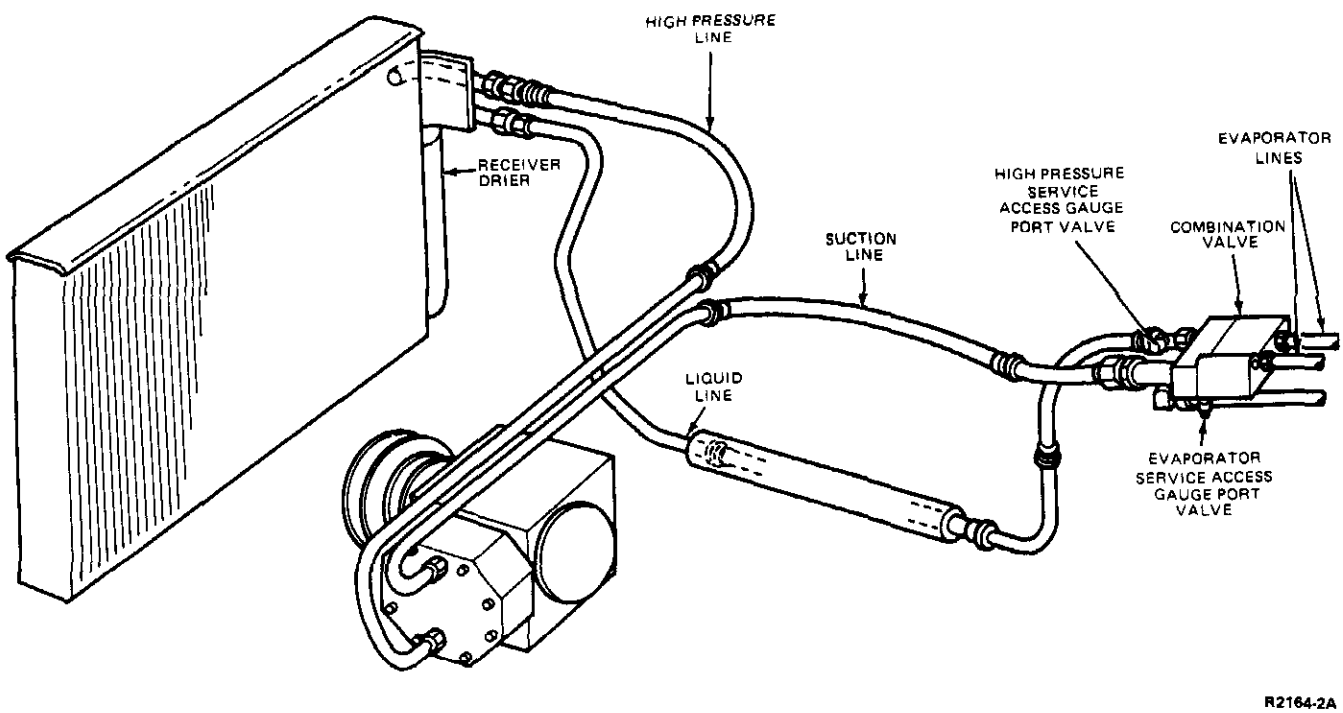


FIG. 13 Refrigerant Line Routing—5.0L (302 CID) Engine

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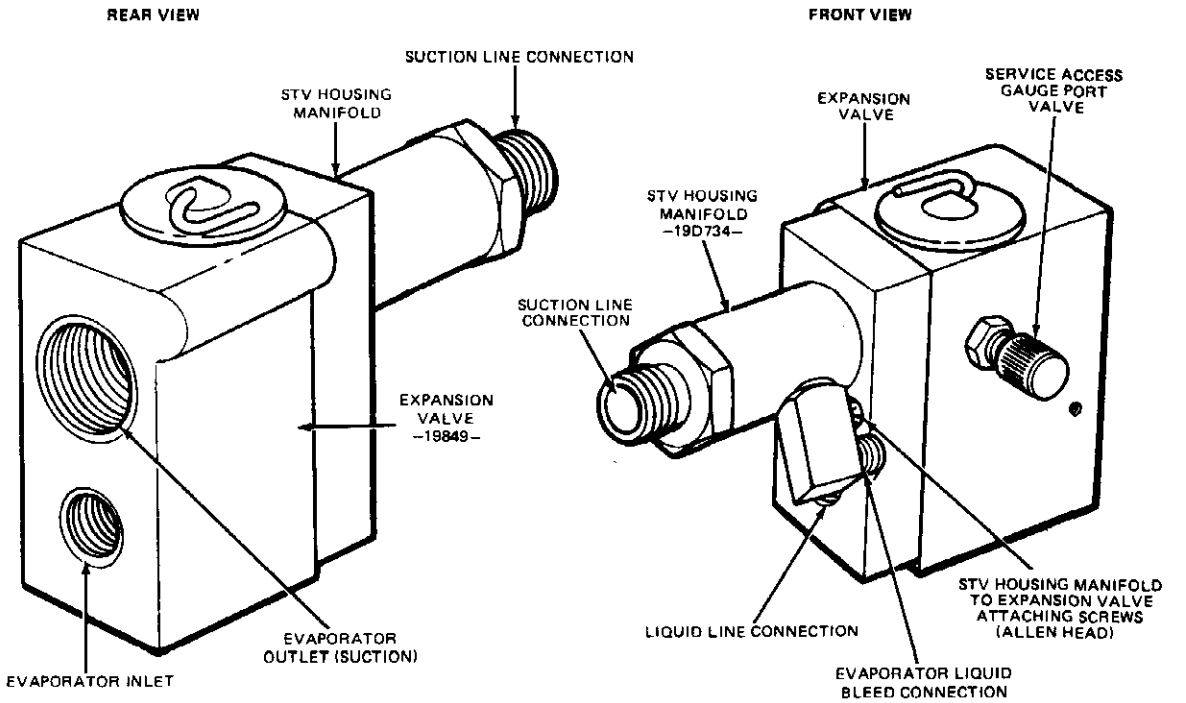


FIG. 14 Combination Valve Assembly—Front and Rear View

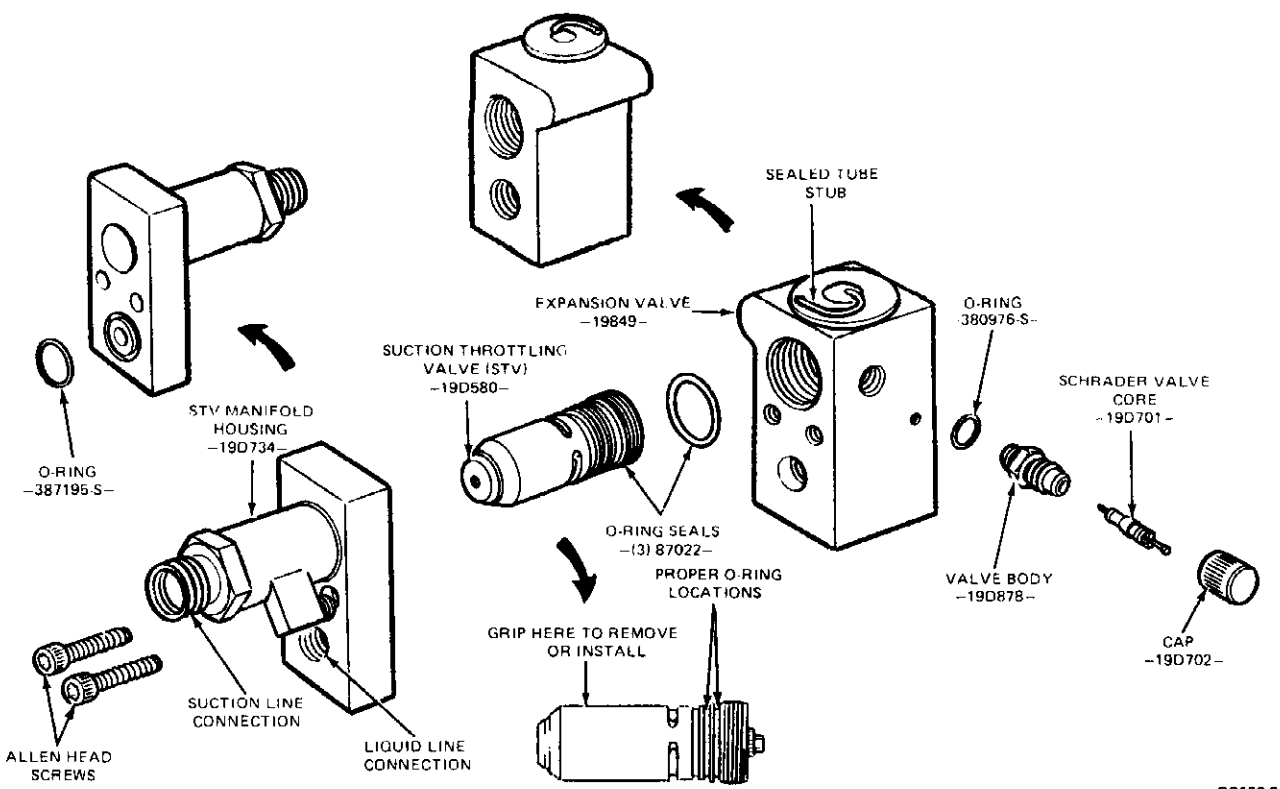


FIG. 15 Combination Valve Disassembled

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PRESSURE DIFFERENTIAL VALVE

The pressure differential valve is a Schrader type valve that is calibrated to open at a pressure range of 10 to 20 psi. Its function is to by-pass oil laden refrigerant around the restriction formed when the STV is closed (due to reduced heat load on the A/C system) and thereby provide an assured oil return to the compressor. This valve is closed under high heat loads since ample refrigerant is moving through the compressor suction line back to the compressor.

CAUTION: DO NOT USE A SCHRADER TYPE SERVICE VALVE CORE FROM ONE OF THE SERVICE ACCESS GAUGE PORT VALVES TO REPLACE THE PRESSURE DIFFERENTIAL VALVE. To do so will result in compressor damage by oil starvation because the substituted valve core will never open. The calibrated pressure differential valve core is supplied installed in the STV manifold housing and is not serviced separately.

STV HOUSING MANIFOLD

The STV housing manifold provides a housing for the suction throttling valve (Fig. 16). It has connections for the high pressure liquid line on the front of the manifold, the compressor suction line on the end of the STV housing and the liquid bleed line on the side of the STV housing.

The manifold is attached to the expansion valve with two socket head (ALLEN) screws tightened to 4 to 6 ft-lb torque.

CONDENSER AND RECEIVER-DRIER ASSEMBLY

The condenser and receiver-drier assembly is mounted to the radiator support in front of the radiator. The receiver-drier is attached to a bracket on the right side of the condenser.

A/C COMPRESSOR AND CLUTCH

The A/C compressor is the two cylinder type and is installed in the upright position on the right side of 2.3L and 3.3L (200 CID) engines (Figs. 17, 18 and 19). The compressor is mounted in a horizontal position on the left side of the 5.0L (302 CID) engine (Fig. 20). An idler pulley is included to adjust the compressor belt tension on 2.3L and 5.0L (302 CID) engines. The 3.3L (200 CID) engine uses the alternator to adjust compressor belt tension.

PRESSURE RELIEF VALVE

A pressure relief valve is installed on York and Tecumseh compressors to relieve excessive high pressure build-ups (450 psig and above) and prevent damage to the compressor and other A/C components. The pressure relief valve is located on the back side of the compressor.

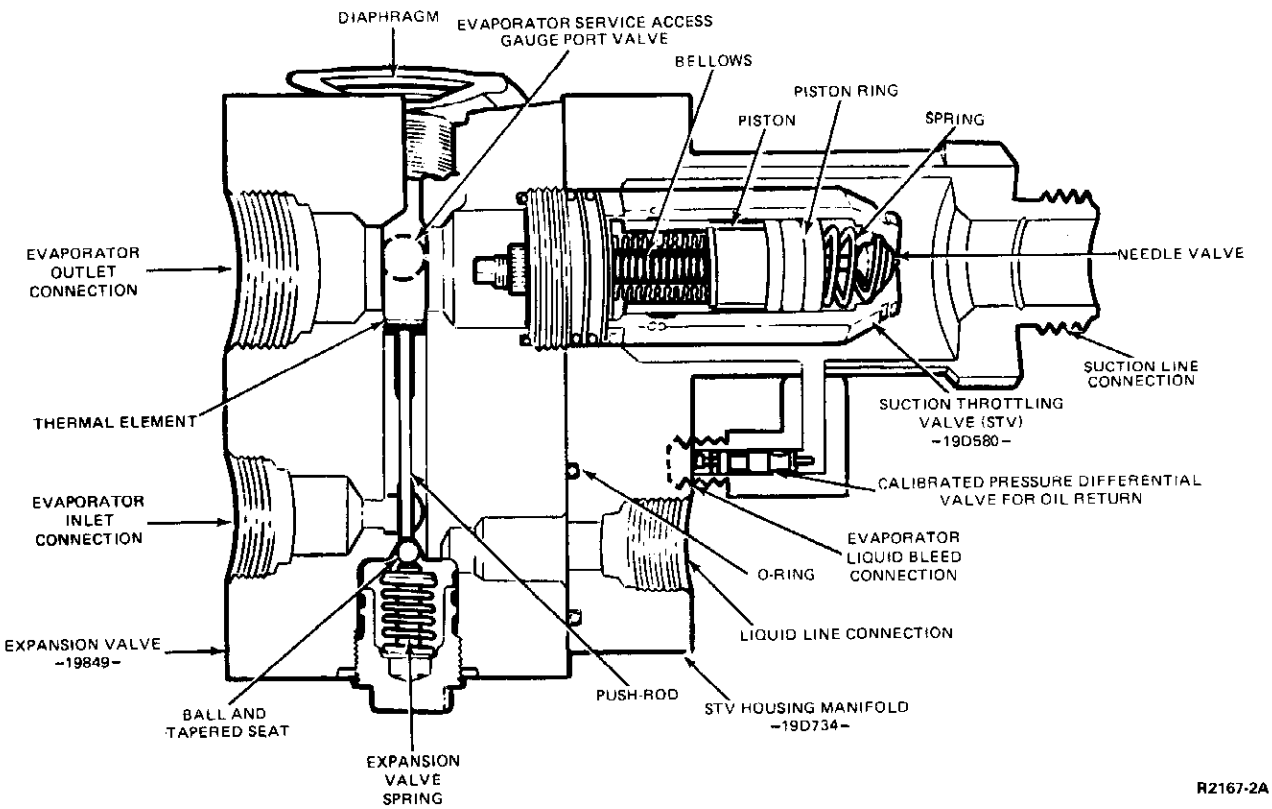


FIG. 16 Combination Valve Assembly—Cut-Away View

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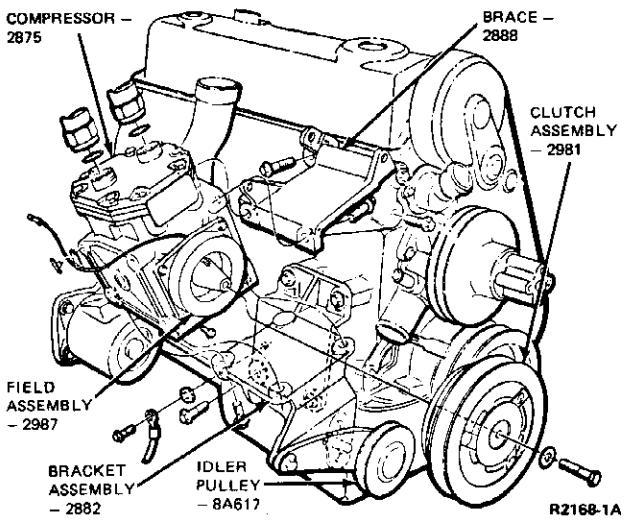


FIG. 17 A/C Compressor Installation—2.3L Engine—49 States With Standard Transmission and California With Standard and Auto Transmission

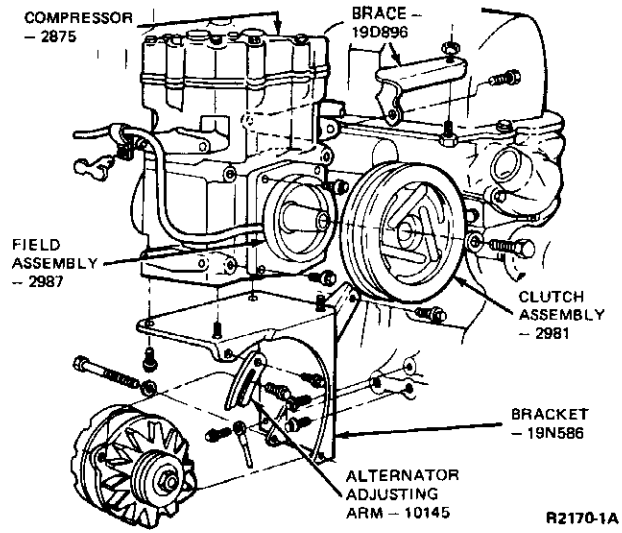


FIG. 19 A/C Compressor Installation—3.3L (200 CID) Engine

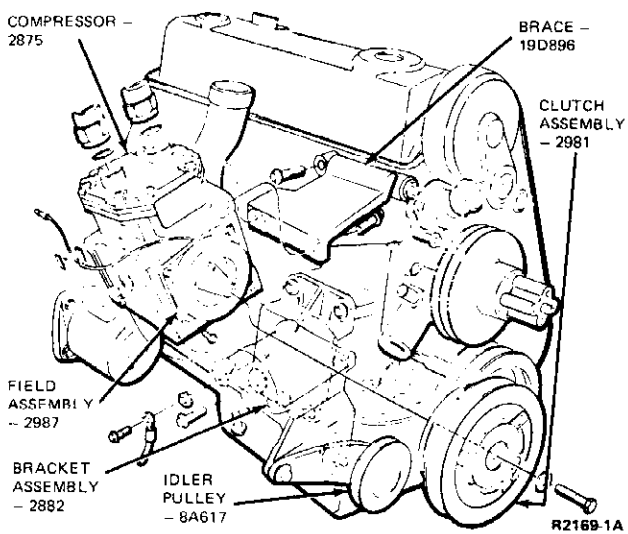


FIG. 18 A/C Compressor Installation—2.3L Engine—49 States and Canada w/Auto Transmission

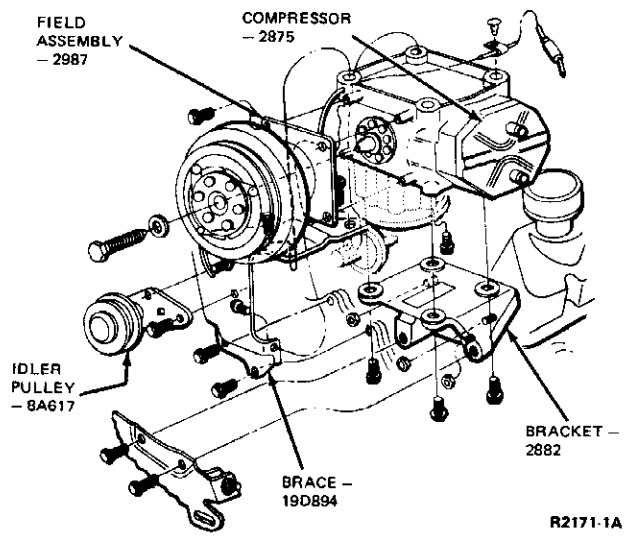


FIG. 20 A/C Compressor Installation 5.0L (302 CID) Engine

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DIAGNOSIS AND TESTING

BLOWER MOTOR VOLTAGE TEST

1. Fabricate a short jumper wire with a male spade connector on one end and a female spade connector on the other end. Strip any insulation from the female connector.
2. Separate the blower motor feed wire at the inline connector (orange w/black stripe) and install the jumper wire in the blower motor feed wire.
3. Connect the positive(+RED) lead of a voltmeter to the female connector of the jumper wire (Fig. 21).
4. Connect the negative (- BLACK) lead of the voltmeter to a good ground (Fig. 21).
5. Place the TEMPERATURE Control Lever in the mid-position for an average air flow around and through the heater core.
6. Place the Function Control Lever in the HEAT position to turn the blower motor on. Turn the ignition switch to the ON position.
7. With a fully charged battery, the blower voltage should be within the specified range for each blower (FAN) switch position as indicated in the blower switch chart of the Electrical Wiring Diagram (Fig. 6).

BLOWER MOTOR CURRENT DRAW TEST

1. Separate the blower motor feed wire at the connector (orange/black stripe).
2. Connect the positive (+) ammeter lead to the male spade connector and the negative (-) ammeter lead to the female spade connector (Fig. 22).
3. Place the TEMPERATURE Control Lever in the mid-position and the Function Control Lever in the HEAT position to turn the blower ON.
4. Turn the ignition switch to the ON position.
5. With a fully charged battery, the blower motor current draws (amps) should be approximately as indicated for each blower speed in the blower switch chart of the Electrical Wiring Diagram (Fig. 6).

VACUUM SYSTEM TESTS

To test the A/C-heater control system, start the engine and move the function control lever slowly from one position to another. A momentary hiss should be heard as the function control lever is moved from one position to another indicating that vacuum is available at the control assembly. A continuous hiss at the control assembly indicates a major leak **somewhere** in the system. It **does not** necessarily indicate that the leak is at the control assembly.

If a momentary hiss **cannot** be heard when the function control lever is moved from one position to another, check for a kinked, pinched or disconnected vacuum supply hose (Fig. 23). Also inspect the check valve between the intake manifold and the vacuum reservoir to be sure it is working properly.

If a momentary hiss can be heard when the function control lever is moved from one position to another, vacuum is available at the control assembly. Then, cycle the function control through each position with the blower on HI and check the location(s) of the discharge air. The air flow schematic and vacuum control chart

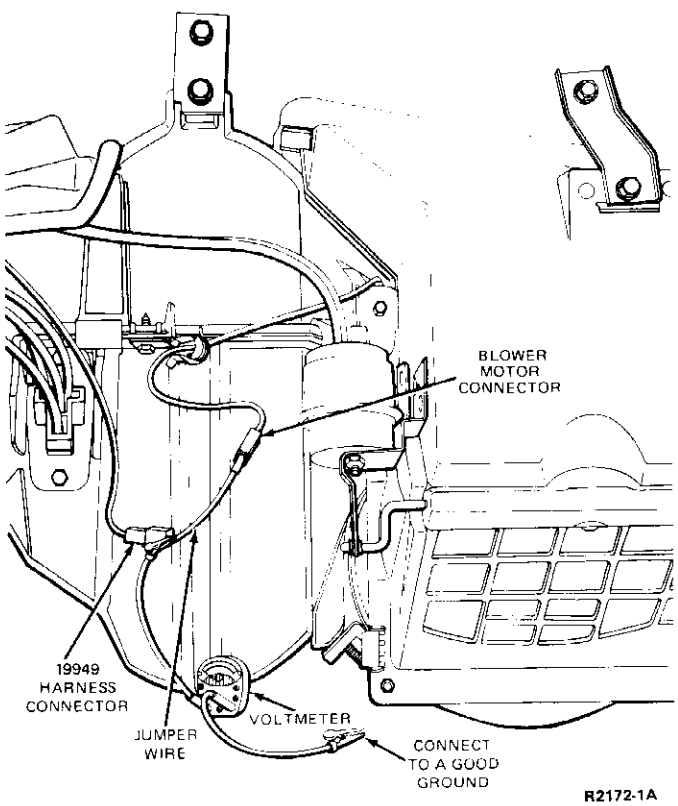


FIG. 21 Blower Motor Voltage Test

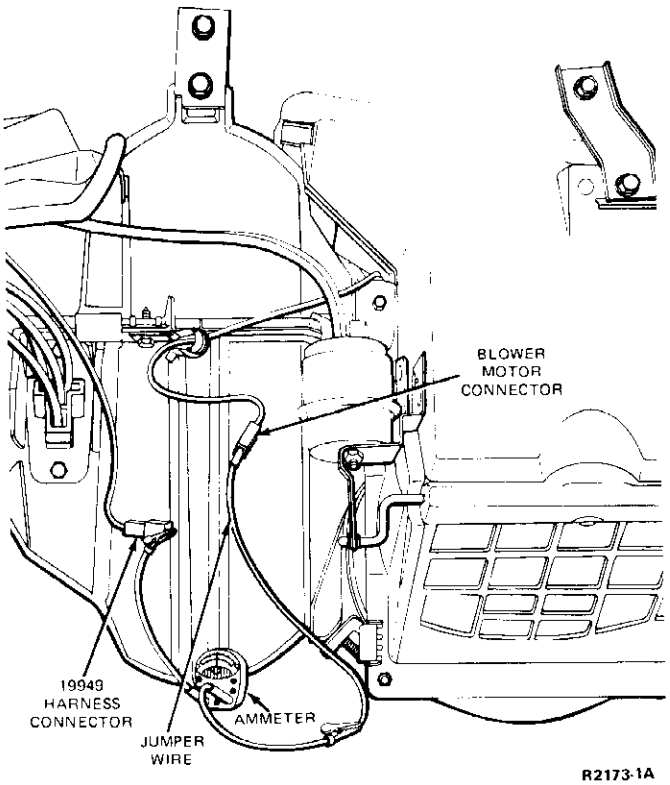
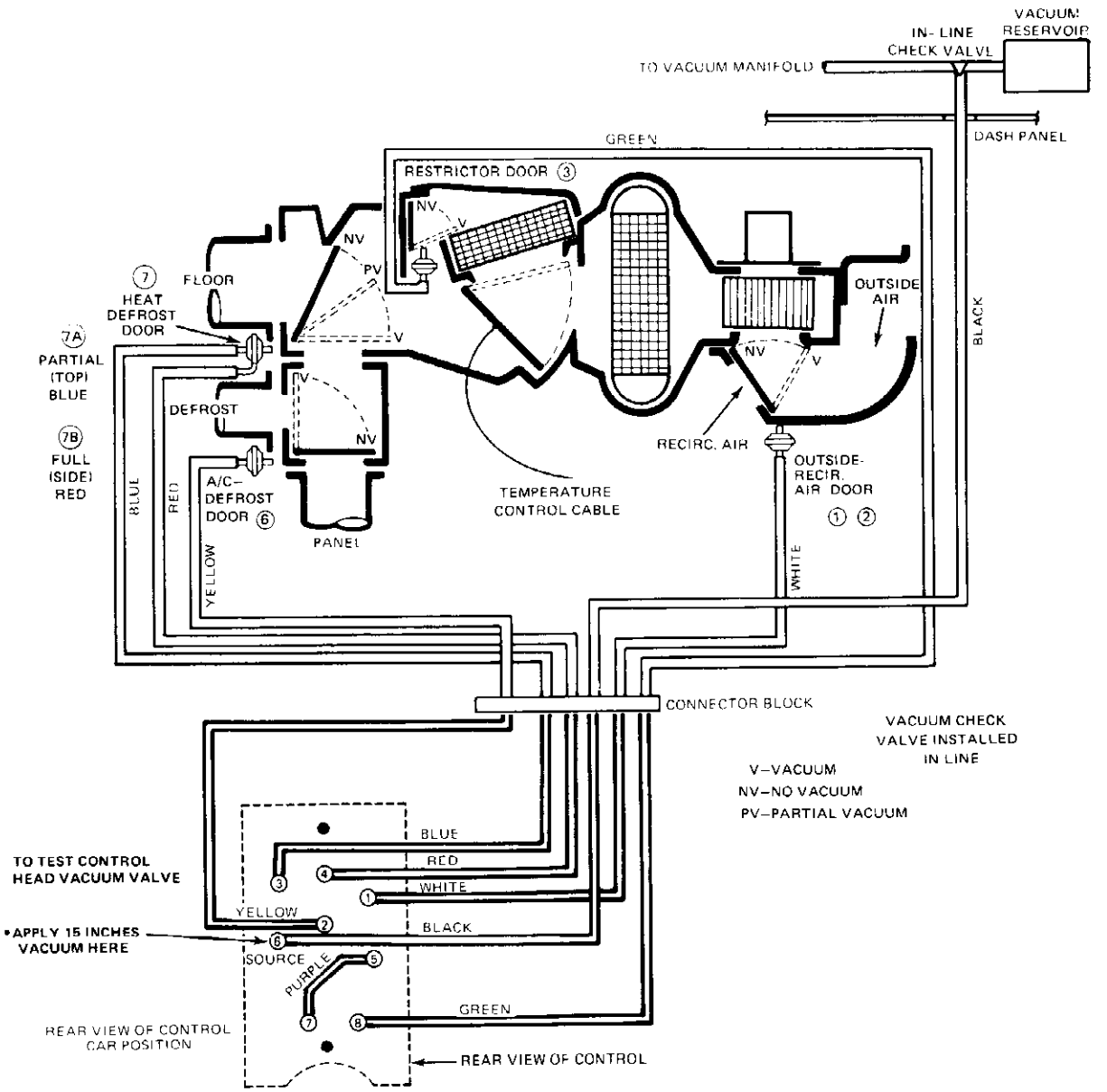


FIG. 22 Blower Motor Current Draw Test

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•CHECK FOR VACUUM TO OTHER PORTS PER CHARTS

•REPLACE CONTROL HEAD IF NOT PER CHARTS

FUNCTION SELECTOR LEVER		DETENT POSITIONS						
PORT	FUNCTION	OFF	MAX	NORM	VENT	HI-LO	HEAT	DEF
1	OUTSIDE-RECIRC	V	V	–	–	–	–	
2	PANEL–DEF	V	V	V	V	V	–	–
3	PANEL–FLOOR	V	–	–	–	V	V	–
4	FULL FLOOR	V			–		V	
5	TO PORT 7	–	V	V	V	–	–	–
6	SOURCE	V	V	V	V	V	V	V

TEMPERATURE LEVER POSITION			
PORT	FUNCTION	COOL	WARM
7	FROM PORT 5	EXT. CONNECTED TO PORT 5	
8	RESTRICTOR	V	

0° 12° 42°

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FIG. 23 Manual A/C—Heater System Vacuum Schematic and Selector Test

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shown in Fig. 2 gives the vacuum motors applied for each position of the function and temperature control levers along with an air flow diagram of the system. The air flow diagram shows the position of each door when vacuum is applied and, their no vacuum position. With this chart, air flow for each position of the control assembly can be determined. If a vacuum motor fails to operate, the motor can readily be found because the air flow will be incorrect.

If a vacuum motor is inoperative, check the operation of the motor with a vacuum tester, Tool 21-0014. If the vacuum motor operates properly, the vacuum hose is probably pinched, kinked, disconnected or has a hole in it (Fig. 23).

REFRIGERANT SYSTEM

Diagnosis of the Fairmont and Zephyr refrigerant system must be done by analyzing the high pressure and the evaporator pressure readings. Compare the pressure readings to the charts shown in Fig. 24 to determine if the system pressures are normal. The conditional requirements for the refrigerant system tests must be satisfied to obtain accurate pressure readings.

If the conditional requirements are not satisfied, the pressure readings will not be accurate and could indicate that a normal system is not functioning properly. If the conditional requirements cannot be satisfied, the pressure readings will not be accurate but can be used to determine what is causing the problem in the system. Compare the pressure results with the pressure conditions in the pressure evaluation chart shown in Fig. 25. Once the problem is corrected, take additional pressure readings while meeting the conditional requirements for the pressure tests to be sure the problem has been corrected.

The evaporator service access gauge port valve is located on the bottom side of the combination valve (Fig. 14). The high pressure service access gauge port valve is located on the liquid line near the combination valve (Figs. 11, 12 and 13). This system does not contain a low pressure service access gauge port valve. A special adaptor (Tool T77L-19703-A or Tool VT-367) is necessary to connect a manifold gauge set to the high pressure service access gauge port valve. This adaptor is the quick connect type and is installed by pushing it on the gauge port valve. The quick connect adaptor should seal the hose when the adaptor is disconnected from the high pressure service access gauge port valve and eliminate accidental discharge of refrigerant from the hose.

THE CONDITIONAL REQUIREMENTS FOR THE STV/BPO SYSTEM TEST MUST BE SATISFIED TO OBTAIN ACCURATE PRESSURE READINGS.

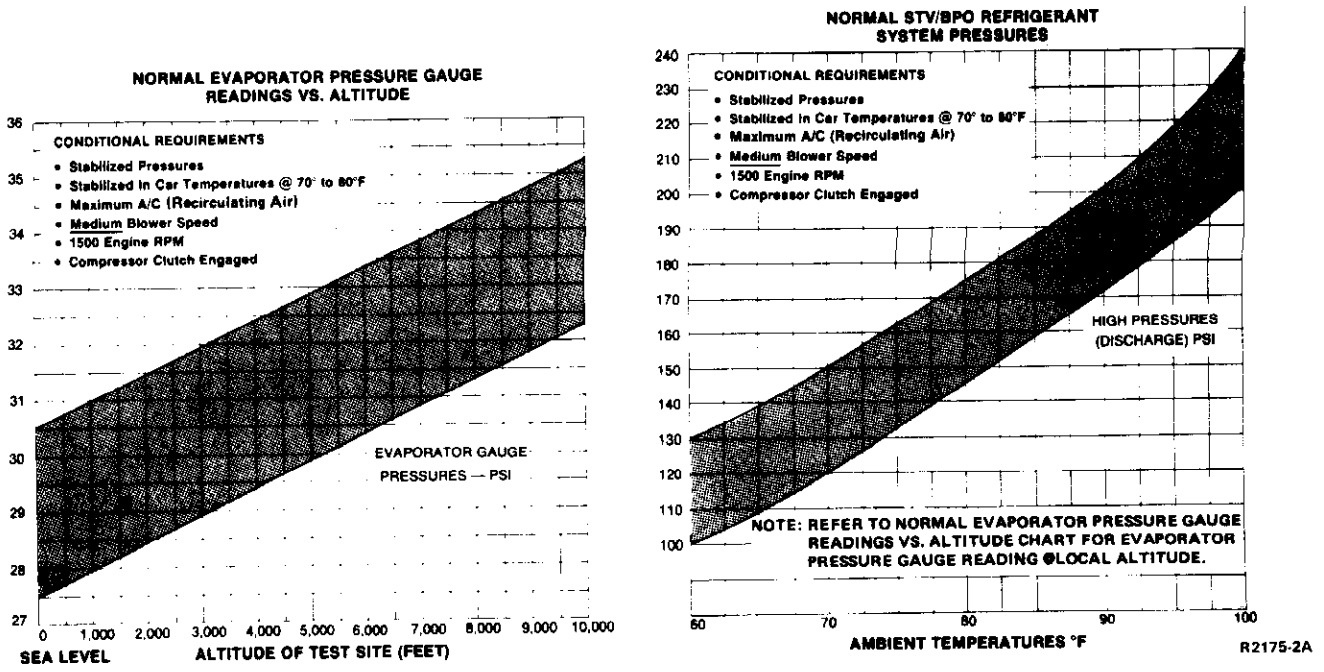


FIG. 24 Normal STV/BPO Refrigerant System Pressures

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PROBLEM REFRIGERANT SYSTEM PRESSURE EVALUATION

For Systems Without Low Pressure Suction Service Access Gauge Port Valve

NOTE: Normal system conditional requirements must be maintained to properly evaluate refrigerant system pressures. Refer to chart applicable to system under test.

HIGH PRESSURE @ LIQUID LINE	HIGH PRESSURE @ COMPRESSOR	EVAPORATOR PRESSURE	POSSIBLE PROBLEM/COMPONENT
HIGH	HIGH	HIGH	ENGINE OVERHEATING / EXPANSION VALVE SENSING BULB – Poor Contact, Inadequate Insulation
HIGH	HIGH	NORMAL TO HIGH	HEATER WATER VALVE – Insufficient Closure / EVAPORATOR – Too Much Air Flow - Reset Blower to Conditional Requirement / EXPANSION VALVE – Sticking Open
HIGH	HIGH	NORMAL	AIR IN REFRIGERANT SYSTEM REFRIGERANT – Overcharge
HIGH	HIGH	LOW	COMPRESSOR-TO-CONDENSER A/C LINE – Restriction; *After Service Access Valve*
NORMAL TO HIGH	NORMAL TO HIGH	HIGH	CONDENSER – Inadequate Air Flow (Bent Fins, Debris, Loose Radiator Fan Belt, Slipping Fan Clutch)
NORMAL TO HIGH	NORMAL TO HIGH	NORMAL TO HIGH	HUMIDITY WELL ABOVE NORMAL
NORMAL TO HIGH	NORMAL TO HIGH	NORMAL	EXCESSIVE REFRIGERANT OIL
NORMAL	NORMAL	LOW	SUCTION THROTTLING VALVE – Sticking Open – May Cause Iced-Up Evaporator, May Be Related to Moisture.
NORMAL TO *ERRATIC*	NORMAL TO *ERRATIC*	NORMAL TO *ERRATIC*	MOISTURE IN REFRIGERANT SYSTEM – Affects Expan*sion Valve and STV Functions.*
ERRATIC	ERRATIC	ERRATIC	EXPANSION VALVE SENSING BULB – Kinked Capillary Tube
NORMAL TO LOW	NORMAL TO LOW	NORMAL	EVAPORATOR – Restriction, Inadequate Air Flow - Reset Blower to Conditional Requirement and/or Confirm Blower Condition
LOW	HIGH	LOW	RECEIVER/DRIER – Restriction / A/C LIQUID LINE – Restriction; Before Service Access Valve / CONDENSER – Restriction
LOW	LOW	NORMAL TO HIGH	A/C SUCTION LINE – Restriction; SUCTION ACCUMULATOR – Restriction
LOW	LOW	HIGH	COMPRESSOR – Damaged Valves - (Inadequate compression) SUCTION THROTTLING VALVE – Sticking Closed – May Be Related to Moisture.
LOW	LOW	LOW	EVAPORATOR – Iced-up / CONDENSER – Plugged / RECEIVER/DRIER – Plugged / A/C LIQUID LINE – Restriction; After Service Access Valve / EXPANSION VALVE SENSING BULB – Perforated Bulb / EXPANSION VALVE – Sticking Closed / REFRIGERANT LEAK AND/OR UNDERCHARGE COMPRESSOR-TO-CONDENSER A/C LINE – Restriction; *Before Service Access Valve*

ADDITIONAL POSSIBLE PROBLEM COMPONENTS ASSOCIATED WITH INADEQUATE COMPRESSOR OPERATION

COMPRESSOR CLUTCH – Slipping / COMPRESSOR DRIVE BELT – Loose / CLUTCH COIL – Shorted Coils; Slipping / CLUTCH COIL – Open Circuit / AMBIENT CUT-OFF SWITCH – Sticking Open / BLOWN CLUTCH CIRCUIT FUSE / Improper Clutch Circuit Contact in Control Assembly Switch

ADDITIONAL POSSIBLE PROBLEM COMPONENTS ASSOCIATED WITH A COMPRESSOR FAILURE

PRESSURE DIFFERENTIAL VALVE (In Liquid Bleed Line) – Sticking Closed / AMBIENT CUT-OFF SWITCH – Sticking Closed / SUCTION THROTTLING VALVE – Sticking Open / REFRIGERANT LEAK

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FIG. 25 Refrigerant System Pressure Evaluation

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ADJUSTMENTS

TEMPERATURE CONTROL CABLE ADJUSTMENT

The temperature control cable is self-adjusting with the movement of the temperature control lever to the top of the slot in the bezel face of the control head.

1. Insert the end of a small pocket screwdriver in the end loop of the temperature control cable, at the crank arm (Fig. 26).
2. Slide the self-adjusting cable attaching clip down the shaft (away from the loop) approximately one (1) inch.
3. Move the temperature control lever to the top of the slot in the bezel face of the control head.

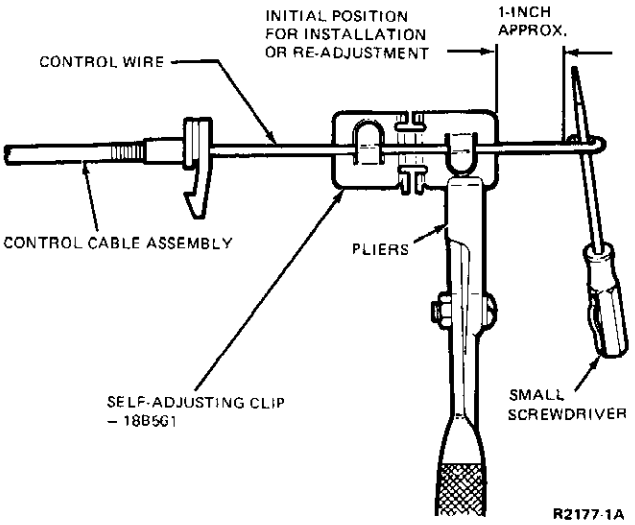


FIG. 26 Control Cable Pre-Set Adjustment

4. Check total lever travel. A space of approximately 1/4 inch should exist, between the control lever and the ends of the slot, at both ends of the slot.

COMPRESSOR DRIVE BELT ADJUSTMENT

3.3L (200 CID) Engine

1. Check the belt tension with Tool T63L-8620-A or equivalent. The belt tension should be within specification.
2. If the belt tension is not within specification, loosen the alternator mounting bolt to a snug position and loosen the alternator adjusting arm bolt (Fig. 19).
3. Place an open end wrench on the alternator adjusting arm bolt boss and apply pressure on the boss with the wrench until the belt tension is within specification. Then, tighten the alternator adjusting arm bolt while maintaining the belt tension.
4. Remove the wrench and belt tension gauge.

2.3L and 5.0L (302 CID) Engines

1. Check the belt tension with Tool T63L-8620-A or equivalent. The belt tension should be within specifications.
2. If the belt tension is not within specification, loosen the two idler pulley arm attaching bolts until they are just snug (Figs. 17, 18 and 20).
3. Insert the end of a 1/2 inch flex-handle into the square hole in the idler arm and apply pressure to the idler arm with the flex handle until the belt tension is within specification. Then, tighten the idler arm attaching bolts while holding pressure on the idler arm. Then, tighten the idler arm bolts to specification.
4. Remove the belt tension gauge and the flex handle.

REMOVAL AND INSTALLATION

COMPRESSOR

REMOVAL

1. Discharge the refrigerant from the A/C system at the service access gauge port valve located on the underside of the combination valve. Observe all safety precautions.
2. Energize the magnetic clutch and remove the clutch retaining bolt.
3. On 2.3L and 5.0L (302 CID) engines, loosen the idler attaching screws and release the drive belt tension (Figs. 17, 18 and 20).
4. On 3.3L (200 CID) engines, loosen the alternator attaching bolt and the adjusting arm bolt. Then, release the compressor and alternator belt tension (Fig. 19).
5. Remove the drive belt from the compressor clutch pulley.
6. Install a 5/8-11 bolt in the compressor shaft hole of the clutch and, with the clutch energized, tighten the bolt to push the clutch from the compressor shaft.
7. Disconnect the clutch field wire at the connector.
8. Remove the refrigerant lines from the compressor and plug the lines and compressor ports to prevent the entrance of dirt and excessive moisture.
9. Remove the compressor mounting bolts as shown in Figs. 17 through 20 and remove the compressor.
10. Remove the clutch field coil from the compressor if the compressor is to be replaced.

INSTALLATION

1. If the compressor is to be replaced, drain the oil from the old compressor into a suitable container. Then, remove oil from the new compressor until the amount drained from the old compressor is equal to the amount in the new compressor.
2. Install the clutch field coil on the compressor if it was removed or if the compressor was replaced.
3. Position the compressor to the compressor mounting bracket(s), and install the attaching bolts and lock washers. Tighten the bolts to specification.
4. Connect the refrigerant lines to the compressor. Use *new O-rings dipped in clean refrigeration oil.*

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5. Install the pulley and clutch drive assembly on the compressor shaft. Connect the clutch field coil wire at the connector and energize the clutch. Then, tighten the clutch retaining bolt to specification.
6. Install the drive belt on the compressor clutch pulley and tighten the belt to specification following the procedure under Compressor Drive Belt Adjustment.
7. Leaktest, evacuate, and charge the refrigeration system following the recommended procedures and safety precautions.

CONDENSER

REMOVAL

1. Discharge the refrigerant from the A/C system at the service access gauge port valve located on the underside of the combination valve. Observe all safety precautions.
2. Remove six radiator grille attaching screws and remove the radiator grille. Move the ambient cut-off switch away from the front of the radiator and condenser.
3. Disconnect and remove the battery from the battery tray.
4. Disconnect the two refrigerant lines at the fittings on the right side of the radiator (Fig. 27).
5. Remove four bolts attaching the condenser to the radiator support and remove the condenser and receiver-drier from the vehicle.
6. Disconnect the refrigerant lines from the receiver-drier. Then, remove the two receiver-drier attaching bolts and remove the receiver-drier. Tightly cap the receiver-drier if it is to be re-used.

INSTALLATION

1. Connect the refrigerant lines to the receiver-drier using new O-rings dipped in refrigeration oil.
2. Position the receiver-drier to the condenser and install the two attaching screws.
3. Position the condenser assembly to the radiator support brackets and install the attaching bolts.
4. Connect the refrigerant lines to the condenser assembly using new O-rings dipped in refrigeration oil.
5. Position the radiator grille and the ambient cut-off switch to the vehicle and install the six attaching screws. The ambient cut-off switch should be mounted at the grille right mounting bracket.

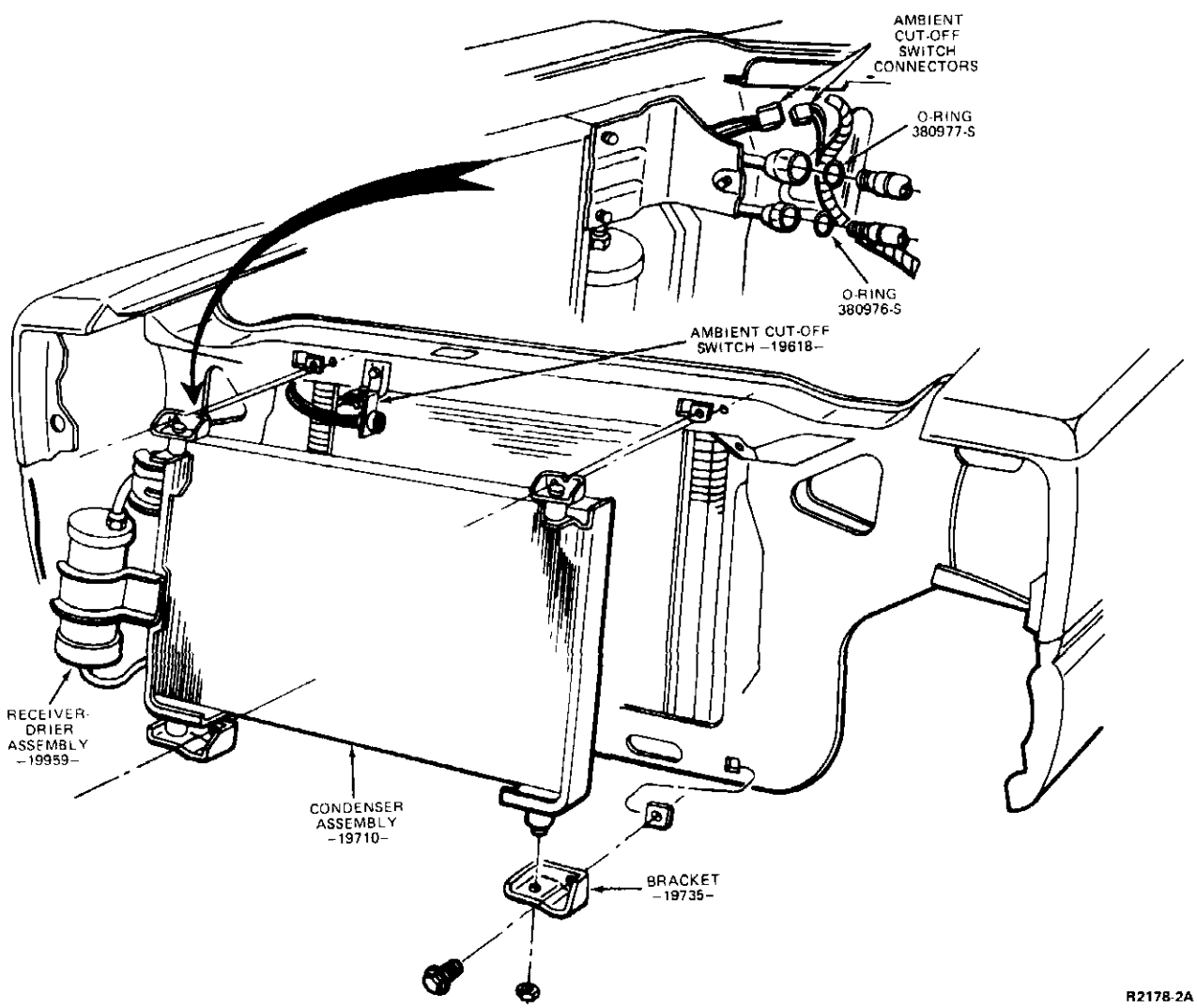


FIG. 27 Condenser and Receiver—Drier Installation

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6. Install and connect the battery.
7. Leaktest, evacuate and charge the refrigerant system following the recommended procedures and safety precautions.

RECEIVER-DRIER

REMOVAL

1. Discharge the refrigerant from the A/C system at the service access gauge port valve located on the underside of the combination valve. Observe all safety precautions.
2. Remove six radiator grille attaching screws and remove the radiator grille. Place the ambient cut-off switch away from the front of the radiator and condenser.
3. Disconnect the refrigerant lines from the receiver-drier (Fig. 27).
4. Remove two screws attaching the receiver-drier to the condenser and remove the receiver-drier.

INSTALLATION

1. Connect the refrigerant lines to the receiver-drier using new O-rings dipped in refrigeration oil.
2. Position the receiver-drier mounting bracket to the condenser and install the two attaching screws.
3. Position the radiator grille and ambient cut-off switch to the vehicle and install the six attaching screws. The ambient cut-off switch should be mounted at the grille right mounting bracket.
4. Leaktest, evacuate and charge the refrigerant system following the recommended procedures and safety precautions.

REFRIGERANT LINES

1. Discharge the refrigerant from the A/C system at the service access gauge port valve located on the underside of the combination valve. Observe all safety precautions.
2. Disconnect and remove the refrigerant line using a wrench on each side of each fitting.
3. Route the new refrigerant line with the protective caps installed as shown in Figs. 28, 29 or 30.
4. Connect the refrigerant line into the system using new O-rings dipped in refrigeration oil. Use two wrenches when tightening the fittings.
5. Leaktest, evacuate and charge the refrigerant system following the recommended procedures and safety precautions.

EXPANSION VALVE

REMOVAL

1. Discharge the refrigerant from the A/C system at the service access gauge port valve located on the underside of the combination valve. Observe all safety precautions.
2. Remove the high and low pressure refrigerant lines and the liquid bleed line from the STV housing manifold of the combination valve. Use a back-up wrench on the STV housing manifold to prevent component damage.
3. Remove the evaporator high and low pressure fittings from the combination valve. Again use a back-up wrench on the STV housing manifold to prevent damage to the evaporator core tubes.

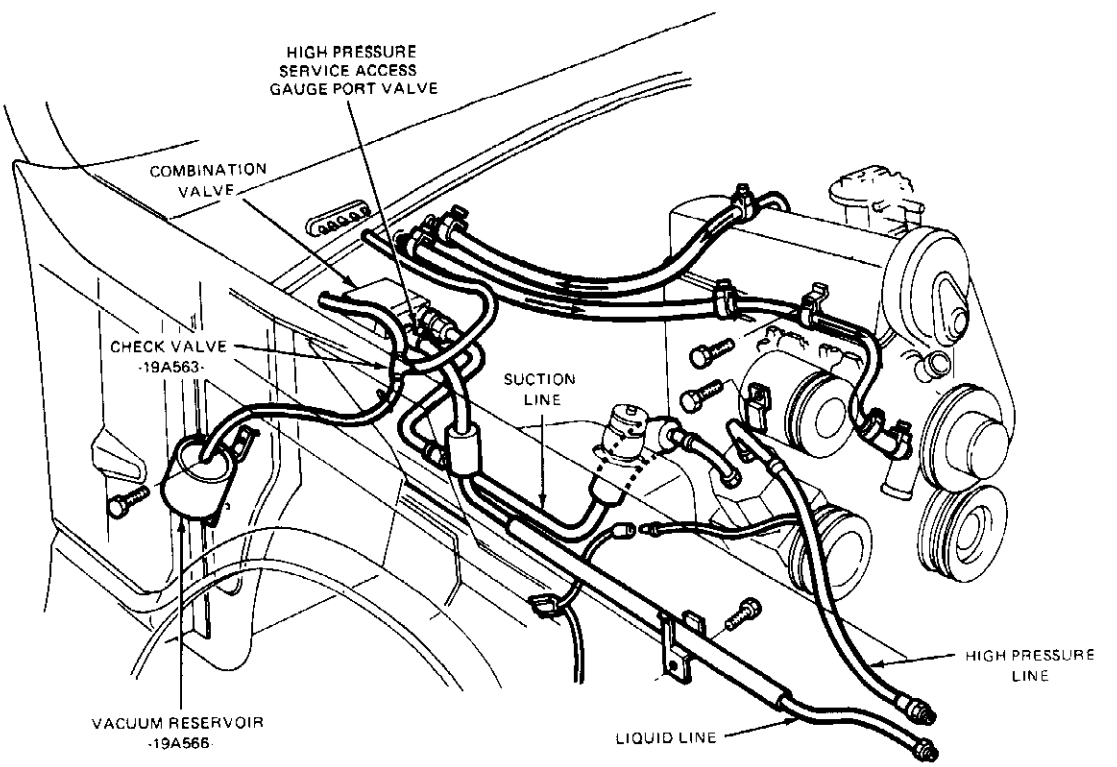


FIG. 28 Refrigerant Lines and Heater Hose Routings—2.3L I-4 Engine

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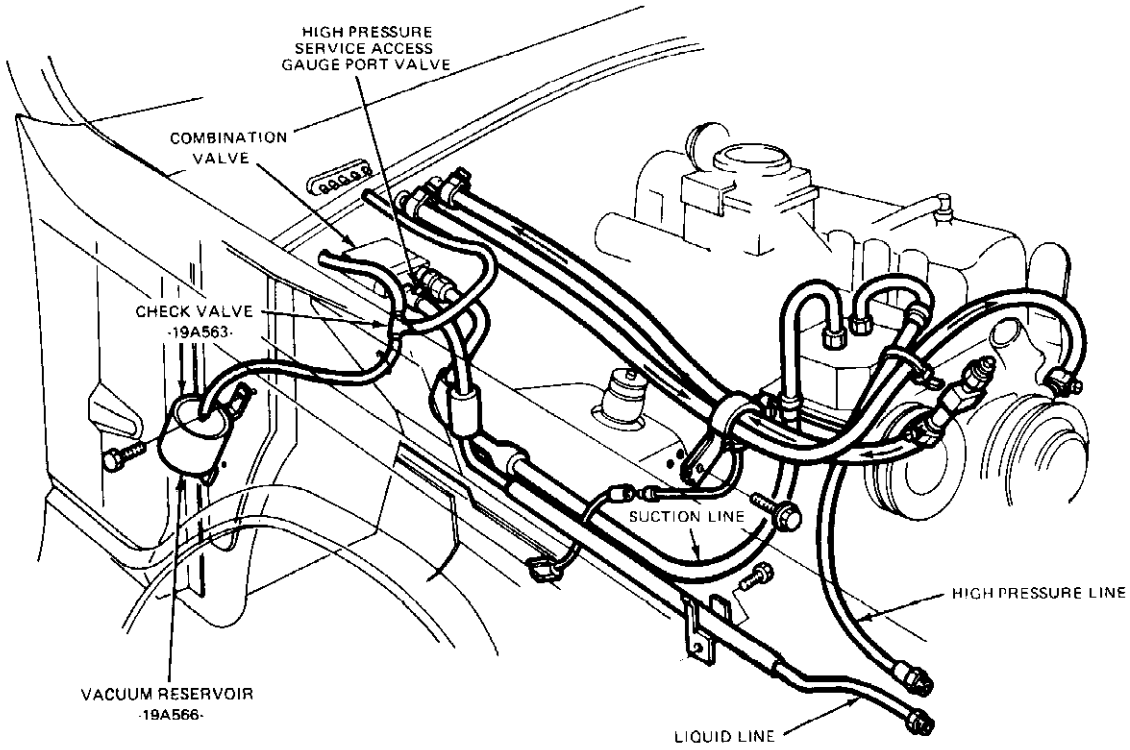


FIG. 29 Refrigerant Lines and Heater Hose Routings—3.3L (200 CID) I-6 Engine

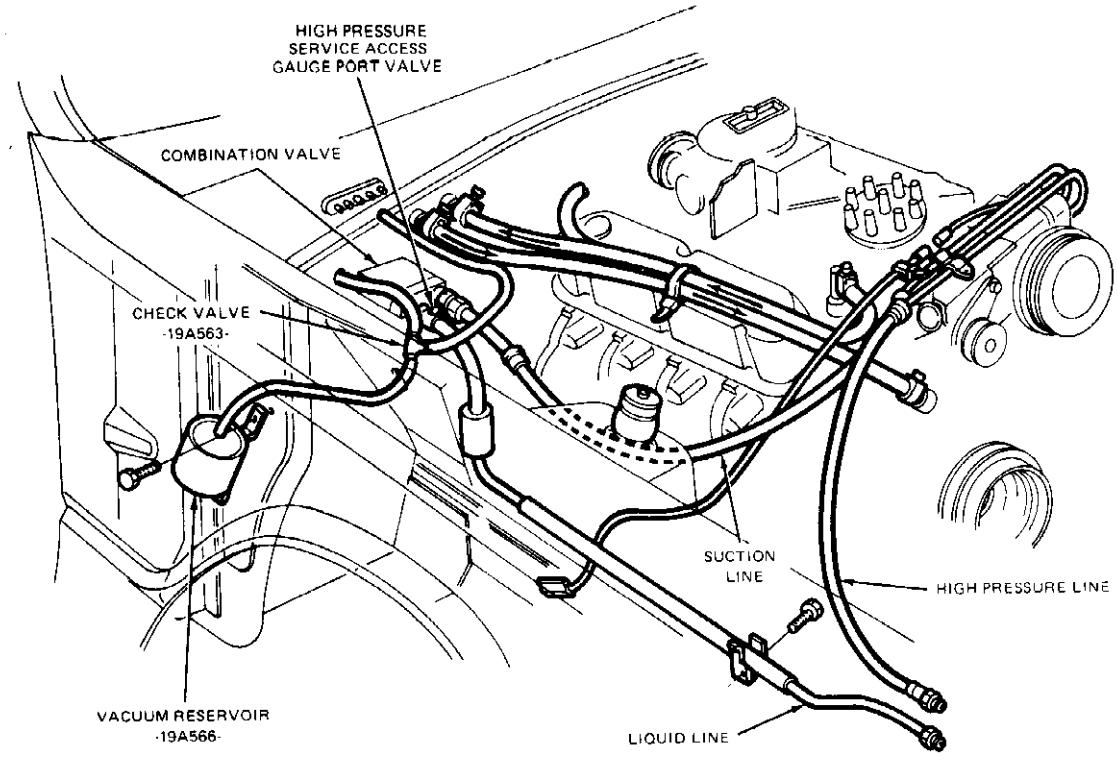


FIG. 30 Refrigerant Lines and Heater Hose Routings—5.0L (302 CID) V-8 Engine

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4. Remove one screw attaching the support bracket to the underside of the combination valve and remove the combination valve.
5. Remove two Allen head cap screws attaching the STV housing manifold to the expansion valve (Fig. 15). Remove the STV housing manifold from the expansion valve.
6. Remove the STV from the expansion valve with STV Wrench T77L-19703-D, Tool YT-366 or a pair of curved jaw "channel lock" type pliers. Grip the STV only in the location shown in Fig. 15.

INSTALLATION

Use new O-rings dipped in refrigeration oil during assembly and installation of the combination valve.

1. Install the STV in the expansion valve using a new O-ring dipped in refrigeration oil.
2. Install two O-rings on the STV as shown in Fig. 15.
3. Assemble the STV housing manifold to the expansion valve using new O-rings. Install the two Allen head screws and tighten them to 4-6 ft-lb torque.
4. Install the restrictor in the evaporator core inlet tube as shown in Fig. 10.
5. Install new O-rings in the evaporator tube ports of the combination valve. Then, install the combination valve on the evaporator core tubes. Use a back-up wrench on the STV housing manifold to prevent component damage while tightening the evaporator core tube nuts.
6. Install the screw attaching the combination valve to the support bracket.
7. Connect the refrigerant lines and the liquid bleed line to the STV housing manifold using new O-rings dipped in refrigeration oil. Use a back-up wrench on the STV housing manifold when tightening the refrigerant lines to prevent component damage.
8. Leaktest, evacuate and charge the refrigerant system following the recommended procedures and safety precautions.

SUCTION THROTTLING VALVE (STV)

REMOVAL

1. Discharge the refrigerant from the A/C system at the service access gauge port valve located on the underside of the combination valve. Observe all safety precautions.
2. Remove the high and low pressure refrigerant lines and the liquid bleed line from the STV housing manifold of the combination valve. Use a back-up wrench on the STV housing manifold to prevent component damage.
3. Remove two Allen head cap screws attaching the STV housing manifold to the expansion valve (Fig. 15). Remove the STV housing manifold from the expansion valve.
4. Remove the STV from the expansion valve with STV Wrench T77L-19703-D, Tool YT-366 or a pair of curved jaw "channel lock" type pliers. Grip the STV only in the location shown in Fig. 15.

INSTALLATION

Use new O-rings dipped in refrigeration oil during assembly and installation of the STV.

1. Install the STV in the expansion valve using a new O-ring dipped in refrigeration oil.
2. Install two O-rings on the STV as shown in Fig. 15.
3. Assemble the STV housing manifold to the expansion valve using a new O-ring. Install the two Allen head screws and tighten them to 4-6 ft-lb torque.
4. Connect the refrigerant lines and liquid bleed line to the STV housing manifold using new O-rings dipped in refrigeration oil. Use a back-up wrench on the STV housing manifold when tightening the refrigerant lines to prevent component damage.
5. Leaktest, evacuate and charge the refrigerant system following the recommended procedures and safety precautions.

CONTROL ASSEMBLY

REMOVAL

1. Remove three screws attaching the upper edge of the instrument cluster trim panel to the instrument panel and remove the trim panel (Fig. 31).
2. Disconnect the temperature cable from the evaporator case.
3. Remove four screws attaching the control assembly to the instrument panel.
4. Pull the control assembly out from the instrument panel and disconnect the temperature cable from the control assembly.
5. Disconnect the wire connectors from the control assembly and the illumination wires at the connector.
6. Remove the push nuts retaining the vacuum harness connector to the control assembly. Then, remove the vacuum harness connector from the control assembly.

INSTALLATION

1. Connect the vacuum harness connector to the control assembly and install the push nuts.
2. Connect the two wire connectors to the control assembly and connect the illumination wires to the harness.
3. Connect the temperature control cable to the control assembly.
4. Position the control assembly to the instrument panel opening. Be sure the locating pins at the top and bottom of the control assembly are inserted into the locating pin holes in the instrument panel.
5. Install four screws to attach the control assembly to the instrument panel.
6. Install the instrument cluster trim panel.
7. Connect the temperature cable to the evaporator case and adjust the cable as outlined under Adjustments.

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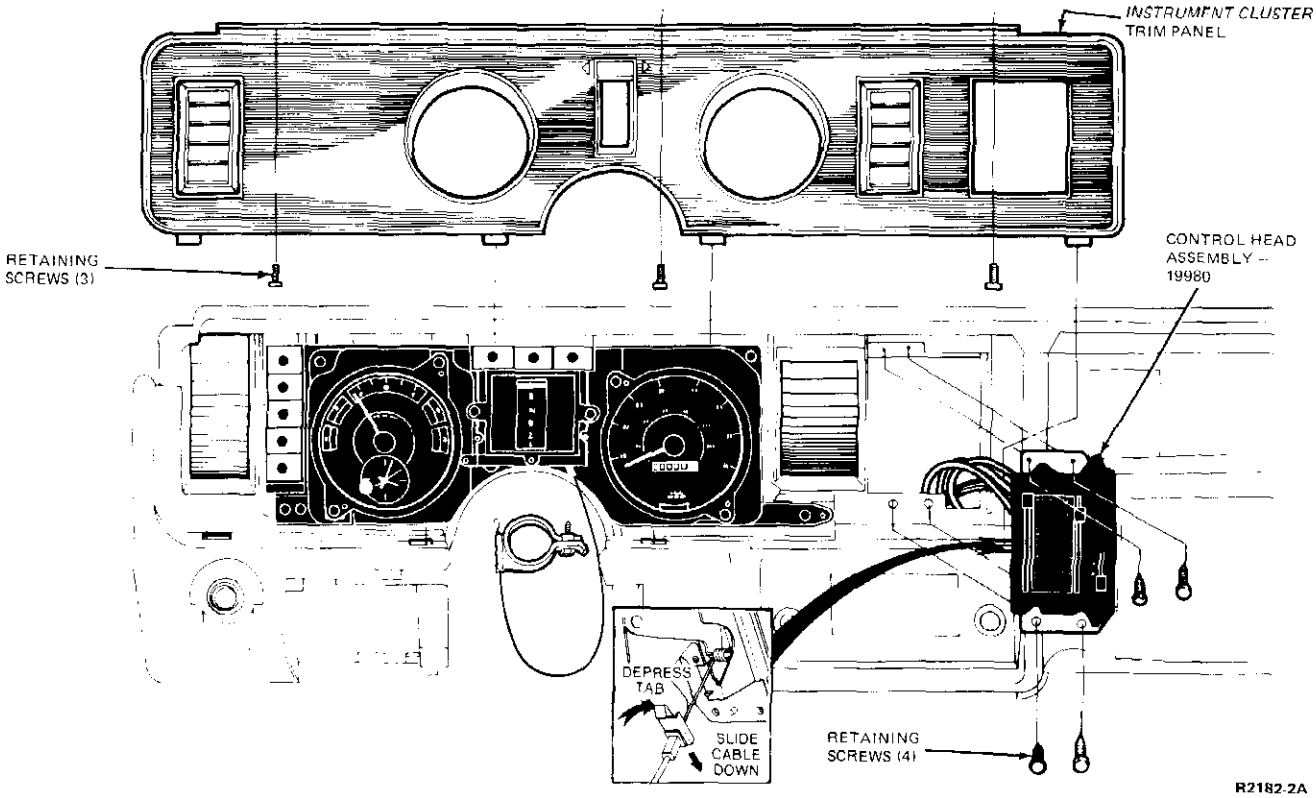


FIG. 31 Manual A/C—Heater System Control Head Assembly—Removal

BLOWER (FAN) SWITCH

REMOVAL

1. Remove the fan switch knob from the switch shaft by placing a screwdriver blade between the knob spring retainer and the control assembly. Then, pull on the screwdriver applying pressure on the spring retainer and pull the knob off the switch shaft.
2. Remove three screws attaching the upper edge of the instrument cluster trim panel to the instrument panel and remove the trim panel.
3. Disconnect the temperature control cable from the evaporator case (Fig. 32).
4. Remove four screws attaching the control assembly to the instrument panel, and pull the control away from the instrument panel.
5. Remove the screw attaching the fan switch to the control head. Separate the switch from the control head and disconnect the wire connector from the switch.

INSTALLATION

1. Connect the wire harness connector to the fan switch and position the switch to the control assembly. Be sure the locating pin is inserted in the hole of the switch mounting bracket.
2. Position the control assembly to the instrument panel opening. Be sure the locating pins at the top and bottom of the control assembly are inserted into the locating pin holes in the instrument panel.
3. Install the four screws to attach the control assembly to the instrument panel.
4. Install the instrument cluster trim panel. Then, push the blower switch knob on the fan switch shaft.
5. Connect the temperature cable to the evaporator case (Fig. 32).

TEMPERATURE CONTROL CABLE

REMOVAL

1. Reach under the instrument panel and disconnect the temperature control cable from the blend door and the cable bracket (Fig. 32).
2. Remove three screws attaching the upper edge of the instrument cluster trim panel to the instrument panel and remove the trim panel.
3. Remove four screws attaching the control assembly to the instrument panel.
4. Pull the control assembly away from the instrument panel and disconnect the temperature cable from the control assembly.
5. Remove the cable from under the instrument panel.

INSTALLATION

1. Position the self-adjusting clip on the control cable to the dimension shown in Fig. 26.
2. Position the control cable behind the instrument panel and connect the cable to the temperature lever on the control assembly.
3. Position the control assembly to the instrument panel opening. Be sure the locating pins at the top and bottom of the control assembly are inserted into the locating pin holes in the instrument panel.
4. Install the four screws attaching the control assembly to the instrument panel.

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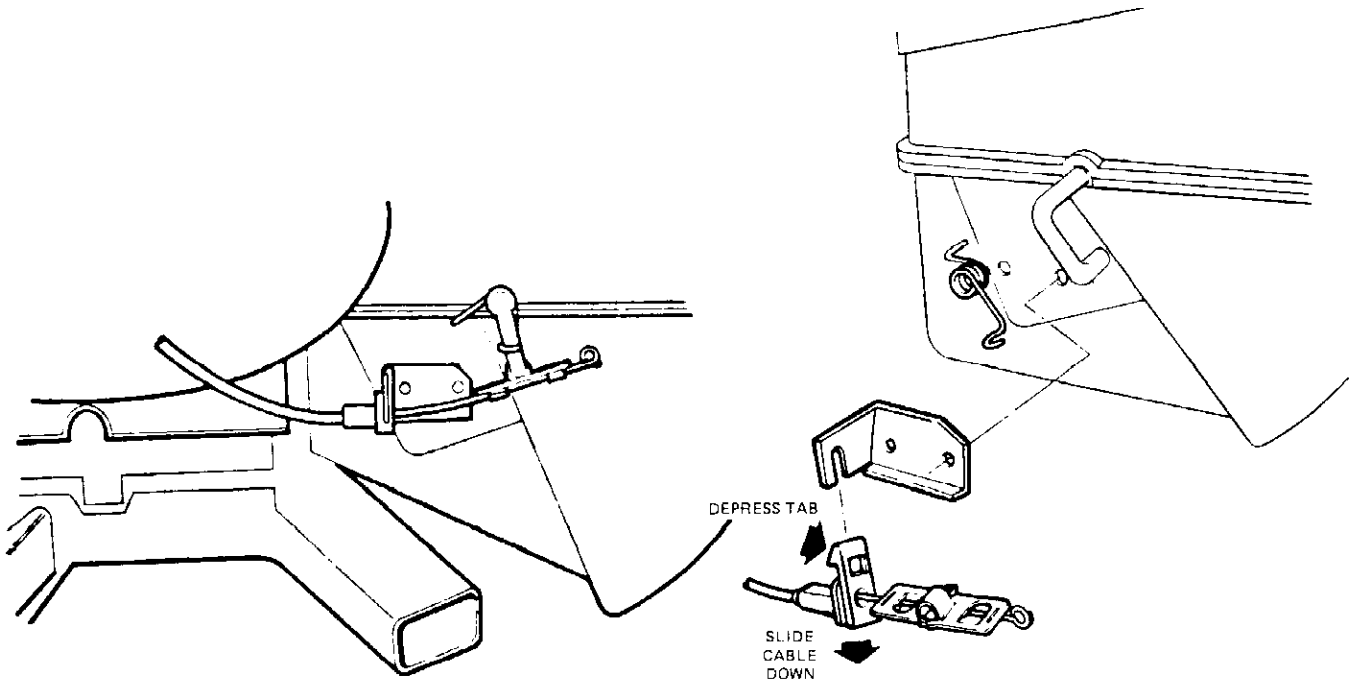


FIG. 32 Temperature Control Cable—Removal

5. Install the instrument cluster trim panel.
6. Connect the self-adjusting clip to the blend door crank. Then, connect the cable to the cable bracket on the evaporator case (Fig. 32).
7. Move the TEMPERATURE control lever to the WARM position and the cable will adjust to the correct length.

REGISTER ASSEMBLY

REMOVAL

1. Insert a thin blade under the retaining tab (Fig. 33) and pry the retaining tab toward the louvers until the retaining tab pivot clears the hole in the register opening.
2. Pull the register assembly end out from the housing only enough to prevent the pivot from going back into the pivot hole.
3. Repeat Step 1 for the other retaining tab and pull the register assembly from the register opening.

INSTALLATION

The pivots on each end of the register assembly are different diameters and therefore determine the installed position of the register assembly.

1. Position the register assembly into the opening with the largest diameter pivot near the largest pivot hole.
2. Depress the retaining tabs, push the register assembly into the register opening and engage the retainer tab pivots in the pivot holes.

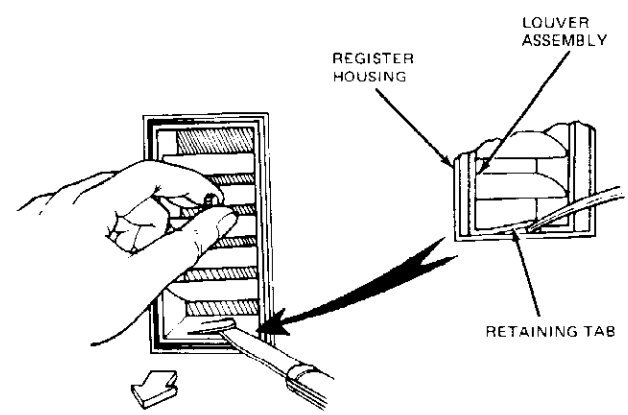


FIG. 33 Instrument Panel Register Removal

AIR INLET DUCT AND BLOWER HOUSING ASSEMBLY

REMOVAL

1. Remove the glove compartment and disconnect the hose from the outside-recirc door vacuum motor (Fig. 34). Remove the instrument panel lower right-to-side cowl attaching bolt.
2. Remove the screw attaching the support brace to the top of the air inlet duct.
3. Disconnect the blower motor power lead at the wire connector.

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4. Remove the nut retaining the blower housing lower support bracket to the evaporator case (Fig. 34).
5. Remove the side cowl trim panel and remove the blower ground wire screw.
6. Remove one screw attaching the top of the air inlet duct to the evaporator case (Fig. 34).
7. Move the air inlet duct and blower housing assembly down and away from the evaporator case.

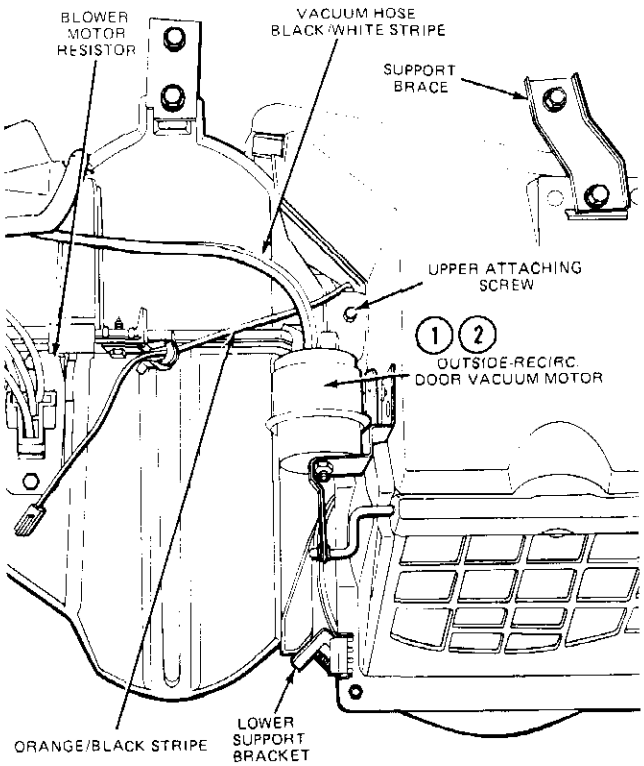


FIG. 34 Fairmont and Zephyr Air Inlet Duct and Blower Housing Assembly

INSTALLATION

1. Tape the blower motor power lead to the air inlet duct to keep the wire away from the blower outlet during installation.
2. Position the air inlet duct and blower housing assembly to the evaporator case, inserting the flange at the top of the blower outlet into the opening in the evaporator case. Slide the blower housing lower bracket over the stud and install the retaining nut. Be sure the blower wire is routed to the passenger side of the evaporator case.
3. Install the screw to retain the air inlet duct to the evaporator case.
4. Hold the outside-recirc door open and rotate the blower wheel to be sure it rotates freely. If an interference exists, remove the blower motor and wheel and correct the condition.
5. Connect the blower motor power lead to the harness at the connector.
6. Install the air inlet duct-to-cowl support brace attaching screw.
7. Connect the vacuum hose to the outside recirc door vacuum motor and install the glove compartment.
8. Connect the blower motor ground wire to the cowl side panel with the ground screw.
9. Install the instrument panel lower right side attaching bolt. Then, install the right cowl side trim panel.

BLOWER MOTOR RESISTOR

The blower motor resistor and thermal limiter assembly are installed on the passenger side of the evaporator case behind the glove compartment (Fig. 34). To remove the thermal limiter and resistor, remove the glove compartment and pull the wire connector from the resistor. Remove the two attaching screws and pull the resistor from the housing. Use only the specified resistor assembly for Service replacement. Do not apply sealer to the resistor board mounting surface.

BLOWER MOTOR AND WHEEL ASSEMBLY

REMOVAL

1. Remove the air inlet duct and blower housing assembly from the vehicle.
2. Remove four blower motor mounting plate screws and remove the blower motor and wheel assembly from the blower housing (Fig. 35). **DO NOT remove the mounting plate from the motor.**
3. Remove the blower wheel from the motor shaft.

INSTALLATION

1. Install the blower wheel on the blower motor shaft until the outside edge of the blower wheel is 3 3/4 inches from the blower motor mounting plate. Then, install the new retaining clip on the blower wheel.
2. Tape the blower motor power lead to the air inlet duct to keep the wire away from the blower outlet during installation.
3. Position the blower motor and wheel assembly to the blower housing with the flat side of the flange near the blower outlet. Install the four attaching screws.
4. Install the air inlet duct and blower housing assembly in the vehicle.

INSTRUMENT PANEL PAD

1. Remove three screws attaching the instrument cluster trim panel to the instrument panel pad (Fig. 36).
2. Remove one screw attaching the pad to the instrument panel at each defroster opening (Fig. 36).
3. Remove four screws attaching the edge of the instrument panel pad to the instrument panel and remove the pad.
4. To install, position the pad to the instrument panel and install the four screws along the edge.
5. Install one screw at each defroster opening.
6. Place the instrument cluster trim panel in position and install the three screws along the upper edge of the trim panel.

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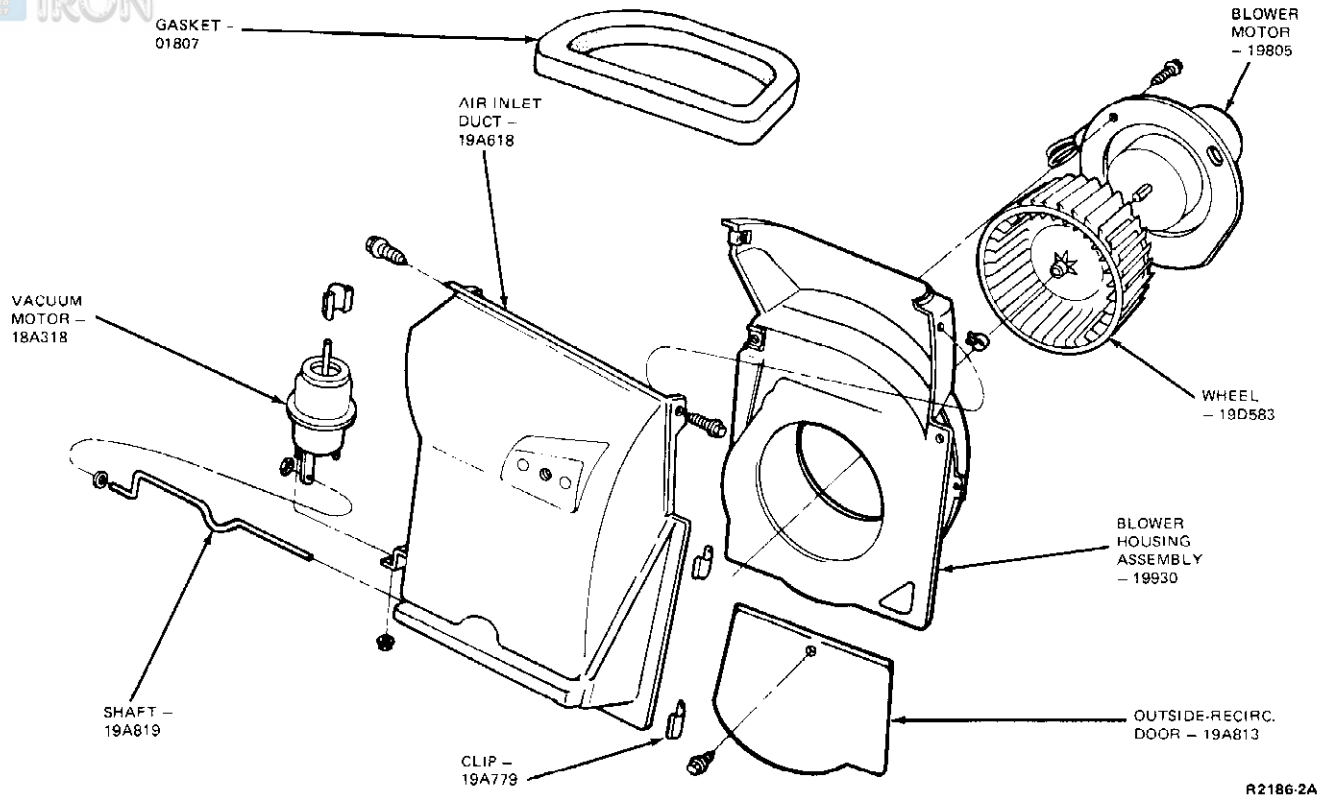


FIG. 35 Air Inlet Duct and Blower Housing Assembly Disassembled

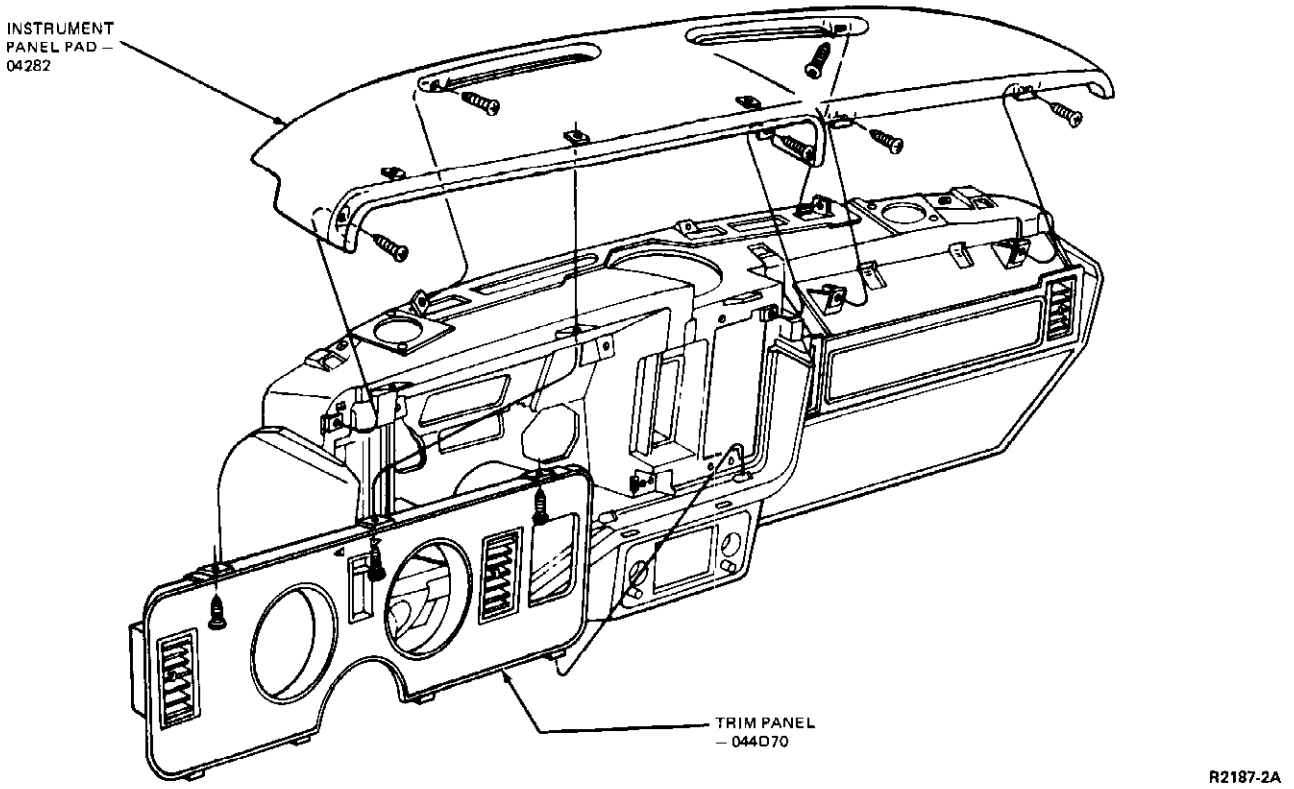


FIG. 36 Instrument Panel Pad Installation

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INSTRUMENT PANEL

REMOVAL

1. Disconnect the ground cable from the battery.
2. Remove the instrument panel pad following the procedure under Instrument Panel Pad removal.
3. Remove two screws attaching the steering column opening lower cover to the instrument panel and remove the cover.
4. Remove two nuts and the bracket retaining the steering column to the instrument panel and brake pedal support, and lay the steering column against the seat.
5. Remove one screw attaching the instrument panel to the brake pedal support at the steering column opening (Fig. 37).
6. Remove one screw attaching the lower brace to the lower edge of the instrument panel below the radio.
7. Remove one screw attaching the brace to the lower edge of the instrument panel.
8. Disconnect the temperature control cable from the temperature blend door and the evaporator case bracket.
9. Disconnect the 7-port vacuum hose connectors at the evaporator case.
10. Disconnect the blower resistor wire connector from the resistor on the evaporator housing, and the blower motor feed wire at the in-line connector near the blower resistor wire connector.
11. Support the instrument panel and, with an angle Phillips screwdriver, remove three screws attaching the top of the instrument panel to the cowl (Fig. 37).
12. Remove one screw attaching each end of the instrument panel to the cowl side panels.
13. Move the instrument panel rearward and disconnect the speedometer cable from the speedometer and any wires that will not allow the instrument panel to lay on the front seat. Use care not to scratch the instrument panel or the steering column.

INSTALLATION

1. Place the instrument panel near the installed position and connect any wires or connectors that were disconnected during removal.
2. Connect the speedometer cable to the speedometer.
3. Place the instrument panel in position and install one screw at each end of the instrument panel (Fig. 37).
4. Install three screws along the top front edge of the instrument panel with an angle Phillips screwdriver.
5. Connect the two support braces to the lower edge of the instrument panel with one screw each.
6. Connect the temperature control cable to the temperature blend door crank arm and the bracket.
7. Connect the vacuum hoses at the 7-port connectors and the blower motor wires at the resistor and in-line connector near the resistor.
8. Install the screw attaching the instrument panel to the brake pedal support.
9. Position the steering column to the brake pedal support and install the retainer with two nuts.

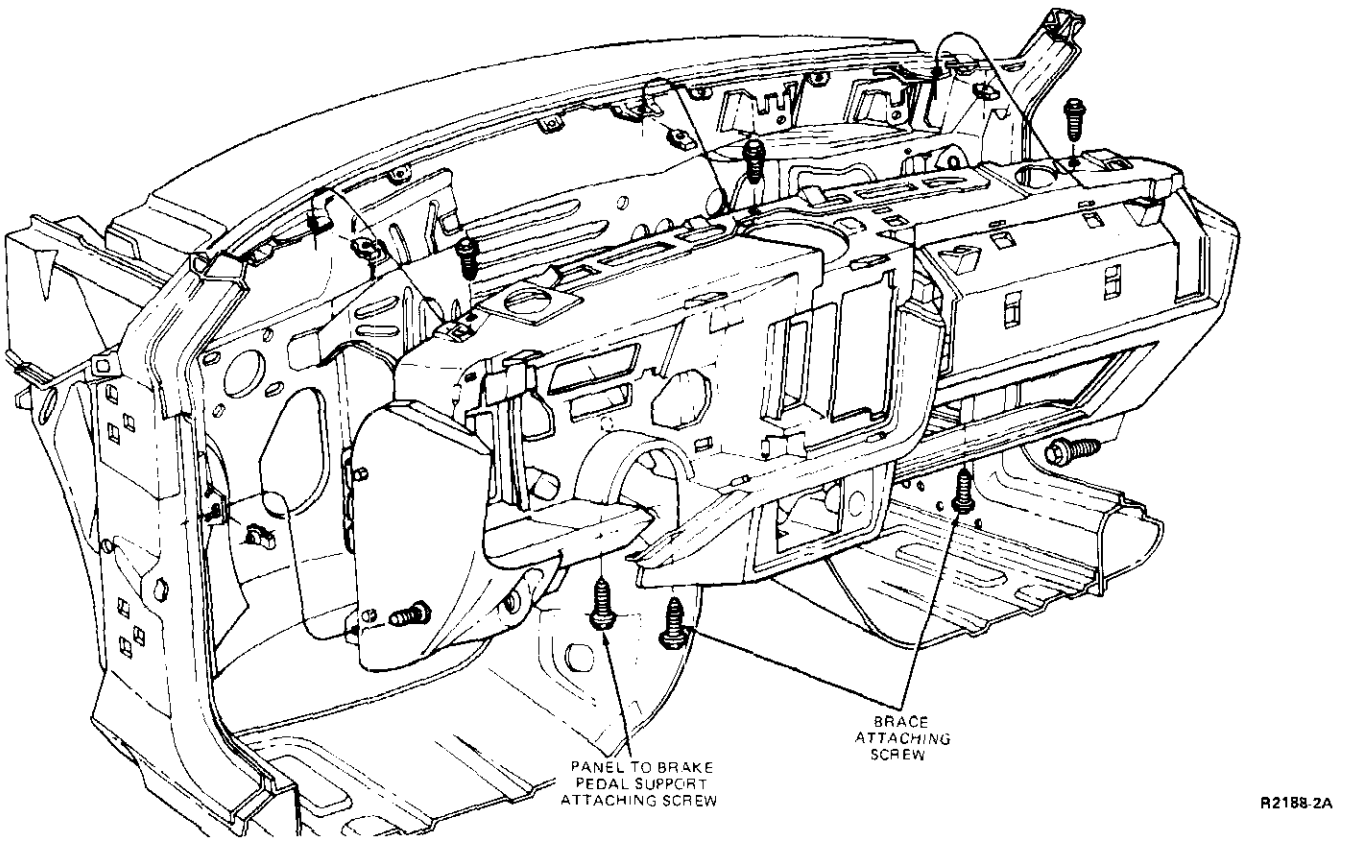


FIG. 37 Instrument Panel Installation

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10. Position the steering column opening cover to the instrument panel and install the two attaching screws.
11. Install the instrument panel pad and connect the ground cable to the battery.
12. Connect the temperature control cable to the temperature blend door crank arm.

REGISTER DUCTS AND/OR DEFROSTER NOZZLE

REMOVAL

1. Remove the instrument panel and lay it back against the front seat following the procedure under Instrument Panel Removal.
2. Remove the radio speaker from the top center of the instrument panel, if so equipped.
3. Working through the radio speaker opening, remove one screw attaching the defroster nozzle to the center register duct.
4. Remove four screws attaching the defroster nozzle to the top of the instrument panel (Fig. 8) and remove the defroster nozzle.
5. To remove the right or left register duct, remove one screw attaching the duct to the top of the instrument panel (Fig. 8).
6. Remove one screw attaching the duct to the instrument panel at the register opening and remove the register duct.
7. To remove the center register duct and/or the A/C-defrost distribution duct, remove the right and left register ducts. Then, remove one screw from each center register opening and remove the center register duct and A/C-defrost duct from the instrument panel.
8. Remove four screws attaching the A/C-defrost duct to the center register duct. Then, separate the center register duct from the A/C-defrost distribution duct.

INSTALLATION

1. Apply caulking cord on three sides of the A/C-defrost distribution duct opening on the center register duct.
2. Position the A/C-defrost distribution duct to the center register duct and install the four attaching screws.
3. Position the center register duct to the instrument panel and install one screw over each center register to retain the center register duct to the instrument panel.
4. Install the right and left register ducts retaining each duct in place with two screws (Fig. 8).
5. Position the defroster nozzle to the instrument panel and the A/C-defrost distribution duct. Then, install four screws to attach the defroster duct to the instrument panel at the defroster openings.
6. Working through the radio speaker opening, install one screw to attach the defroster nozzle to the center register duct.
7. Install the radio speaker in the top center of the instrument panel, if so equipped.
8. Install the instrument panel following the procedure under Instrument Panel Installation.

EVAPORATOR CASE

REMOVAL

1. Remove the instrument panel and lay it on the front seat following the procedures under Instrument Panel Removal.
2. Discharge the refrigerant from the A/C system at the service access gauge port valve located on the underside of the combination valve. Observe all safety precautions.
3. Once the refrigerant is discharged from the system, remove the high and low pressure hoses from the combination valve. Use a back-up wrench on the STV housing manifold to prevent component damage. Cap the combination valve and hose openings to prevent the entrance of dirt and excessive moisture.
4. Drain the engine coolant from the cooling system and remove the hoses from the heater core. Plug the hoses and core.
5. Remove the screw attaching the air inlet duct and blower housing assembly support brace to the cowl top panel (Fig. 34).
6. Disconnect the vacuum supply hose (black) from the in-line vacuum check valve in the engine compartment.
7. Disconnect the blower motor ground wire from the cowl side panel and the wire harness from the resistor and motor lead.
8. Working under the hood, remove two nuts retaining the evaporator case to the dash panel.
9. In the passenger compartment, remove the screw attaching the evaporator case support bracket to the cowl top panel.
10. Remove one nut retaining the bracket at the left end of the evaporator case to the dash panel, and one nut retaining the bracket below the evaporator case to the dash panel.
11. Carefully pull the evaporator case away from the dash panel and remove the evaporator case assembly from the vehicle.

INSTALLATION

1. Position the evaporator case assembly in the vehicle and install the screw attaching the evaporator case support bracket to the cowl top panel.
2. Check the evaporator case drain tube to be sure it is through the dash panel and is not pinched or kinked.
3. Install one nut retaining the mounting bracket at the left end of the evaporator case to the dash panel, and another nut to retain the bracket below the evaporator case to the dash panel.
4. Working under the hood, install two nuts retaining the evaporator case to the dash panel. Tighten the four nuts (2 in engine compartment and 2 in the passenger compartment) and the one support bracket attaching screw.

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5. Connect the blower motor ground wire to ground and the harness to the resistor and blower motor lead.
6. Connect the black vacuum supply hose to the vacuum check valve in the engine compartment.
7. Connect the high and low pressure refrigerant hoses to the combination valve using new O-rings dipped in refrigeration oil. Use a back-up wrench on the STV *housing manifold to prevent component* damage.
8. Install the instrument panel following the procedures under Instrument Panel Installation.
9. Connect the heater hoses to the heater core and fill the cooling system.
10. Leaktest, evacuate and charge the refrigeration system following the recommended procedures and safety precautions.

EVAPORATOR CORE

REMOVAL

1. Remove the evaporator case from the vehicle following the procedure under Evaporator Case Removal. Then, remove the air inlet duct and blower housing assembly from the evaporator case.
2. Remove five screws attaching the heater core access cover to the evaporator case and remove the access cover *(Fig. 38).*
3. Remove the heater core from the evaporator case.
4. Remove two nuts retaining the restrictor door vacuum motor to the mounting bracket. Then, disengage the vacuum motor arm from the restrictor door.
5. Remove eleven screws and six snap clips retaining the two halves of the evaporator case together, and separate the two halves of the evaporator case.
6. *Lift the evaporator core, seal and combination* valve from the lower half of the evaporator case.
7. Remove two nuts retaining the combination valve support to the evaporator core.
8. Remove the combination valve from the evaporator core. Then, remove the restrictor from the evaporator inlet line (Fig. 10).

INSTALLATION

1. *Install the combination valve on the evaporator* core tubes using new O-rings dipped in refrigeration oil. Be sure the restrictor (Fig. 10) is installed into the evaporator inlet line.
2. Install two nuts to retain the combination valve support to the evaporator core.
3. Position the evaporator core in the lower half of the evaporator case fitting the seal over the edge of the case lower half.
4. *Position the case upper half on the case lower half* making sure the temperature blend door and the heat defrost door are properly positioned.
5. Install the eleven screws and six snap clips to retain the two halves of the housing together.
6. Connect the restrictor door vacuum motor to the restrictor door and install the two restrictor door vacuum motor retaining nuts.
7. Install the heater core with new caulking cord between the core and the evaporator case. Then, install the heater core access cover.
8. Install the air inlet duct and blower housing assembly on the evaporator case.
9. Install the evaporator case in the vehicle following the procedure under Evaporator Case Installation.

HEATER CORE

REMOVAL

1. Remove the instrument panel and lay it on the front seat following the procedures under Instrument Panel Removal.
2. Drain the coolant from the engine cooling system. Then, disconnect the heater hoses from the heater core and plug the heater core tubes.
3. Working under the hood, remove two nuts retaining *the evaporator case to the dash panel.*
4. In the passenger compartment, remove the screws attaching the evaporator case support bracket and the air inlet duct support bracket to the cowl top panel.
5. Remove one nut retaining the bracket at the left end of the evaporator case to the dash panel, and one nut retaining the bracket below the case to the dash panel.
6. *Carefully pull the evaporator case assembly away* from the dash panel to gain access to the screws retaining the heater core access cover to the evaporator case (Fig. 38).
7. Remove five heater core access cover attaching screws, and remove the access cover from the evaporator case.
8. Lift the heater core and seals from the evaporator case.
9. *Remove the two seals from the heater core tubes.*

INSTALLATION

1. Install the heater core tube seals on the heater core tubes, the thin seal first.
2. Install the heater core in the evaporator case with the seals on the outside of the case.
3. Position the heater core access cover on the evaporator case and install the five attaching screws.
4. Position the evaporator case assembly to the dash panel and install the two support bracket attaching screws.
5. Install one nut retaining the mounting bracket at the left end of the evaporator case to the dash panel and another nut to retain the bracket below the evaporator case to the dash panel.
6. Working under the hood, install two nuts retaining the evaporator case to the dash panel. Tighten the four nuts (2 in engine compartment and 2 in passenger compartment) and the support bracket attaching screws.
7. Install the instrument panel following the procedures under Instrument Panel Installation.
8. Connect the heater hoses to the heater core tubes and fill the cooling system.

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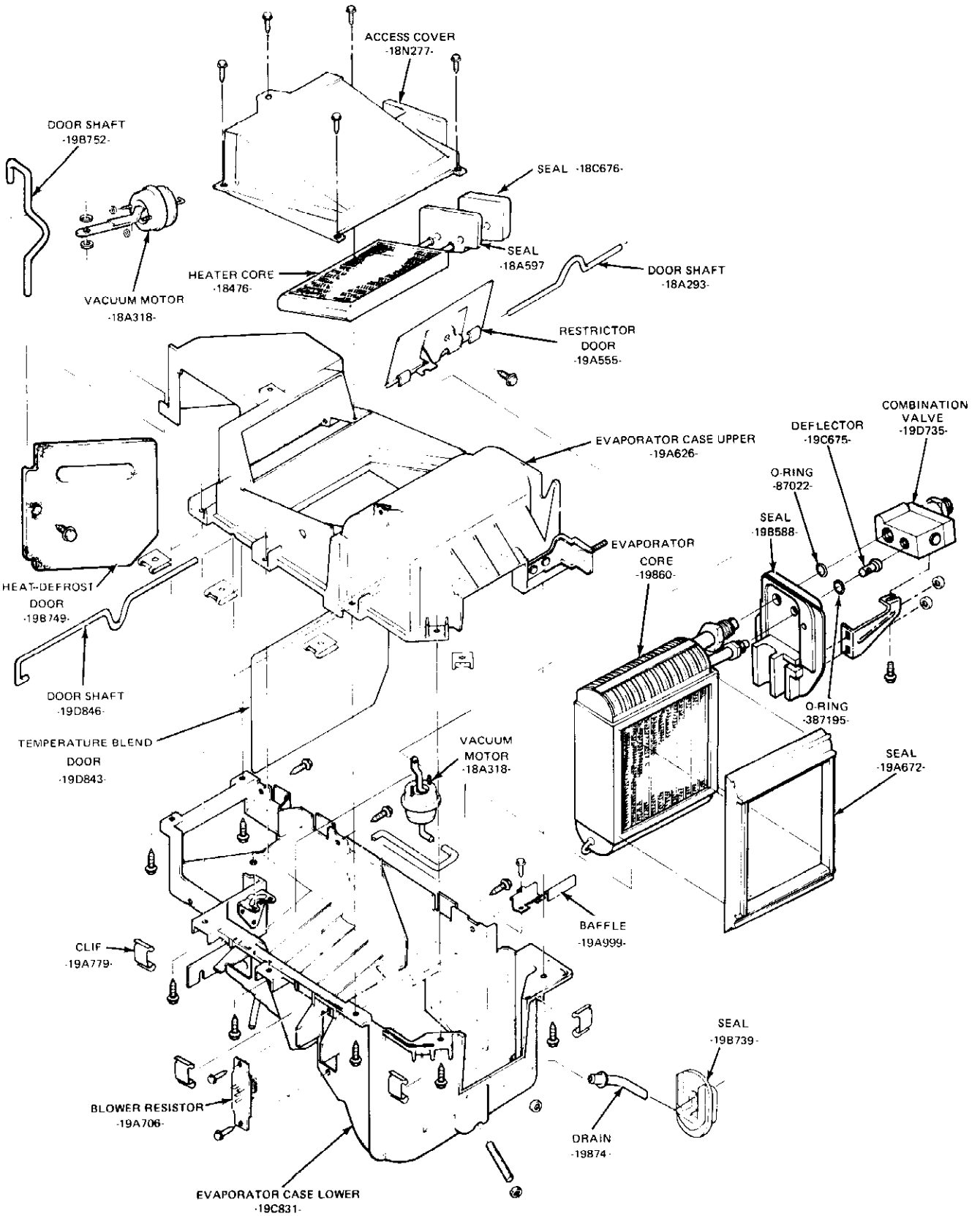


FIG. 38 Evaporator Case Assembly—Disassembled

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FLOOR AIR DISTRIBUTION DUCT

1. Remove two screws attaching the duct to the evaporator case assembly just below the A/C-Heat distribution duct (Fig. 7).
2. Pull the floor air distribution duct away from the evaporator case.
3. To install, position the duct to the evaporator case. Make sure the retainer at the forward edge of the duct is inserted over the edge of the opening in the evaporator case. Then, install the two attaching screws.

TEMPERATURE BLEND DOOR

1. Remove the evaporator case from the vehicle.
2. Remove the heater core and remove two nuts retaining the restrictor door vacuum motor to the mounting bracket. Disengage the vacuum motor arm from the restrictor door.
3. Remove eleven screws and six snap clips retaining the two halves of the evaporator case together, and separate the two halves of the evaporator case (Fig. 38).
4. Remove the temperature blend door from the evaporator case.
5. To install, reverse the removal procedure.

OUTSIDE-RECIRC DOOR AND/OR SHAFT

1. Remove the air inlet duct and blower housing assembly from the vehicle (Fig. 34).
2. Remove three snap clips and two screws attaching the air inlet duct to the blower housing. Then, separate the duct from the blower housing (Fig. 35).
3. Remove the screw retaining the door to the shaft and pull the door from the shaft.
4. To remove the shaft, disconnect the shaft from the vacuum motor and remove the shaft from the duct.
5. To install, reverse the removal procedure.

OUTSIDE-RECIRC DOOR VACUUM MOTOR

1. Remove the glove compartment and disconnect the vacuum hose from the vacuum motor.
2. Remove the motor arm retainer from the outside-recirc door shaft.
3. Remove two nuts retaining the vacuum motor to the mounting bracket and remove the motor.
4. To install, reverse the removal procedure.

RESTRICTOR DOOR AND SHAFT

1. Remove the heater core following the procedure for Heater Core Replacement.
2. Remove two nuts retaining the restrictor door vacuum motor to the mounting bracket (Fig. 38).
3. Disengage the vacuum motor from the mounting bracket and the restrictor door.
4. Remove the screw retaining the restrictor door to the shaft and pull the door from the shaft.
5. To install, reverse the removal procedure.

RESTRICTOR DOOR VACUUM MOTOR

1. Remove the heater core following the procedure for Heater Core Replacement.
2. Remove two nuts retaining the vacuum motor to the mounting bracket (Fig. 38).
3. Disengage the vacuum motor from the mounting bracket and the restrictor door.
4. Disconnect the vacuum hose from the vacuum motor and remove the motor from the plenum through the heat-defrost door opening.
5. To install, reverse the removal procedure.

HEAT-DEFROST DOOR VACUUM MOTOR

REMOVAL

1. Disconnect the ground cable from the battery.
2. Remove the radio from the vehicle, if so equipped.
3. Remove two screws and remove the floor air distribution duct from the evaporator case.
4. Remove four screws attaching the A/C-defrost distribution duct to the center register duct (Fig. 7). Then, pull the A/C-defrost distribution duct down from the installed position and disconnect the vacuum hose from the A/C-defrost vacuum motor.
5. Remove the spring nut retaining the vacuum motor arm on the heat-defrost door shaft.
6. Remove two nuts retaining the vacuum motor to the mounting bracket.
7. Remove the vacuum motor from the mounting bracket and disconnect the vacuum hoses from the vacuum motor.

INSTALLATION

1. Connect the vacuum hoses to the vacuum motor making sure the red stripe hose is on the side of the motor.
2. Position the vacuum motor to the mounting bracket and the motor arm on the door shaft. Then, install the two nuts retaining the vacuum motor to the mounting bracket.
3. Install a new spring nut (Part No. 383358-S) to retain the vacuum motor arm on the A/C-defrost door shaft.
4. Position the A/C-defrost distribution duct to the center register duct and the evaporator case assembly. Then, install the four screws to attach the A/C-defrost distribution duct to the center register duct (Fig. 7).
5. Position the floor air distribution duct to the evaporator case. Make sure the retainer on the forward edge of the duct is inserted over the edge of the opening in the evaporator case. Then, install two screws attaching the duct to the evaporator case.
6. Install the radio, if so equipped, and connect the ground cable to the battery.

HEAT-DEFROST DOOR

REMOVAL

1. Remove the instrument panel following the procedures given under Instrument Panel Removal.

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2. Remove the screw retaining the heat-defrost door to the door shaft (Fig. 38).
3. Slide the door off the shaft and remove the door from the evaporator case.

INSTALLATION

1. Position the heat-defrost door in the evaporator case and slide it on the shaft. Be sure it is firmly seated on the shaft.
2. Install the heat-defrost door retaining screw.
3. Install the instrument panel following the procedures given under Instrument Panel Installation.

A/C—DEFROST DOOR VACUUM MOTOR

REMOVAL

1. Disconnect the ground cable from the battery.
2. Remove the radio from the vehicle, if so equipped.
3. Remove the floor air distribution duct from the evaporator case.
4. Remove four screws attaching the A/C-defrost distribution duct to the center register duct. Then, pull the A/C-defrost distribution duct down from its installed position.
5. Remove the spring nut retaining the A/C-defrost door vacuum motor arm to the door shaft.
6. Remove two nuts retaining the vacuum motor to the mounting bracket.
7. Remove the vacuum motor from the mounting bracket and disconnect the vacuum hose.

INSTALLATION

1. Position the vacuum motor to the mounting bracket and the door shaft.
2. Install two nuts to attach the A/C-defrost vacuum motor to the mounting bracket.
3. Install a new spring nut (Part No. 383358-S) to retain the vacuum motor arm on the heat-defrost door shaft.
4. Position the A/C-defrost distribution duct to the center register duct and the evaporator case. Then, install the four attaching screws.
5. Connect the vacuum hose to the A/C-defrost vacuum motor.
6. Install the radio and connect the ground cable to the battery.
7. Install the floor air distribution duct on the evaporator case.

A/C—DEFROST DOOR

REMOVAL

1. Remove the A/C-defrost distribution duct following the procedure under A/C-Defrost Door Vacuum Motor.
2. Remove one screw retaining the A/C-defrost door to the door crank and pull the door from the door crank.
3. To replace the door crank, remove the spring nut retaining the crank to the vacuum motor arm. Then, disengage the vacuum motor arm from the door crank and remove the crank from the A/C-defrost distribution duct.

INSTALLATION

1. Place the door crank in the A/C-defrost distribution duct. Place the flatwasher on the crank end of the shaft, then the vacuum motor arm and install a new spring nut (Part No. 383358-S) to retain the vacuum motor arm on the door crank.
2. Position the A/C-defrost door on the crank so the door is on the same side of the crank as the vacuum motor. Then, install the retaining screw.
3. Install the A/C-defrost distribution duct following the procedure under A/C-Defrost Door Vacuum Motor.

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SPECIFICATIONS

REFRIGERANT	
TYPE	Refrigerant 12 (R-12) Dichlorodifluoromethane CCL_2F_2
FORD SPECIFICATION	ESA-M17B2A
FORD PART NUMBER	D3AZ-19B519-A
CAPACITY	3 Lb. 8 Oz. +4 Oz. −0 Oz.
REFRIGERANT OIL	
Ford Specification	ESA-M2C31-A
Ford Part Number	C9AZ-19577-A
Oil Capacity	11 Fluid Ounces ± 2 Oz.
COMPRESSOR	
Displacement	10.3 Cu. Inch
Type	2 Cylinder Piston
Magnetic Clutch Current Draw	Approx. 3.75 Amps @ 12.8 V
Drive Belt Tension	New – 120-160 Lbs. Used – 75-120 Lbs. (after operation of 10 minutes)
Blower Motor Current Draw (Amps and Voltage)	Low: 4 AMPS, 3.9 VOLTS Med. Low: 8 AMPS, 6.2 VOLTS Med. High: 13 AMPS, 8.9 VOLTS High: 23 AMPS, 12.8 VOLTS
Ambient Temp. Switch (Open and Close)	Opens 35°F Minimum Closes 50°F Maximum 3°F Minimum Difference Between Opening and Closing Temperatures.
Protective Device	30 Amp. Fuse in Blower Circuit. 4 Amp. Fuse in Clutch Circuit. Thermal Limiter in Blower Resistor Circuit (Integral with Resistor).

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DETROIT IRON

Mustang II, Pinto and Bobcat Heater — Air Conditioner System

PART 36-44

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This Part deals with the controls and components that are peculiar to the Mustang II, Pinto and Bobcat Manual Heater-A/C system. Parts 36-31 through 36-35 give the information and procedures required for servicing the refrigeration system which is common to all car lines. Reference to all Parts is necessary for complete servicing of the system.

DESCRIPTION AND OPERATION

The Mustang II, Pinto and Bobcat manual air conditioning and heating system is an integral system receiving outside air directly from the cowl air intake, or recirculated air through the register on the right side of the evaporator case assembly.

INDEPENDENT CASE ASSEMBLY—BLOWER UPSTREAM

In systems using this type of case either outside air or interior (recirculating) air is drawn into the system by the blower motor and wheel. From this point, the blower "pushes" the air through the evaporator, then through/or around the heater core into the plenum and on through ducts to the several outlets—panel, floor and defroster.

The Mustang II control assembly is located in the lower left corner of the instrument panel. The Pinto and Bobcat control assembly is located in the center consolette.

The instrument panel register vertical vanes can be moved from side to side and pivoted up and down for air distribution or can be closed by moving the vanes to the side. On the Mustang II, Pinto and Bobcat, the left-hand and right-hand outboard registers are closed by moving the vanes inboard towards the centerline of the car.

SYSTEM OPERATION

Mustang II, Pinto and Bobcat Air Flow (See Fig. 2)

With the function control lever in any position except OFF, air is drawn directly into the system by the blower motor and wheel from the cowl or recirculating air intake. The air is then forced thru the evaporator core and depending upon the setting of the temperature blend door, is forced through and/or around the heater core into the air distribution ducts to the registers, defroster nozzles or floor area depending on the exact position of the function control lever setting. The temperature blend door is operated by a control cable connected to the temperature control lever.

When the temperature control lever is moved away from the maximum cool position one width of the lever (1/2 inch) the outside recirc. air door moves from recirc.

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to outside air position and the water valve remains closed. Moving the lever one inch away from the maximum cool position opens the water valve. With the function control lever in **OFF** position the blower is off and the outside recirc. air door is closed to outside air, open to recirc. air (vacuum), the water valve is closed (vacuum), and the system is inoperative.

In **ECONOMY VENT** position, the outside-recirc. air door is open to outside air (no vacuum), the water valve is closed (vacuum), and the Heat-Defrost door directs air upward (no vacuum) thru the A/C-defrost door (vacuum) to the registers. The outside air cannot be heated or cooled as the water valve is closed and the A/C clutch switch is open.

In **A/C** position with the temperature lever in maximum cool the outside-recirc. door is closed to outside air, open to recirc. air (vacuum), the Heat-Defrost door is positioned the same as in **ECONOMY VENT** position (no vacuum), the water valve is closed (vacuum), the A/C-defrost door is open to A/C (panel) position (vacuum) and cold air is discharged through the four registers in the instrument panel. *The compressor operates in this position* (A/C) only when the ambient switch is closed.

In all the remaining **A/C** temperature control positions the outside-recirc. door is open to outside air (no vacuum) and the water valve is open (no vacuum).

In **HI/LO** position, the Heat-Defrost door is in the mid-position (partial vacuum), the A/C-defrost door is open to panel position (vacuum) and air is discharged thru the instrument panel registers and also to the floor outlets. Air flow thru the heater core is controlled proportionate to the setting of the temperature blend door that controls the warm and cool air as it enters the air distribution (plenum) duct.

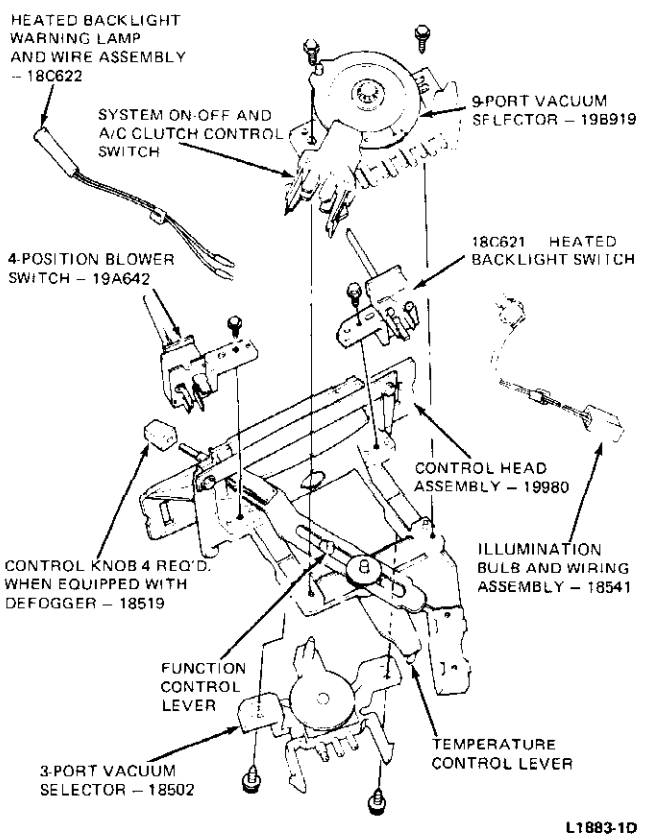


FIG. 1 A/C Control Assembly Disassembled—Mustang II, Pinto and Bobcat

In **HEAT** position, the Heat-Defrost door restricts air to the registers (full vacuum), and diverts the air to the floor with some defrost bleed.

In **DEFOG** (mid-position), the Heat-Defrost door is in the mid-position (partial vacuum), the A/C-defrost door is open to the defroster outlets (no vacuum); the air is distributed to the defrosters and floor outlets. The compressor operates in this position when the ambient temperature switch is closed. This aids in reducing fogging by dehumidifying the incoming outside air.

In **DEFROST** position, the Heat-Defrost door restricts air to the floor outlets (no vacuum), the A/C-defrost door is open to the defroster outlets (no vacuum) and diverts air to the defrosters with some floor bleed. The compressor operates in this position, to reduce the humidity when the ambient temperature switch is closed.

A blower switch and resistor assembly provides four blower speeds to control the quantity of air flow. The system on-off and **A/C** clutch control switch is mounted on the control head 9-port vacuum selector (Fig. 3) and is actuated when the functional control lever is in all positions except **OFF** . The A/C clutch switch is actuated in the **A/C, DEFOG and DEFROST position.**

CONTROLS—MUSTANG II (SEE FIG. 1)

Function Control Lever (See Figs. 3 and 4)

The function control lever actuates a 9 port vacuum selector that controls vacuum to all of the vacuum motors in the system. It also controls the blower switch and activates the A/C clutch circuit in A/C, DEFOG and DEFROST positions. Selection of any positions except **OFF** and **A/C** will activate the outside-recirc. door to the outside air position regardless of the temperature lever position.

Clutch operation is dependent upon an ambient temperature switch and the function lever position. The clutch will be on when the function lever is in the A/C, DEFOG and DEFROST positions and the ambient temperature is closed.

The blower motor runs at all times except when the function lever is in the OFF position.

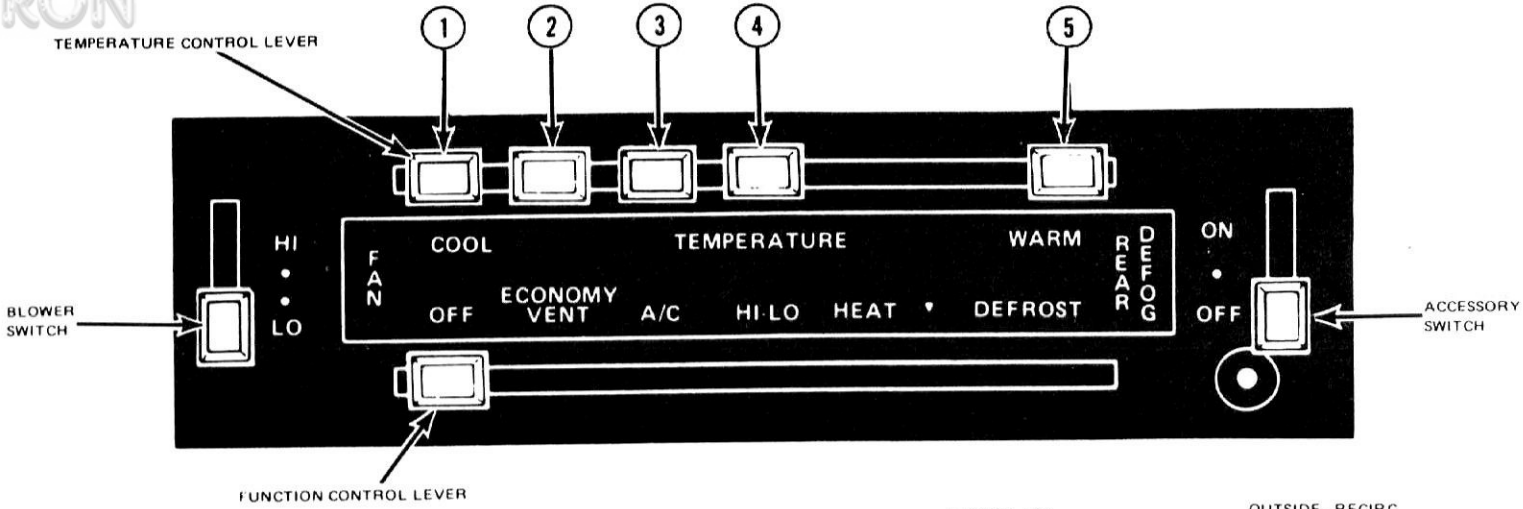
Temperature Control Lever (See Fig. 1)

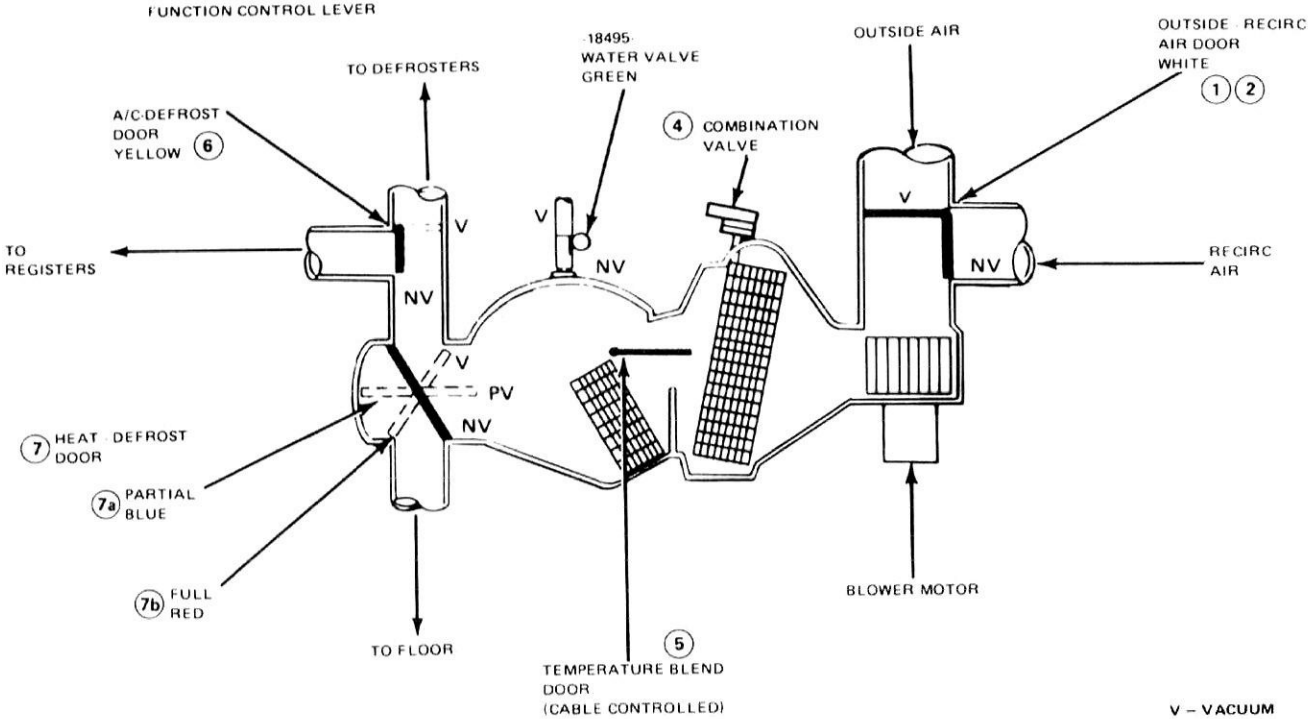
The temperature control lever actuates a 3 port vacuum selector that controls the outside-recirc. door and water valve vacuum motors. It also operates the control cable which controls the temperature blend door.

The system operates to recirculate (inside) air when the temperature lever is in the **COOL** position and the function lever is set on A/C. When the temperature lever has moved approximately 1/2 inch to the right of the extreme left (cool) position, the outside/recirc. air door opens to admit outside air. Regardless of the temperature lever setting the system will operate with outside air in all positions except **OFF** and **A/C** .

The water valve opens (hot water to the heater core) when the temperature lever has moved approximately

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V – VACUUM
NV – NO VACUUM
PV – PARTIAL VACUUM

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MANUAL A/C-HEATER SYSTEM VACUUM MOTOR TEST CHART

FUNCTION CONTROL LEVER POSITION	TEMPERATURE CONTROL LEVER POSITION	VACUUM MOTORS APPLIED WITH VACUUM				
		OUTSIDE-RECIRC.	WATER VALVE	A/C-DEFROST	HEAT - DEFROST	
					PARTIAL	FULL
OFF	Any Position	1 - 2	4	–	7a	7b
ECONOMY VENT	Any Position	–	4	6	–	–
A/C *	Cool - 1	1 - 2	4	6	–	–
	Cool - 2	–	4	6	–	–
	Cool - 3 Temp - 4 Warm - 5	–	–	6	–	–
HI - LO	Cool - 1	–	4	6	7a	–
	Cool - 2	–	4	6	7a	–
	Cool - 3 Temp - 4 Warm - 5	–	–	6	7a	–
HEAT	Cool - 1	–	4	–	7a	7b
	Cool - 2	–	4	–	7a	7b
	Cool - 3 Temp - 4 Warm - 5	–	–	–	7a	7b
▽ (DEFOG) *	Cool - 1	–	4	–	7a	–
	Cool - 2	–	4	–	7a	–
	Cool 3 - Temp - 4 Warm - 5	–	–	–	7a	–
DEFROST *	Cool - 1	–	4	–	–	–
	Cool - 2	–	4	–	–	–
	Cool - 3 Temp - 4 Warm - 5	–	–	–	–	–
VACUUM LINE COLOR CODE		WHITE	GREEN	YELLOW	BLUE (TOP)	RED (SIDE)

* COMPRESSOR CLUTCH ENGAGED WHEN AMBIENT CUT-OFF SWITCH IS CLOSED.
– NO VACUUM

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FIG. 2 Air Flow—Mustang II, Pinto and Bobcat

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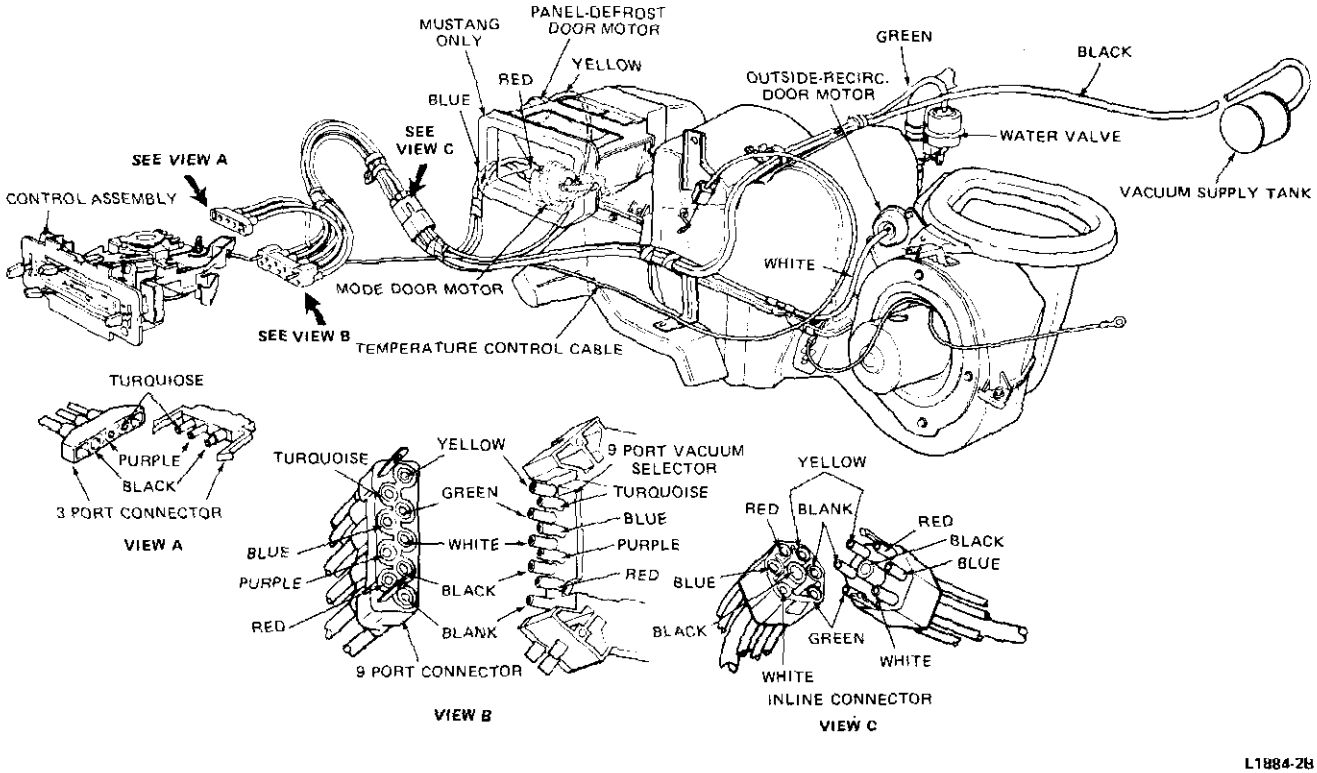


FIG. 3 Independent Case, Manual A/C-Heater System Assembly—Mustang II, Pinto and Bobcat

one inch to the right of the extreme left (cool) position. The water valve will be closed when the lever is in **either OFF or VENT** position regardless of the temperature lever setting.

Blower Switch and Resistor Assembly (See Figs. 3, 4 and 5)

The blower switch is located on the left side of the control assembly. *The switch and a resistor assembly* provide four blower speeds to control the amount of air flowing through the system. The switch *cannot turn the* blower off. The blower runs at all times except when *the function* lever is in the **OFF** position. The resistor assembly is located on the rear surface of the lower evaporator case assembly near the blower motor.

Water Valve

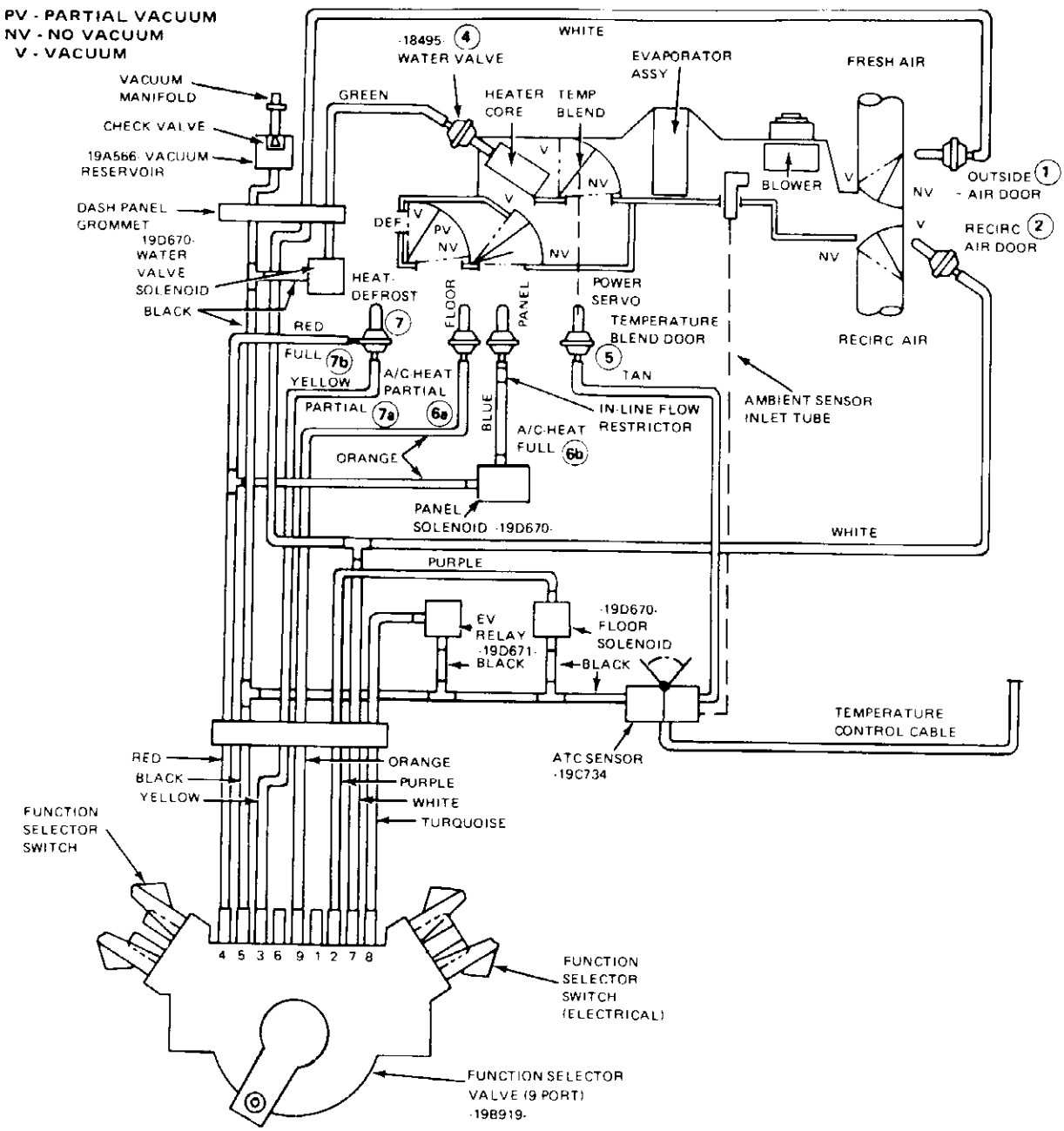
The water valve is located in the engine compartment in the heater core inlet water line near the dash panel.

FOR INFORMATION ON PINTO, BOBCAT AND MUSTANG II REFRIGERANT SYSTEMS, SEE PART 36-32

REFRIGERANT CHARGING VALVES

The two service access gauge port valves for charging the refrigerant system with Refrigerant-12 are located as shown in Figs. 6 through 10. A *third service access gauge port valve* is located on the combination valve to monitor the evaporator pressure.

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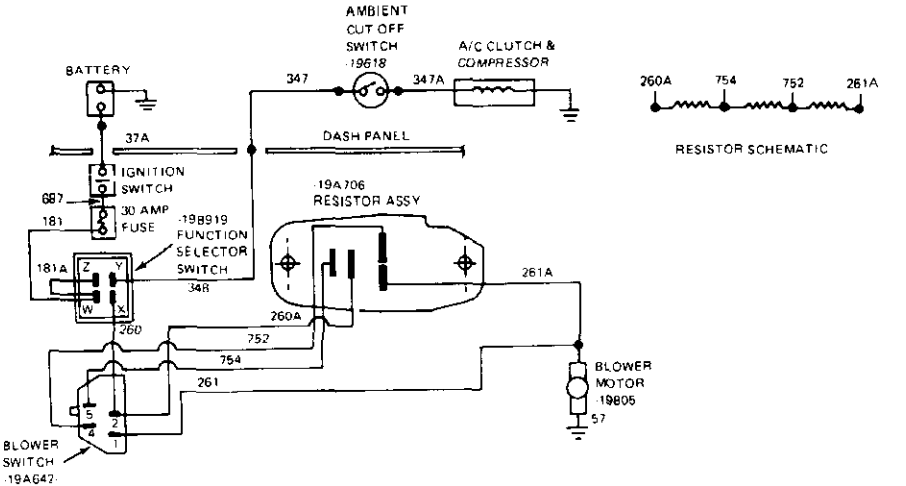


PORT	FUNCTION	FUNCTION SELECTOR VALVE POSITIONS					HOSE COLOR
		OFF	ECONOMY VENT	AUTO	DEFOG	DEFROST	
1	No Function	Seal	Seal	Seal	Seal	Seal	–
2	Floor Solenoid	Seal	Seal	To 9	Seal	Seal	Purple
3	Heat/Def Partial	V	V	V	V		Yellow 7a
4	Heat/Def Full	V	V	V			Red 7b
5	Source Vacuum	V	V	V	V	V	Black
6	No Function	Seal	Seal	Seal	Seal	Seal	–
7	Outside–Recirc.	V		To 8			White 1-2
8	EV Relay	Seal	Seal	To 7	Seal	Seal	Turquoise
9	A/C–Heat Partial		V	To 2			Orange 6a

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FIG. 4 Vacuum Diagram

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FUNCTION SELECTOR SWITCH -19B919-							
SWITCH SCHEMATIC	TERMINAL CONNECTIONS						
	OFF	ECONOMY VENT	A/C	HI-LO	HEAT	▽ DEFOG	DEFROST
X Y W Z	None	W - X	W - X Y - Z	W - X	W - X	W - X Y - Z	W - X Y - Z

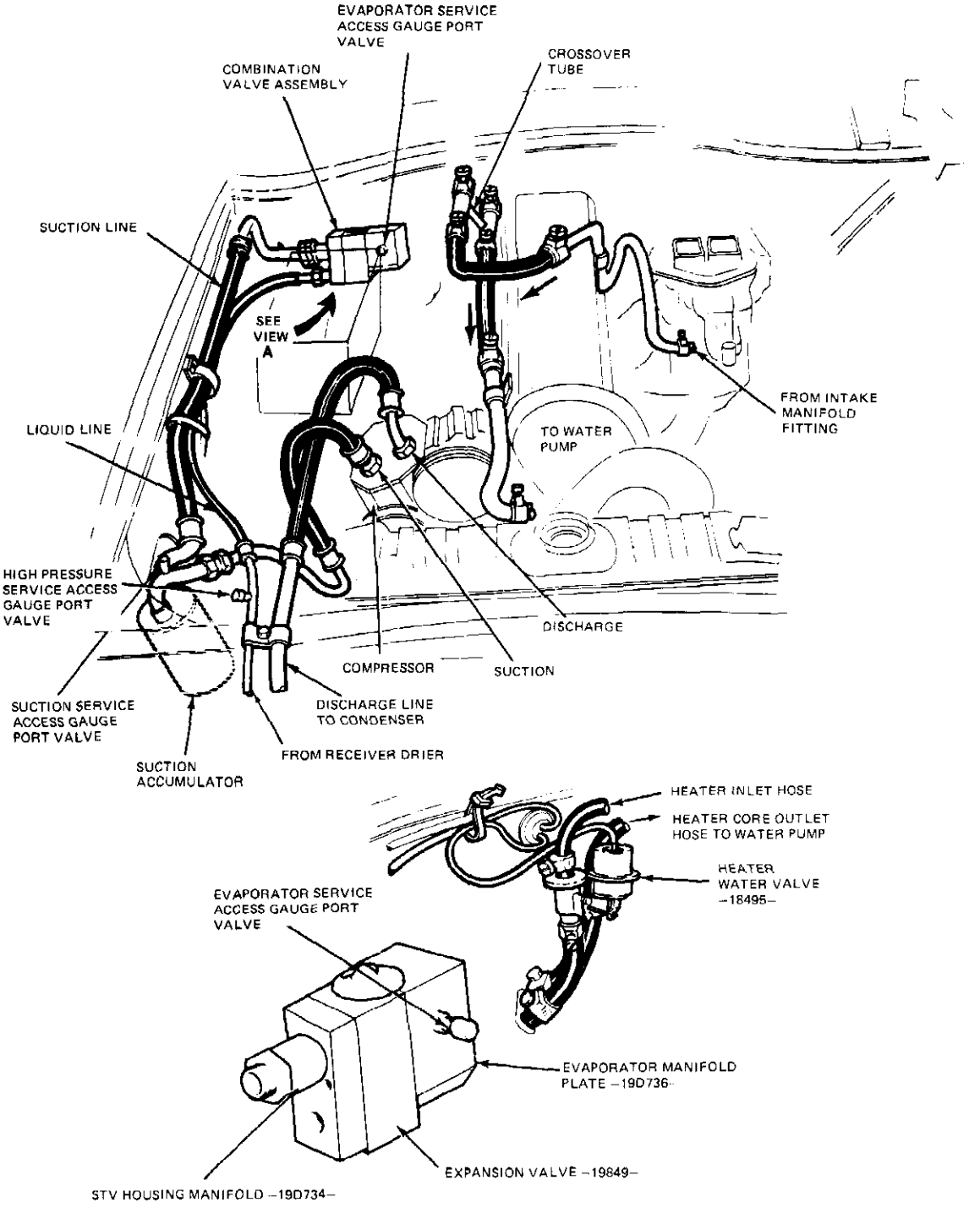
BLOWER SWITCH -19A642-			
BLOWER SPEED	TERMINAL CONNECTIONS	CURRENT IN CAR (AMPS)	BLOWER VOLTAGE
Low	2	5	7.0 - 9.0
Med Low	2 - 5	8	9.0 - 11.5
Med High	2 - 4 - 5	15	11.5 - 13.0
High	2 - 1 - 4	22	13.0 - 14.8

CIRCUIT NO	WIRE COLOR
37A	Yellow
57	Black
181A	Brown W/Orange Stripe
260A	Red W/Orange Hash
261A	Orange W/Black Stripe
347A	Black W/Yellow Hash
348	Lt. Green W/Purple Hash
687	Gray W/Lt. Blue Hash
752	Yellow W/Red Dot
754	Lt. Green W/White Hash

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FIG. 5 Electrical Wiring Diagram—Mustang II, Pinto and Bobcat

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FIG. 6 Mustang II— A/C and Heater Hose Routings—2.3L Engines

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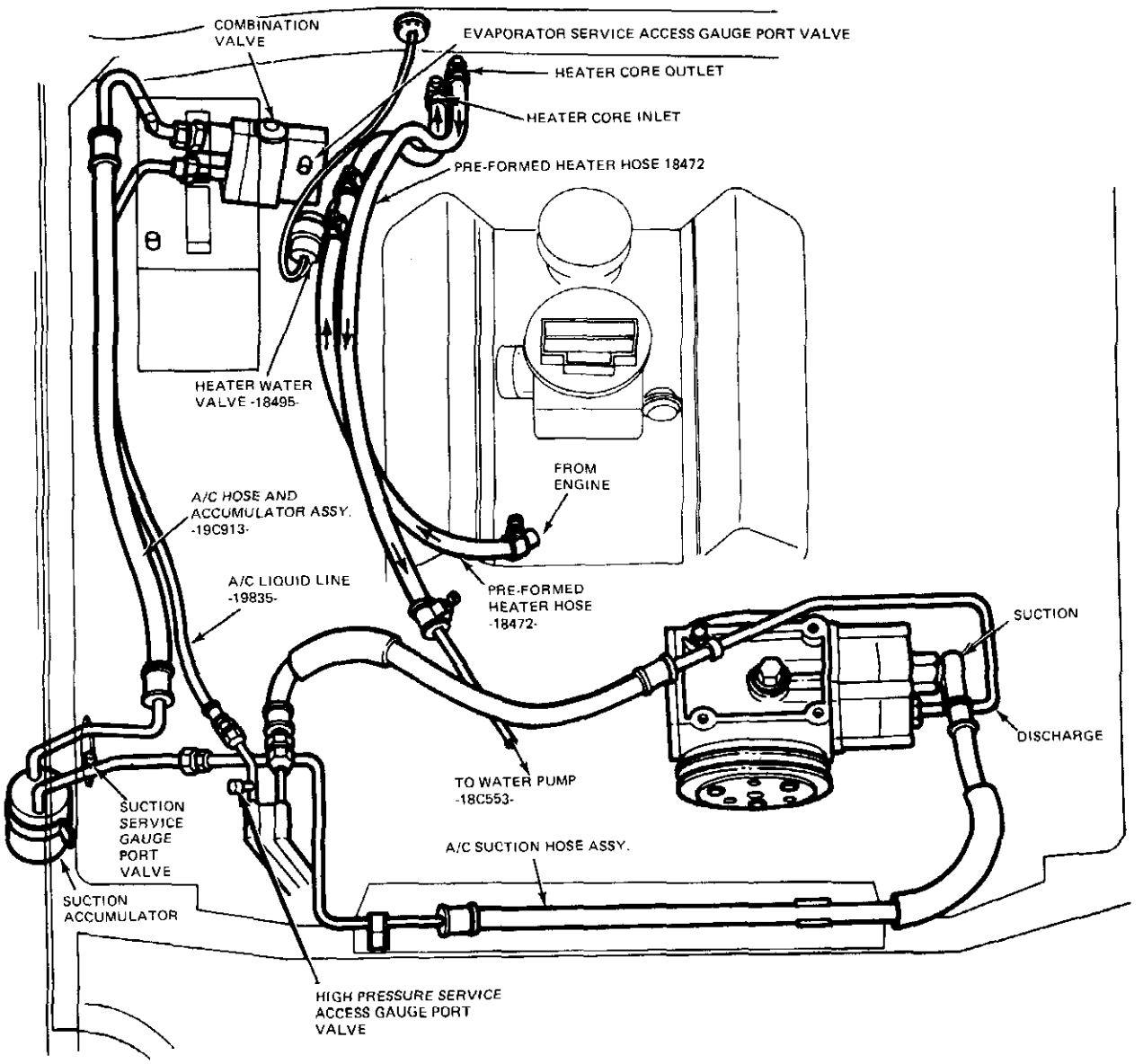


FIG. 7 Mustang II A/C and Heater Hose Routings—2.8L Engines

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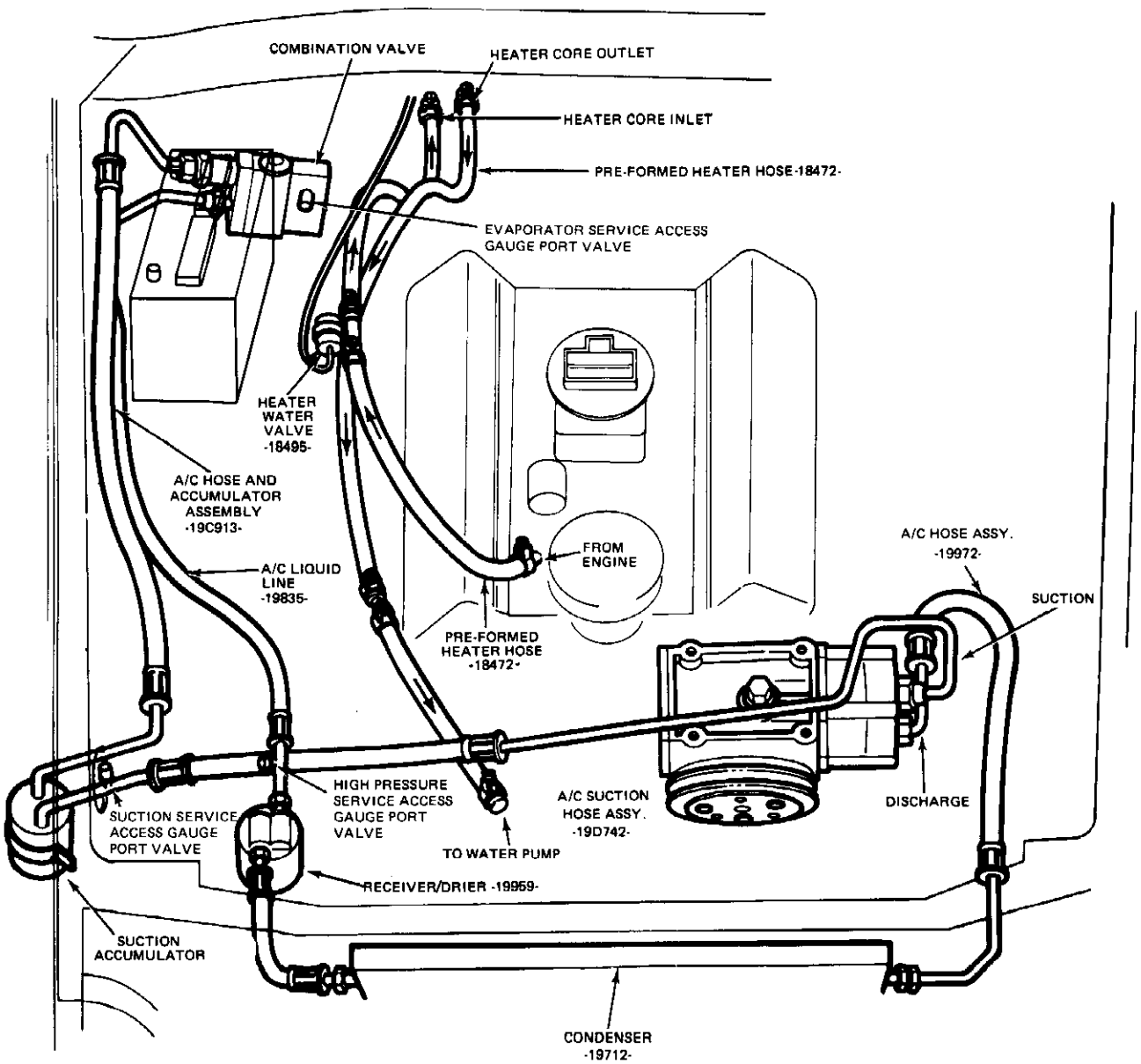
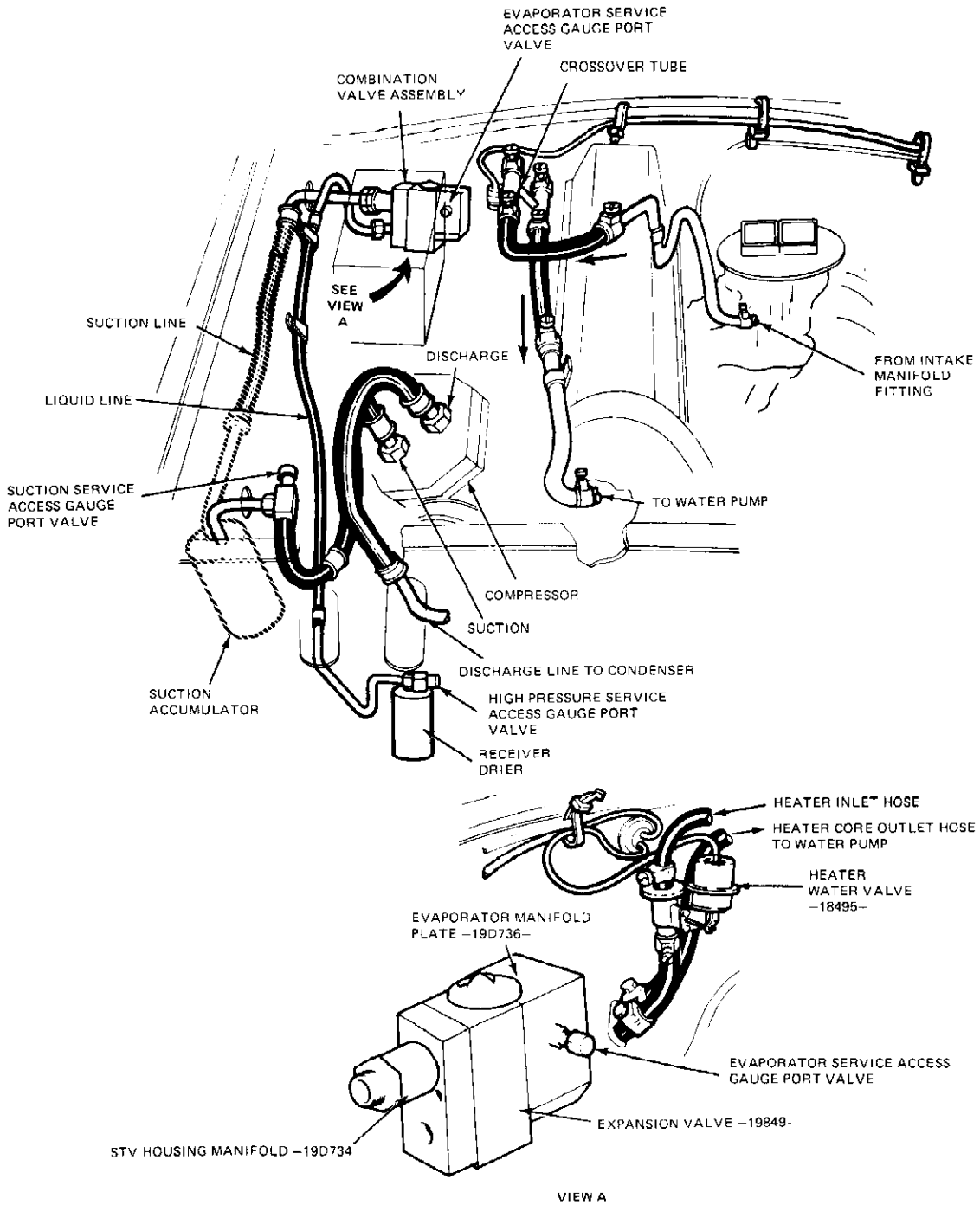


FIG. 8 Mustang II A/C and Heater Hose Routings—5.0L (302 CID) Engines

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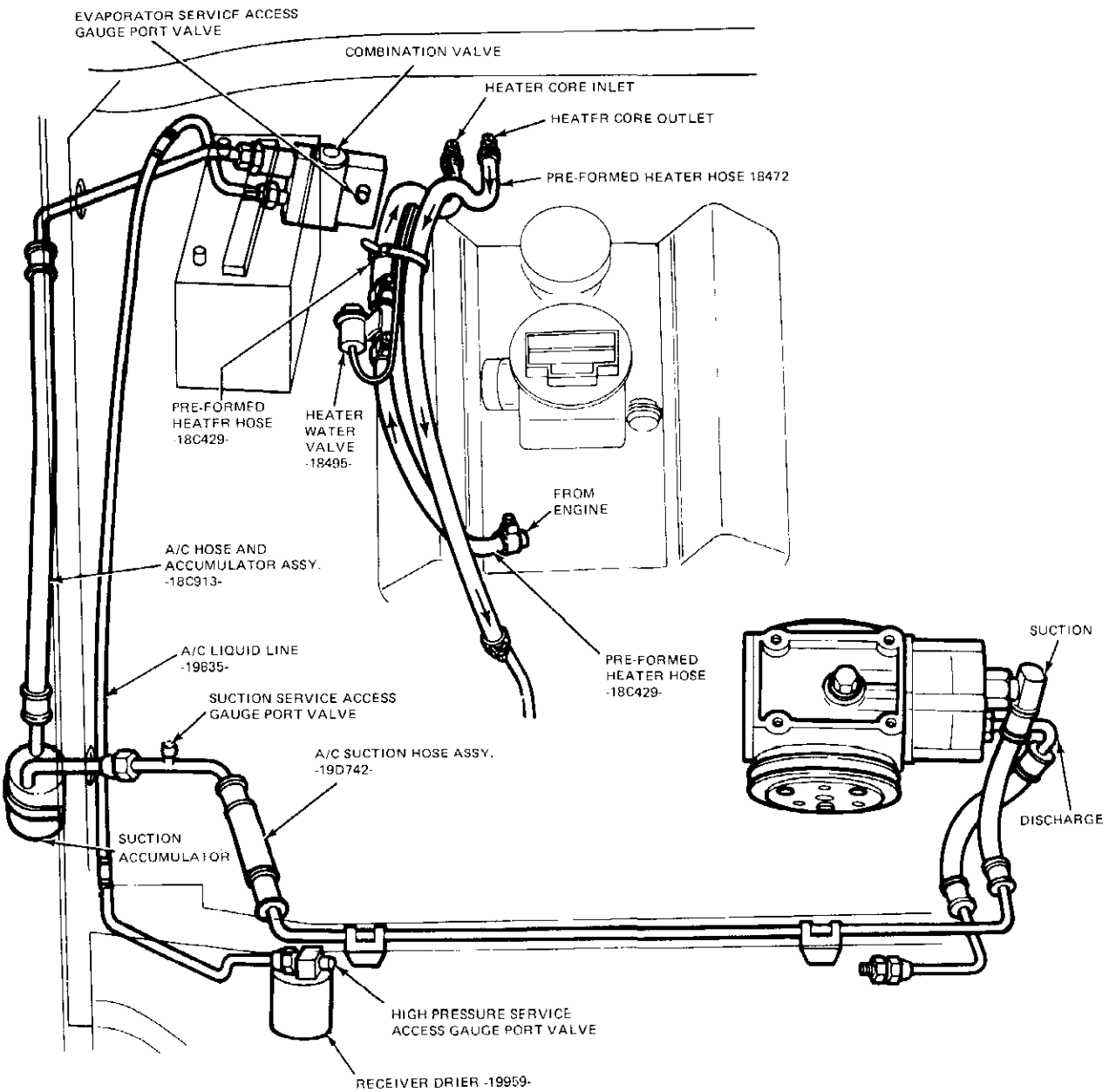
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FIG. 9 Pinto and Bobcat A/C and Heater Hose Routings—2.3L Engines

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FIG. 10 Pinto and Bobcat A/C and Heater Hose Routings—2.8L Engines

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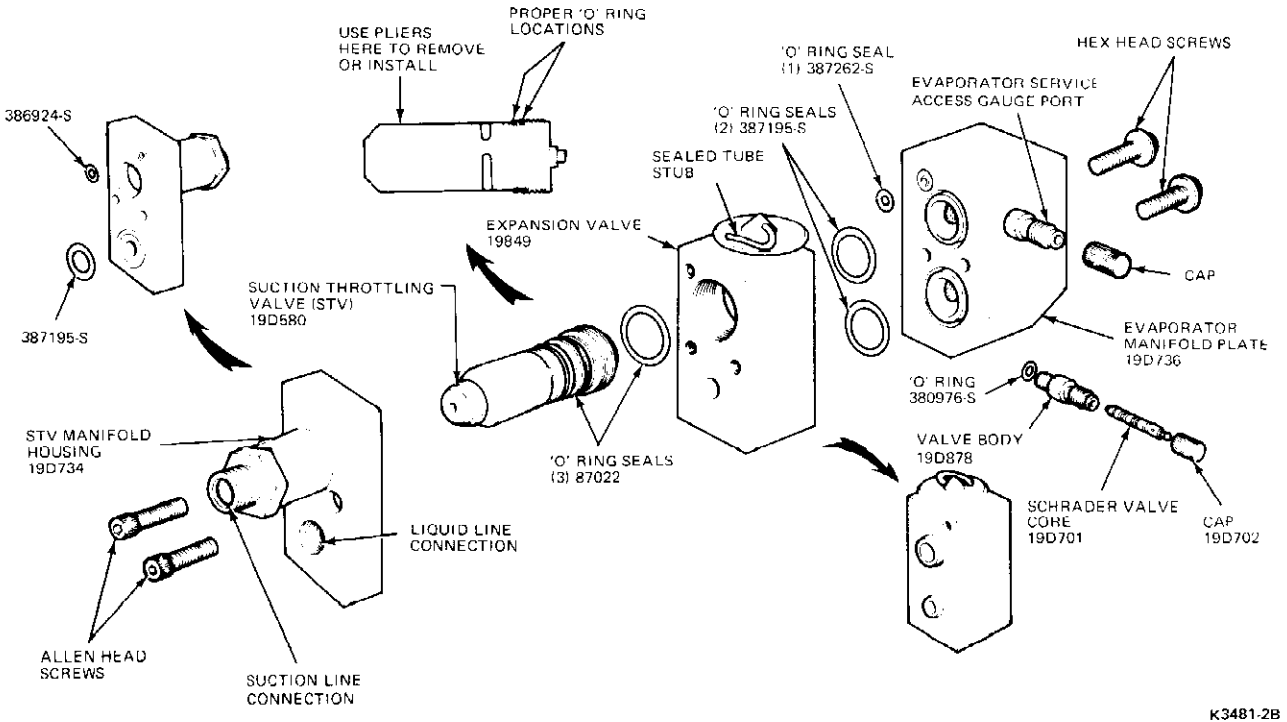


FIG. 11 Combination Valve—Disassembled View

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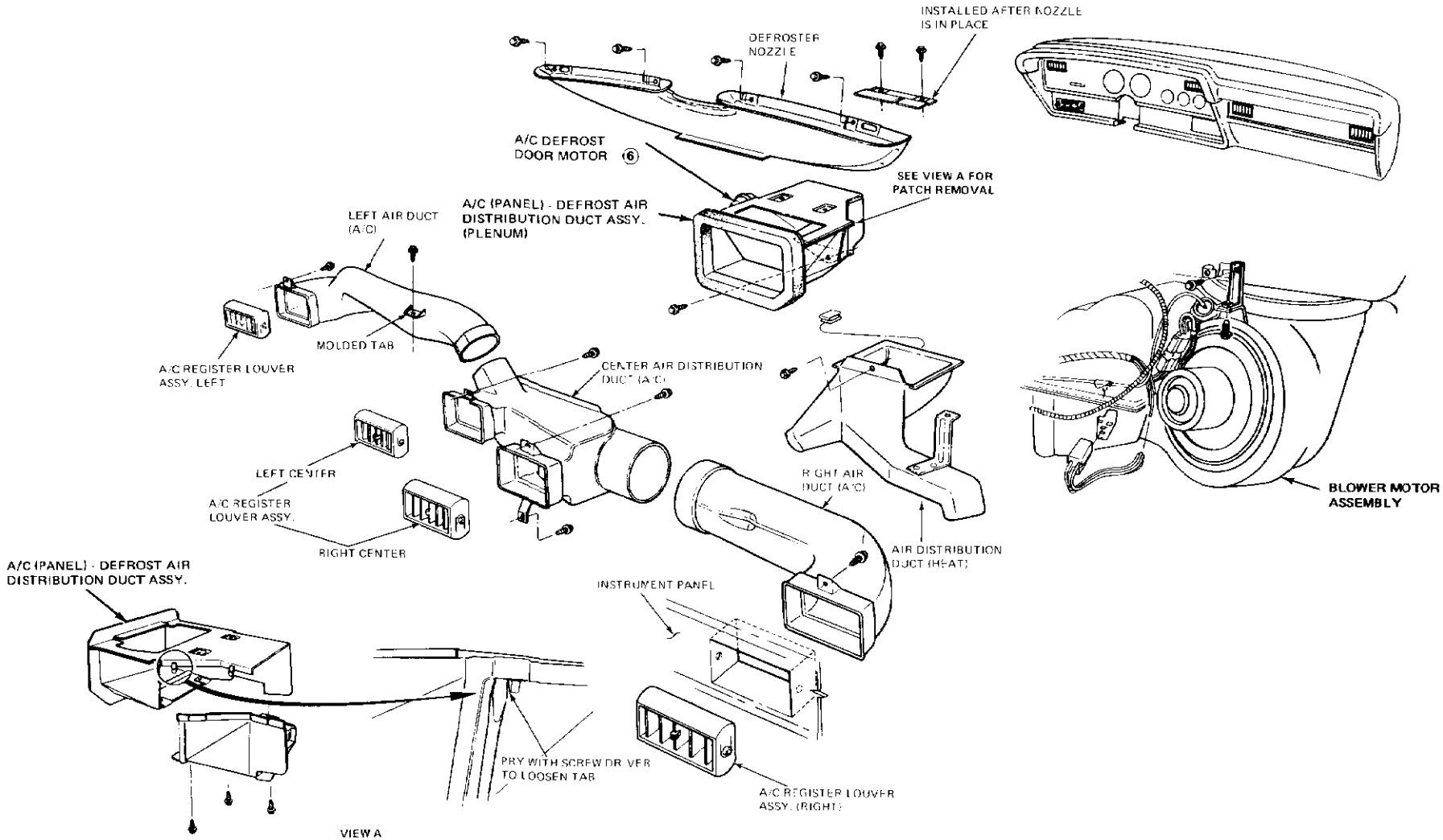


FIG. 12 Independent Case—Manual A/C-Heater System—Mustang II

L1919-2C

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DETROIT IRON

REMOVAL AND INSTALLATION

COMBINATION VALVE ASSEMBLY (FIG. 11)

Observe the Safety Precautions outlined in Part 36-31.

Removal

1. Discharge the refrigerant system.
2. Remove the battery cables, battery and battery heat shield for access to the Combination Valve assembly.
3. Remove the (2) refrigerant lines from the STV Housing Manifold, using a back-up wrench on the STV Housing Manifold hex fitting (large diameter line), to prevent component damage.
4. Remove the (2) hex-head attaching bolts from the side of the Manifold Plate and remove the Expansion Valve and STV Housing Manifold from the Evaporator Manifold Plate.
5. Remove the (2) socket-head (Allen) screws attaching the STV Housing Manifold to the Expansion Valve body.
6. Separate the STV Housing Manifold from the Expansion Valve body.
7. Using curved jaw "channel lock" type pliers, grasp the STV body on the surface nearest the tapered end (opposite end from the slots). Unscrew in a counter-clockwise direction and remove the STV.
8. Remove the STV O-ring seal from the Expansion Valve body.

Installation

1. Lubricate and install (3) new O-rings, two on the STV to seal the STV Housing Manifold and one in the STV opening of the Expansion Valve body.
2. Thread the STV into the Expansion Valve body and tighten, hand tight, with curved jaw "channel lock" type pliers.

   CAUTION: To prevent STV damage, grasp the body of the STV on the end nearest the taper, opposite from the slotted end.
3. Lubricate and install the two remaining O-rings in the STV Housing Manifold.
4. Place the STV Housing Manifold over the STV and position against the Expansion Valve body.
5. Install the (2) socket-head (Allen) screws and torque to 4-6 ft-lbs.
6. Lubricate and install (3) new O-rings on the Evaporator Manifold Plate.
7. Position the Expansion Valve and the STV Housing Manifold assembly on the Evaporator Manifold Plate. Install the (2) hex-head attaching bolts and torque to 4-8 ft-lbs.
8. Lubricate and install (2) new O-rings on the refrigerant line fittings.
9. Install the refrigerant lines, using a back-up wrench on the STV Housing Manifold hex fitting to prevent component damage.
10. Install the battery heat shield, battery and battery cables.
11. Evacuate, leak check and recharge the refrigerant system to specifications.

CONDENSER AND RECEIVER ASSEMBLY—MUSTANG II (SEE FIG. 14)

Observe the safety precautions outlined in Part 36-31.

1. Discharge the refrigerant system.
2. Remove the lower hood lock and vertical support brace.
3. Disconnect the ambient temperature switch wiring.
4. If equipped with power steering, remove the power steering cooler tube mounting screws from the radiator support and move the cooler up and outward away from the condenser. **DO NOT DISCONNECT THE LINES.**
5. Disconnect the liquid and discharge lines at the fittings.
6. Remove four condenser mounting screws and move the condenser upward out of the vehicle.
7. To install, reverse the preceding procedure. Install new O-rings in the refrigerant lines. Dip the O-rings in refrigerant oil before installing.
8. Evacuate and charge the system (Part 36-32).

CONDENSER AND RECEIVER ASSEMBLY—PINTO AND BOBCAT (SEE FIG. 14)

Observe the safety precautions outlined in Part 36-31.

The condenser and receiver assembly is located forward of the radiator and mounted to the radiator support with four screws. It can be serviced by removing the lower hood latch bracket and sliding the assembly up through the opening forward of the radiator support.

CONTROL ASSEMBLY—MUSTANG II

1. Remove the two control head mounting screws from the rear of the instrument panel and one control support bracket screw from the lower lip of the instrument panel.
2. Lower the control assembly from the rear of the panel opening.
3. Remove the temperature control cable from the control head (one screw and one push nut).
4. Disconnect the vacuum harness from the two vacuum selectors.
5. Disconnect the electrical wiring connectors from the blower switch, clutch switch, and illumination bulb. Disconnect the wiring from the rear defogger switch and warning lamp, if so equipped.
6. Remove the control head.
7. To install, reverse the preceding procedure and adjust the temperature control cable at the evaporator case, as required.

CONTROL ASSEMBLY—PINTO AND BOBCAT

1. Remove the consolette trim cover.
2. Disconnect the temperature control cable from the evaporator case.
3. Remove two screws retaining the consolette to the support bracket and pull the consolette rearward.

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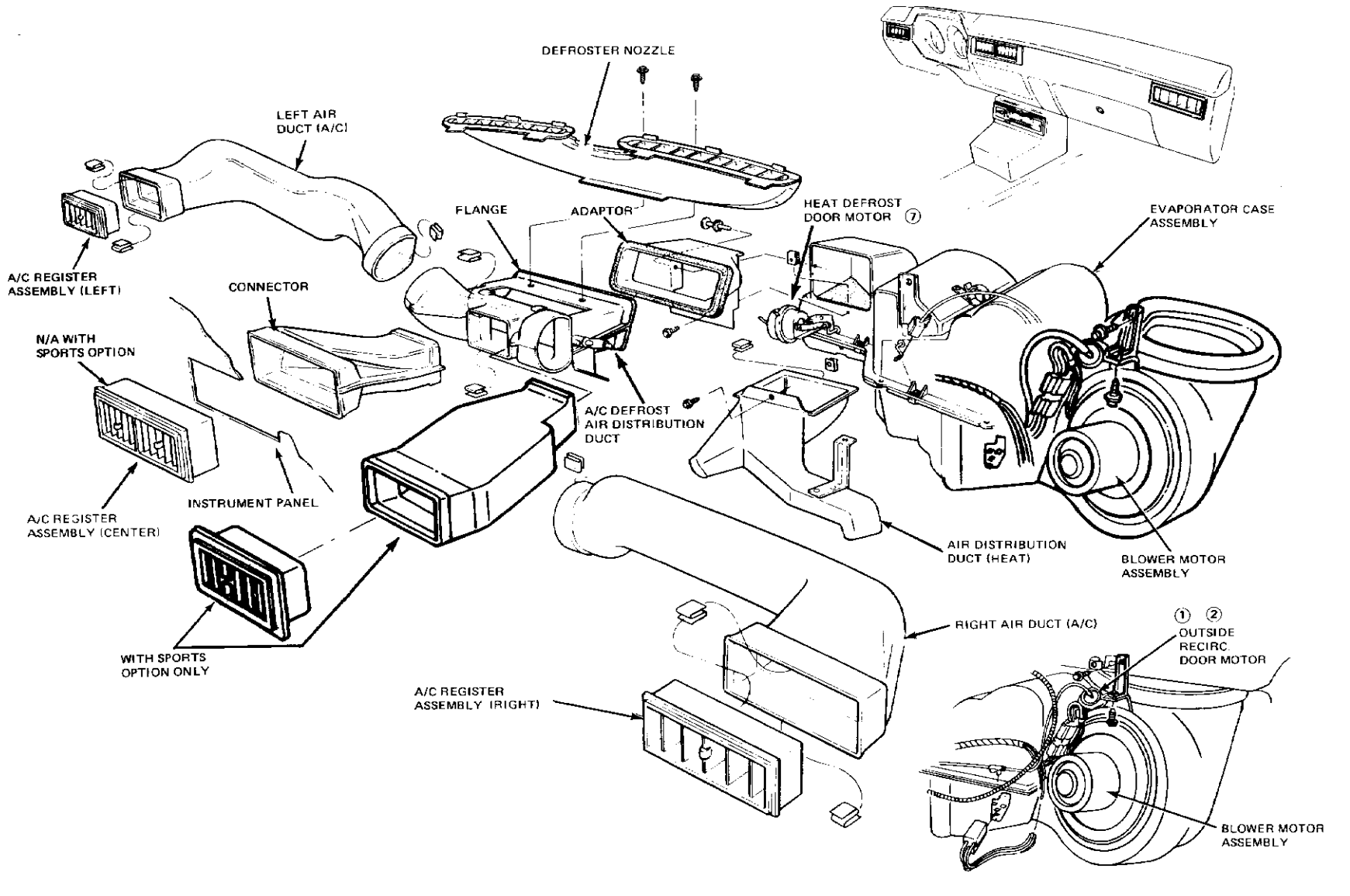


FIG. 13 Independent Case—Manual Integral A/C-Heater System—Pinto and Bobcat

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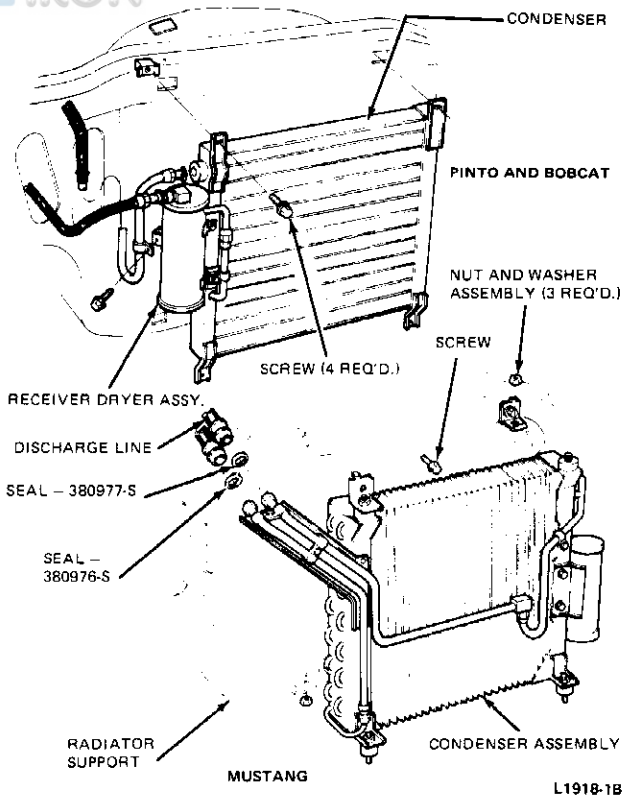


FIG. 14 Condenser Receiver Assembly

4. Remove two screws from the face of control assembly.
5. Pull the control assembly away from the consolette.
6. Disconnect the vacuum harness from the vacuum selector and water valve vacuum switch.
7. Disconnect the electrical wiring from the blower switch, clutch switch and illumination bulb wire.
8. Remove the control head assembly.

To install, reverse the procedure and adjust the temperature cable.

AIR DISTRIBUTION DUCTS—MUSTANG II (SEE FIG. 12)

Right Air Duct

1. Remove the glove box.
2. Remove the register louver assembly.
3. Remove the air duct to the instrument panel retaining screw at the register opening.
4. Disconnect the air duct from the A/C-Defrost plenum and remove the duct.
5. To install, reverse the procedure.

Left Air Duct

1. Remove the instrument cluster.
2. Remove the register louver assembly.
3. Remove the air duct to instrument panel retaining screws at the register opening and near the center air duct.
4. Rotate the duct and remove it through the cluster opening or from below the instrument panel.
5. To install, reverse the procedure.

Center Air Duct

1. Remove the two center register louver assemblies.
2. Remove the radio.
3. Remove the one retaining screw at the left center register louver opening and the two retaining screws at the right center register louver opening.
4. Disconnect the center air duct and remove from under the instrument panel.
5. To install, reverse the procedure.

Air Distribution Duct—Heat

1. Remove the heat duct bracket retaining screw.
2. Remove the heat duct to evaporater case assembly retaining screw and remove the heat duct.
3. To install, reverse the procedure.

AIR DISTRIBUTION DUCTS—PINTO AND BOBCAT (SEE FIG. 13)

Right Air Duct

1. Remove the glove box.
2. Remove the register assembly.
3. Disconnect right air duct from A/C-Defrost plenum and remove the duct.
4. To install, reverse the preceding procedure. **Make sure S-clips are positioned properly on each end of the duct as shown (Fig. 13).**

Left Air Duct

1. Remove the instrument cluster.
2. Remove the left register assembly.
3. Disconnect the left air duct from the A/C-Defrost plenum.
4. Rotate the duct and remove it through the cluster opening or below the instrument panel.
5. To install, reverse the preceding procedure. **Make sure the S-clips are positioned properly on each end of the duct as shown (Fig. 13).**

Center Air Duct

1. Remove the center register assembly.
2. Remove the consolette.
3. Remove the radio.
4. Disconnect the center air duct and remove the center air duct and connector from under the instrument panel.
5. To install, reverse the preceding procedure and make sure the S-clips are installed properly as shown (Fig. 13).

A/C-Defrost Plenum

1. Remove the right air duct and center duct.
2. Remove two A/C-Defrost plenum to speaker mounting bracket stud nuts.
3. Remove vacuum hose from the A/C-Defrost door vacuum motor.
4. Remove two (2) plenum to defroster nozzle mounting screws.
5. Move plenum rearward to separate it from the defroster nozzle and toward the right side to separate the plenum from left air duct S-clip.

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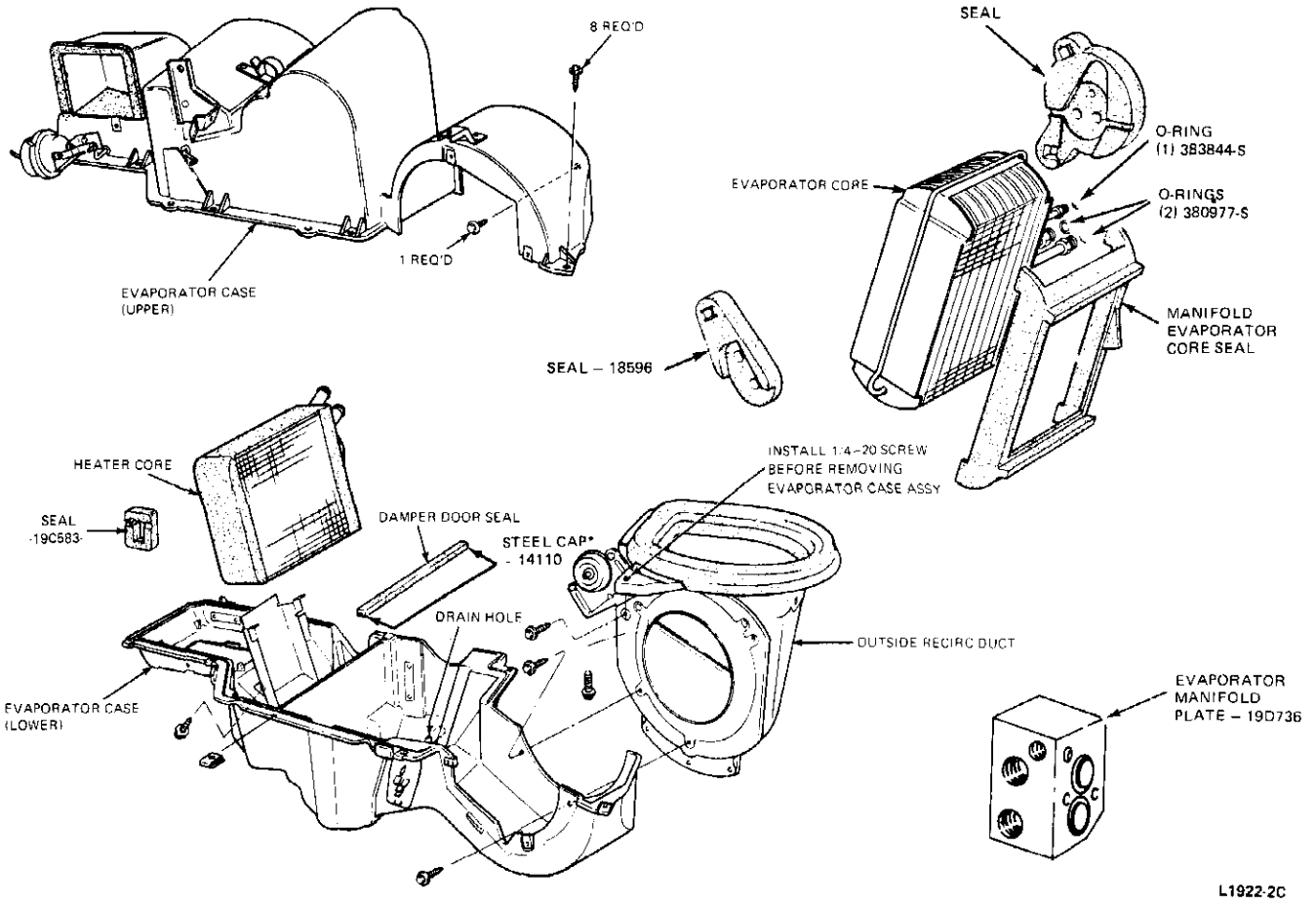


FIG. 15 A/C Evaporator Case Disassembled—Pinto, Bobcat and Mustang II

6. To install, reverse the preceding procedure and **make sure S-clips are installed properly as shown (Fig. 13).**

Air Distribution Duct—Heat

1. Remove the heat duct bracket retaining screw.
2. Remove the heat duct to evaporator case retaining screw and remove the heat duct.
3. To install, reverse the procedure.

REGISTER LOUVERS

With reference to Fig. 16, pry on the end pivot with a thin blade to separate the pivot from the pivot hole and pull the barrel assembly rearward from the register housing.

DEFROSTER NOZZLE

Mustang II (See Fig. 12)

1. Remove the instrument panel crash pad.
2. Loosen the four instrument mounting bolts and move the panel assembly rearward.
3. Remove the two screws from the nozzle retaining plate on top of the plenum and remove the plate.
4. Remove the four nozzle to panel mounting screws.
5. Remove one plenum to case attaching screw to allow plenum to move rearward.
6. Remove the defroster nozzle upward through the crash pad opening.
7. To install, reverse the procedure.

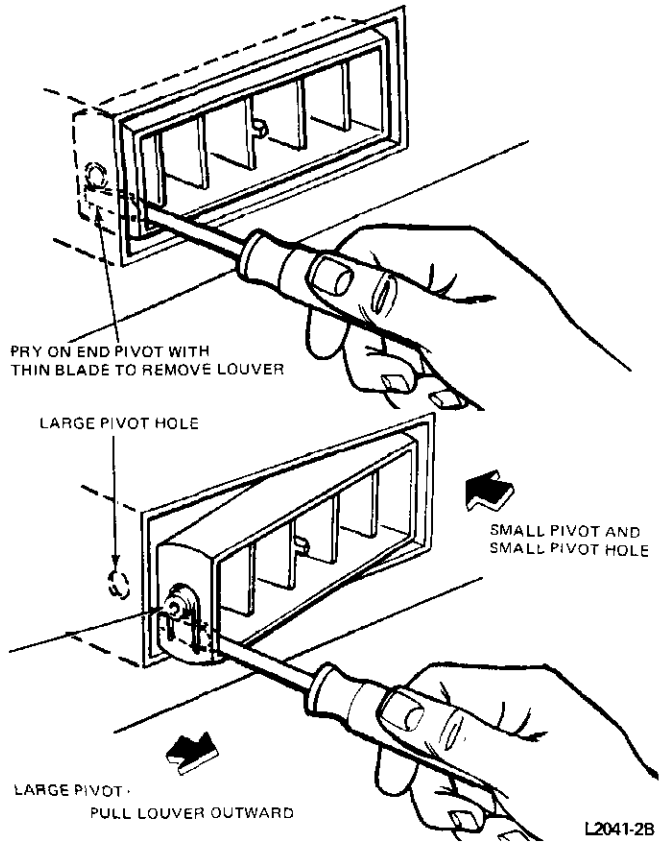


FIG. 16 Register Louver Removal

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DETROIT IRON

Pinto and Bobcat (See Fig. 13)

1. Remove the glove box.
2. Remove the A/C-Defrost plenum right and center air ducts.
3. Straighten the four defroster to instrument panel flange tabs, lower the nozzle toward the right and remove it from below the instrument panel.
4. To install, reverse the preceding procedure. Be sure that the access door is **securely closed to prevent air leakage.**

EVAPORATOR ASSEMBLY

Mustang II (Fig. 12)

Observe the safety precautions outlined in Part 36-31.

Removal

1. Disconnect the battery cables, remove the battery, drain the cooling system and discharge the refrigerant from the A/C system.
2. Remove the instrument panel pad assembly. Refer to Volume 4, Group 45—Part 61.
3. Remove the radio speaker assembly (if so equipped). Refer to Part 35-30.
4. Remove both "A" pillar mouldings.
5. Remove both side kick panel pad assemblies.
6. Remove the lower steering column cover (2 screws).
7. Remove the steering column-to-cowl panel shake brace (4 nuts).
8. Remove the accelerator pedal assembly and disconnect the (2) control cables.
9. Remove the bottom bolt retaining center shake brace to the instrument panel assembly.
10. Disconnect the antenna lead from the radio (if so equipped).
11. Disconnect (5) connectors at the left cowl panel.
12. Disconnect the wiper harness plug from the wiper switch.
13. Disconnect (5) connectors at the right cowl panel.
14. Disconnect the plug from the dimmer switch assembly.
15. Disconnect the heater blower motor resistor.
16. Disconnect temperature control cable. Remove two evaporator-to-upper cowl bracket screws.
17. Disconnect the main wiring harness (in the engine compartment) and then, push the harness into the passenger compartment.
18. Disconnect the (3) remaining connectors and push the connectors into the passenger compartment.
19. Disconnect the turn signal indicator switch assembly.
20. Drop the steering column assembly (4) nuts.
21. Disconnect the multiple connector(s) at the ignition switch.
22. Disconnect the plug at the stoplight switch assembly.
23. Remove the instrument panel-to-steering column center support bracket (1 bolt) and remove the bracket.
24. Remove (4) instrument panel retaining bolts and remove the instrument panel.
25. Disconnect the heater hoses from the heater core tubes in the engine compartment.
26. Remove the two hex head screws attaching the evaporator manifold plate to the expansion valve body.
27. Separate the expansion valve body and the STV housing manifold from the evaporator manifold plate.
28. Remove (4) nuts retaining the evaporator to the dash panel and remove the evaporator assembly.
29. Remove the defroster and A/C duct assembly (5 screws).
30. Remove the mounting brackets from the evaporator case assembly and place on work bench.
31. Remove flower motor, wheel and recirc. duct.
32. Remove (11) screws from the evaporator case, separate the case and remove the evaporator core assembly.

Installation

1. Position the evaporator core to the evaporator case making sure the damper door seal and steel cap are in position (Fig. 15), and install the (11) attaching screws, blower motor and recirc. duct.
2. Install the mounting brackets to the evaporator case assembly (2 bolts).
3. Install the defroster and A/C duct assembly (5 screws). Attach temperature control cable.
4. Install the heater assembly to the dash panel and install the (4) retaining nuts. Install two evaporator-to-upper cowl bracket screws.
5. Insert new, freshly lubricated O-rings on the openings between the evaporator manifold plate and the expansion valve and STV housing manifold assembly.
6. Position the expansion valve body on the evaporator manifold plate and install the two hex-head attaching screws. Tighten the screws to 4-8 ft-lbs torque.
7. Connect the heater hoses to the heater core tubes.
8. Install the instrument panel to the dash panel (4 bolts).
9. Install the instrument panel-to-steering column center support bracket (1 bolt).
10. Connect the plug to the stoplight switch assembly.
11. Connect the multiple connector(s) to the ignition switch.
12. Place the steering column into position and install the (4) retaining nuts.
13. Connect the turn signal indicator switch to the connector plug.
14. Insert the (3) connectors and 14401 harness into the engine compartment, connect and install the attaching screw.
15. Connect the heater blower resistor.
16. Connect the dimmer switch plug.
17. Connect the (5) connectors at the right cowl panel.
18. Connect the wiper harness plug to the wiper switch assembly.

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19. Connect the (5) connectors at the left cowl panel.
20. Connect the radio antenna lead to the radio (if so equipped).
21. Install the bottom bolt-center shake brace-to-instrument panel.
22. Connect the accelerator control cables (2) and install the accelerator pedal assembly.
23. Install the steering column-to-cowl panel shake brace (4 nuts).
24. Install the lower steering column cover (2 screws).
25. Install the left and right side kick panel pad assemblies.
26. Install the left and right "A" pillar mouldings.
27. Install the radio speaker assembly (if so equipped).
28. *Install the instrument cluster and cluster finish* panel.
29. Install the instrument panel pad assembly.
30. Install the battery, fill the cooling system and charge the refrigerant system (Part 36-32).

Pinto and Bobcat (Fig. 12)

Observe the safety precautions outlined in Part 36-31.

1. Drain the engine coolant, discharge the refrigerant from the A/C system and disconnect the battery.
2. Remove the two hex head screws attaching the evaporator manifold plate to the expansion valve body.
3. Separate the expansion valve body and the STV housing manifold from the evaporator manifold plate. NOTE: On reassembly, use new, freshly lubricated O-rings between the expansion valve body and the evaporator manifold plate. Torque the attaching screws to 4-8 ft-lbs.
4. *Disconnect the two heater hoses from the core* tubes in the engine compartment.
5. Remove the glove box.
6. Disconnect the vacuum hoses from the evaporator case with reference to Fig. 8 or 9.
7. Disconnect the temperature control cable from the blend door crank arm.
8. Remove the heat distribution duct.
9. On the Pinto and Bobcat, to remove the A/C defrost plenum, remove adapter duct.
10. Remove the blower motor and wheel from the blower scroll.
11. Install one 1/4-20 hex-washer head screw to the mounting tab on the inlet duct to upper cowl bracket to hold the duct in place.

    NOTE: Leave this screw in place when installing the case assembly.
12. Remove the three inlet duct to evaporator case attaching screws through blower scroll opening.
13. Remove one upper case to inlet duct attaching screw located under outside-recirc. motor mounting bracket.
14. Remove two evaporator to upper cowl bracket attaching screws.
15. Remove four evaporator to dash panel attaching nuts in engine compartment.
16. Rotate the evaporator assembly down and away from dash panel and out from under the instrument panel.
17. To install, reverse the above procedure. Make sure to follow the note on installation in Steps 3 and 12. Evacuate and charge the refrigerant system (Part 36-32). Observe the Safety Precautions outlined in Part 36-31.

EVAPORATOR AND HEATER CORES (SEE FIG. 15)

Observe the Safety Precautions outlined in Part 36-31.

1. Remove the evaporator case assembly from the vehicle.
2. *Remove nine upper to lower case attaching screws.*
3. Remove the blower motor and wheel (Fig. 17).
5. Remove the rubber seal from heater core tubes.
6. Remove the upper half of the evaporator case.
7. Move the rubber seal on the evaporator core forward to clear case mounting stud and pull core out of lower case.
8. Remove the air deflector mounting screw on lower case to left of heater core, remove the deflector and remove the heater core.
9. Remove the rubber gaskets from the core.
10. Remove the evaporator manifold plate from the evaporator core tubes.
11. Remove the rubber and urethane seals from the core tubes and the rubber core seal from the right side of the core.
12. To install, reverse the preceding procedure. **Be sure to install new rope sealer around the flange of the lower case before installing the upper half of the case. Install new O-rings on the evaporator manifold plate. Always dip O-rings in refrigerant oil before installation.**
13. Evacuate and charge the refrigerant system with Refrigerant 12 following the procedure in Part 36-32.

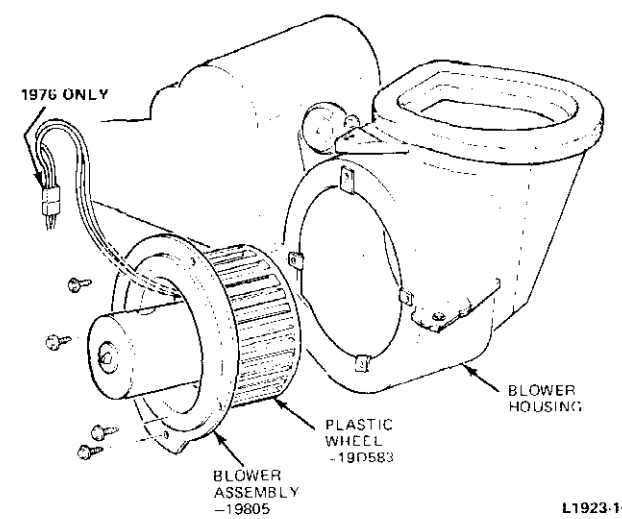


FIG. 17 Blower Motor and Wheel

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DETROIT IRON

BLOWER MOTOR AND WHEEL

The blower motor and wheel is integrally located within the scroll portion of the evaporator assembly on the right side of the evaporator case. To remove the blower motor and wheel, remove the glove box and remove the four screws retaining the blower motor and wheel in the blower scroll (Fig. 16). NOTE:It may be necessary to remove the bolt securing the instrument panel to the right side cowl and pull the instrument panel rearward in the vehicle to obtain clearance for blower motor removal.

VACUUM MOTORS

1. The outside-recirc. door vacuum motor is accessible for service by removing the glove box.
2. The A/C-defrost door motor and Heat-Defrost door motor can be serviced from under the instrument panel.
3. The vacuum controlled water valve in the engine compartment near the dash panel can be serviced as an assembly.

SPECIFICATIONS

MUSTANG, BOBCAT AND PINTO HEATER-A/C

Protective Device	– 30 Amp Fuse in Fuse Panel
Control Illumination	– One 1 CP 161 Bulb
Blower Motor Current Draw @ 12.8 Volts	– 25 Amps (Maximum)
Compressor Drive Ratio	– 42:1
Refrigerant Charge – Refrigerant 12	
Mustang	– 3-1/4 lbs. (+ 1/4; – 0)
Pinto and Bobcat	– 2-1/4 lbs. (+ 1/4; – 0)
Clutch Current Draw	– 3.75 Amps (Maximum)
Ambient Temperature Switch	– 35°F Minimum Cut-Out 50°F Maximum Cut-In

CL1775-1C

SERVICE COMPONENTS

Eight component packages have been made up for servicing the combination valve assembly.

1. Evaporator Manifold Plate—19D736. Packaged with six O-rings as follows:
   1 — O-ring — 387262-S
   2 — O-rings — 387195-S
   1 — O-ring — 380976-S
   1 — O-ring — 38977-S
   1 — O-ring — 383844-S
2. A/C Charging Valve Body—19D878. Packaged with 1 O-ring — 380976-S.
3. Schrader Valve—19D701.
4. Cap A/C Charging — 19D702.
5. Expansion Valve — 19849. Packaged with eight O-rings as follows:
   3 — O-rings —87022-S91.
   3 — O-rings — 387195-S
   1 — O-ring — 386924-S
   1 — O-ring — 387262-S
6. STV Valve — 19D580. Packaged with five O-rings as follows:
   3 — O-rings — 87022-S91
   1 — O-ring — 386924-S
   1 — O-ring — 387195-S
7. STV Housing Manifold — 19D734. Packaged with four O-rings as follows:
   2 — O-rings — 87022-S91
   1 — O-ring — 386924-S
   1 — O-ring — 387195-S
8. Seal Kit — 19D881. Contains nine O-rings as follows:
   3 — O-rings — 87022-S91
   2 — O-rings — 386924-S
   3 — O-rings — 387195-S
   1 — O-ring — 387262-S

   Assembly Bolts Required:
   2 hex head screws — 56710-S2—1/4 x 20 x 2-1/4 inches;
   2 socket head screws — 302202-S2—1/4x20x1 inch.

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LTD II, Cougar and Thunderbird Manual A/C—Heater System

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CL2349-28

DESCRIPTION

The LTD II, Cougar and Thunderbird manual air conditioning and heating system is an integral system receiving outside air directly from the cowl air intake, or recirculated air through the grilled opening of the recirc duct located on the blower housing. This system features a "High Airflow" plenum for greater air output.

The control assembly is located at the lower left side of the instrument panel to the left of the steering column. Two horizontal levers in the control assembly control air distribution and temperature. A four position blower switch below the control levers and a resistor assembly on the evaporator assembly provides four blower speeds to control air quantity. The A/C compressor clutch is engaged through an ambient temperature switch in all function lever positions except OFF, ECONOMY-VENT, HI-LO and HEAT in all fan switch positions.

Four panel registers of various styling configurations are utilized. The left outboard register is a louvered ball type design. The center and right outboard registers have an adjustable set of louvers contained in a pivoting housing to control air distribution. The louvers can be adjusted to a shut off position in each register. See Fig. 1.

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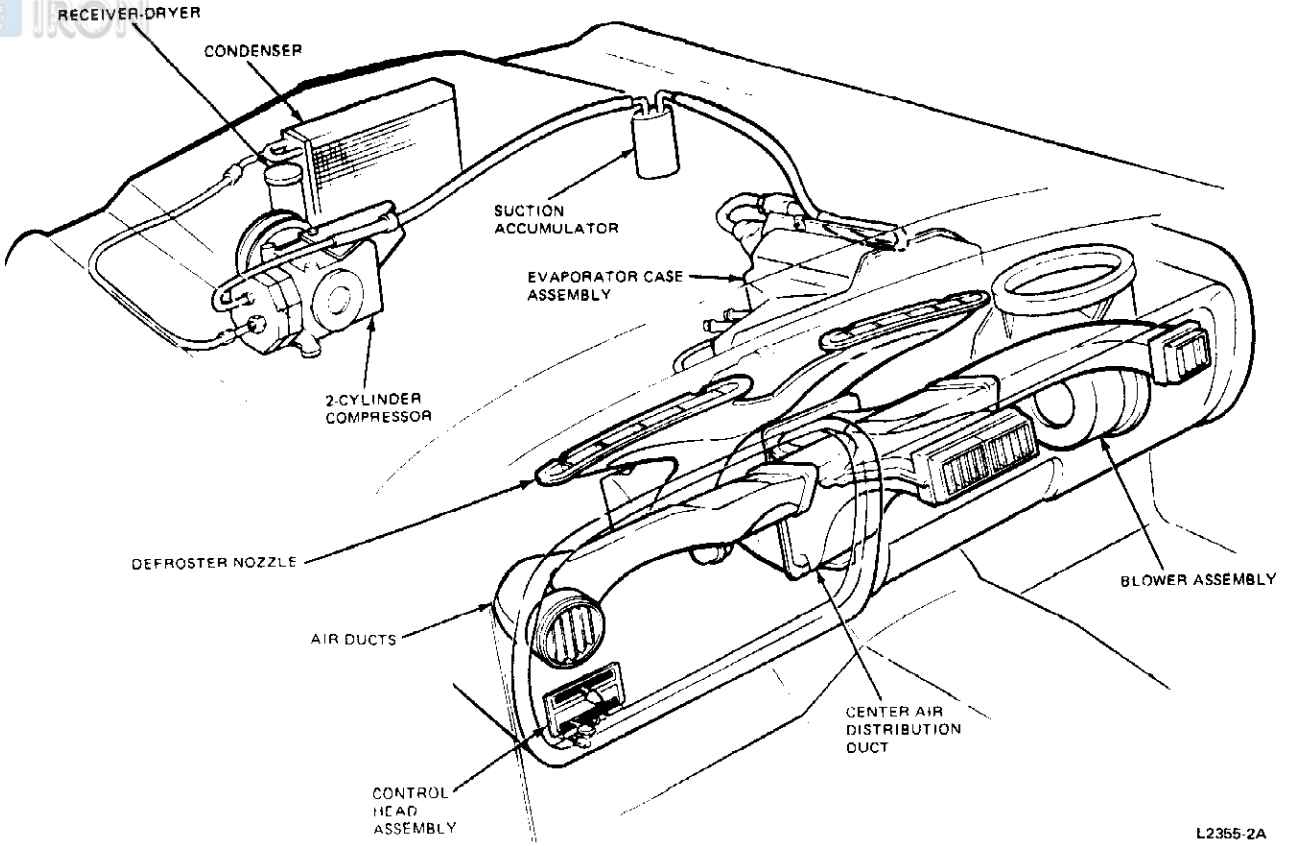


FIG. 1 A/C System Installation—LTD II, Thunderbird, Cougar

OPERATION

Air is drawn directly into the system by the blower motor and wheel from the cowl air intake independent of the temperature lever position in all control settings except OFF and A/C. In the A/C position air flow is through the grilled opening in the recirc duct when the temperature lever is in the COOL position. When the temperature control lever is moved away from the COOL position, approximately 1.0 inch, the outside-recirc air door moves from recirc to outside air position.

The water valve is closed (no hot water to heater core) independent of temperature lever position in the OFF and ECONOMY-VENT control settings. In all other control settings, the water valve is opened when the temperature control lever is moved away from the COOL position approximately 1/2 inch.

After being drawn either from the outside through the cowl air intake or from inside the vehicle through the opening in the recirc duct, the air is forced through the evaporator core. Depending upon the setting of the temperature blend door, the air is then forced through and/or around the heater core and into the plenum. The air then moves to the distribution ducts and to the registers, defroster nozzles, or floor duct depending on the function control lever setting. The temperature blend door is operated by a control cable connected to the temperature (upper) lever of the control assembly.

SYSTEM AIR FLOW

Fig. 2 shows the system air flow schematics with door positions and vacuum motor requirements for each control setting. Also refer to Fig. 3 for information on vacuum hose routing.

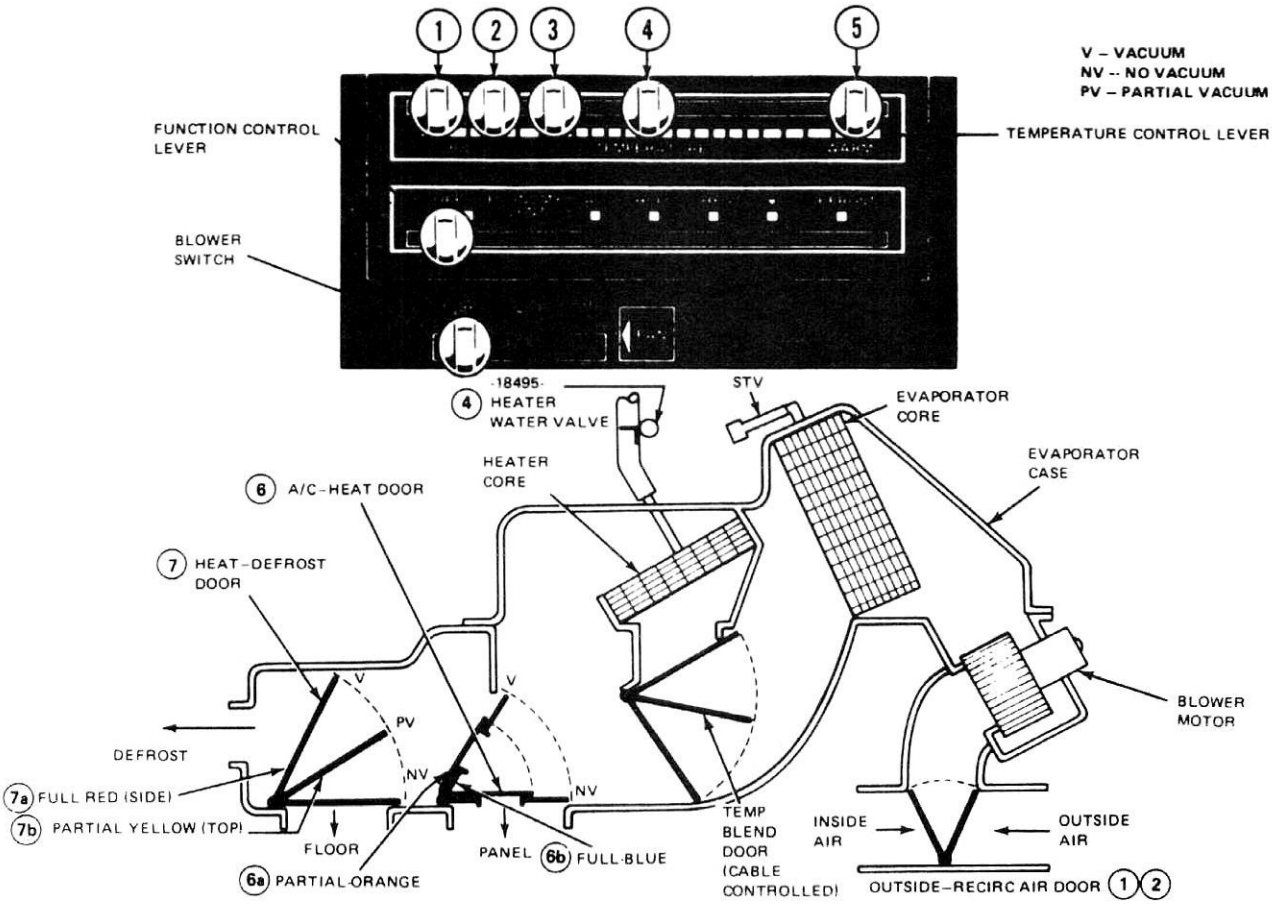
In OFF position, the outside-recirc air door is in the recirc position (vacuum), the water valve is closed (vacuum) and no air passes through the system. The blower is "ON" in all positions except OFF position.

In ECONOMY-VENT position, the outside-recirc door is in the outside position (no vacuum), the water valve is closed (vacuum), the A/C-Heat doors are open (vacuum to both doors) and air is discharged through the panel registers. Move the temperature control lever to COOL position for maximum ventilation through the panel registers. The A/C compressor does not operate in ECONOMY-VENT position.

In A/C position, the A/C-Heat doors are positioned the same as ECONOMY-VENT. When the temperature control lever is in the COOL position, the outside-recirc door is in the recirculating air position (vacuum). Maximum A/C performance is obtained in this position. In the A/C position, all air comes out the panel registers except for a slight floor bleed.

In HI-LO position, the partial A/C-Heat door in the plenum chamber is open (vacuum), the heat-defrost door is in the heat position (full vacuum), and air is discharged through the panel registers and also through the floor duct to the floor area. Air flow through the heater core is controlled by the setting of the temperature blend door that controls the warm and cool air as it enters the plenum chamber. The compressor is inoperative.

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LTD II, COUGAR AND THUNDERBIRD
MANUAL A/C-HEATER SYSTEM VACUUM MOTOR TEST CHART

FUNCTION CONTROL LEVER POSITION	TEMPERATURE CONTROL LEVER POSITION	VACUUM MOTORS APPLIED WITH VACUUM					
		OUTSIDE–RECIRC.	WATER VALVE	A/C–HEAT		HEAT–DEFROST	
				PARTIAL	FULL	PARTIAL	FULL
OFF	Any Position	1 · 2	4	–	–	7a	7b
ECONOMY VENT	Any Position	–	4	6a	6b	7a	7b
A/C *	Cool · 1	1 · 2	4	6a	6b	7a	7b
	Cool · 2	1 · 2	–	6a	6b	7a	7b
	Cool · 3 Temp · 4 Warm · 5	–	–	6a	6b	7a	7b
HI · LO	Cool · 1	–	4	6a	–	7a	7b
	Cool · 2	–	–	6a	–	7a	7b
	Cool · 3 Temp · 4 Warm · 5	–	–	6a	–	7a	7b
HEAT	Cool · 1	–	4	–	–	7a	7b
	Cool · 2	–	–	–	–	7a	7b
	Cool · 3 Temp · 4 Warm · 5	–	–	–	–	7a	7b
▽ (DEFOG) *	Cool · 1	–	4	–	–	7a	–
	Cool · 2	–	–	–	–	7a	–
	Cool · 3 Temp · 4 Warm · 5	–	–	–	–	7a	–
DEFROST *	Cool · 1	–	4	–	–	–	–
	Cool · 2	–	–	–	–	–	–
	Cool · 3 Temp · 4 Warm · 5	–	–	–	–	–	–
VACUUM LINE COLOR CODE		WHITE	GREEN	ORANGE	BLUE	YELLOW (TOP)	RED (SIDE)

* COMPRESSOR CLUTCH ENGAGED WHEN AMBIENT CUT-OFF SWITCH IS CLOSED
– NO VACUUM

L2356-2B

FIG. 2 Manual A/C-Heater System Air Flow Schematic and Vacuum Control Chart—LTD II, Cougar and Thunderbird

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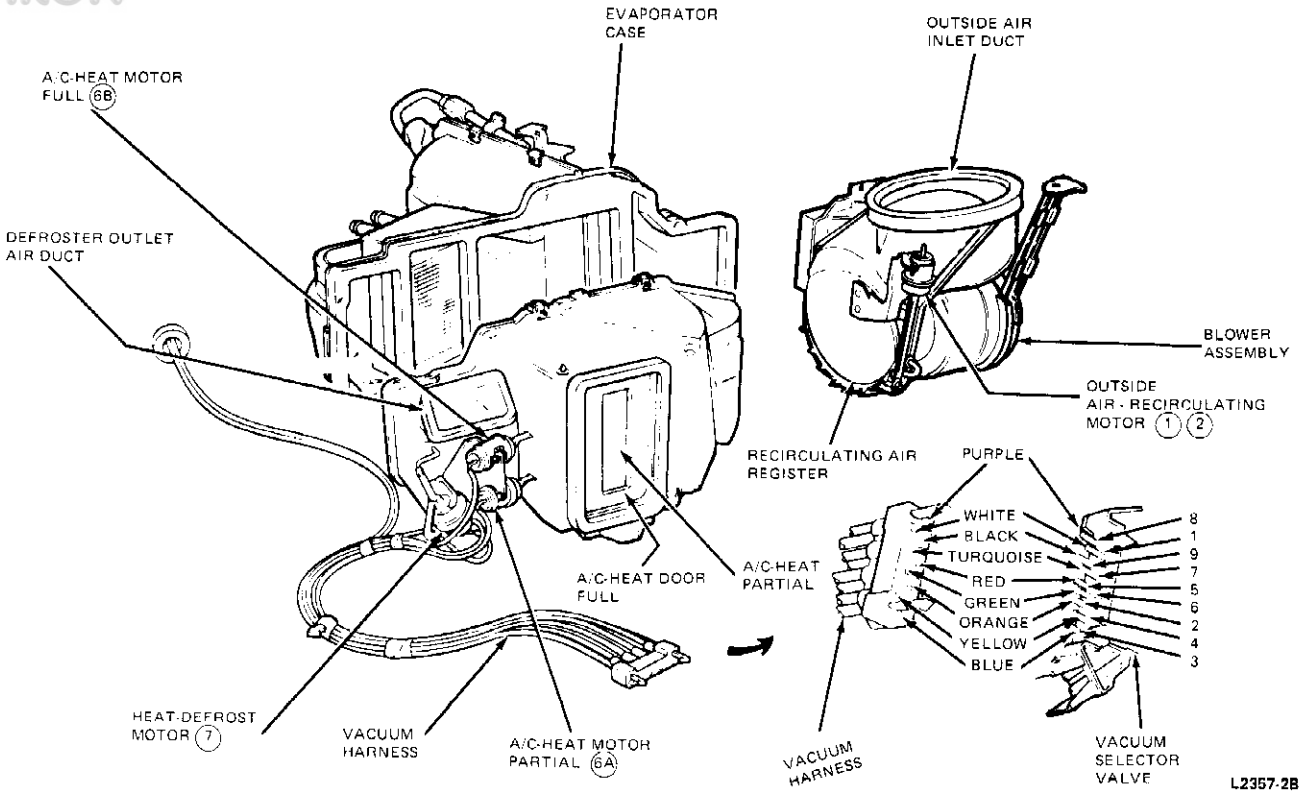


FIG. 3 Manual A/C Vacuum System Locations

In HEAT position, the A/C-Heat doors restrict air to the registers (no vacuum), the heat-defrost door is in the heat position (full vacuum) and the air is discharged through the plenum floor duct to the floor with some defrost bleed. The compressor is inoperative.

In DEFOG position ( ), the heat-defrost door is in the mid-position (partial vacuum) and the air is discharged through the defrosters and plenum floor duct. The compressor operates in this position to assist in reducing window fogging by dehumidifying the incoming air.

In DEFROST position, the heat-defrost door is in defrost position (no vacuum) and air is discharged through the defrosters with some bleed air to the floor. The compressor operates in this position also to reduce the humidity of the incoming air.

A four position blower switch and resistor assembly provides four blower speeds to control air volume. The master blower switch is mounted on the control head assembly 9-port vacuum selector and is energized when the function control lever is in all positions except OFF. Refer to Electrical Diagram, Fig. 4.

SYSTEM COMPONENTS

CONTROLS

The Temperature and Function control levers operate all vacuum motors and doors.

FUNCTION CONTROL LEVER (BOTTOM)

The function control lever actuates a 9-port vacuum selector that controls vacuum motors at the A/C-Heat and heat-defrost doors and also controls the A/C clutch and blower switches. Selection of ECONOMY-VENT, HI-LO, HEAT, DEFOG, DEFROST will also activate the outside-recirc door to the outside air position regardless of the temperature lever position.

Clutch operation is dependent upon an ambient temperature cut-off switch (Fig. 5) and the function lever position. The clutch will be off only when the lever is in the OFF, ECONOMY-VENT, HI-LO, or HEAT position and/or the ambient temperature cut-off switch opens at 35°F and closes at 50°F with a minimum differential of 3°F between opening and closing temperatures.

The blower motor runs at all times except when the function control lever is in the OFF position. A separate four position, four speed blower motor switch is used to regulate the volume of airflow and cannot turn the blower off (Fig. 4).

TEMPERATURE LEVER (TOP)

The temperature lever actuates a 3-port vacuum selector that controls the outside-recirc door and water valve vacuum motors via the 9-port selector valve. It also operates the control cable which controls the temperature blend door.

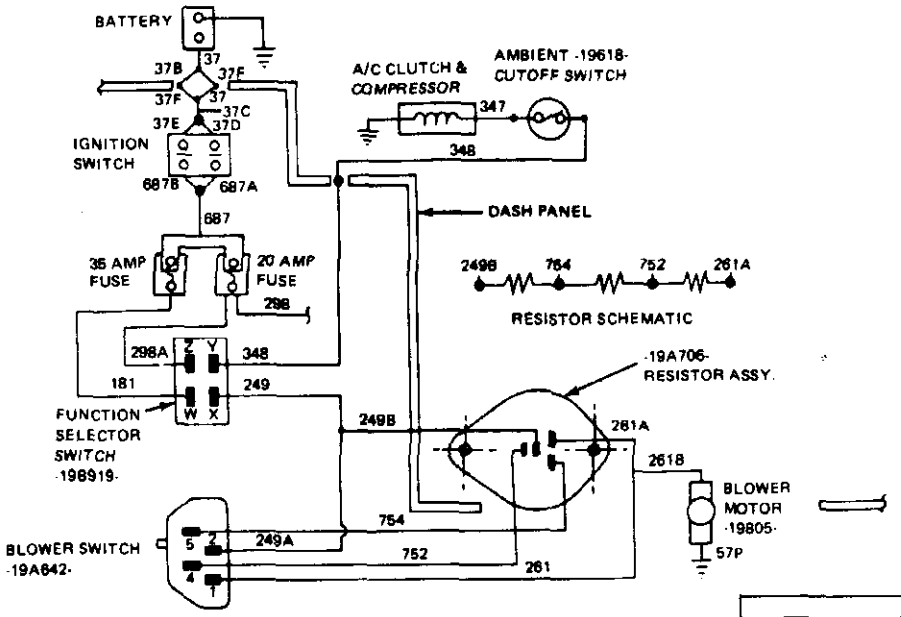
BLOWER SWITCH

The blower switch is located at the lower left corner of the control assembly (Fig. 6).

WATER VALVE

The water valve is located in the engine compartment in the inlet water line near the dash panel.

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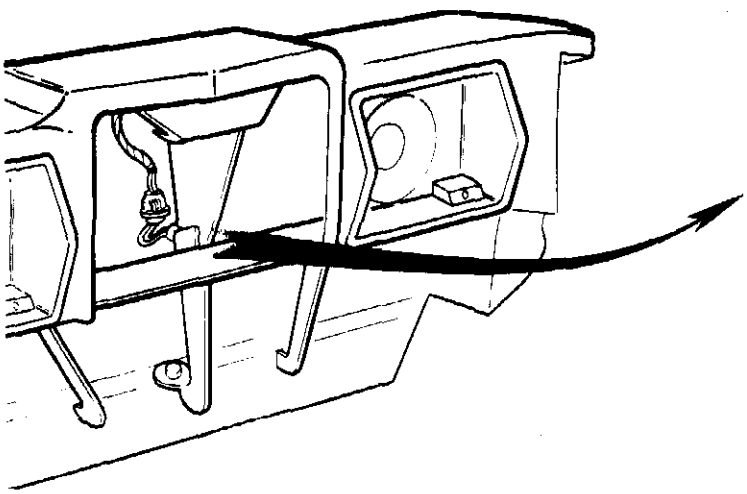
CIRCUIT NO.	WIRE COLOR
347	Black/Yellow Hash
57P	Black
261A	Orange W/Black Stripe
249B	Dk. Blue W/Lt. Green Stripe
249A	Dk. Blue W/Lt. Green Stripe
261B	Orange W/Black Stripe
298A	Purple W/Orange Hash
348	Lt. Green W/Purple Hash
181	Brown W/Orange Stripe
752	Yellow W/Red Dot
754	Lt. Green W/White Hash
37F	Yellow
37C-D-E	Yellow
687	Grey W/Yellow Stripe
687A-B	Grey W/Yellow Stripe

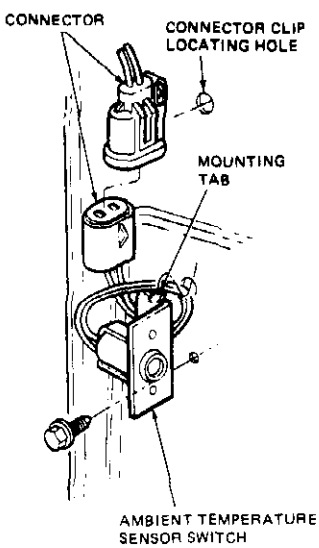
FUNCTION SELECTOR SWITCH -19B919-							
SWITCH SCHEMATIC	TERMINAL CONNECTIONS						
	OFF	ECONOMY VENT	A/C	HI-LO	HEAT	DEFOG ▽	DEFROST
X Y W Z	None	W - X	W - X Y - Z	W - X	W - X	W - X Y - Z	W - X Y - Z

BLOWER SWITCH -19A642-			
BLOWER SPEED	TERMINAL CONNECTIONS	CURRENT IN CAR (AMPS)	BLOWER VOLTAGE
Low	2	6	5
Med. Low	2 - 5	8	7
Med High	2 - 4 - 5	15	10
High	2 - 1 - 4	22	12.4

L2358-2B

FIG. 4 Manual A/C-Heater System Electrical Wiring Diagram and Continuity Test—LTD II, Cougar and Thunderbird





L2359-2A

FIG. 5 Ambient Temperature Sensor Switch Installation

BLOWER RESISTOR ASSEMBLY

The resistor assembly is located on the right surface of the evaporator assembly (Fig. 7).

EVAPORATOR CASE ASSEMBLY

The evaporator case assembly, located in the engine compartment on the right side of the dash panel, must be removed from the vehicle to service the evaporator core. A gasket around the evaporator case mounting flange provides a positive seal to the dash panel openings. See Figs. 7 and 8.

BLOWER MOTOR HOUSING ASSEMBLY

The blower motor housing, located under the right side of the instrument panel adjacent to the plenum assembly, contains the outside-recirc air door and recirc duct as well as the blower motor and wheel assembly.

PLENUM CHAMBER AND AIR DISTRIBUTION DUCTS

The plenum chamber is attached to the dash panel directly over the evaporator outlet openings and contains the temperature blend door, partial and full

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A/C-heat doors, and heat-defrost door. The center air distribution duct containing air mix baffles, seats firmly over the rectangular opening in the plenum chamber and distributes air directly to the center panel registers and to the left and right registers through rigid air ducts. See Fig. 9.

DEFROSTER NOZZLES

The defroster nozzle is connected to the plenum and retained to the cowl top inner panel.

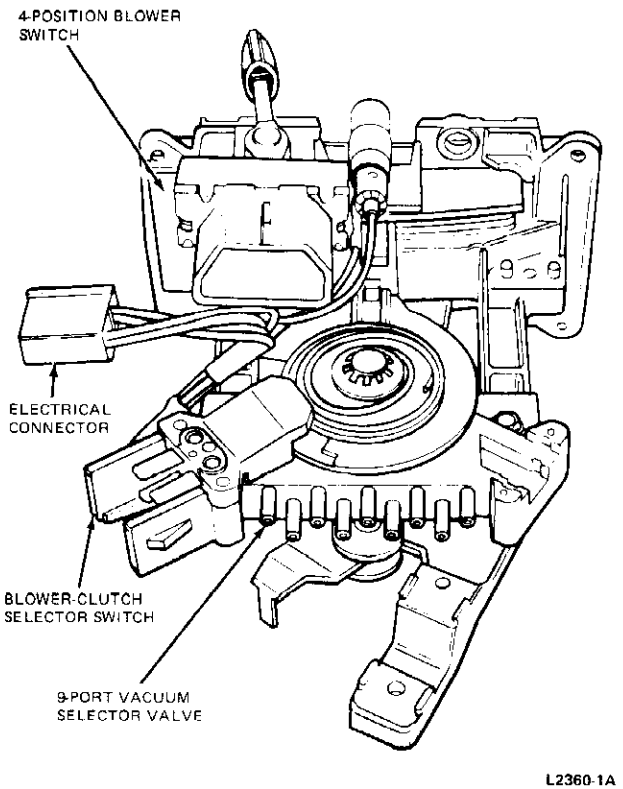


FIG. 6 Manual A/C Control Head, Bottom Rear View

CONDENSER AND RECEIVER ASSEMBLY

The condenser and receiver assembly is located forward of the radiator and is mounted to the radiator support in four places. Clearance for removal is provided by removing the upper radiator mounts and tilting the radiator rearward.

COMPRESSOR AND CLUTCH ASSEMBLY

The A/C compressor and clutch assembly is located in a horizontal position on the forward left side of all engines. An idler pulley is provided to adjust belt tension.

PRESSURE RELIEF VALVE

The pressure relief valve has been incorporated in the York and Tecumseh compressors to relieve unusual high pressure build-ups (450 PSIG and above) and prevents damage to the compressor and other A/C components.

REFRIGERANT CHARGING VALVES

The valves for charging the system with refrigerant-12 are located in the refrigerant lines near the compressor. A refrigerant tag that indicates the amount of refrigerant to be charged into the system is located at the front of the engine compartment on the radiator support or fan shroud.

VACUUM MOTORS

1. The outside-recirc air door vacuum motor is accessible for service by removing the glove box.
2. The heat-defrost door vacuum motor can be serviced from under the instrument panel.
3. The partial and full A/C-Heat door vacuum motors can be serviced only by removing the plenum chamber.

ELECTRICAL SYSTEM

Refer to Electrical Schematic in Fig. 4 for wire color coding and continuity tests.

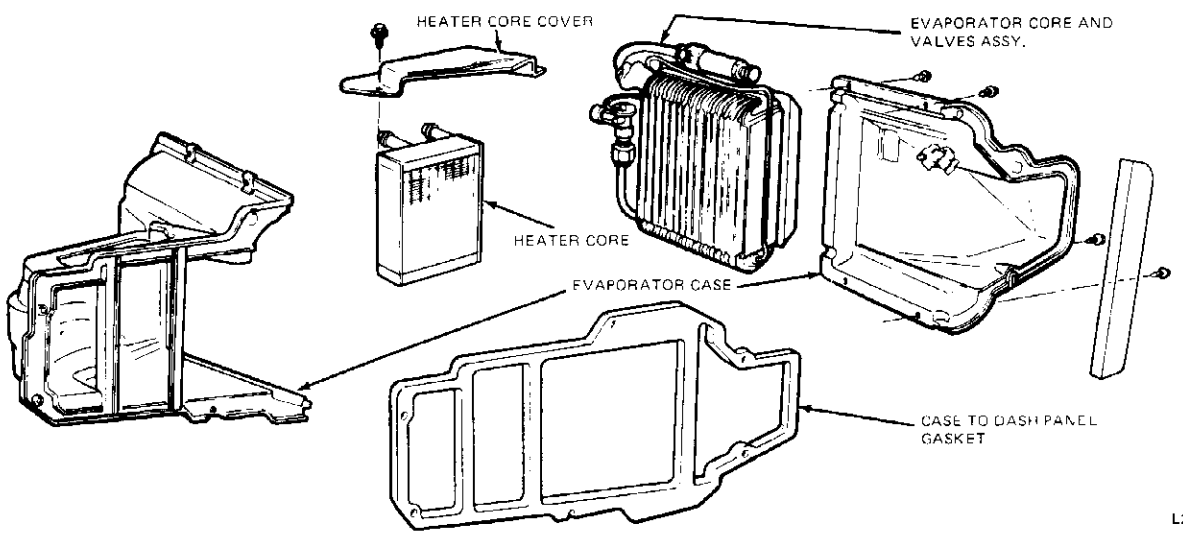


FIG. 7 Evaporator Case Disassembled

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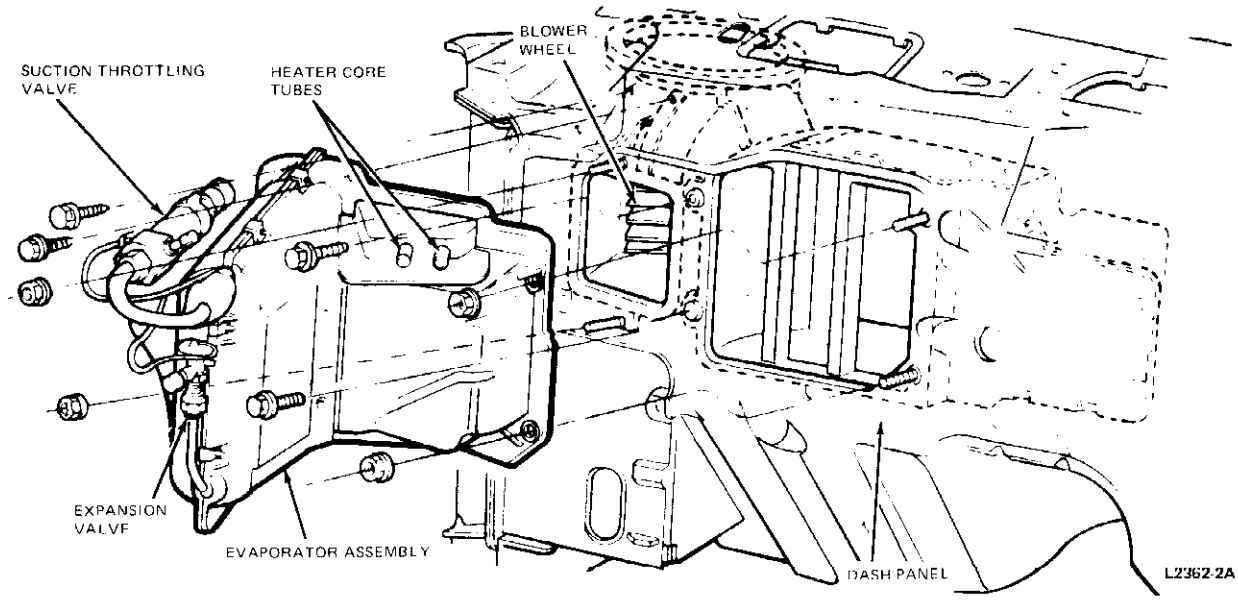


FIG. 8 Evaporator Assembly Installation

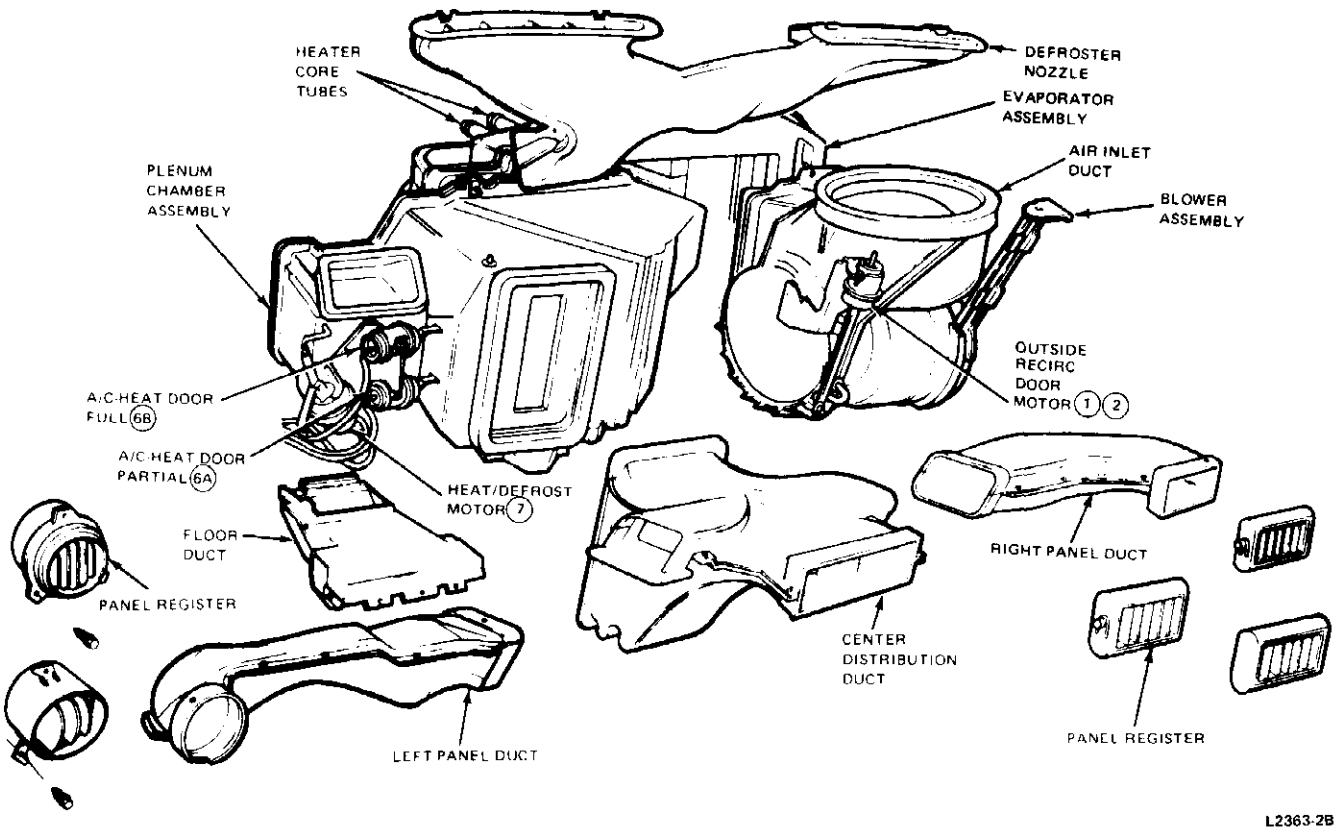


FIG. 9 Air Distribution Ducts—LTD II, Thunderbird and Cougar

REMOVAL AND INSTALLATION

CONTROL ASSEMBLY

1. Remove A/C control knobs and accessory switch knob.
2. Remove two (2) lower control assembly attaching screws.
3. Remove two (2) upper control assembly attaching screws.
4. Remove temperature control cable from control heat (1 screw).

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5. Disconnect vacuum harness from vacuum selector valve.
6. Disconnect electrical wiring connectors from blower switch.
7. Remove control head from rear of instrument panel.

To install reverse the above procedure. Adjust the temperature cable for proper output.

EVAPORATOR CASE AND CORE

1. Discharge the A/C system at the STV (observe safety precautions).
2. Raise the vehicle and remove the right front wheel.
3. Drill a 1.50 inch service hole in the fender apron. See Fig. 10. A drill dimple is provided for proper location of the hole.
4. Drain engine coolant and disconnect the heater hoses at the heater core.
5. Disconnect refrigerant lines from the STV and expansion valve. Cap the lines. Disconnect the wiring connector at the blower resistor.
6. Seven fasteners retain the A/C evaporator assembly to the dash panel. One is removed from the inside of vehicle and is located on the lower flange of the evaporator housing on the inboard side of the evaporator core.
7. Remove 2 self-tapping screws (1/4-20) located at the top of the evaporator assembly; one on each side of the evaporator core.
8. Remove 2 nuts from the inboard side of the evaporator (these nuts also retain the A/C plenum).
9. Remove the top nut on the outboard side of the evaporator (this nut also retains the A/C blower assembly).
10. Through the service hole in the fender apron, loosen the lower nut on the outboard side and run the nut to the end of the stud. Do not remove the nut.
11. On the inside of the vehicle, remove the instrument panel pad and R.H. cowl side trim panel. Remove the 2 fasteners retaining the instrument panel to the body (one is located on the cowl inner panel, the other is located on the cowl side panel). This permits the instrument panel to be pulled rearward to allow the A/C ducts to be removed.
12. Remove the radio speaker or support rod at the instrument cluster.
13. Remove 4 screws retaining the defroster nozzle and remove the nozzle.
14. Remove 3 retaining clips from the R.H. duct and remove the duct.
15. Remove the 2 retaining clips from the floor ducts and remove the ducts.
16. Remove 2 screws retaining the center duct to the plenum. Remove the 3 retaining clips from the center duct. Lift the end of the L.H. duct from the center duct and remove the center duct.
17. Remove the 2 outboard nuts retaining the plenum.
18. Remove the screw retaining the blower assembly support bracket to the inner cowl.
19. Move the plenum and blower assemblies rearward to reduce the length of studs protruding through the dash. These components do not have to be removed.
20. Remove the A/C evaporator housing by moving it forward and lifting upward.
21. Remove 7 screws from the evaporator flange and separate the two halves of the assembly. Remove the STV support clamp.
22. Remove the evaporator core and valve assembly from the R.H. housing. The STV and expansion valve can be removed with the evaporator core (Fig. 7).
23. Replace the evaporator core. Re-assemble the valves with new "O" rings.
24. Remove and replace the sealer between the two case halves.
25. Re-assemble the evaporator assembly.
26. Replace the evaporator dash seal. Inspect the condensate drainage hole for any blockage.
27. Install the evaporator assembly. Re-assemble all components using the reverse procedure.
28. Replace the "O" rings on the refrigerant hoses and connect to valves.
29. Turn the blower on and check for air leakage around the evaporator core.
30. Evacuate and charge the A/C system. Check for refrigerant leaks.
31. Install a plug button, 377901-S, in the service hole in the fender apron.

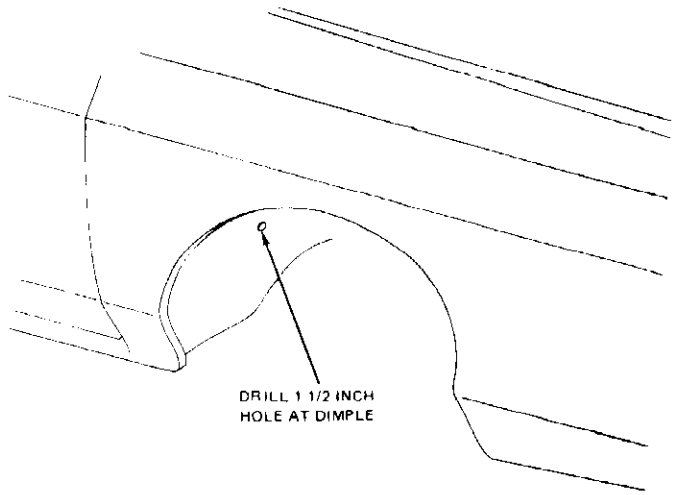


FIG. 10 Location for Cutting Access Hole in Right Fender Apron

HEATER CORE

The heater core can be removed from the A/C evaporator assembly by removing the heater cover plate.

1. Drain engine coolant and disconnect heater hoses from heater core.
2. Remove heater core cover plate (4 screws).
3. Press down on the heater core and tip it towards the front of vehicle. This is to release the heater core seal from the housing.

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4. Remove heater core by lifting upward. See Fig. 11.
5. Replace heater core and seals. Carefully install the new heater assembly. Verify that the seals on the sides of the core fit against their respective metal support brackets in the evaporator housing. Press down on the heater core and tip it rearward so that the notch on seal is aligned with the flange on the evaporator housing.
6. Clean off old sealer from the heater cover plate and evaporator housing. Apply rope sealer, ESB-M4G32-A, in the formed depression and sides of the heater cover plate.
7. Install cover plate (4 screws).
8. Check for air leaks by placing the A/C control temperature lever in maximum heat, the function control lever in HEAT and the blower in high. Seal oil leaks.
9. Connect hoses and fill cooling system. Start engine and check for coolant leaks. Run the engine until the thermostat opens then recheck the coolant level for proper fill.

DEFROSTER NOZZLES

1. Remove instrument panel upper finish panel. Remove speaker bracket or support rod. Refer to Part 45-61.
2. Remove upper attaching screws (2) at each defroster nozzle outlet.
3. Remove nozzle upward through opening in panel.
4. Visually inspect the defroster nozzle openings for proper alignment and eliminate any blockage.

To install, reverse the above procedure.

PLENUM ASSEMBLY

1. Remove instrument panel pad.
2. Loosen instrument panel enough to allow panel to be moved approximately one inch rearward.
3. Remove right and left A/C distribution ducts (4 clips).
4. Remove center duct (2 screws) (2 clips).
5. Remove floor register duct (2 clips).
6. Disconnect control cable from bottom of plenum (1 screw).
7. Disconnect vacuum hose harness from control head, water valve and vacuum source in engine compartment and from recirc vacuum motor on recirc duct.
8. Remove two 1/4 x 20 nuts from the right side of plenum chamber located on the passenger side of the dash panel. Remove two 1/4 x 20 nuts from the left side of the plenum chamber located on the engine side of the dash panel. See Fig. 8.
9. To remove plenum and vacuum harness assembly, pull plenum rearward until studs on left side of plenum are clear of the dash panel and move plenum to the right of the transmission tunnel.

To install, reverse the above procedure.

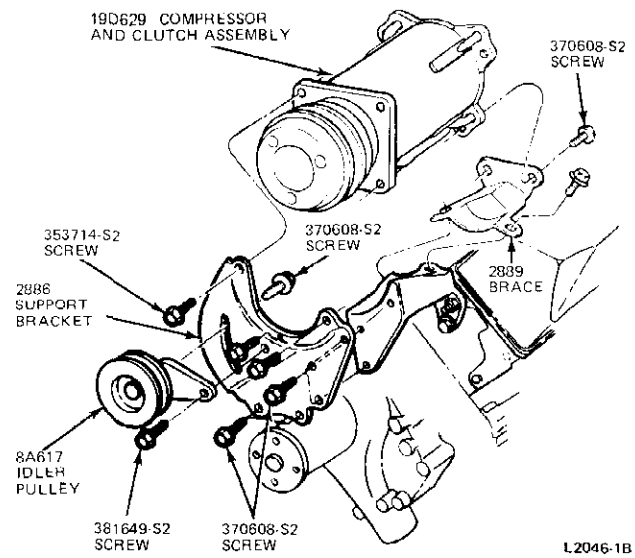


FIG. 11 Heater Core Disassembled

BLOWER MOTOR AND WHEEL ASSEMBLY—FIGURE 12

1. Remove instrument panel pad.
2. Remove glove box.
3. Remove side cowl trim panel.
4. Remove instrument panel attachment on right side.
5. Remove one (1) blower housing to dash nut (in engine compartment).
6. Remove one (1) blower housing to dash nut (in passenger compartment).
7. Remove one (1) blower housing mounting bracket and cowl top inner screw.
8. Disconnect outside-recirc air door vacuum motor hose (white).
9. Disconnect blower motor lead wire plug from harness connector, and motor ground wire (black) (one screw).
10. Remove blower assembly.
11. Remove the blower motor and wheel as an assembly from the blower.

To install, reverse the above procedure.

AIR DISTRIBUTION DUCTS

The air distribution ducts can be serviced by removing the instrument panel upper finish panel with reference to Fig. 9.

AMBIENT TEMPERATURE CUT-OFF SWITCH

The ambient temperature switch is located on the hood lock vertical support bracket in front of the condenser. It is a temperature sensitive, snap-action unit that is installed in the compressor clutch circuit to prevent unnecessary compressor operation at low temperatures. It closes the circuit to the clutch at 50° F and opens the circuit at 35°F.

The switch is serviced by disconnecting the electrical connector and removal of the attaching screw at the bracket. See Fig. 5.

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TEMPERATURE CONTROL CABLE ADJUSTMENT

1. Move the temperature control lever to maximum WARM position.
2. Adjust the cable at the bracket on the bottom of the plenum by sliding cable flag in bracket groove until the temperature door crank arm is in the full heat position. Provide 1/8 inch clearance between the temperature control lever and right end of the lever slot to insure maximum heat position before tightening cable screw at plenum bracket.

CONDENSER

The condenser assembly is serviced by removing four nuts at the isolation mounts, one screw at the liquid line to condenser bracket, and the liquid and discharge lines. See Fig. 13.

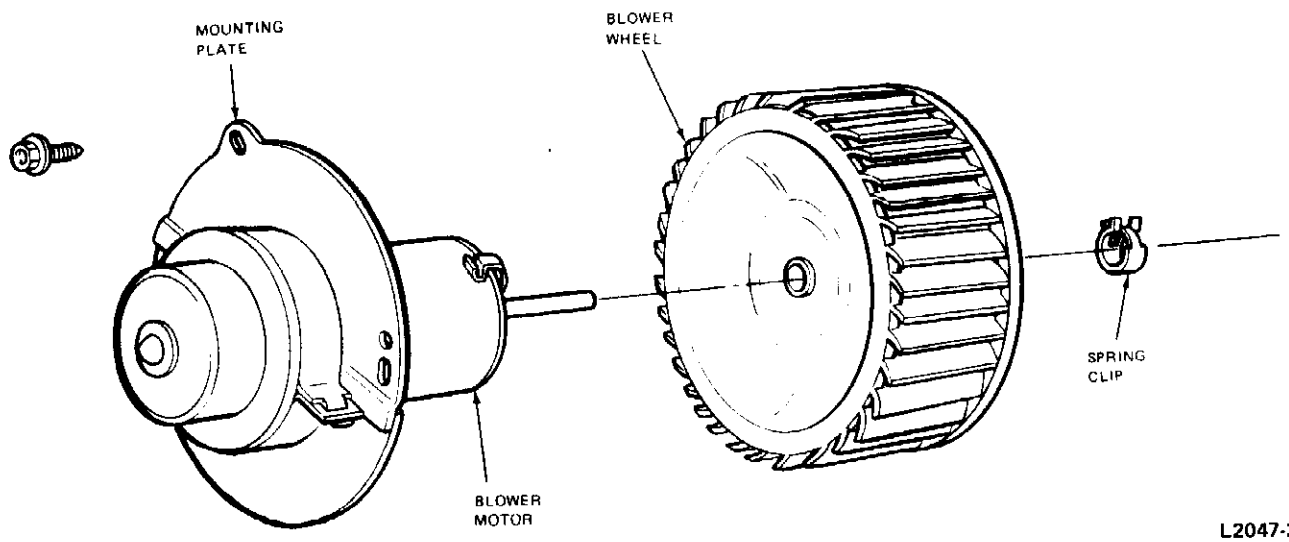


FIG. 12 Blower Motor and Wheel Disassembled

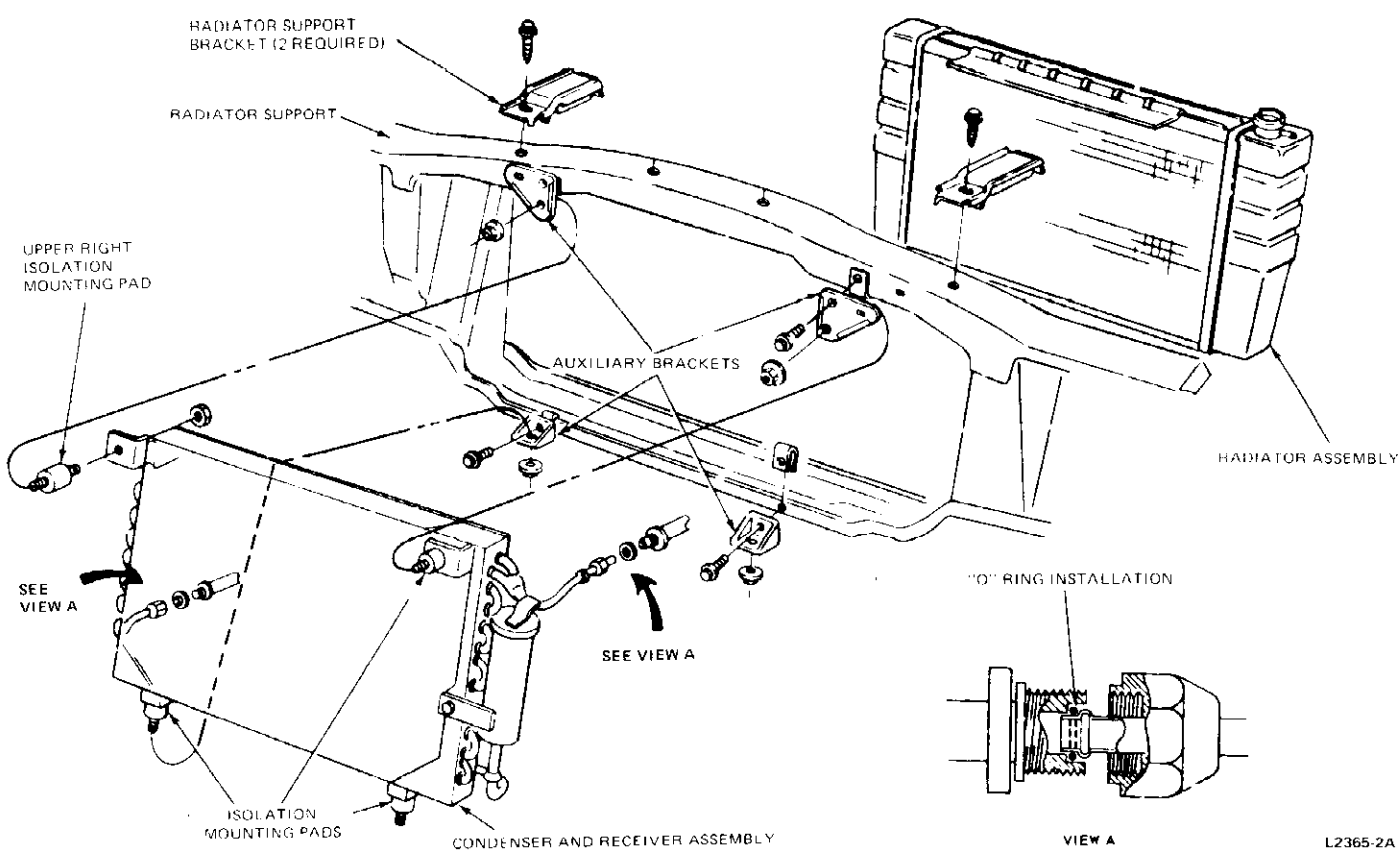


FIG. 13 Condenser Installation—LTD II, Thunderbird, Cougar

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SPECIFICATIONS

MANUAL A/C-HEATER SYSTEM – LTD II, Cougar and Thunderbird

Protection Device	20 amp fuse in clutch circuit 35 amp fuse in blower circuit
Control Illumination	One ICP, No. 161 bulb
Blower Motor Current (Amps.) and Voltage	Low 6 amps 5 volts Medium Low 8 amps 7 volts Medium High 15 amps 10 volts High 22 amps 12.4 volts
Compressor Displacement Oil Capacity	10.3 cubic inch (York and Tecumseh) York – 10 oz. Tecumseh – 11 oz.
Compressor (Cont'd.) Refrigerant Capacity Refrigerant Type Oil Specification	4-1/4 lbs. + 1/4 lb. R-12 ESA-M2C31-A (Ford Part No. C9AZ-19577-A)
Clutch – Magnetic	Approx. 3.75 amps @ 12.8 volts Open: 35°F. Min. Closed: 50°F. Max.
Compressor Drive Belt	New: 120 to 160 lbs. Used: 75 to 120 lbs. (after operation for 10 minutes or more)

CL2390-2A

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DETROIT IRON

Ford, Mercury and Lincoln Continental ATC

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CL2350-2A

DESCRIPTION AND OPERATION

The Automatic Temperature Control System is a split case design, integral blower system and will automatically control the temperature and reduce the relative humidity of air inside the car (See Fig. 1). Two control levers are provided to maintain the desired temperature and system functions. The system will deliver heated or cooled air to maintain the car interior temperature and will maintain the set comfort level automatically. The blower speed can be adjusted for more or less air as desired.

Automatic control of passenger compartment temperature is maintained in all operational modes except when the system is turned off. In hot weather, it will cool the car to the pre-set comfort level and then modulate cooling or heating to whatever is required to maintain the desired temperature.

In cold weather, provision is made in the HEAT position of the function lever to delay the operation of the system until engine coolant has warmed enough to minimize the discharge of cold air from the heater outlet. The system will then heat the car to the desired temperature and level out to maintain the pre-set temperature.

During system operation, outside air is drawn from the cowl vent just below the windshield at all times, except during maximum cooling when recirculated air is used.

The system utilizes what is called a "reheat" method to provide conditioned air to the car interior. With this method all air flow from the blower passes through the evaporator core, where it is cooled and dehumidified. Temperature is then regulated by reheating a portion of the cooled dry air and blending it with the remaining cool air to the desired temperature. Temperature blending is automatically varied by the temperature blend door which controls the amount of cooled air that flows through or around the heater core where it is mixed and directed into the distribution plenum. The air is finally directed to the heater ducts, the defroster nozzles, or the instrument panel (A/C) registers according to the selected function lever position.

CONTROL LEVER OPERATION

The Automatic Temperature Control includes a function control lever for OFF, ECONOMY-VENT, A/C, HI-LO, HEAT, DEFOG (▼) and DEFROST that determines the manner in which the system will operate, a calibrated temperature control lever for setting the desired comfort temperature and a blower switch to control the volume of air movement. Each position of the function control lever and blower switch is detented for positive engagement. The blower switch provides four manually selected blower speeds. The switch can be operated in any position to select the desired amount of air flow.

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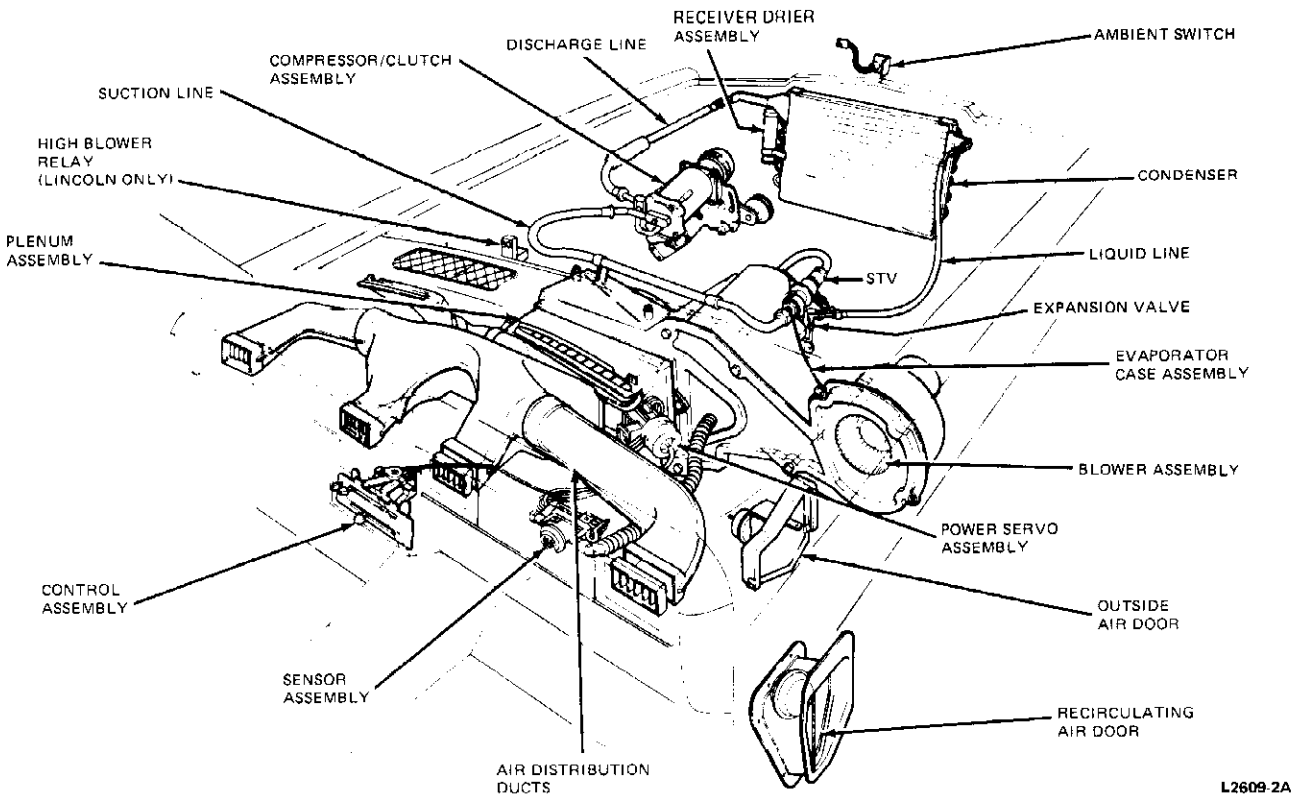


FIG. 1 ATC System Overall Schematic – 1978 Ford, Mercury and Lincoln Continental

AUTOMATIC TEMPERATURE CONTROL

The electrical and air flow schematics and vacuum charts shown in Figures 2 through 5 may be used in conjunction with the following explanation to clarify system operations:

Temperature control of the ATC system is primarily determined by the modulated vacuum produced by the sensor assembly which controls the servo vacuum motor. Discharge air flow is manually controlled by the control assembly. Temperature control is accomplished by means of a control cable between the control assembly and sensor assembly.

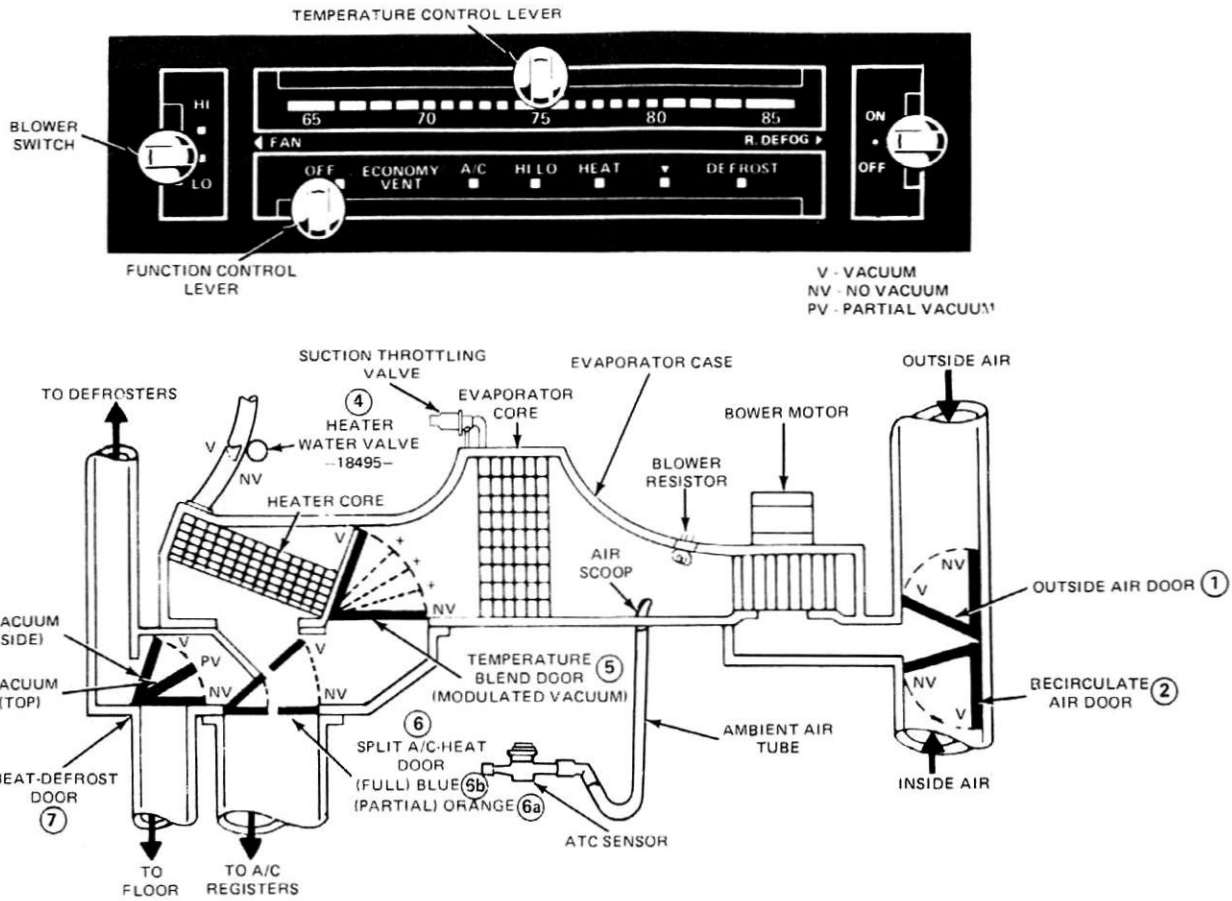
The sensor assembly is basically a bimetal operated vacuum modulator, directly converting air temperature into corresponding values of modulated vacuum. The bimetal senses in-car temperature and is mechanically linked to an internal vacuum modulator to directly control and regulate a vacuum which is proportional to temperature. The bimetal and vacuum modulator are placed within a plastic aspirator. Air is diverted by an air scoop near the high pressure side of the blower (before the evaporator) through a tube to the sensor assembly. The air flows through the aspirator which draws vehicle interior air over the in-car bimetal. This combined air is then exhausted from the sensor underneath the instrument panel where it will not be felt by the passengers or driver.

The modulated vacuum from the sensor is directly connected to the large calibrated vacuum motor portion of the servo assembly. The modulated vacuum controls and positions the blend door attached to the arm of the servo motor assembly. The calibrated vacuum motor moves the blend door to mix various proportions of hot air from the heater core and cold air that has by-passed the heater core. Vehicle air temperatures produce compensating discharge air temperatures, i.e., high vehicle interior temperatures produce high sensor output vacuums which position the blend door to deliver cool discharge air. Low vehicle interior temperatures produce low sensor vacuum levels which cause warm discharge air.

A vacuum diverter valve, a part of the power servo assembly and also attached to the arm of the servo motor, turns off the water valve under maximum cooling conditions, and controls the outside air/recirc door for maximum cooling conditions when the function control lever is in the A/C position.

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1978 FORD, MERCURY, LINCOLN
AUTOMATIC TEMPERATURE CONTROL SYSTEM
VACUUM MOTOR TEST CHART

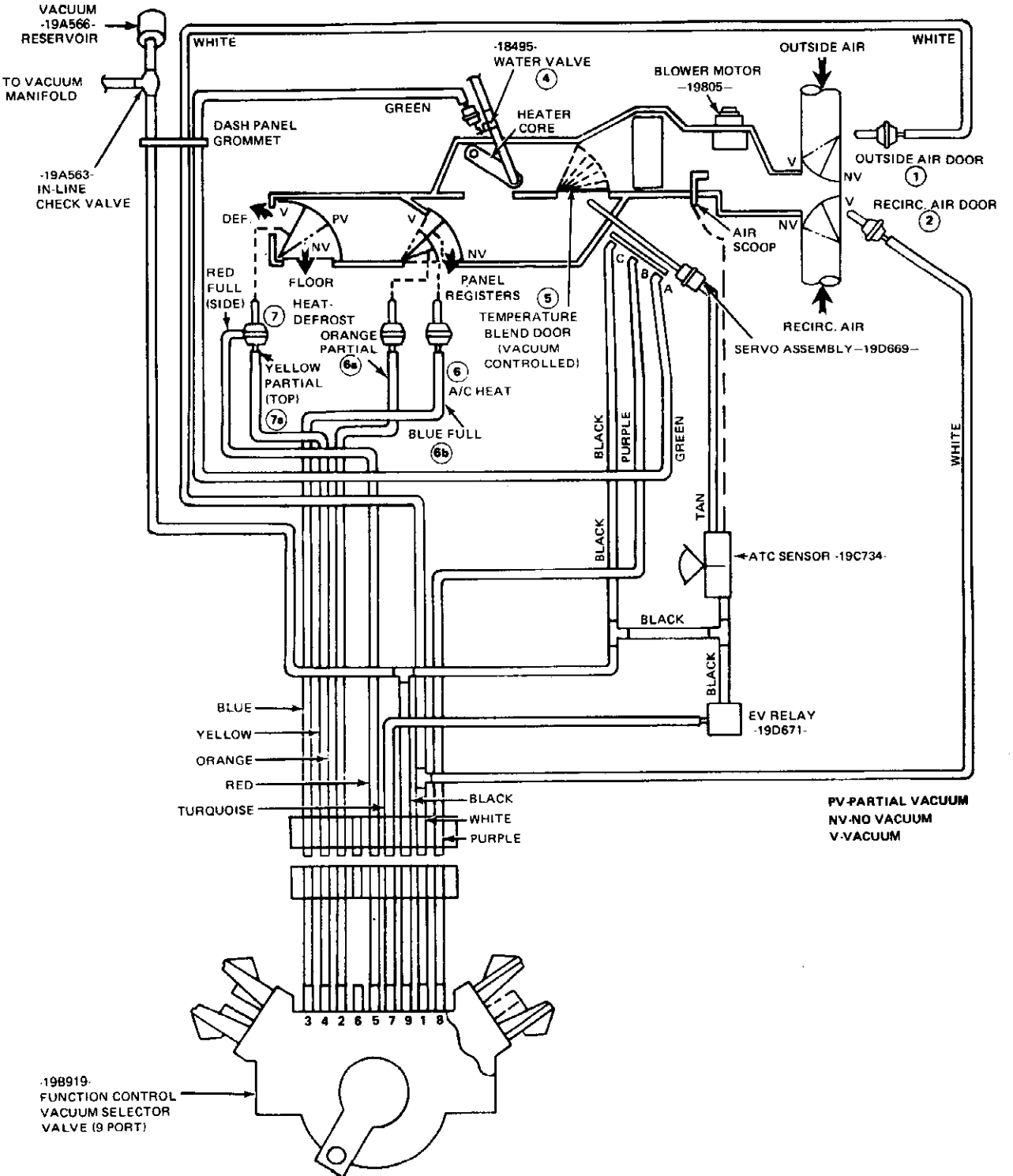
FUNCTION CONTROL LEVER POSITION	ATC REQUIREMENT	VACUUM MOTORS APPLIED WITH VACUUM							
		OUT SIDE	RE-CIRC.	WATER VALVE * *	TEMP BLEND +	A/C-HEAT		HEAT-DEFROST	
						PARTIAL	FULL	PARTIAL	FULL
OFF	–	1	2	**	+	–	–	7a	7b
ECONOMY VENT	Cool	–	–	4	5	6a	6b	7a	7b
	Mid	–	–		+	6a	6b	7a	7b
	Warm	–	–			6a	6b	7a	7b
A/C *	Cool	1**	2**	4	5	6a	6b	7a	7b
	Mid	–	–		+	6a	6b	7a	7b
	Warm	–	–			6a	6b	7a	7b
HI - LO *	Cool	–	–	4	5	6a	–	7a	7b
	Mid	–	–		+	6a	–	7a	7b
	Warm	–	–			6a	–	7a	7b
HEAT	Cool	–	–	4	5	–	–	7a	7b
	Mid	–	–		+	–	–	7a	7b
	Warm	1†	2†			–	–	7a	7b
▽ (DEFOG) *	Cool	–	–	4	5	–	–	7a	–
	Mid	–	–		+	–	–	7a	–
	Warm	–	–			–	–	7a	–
DEFROST *	Cool	–	–	4	5	–	–	–	–
	Mid	–	–		+	–	–	–	–
	Warm	–	–			–	–	–	–
VACUUM LINE COLOR CODE		WHITE	WHITE	GREEN	TAN	ORANGE	BLUE	YELLOW (TOP)	RED (SIDE)

* COMPRESSOR CLUTCH ENGAGED WHEN AMBIENT CUT-OFF SWITCH IS CLOSED
† DELAYED BY ENGINE TEMP. SENDER AND E.V. RELAY UNTIL 120°F. ENGINE COOLANT TEMP.
* * DEPENDENT ON HEATING/COOLING REQUIREMENT OF SERVO DIVERTER VALVE
\+ MODULATED VACUUM
– NO VACUUM

L2610-2A

FIG. 2 ATC System Air Flow Schematic and Vacuum Control Chart – 1978 Ford, Mercury and Lincoln Continental

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PORT	FUNCTION	FUNCTION SELECTOR VALVE LEVER POSITIONS							HOSE COLOR
		OFF	ECONOMY VENT	A/C	HI-LO	HEAT	▽ DEFOG	DEFROST	
1	Outside–Recirc.	V		To 8		To 7			White 1-2
2	Partial A/C- Heat		V	V	V				Orange 6a
3	Full A/C--Heat		V	V					Blue 6b
4	Partial Heat–Defrost	V	V	V	V	V	V		Yellow 7a
5	Full Heat–Defrost	V	V	V	V	V			Red 7b
6	No Function	Seal	Seal	Seal	Seal	Seal	Seal	Seal	-
7	From EV Relay	Seal	Seal	Seal	Seal	To 1	Seal	Seal	Turquoise
8	From Servo Diverter Valve Port B	Seal	Seal	To 1	Seal	Seal	Seal	Seal	Purple
9	Source Vacuum	V	V	V	V	V	V	V	Black

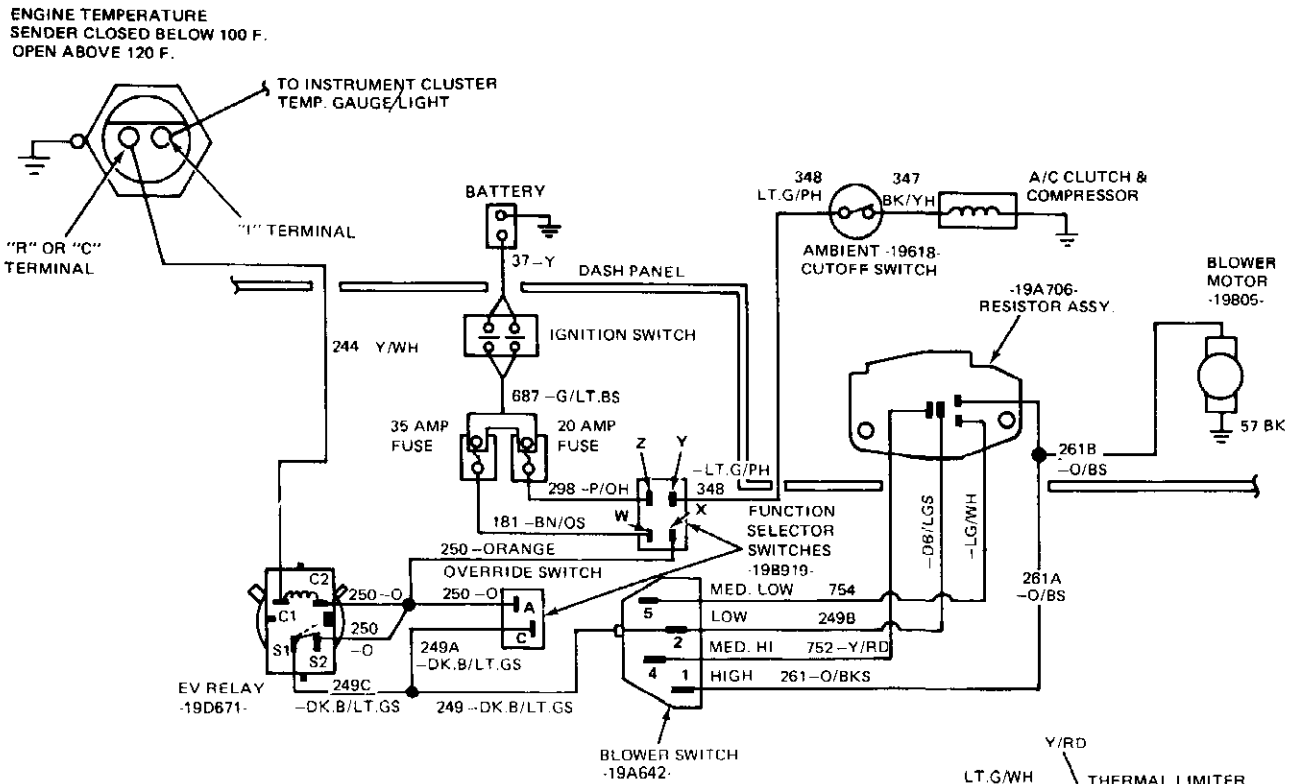
V - VACUUM

BLANK - ATMOSPHERE

L2611-2A

FIG. 3 ATC System Vacuum Schematic and Selector Test – 1978 Ford, Mercury and Lincoln Continental

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COIL TERMINALS	SWITCH TERMINALS	VACUUM SWITCH	
C1 C2	S1 S2	V1	V2
12.8 VOLTS	OPEN	OPEN	OPEN
0 VOLTS	CLOSED	SEALED	VENTED

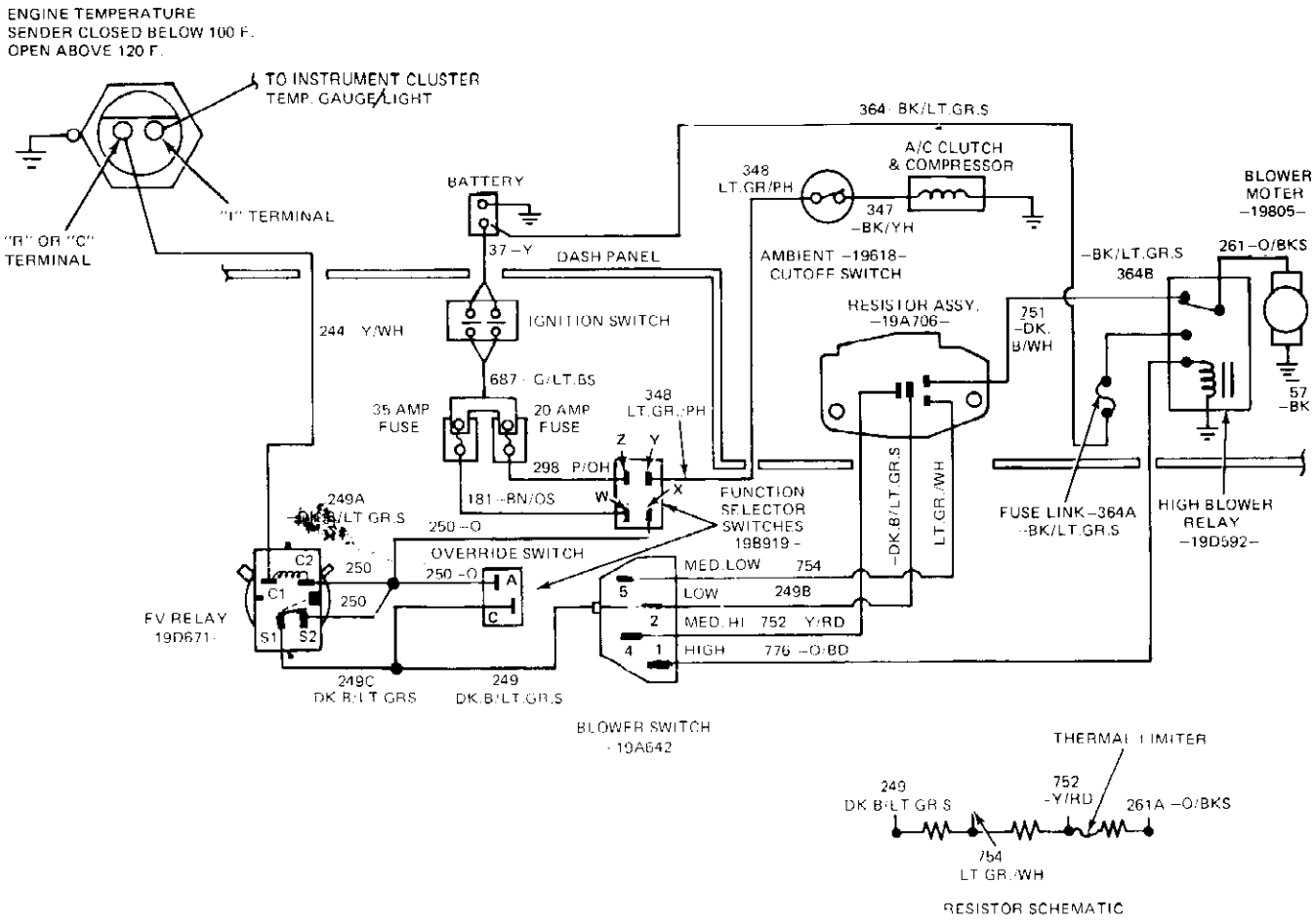
FUNCTION SELECTOR SWITCH -19B919-							
SWITCH SCHEMATIC	OFF	ECONOMY VENT	A/C	HI-LO	HEAT	▽ DEFOG	DEFROST
A — C	A - C	A - C	A - C	A - C	Open	A - C	A - C
X Y W Z	None	W - X	W - X Y - Z	W - X Y - Z	W - X	W - X Y - Z	W - X Y - Z

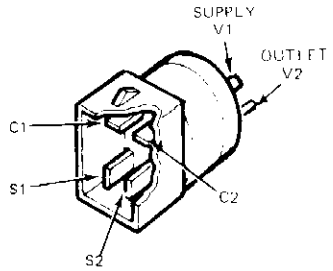
BLOWER SWITCH -19A642-			
BLOWER SPEED	TERMINAL CONNECTIONS	CURRENT IN CAR (AMPS)	BLOWER VOLTAGE
Low	–	6	5
Med Low	2 - 5	10	7
Med High	2 - 4 - 5	17	10
High	2 - 1 - 4	25	12.4

L2612-2A

FIG. 4 ATC System Electrical Wiring Diagram and Continuity Test — 1978 Ford and Mercury

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EV RELAY 19D671

COIL TERMINALS	SWITCH TERMINALS	VACUUM SWITCH	
C1 C2	S1 S2	V1	V2
12.8 VOLTS	OPEN	OPEN	OPEN
0 VOLTS	CLOSED	SEALED	VENTED

FUNCTION SELECTOR SWITCH 19B919-

SWITCH SCHEMATIC	OFF	ECONOMY VENT	A/C	HI-LO	HEAT	▽ DEFOG	DEFROST
A—C	A C	A · C	A · C	A · C	Open	A · C	A · C
X Y / W Z	None	W · X	W · X Y · Z	W · X Y · Z	W X	W · X Y · Z	W · X Y · Z

BLOWER SWITCH 19A642-

BLOWER SPEED	TERMINAL CONNECTIONS	CURRENT IN CAR (AMPS)	BLOWER VOLTAGE
Low	·	6	5
Med Low	2 · 5	10	7
Med High	2 · 4 · 5	17	10
High	2 · 1 · 4	25	12.4

L2613-2A

FIG. 5 ATC System Electrical Wiring Diagram and Continuity Test — 1978 Lincoln Continental

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SYSTEM AIR FLOW

Figures 2 and 3 contain system vacuum schematics and vacuum motor charts which illustrate vacuum routings and air flow during the various system conditions. Figures 4 and 5 show the system electrical wiring diagram including continuity test information.

OFF POSITION

In OFF position the outside-recirc air doors are in recirculating position. The A/C-heat door is in the heat (no vacuum) position, and the heat-defrost door is in the heat (full vacuum) position. The blower is off and the temperature blend door and water valve assume a position depending on the modulated vacuum from the sensor to the power servo.

NOTE: A modulated vacuum is produced in ALL function control lever positions and is entirely dependent on the temperature lever setting and existing in-vehicle temperature conditions.

ECONOMY VENT POSITION

In ECONOMY-VENT position, outside air is directed through the panel (A/C) registers with automatic control of discharge air temperatures and water valve actuation. However, refrigerated cooling is not available. ECONOMY-VENT and HEAT positions provide the most economical operations because the compressor does not operate.

A/C POSITION — MAXIMUM COOLING (RECIRCULATE)

With the function lever in the A/C position and the car interior temperature considerably above the temperature setting, the modulated vacuum is high at the *servo motor, causing:*

1. The outside-recirc door to go to the recirc position;
2. The water valve to close;
3. The temperature blend door to close, allowing all air to by-pass the heater core. Air is drawn from the passenger compartment, directed through the evaporator core where it is cooled and returned to the car interior *through the panel (A/C) ducts and registers.*

A/C POSITION — MODULATED COOLING (OUTSIDE-AIR)

When less cooling is required to maintain the temperature setting, the temperature blend door is actuated to a mid-position where part of the air leaving the evaporator core is directed through the heater core. Blended air (the combination of cooled and *heated air) is then mixed in the plenum and directed* into the car interior through the panel (A/C) ducts and registers. The temperature selected. If the in-car temperature rises above the temperature lever setting, the blend door moves to admit more cooled air and less heated air. If the in-car temperature drops below the setting, the blend door moves to admit more heater air and less cooled air.

HI-LO POSITIONS

Operation is similar to that described in the A/C position paragraphs, except that airflow is divided between the panel registers and floor ducts. The system will not recirculate interior air for maximum cooling.

HEAT POSITION — MAXIMUM HEATING

With the function control lever in the HEAT position and the car interior temperature below the temperature setting, the modulated vacuum is low, causing the water valve to open and the temperature blend door to fully open. Blower operation will be delayed until the engine coolant reaches approximately 120°F (49°C), then the air is forced by the blower through the evaporator and all of the air passes through the heater core before being distributed through the heater (floor) ducts into the car interior. A portion of this air is diverted to the defroster nozzles.

HEAT POSITION — MODULATED HEATING

When less heating is required to maintain the temperature setting, the temperature blend door has moved to a mid-position so that only part of the air leaving the evaporator core is directed through the heater core. Blended air (the mixture of outside air and heater air) then is directed into the car interior. The A/C clutch does not operate in the HEAT position.

DEFOG (▼) POSITION

In DEFOG (▼) operation is the same as the HEAT position, except that the A/C-Heat doors are in the HEAT (no vacuum) position and the heat-defrost door is in a partial position. The air flow is directed to the defroster nozzles and the floor outlets. The A/C clutch will also be engaged when the outside air temperature is sufficiently high to close the ambient cut-off switch. This assists in reducing windshield fogging by de*humidifying* the outside air.

DEFROST POSITION

When the function lever is in the DEFROST position, the A/C-heat doors and the heat-defrost door are in the full defrost (no vacuum) positions so that all incoming air is directed to the defroster nozzles with a slight bleed to the floor. The temperature blend door modulates in this position but maximum heat can be obtained by moving the temperature lever to the highest temperature position. *The A/C clutch also operates* in this position to dehumidify the air and reduce windshield fogging.

COMPONENTS

SENSOR ASSEMBLY

The sensor assembly is located behind the instrument panel above the glove box. A small opening in *the instrument panel allows passenger compartment* air to enter the sensor. The sensor assembly contains a bi-metallic sensor that senses the passenger compartment air temperatures. The output controls a vacuum modulator and higher temperatures cause higher vacuum gauge readings. A bias to the vacuum output level is accomplished by means of a control arm attached by a cable assembly to the temperature control lever.

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Thus, the modulated vacuum output is the result of the effects of the control bias and the temperature of the air across the bi-metallic sensor.

The sensor assembly also includes an aspirator or venturi (as it is called in previous ATC systems). The aspirator provides a very small vacuum to draw a continuous sampling of passenger compartment air across the air temperature sensing bimetal. Primary air is ducted to the sensor via a tube from the blower stream providing the power to operate the aspirator for the in-car sensor.

SERVO ASSEMBLY

The servo assembly is a large calibrated vacuum motor and vacuum diverter valve and is located behind the lower edge of the glove box on the mounting bracket attached to the plenum chamber. The calibrated vacuum motor provides specific temperature blend door positions for given vacuum levels. The attached vacuum diverter valve controls water valve operation and recirc or outside air operation.

ELECTRO-VACUUM RELAY (E.V. RELAY)

Located on the servo assembly mounting bracket the E.V. Relay is a combination normally closed vacuum solenoid valve and a single pole single throw normally closed electrical relay, both actuated by one electrical coil. The E.V. Relay is used during cold engine operation, in the HEAT functon lever position, to lock-out blower operation, and to switch the system to recirculating air until the engine coolant warms up to above 120°F (49°C).

CONTROL ASSEMBLY

The control assembly consists of three main parts: 1) the function selector — a nine-port vacuum selector valve combined with two cam operated electrical switches; 2) blower switch — an electrical switch that provides four speeds of blower operations; and 3) the temperature control lever which connects through a control cable assembly to the sensor assembly.

1. The 9-port vacuum selector valve is very similar to the manual A/C 9-port vacuum selector valve. It directs source vacuum to various vacuum motors and connects the vacuum from the electro-vacuum relay to the outside air-recirc door in HEAT (See Vacuum Schematic — Figure 3). A single pole and a double pole cam operated electrical switch is also controlled by the vacuum selector. The combination of these cam operated electrical switches controls the electrical supply to the A/C clutch and blower switch.
2. The four-position blower switch is identical to the manual A/C heater system blower switch.
3. The temperature control lever is connected to the sensor assembly by a control cable assembly. Movement of the control lever from 65 to 85 causes a corresponding movement on the pre-load (bias) portion of the sensor assembly, and determines the temperature that the system will maintain.

THERMAL LIMITER RESISTOR ASSEMBLY

The blower motor thermal limiter resistor assembly is located on the evaporator assembly in the engine compartment. There are three resistance elements mounted on the resistor board to provide four blower speeds. Depending on the blower switch position, series resistance is added or by-passed in the blower motor circuit to decrease or increase blower motor speed.

A thermal limiter resistor assembly is similar to a standard resistor assembly except an overheating protective device (thermal limiter) has been added to prevent heat damage to the evaporator case assembly (Fig. 6). Overheating of the resistor coil(s) may occur when the system air flow is reduced as a result of an inlet or outlet air restriction or if the blower wheel becomes locked and/or is unable to turn freely.

When the thermal limiter resistor circuit has opened as a result of excessive heat, it should be replaced only with the identical replacement thermal limiter resistor assembly. It must not be substituted with a standard resistor assembly which does not include the thermal limiter device.

THERMAL LIMITER

The thermal limiter, used in the thermal limiter resistor assembly, serves as a temperature protecting fuse. Located a predetermined distance from the resistor coils and in series with the coil circuit, it will open the resistor coil circuit when the temperature of the thermal limiter reaches 300°F (149°C) interrupting blower operation in all speeds except high blower. Internal spring loaded contacts are held closed with a wax material which has a melting point of 300°F (149°C). When the wax softens, the spring contacts separate, opening the resistor circuit. The spring contacts cannot be closed again. As a result, it is necessary to replace the entire thermal limiter resistor assembly.

ENGINE TEMPERATURE SENDER SWITCH

The engine temperature sender switch is located on the engine and senses the engine coolant temperature near the engine thermostat. In the HEAT position only, a ground circuit from the engine temperature sender switch to the E.V. relay coil prevents blower operation until the engine coolant temperature reaches approximately 120°F (49°C).

HIGH BLOWER RELAY (LINCOLN ONLY)

On Lincoln, a high blower relay is used to switch the blower feed from the resistor output to a direct low resistance feed from the battery. Power to the relay coil comes from the blower switch "high" position.

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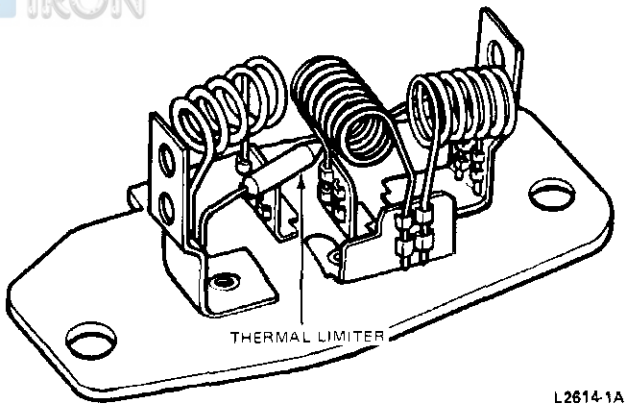


FIG. 6 Thermal Limiter Resistor Assembly

REGISTER ASSEMBLIES

Retaining tabs lock the register assemblies into the register housings of the instrument trim panels. Horizontal registers swivel and direct the register outlet air up or down while the louvers permit side to side air distribution or closure of the register outlet. Vertically mounted registers swivel and direct the register outlet air from side to side while the louvers permit upward and downward air distribution or closure of the register outlet.

REFRIGERANT SYSTEM

The refrigerant system incorporates a six cylinder compressor with an ambient cut-off switch connected in series with the compressor clutch to control compressor operation. The ambient switch will open and close between 35°F (2°C) minimum and 50°F (10°C) maximum with a minimum difference of 3°F between opening and closing temperatures. The ambient switch is located in the airflow path behind the radiator grille.

An internally equalized By-Pass Orifice Expansion Valve is used with a separate Suction Throttling Valve which does not have the equalizer line fitting (Fig. 8).

Refer to the Normal System Operation Charts and the Problem Refrigerant System Pressure Evaluation Chart for refrigerant system testing and diagnosis. Refer to the Car Shop Manual — A/C General Service Section for servicing the refrigerant system.

BY-PASS ORIFICE (BPO) EXPANSION VALVE

The By-Pass Orifice (BPO) Expansion Valve is the capillary tube type similar to those used on earlier refrigerant systems, except the tapered ball seat is *slotted to prevent complete sealing of the liquid refrigerant* inlet to the evaporator. The need for the external equalizer line is eliminated, as the BPO expansion valve is internally equalized through the passages around the push pins (Fig. 7). The slotted ball seat provides additional refrigerant and refrigerant oil flow to lubricate and cool the compressor, during minimum cooling requirement conditions, when the expansion valve is closed.

The By-Pass Orifice (BPO) Expansion Valve must regulate the flow of liquid refrigerant during cool-down (while the car interior and evaporator core are cooling down). As the evaporator core temperature approaches 32°F, the Suction Throttling Valve begins to control refrigerant pressure.

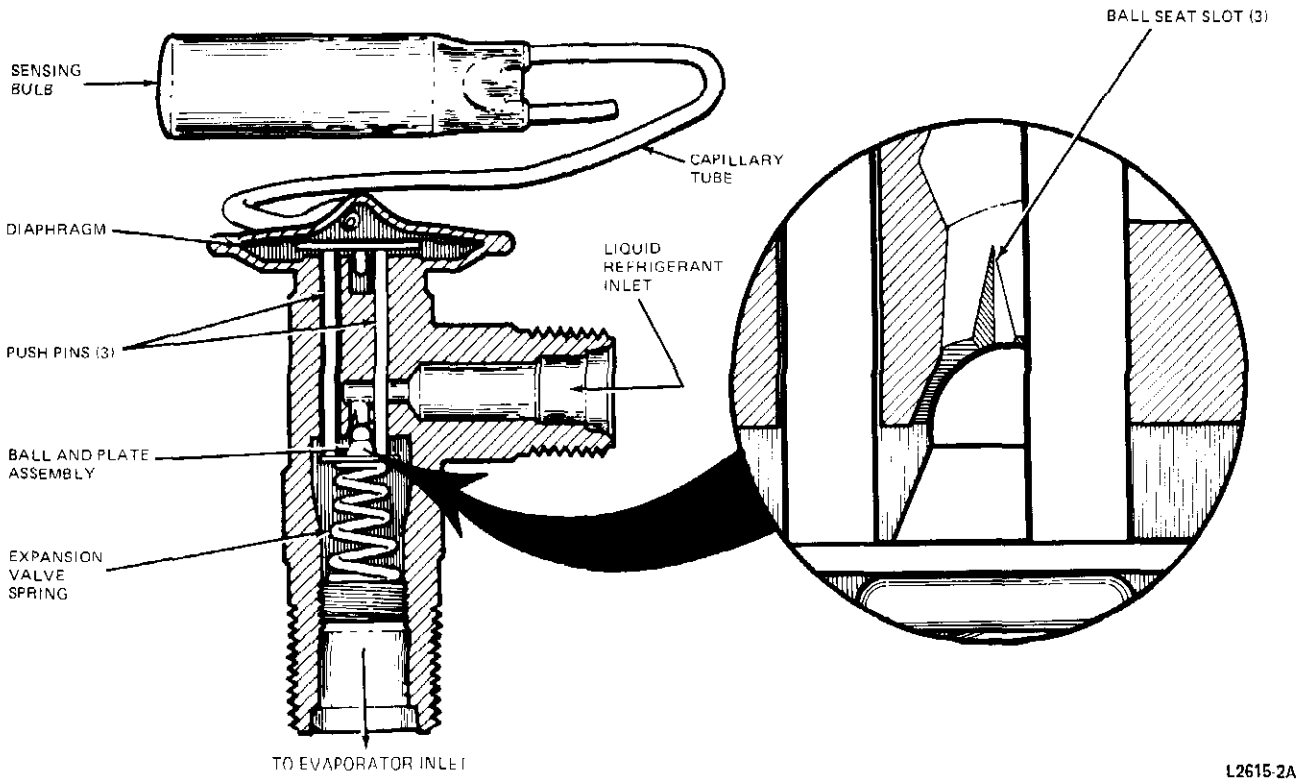


FIG. 7 By-Pass Orifice (BPO) Expansion Valve Cutaway View

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SUCTION THROTTLING VALVE (STV)

The Suction Throttling Valve (STV) is the same used in current model refrigerant systems, except the equalizer line connection has been removed (Fig. 8). Its purpose is to control suction pressure in the evaporator to prevent ice or frost from blocking the flow of air through the heat exchanging surfaces of the evaporator. Gauge pressure at sea level is specified at a minimum of 28.5 psi. The pressure reading is higher at higher altitudes because of gauge error, not because of a change in pressure inside the evaporator. Refer to the normal Pressure/Altitude Chart in Fig.14.

Suction "throttling" starts when the compressor suction pressure decreases below the pressure setting of the valve. Compressor suction pressure can continue to drop but the evaporator pressure is held steady by the controlling or "throttling" action of the STV.

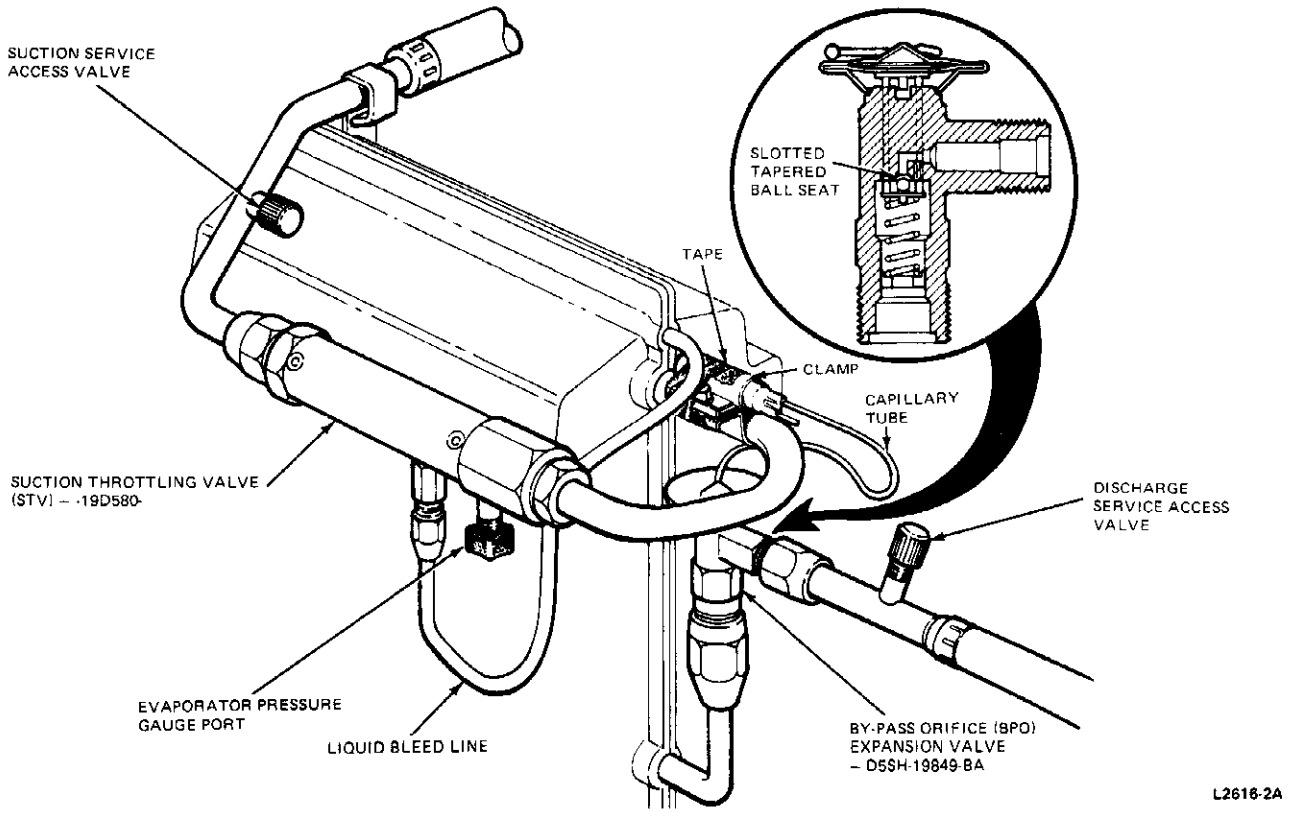


FIG. 8 By-Pass Orifice Type Expansion Valve and Suction Throttling Valve

PRESSURE DIFFERENTIAL VALVE

A calibrated Pressure Differential Valve core is provided, in the liquid bleed line fitting, as a liquid refrigerant bleed circuit around the STV to assure oil return to the compressor when the STV is closed due to minimum heat loading of the A/C system. Refer to Fig. 9.

The Pressure Differential Valve is a Schrader type valve that has been calibrated to open at a pressure range of 10 to 20 psi. Its function is to by-pass oil laden refrigerant around the restriction formed when the STV is closed (due to reduced heat load on the A/C system) and thereby provide an assured oil return to the compressor. Under high heat loads this valve is closed, since ample refrigerant is moving through the compressor suction line back to the compressor. Substitution of a Schrader type service access valve core from one of the gauge port valves is not permitted and would result in compressor damage by oil starvation because the substituted valve core would never open.

The calibrated Pressure Differential Valve Core is supplied installed in the liquid bleed line fitting of the Suction Throttling Valve and is not serviced separately.

INSPECTION AND ASSEMBLY REQUIREMENTS

O-ring seal surfaces must be free of dirt, lint, burrs and scratches.

All O-rings must be lubricated with clean refrigerant oil immediately prior to installation.

NOTE: At any time a hose or component connection leak is observed, tightening the connection will only stop the leak temporarily. To correctly repair the leak, the connector fitting must be separated, cleaned and a new O-ring installed. The O-ring and connector surfaces should be lubricated with clean refrigerant oil prior to assembly.

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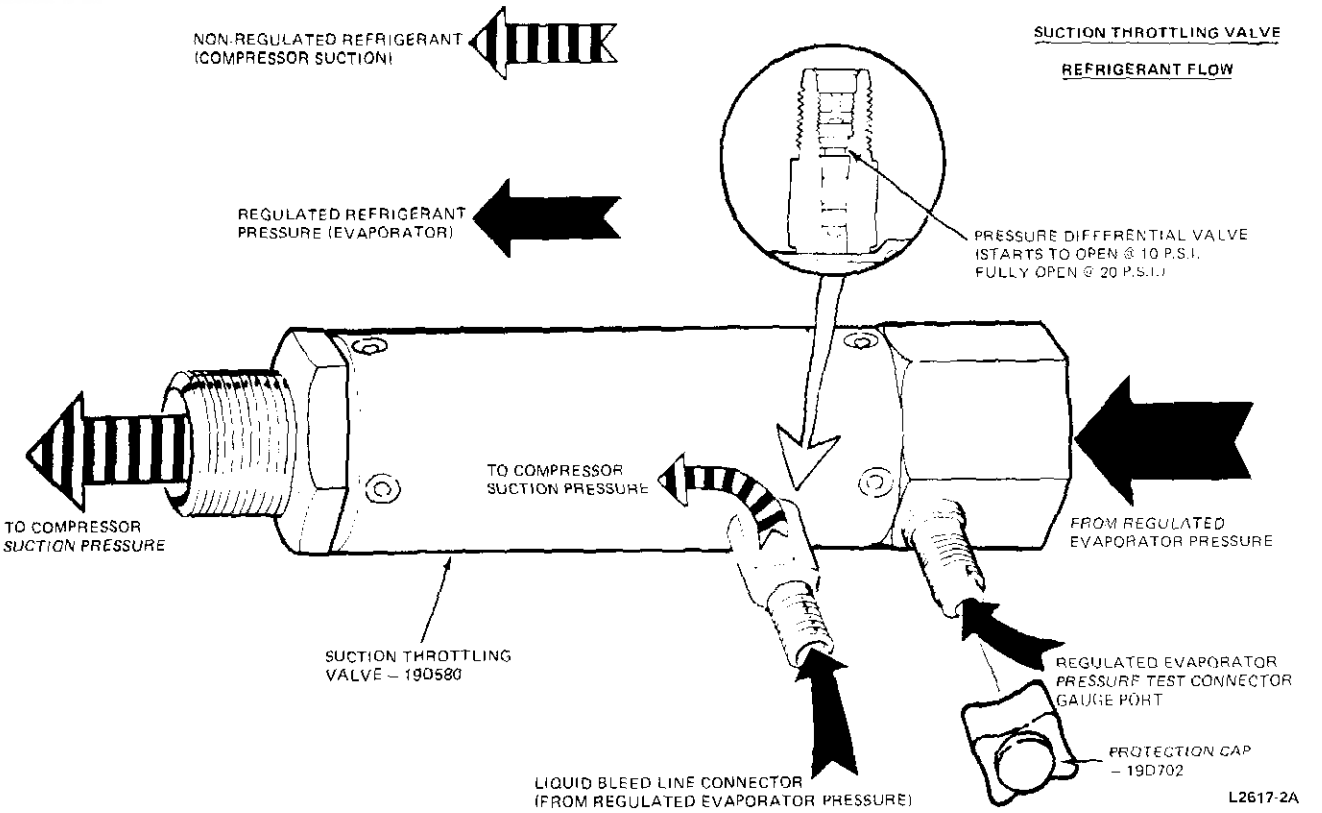


FIG. 9 By-Pass Orifice Type Suction Throttling Valve

REFRIGERANT FLOW

1. Liquid refrigerant from the receiver/drier enters the high pressure liquid line fitting of the By-Pass Orifice (BPO) Expansion Valve.
2. During stabilized (vehicle shutdown) conditions, the pressure on the bottom of the Expansion Valve diaphragm rises above the pressure on the top of the diaphragm, closing the valve.
3. When the system is started, the pressure on the bottom of the diaphragm drops rapidly, allowing the valve to open and spew liquid refrigerant to the lower evaporator tube where it begins to vaporize.
4. The compressor suction draws the vaporized refrigerant out of the top of the evaporator at the outlet (top) tube where it passes, and the temperature is transferred to the bulb of the capillary tube, which is clamped tightly on the tube.
5. Gas pressure in the capillary tube drops when cooled and the expansion valve starts to close. Its pressure rises with evaporator superheat and opens the expansion valve, allowing more refrigerant to flow.
6. Pressure differences, between the evaporator and compressor, force the Suction Throttling Valve control piston further into the valve cylinder. This allows the refrigerant to escape out of the internal side slots of the STV and enter the housing, or suction side, of the Suction Throttling Valve.
7. As the system operates, the temperature (and pressure) in the evaporator core begins to drop. If operating conditions (ambient temperature, vehicle speed, blower speed) permit the temperature of the core to approach the freezing point, the reduced pressure in the evaporator core allows the STV piston to move back and partially cover the side slots. This action "throttles" or restricts refrigerant flow through the STV and maintains the evaporator core pressure of 28.5 psi. This pressure for R-12 corresponds to a temperature of 32°F. The evaporator core is therefore kept above the temperature at which it would freeze the condensed moisture on its surface.
8. The liquid bleed line circuit parallels the Suction Throttling Valve. The Pressure Differential Valve, in the circuit (no replacement part available), starts to open when the suction pressure in the STV housing is 10 psi less than the evaporator pressure. It will fully open when the suction pressure is 20 psi less than the evaporator pressure.
9. The bottom of the pressure sensing diaphragm (on top of the expansion valve) internally senses the evaporator pressure through the internal passages around the ball and plate assembly push pins. As evaporator pressure is increased, the diaphragm flexes upward pulling the push pins away from the ball and plate assembly. The expansion valve spring forces the ball onto the slotted tapered seat and the liquid refrigerant flow is reduced.

   As the pressure is reduced, due to the restricted refrigerant flow, the diaphragm flexes downward again opening the expansion valve to provide the required controlled pressure and refrigerant flow condition.

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10. Gas in the capillary tube bulb produces the required pressure on the top of the pressure sensing diaphragm. As the cool refrigerant passes through the evaporator outlet tube, the temperature is transferred to the bulb of the capillary tube and the gas above the diaphragm will contact and allow the expansion valve spring to close the expansion valve.

When heat from the passenger compartment is absorbed by the refrigerant, it will cause the gas in the capillary tube to expand and the push pins will again force the expansion valve to open, allowing more refrigerant to flow so that more heat can be absorbed.

TESTS

ELECTRICAL

Refer to the ATC System Electrical Wiring Diagram and Continuity Test illustrations Figs. 4 and 5 to assist in performing component and system electrical wiring and continuity tests. The blower switch chart also provides blower motor voltage and current information for each blower switch position.

VACUUM

Refer to the ATC System Vacuum Schematic and Selector Test illustrations (Fig. 3) to assist in performing vacuum system and function selector valve tests. Also refer to Figs. 10, 11 and 12 for the ATC system vacuum leak diagnosis charts.

AIR FLOW

Refer to the ATC System Air Flow Schematic and Vacuum Control Chart (Fig. 2) to assist in performing air flow function and Vacuum Motor Application Tests.

REFRIGERANT SYSTEM

Refer to the normal system operation charts (Figs. 13, 14 and 15) for normal center register discharge air temperatures, normal evaporator pressure gauge readings vs. altitude and normal STV/BPO refrigerant system pressures. Also refer to the problem refrigerant system diagnosis (Fig. 16) for systems with pressures outside of those specified in the charts.

COLD ENGINE BLOWER CIRCUIT INTERRUPTION

1. Turn the ignition switch ON (Do not start engine).
2. Move the blower switch to HI position.
3. Move the Function Control Lever to HEAT position.

Results: a. If the engine coolant temperature is below 100°F, the blower should not operate and the outside air door should be closed.
b. If the engine coolant temperature is above 120°F, the blower should turn on and the outside air door should be open.
c. If results of a or b are not satisfactory, proceed to step 4.

4. Start the engine and operate at idle rpm.
5. Disconnect the "D" shaped connector from the engine temperature sender unit (Figs. 4 and 5). The blower should turn ON. If the blower does not turn ON, the E.V. Relay should be checked for contact continuity between switch terminals S_1 and S_2. When below 100°F the contacts should **not** have more than one ohm resistance. If one ohm or more, replace the E.V. Relay.

   If the E.V. Relay is OK, check for an improper ground contact in the 244 (Yellow w/White Hash) circuit of the wire harness.
6. Connect a jumper wire from frame (ground) to the 244 circuit (Yellow w/White Hash) in the "D" shaped engine temperature sender wire harness connector. The blower should turn OFF.

   CAUTION: Do not accidentally ground the other terminal (I) of the "D" connector if the vehicle is equipped with a temperature gauge. Serious temperature gauge damage may result.

   If the blower does not turn OFF, check for continuity between the coil terminals C_1 and C_2 should have continuity (approximately 31 ohms). If no continuity between terminal C_1 and C_2 exists, replace the E.V. Relay.
7. If the results in step 3a and 3b do not agree with step 5 and 6, the engine temperature sender should be further tested for improper operation. Refer to Engine temperature sender test.

ENGINE TEMPERATURE SENDER

The terminal marked "R" (vehicles with temperature gauge) or "C" (vehicles with engine temperature warning light system), should provide an engine ground circuit below 100°F and an open circuit above 120°F engine coolant temperature. If a terminal resistance of one ohm or more with the coolant temperature below 100°F, or if the circuit does not open above 120°F, replace the engine temperature sender.

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CHART 1

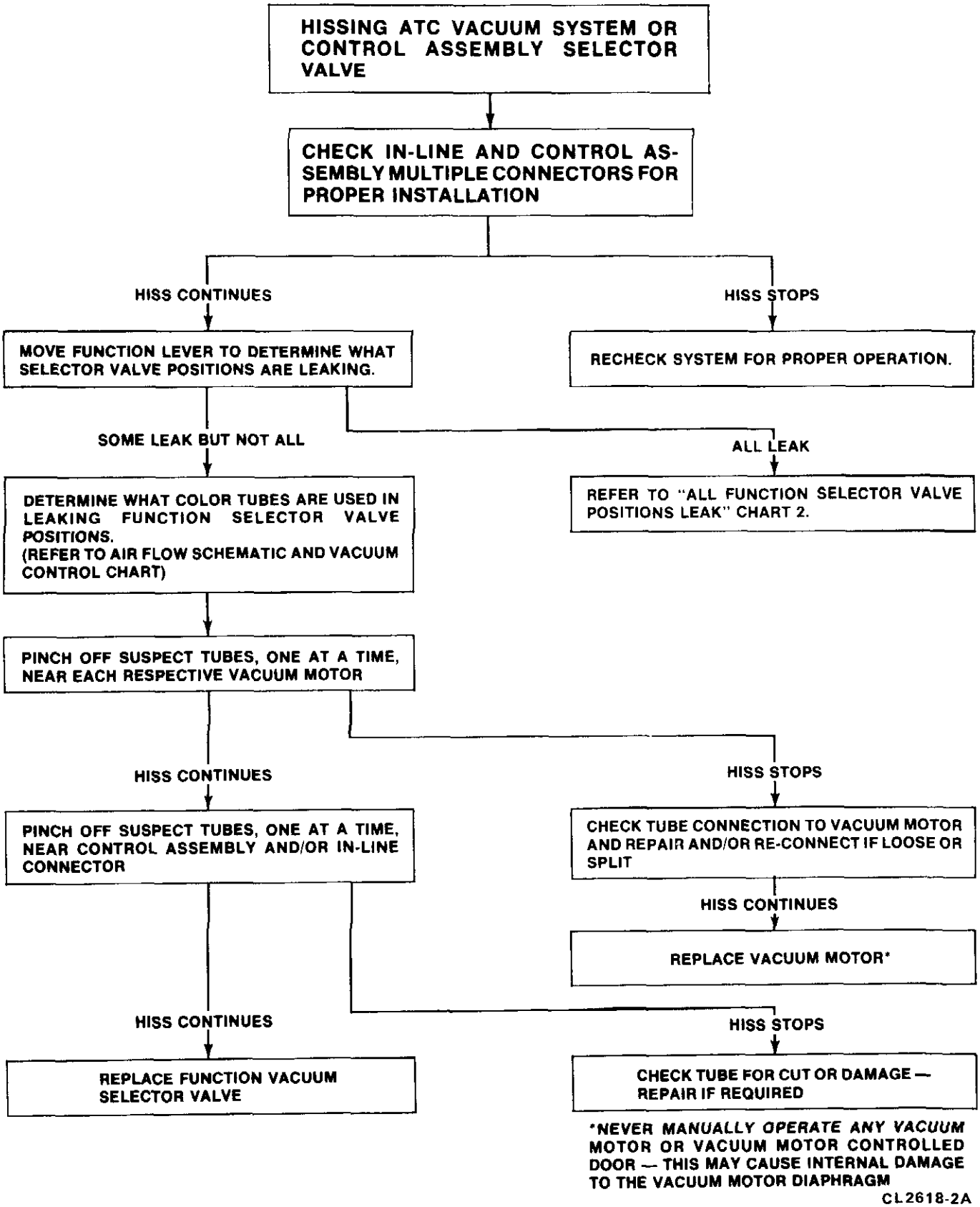


FIG. 10 ATC System Vacuum Leak Diagnosis

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CHART 2

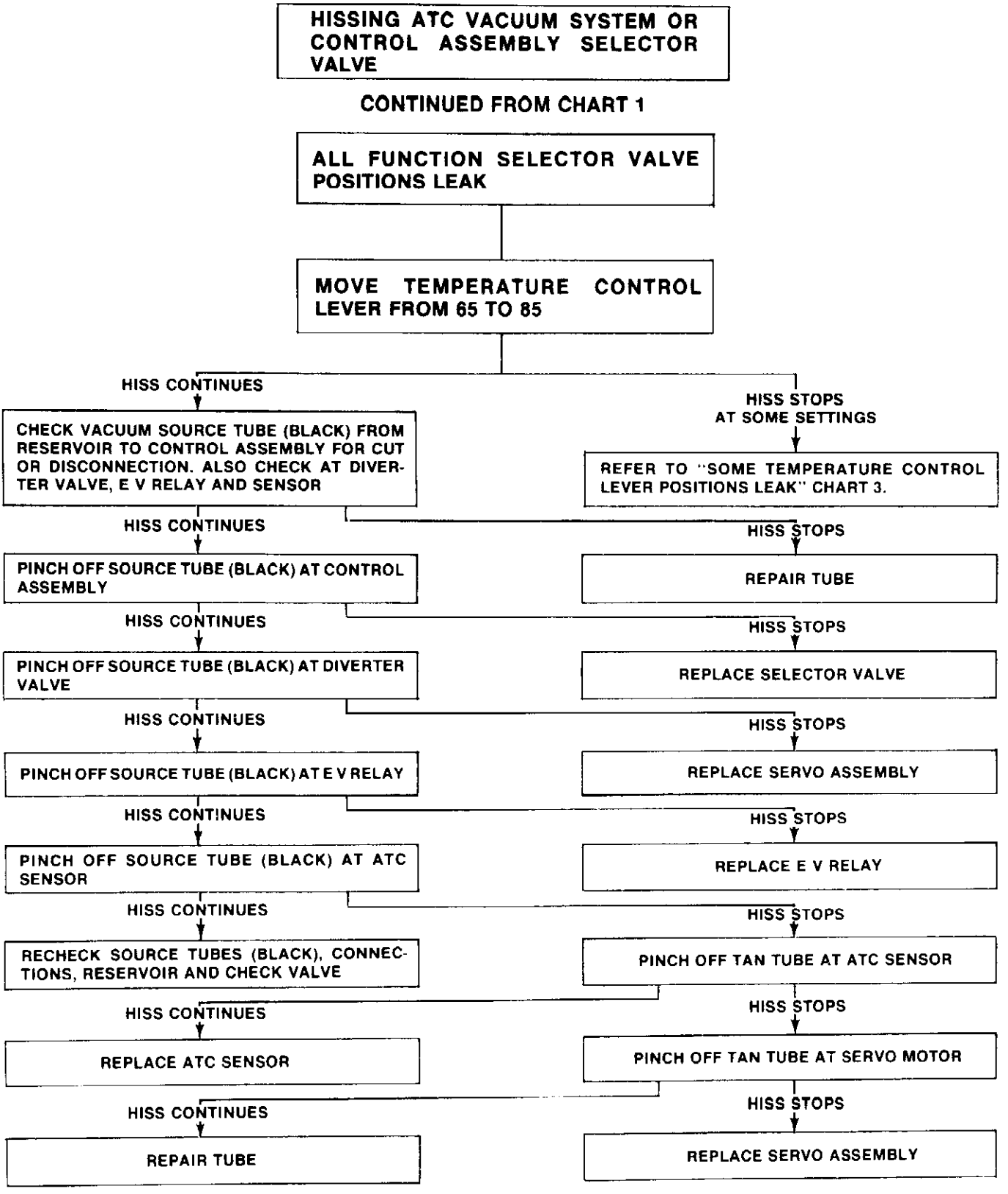
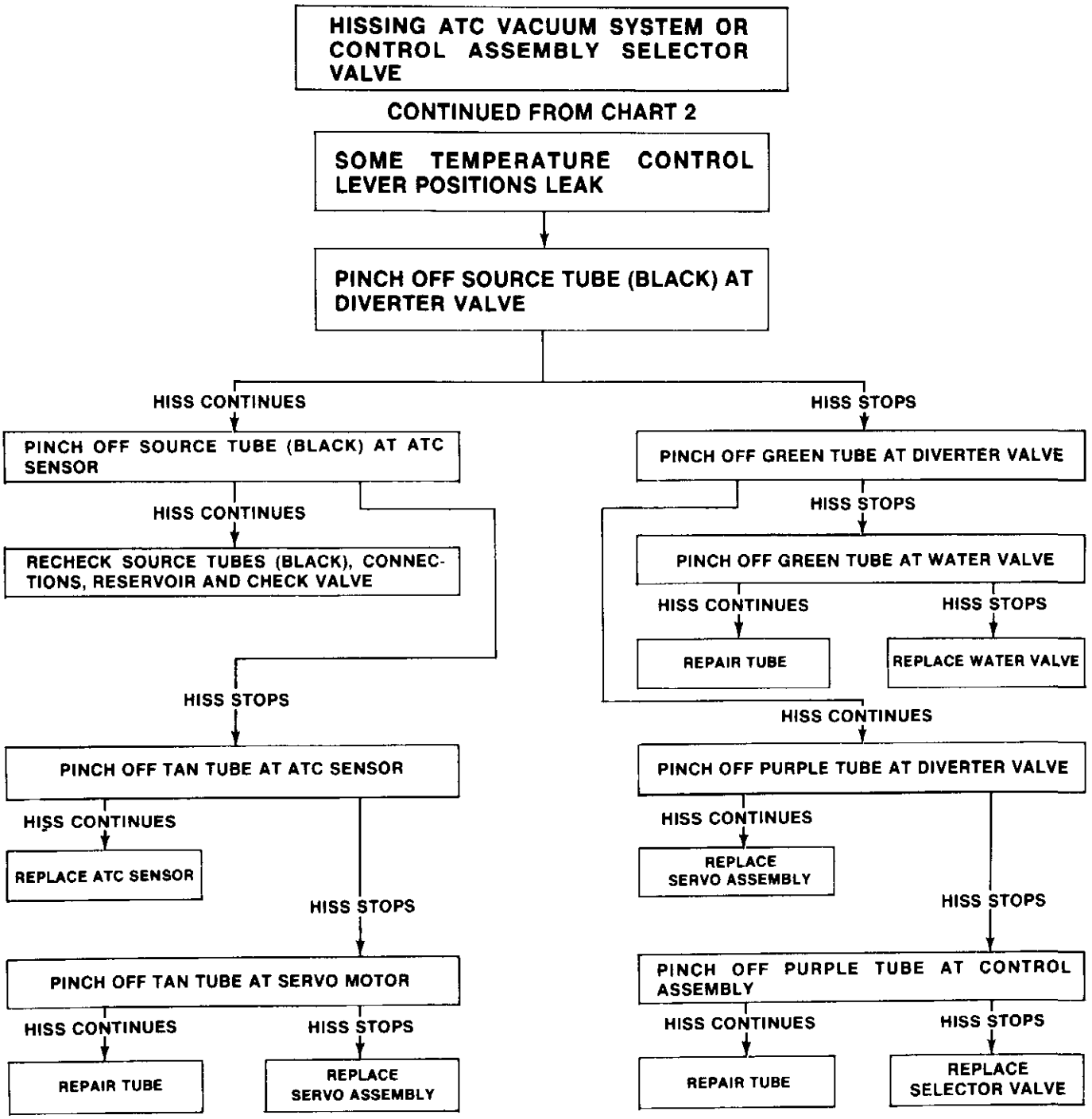


FIG. 11 ATC System Vacuum Leak Diagnosis

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CHART 3



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FIG. 12 ATC System Vacuum Leak Diagnosis

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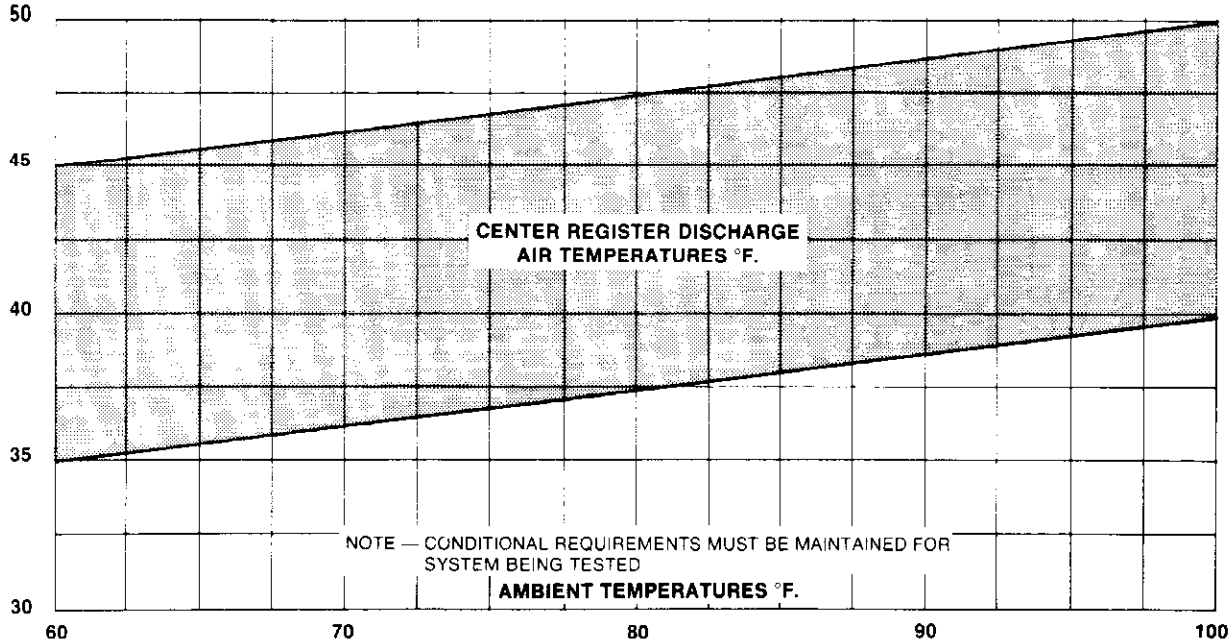


FIG. 13 Normal Center Register Discharge Air Temperatures

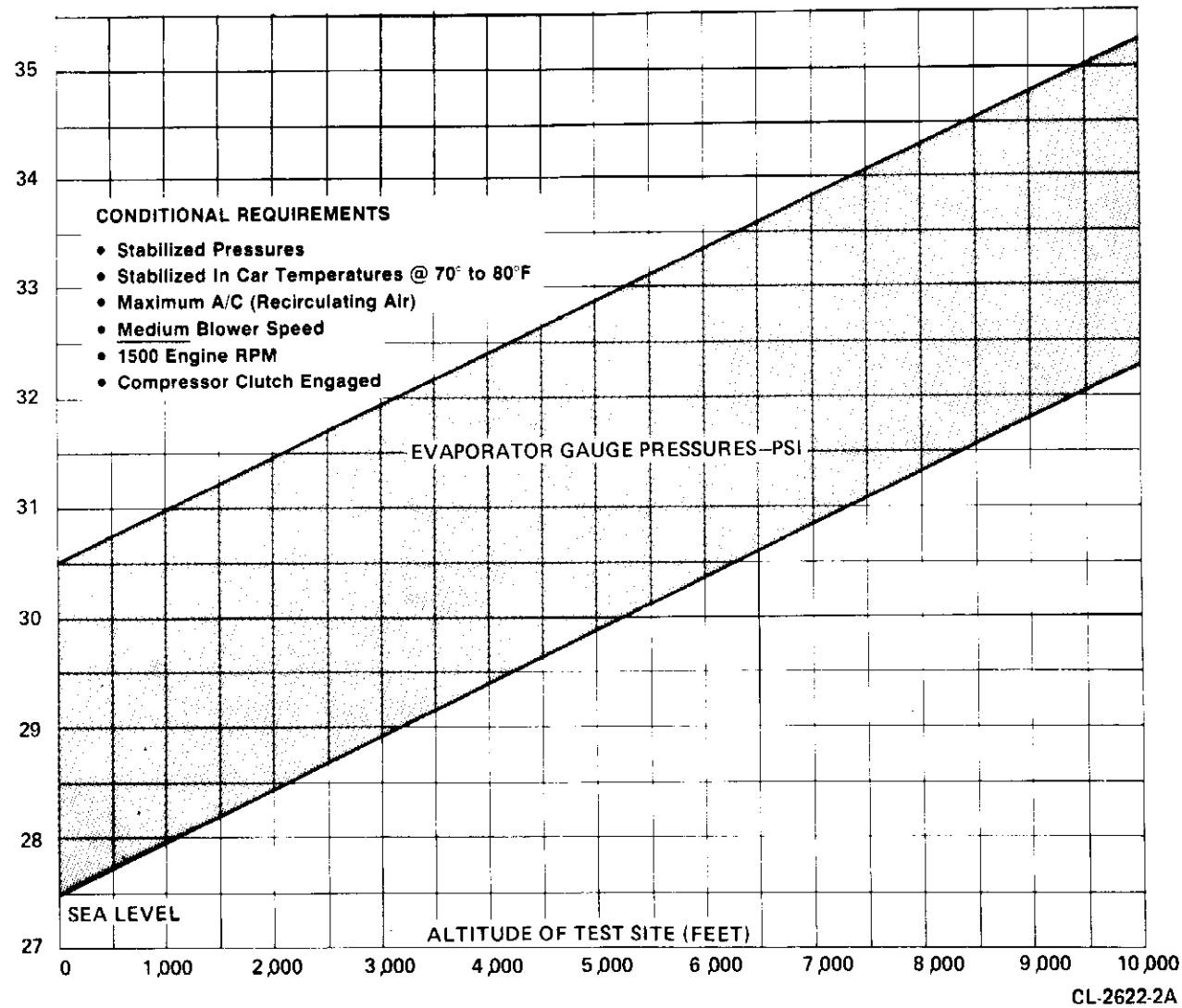
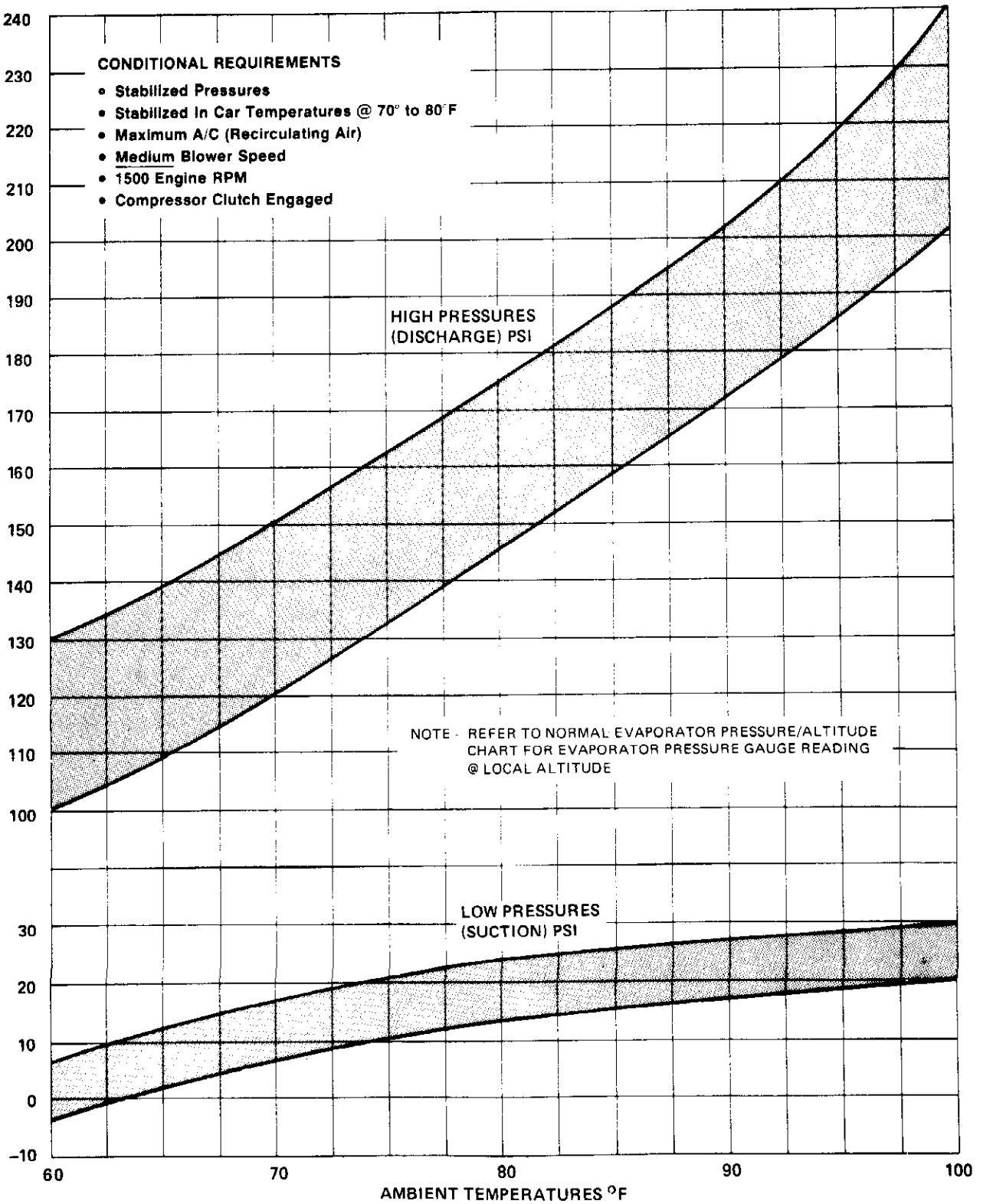


FIG. 14 Normal Evaporator Pressure Gauge Readings VS. Altitude

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NORMAL STV/BPO REFRIGERANT SYSTEM PRESSURES



CL2623-2A

FIG. 15 Normal STV/BPO Refrigerant System Pressures

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PROBLEM REFRIGERANT SYSTEM PRESSURE EVALUATION

For All STV and STV/BPO Systems with Low Pressure Suction Service Access Gauge Port Valves

NOTE: Normal system conditional requirements must be maintained to properly evaluate refrigerant system pressures. Refer to chart applicable to system under test.

HIGH PRESSURE @ LIQUID LINE	HIGH PRESSURE @ COMPRESSOR	LOW PRESSURE	EVAPORATOR PRESSURE	POSSIBLE PROBLEM/COMPONENT
HIGH	HIGH	HIGH	HIGH	ENGINE OVERHEATING / EXPANSION VALVE SENSING BULB – Poor Contact, Inadequate Insulation
HIGH	HIGH	HIGH	NORMAL TO HIGH	HEATER WATER VALVE – Insufficient Closure / EVAPORATOR – Too Much Air Flow - Reset Blower to Conditional Requirement / EXPANSION VALVE – Sticking Open
HIGH	HIGH	NORMAL TO HIGH	NORMAL	AIR IN REFRIGERANT SYSTEM
HIGH	HIGH	NORMAL	NORMAL	REFRIGERANT – Overcharge
HIGH	HIGH	LOW	LOW	COMPRESSOR-TO-CONDENSER A/C LINE – Restriction; After Service Access Valve
NORMAL TO HIGH	NORMAL TO HIGH	HIGH	HIGH	CONDENSER – Inadequate Air Flow (Bent Fins, Debris, Loose Radiator Fan Belt, Slipping Fan Clutch)
NORMAL TO HIGH	NORMAL TO HIGH	NORMAL TO HIGH	NORMAL TO HIGH	HUMIDITY WELL ABOVE NORMAL
NORMAL TO HIGH	NORMAL TO HIGH	NORMAL TO HIGH	NORMAL	EXCESSIVE REFRIGERANT OIL
NORMAL	NORMAL	NORMAL	LOW	SUCTION THROTTLING VALVE – Sticking Open – May Cause Iced-Up Evaporator, May Be Related to Moisture.
NORMAL TO ERRATIC	NORMAL TO ERRATIC	NORMAL TO ERRATIC	NORMAL TO ERRATIC	MOISTURE IN REFRIGERANT SYSTEM – Affects Expansion Valve and STV Functions.
ERRATIC	ERRATIC	ERRATIC	ERRATIC	EXPANSION VALVE SENSING BULB – Kinked Capillary Tube
NORMAL TO LOW	NORMAL TO LOW	NORMAL TO LOW	NORMAL	EVAPORATOR – Restriction, Inadequate Air Flow - Reset Blower to Conditional Requirement and/or Confirm Blower Condition
LOW	HIGH	LOW	LOW	RECEIVER/DRIER – Restriction / A/C LIQUID LINE – Restriction; Before Service Access Valve - CONDENSER – Restriction
LOW	LOW	HIGH	NORMAL TO HIGH	A/C SUCTION LINE – Restriction; After Service Access Valve - SUCTION ACCUMULATOR – Restriction, After Service Access Valve
LOW	LOW	HIGH	HIGH	COMPRESSOR – Damaged Valves (Inadequate compression)
LOW	LOW	LOW	HIGH	SUCTION THROTTLING VALVE – Sticking Closed - May Be Related to Moisture
LOW	LOW	LOW	NORMAL TO HIGH	A/C SUCTION LINE - Restriction, Before Service Access Valve / SUCTION ACCUMULATOR – Restriction; Before Service Access Valve
LOW	LOW	LOW	LOW	EVAPORATOR - Iced-up / CONDENSER – Plugged / RECEIVER/DRIER – Plugged / A/C LIQUID LINE - Restriction; After Service Access Valve / EXPANSION VALVE SENSING BULB – Perforated Bulb / EXPANSION VALVE – Sticking Closed / REFRIGERANT LEAK AND/OR UNDERCHARGE COMPRESSOR-TO-CONDENSER A/C LINE - Restriction; Before Service Access Valve

ADDITIONAL POSSIBLE PROBLEM COMPONENTS ASSOCIATED WITH INADEQUATE COMPRESSOR OPERATION

COMPRESSOR CLUTCH – Slipping / COMPRESSOR DRIVE BELT – Loose / CLUTCH COIL – Shorted Coils; Slipping / CLUTCH COIL – Open Circuit / AMBIENT CUT-OFF SWITCH – Sticking Open / BLOWN CLUTCH CIRCUIT FUSE – Improper Clutch Circuit Contact in Control Assembly Switch.

ADDITIONAL POSSIBLE PROBLEM COMPONENTS ASSOCIATED WITH A COMPRESSOR FAILURE

PRESSURE DIFFERENTIAL VALVE (In Liquid Bleed Line) – Sticking Closed / AMBIENT CUT-OFF SWITCH – Sticking Closed / SUCTION THROTTLING VALVE – Sticking Open / REFRIGERANT LEAK

CL2624-2A

FIG. 16 Problem Refrigerant System Pressure Evaluation

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ADJUSTMENTS

SENSOR CALIBRATION

1. Remove the instrument panel pad and visually determine which direction to rotate the sensor calibration locking pin (Fig. 17).
2. While moving the temperature control lever, rotate the calibration locking pin into the calibration notch of the sensor control arm.
3. Check the position of the temperature control lever, it should be at 75. If it is not, loosen the cable housing-to-sensor attaching screw and move the temperature control lever to 75 while the sensor control arm is locked in the calibration position. Retighten the cable housing-to-sensor attaching screw, making sure the temperature control stays at 75 and the sensor arm stays locked.

Readjusting Sensor Calibration Point

If it should become necessary to change the calibration point to suit a customer, first check the sensor calibration as described in the above procedure. If OK, use the following procedure:

1. Establish the customers preference and the difference between the present and desired comfort level setting.
2. Determine the direction of change.
3. To decrease or increase, adjust the temperature control lever position with the sensor arm locked in the calibration notch. Loosen the cable housing-to-sensor attaching screw, move the temperature control lever the desired amount and retighten the attaching screw (Fig. 17).

NOTE: Move the temperature control lever HIGHER to DECREASE and LOWER to INCREASE the controlled temperature at a given setting.

CAUTION: If a readjustment of the temperature control lever of more than 4°F. is required, and the cable adjustment is correct, per Sensor Calibration Procedure above, replace the sensor assembly.

SERVO MOTOR

1. Remove vacuum from the servo motor by disconnecting the tan vacuum hose.
2. Loosen the two (2) retaining screws (Fig. 18).
3. Carefully slide the motor forward (into the housing) until the blend door seal just contacts its stop (full heat). Continue to slide the motor forward another 1/8 inch (3.2 mm). The diaphragm should move into the motor housing about 1/8 inch (3.2 mm).
4. Tighten the two retaining screws.
5. Connect the tan vacuum hose.

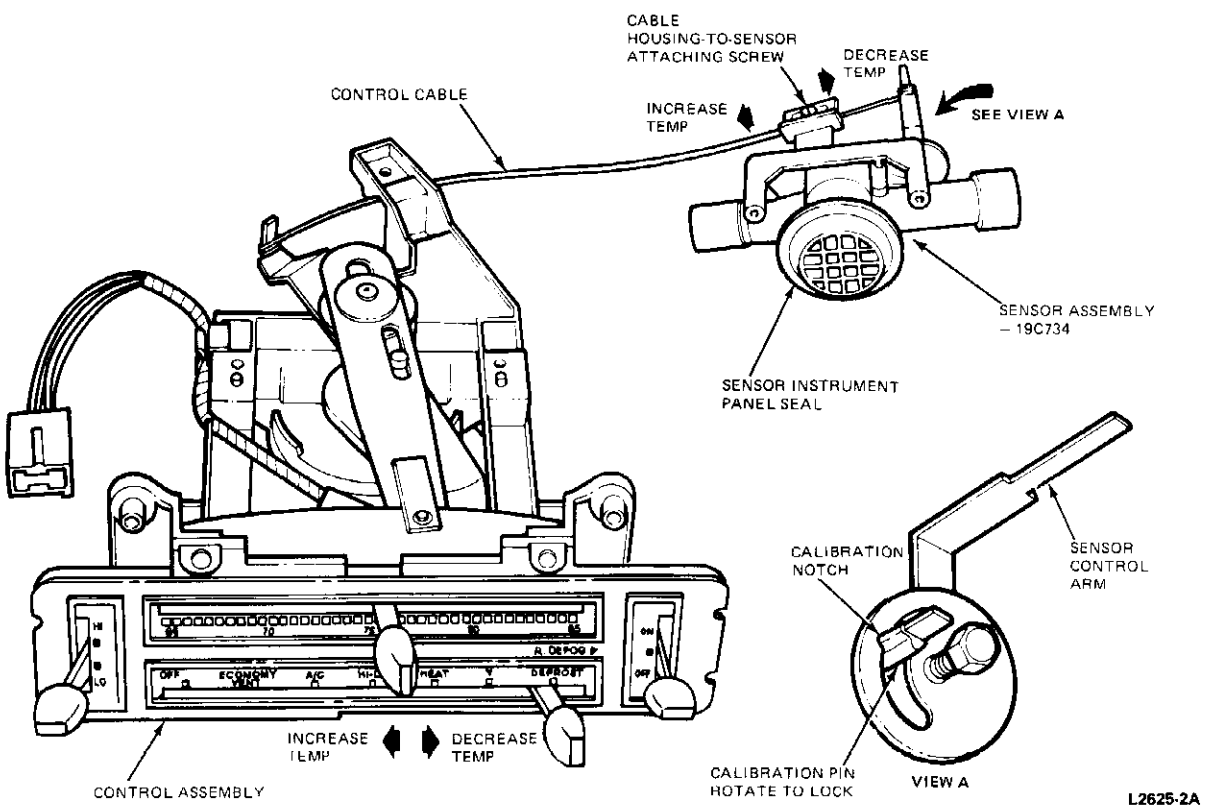


FIG. 17 A.T.C. System Temperature Calibration

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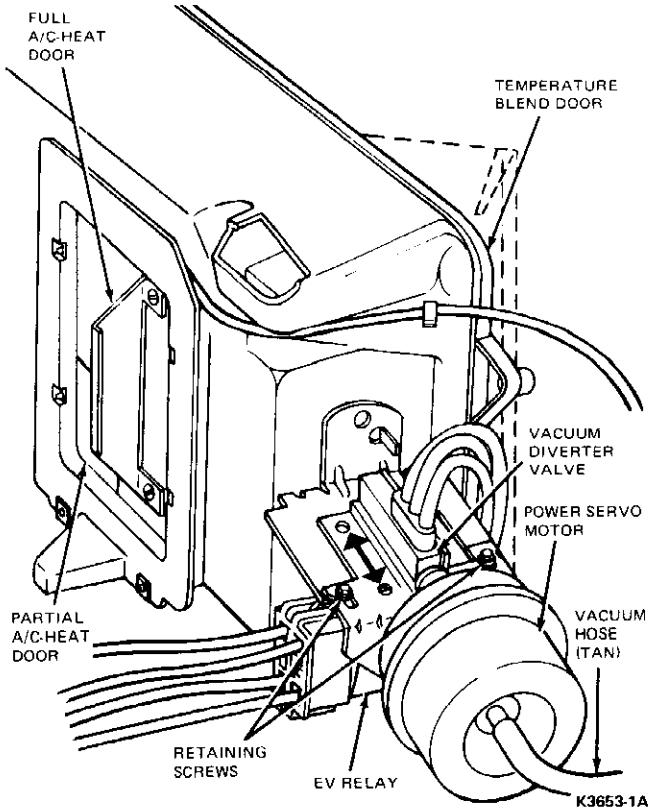


FIG. 18 1978 Ford, Mercury and Lincoln Continental ATC Servo Assembly Adjustment

COMPRESSOR DRIVE BELT TENSION

5.0L (302 CID), 5.7L (351 CID) and 6.6L (400 CID) Engines

1. Check the belt tension with Tool T63L-8620-A or equivalent. The belt tension should be with specifications.
2. If the belt tension is not within specification, loosen the two idler pulley arm attaching bolts until they are just snug (Figs. 19, 20, and 21).
3. Insert the end of a ½ inch flex-handle into the square hole in the idler arm and apply pressure to the idler arm with the flex handle until the belt tension is within specifications. Then, tighten the idler arm attaching bolts while holding pressure on the idler arm. Again check the belt tension and tighten the idler arm attaching bolts to the specified torque.
4. Remove the belt tension gauge and the flex handle.

7.5L (460 CID) Engine

1. Check the belt tension with Tool T63L-8620-A or equivalent. The belt tension should be within specifications.
2. If the belt tension is not within specification, loosen the compressor adjusting bolt and the two pivot bolts (Figs. 22 and 23) until they are just snug.
3. Insert the end of a ½ inch flex handle into the square hole in the brace at the front of the compressor (Figs. 22 and 23). Apply pressure to the brace with the flex handle until the belt tension is within specification. Then, tighten the adjusting bolt.
4. Again check the belt tension. If it is within specification, tighten the two pivot bolts and the adjusting bolt to specifications.
5. Remove the belt tension gauge and the flex handle.

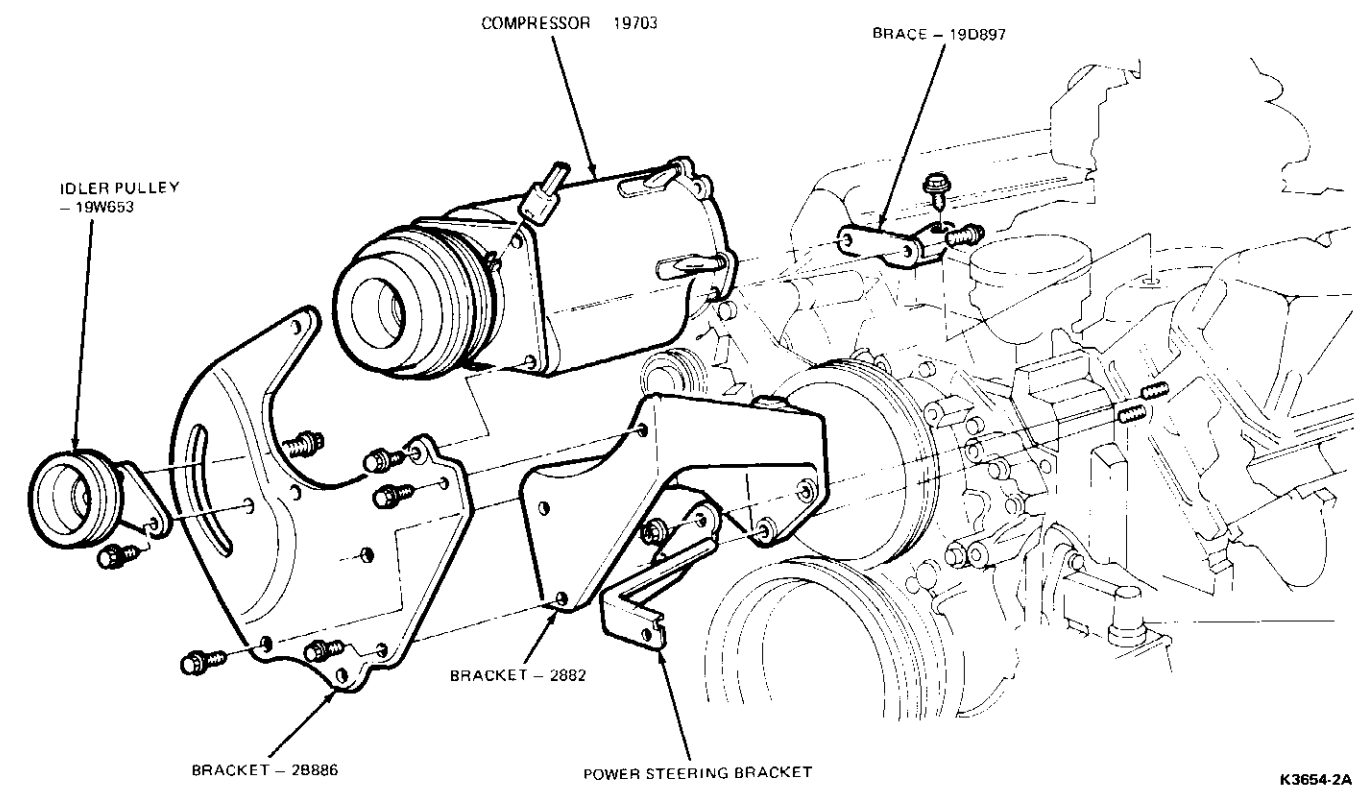


FIG. 19 Compressor Installation — 5.7L (351-M CID) and 6.6L (400 CID) Engines — Early Production

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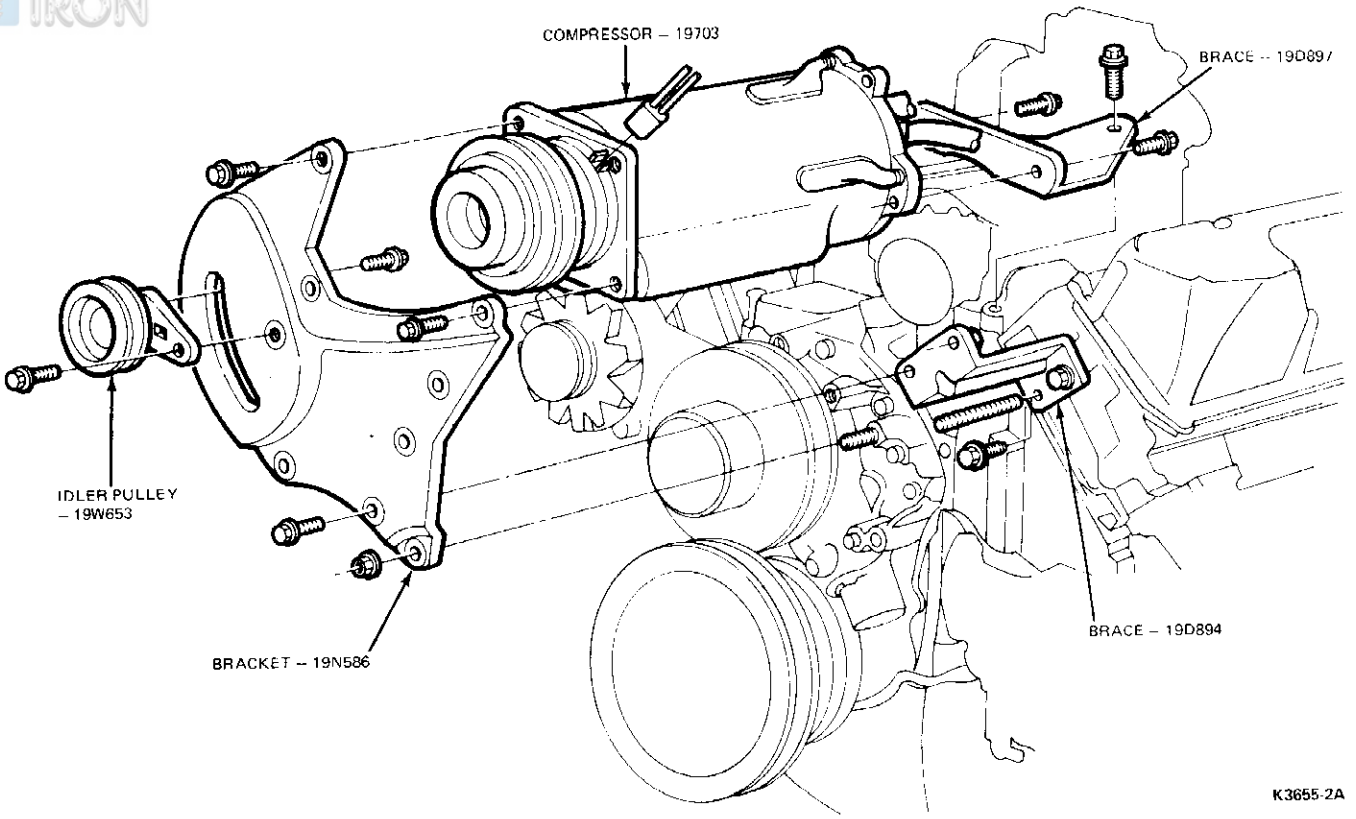


FIG. 20 Compressor Installation — 5.7L (351-M CID) and 6.6L (400 CID) Engines — Later Production

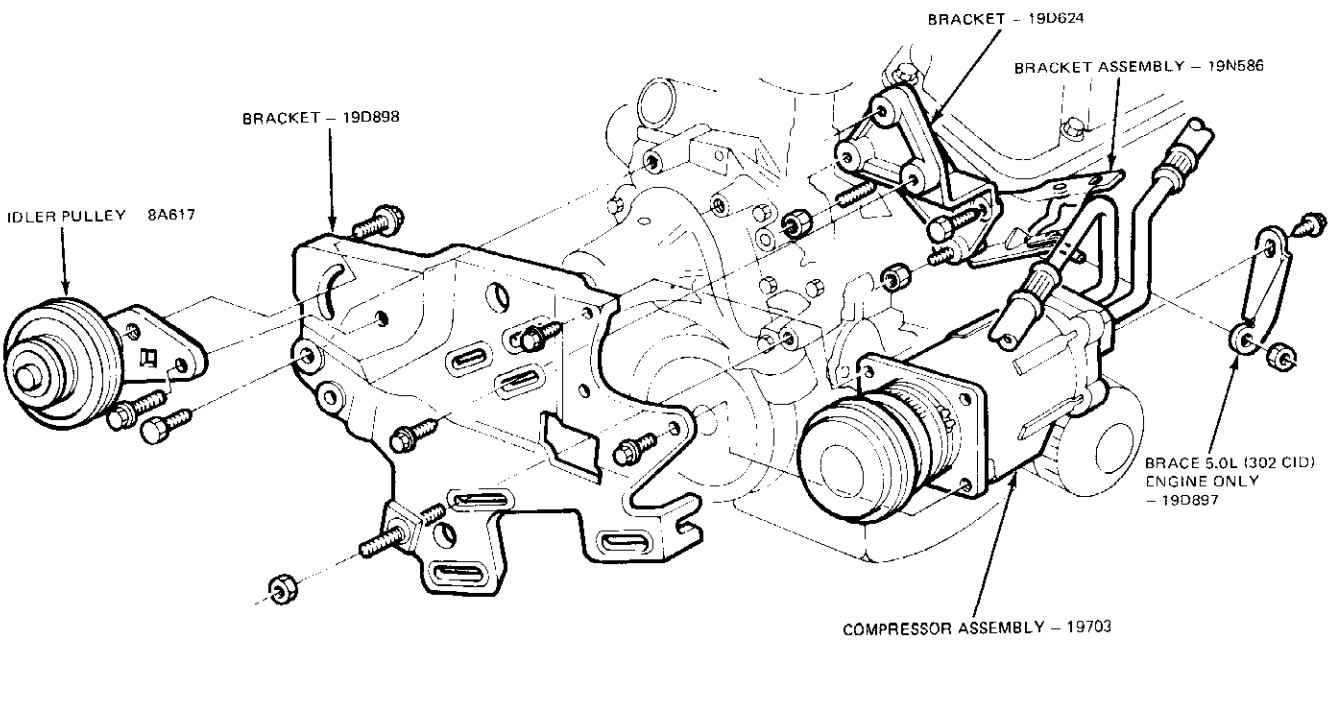


FIG. 21 Compressor Installation — 5.0L (302 CID) and 5.7L (351-W CID) Engines

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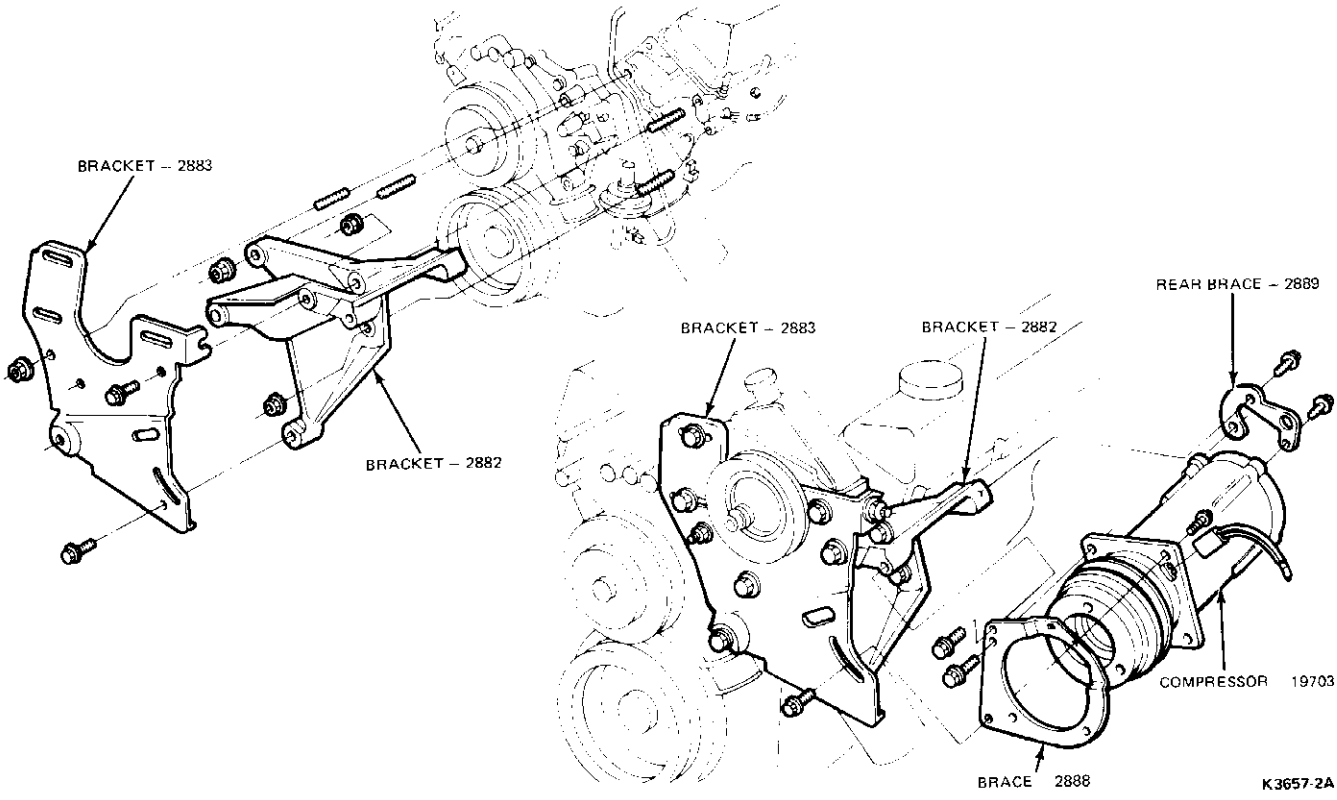


FIG. 22 Compressor Installation – Lincoln Continental with 7.5L (460 CID) Engine

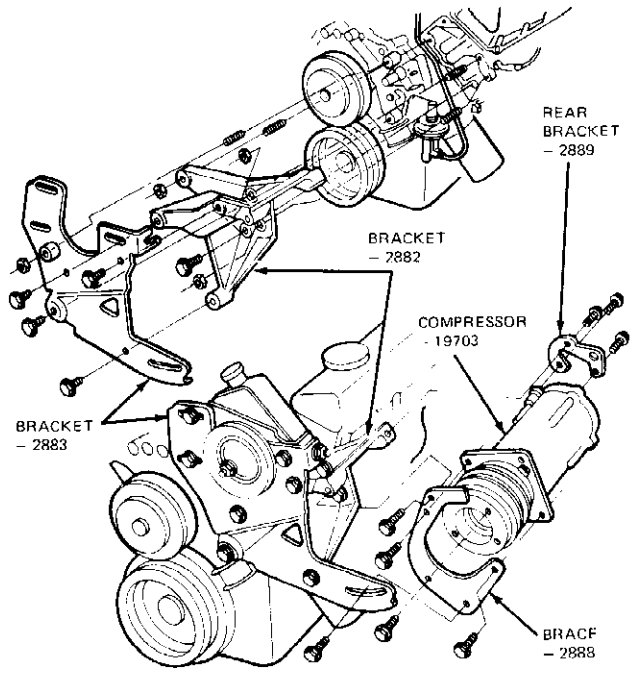


FIG. 23 Compressor Installation – Ford and Mercury with 7.5L (460 CID) Engine

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DETROIT IRON

REMOVAL AND INSTALLATION

CONTROL ASSEMBLY

Removal

1. Remove the radio knobs (4) from the radio.
2. Remove the retaining screws (2) securing the right instrument cluster trim panel to the instrument panel.
3. Pull the lower edge of the right instrument cluster trim panel away from the instrument panel and disengage the top right instrument cluster trim panel tabs (2) from the instrument panel. Put the instrument cluster trim panel, radio knobs and trim panel retaining screws aside for later installation.
4. Remove the ash tray from the ash tray support bracket.
5. Remove the retaining screws (3) securing the ash tray support bracket to the instrument panel and remove the ash tray support bracket.
6. Disconnect the multiple vacuum connector from the rear of the function control vacuum selector valve (Fig. 24).
7. Disconnect the electrical wire harness connectors (2) from the function control vacuum selector valve.
8. Disconnect the electrical wire harness connectors from the blower switch and the accessory switch (if applicable).
9. Remove the retaining screws (4) securing the control assembly to the instrument panel.
10. Pull the control assembly out of the instrument panel for access to the temperature control cable assembly retaining screw (1).
11. Remove the retaining screw (1) securing the temperature control cable assembly to the control assembly and remove the control assembly.

Installation

1. Position the control assembly near the instrument panel opening and slip the wire coil of the temperature control cable assembly onto the temperature lever arm.
2. Position the temperature control cable housing on the control assembly, install and tighten the control cable housing end tab retaining screw (1).
3. Position the control assembly into the instrument panel opening, install and tighten the control assembly-to-instrument panel retaining screws (4).
4. Install the blower switch and accessory switch (if applicable) electrical wire harness connectors.
5. Install the function vacuum selector control valve electrical wire harness connectors (2).
6. Install the multiple vacuum connector onto the function vacuum selector control valve.
7. Insert the top right instrument cluster trim panel tabs (2) into the tab slots at the top of the instrument panel, lower the trim panel into position and install the right instrument cluster trim panel-to-instrument panel retaining screws (2). Tighten the retaining screws to specification.
8. Align and install the radio control knobs (4).

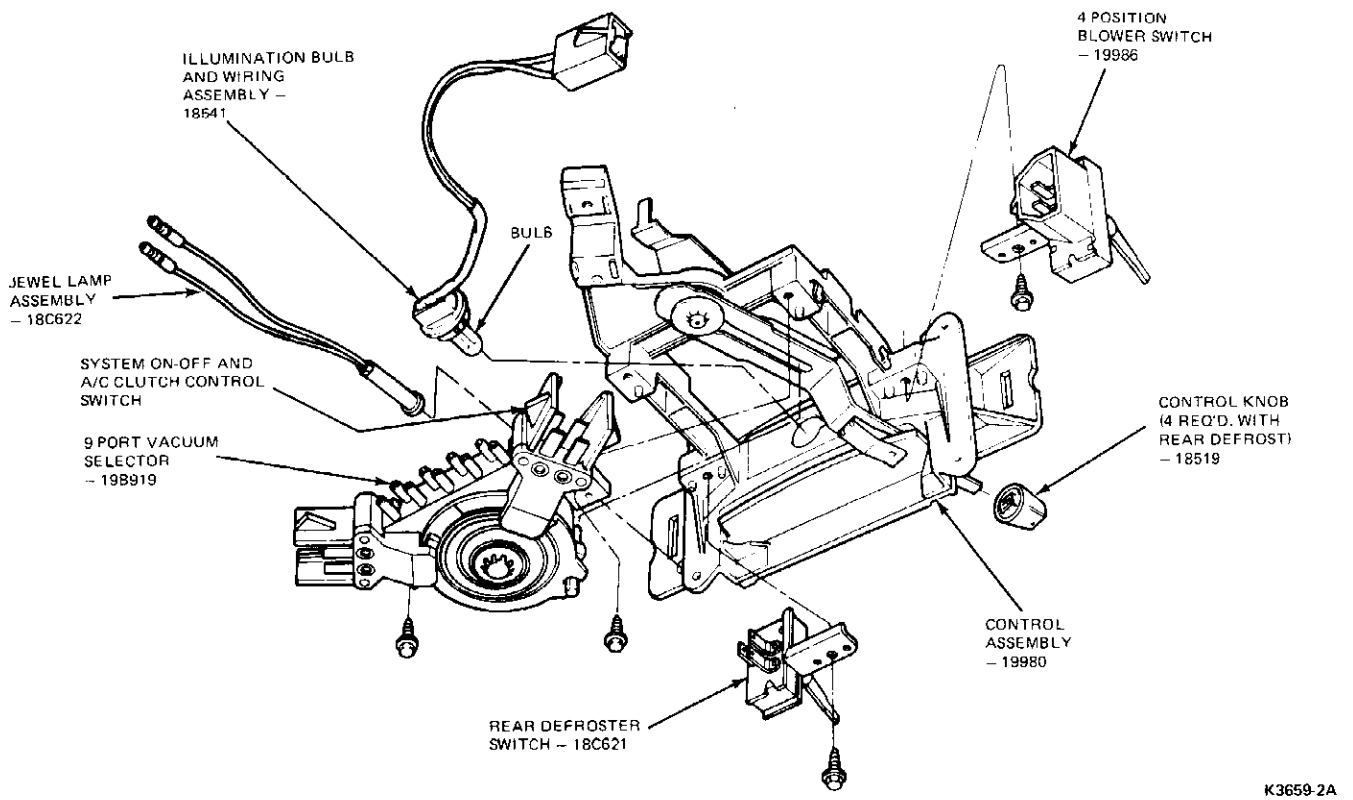


FIG. 24 ATC Control Assembly Disassembled

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9. Position the ash tray support bracket, install and tighten the ash tray-to-instrument panel retaining screws (3).
10. Insert the ash tray into the guide tracks of the ash tray support bracket and install the ash tray.
11. Test the ATC system for proper operation.

BLOWER AND/OR ACCESSORY SWITCH(ES)

Removal

1. Remove the ash tray from the ash tray support bracket.
2. Remove the retaining screws (3) securing the ash tray support bracket to the instrument panel and remove the ash tray support bracket for access.
3. Disconnect the electrical wire harness connector(s) from the blower and/or accessory switch(es).
4. Depress the locking tang(s) securing the control knob(s) onto the switch(es) arm(s) and remove the blower and/or accessory control knob(s).
5. Remove the retaining screw (1) securing the blower and/or accessory switch(es) assembly(ies) to the control assembly and remove the switch(es) from behind the instrument panel (Fig. 24).

Installation

1. Insert the switch(es) shaft through the slotted opening and position the blower and/or accessory switch onto the control assembly.
2. Install and tighten the blower and/or accessory switch(es)-to-control assembly retaining screw.
3. Install the electrical wire harness connector(s) until the connector fully engages the spade terminals of the blower and/or accessory switch(es).
4. Install the blower and/or accessory control knob(s).
5. Position the ash tray support bracket, install and tighten the ash tray-to-instrument panel retaining screws (3).
6. Insert the ash tray into the guide tracks of the ash tray support and install the ash tray.
7. Operate the blower and/or accessory switch(es) to test for proper function.

FUNCTION CONTROL VACUUM SELECTOR VALVE

Removal

1. Remove the ash tray from the ash tray support bracket.
2. Remove the retaining screws (3) securing the ash tray support bracket to the instrument panel and remove the ash tray support bracket for access.
3. Disconnect the multiple vacuum connector from the function control 9-Port vacuum selector valve (Fig. 24).
4. Disconnect the electrical wire harness connectors (2) from the function control vacuum selector valve.
5. Remove the retaining screws (2) securing the function control vacuum selector valve to the control assembly and remove the function control vacuum selector valve.

Installation

1. Align the function lever slot with the pin on the function control vacuum selector valve, position the alignment pins of the control assembly with the alignment holes on the selector valve body and install the function control vacuum selector valve-to-control assembly retaining screws (2). Tighten the screws to specification.
2. Install the electrical wire harness connectors (2).
3. Install the multiple vacuum connector.
4. Position the ash tray support bracket, install and tighten the ash tray-to-instrument panel retaining screws (3).
5. Insert the ash tray into the guide tracks of the ash tray support bracket and install the ash tray.
6. Operate the function control lever to test the function control vacuum selector valve for proper function.

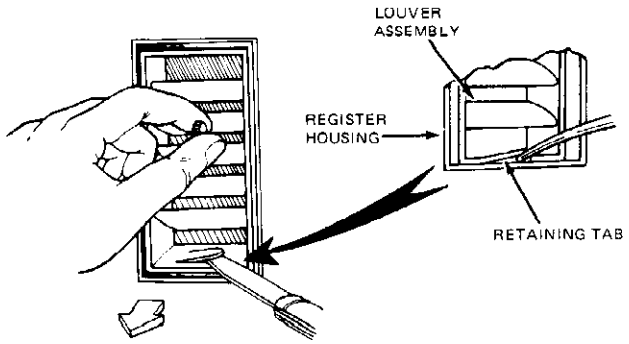


FIG. 25 Instrument Panel Register Removal

REGISTER ASSEMBLIES

Removal

1. Insert a thin blade under the retaining tab (Fig. 25) and pry the retaining tab toward the louvers until the retaining tab pivot clears the hole in the register opening.
2. Pull the register assembly end out from the housing only enough to prevent the pivot from going back into the pivot hole.
3. Repeat Step 1 for the other retaining tab and pull the register assembly from the register opening.

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DETROIT IRON

Installation

The pivots on each end of the register assembly are different diameters and therefore determine the installed position of the register assembly.

1. Position the register assembly into the opening with the largest diameter pivot near the largest pivot hole.
2. Depress the retaining tabs, push the register assembly into the register opening and engage the retaining tab pivots in the pivot holes.

A/C REGISTER DUCTS

Removal

1. Disconnect the ground cable from the battery.
2. Remove the pad from the instrument panel.
3. Remove two screws attaching the steering column opening lower cover to the instrument panel and remove the cover.
4. Remove the steering column support bracket and lay the steering column against the seat.
5. Remove the instrument panel attaching bolts and lay the instrument panel back on the seat. Disconnect wires, vacuum hoses, speedometer cable and other components as necessary to lay the instrument panel on the front seat.
6. Remove five screws attaching the register ducts to the instument panel (Figs. 26 and 27). On Lincoln and Mercury models, remove one screw attaching the right duct to the center duct (Fig. 27). Then, remove the register ducts.

Installation

1. Position the register ducts to the instrument panel and install the attaching screws. (Fig.
2. Position the instrument panel near the dash panel and connect all the inter-connecting components. Then, install the instrument panel attaching bolts.
3. Secure the steering colmn to the support and install the steering colmn opening lower cover.
4. Install the instrument panel pad and connect the ground cable to the battery.

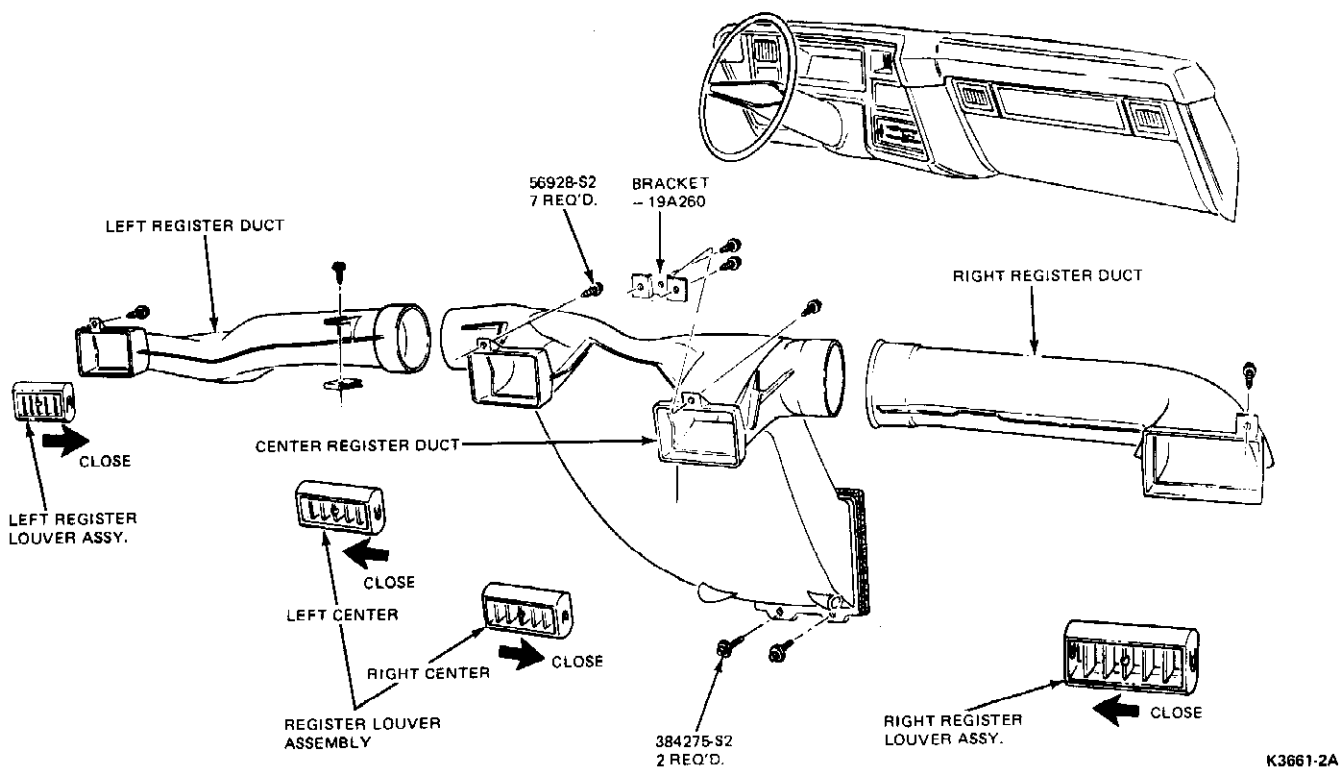


FIG. 26 1978 Ford A/C Register Ducts and Registers

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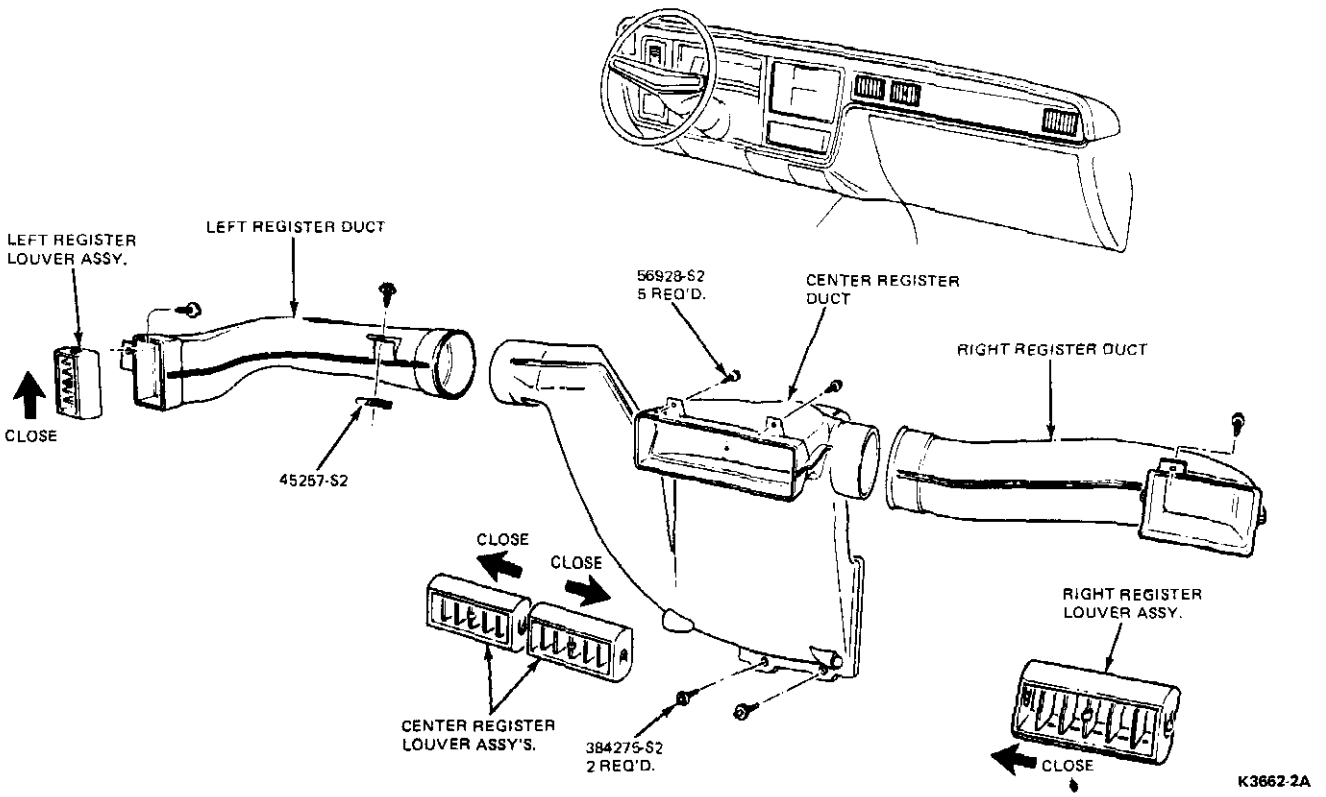


FIG. 27 1978 Mercury and Lincoln Continental A/C Register Ducts and Registers

DEFROSTER NOZZLES

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument panel pad.
3. To remove the right defroster nozzle, remove two screws attaching the nozzle to the dash panel and one screw attaching the nozzle to the duct (Fig. 28).
4. To remove the left defroster nozzle, loosen the Y-brace near the cluster. Then, remove two screws attaching the defroster nozzle to the dash panel and one screw attaching the nozzle to the duct.
5. Separate the defroster nozzle from the duct and remove the nozzle through the instrument panel pad opening.

Installation

1. Position the defroster nozzle to the dash panel and the defroster duct. Install two screws to attach the defroster nozzle to the dash panel and one screw to attach the nozzle to the defroster duct.
2. Tighten the brace near the cluster if it was loosened for removal of the left defroster duct.
3. Install the instrument panel pad and connect the ground cable to the battery.

INSTRUMENT PANEL PAD-FORD

Removal

1. Using a magnetic or locking tang-type phillips screwdriver, remove the retaining screws (2) securing the leading edge of the upper finish panel to the defroster openings (Fig. 29).

CAUTION: CARE SHOULD BE TAKEN TO PREVENT RETAINING SCREW LOSS IN THE DEFROSTER OUTLET OPENINGS. DAMAGE TO THE PLENUM DOORS MAY OCCUR, RESULTING IN CASE ASSEMBLY REMOVAL AND DISASSEMBLY FOR PROBLEM CORRECTION.

2. Remove the retaining screws (3) securing the instrument panel pad to the instrument panel, above the glove box door.
3. Remove the retaining screws (4) securing the instrument panel pad to the instrument panel, around the top of the instrument cluster.
4. Raise the brow edge the instrument panel pad and carefully remove the instrument panel pad and upper finish panel assembly from the vehicle.

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DETROIT IRON

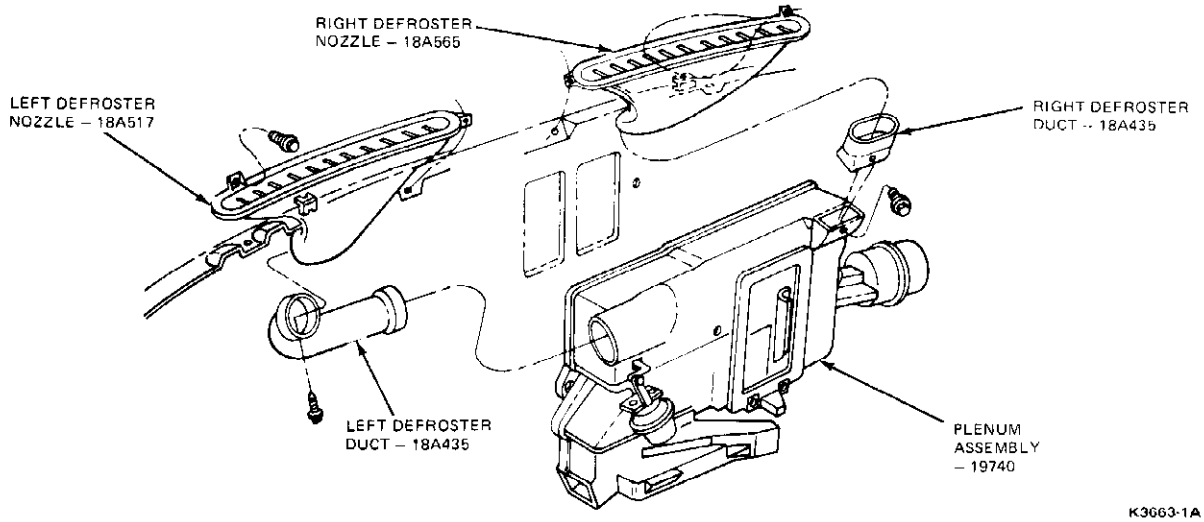


FIG. 28 Defroster Nozzle Removal

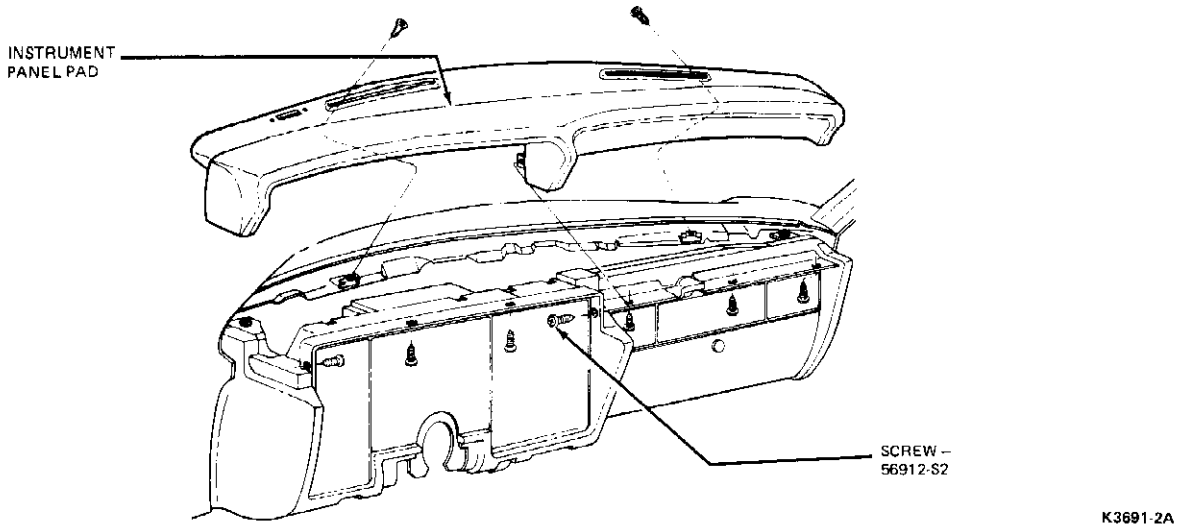


FIG. 29 Instrument Panel Pad Removal – Ford

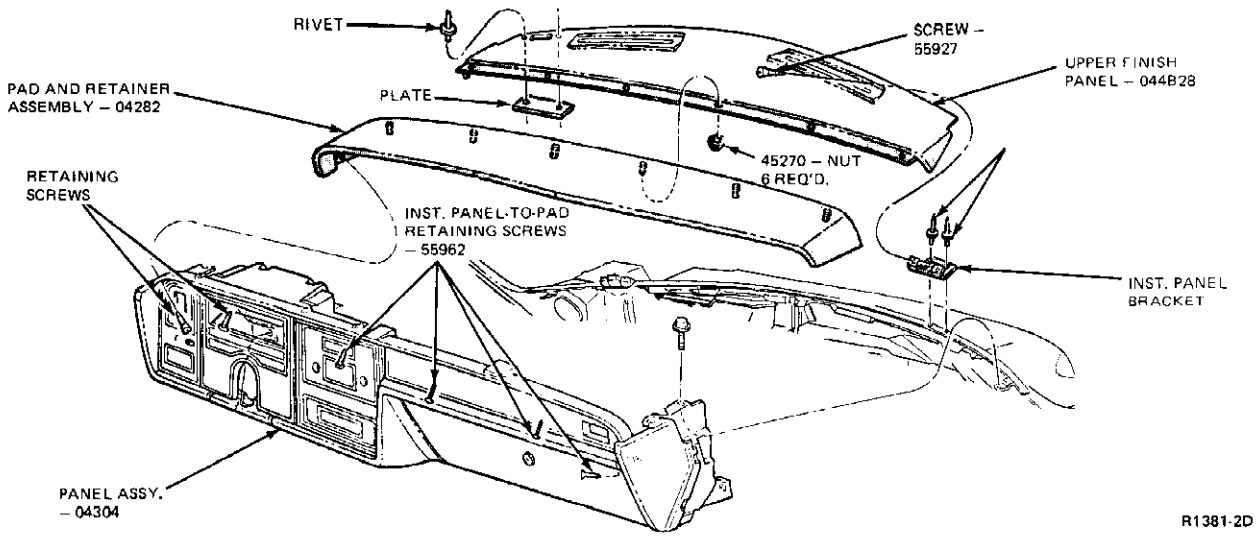


FIG. 30 Instrument Panel Pad Removal – Mercury and Lincoln Continental

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Installation

1. Carefully position the instrument panel pad and upper finish panel assembly onto the instrument panel (Fig. 29).
2. Using a magnet or locking tang-type phillips screwdriver, loosely install the upper finish panel retaining screws (2) in the retaining screw holes of the defroster outlet openings.

   CAUTION: CARE SHOULD BE TAKEN TO PREVENT RETAINING SCREW LOSS IN THE DEFROSTER OUTLET OPENINGS. DAMAGE TO THE PLENUM DOORS MAY OCCUR, RESULTING IN CASE ASSEMBLY REMOVAL AND DISASSEMBLY FOR PROBLEM CORRECTION.
3. Loosely install the retaining screws (4) securing the instrument panel pad to the instrument panel, around the tip of the instrument cluster.
4. Loosely install the retaining screws (3) securing the instrument panel pad to the instrument panel, above the glove box door.
5. Secure the instrument panel pad and upper finish panel in position by tightening the retaining screws (9) described in Steps 2, 3 and 4 to specifications.

INSTRUMENT PANEL PAD— MERCURY AND LINCOLN

Removal

1. Using a magnetic or locking tang-type phillips screwdriver, remove the retaining screws (2) securing the leading edge of the upper finish panel to the defroster openings (Fig. 30)

   CAUTION: CARE SHOULD BE TAKEN TO PREVENT RETAINING SCREW LOSS IN THE DEFROSTER OUTLET OPENINGS. DAMAGE TO THE PLENUM DOORS MAY OCCUR, RESULTING IN CASE ASSEMBLY REMOVAL AND DISASSEMBLY FOR PROBLEM CORRECTION.
2. Remove the retaining screws (4) securing the instrument panel pad to the instrument panel, along the top edge of the instrument panel.
3. Remove the retaining screws (2) securing the instrument panel pad to the instrument panel, at the ends of the top edge of the instrument panel.
4. Raise the brow edge of the instrument panel pad and carefully remove the instrument panel pad and upper finish panel assembly from the vehicle.

Installation

1. Carefully position the instrument panel pad and upper finish panel assembly onto the instrument panel (Fig. 30)
2. Using a magnet or locking tang-type phillips screwdriver, loosely install the upper finish panel retaining screws (2) in the retaining screw holes of the defroster outlet openings.

   CAUTION: CARE SHOULD BE TAKEN TO PREVENT RETAINING SCREW LOSS IN THE DEFROSTER OUTLET OPENINGS. DAMAGE TO THE PLENUM DOORS MAY OCCUR, RESULTING IN CASE ASSEMBLY REMOVAL AND DISASSEMBLY FOR PROBLEM CORRECTION.
3. Loosely install the retaining screws (4) securing the instrument panel pad to the instrument panel, along the top edge of the instrument panel.
4. Loosely install the retaining screws (2) securing the instrument panel pad to the instrument panel, at the ends of the top edge of the instrument panel.
5. Secure the instrument panel pad and upper finish panel in position by tightening the retaining screws (8) described in Steps, 2, 3 and 4 to specifications.

SENSOR ASSEMBLY

Removal

1. Remove the instrument panel pad for access to the sensor assembly.
2. Carefully, disconnect the inlet air elbow and hose, the vacuum connector and control cable.
3. Remove the retaining screws (2) securing the sensor assembly (sensor and bracket on Mercury and Lincoln) to the instrument panel and remove the sensor assembly (Fig. 31).

Installation

1. Rotate the sensor control arm to the mid-position and turn the calibration pin to the locked calibration position.
2. Position the sensor assembly in the mounted position behind the instrument panel and install the sensor-to-instrument panel retaining screws (2). Tighten the retaining screws to specification.
3. Snap the inlet air elbow and hose onto the sensor housing.
4. Install the vacuum hose connector. Check to be certain the locking tangs are fully engaged.
5. Slip the control cable wire and loop over the sensor control arm.
6. Position the control cable housing tab onto the sensor and loosely install the retaining screw.
7. Move the Temperature control lever to 75, while the sensor control arm remains locked in the calibration position, then tighten the cable housing-sensor retaining screw.
8. Check the system for proper operation.

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DETROIT IRON

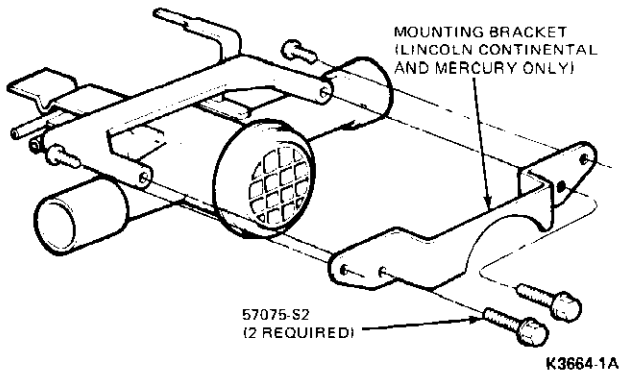


FIG. 31 ATC Sensor Assembly

ATC SENSOR SEALS

MERCURY AND LINCOLN

A seal is used at the ATC Sensor opening on Mercury and Lincoln models. The two piece seal is located between the instrument panel and the trim panel as shown in Fig. 32 to prevent the sensor from drawing air from behind the instrument panel.

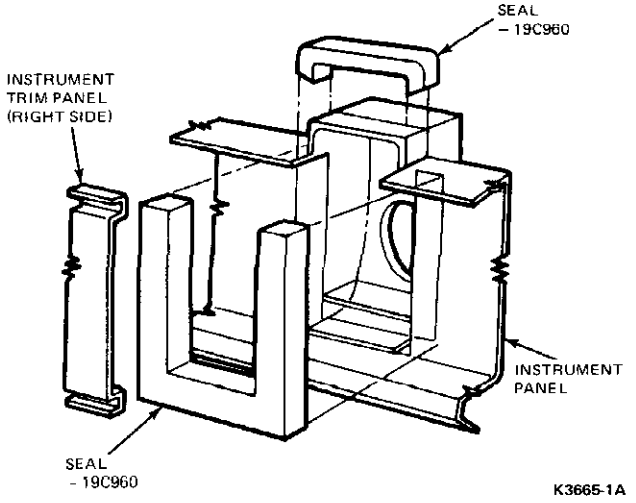


FIG. 32 Installation of 1978 Mercury and Lincoln Continental ATC Sensor Seals

SERVO ASSEMBLY

Removal

1. Remove the Center A/C Distribution Duct for preliminary access to the Servo Motor Arm-to-Temperature Blend Door connecting pin.
2. Disconnect the blue and orange vacuum hoses from the full (blue) and partial (orange) A/C-Heat Door vacuum motors.
3. Using a tee connector and a hand vacuum pump, evacuate both full and partial A/C-Heat Door vacuum motors to provide final access to the Servo Motor Arm-to-Temperature Blend Door connecting pin.
4. Loosen the two (2) Servo Motor-to-Mounting Bracket retaining screws (Fig. 33) to relieve the pressure on the connecting pin and remove the connecting pin to separate the door arm from the servo link and overtravel spring.
5. Remove the tan vacuum hose from the servo motor.
6. Remove the Servo Motor-to-Mounting Bracket retaining screws (2), pull the servo motor away from the plenum to clear the arm and lower for access to the vacuum diverter valve.
7. Remove the push-nut securing the multiple vacuum connector to the servo motor vacuum diverter valve and disconnect the vacuum connector.
8. Remove the servo motor assembly.

Installation

1. Install the multiple vacuum connector on the vacuum diverter valve and secure with a new push nut.
2. Slide the servo motor arm into the opening of the plenum, position and loosely install the servo motor-to-mounting bracket retaining screws (2).
3. Align the holes of the temperature blend door arm with the eye of the servo motor link and overtravel spring and insert the connecting pin.
4. Carefully slide the servo motor forward on the mounting bracket until the blend door seal just contacts its stop (full heat). Continue to slide the motor forward approximately 1/8 inch (3.2mm). The diaphragm should move into the servo motor housing about 1/8 inch (3.2mm).
5. Tighten the servo motor retaining screws (2).
6. Disconnect the tee connector and hand vacuum pump from the partial and full A/C-Heat Door vacuum motors.
7. Connect the partial (orange) and full (blue) vacuum hoses to their respective A/C-Heat Door vacuum motors.
8. Connect the tan vacuum hose to the servo motor.
9. Install the center A/C Distribution Duct.
10. Test the ATC System for proper operation.

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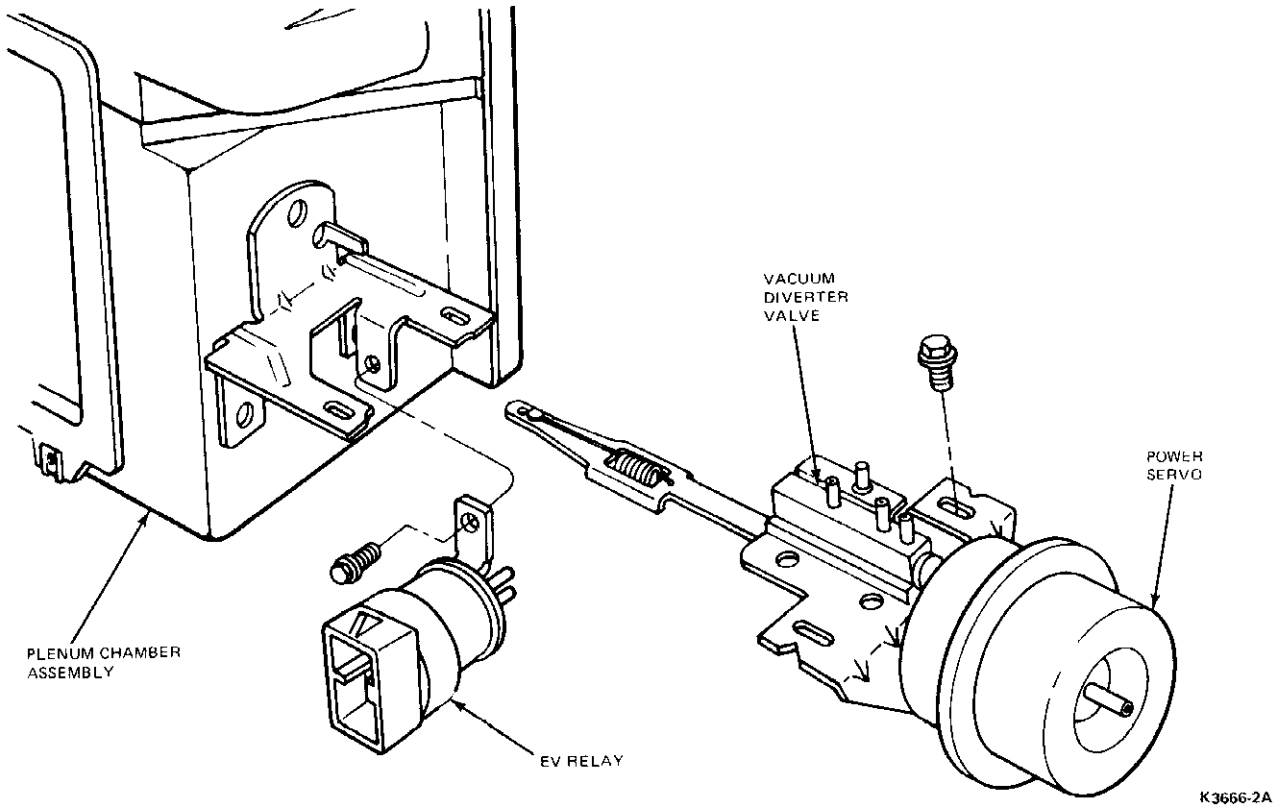


FIG. 33 ATC Servo Assembly Removal — 1978 Ford, Mercury and Lincoln Continental

E. V. RELAY

Removal

1. Remove the retaining screw securing the E. V. Relay to the servo motor mounting bracket and pull the E. V. Relay out for access to the vacuum and electrical connectors (Fig. 33).
2. Remove the push-nut, securing the vacuum harness connector onto the E. V. Relay, and disconnect the vacuum harness connector.
3. Carefully exert outward pressure on the locking tabs, securing the electrical wire harness connector onto the E. V. Relay, and disconnect the electrical connector.

Installation

1. Install the vacuum harness connector on the E. V. Relay and secure with a new push nut.
2. Install the electrical wiring harness connector. Be sure the locking tabs are fully engaged.
3. Position the E. V. Relay on the servo motor mounting bracket and install and tighten the retaining screw.

PLENUM CHAMBER

Removal

1. Disconnect the ground cable from the battery.
2. Remove the instrument panel pad.
3. Remove two screws attaching the steering column opening lower cover to the instrument panel and remove the cover.
4. Remove the steering column support bracket and lay the steering column against the seat.
5. Remove the instrument panel attaching bolts and lay the instrument panel back on the seat. Disconnect wires, vacuum hoses, speedometer cable and other components as necessary to lay the instrument panel on the front seat.
6. Remove three nuts retaining the plenum chamber to the dash panel (Fig. 34), and disconnect the wires at the connectors. Then, remove the screws attaching the ducts to the plenum and remove the plenum chamber.

Installation

1. Position the plenum and defroster ducts to the dash panel and defroster nozzles. Then, install the three retaining nuts attaching the plenum to the dash panel.
2. Install the two screws attaching the defroster ducts to the defroster nozzles.
3. Position the instrument panel near the dash panel and connect all the inter-connecting components. Then, install the instrument panel attaching bolts.
4. Secure the steering column to the support and install the steering column opening lower cover on the instrument panel.
5. Install the instrument panel pad and connect the ground cable to the battery.

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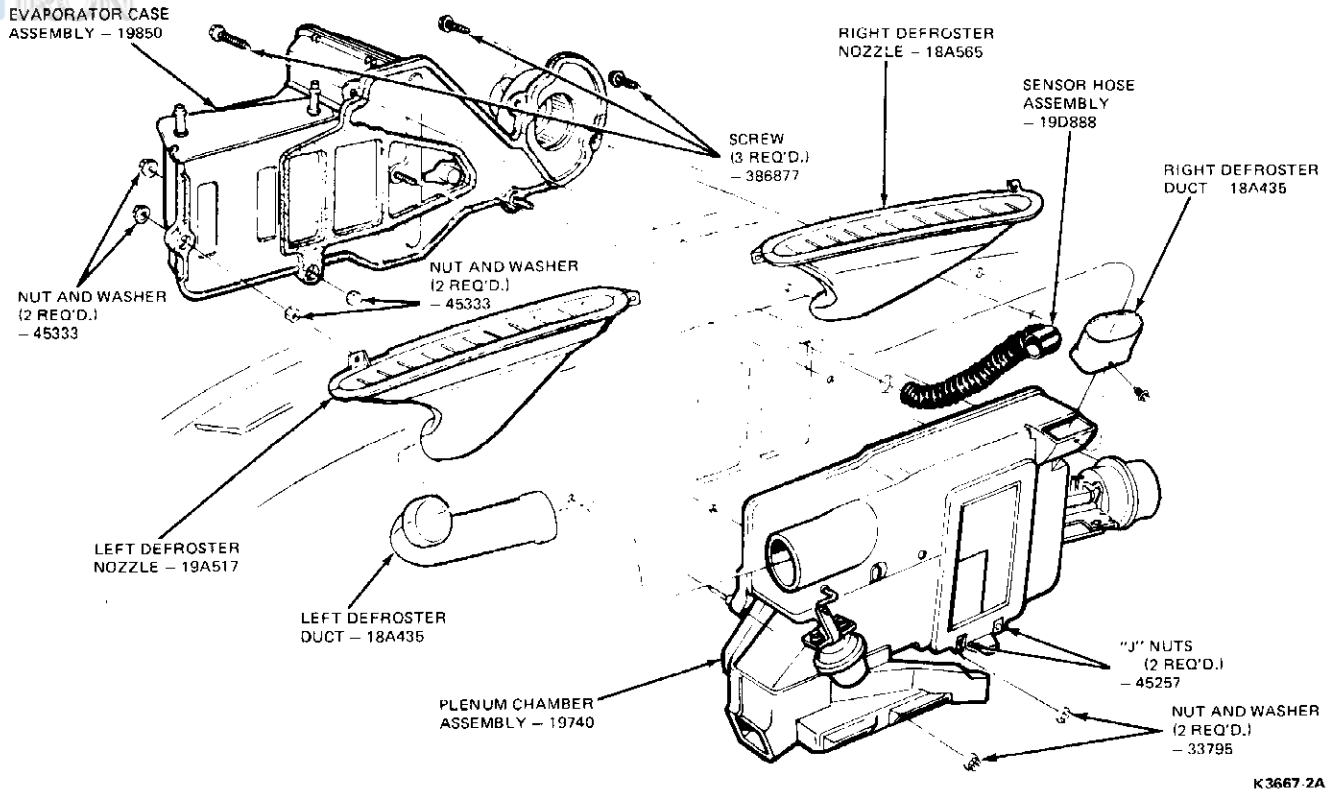


FIG. 34 1978 Ford, Mercury and Lincoln Continental ATC System – Exploded

OUTSIDE AIR DOOR VACUUM MOTOR

Removal

1. Remove the right cowl air intake screen located under the hood near the bottom of the windshield (Fig. 35).
2. Remove two screws retaining the outside air door assembly to the cowl panel and lift the assembly from the cowl (Fig. 35).
3. Disconnect the vacuum hose from the vacuum motor.
4. Remove the spring nut and washer retaining the motor arm to the door.
5. Remove two attaching screws and remove the vacuum motor from the air door assembly.

Installation

1. Position the vacuum motor to the airdoor assembly and install the two attaching screws.
2. Connect the motor arm to the door and install the washer and spring nut.
3. Connect the vacuum hose to the vacuum motor.
4. Position the outside air door assembly to the cowl and install the attaching screws.
5. Install the air intake screen.

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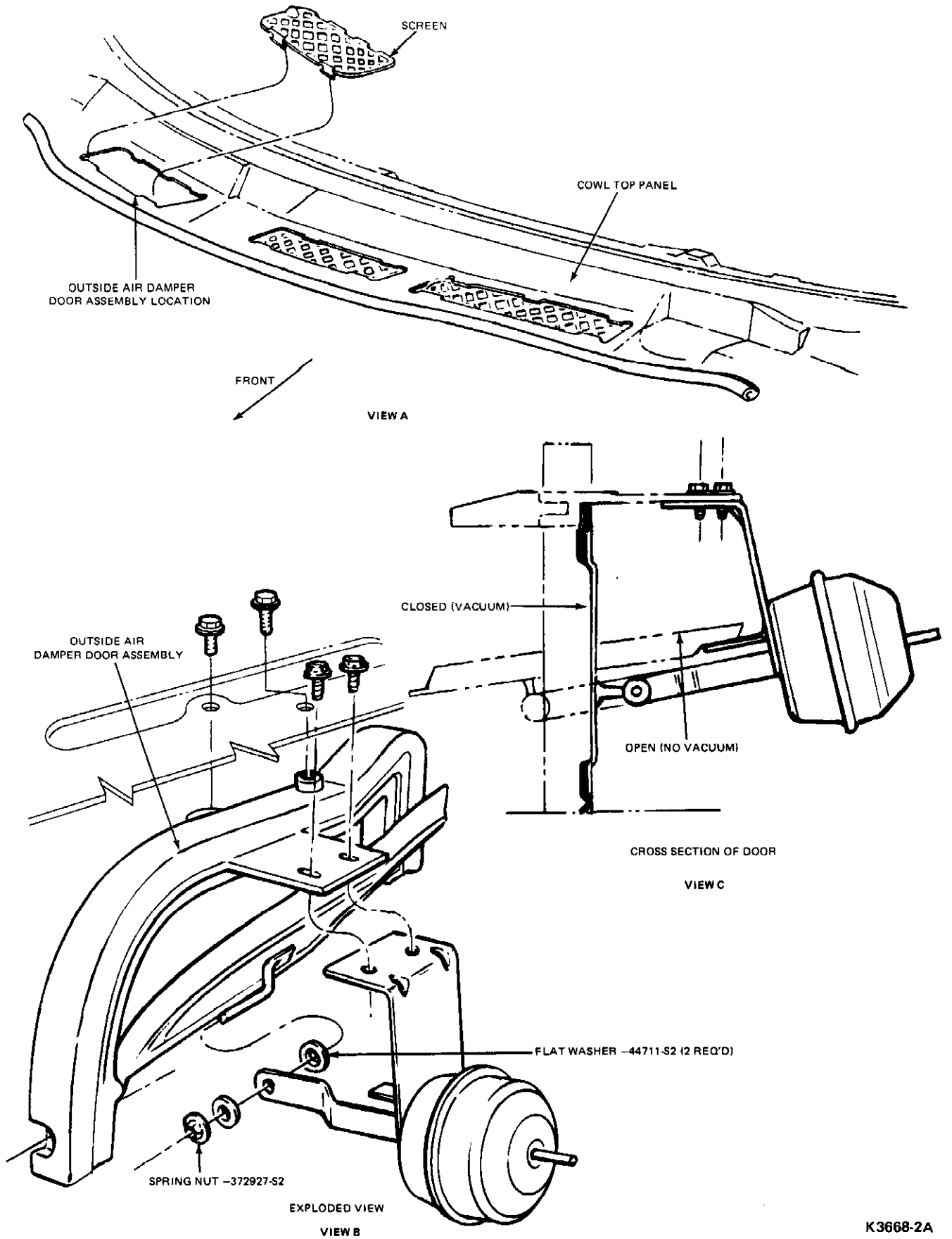


FIG 35 Outside Air Door Assembly

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RECIRCULATING AIR DOOR VACUUM MOTOR

Removal

1. Remove the sill plate from the right (front) door opening.
2. Remove the right cowl side trim panel (Fig 36).
3. Remove the push nut retaining the vacuum motor arm to the cowl vent assembly.
4. Disconnect the vacuum hose from the vacuum motor.
5. Remove two vacuum motor attaching screws and remove the motor.

Installation

1. Position the motor to the vent assembly and install the two attaching screws.
2. Connect the vacuum motor arm to the vent assembly door and install a new push nut.
3. Connect the vacuum hose to the vacuum motor and install the cowl side trim panel.
4. Install the door opening sill plate.

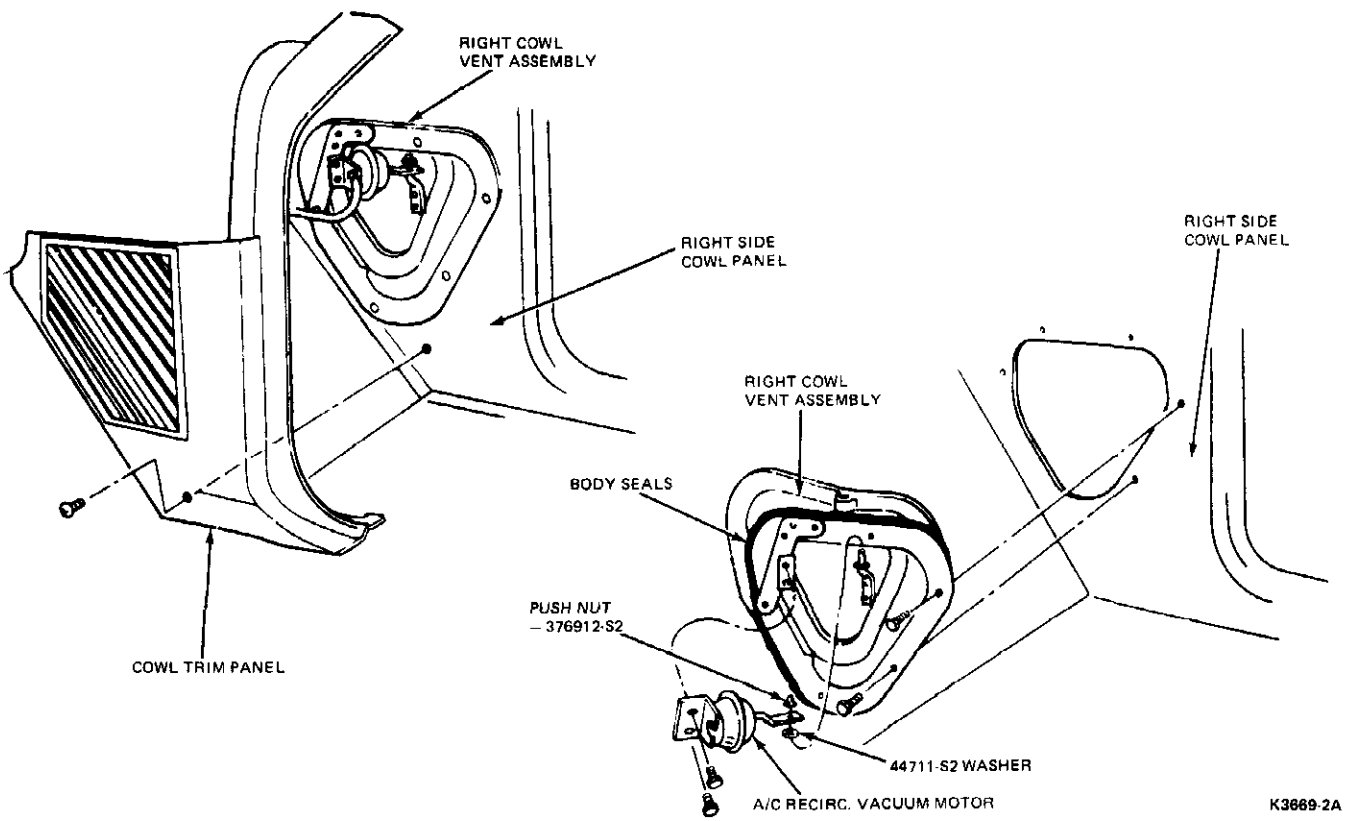


FIG. 36 1978 Ford, Mercury and Lincoln Continental A/C Recirculating Air Inlet

A/C — HEAT DOOR VACUUM MOTOR

Removal

1. Remove the floor air distribution duct from the plenum assembly.
2. Remove the push nut from the door crank and disconnect the motor arm from the door crank.
3. Remove two retaining nuts and separate the motor from the bracket. Then, disconnect the vacuum hose from the motor.

Installation

1. Connect the vacuum hose to the vacuum motor.
2. Position the motor to the door crank and the mounting bracket. Install a new push nut on the door crank and install the two motor retaining nuts.
3. Install the floor air distribution duct.

HEAT-DEFROST DOOR VACUUM MOTOR

Removal

1. Disconnect the vacuum hoses from the heat-defrost door vacuum motor.
2. Remove the push nut from the door crank arm.
3. Remove two retaining nuts and separate the vacuum motor from the mounting bracket and the door crank arm.

Installation

1. Position the vacuum motor to the door crank arm and the mounting bracket.
2. Install the two retaining nuts and a new push nut.
3. Connect the vacuum hoses to the vacuum motor.

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WATER VALVE

Removal

1. Loosen the radiator cap, open the radiator drain cock and partially drain the coolant from the engine cooling system. Close the radiator drain cock.
2. Disconnect the vacuum hose (green) from the vacuum motor.
3. Loosen the hose clamps (2) securing the heater core inlet hose to the water valve.
4. Disconnect the Engine-to-Water Valve inlet hose.
5. Disconnect the water valve from the heater core inlet hose and remove the water valve.

Installation

1. Position and install the water valve into the heater core inlet hose.
   NOTE: The Arrow on the side of the valve should point toward the heater core inlet tube.
2. Connect the Engine-to-Water Valve inlet hose and tighten the water valve hose clamps (2) to specification.
3. Connect the vacuum hose (green) to the water valve vacuum motor.
4. Refill the engine cooling system to proper level with a 50-50 mix of coolant and water.
5. Move the function control lever to HEAT and start the engine to refill the heater core and hoses.
6. Recheck the engine coolant level after operating the engine and, if necessary, add additional 50-50 mixed coolant to proper level.
7. Check the system for proper operation.

BLOWER MOTOR AND WHEEL ASSEMBLY FORD AND MERCURY

Removal

1. Disconnect the ground cable from the battery.
2. Remove the right front tire and wheel assembly.
3. With reference to Fig. 37, locate the access opening area shown and clean this area of the fender apron.
4. Drill a 1-inch hole tangent to the centerline of the bead using the drill dimple provided in the apron ½ inch from the centerline of the bead.
5. Cut out the access opening along the centerline of the bead with aircraft snips. Smooth any rough metal edges.
6. Working through the access opening in the apron, remove the cooling tube from the blower motor (Fig. 38).
7. Disconnect the blower motor connector from the wiring harness.
8. Remove four (4) blower motor mounting plate screws and carefully move the motor and wheel assembly forward out of the evaporator case through the access hole.

Installation

1. Procure a cover plate (Part No. D3AZ-18A475-A or equivalent).
2. Position the cover plate over the access opening and drill eight (8) ⅛-inch holes in the apron, using the 8 holes in the cover as a template. Protect the evaporator case with a metal shield during the drilling operation to prevent damage to the case.
3. Apply rope sealer to the motor mounting plate and install the blower motor and wheel as an assembly.
4. Replace the cooling tube in the cooling hole in the blower motor.
5. Reconnect the blower motor connector.
6. Connect the battery ground cable to the battery and check operation of the blower motor.
7. Apply rope sealer to the perimeter of the access cover and position the cover on the apron. Install the cover with eight (8) 357903-S8 or equivalent screws self-tapping round washer (No. 8-15 x 1/2 inch).
8. Replace the tire and wheel assembly.

BLOWER MOTOR AND WHEEL ASSEMBLY LINCOLN

Removal

1. Remove the hood-to-hinge attaching bolts and remove the hood from the car.
2. Remove the right hood hinge and right fender inner support brace as an assembly.
3. Disconnect the blower motor air cooling tube from the motor (Fig. 38).
4. Disconnect the motor connector from the harness.
5. Remove the four blower motor mounting plate screws. Move the motor and wheel forward out of the blower scroll and remove the assembly through the opening while applying pressure to the fender apron to enlarge the opening at the hinge area (Fig. 39).

Installation

1. Install rope sealer to the blower motor mounting plate while applying pressure to the fender apron to enlarge the opening. Carefully insert the blower motor and wheel assembly through the opening to prevent damage to the blower wheel.
2. Position the blower motor wheel assembly into the blower scroll and install the four blower motor mounting plate screws (Fig. 38).
3. Connect motor connector to wire harness.
4. Connect the motor air cooling tube to the motor.
5. Install the right hood hinge and fender inner support brace assembly.
6. Position the hood to the hood hinges and install the attaching bolts. Adjust the hood for a good body fit and the hood latch for proper retention.

BLOWER WHEEL

Removal

1. Remove the blower motor and wheel assembly from the vehicle. Refer to the blower motor and wheel removal procedure.
2. Remove the hub clamp spring from the wheel hub.

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DETROIT IRON

NOTE: Hose clamp pliers for flat spring type clamps will simplify this operation.

3. Slide the blower wheel from the motor shaft.

Installation

1. Align the flat surface on the I.D. of the blower wheel hub with the flat surface of the motor shaft.
2. Slide the blower wheel onto the motor shaft until it is fully seated.
3. Using flat spring type hose clamp pliers, install a **new** hub clamp spring. Position clamp 90° to the flat on the motor shaft.

NOTE: DO NOT RE-USE THE OLD HUB CLAMP SPRING.

4. Connect the blower to a battery and check for excessive wheel runout and/or vibration before installing the blower motor and wheel assembly in the vehicle.
5. Install the blower motor and wheel assembly in the vehicle. Refer to procedure.
6. Check the system for proper blower operation.

RESISTOR ASSEMBLY

Removal

1. Disconnect the wire harness connector from the resistor assembly.
2. Remove the resistor assembly retaining screws (2) securing the resistor board to the evaporator case assembly.
3. Remove the resistor assembly.

Installation

1. Position the resistor assembly onto the resistor opening of the evaporator case assembly.
2. Install the resistor assembly retaining screws (2) and tighten to specification.
3. Install the resistor wire harness connector and test blower for proper operation.

HIGH BLOWER RELAY (LINCOLN ONLY)

Removal

1. Disconnect the electrical wire harness connector (Fig. 40).
2. Remove the retaining screws (2) securing the high blower relay to the dash panel.
3. Remove the high blower relay from the vehicle.

Installation

1. Position the high blower relay in its mounting location on the dash in the engine compartment.
2. Install the Relay-to-Dash Panel retaining screws (2) and tighten to specification.
3. Connect the electrical wire harness connector.
4. Check the system for proper high blower operation.

OUTSIDE AIR DOOR ASSEMBLY

Removal

1. Raise hood and remove the screen from the right side of the cowl top panel (Fig. 35).
2. Disconnect the vacuum hose from the outside air door vacuum motor.
3. Remove two (2) vacuum motor mounting plate screws (Fig. 35).
4. Remove two (2) air door to cowl top panel mounting screws.
5. Carefully remove the push nut and two flat washers from the door crank arm and remove the vacuum motor.
6. Move the air door assembly inboard and rotate the door and frame assembly carefully to clear the opening in the cowl top panel.

Installation

1. Carefully insert the air door and frame assembly into position in the cowl top panel.
2. Install the motor shaft on the door crank arm as shown in Fig. 35.
3. Align the air door frame mounting holes with the two screw holes in the cowl top panel.
4. Install the air door frame mounting screws. Do not tighten the screws at this time.
5. Install the vacuum motor mounting plate screws.
6. Tighten the air door frame mounting screws.
7. Connect the vacuum hose to the motor.
8. Install the cowl screen.

EXPANSION VALVE

Removal

1. Discharge the refrigerant system using established procedures. Be sure to observe all safety precautions.
2. Remove the insulation from the expansion valve (Fig. 41).
3. Loosen the fitting and remove the high pressure hose (liquid line) from the expansion valve.
4. Loosen the clamp retaining screw and pull the sensing bulb from the clamp.
5. Loosen the fitting and remove the expansion valve from the evaporator core inlet tube.

Installation

1. Lubricate and install a new O-ring and install the expansion valve on the evaporator core inlet tube.
2. Position the sensing bulb in the clamp and tighten the retaining screw. Be sure that the sensing bulb, outlet tube surface and the clamp are clean to maintain good thermal contact.
3. Lubricate and install a new O-ring and connect the high pressure hose (liquid line) to the expansion valve.
4. Install the insulation on the sensing bulb and clamp to prevent engine compartment temperature from affecting the operation of the expansion valve.
5. Evacuate and charge the refrigerant system, with Refrigerant 12, using established procedures and safety precautions.

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SUCTION THROTTLING VALVE (STV)

Removal

1. Discharge the refrigerant system following the recommended procedures and safety precautions.
2. Disconnect the suction line from the STV and cap the suction line (Fig. 41).
3. Disconnect the liquid bleed line from the STV and cap the bleed line.
4. Remove the clamp from the STV and disconnect the STV from the evaporator core outlet tube. Cap the evaporator outlet tube if the STV or a new STV will not be installed immediately.

Installation

1. Assemble the STV to the evaporator core tube using a new O-ring dipped in clean refrigeration oil.
2. Position the clamp around the STV and install the attaching screw.
3. Connect the liquid bleed line to the STV using a new O-ring dipped in clean refrigeration oil.
4. Connect the suction line to the STV using a new O-ring dipped in clean refrigeration oil.
5. Leaktest, evacuate and charge the refrigerant system with 4¼ lbs. Refrigerant-12. Use the recommended procedures and observe all safety precautions.

EVAPORATOR CORE

Removal

1. Discharge refrigerant system following the recommended procedure observing all safety precautions.
2. Disconnect the suction line from the STV and cap the suction line and STV.
3. Disconnect the liquid line from the expansion valve and cap the valve and liquid line (Fig. 41).
4. Remove the insulation tape from the expansion valve capillary bulb. Disconnect the capillary bulb from the suction tube.
5. Remove the STV clamp (Fig. 41).
6. Remove the liquid line support clamp (1 screw).
7. Remove four (4) right-to-left cover flange screws.
8. Remove five (5) cover to case mounting screws from left (inboard) cover and remove cover.

   NOTE: A bead of rope sealer between the two covers must be replaced during installation.

9. Remove five (5) cover-to-case mounting screws from the right (outboard) cover.
10. Pull the evaporator core and right cover diagonally forward away from the case.
11. Disconnect the oil return line from the STV.
12. Disconnect the STV from the evaporator core.
13. Remove the right cover from the core.
14. Disconnect the expansion valve from the evaporator core tube.
15. Remove the core mounting gasket.

Installation

1. Install the gasket on the evaporator core.
2. Connect the expansion valve to the evaporator core. Use a new O-ring dipped in clean refrigeration oil.
3. Install the core right cover (Fig. 41) on the evaporator core.
4. Connect the STV to the evaporator core using a new O-ring dipped in refrigeration oil.
5. Connect the oil return line to the STV using a new O-ring dipped in refrigeration oil.
6. Place the evaporator core and attached components in the evaporator case and install the five attaching screws (Fig. 41).
7. Place a bead of rope sealer between the two covers and install the left evaporator core cover.
8. Install the five left cover attaching screws.
9. Install four screws to attach the left and right covers together.
10. Install the liquid line support clamp and connect the liquid line to the expansion valve. Use a new O-ring dipped in refrigeration oil.
11. Position the capillary bulb to the suction tube and install the clamp. Be sure the bulb makes good contact with a clean area of the suction tube.
12. Install the insulation tape on the capillary bulb and suction tube.
13. Connect the suction line to the STV using a new O-ring dipped in refrigeration oil.
14. Leak test, evacuate and charge the refrigerant system following the recommended procedures and safety precautions.

REFRIGERANT LINES

1. Discharge the refrigerant from the A/C system following the recommended procedure and observing all safety precautions.
2. Disconnect and remove the refrigerant line using a wrench on each side of each fitting.
3. Route the new refrigerant line with the protective caps installed as shown in Figs. 42 through 46.
4. Connect the refrigerant line into the system using new O-rings dipped in refrigeration oil. Use two wrenches when tightening the fittings.
5. Leak test, evacuate and charge the refrigerant system following the recommended procedures and safety precautions.

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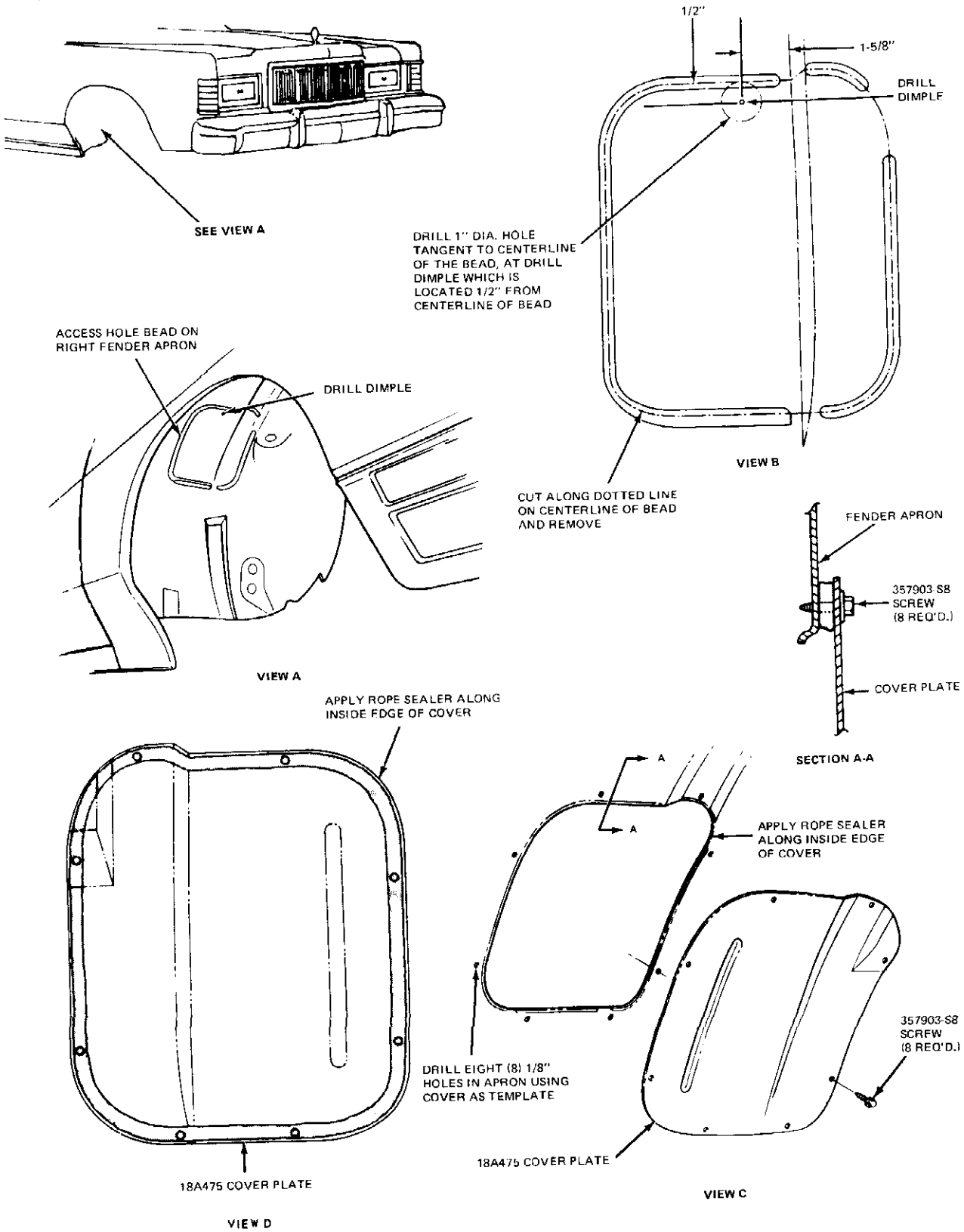


FIG. 37 Blower Access Hole in Fender

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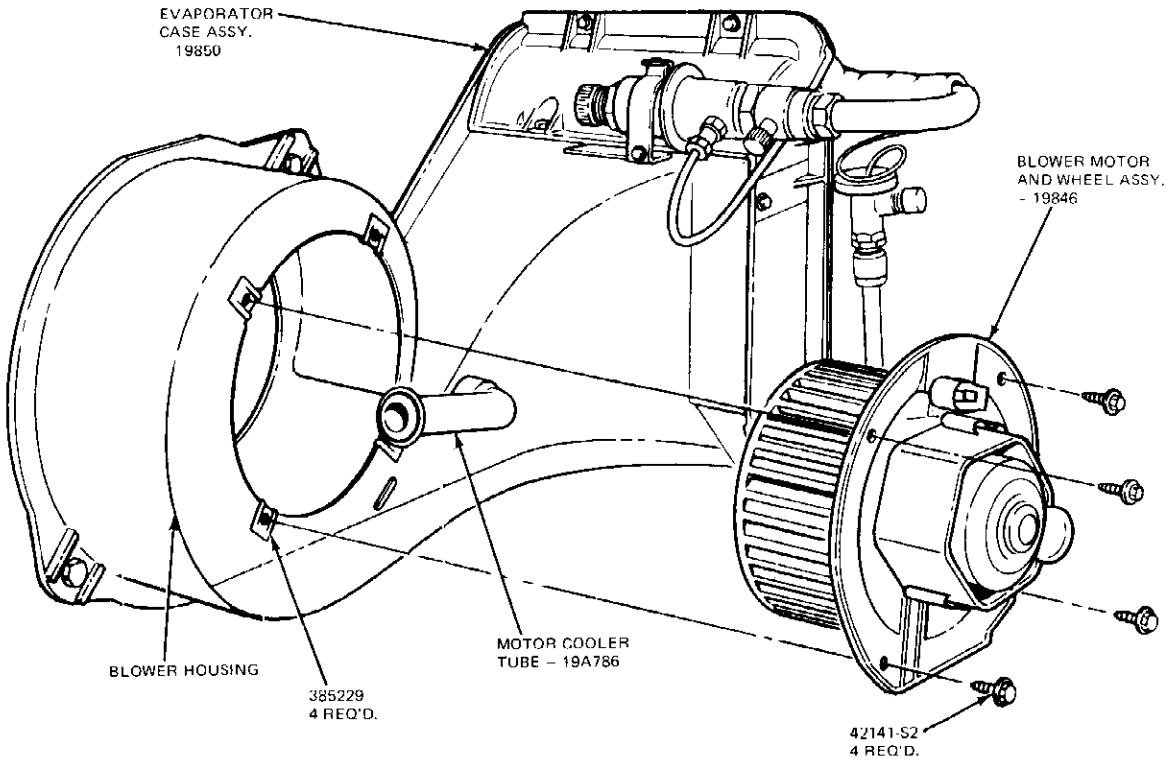
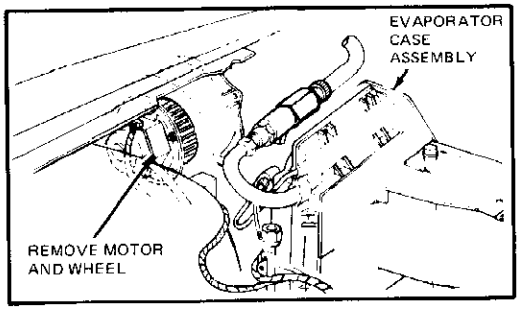


FIG. 38 Blower Motor and Wheel—Disassembled



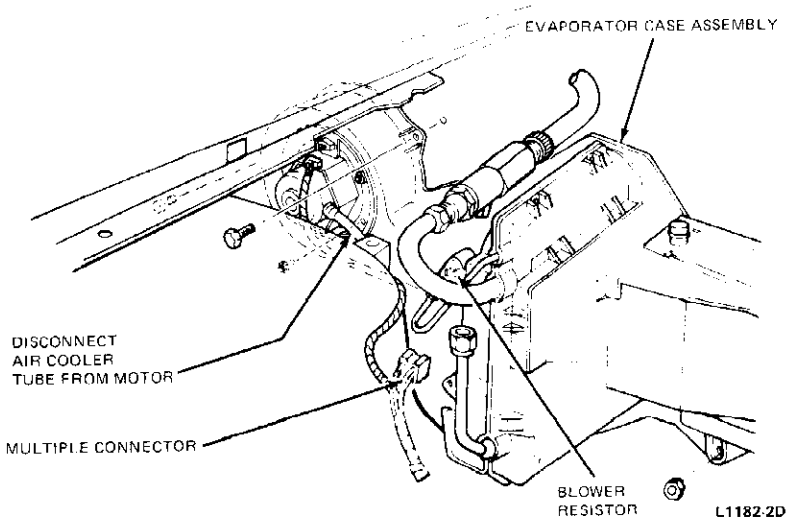


FIG. 39 Blower Motor and Wheel Removal—Lincoln

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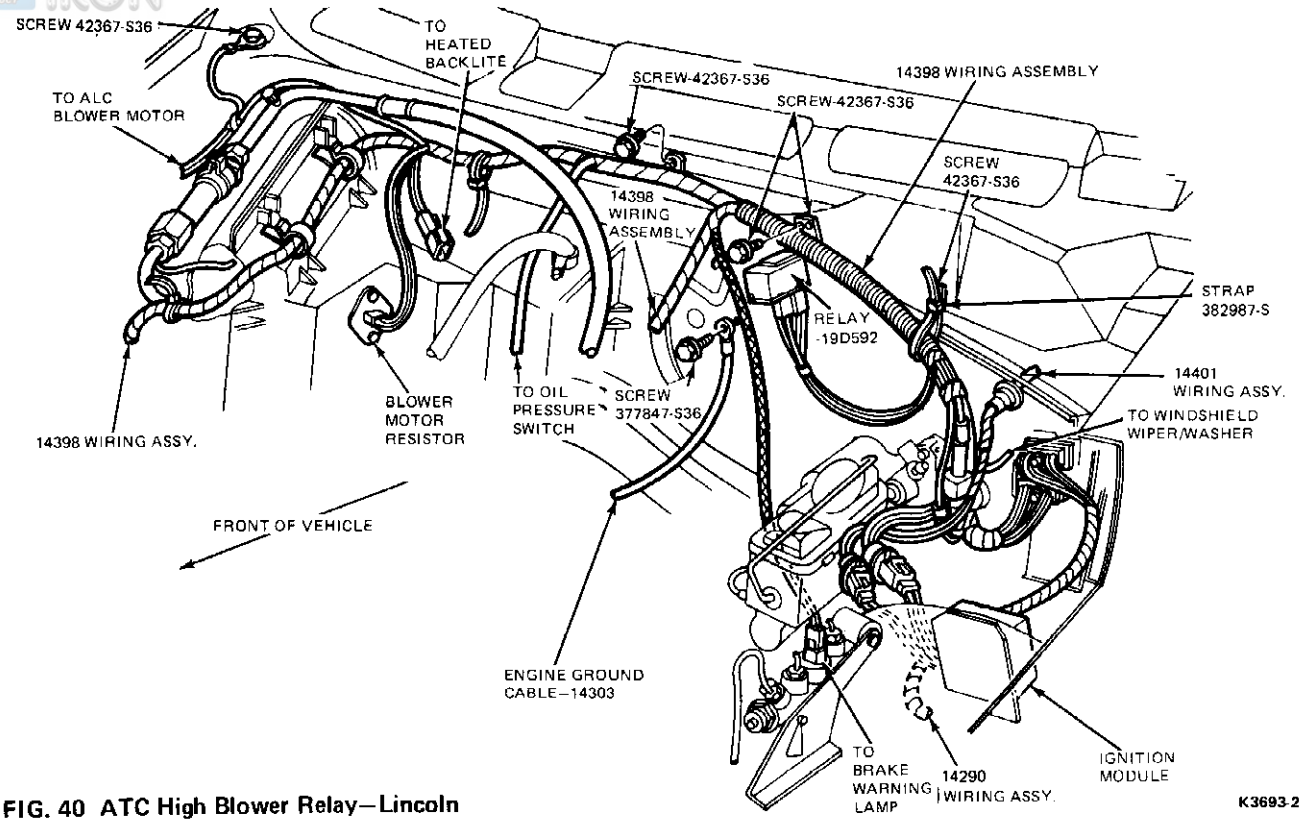


FIG. 40 ATC High Blower Relay—Lincoln

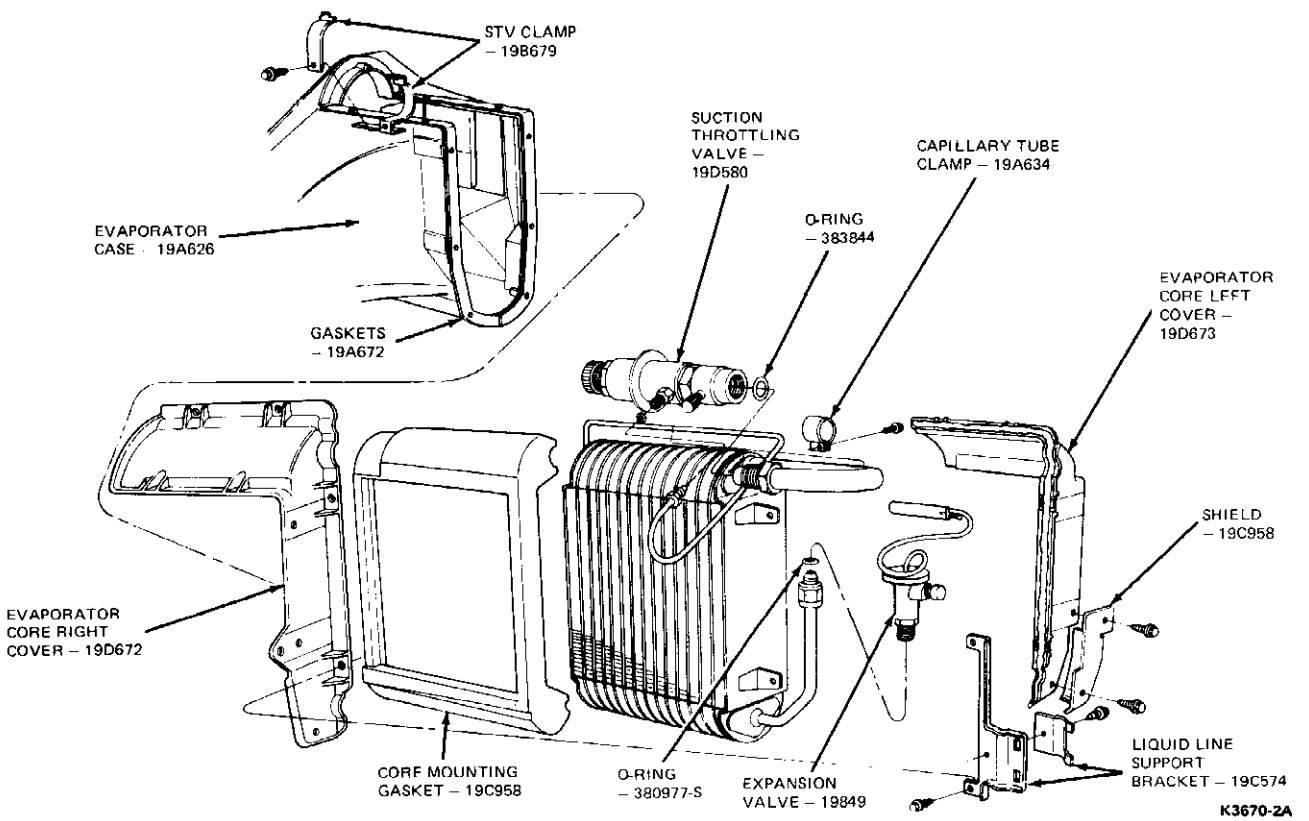


FIG. 41 Evaporator Core Removal

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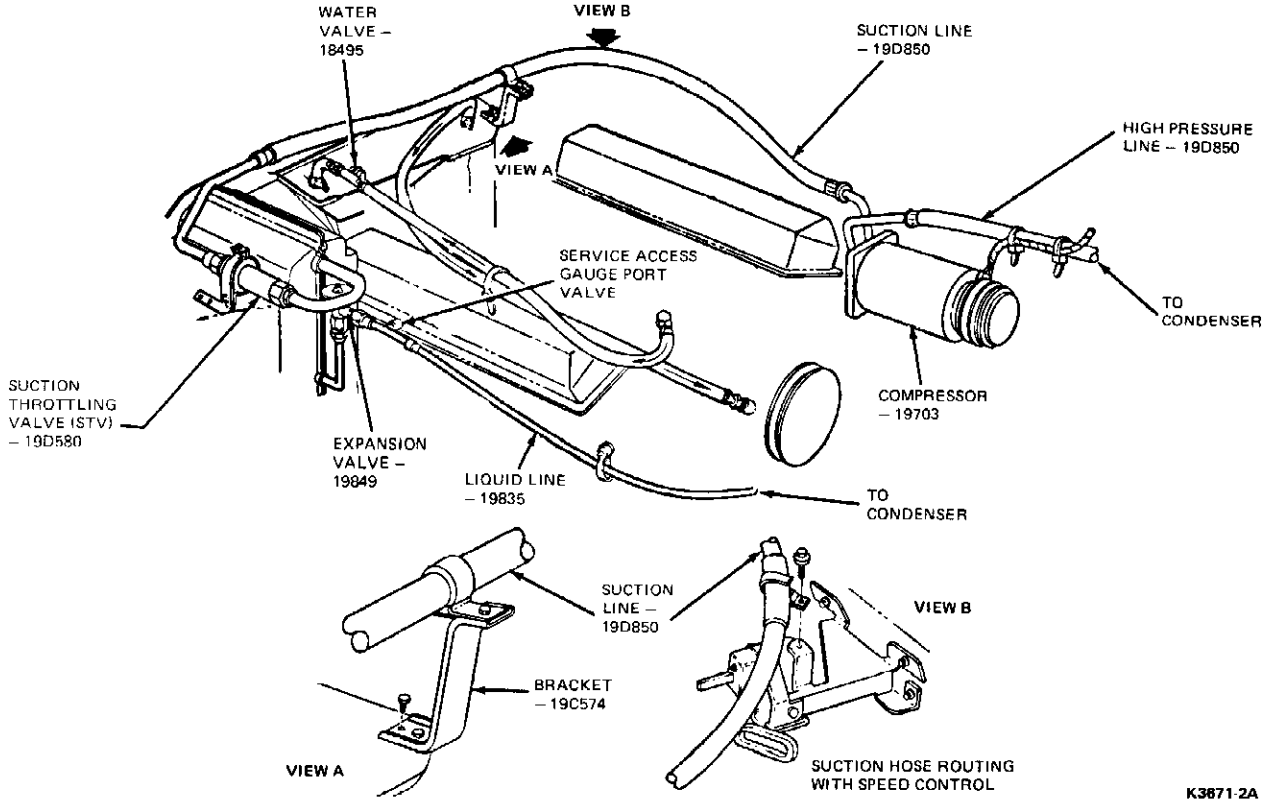


FIG. 42 Refrigerant Lines and Heater Hoses–5.0L and 5.7L (302 CID and 351W CID) Engines

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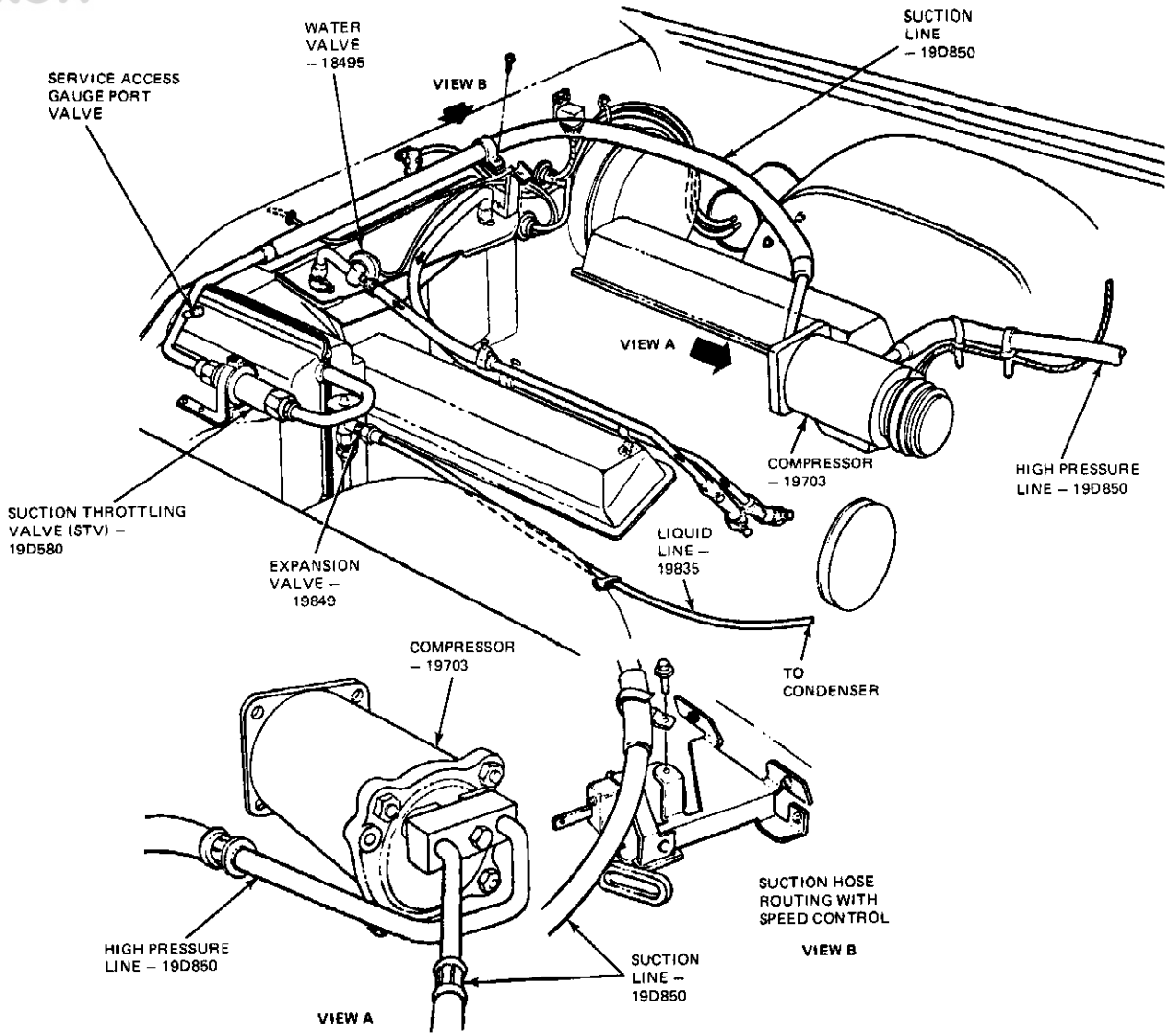


FIG. 43 Refrigerant Lines and Heater Hose Routings–5.8L and 6.6L (351M CID and 400 CID) Engines

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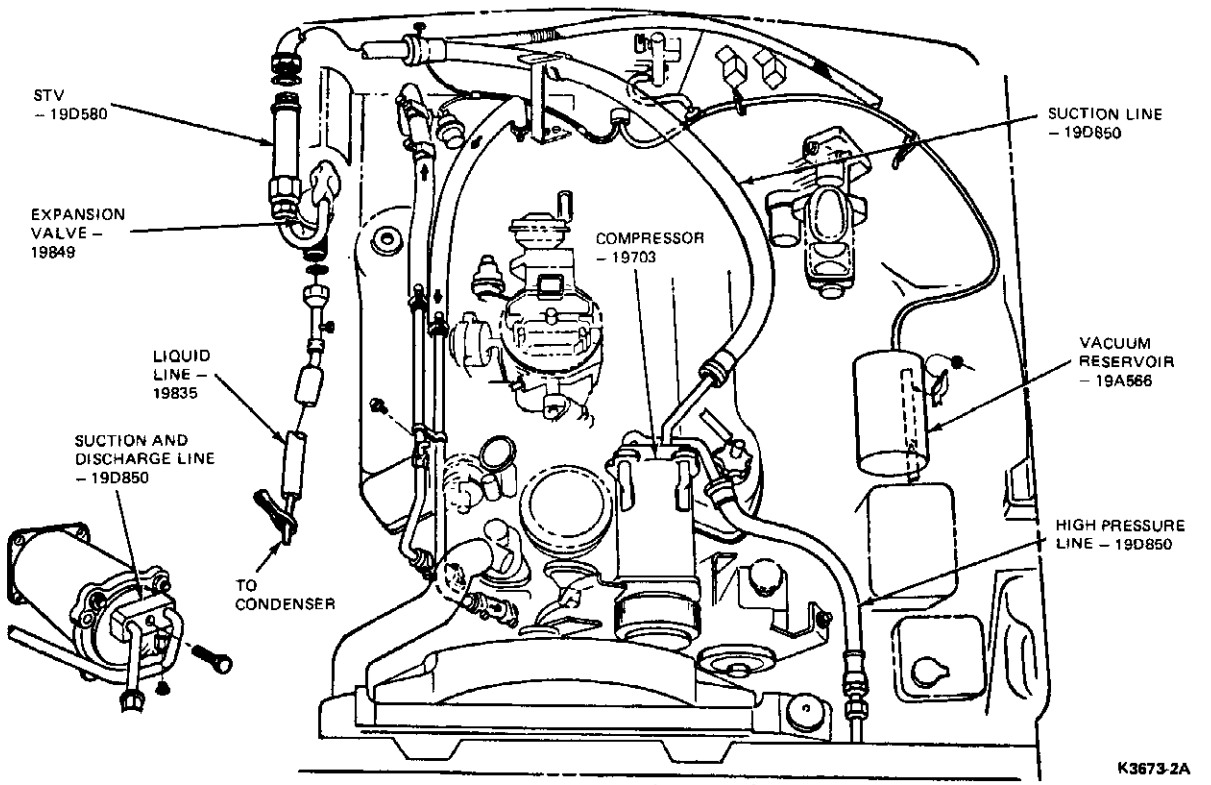


FIG. 44 Refrigerant Lines and Heater Hose Routings—Lincoln with 6.6L (400 CID) Engine

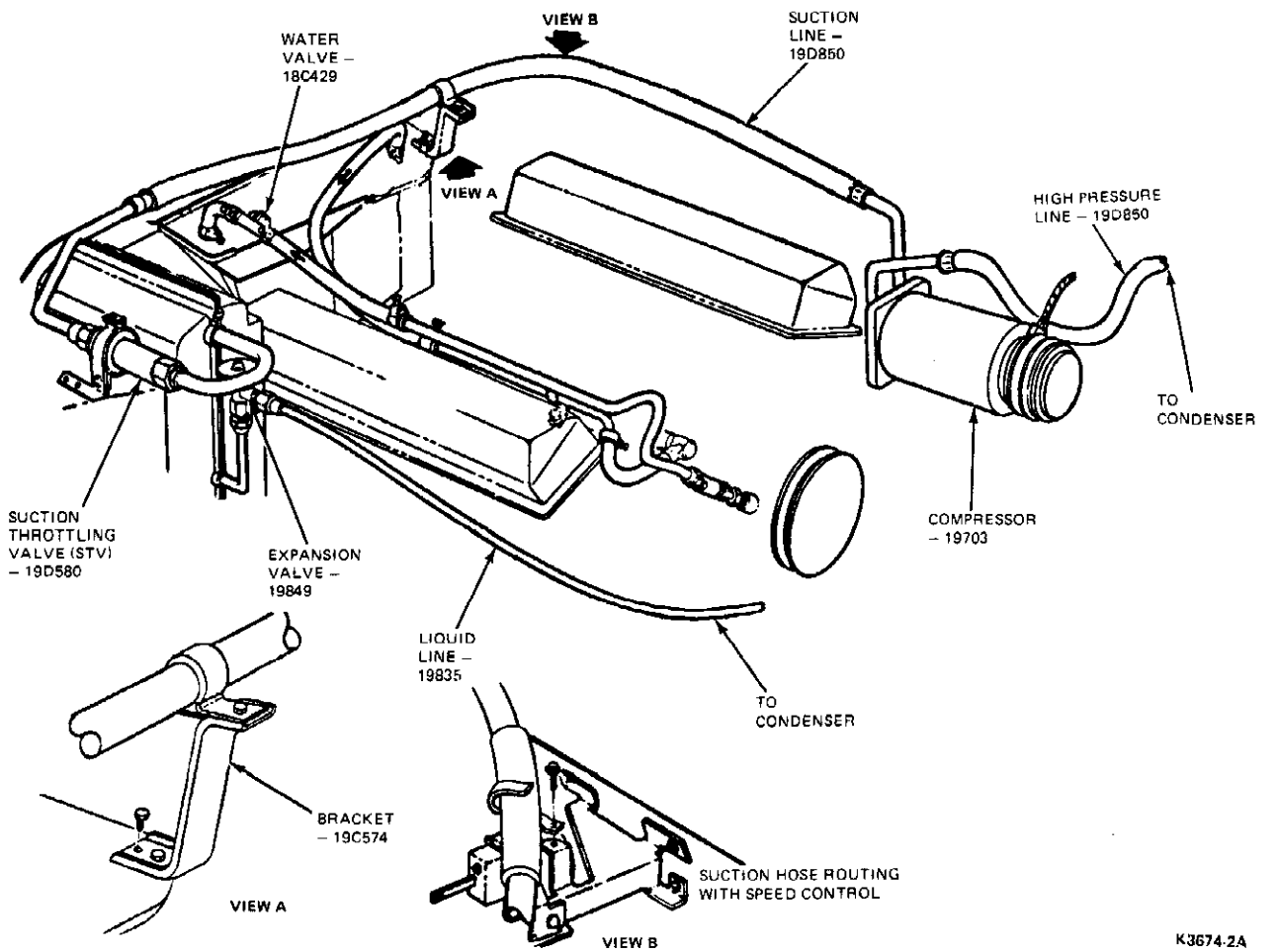


FIG. 45 Refrigerant Lines and Heater Hose Routings—Ford and Mercury with 7.5L (460 CID) Engine

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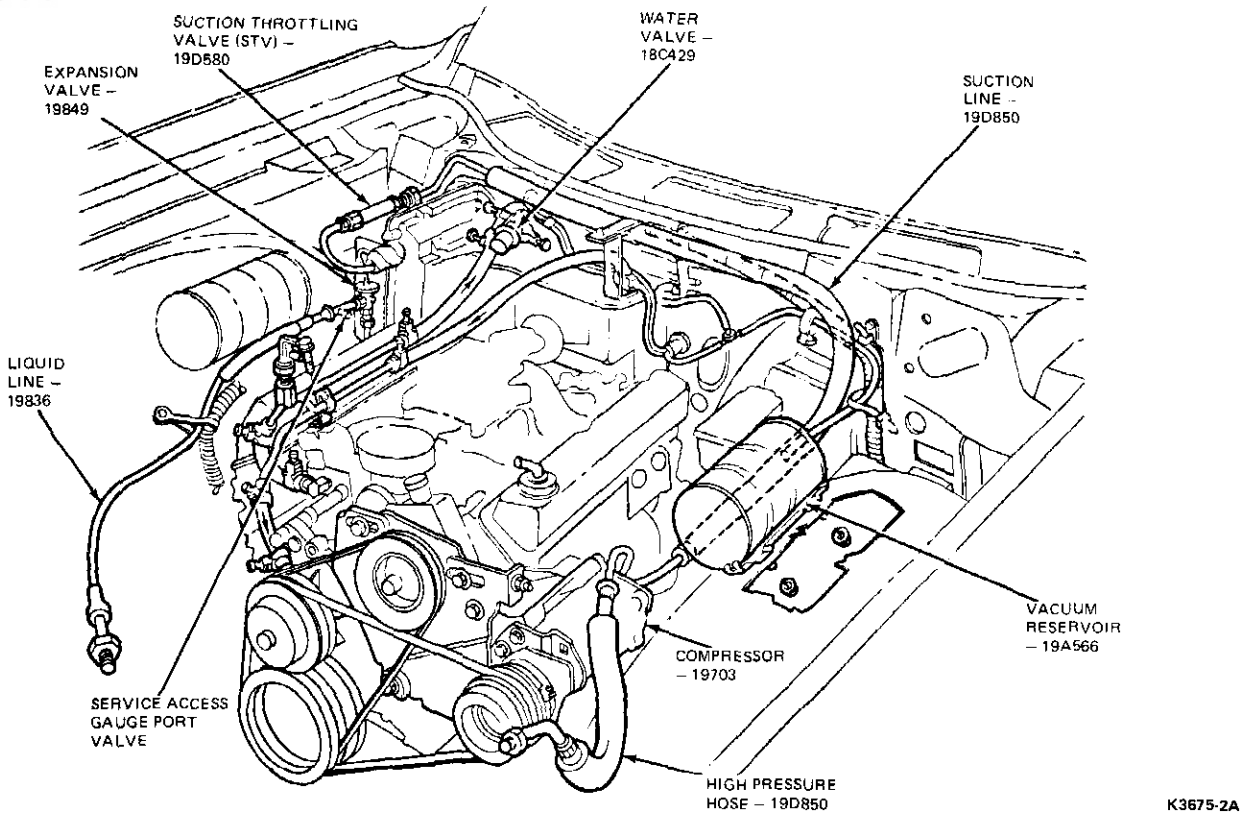


FIG. 46 Refrigerant Lines and Heater Hose Routings — Lincoln with 7.5L (460 C.I.D.) Engine

HEATER CORE

Removal

1. Loosen the radiator cap, open the radiator drain cock and drain the engine coolant.
2. Close the radiator drain cock.
3. Loosen the heater hose clamps and disconnect the heater hoses from the inlet and outlet heater core tubes.
4. Remove the engine vacuum distribution connector (Christmas tree), located on the dash panel above the heater core cover plate, for clearance.
5. Remove the electrical harness ground terminal, located on the dash panel above the heater core cover plate, for clearance.
6. Remove the heater core cover plate retaining screws (7) and remove the heater core cover plate and cover plate gasket (Fig. 47).
7. Lift the heater core and lower mounting gasket out of the evaporator case.
8. Remove the lower mounting gasket from the heater core.

Installation

1. Install the lower mounting gasket on the heater core.
2. Lower the heater core and lower mounting gasket into the heater core opening of the evaporator case. Be sure the core and gasket are seated firmly forward of the core retention spring in the evaporator case.
3. Place the heater core cover plate gasket and cover plate over the core tubes and align the retaining screw holes.
4. Install the heater core cover plate retaining screws (7) and tighten to specification.
5. Install the engine vacuum distribution connector (Christmas tree) on the dash panel above the heater core cover plate.
6. Install the electrical harness ground terminal on the dash panel above the heater core cover plate.
7. Install the inlet heater hose (with water valve) on the core tube nearest the evaporator core. Tighten the hose clamp to specification.
8. Install the outlet heater hose (to water pump) on the remaining core tube furthest from the evaporator core. Tighten the hose clamp to specification.
9. Fill the cooling system with the recommended mixture of engine coolant.
10. Start the engine and check for coolant leaks around the heater core tubes and radiator drain cock.
11. Recheck the coolant level and add additional coolant, if required.

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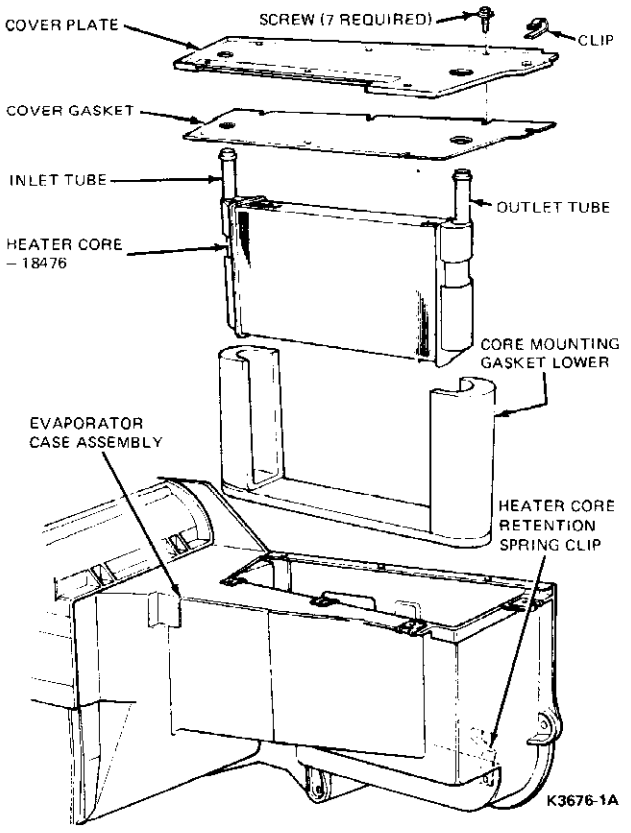


FIG. 47 Heater Core Removal – Ford, Mercury and Lincoln Continental

EVAPORATOR CASE ASSEMBLY

Removal

1. Drain the engine coolant in a clean container and save the coolant.
2. Discharge the refrigerant system following the recommended procedures.
3. Remove the hood hinge attaching bolts and remove the hood from the vehicle.
4. Remove the right hood hinge and right front fender inner support brace as an assembly.
5. Disconnect the suction throttling valve from the suction line (Fig. 42).
6. Disconnect the liquid line at the expansion valve.
7. Remove the multiple connector from the blower resistor and harness from the clamp on the case.
8. Disconnect the blower motor connector from the harness.
9. Disconnect the vacuum junction valve from the dash panel and move the valve and vacuum hoses away from the case.
10. Disconnect the speed control servo and bracket assembly from the dash panel (on vehicles so equipped), and move them away from the case.
11. Disconnect the heater hoses from the heater core and the hose support bracket from the front of the case. Move the hoses and water valve away from the case.
12. Remove one case mounting stud nut under the instrument panel on the right side of the plenum chamber mounting flange (Fig. 34).
13. Remove three case-to-dash panel mounting screws and two stud mounting nuts.
14. Move the case assembly forward to clear three studs, lift the case upward to clear the engine and inboard to clear the fender and aprons.

Installation

1. To provide a positive seal between the case and dash panel and ensure against water leaks, apply rope sealer body caulking around the edge of the dash panel openings before installing the evaporator case assembly (Fig. 34).
2. Carefully place the evaporator case assembly over the dash panel openings and on the two mounting studs. Make certain that the mounting stud on the evaporator case aligns properly with the hole in the dash panel.
3. Install three evaporator case-to-dash panel mounting screws and two mounting stud nuts.
4. Install the one case mounting stud nut under the instrument panel on the right side of the plenum chamber mounting flange.
5. Plug the wire harness multiple connector onto the blower resistor and insert the harness into the clip on the case.
6. Connect the blower motor ground wire to the dash panel and the lead wire to the harness.
7. Connect the heater hoses to the heater core tubes and secure the hoses and hose support clamp to the core cover with the retaining bolt. Position and secure the heater hose clamps at the heater core tubes.
8. Position the speed control servo and bracket assembly (if so equipped) on the dash panel and secure it with the two dash panel mounting screws.
9. Position the vacuum junction valve on the dash panel and secure it with the two dash panel mounting screws.
10. Lubricate and install a new O-ring and connect the liquid line to the expansion valve.
11. Lubricate and install a new O-ring and connect the suction throttling valve to the suction hose.
12. Install the right hood hinge and front fender inner support brace assembly.
13. Position the hood to the hood hinges and install the attaching bolts. Adjust the hood and hood latch as necessary to obtain a good fit.
14. Fill the cooling system with coolant; start the engine; and test the heater system for coolant leaks.
15. Evacuate, leak test and charge the refrigerant system following the recommended procedures and safety precautions.

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CONDENSER

Removal

1. Discharge the refrigerant from the system observing all safety precautions.
2. Drain the coolant from the radiator in a clean container.
3. Remove the radiator hoses and the transmission cooler lines from the radiator. Then, remove the radiator and related components.
4. Remove two nuts retaining the bottom of the condenser to the lower mounting brackets (Fig. 48).
5. Disconnect the refrigerant lines from the condenser and cap the lines.
6. Remove two screws attaching the condenser upper brackets to the radiator support and carefully remove the condenser from the vehicle.

Installation

1. Position the condenser to the lower mounting brackets and the radiator support. Install the two lower retaining nuts and the upper attaching bolts.
2. Connect the refrigerant lines to the condenser using new O-rings dipped in refrigeration oil.
3. Install the radiator and related components.
4. Connect the radiator hoses and automatic transmission oil cooler lines to the radiator.
5. Fill the cooling system following the recommended procedure.
6. Leak test, evacuate and charge the refrigeration system with 4½ lbs. of refrigerant-12.

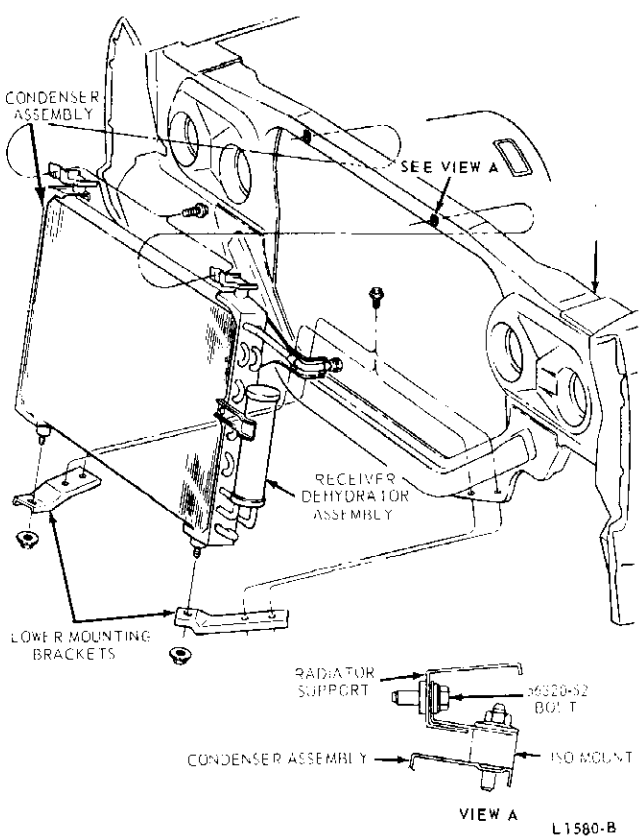


FIG. 48 Condenser Installation

RECEIVER-DRIER—FORD & MERCURY

Removal

1. Discharge the refrigerant from the system at the service access gauge port valve on the STV. Observe all safety precautions.
2. Working under the vehicle, disconnect the two refrigerant lines at the fittings on the bottom of the receiver-drier.
3. Reach in behind the radiator grille and remove the screw attaching the receiver-drier mounting bracket to the condenser (Fig. 48). Remove the receiver-drier from under the vehicle.

Installation

1. Position the receiver-drier to the condenser and install the mounting bracket attaching screw.
2. Connect the refrigerant lines to the receiver-drier using new O-rings dipped in clean refrigeration oil.
3. Leak test, evacuate and charge the refrigerant system following the recommended procedures and safety precautions.

AMBIENT CUT-OFF SWITCH—FORD & MERCURY

Removal

1. Remove six screws and remove the radiator grille from the vehicle.
2. Remove one screw attaching the ambient cut-off switch to the hood latch support (Fig. 49).
3. Separate the wires at the connector, unhook the connector from the hood latch support, and remove the switch.

Installation

1. Connect the wires at the connector and engage the connector tab in the hole of the hood latch support.
2. Position the ambient cut-off switch to the hood latch support and install the attaching screw.
3. Install the radiator grille.

AMBIENT CUT-OFF SWITCH—LINCOLN

Removal

1. Open the hood and remove six screws attaching the upper sight shield to the radiator support and the grille opening panel. Then, remove the sight shield.
2. Reach down behind the grille and remove one screw attaching the ambient cut-off switch to the hood latch support (Fig. 49).
3. Disconnect the ambient cut-off switch wires at the connector and remove the switch.

Installation

1. Position the ambient cut-off switch to the hood latch support and install the attaching screw (Fig. 49).
2. Connect the ambient cut-off switch wires at the connector.
3. Install the sight shield between the raidator support and the grille opening panel.

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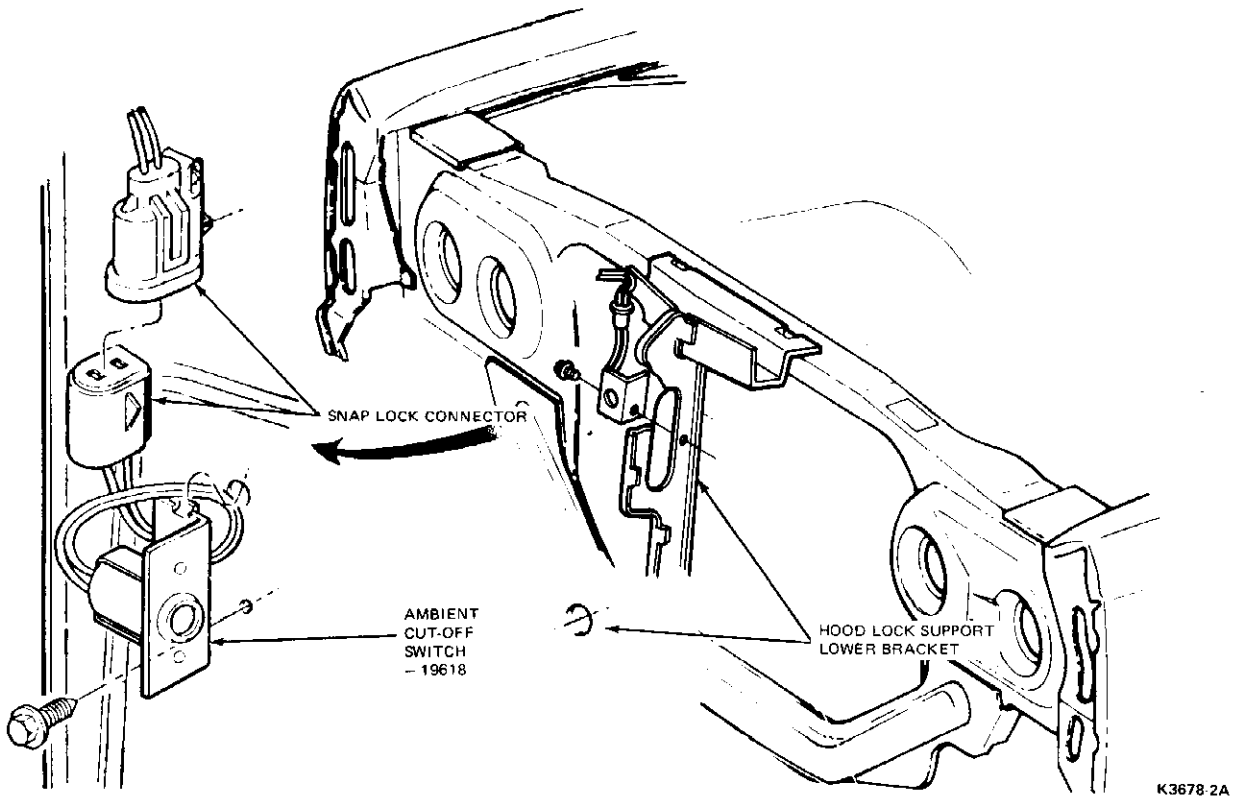


FIG. 49 Ambient Cut-off Switch Removal – Ford, Mercury and Lincoln Continental

COMPRESSOR

Removal

1. Discharge the refrigerant system following the recommended procedure and observing all safety precautions.
2. Disconnect the suction and high pressure refrigerant lines from the compressor. Cap the refrigerant lines and compressor to prevent the entry of dirt or other contaminants.
3. Disconnect the compressor clutch wire at the compressor.
4. On all engines except the 7.5L (460 C.I.D.), loosen the idler attaching screws and release the drive belt tension.
5. On 7.5L (460 C.I.D.) engines, loosen the two compressor mounting brace attaching screws (Figs. 22 and 23), and release the drive belt tension.
6. Remove the compressor mounting bolts and nuts as shown in Figs. 19 through 23 and remove the compressor.
7. Remove the magnetic clutch components from the compressor following the instructions in Part 36-34 of the car shop manual.

Installation

1. Assemble the magnetic clutch components to the compressor following the instructions in Part 36-34 of the car shop manual.
2. Position the compressor to the mounting brackets and install the attaching bolts and nuts.
3. Install the drive belt and adjust the drive belt tension as outlined under Drive Belt Adjustments.
4. Connect the compressor clutch wire.
5. Connect the suction and high pressure lines to the compressor. Use new O-rings dipped in refrigeration oil.
6. Leak test, evacuate and charge the system following established procedures and safety precautions.

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SPECIFICATIONS

ELECTRICAL

System Protection		
Clutch (Accessory) Circuit	20 Amp Fuse in Panel	
Blower Circuit	35 Amp Fuse in Panel	
Blower Motor Current Draw		
Switch Setting	Amps	Volts
Low	6	5
Medium Low	10	7
Medium High	17	10
High	25	12.4
Magnetic Clutch		
Current Draw	Approx. 3.44 Amps @ 12.8 Volts	
Illumination		
Control Head	One ICP-161 Bulb	

REFRIGERANT

Capacity	4-1/4 Lbs. Plus 1/4 Lb., Minus 0 68 Oz. Plus 4 Minus 0 1.928 Kg Plus .113 Minus 0
Type	Refrigerant 12 (R-12)

COMPRESSOR – 6 Cylinder

Type – Swash Plate – Three Double Acting Pistons – Axial Type

Cylinder Bore	1-1/2 Inches
Stroke	1-3/16 Inches
Rotation	Clockwise
Refrigerant Oil	
Type	TL 4538 Texaco 525 Viscosity
Capacity	10-1/2 Fluid Ounces (Ford D1VY-19557-A)
Drive Belt Tension	
New	120-160 Lbs.
Used	(after operation for 10 minutes or more) – 75-120 Lbs.

TORQUE SPECIFICATIONS

Heater Hose Clamps	13 to 18 In-Lb.
Heater Core Cover Plate Retaining Screws	12 to 16 In-Lb.
Compressor-To-Mounting Bracket	20 to 30 Ft-Lb.
Idler Arm-To-Mounting Bracket	30 to 45 Ft-Lb.
Adjusting Bolts – 7.5L (460 CID) Engine	30 to 45 Ft-Lb.
Liquid Hose To Condenser	8 to 13 Ft-Lb.
Suction Hose To STV	30 to 35 Ft-Lb.
Discharge Hose To Condenser	24 to 29 Ft-Lb.
Liquid Hose To Expansion Valve	15 to 20 Ft-Lb.
Suction and Discharge To Compressor (bolt)	20 to 25 Ft-Lb.

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Granada and Monarch A.T.C.

PART 36-72

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System Air Flow	72-5
ADJUSTMENTS	
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CK3456-2B

DESCRIPTION AND OPERATION

The Automatic Temperature Control System will automatically control the temperature and reduce the relative humidity of air inside the car. Two slide control levers are provided to maintain the desired temperature and system function. The system will deliver heated or cooled air to maintain the car interior temperature and will maintain the set comfort level automatically. The blower speed can be adjusted for more or less air as desired, depending on the operating condition.

Automatic control of temperature is maintained in both summer and winter. In hot weather, it will cool the car to the pre-set comfort level and then modulate cooling to whatever is required to maintain the desired temperature.

In mild weather, the interior of the vehicle is heated or cooled automatically as required to maintain comfort. In cold weather, provision is made in the HEAT position of the function lever to delay the operation of the system until engine coolant has warmed enough to minimize the discharge of cold air from the heater outlets. The system will then heat the car quickly to the desired temperature and level out to maintain the pre-set temperature.

During operation, outside air is drawn from the cowl vent just below the windshield at all times, except during maximum cooling in the A/C function lever position, when recirculated air is used.

The system utilizes what is called a "reheat" method to provide conditioned air to the car interior. With this method all air flow from the blower passes through the evaporator core, where it is cooled and dehumidified. Temperature is then regulated by reheating a protion of the cooled dry air and blending it with the remaining cool air to the desired temperature. Temperature blending of the evaporator outlet air is automatically varied by the temperature blend door which controls the amount of cooled air that flows through or around the heater core, where it is mixed and directed into the distribution plenum. The air is finally diverted to the heater ducts, the defroster nozzles, or the panel (A/C) registers according to the selected function lever position.

CONTROL LEVER

The Automatic Temperature Control includes a function control slide lever for OFF, ECONOMY-VENT, A/C, HI-LO, HEAT, DEFOG (▽) and DEFROST that determines the manner in which the system will operate, a calibrated temperature control slide lever for setting the desired comfort temperature, and a blower switch to control the volume of air movement. Each position of the function control lever and blower switch is detented for positive engagement.

The blower switch provides four manually selected blower speeds.

AUTOMATIC TEMPERATURE CONTROL

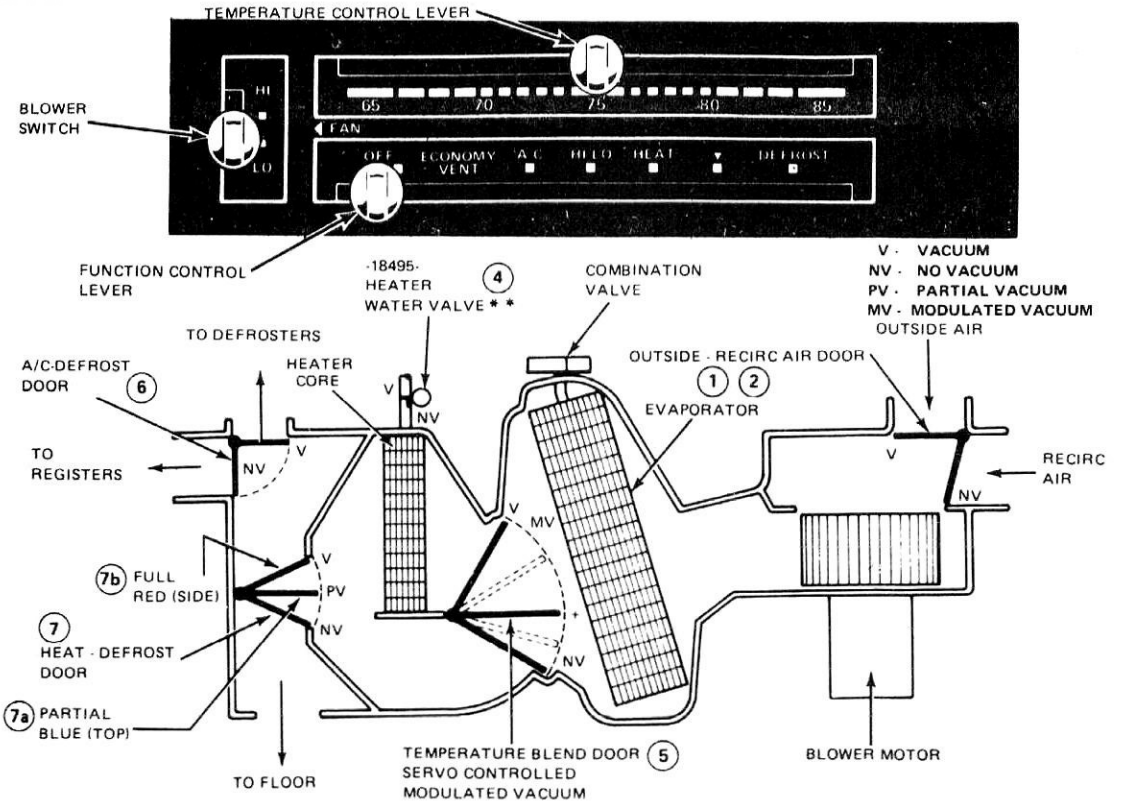
The electrical and airflow schematics and vacuum charts shown in Figs. 1, 2 and 3 may be used in conjunction with the following explanation to clarify system operation:

Temperature control of the ATC system is primarily determined by the vacuum modulation produced by the mechanical sensor assembly that controls the servo vacuum motor. Discharge air outlet is manually controlled by the control head assembly. Temperature control is accomplished by means of a control cable between the control head assembly and sensor assembly.

The sensor assembly is basically a bimetal operated vacuum modulator. The sensor directly converts air temperature into corresponding values of modulated vacuum. The bimetal senses in-car temperature and is mechanically linked to an internal vacuum modulator to directly control and regulate a vacuum which is proportional to temperature. The bimetal and vacuum modulator are placed within a plastic aspirator. Air is diverted by an air scoop near the high pressure side of the blower (before the evaporator), through a tube to

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AUTOMATIC TEMPERATURE CONTROL SYSTEM
VACUUM MOTOR TEST CHART

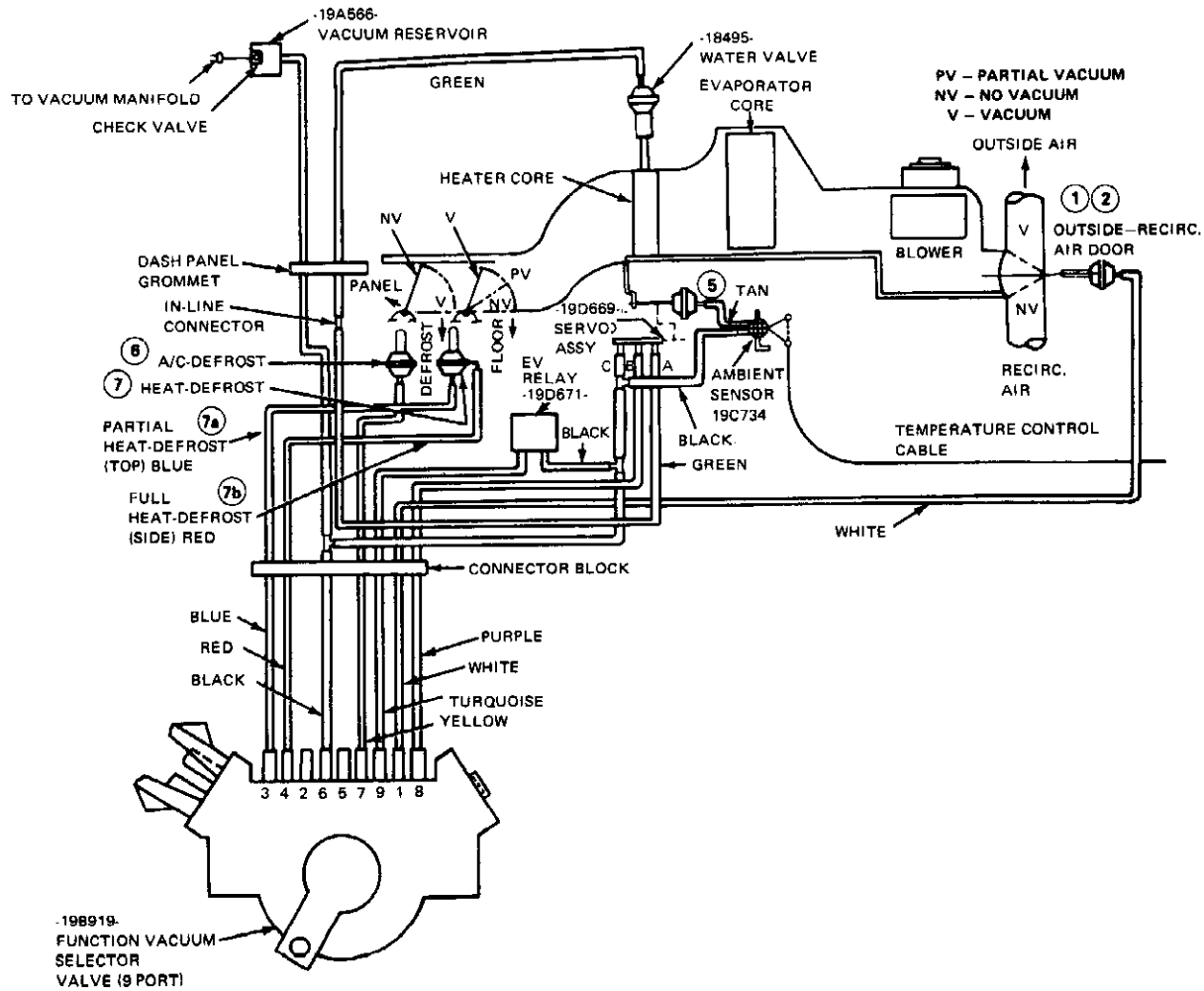
FUNCTION CONTROL LEVER POSITION	ATC REQUIREMENT	OUTSIDE–RECIRC.	VACUUM MOTORS APPLIED WITH VACUUM				
			WATER VALVE * *	TEMP BLEND +	A/C–DEFROST	HEAT–DEFROST	
						PARTIAL	FULL
OFF	–	1 - 2	* *	+	–	7a	7b
ECONOMY VENT	Cool	–	4	5	6	–	–
	Mid	–	–	+	6	–	–
	Warm	–	–	–	6	–	–
A/C *	Cool	1 - 2 * *	4	5	6	–	–
	Mid	–	–	+	6	–	–
	Warm	–	–	–	6	–	–
HI - LO *	Cool	–	4	5	6	7a	–
	Mid	–	–	+	6	7a	–
	Warm	–	–	–	6	7a	–
HEAT	Cool	1 - 2†	4	5	–	7a	7b
	Mid	1 - 2†	–	+	–	7a	7b
	Warm	1 - 2 †	–	–	–	7a	7b
▽ (DEFOG) *	Cool	–	4	5	–	7a	–
	Mid	–	–	+	–	7a	–
	Warm	–	–	–	–	7a	–
DEFROST *	Cool	–	4	5	–	–	–
	Mid	–	–	+	–	–	–
	Warm	–	–		–	–	–
VACUUM LINE COLOR CODE		WHITE	GREEN	TAN	YELLOW	BLUE (TOP)	RED (SIDE)

* COMPRESSOR CLUTCH ENGAGED WHEN AMBIENT CUT-OFF SWITCH IS CLOSED
† DELAYED BY ENGINE TEMP. SENDER AND E.V. RELAY UNTIL 130°F. ENGINE COOLANT TEMP.
* * DEPENDENT ON HEATING/COOLING REQUIREMENT OF SERVO DIVERTER VALVE
\+ MODULATED VACUUM
– NO VACUUM

K3460-2B

FIG. 1 ATC System Air Flow Schematic and Vacuum Control Chart

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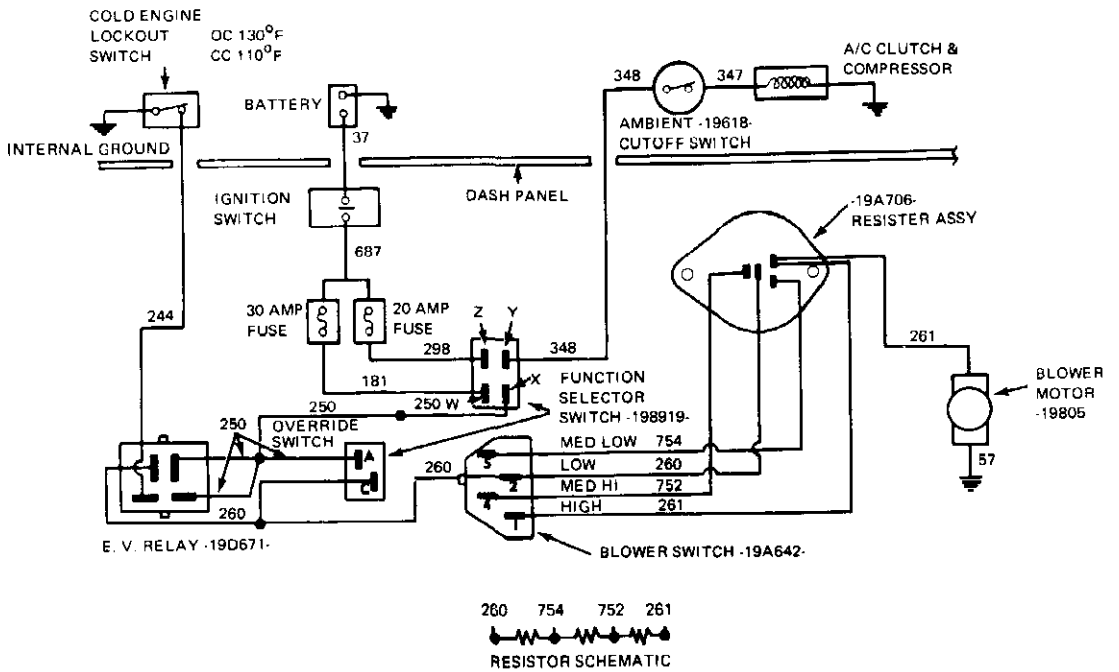
PORT	FUNCTION	FUNCTION SELECTOR VALVE LEVER POSITIONS							HOSE COLOR
		OFF	ECONOMY VENT	A/C	HI–LO	HEAT	▽ DEFOG	DEFROST	
1	Outside–Recirc.	V		To 8		To 2			White 1-2
2	From EV Relay	Seal	Seal	Seal	Seal	To 1	Seal	Seal	Turquoise
3	Partial Heat–Defrost	V			V	V	V		Blue 7a
4	Full Heat–Defrost	V				V			Red 7b
5	No Function	Seal	Seal	Seal	Seal	Seal	Seal	Seal	–
6	No Function	Seal	Seal	Seal	Seal	Seal	Seal	Seal	–
7	Defrost A/C–Defrost		V	V	V				Yellow 6
8	From Diverter Valve No. 2	Seal	Seal	To 1	Seal	Seal	Seal	Seal	Purple
9	Source	V	V	V	V	V	V	V	Black

V – VACUUM BLANK – ATMOSPHERE

K3481-2B

FIG. 2 ATC System—Vacuum Schematic and Selector Test

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FUNCTION SELECTOR AND OVERRIDE SWITCH -198919-							
SWITCH SCHEMATIC	TERMINAL CONNECTIONS						
	OFF	ECONOMY VENT	A/C	HI-LO	HEAT	▽ DEFOG	DEFROST
X Y W Z	None	W - X	W - X Y - Z	W - X Y - Z	W - X	W - X Y - Z	W - X Y - Z
A C	A - C	A - C	A - C	A - C	None	A - C	A - C

BLOWER SWITCH -19A642-			
BLOWER SPEED	TERMINAL CONNECTIONS	CURRENT IN CAR (AMPS)	BLOWER VOLTAGE
Low	2	8	5
Med Low	2 - 5	11	7
Med High	2 - 4 - 5	20	10
High	2 - 1 - 4	25	14

CIRCUIT NO.	WIRE COLOR
37	Yellow
57	Black
181	Brown W/Orange Stripe
260	Red W/Orange Hash
261	Orange W/Black Stripe
347	Black W/Yellow Hash
348	Lt. Green W/Purple Hash
687	Gray W/Yellow Stripe
752	Yellow W/Red Dot
754	Lt. Green W/White Hash
244	Yellow/White Hash
298	Purple W/Orange Hash
250	Orange

K3462-2B

FIG. 3 ATC System—Electrical Wiring Diagram and Continuity Test

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the sensor assembly. The air flows through the aspirator which draws vehicle interior air over the in-car bimetal. This combined air is then exhausted from the sensor underneath the instrument panel where it will not be felt by the passengers or driver.

The modulated vacuum from the sensor is directly connected to the large calibrated vacuum motor portion of the servo assembly. The modulated vacuum controls and positions the blend door attached to the arm of the servo motor assembly. The calibrated vacuum motor moves the blend door to mix various proportions of hot air from the heater core and cold air that has by-passed the heater core. Vehicle air temperatures produce compensating discharge air temperatures, i.e., high vehicle interior temperatures produce high sensor output vacuums which position the blend door to deliver cool discharge air. Low vehicle interior temperatures produce low sensor vacuum levels which cause warm discharge air.

Blower motor speed is manually controlled to satisfy the operator. There are four switch positions to provide four blower speeds. There are no automatic speeds. A vacuum diverter valve, a part of the power servo assembly and also attached to the arm of the servo motor, turns off the water valve under maximum cooling conditions, and controls the outside air/recirculating door for maximum cooling conditions when the function control lever is in the A/C position.

Sensor Assembly

The "sensor" consists of a bi-metallic sensor that senses in-car air temperature. The output controls a vacuum modulator and higher temperatures cause higher vacuum gauge readings. A bias to the vacuum output levels is accomplished by means of a control arm attached by a cable assembly to the temperature control lever. Thus, the modulated vacuum output is the result of the effects of the control bias and the temperature of the air across the bi-metallic sensor.

The SENSOR also includes an aspirator or venturi (as it is called in previous ATC systems). The aspirator performs the same function as it has in the past, which is to provide a very small vacuum to draw a continuous sampling of in-car air across the air temperature sensing element. In this case, the sensing element is a bi-metallic strip. Air is piped to the sensor via a tube from the blower stream providing the power to operate the aspirator for the in-car sensor.

Servo Assembly

The servo assembly is a large calibrated vacuum motor and vacuum diverter valve. See Fig. 4. The calibrated vacuum motor provides specific temperature blend door positions for given vacuum levels. The attached vacuum diverter valve controls water valve operation and recirc or outside air operation.

Electro-Vacuum Relay (E.V.R.)

The E.V.R. is a combination normally closed vacuum solenoid valve and a single pole single throw normally closed electrical relay, both are actuated by one electrical coil. The E.V.R. performs two functions in the system. It is used during cold engine operation in the HEAT function lever position, to lock-out blower operation, and to switch the system to recirculating air until the engine coolant warms-up to about 115°F.

Control Head Assembly (Figs. 5, 6 and 7)

The control head consists of three main parts: 1) the function selector—a nine port vacuum selector valve combined with two cam operated electrical switches; 2) blower switch—an electrical switch that provides four speeds of blower operation; and 3) the temperature control lever which connects through a bowden control cable to the sensor assembly.

1. The 9-port vacuum selector valve is very similar to the manual A/C 9-port vacuum selector valve. It directs source vacuum to various vacuum motors and connects the vacuum from the electro-vacuum relay to the outside air-recirc. door in HEAT (See Vacuum Schematic - Fig. 8). A single pole and double pole cam operated electrical switch is also controlled by the vacuum selector. The combination of these cam operated electrical switches controls the electrical supply to the A/C clutch and blower switch.
2. The four-position blower switch is identical to the manual A/C-heater system blower switch.
3. The temperature control lever is connected to the sensor assembly by a Bowden cable assembly. Movement of the control lever from 65°F to 85°F causes a corresponding movement on the pre-load (bias) portion of the sensor assembly, and determines the temperature that the system will maintain. See Fig. 1.

Resistor Assembly

The blower motor resistor assembly is located on the evaporator assembly and is identical to the manual A/C-heater resistor assembly. See Fig. 8. There are three resistance elements mounted on the resistor board to provide four blower speeds. Depending on the blower switch position, series resistance is added or shorted out of the blower motor circuit to decrease or increase speed.

Water Temperature Switch

In the HEAT position only, a ground circuit from the engine water temperature switch to the E.V. relay prevents blower operation until the engine coolant temperature reaches about 115°F. This minimizes any cold air discharge from the heater ducts. See Fig. 8. The E.V. relay also provides vacuum to position the outside air-recirc. door in recirc. during cold engine operation in heat.

SYSTEM AIR FLOW

Figs. 2, 3 and 4 contain system vacuum schematics and vacuum motor charts which illustrate vacuum routings and air flow during the various system conditions. Fig. 4 is a system electrical wiring diagram including continuity test information.

Off Position

In OFF position the outside recirc. air door is in recirculating position. The heat-defrost door is in the heat (full vacuum) position, and the A/C-defrost door is in the defrost (no vacuum) position. The blower is off

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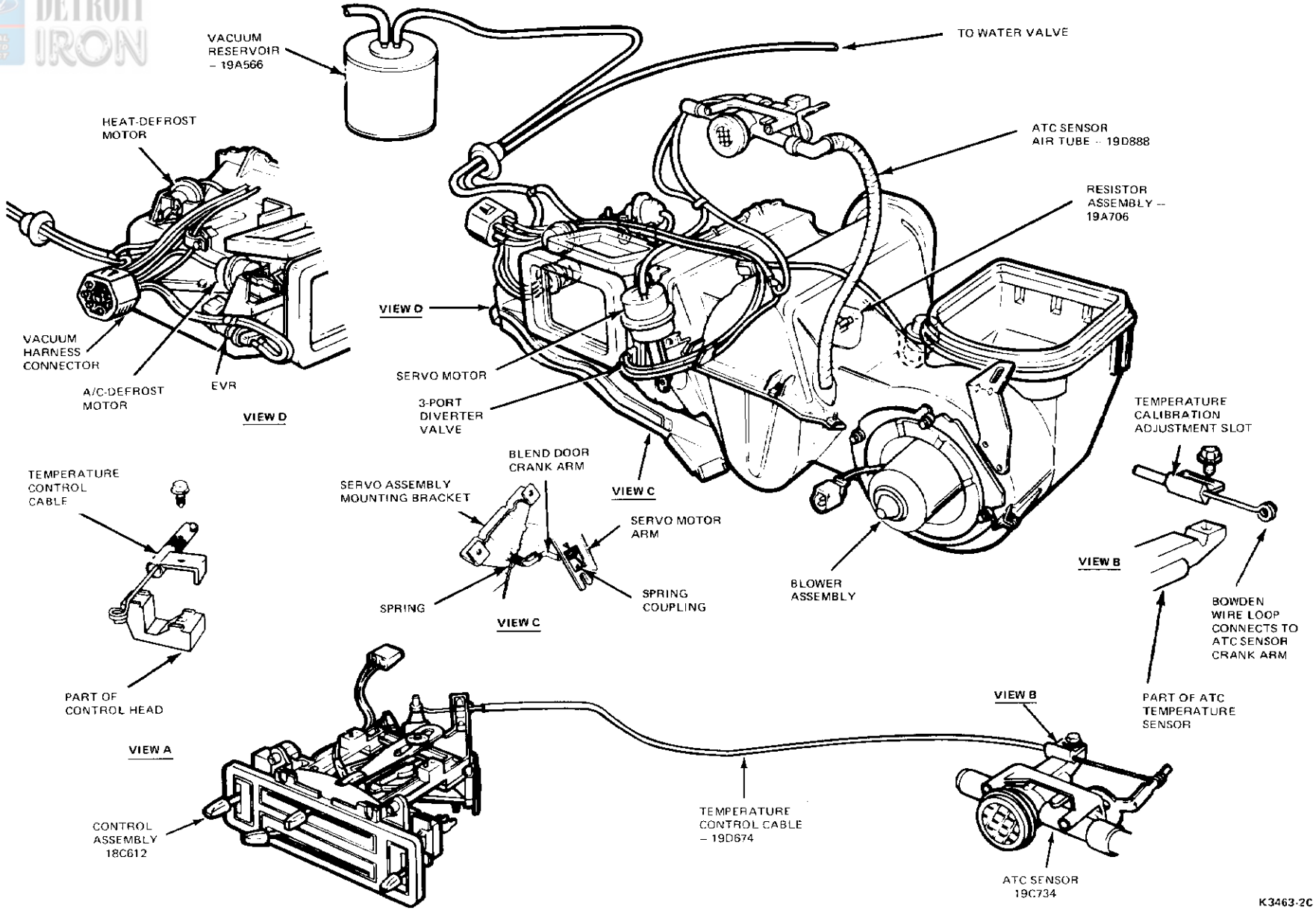


FIG. 4 ATC Vacuum System Locations

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and the temperature blend door and water valve assume a position depending on the modulated vacuum form the sensor to the power servo.

NOTE: A modulated vacuum is produced in ALL function control lever positions and is entirely dependent on the temperature lever setting and existing in-vehicle temperature conditions.

Economy/Vent Position

In ECONOMY/VENT Position, outside air is directed through the panel (A/C) registers with automatic control of discharge air temperature and water valve actuation. However, refrigerated cooling is not available. ECONOMY-VENT and HEAT positions provide the most economical operation because the compressor does not operate.

A/C Position—Maximum Cooling (Recirculate)

With the function lever in A/C position, maximum cooling is required to achieve or maintain the temperature setting, the modulated vacuum is high at the servo motor, causing:

1. The outside recirc door to go to recirc position;
2. The water valve to close;
3. The temperature blend door to close, allowing all air to by-pass the heater core. Air is drawn from the passenger compartment, directed through the evaporator core where it is cooled and returned to the car interior through the panel (A/C) ducts and registers.

A/C Position—Modulated Cooling (Outside-Air)

When modulated cooling is required to maintain the temperature setting, the temperature blend door is actuated to near the mid-position. The blend door has moved to a position where part of the air leaving the evaporator core is directed through the heater core where it is warmed. Blend air (the combination of cooled and heated air) is then mixed in the plenum and directed into the car interior through the panel (A/C) ducts and registers. The position of the temperature blend door changes automatically to maintain the temperature selected. If the in-car temperature rises above the temperature lever setting, the blend door moves to admit more cooled air and less heated air. If the in-car temperature drops below the setting, the blend door moves to admit more heated air and less cooled air.

Hi-Lo Position

Operation is similar to that described in the A/C position paragraphs, except that airflow is divided between the panel registers and floor ducts. The system will not recirculate interior air for maximum cooling.

Heat Position—Maximum Heating

With the function control lever in the HEAT position and full heat is required to achieve or maintain the temperature setting, the modulated vacuum is low, causing the water valve to open and the temperature blend door to fully open.

Blower operation will be delayed until the engine coolant reaches about 115°F. Then the air is forced by the blower through the evaporator and all of the air passes through the heater core before being distributed through the heater ducts (floor) into the car interior. A portion of this air is diverted to the defroster nozzles.

Heat Position—Modulated Heating

When modulated heating is required to maintain the temperature setting the temperature blend door has moved to a position so that only part of the air leaving the evaporator core is directed through the heater core where it is warmed. Blended air (the mixture of outside air and heated air) then is directed into the car interior. The A/C clutch does not operate in HEAT position.

Defog (▽) Position

In DEFOG (▽) ,operation is the same as the heating position, except that the A/C-Defrost door is in the Defrost (no vacuum) position and the Heat-Defrost door is in a partial position. The air flow is directed to the defroster nozzles and the floor outlets. The A/C clutch will also be engaged when the outside air temperature is sufficiently high enough to close the ambient cut-off switch. This assists in reducing the windshield fogging by dehumidifying the outside air.

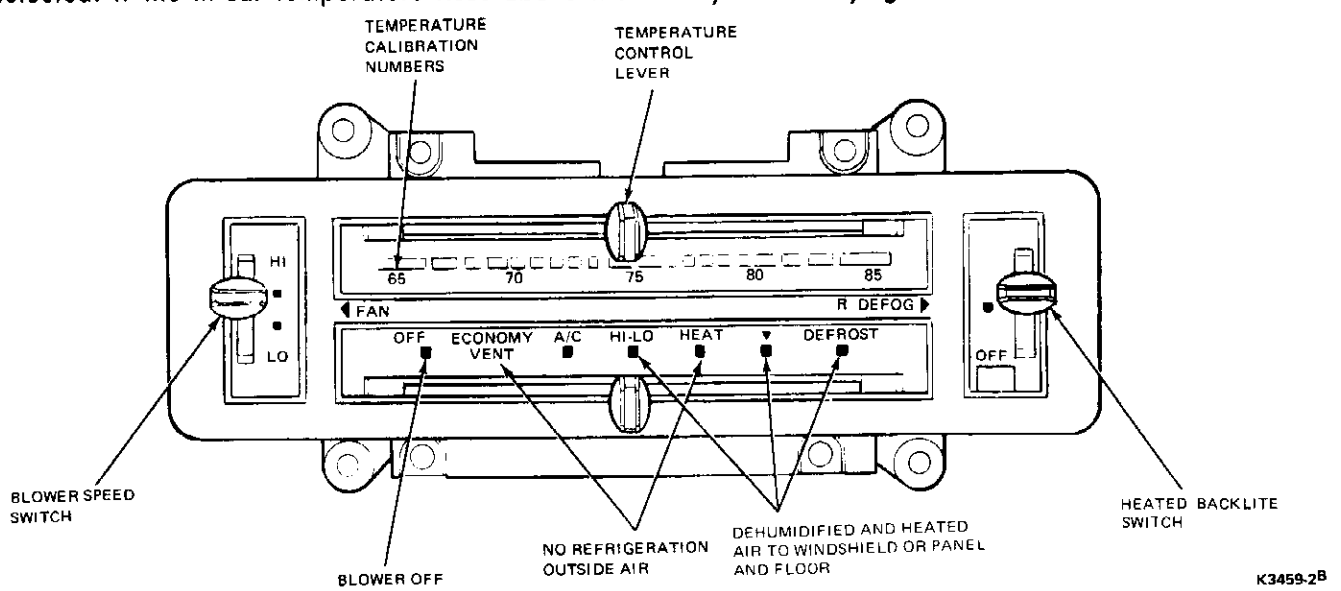


FIG. 5 ATC Control Head Functions

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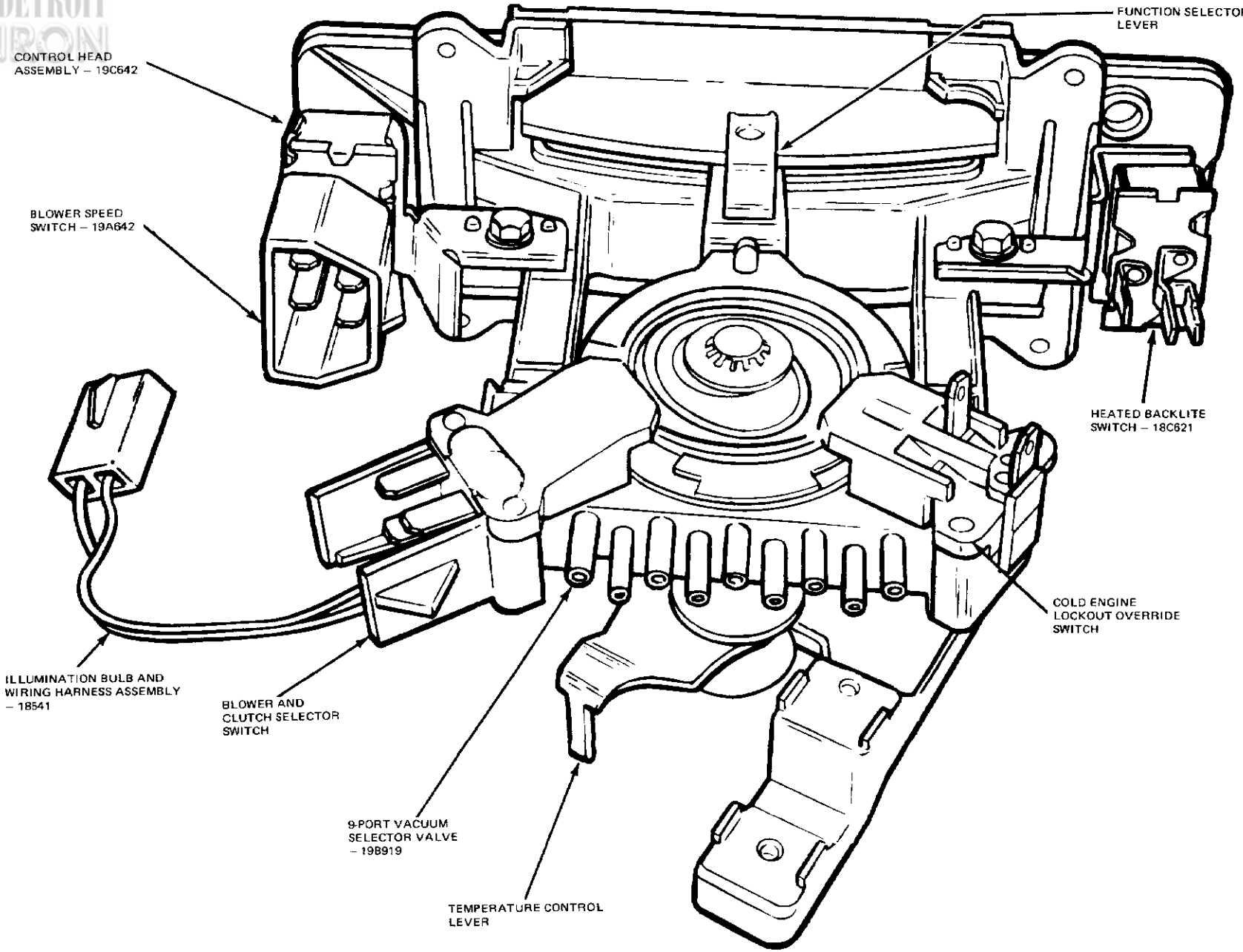


FIG. 6 ATC Control Head, Bottom View

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Defrost Position

When the function lever is in the DEFROST position, the A/C-Defrost and Heat-Defrost doors are in the full defrost (no vacuum) position so that all incoming air is directed to the defroster nozzles with slight bleed to the floor. The temperature blend door modulates in this position but maximum heat can be obtained by moving the temperature lever to the highest temperature position. The A/C clutch also operates in this position to dehumidify the air and reduce fogging.

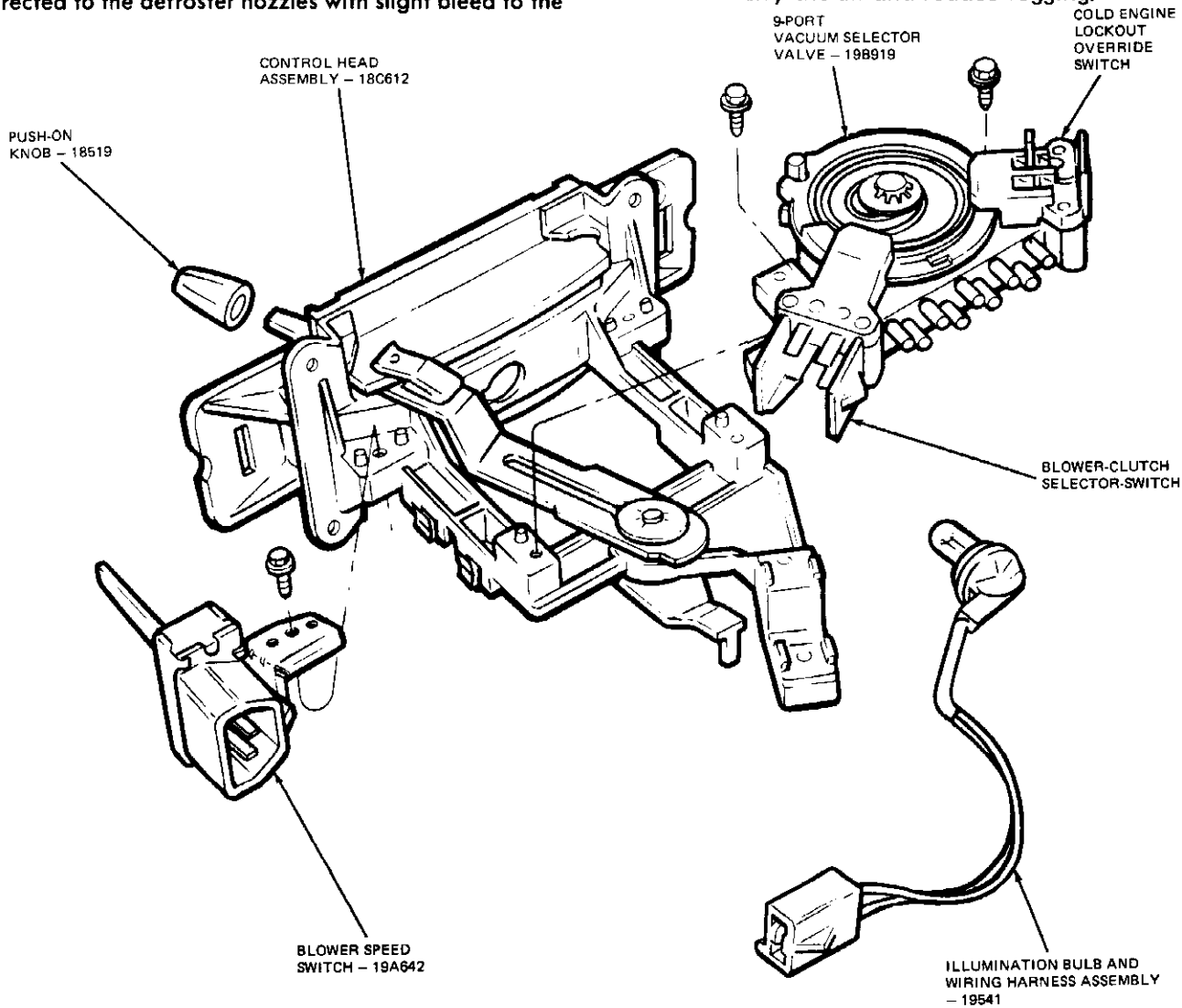


FIG. 7 ATC Control Head, Disassembled

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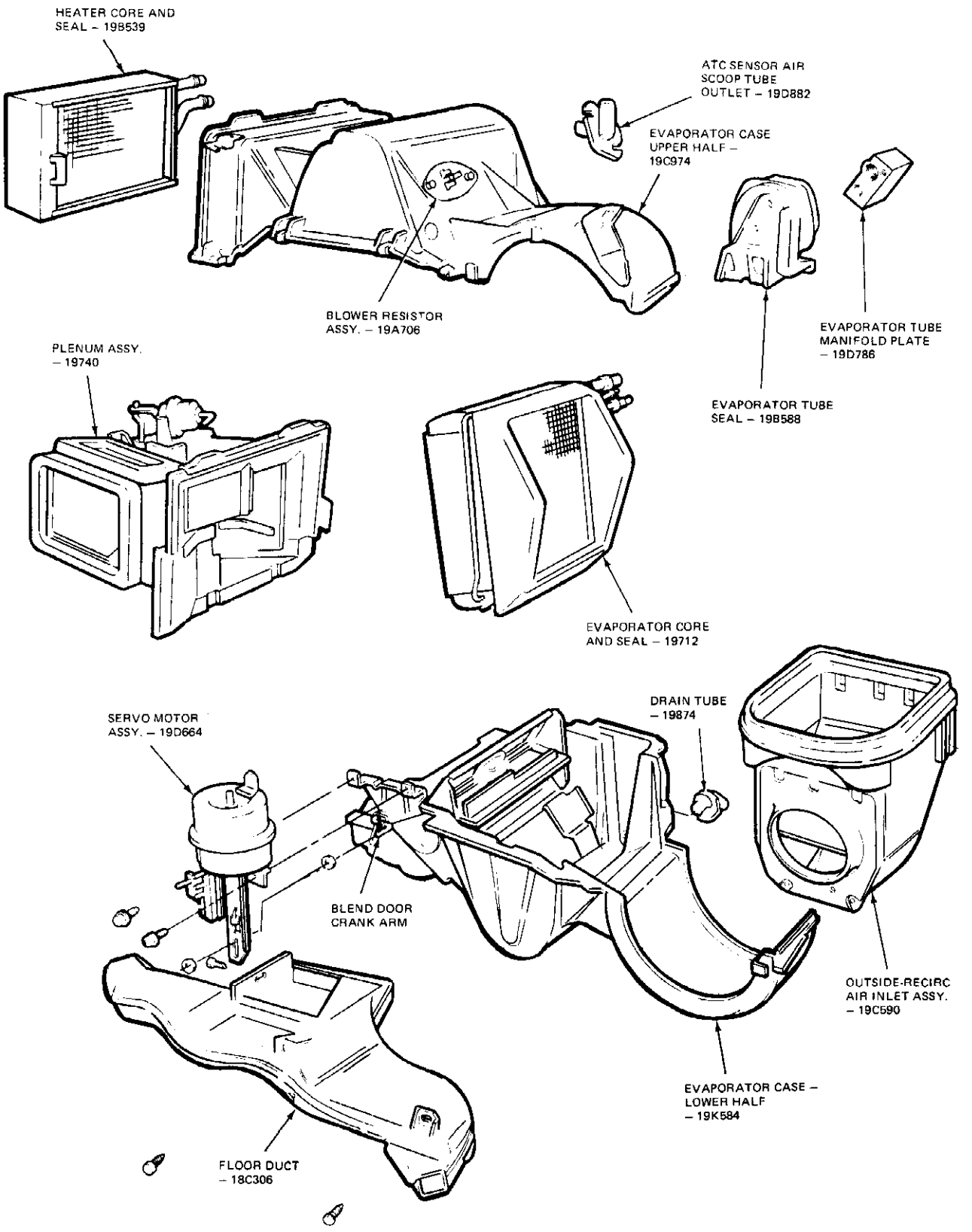


FIG. 8 ATC Evaporator Case Assembly, Disassembled

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ADJUSTMENTS

SENSOR CALIBRATION (FIG. 9)

1. Remove the instrument panel pad and visually determine which direction to rotate the sensor calibration locking pin.
2. While moving the temperature control lever, rotate the calibration locking pin into the 75°F calibration notch of the sensor control arm.
3. Check the position of the temperature control lever, it should be at 75. If it is not, loosen the bowden cable housing-to-sensor attaching screw and move the temperature control lever to 75 while the sensor control arm is locked in the calibration position. Retighten the bowden cable housing-to-sensor attaching screw, making sure the temperature control stays at 75 and the sensor arm stays locked.

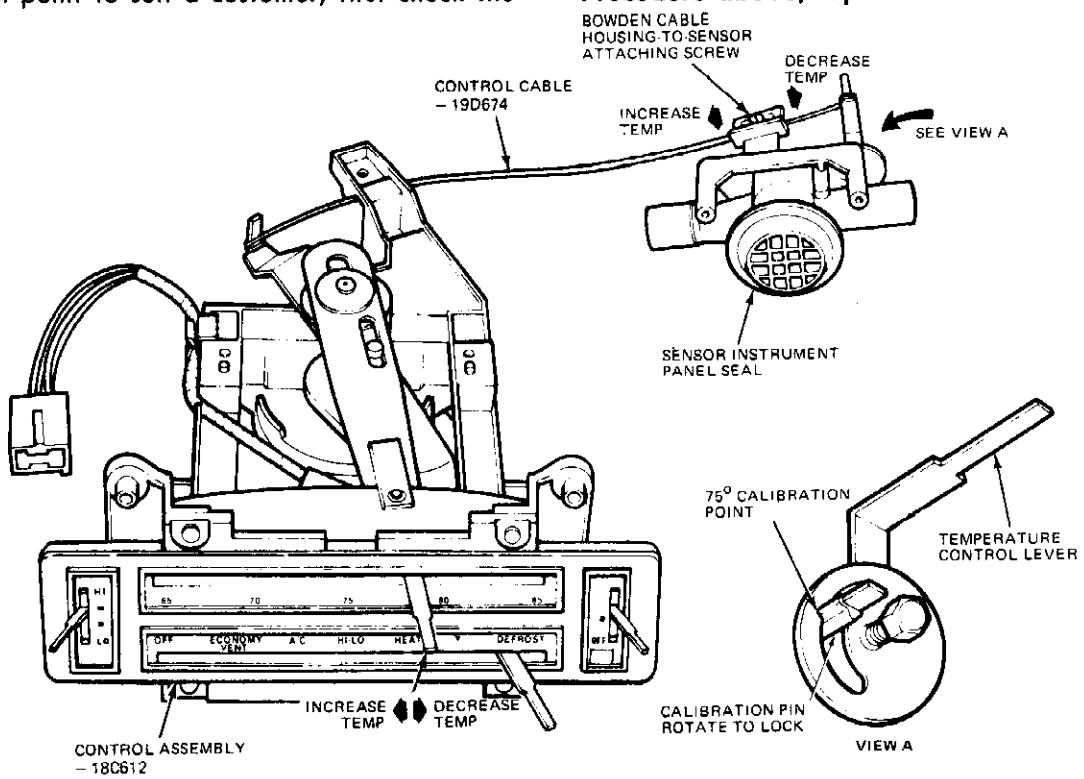
READJUSTING CALIBRATION POINT

If it should become necessary to change the calibration point to suit a customer, first check the sensor calibration as described in the above procedure. If O.K., use the following procedure:

1. Establish the customer's preference and the difference between the present and desired comfort level setting.
2. Determine the direction of change.
3. To decrease or increase, adjust the temperature control lever position with the sensor arm locked in the 75°F calibration notch. Loosen the bowden cable housing-to-sensor attaching screw, move the temperature control lever the desired amount and retighten the attaching screw.

NOTE: Move the temperature control lever HIGHER to DECREASE and LOWER to INCREASE the controlled temperature at a given setting.

CAUTION: If a readjustment of the temperature control lever of more than 4°F is required, and the cable adjustment is correct per Sensor Calibration Procedure above, replace the sensor assembly.



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FIG. 9 A.T.C. System Temperature Calibration

REMOVAL AND INSTALLATION

SENSOR ASSEMBLY

See Fig. 10 for an ATC System installation drawing.

Remove the instrument panel pad to gain access to the sensor assembly. Carefully disconnect the inlet air elbow, the vacuum connector and control cable. Remove two (2) mounting screws and remove the sensor.

To install, rotate the sensor control arm to the mid position and turn the plastic calibration pin to the locked 75°F position. Install the sensor, connect the inlet air elbow and vacuum connector. Connect control cable to sensor control arm and adjust cable with reference to Sensor Calibration procedure.

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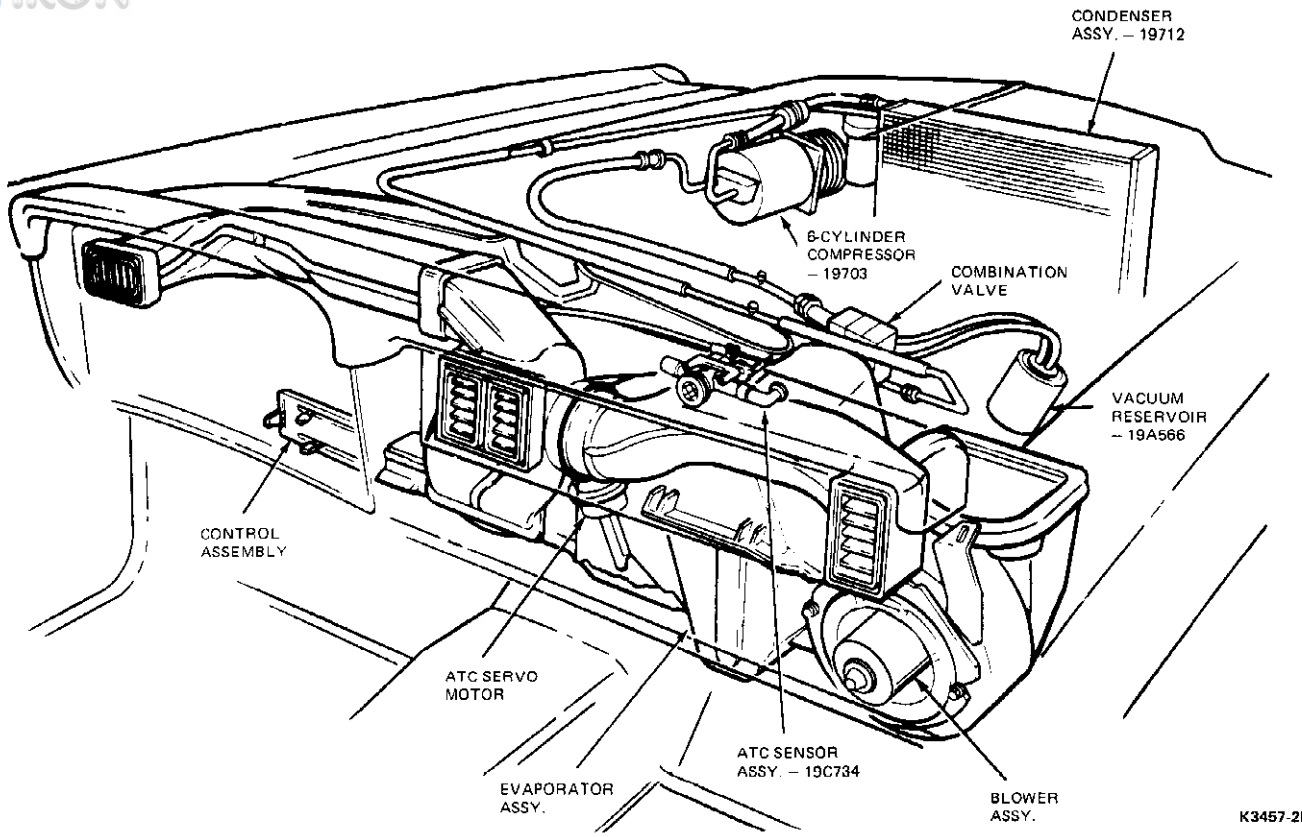


FIG. 10 ATC System Installation

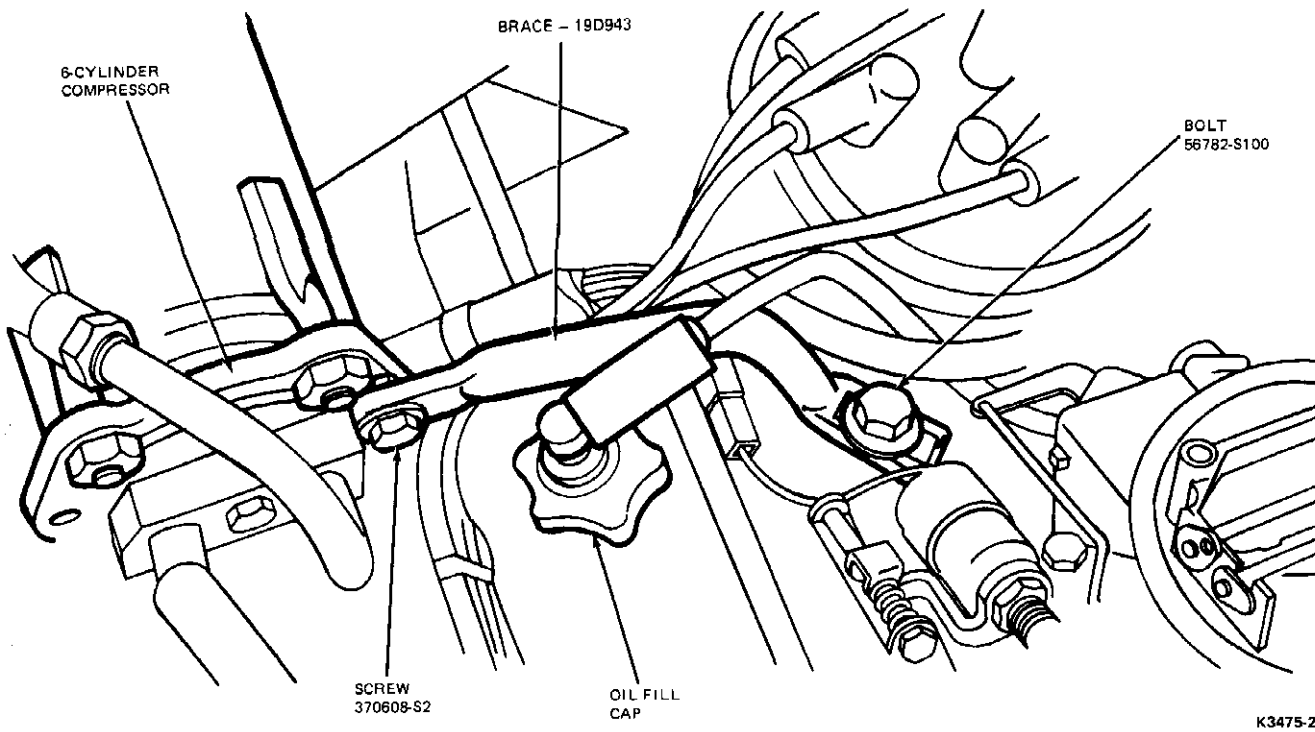


FIG. 11 Compressor Installation—5.0L (302 CID) V-8 Engine

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ELECTRO VACUUM RELAY (EVR)

1. Remove EVR mounting screw from bracket on plenum assembly.
2. Disconnect the vacuum connector and electrical connector.
3. Reverse this procedure to install.

SERVO ASSEMBLY

1. Remove the glove box.
2. Remove tan hose from servo motor.
3. Remove one (1) retaining nut and remove vacuum multiple connector from diverter valve.
4. Remove retainer from temperature blend door crank arm. Avoid bending the crank arm.
5. Remove two (2) servo mounting screws, disconnect the servo arm and tension spring from the temperature blend door crank arm and remove the servo assembly.
6. Install a new servo assembly by reversing the above procedure.

CONTROL HEAD ASSEMBLY

1. Remove A/C control knobs and accessory switch knob.
2. Remove two (2) lower control assembly attaching screws.
3. Remove two (2) upper control assembly attaching screws.
4. Remove temperature control cable from control head (1 screw).
5. Disconnect multiple vacuum harness connector from the 9-port vacuum selector valve.
6. Disconnect electrical wiring connectors from blower switch, override switch, selector switch, illumination bulb and rear defogger switch.
7. Reverse the above procedure to install and check the temperature control cable adjustment, using Sensor Calibration Procedure in Section VI, Paragraph 3. Adjust if required.

RESISTOR ASSEMBLY

1. Disconnect the electrical connector.
2. Remove the resistor assembly from the evaporator assembly. To install, reverse the above procedure. Always apply body sealer between the resistor board and evaporator case before installing the resistor assembly.

COMPRESSOR

For compressor installation drawings, refer to Fig. 11.

SPECIFICATIONS

1. Protective Device - 20 amp fuse in clutch circuit; 35 amp fuse in blower circuit.
2. Control Illumination - one ICP-161 bulb.
3. Blower Motor Current (Amps) and Voltage:
   Low - 8 amps - 5 volts;
   Medium Low - 11 amps - 7 volts;
   Medium High - 20 amps - 10 volts;
   High - 25 amps - 14 volts.
4. Compressor - 6-cylinder:
   Type - Swash Plate - Three double acting pistons - axial type;
   Cylinder Bore - 1-1/2 inches;
   Stroke - 1-3/16 inches;
   Rotation - Clockwise;
   Type of Oil - TL4538 Texaco 525 Viscosity Refrigeration Oil or equivalent;
   Oil Capacity - 10-1/2 ounces (Ford D1VY-19577-A or equivalent).
5. Clutch - Magnetic:
   Approximately 3.44 amps @12.8 volts.
6. Compressor Drive Belt Tension:
   New: 120 to 160 lbs;
   Used: 75 to 120 lbs (after operation for 10 minutes or more).
7. Combination Valve Screws:
   Manifold to Expansion Valve: 4 to 8 ft.-lbs.;
   STV Housing to Expansion Valve: 4 to 6 ft.-lbs.
8. Refrigerant:
   Capacity: 4 lbs. plus 1/4 lb., minus 0;
   64 oz. plus 4 oz., minus 0;
   1.814 Kg. plus 0.113 Kg., minus 0.
   Type: Refrigerant 12 (R-12).

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DETROIT IRON

Versailles Automatic Temperature Control

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DESCRIPTION AND OPERATION

The Versailles Automatic Temperature Control System is an independent case design, integral blower system and will automatically control the temperature and reduce the relative humidity of air inside the car. Refer to Fig. 1. Two control levers are provided to maintain the desired temperature and system functions. The system will deliver heated or cooled air to maintain the car interior temperature and will maintain the set comfort level automatically. The blower speed can be adjusted for more or less air as desired. Refer to Fig. 2.

Automatic control of passenger compartment temperature is maintained in all function control settings shown in Figure 2, except when the system is turned off. In hot weather, it will cool the car to the pre-set comfort level and then modulate cooling or heating to whatever is required to maintain the desired temperature. In cold weather, provision is made in the HEAT position of the function lever to delay the operation of the system until engine coolant has warmed enough to minimize the discharge of cold air from the heater outlet. The system will then heat the car to the desired temperature and level out to maintain the pre-set temperature.

During system operation, outside air is drawn from the cowl vent just below the windshield at all times, except during maximum cooling when recirculated air is used.

The system utilizes what is called a "reheat" method to provide conditioned air to the car interior. With this method, all air flow from the blower passes through the evaporator core, where it is cooled and dehumidified. Temperature is then regulated by reheating a portion of the cooled dry air and blending it with the remaining cool air to the desired temperature. Temperature blending is automatically varied by the temperature blend door which controls the amount of cooled air that flows through or around the heater core where it is mixed and directed into the distribution plenum. The air is finally directed to the heater ducts, the defroster

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nozzles, or the instrument panel (A/C) registers according to the selected function lever position.

CONTROL LEVER OPERATION

The Automatic Temperature Control (Fig. 2.) includes a function control lever for OFF, ECONOMY-VENT, A/C, HI-LO, HEAT, DEFOG (▼) and DEFROST that determines the manner in which the system will operate, a calibrated temperature control lever for setting the desired comfort temperature and a blower switch to control the volume of air movement. Each position of the function control lever and blower switch is detented for positive engagement. The blower switch provides four manually selected blower speeds. The switch can be operated in any position to select the desired amount of air flow.

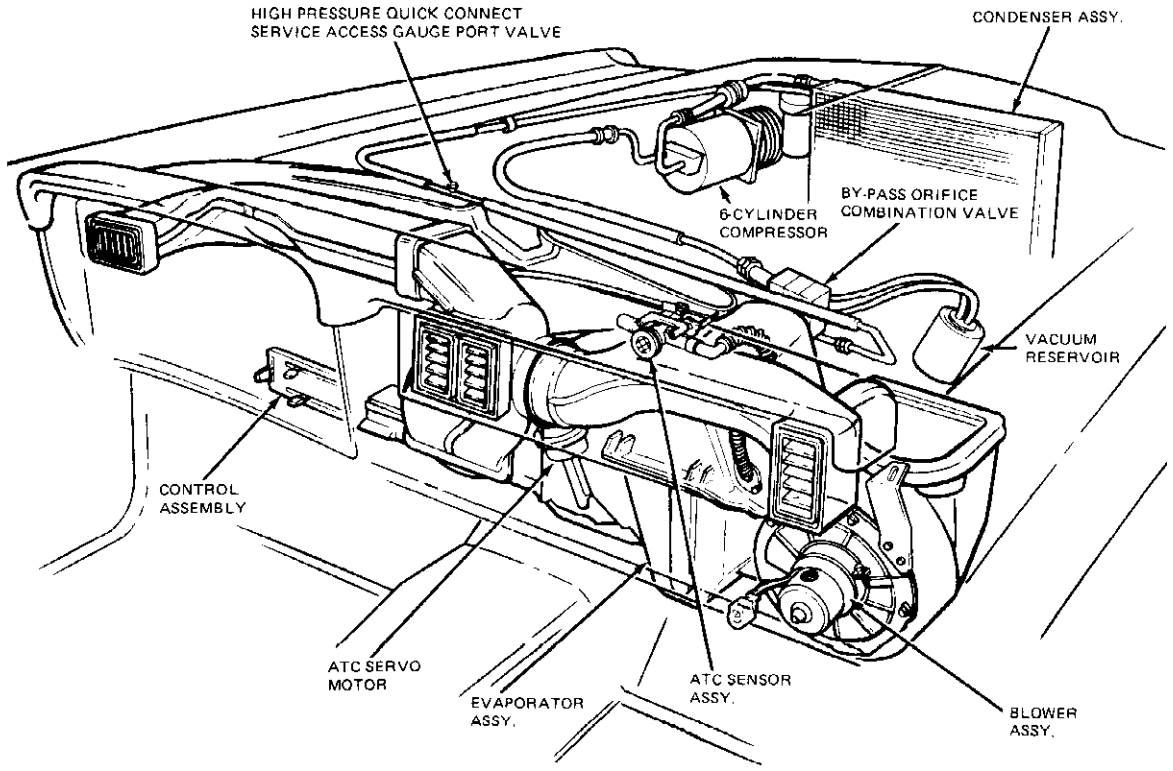


FIG. 1 ATC System Installation

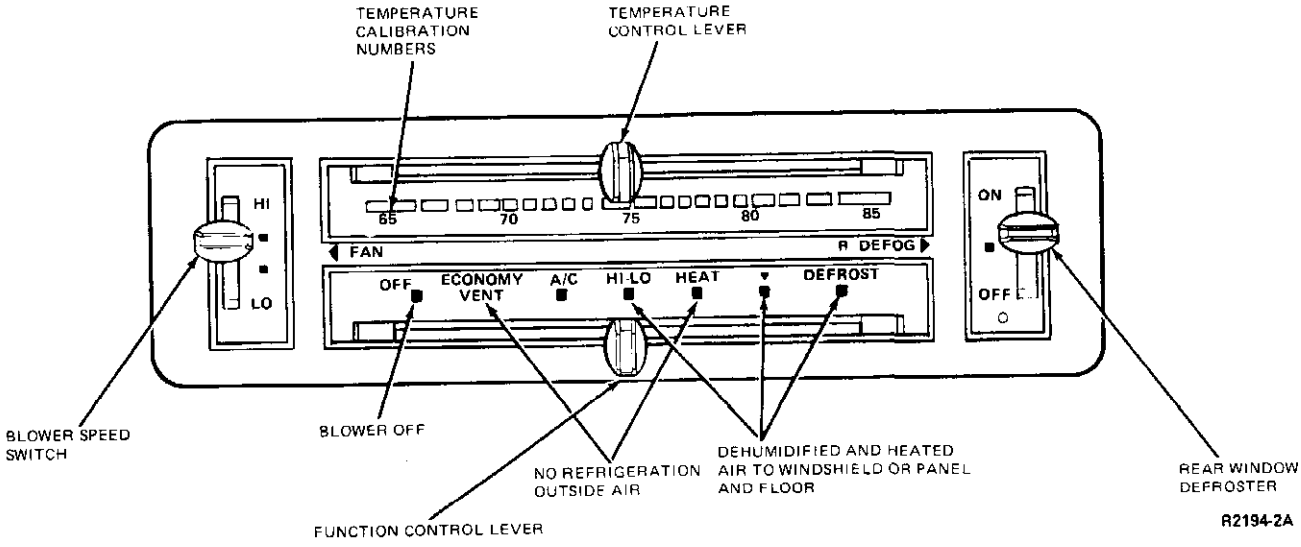


FIG. 2 ATC Control Head Functions

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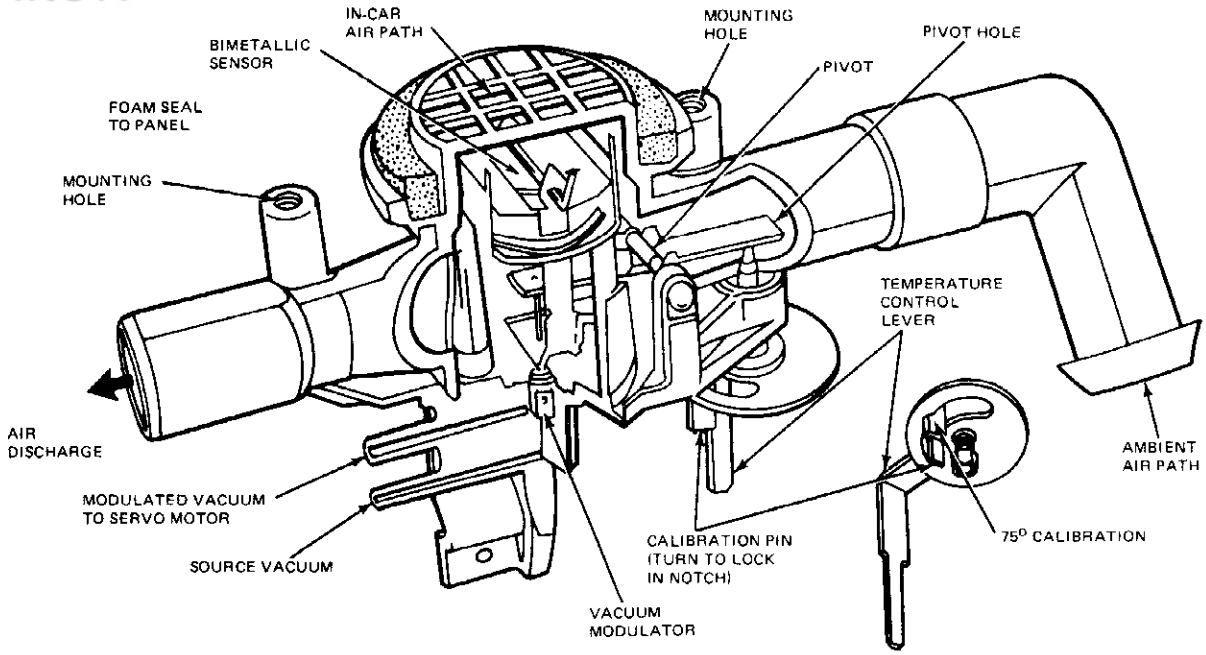


FIG. 3 Sensor Assembly

AUTOMATIC TEMPERATURE CONTROL

Automatic temperature control of the ATC system is determined by the modulated vacuum produced by the sensor assembly which controls the servo vacuum motor (Fig. 1). Temperature level changes are accomplished by means of a control cable between the control assembly and sensor assembly. System air flow is manually controlled by the control assembly. A vacuum selector valve, controlled by the function control lever, distributes vacuum to the various door vacuum motors which in turn direct the air flow through the system.

The sensor assembly contains a bimetal operated vacuum modulator, which directly converts air temperature into corresponding values of modulated vacuum (Fig 3). The bimetal senses in-car temperature and is mechanically linked to an internal vacuum modulator to control and regulate a vacuum which is proportional to temperature. The bimetal and vacuum modulator are placed within a plastic aspirator. Air is diverted by an air scoop near the high pressure side of the blower (before the evaporator) through a tube to the sensor assembly. The air flows through the aspirator which draws vehicle interior air over the bimetal. This combined air is then exhausted from the sensor underneath the instrument panel where it will not be felt by the passengers or driver.

Modulated vacuum from the sensor is directly connected to the large calibrated vacuum motor portion of the servo assembly. The modulated vacuum controls and positions the blend door attached to the arm of the servo motor assembly. The calibrated vacuum motor moves the blend door to mix various proportions of hot air from the heater core and cold air that has bypassed the heater core. Vehicle air temperatures produce compensating discharge air temperatures, i.e., high vehicle interior temperatures produce high sensor output vacuums which position the blend door to deliver cool discharge air. Low vehicle interior temperatures produce low sensor vacuum levels which cause warm discharge air.

A vacuum diverter valve (part of the power servo assembly and also attached to the arm of the servo motor) turns off the water valve under maximum cooling conditions and controls the outside air/recirc door for maximum cooling (recirculating air) conditions when the function control level is in the A/C position.

SYSTEM AIR FLOW

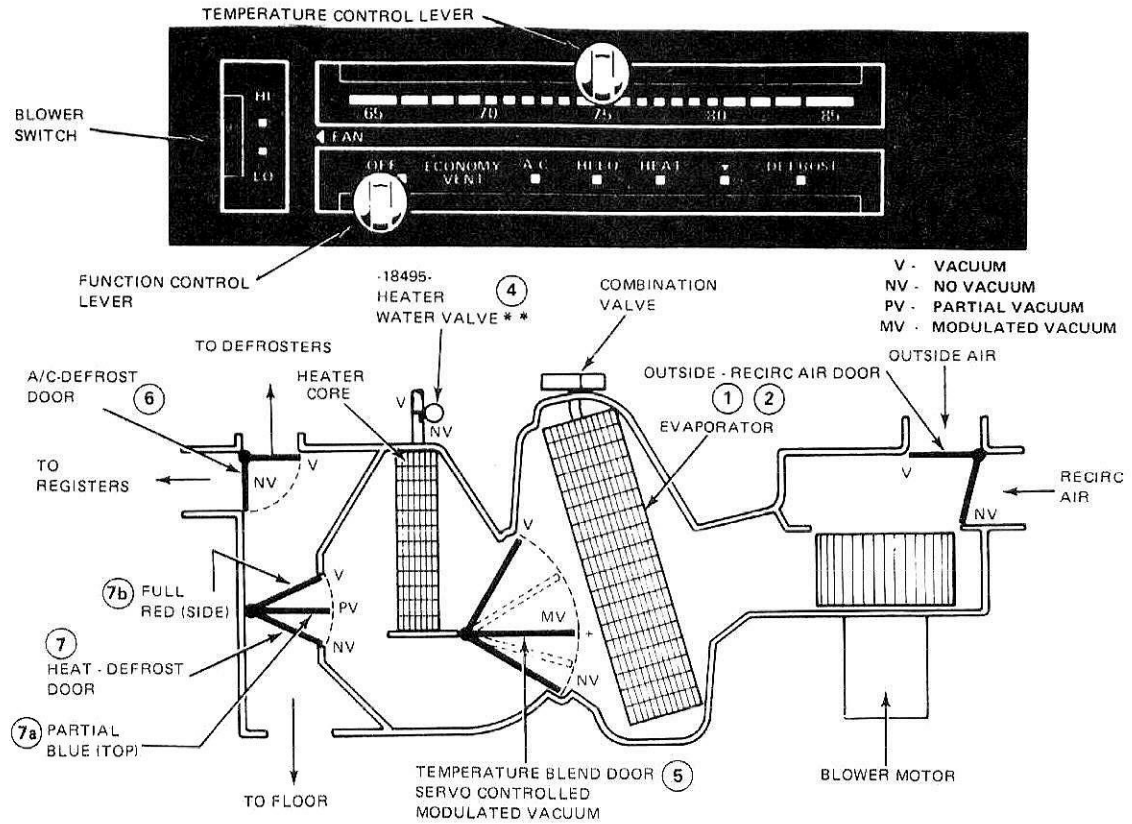
Figure 4 contains system vacuum schematics and vacuum motor charts which illustrate vacuum routings and air flow during the various system conditions. Figure 5 is a system electrical wiring diagram including continuity test information. Refer to the tests section for these illustrations.

OFF POSITION

In OFF position the outside-recirc air door is in the recirculating position. The A/C-Defrost door is in the defrost (no vacuum) position, and the heat-defrost door is in the heat (full vacuum) position. The blower is off and the temperature blend door and water valve assume a position depending on the modulated vacuum from the sensor to the power servo.

NOTE: A modulated vacuum is produced in ALL function control lever positions and is entirely dependent on the temperature lever setting and existing in-vehicle temperature conditions.

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AUTOMATIC TEMPERATURE CONTROL SYSTEM
VACUUM MOTOR TEST CHART

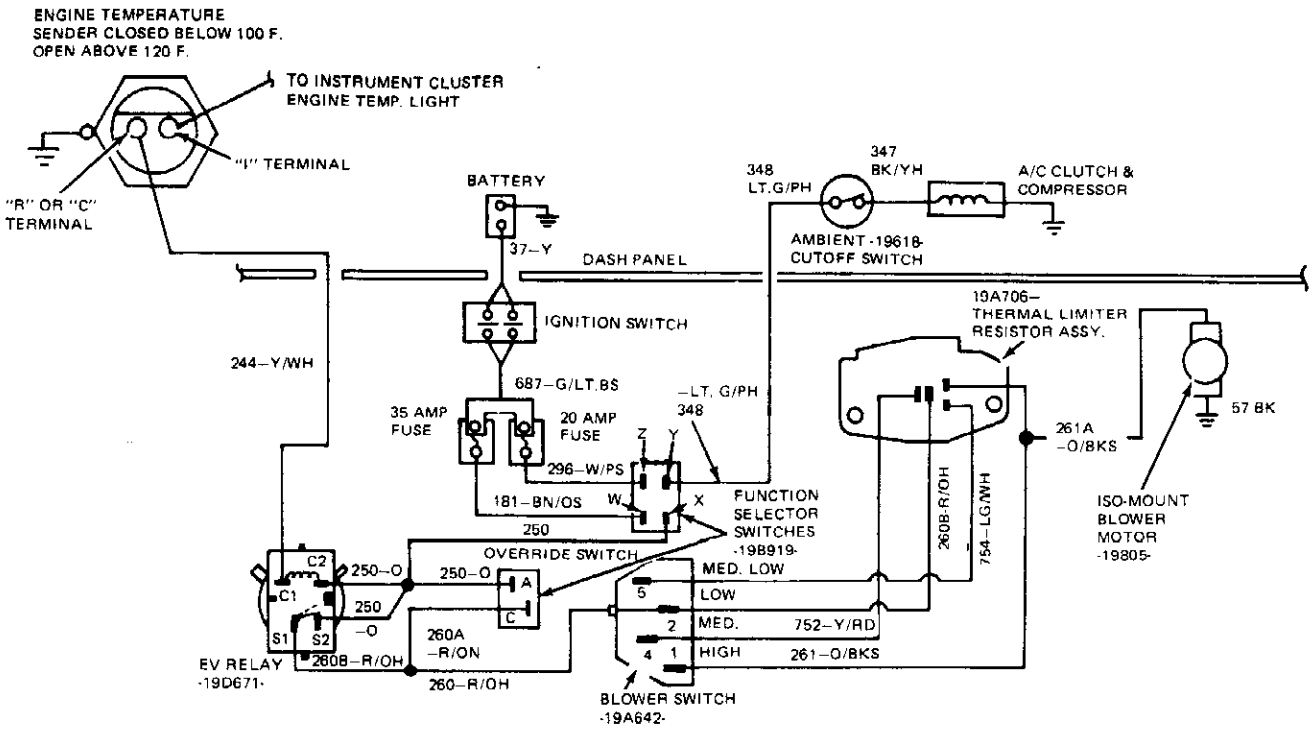
FUNCTION CONTROL LEVER POSITION	ATC REQUIREMENT	OUTSIDE–RECIRC.	VACUUM MOTORS APPLIED WITH VACUUM				
			WATER VALVE * *	TEMP BLEND +	A/C–DEFROST	HEAT–DEFROST	
						PARTIAL	FULL
OFF	–	1 · 2	* *	+	–	7a	7b
ECONOMY VENT	Cool	–	4	5	6	–	–
	Mid	–	–	+	6	–	–
	Warm	–	–	–	6	–	–
A/C *	Cool	1 · 2 * *	4	5	6	–	–
	Mid	–	–	+	6	–	–
	Warm	–	–	–	6	–	–
HI - LO *	Cool	–	4	5	6	7a	–
	Mid	–	–	+	6	7a	–
	Warm	–	–	–	6	7a	–
HEAT	Cool	–	4	5	–	7a	7b
	Mid	–	–	+	–	7a	7b
	Warm	1 · 2 †	–	–	–	7a	7b
▽ (DEFOG) *	Cool	–	4	5	–	7a	–
	Mid	–	–	+	–	7a	–
	Warm	–	–	–	–	7a	–
DEFROST *	Cool	–	4	5	–	–	–
	Mid	–	–	+	–	–	–
	Warm	–	–	–	–	–	–
VACUUM LINE COLOR CODE		WHITE	GREEN	TAN	YELLOW	BLUE (TOP)	RED (SIDE)

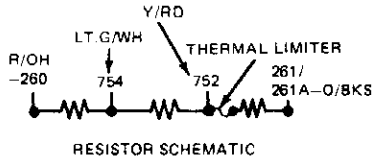
* COMPRESSOR CLUTCH ENGAGED WHEN AMBIENT CUT-OFF SWITCH IS CLOSED.
† DELAYED BY ENGINE TEMP. SENDER AND E.V. RELAY UNTIL 130°F. ENGINE COOLANT TEMP.
* * DEPENDENT ON HEATING/COOLING REQUIREMENT OF SERVO DIVERTER VALVE
\+ MODULATED VACUUM
– NO VACUUM

CL2060-2A

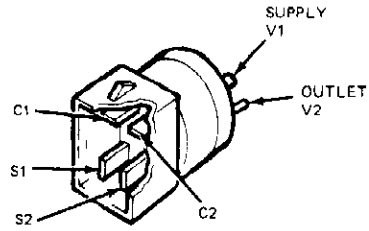
FIG. 4 ATC System Air Flow Schematic and Vacuum Control Chart

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RESISTOR SCHEMATIC



E.V. RELAY – 19D671			
COIL TERMINALS	SWITCH TERMINALS	VACUUM SWITCH	
C1 C2	S1 S2	V1	V2
12.8 VOLTS	OPEN	OPEN	OPEN
0 VOLTS	CLOSED	SEALED	VENTED

FUNCTION SELECTOR SWITCH -19B919-							
SWITCH SCHEMATIC	OFF	ECONOMY VENT	A/C	HI-LO	HEAT	▽ DEFOG	DEFROST
A—C	A - C	A - C	A - C	A - C	Open	A - C	A - C
X Y W Z	None	W - X	W - X Y - Z	W X Y - Z	W - X	W - X Y - Z	W - X Y - Z

BLOWER SWITCH -19A642-			
BLOWER SPEED	TERMINAL CONNECTIONS	CURRENT IN CAR (AMPS)	BLOWER VOLTAGE
Low	–	8	5
Med Low	2 - 5	11	7
Med High	2 - 4 - 5	20	10
High	2 - 1 - 4	25	14

CL2059-2A

FIG. 5 ATC System Electrical Wiring Diagram and Continuity Test

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ECONOMY-VENT POSITION

In ECONOMY-VENT position, outside air is directed through the panel (A/C) registers with automatic control of discharge air temperatures and water valve actuation. However, refrigerated cooling is not available. ECONOMY-VENT and HEAT positions provide the most economical operations because the compressor does not operate.

A/C POSITION — MAXIMUM COOLING (RECIRCULATE)

With the function lever in the A/C position and the car interior temperature considerably above the temperature setting, the modulated vacuum is high at the servo motor, causing:

1. The outside-recirc door to go to the recirc position;
2. The water valve to close;
3. The temperature blend door to close, allowing all air to by-pass the heater core. Air is drawn from the passenger compartment, directed through the evaporator core where it is cooled and returned to the car interior through the panel (A/C) ducts and registers.

A/C POSITION — MODULATED COOLING (OUTSIDE-AIR)

When less cooling is required to maintain the temperature setting, the temperature blend door is actuated to a mid-position where part of the air leaving the evaporator core is directed through the heater core. Blended air (the combination of cooled and heated air) is then mixed in the plenum and directed into the car interior through the panel (A/C) ducts and registers. The position of the temperature blend door changes automatically to maintain the selected temperature. If the in-car temperature rises above the temperature lever setting, the blend door moves to admit more cooled air and less heated air. If the in-car temperature drops below the setting, the blend door moves to admit more heater air and less cooled air.

HI-LO POSITIONS

Operation is similar to that described in the A/C position paragraphs, except that airflow is divided between the panel registers and floor ducts. The system will not recirculate interior air for maximum cooling.

HEAT POSITION — MAXIMUM HEATING

With the function control lever in the HEAT position and the car interior temperature below the temperature setting, the modulated vacuum is low, causing the water valve to open and the temperature blend door to fully open. Blower operation will be delayed until the engine coolant reaches approximately 120° F (49° C), then the air is forced by the blower through the evaporator and all of the air passes through the heater core before being distributed through the heater (floor) ducts into the car interior. A portion of this air is diverted to the defroster nozzles.

HEAT POSITION — MODULATED HEATING

When less heating is required to maintain the temperature setting, the temperature blend door has moved to a mid-position so that only part of the air leaving the evaporator core is directed through the heater core. Blended air (the mixture of outside air and heater air) then is directed into the car interior. The A/C clutch does not operate in the HEAT position.

DEFOG (▼) POSITION

In DEFOG (▼) operation is the same as the HEAT position, except that the A/C-Defrost door is in the defrost (no vacuum) position and the heat-defrost door is in a partial position. The air flow is directed to the defroster nozzles and the floor outlets. The A/C clutch will also be engaged when the outside air temperature is sufficiently high to close the ambient cut-off switch. This assists in reducing windshield fogging by dehumidifying the incoming outside air.

DEFROST POSITION

When the function lever is in the DEFROST position, the A/C-Defrost door and the heat-defrost door are in the full defrost (no vacuum) positions so that all incoming air is directed to the defroster nozzles with a slight bleed to the floor. The temperature blend door modulates in this position but maximum heat can be obtained by moving the temperature lever to the highest temperature position. The A/C clutch also operates in this position to dehumidify the air and reduce windshield fogging.

COMPONENTS

SENSOR ASSEMBLY

The sensor assembly is located behind the instrument panel above the glove box as shown in Figure 1. A small opening in the instrument panel allows passenger compartment air to enter the sensor. The sensor assembly (Fig. 3) contains a bi-metallic sensor that senses the passenger compartment air temperaturem The output controls a vacuum modulator and higher temperatures cause higher vacuum gauge readings. A bias to the vacuum output level is accomplished by means of a control arm attached by a cable assembly to the temperature control lever. Thus, the modulated vacuum output is the result of the effects of the control bias and the temperature of the air across the bimetallic sensor.

The sensor assembly also includes an aspirator or venturi (as it is called in previous ATC systems). The aspirator provides a very small vacuum to draw a continuous sampling of passenger compartment air across the air temperature sensing bimetal. Primary air is ducted to the sensor via a tube from the blower stream providing the power to operate the aspirator for the in-car sensor.

SERVO ASSEMBLY

The servo assembly is a large calibrated vacuum motor and vacuum diverter valve and is located behind the lower left edge of the glove box on the mounting bracket attached to the heater core section at the upper case half. The calibrated vacuum motor provides specific temperature blend door positions for given vacuum levels. The attached vacuum diverter valve controls water valve operation and recirc or outside air operation.

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DETROIT IRON

ELECTRO-VACUUM RELAY (E.V. RELAY)

Located on the plenum assembly below the A/C-Defrost door vacuum motor, the E.V. Relay is a combination normally closed vacuum solenoid valve and a single pole single throw normally closed electrical relay, both actuated by one electrical coil. The E.V. Relay is used during cold engine operation, in the HEAT function lever position, to lock-out blower operation, and to switch the system to recirculating air until the engine coolant warms up to about 120° F (49°C).

CONTROL ASSEMBLY

The control assembly consists of three main parts: 1) the function selector — a nine-port vacuum selector valve combined with two cam operated electrical switches; 2) blower switch — an electrical switch that provides four speeds of blower operation; and 3) the temperature control lever which connects through a control cable assembly to the sensor assembly.

1. The 9-port vacuum selector valve directs source vacuum to various vacuum motors and connects the vacuum from the electro-vacuum relay to the outside air-recirc door in HEAT (See Vacuum Schematic — Figure). A single pole and a double pole cam operated electrical switch is also controlled by the vacuum selector. The combination of these cam operated electrical switches controls the electrical supply to the A/C clutch and blower switch.
2. The four-position blower switch is identical to a manual A/C heater system blower switch. It provides a current path for by-passing the resistors in the resistor assembly, one at a time, until full blower speed is attained in the Hi blower switch position.
3. The temperature control lever is connected to the sensor assembly by a control cable assembly. Movement of the control lever from 65 to 85 causes a corresponding movement on the pre-load (bias) portion of the sensor assembly, and determines the temperature that the system will maintain.

THERMAL LIMITER RESISTOR ASSEMBLY

The blower motor thermal limiter resistor assembly (Fig. 6) is located on the upper case half of the evaporator assembly. There are three resistance elements mounted on the resistor board to provide four blower speeds. Depending on the blower switch position, series resistance is added or by-passed in the blower motor circuit to decrease or increase blower motor speed.

A thermal limiter resistor assembly is similar to a standard resistor assembly except an overheating protective device (thermal limiter) has been added to prevent heat damage to the evaporator case assembly. Overheating of the resistor coil(s) may occur when the system air flow is reduced as a result of an inlet or outlet air restriction or if the blower wheel becomes locked and/or is unable to turn freely.

When the thermal limiter resistor circuit has opened as a result of excessive heat, it should be replaced only with the identical replacement thermal limiter resistor assembly. It must not be substituted with a standard resistor assembly which does not include the thermal limiter device.

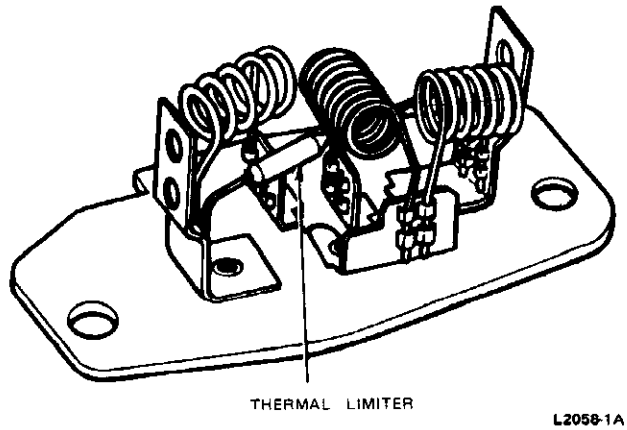


FIG. 6 Thermal Limiter Resistor Assembly

THERMAL LIMITER

The thermal limiter, used in the thermal limiter resistor assembly, serves as a temperature protecting fuse. Located a predetermined distance from the resistor coils and in series with the coil circuit, it will open the resistor coil circuit when the temperature of the thermal limiter reaches 300° F (149° C) interrupting blower operation in all speeds except high blower. Internal spring loaded contacts are held closed with a wax material which has a melting point of 300° F (149° C). When the wax softens, the spring contacts separate, opening the resistor circuit. The spring contacts cannot be closed again. As a result, it is necessary to replace the entire thermal limiter resistor assembly.

ENGINE TEMPERATURE SENDER SWITCH

The engine temperature sender switch is located on the engine and senses the engine coolant temperature near the engine thermostat. In the HEAT position only, a ground circuit from the engine temperature sender switch to the E.V. relay coil prevents blower operation until the engine coolant temperature reaches approximately 120° F (49°C).

REGISTER ASSEMBLIES

Retaining tabs lock the register assemblies into the register housings of the instrument trim panels. Horizontal registers swivel and direct the register outlet air up or down while the louvers permit side to side air distribution or closure of the register outlet. Vertically mounted registers swivel and direct the register outlet air from side to side while the louvers permit upward and downward air distribution or closure of the register outlet.

REFRIGERANT SYSTEM

The refrigerant system incorporates a six cylinder compressor with an ambient cut-off switch connected in series with the compressor clutch to control compressor operation. The ambient switch will open and close between 35° F (2° C) minimum and 50° F (10° C) maximum. The ambient switch is located on the head lock support bracket, in the airflow path, behind the radiator grille.

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An internally equalized By-Pass Orifice (BPO) Combination Valve assembly is used to control refrigerant system pressures.

Refer to the Normal System Operation Charts and the Problem Refrigerant System Pressure Evaluation Chart for refrigerant system testing and diagnosis. Refer to Part 36-32 A/C General Service Section for servicing and refrigerant system.

BY-PASS ORIFICE (BPO) COMBINATION VALVE

By-Pass Orifice Combination Valve, designed to improve the efficiency of the refrigerant system and to maintain the reduced packaging space required for controlling the refrigerant system pressures, is incorporated in the Versailles refrigerant system.

Its advantages are:

- Lower refrigerant system compressor loads
- Slightly improved fuel economy
- Simplified servicing
- Improved service packages
- No exposed small tubing to be damaged

The By-Pass Orifice (BPO) Combination Valve is an assembly which combines the Expansion Valve and the Suction Throttling Valve into one integral unit. It also has an evaporator manifold plate assembly for attachment to the inlet and outlet evaporator core tubes, as well as an STV housing manifold and tube assembly for connecting the high pressure liquid line and the compressor suction line. Refer to Figure 7.

EVAPORATOR MANIFOLD PLATE

The Evaporator Manifold Plate provides the means to rigidly mount the By-Pass Orifice Combination Valve assembly to the evaporator core.

Its service access gauge port valve allows the attachment of a low pressure service gauge to test the constant evaporator pressure and to recharge the refrigerant system.

A fitting is included in the back of the manifold plate to attach the evaporator liquid bleed line. This keeps the bleed line short and out of the engine compartment where it could be damaged when other engine compartment services are being performed.

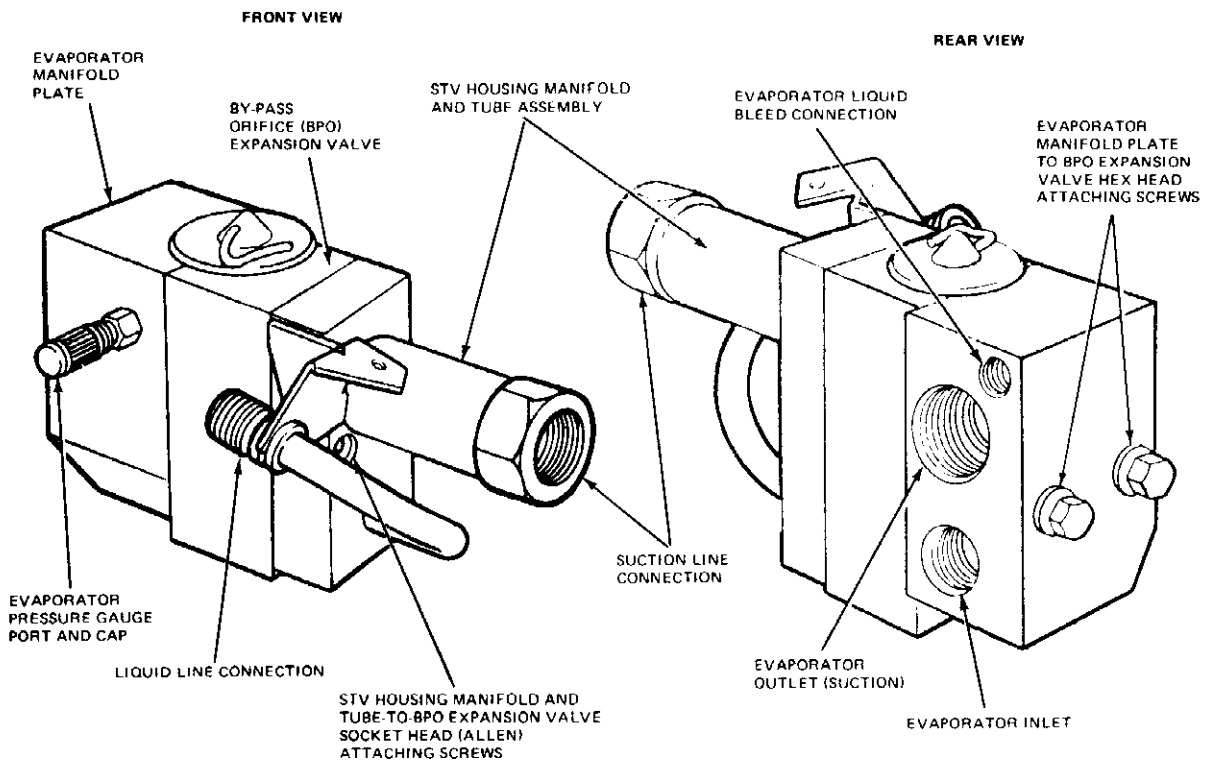


FIG. 7 By-Pass Orifice (BPO) Combination Valve Assembly, Front and Rear View

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DETROIT IRON

BY-PASS ORIFICE (BPO) EXPANSION VALVE

The By-Pass Orifice Expansion Valve is the H-block type similar to that used on earlier refrigerant systems, except that the tapered ball seat is slotted to prevent complete sealing of the liquid refrigerant inlet to the evaporator. It is machined to accommodate the installation of the suction throttling valve. This eliminates the need for the external sensor tube and bulb for sensing the temperature of the evaporator suction line and the external equalizer line, as it is internally equalized. Refer to Figure 8.

It is attached to the evaporator manifold plate with two (2) hex-head screws which are torqued 4 to 8 lbs. ft.

The By-Pass Orifice (BPO) Expansion Valve must regulate the flow of liquid refrigerant during cool-down (while the car interior and evaporator core are cooling down). As the evaporator core temperature approaches 32°F, the suction throttling valve begins to control refrigerant pressure.

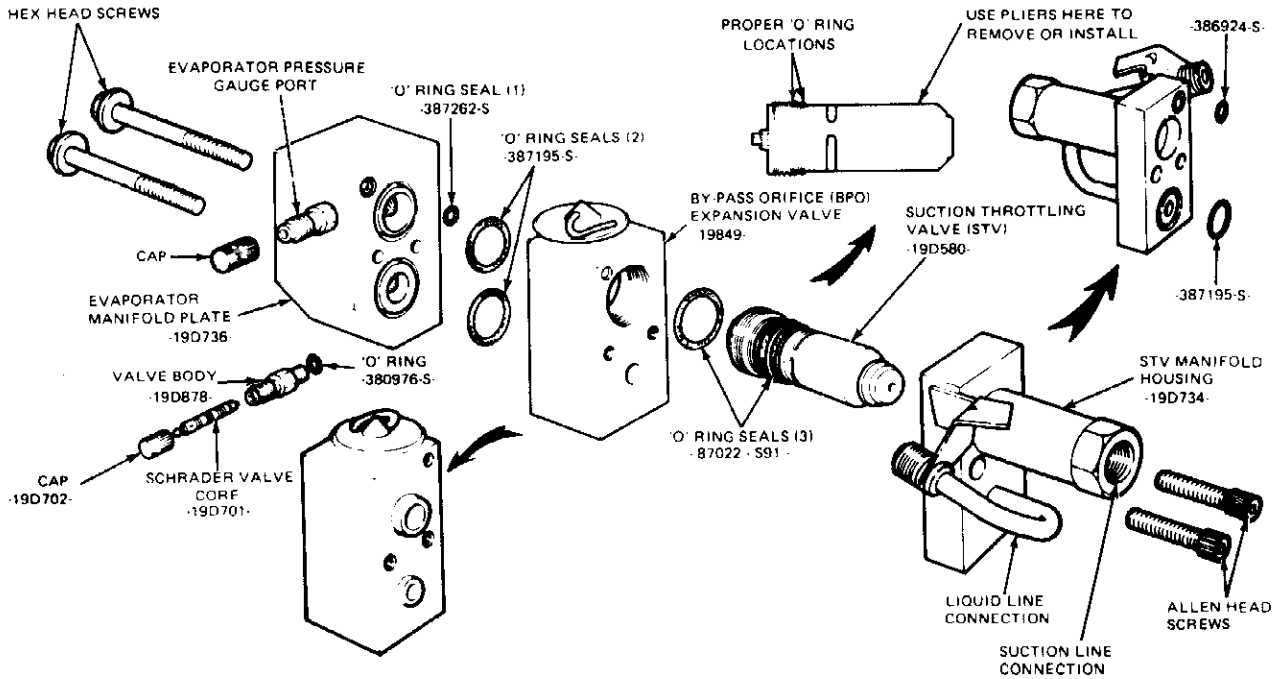


FIG. 8 By-Pass Orifice (BPO) Combination Valve—Disassembled L2443-2A

SUCTION THROTTLING VALVE

The Suction Throttling Valve is the same used inside other model Combination Valve assemblies. Its purpose is to control suction pressure in the evaporator to prevent ice or frost from blocking the flow of air through the heat exchanging surfaces of the evaporator. Gauge pressure at sea level is specified at minimum of 28.5 psi. The pressure reading is higher at higher altitudes because of gauge error, not because of a change in pressure inside of the evaporator. Refer to the Normal Evaporator Pressure vs. Altitude Chart.

Suction "throttling" starts when the compressor suction pressure decreases below the pressure setting of the valve. Compressor suction pressure can continue to drop but evaporator pressure is held steady by the controlling or "throttling" action of the STV.

PRESSURE DIFFERENTIAL VALVE

A calibrated Pressure Differential Valve core is provided as a liquid refrigerant bleed circuit around the STV to assure oil return to the compressor when the STV is closed due to minimum heat loading of the A/C system. Refer to Figure 9.

The Pressure Differential Valve is a Schrader valve that has been calibrated to open at a pressure range of 10 to 20 psi. Its function is to by-pass oil laden refrigerant around the restriction formed when the STV is closed (due to reduced heat load on A/C system) and thereby provide an assured oil return to the compressor. Under high heat loads this valve is closed, since ample refrigerant is moving through the compressor suction line back to the compressor. Substitution of a Schrader type service valve core from one of the gauge port valves is not permitted and would result in compressor damage by oil starvation because the substituted valve core would never open. The calibrated Pressure Differential Valve core is supplied installed in the expansion valve service part and is not to be serviced separately.

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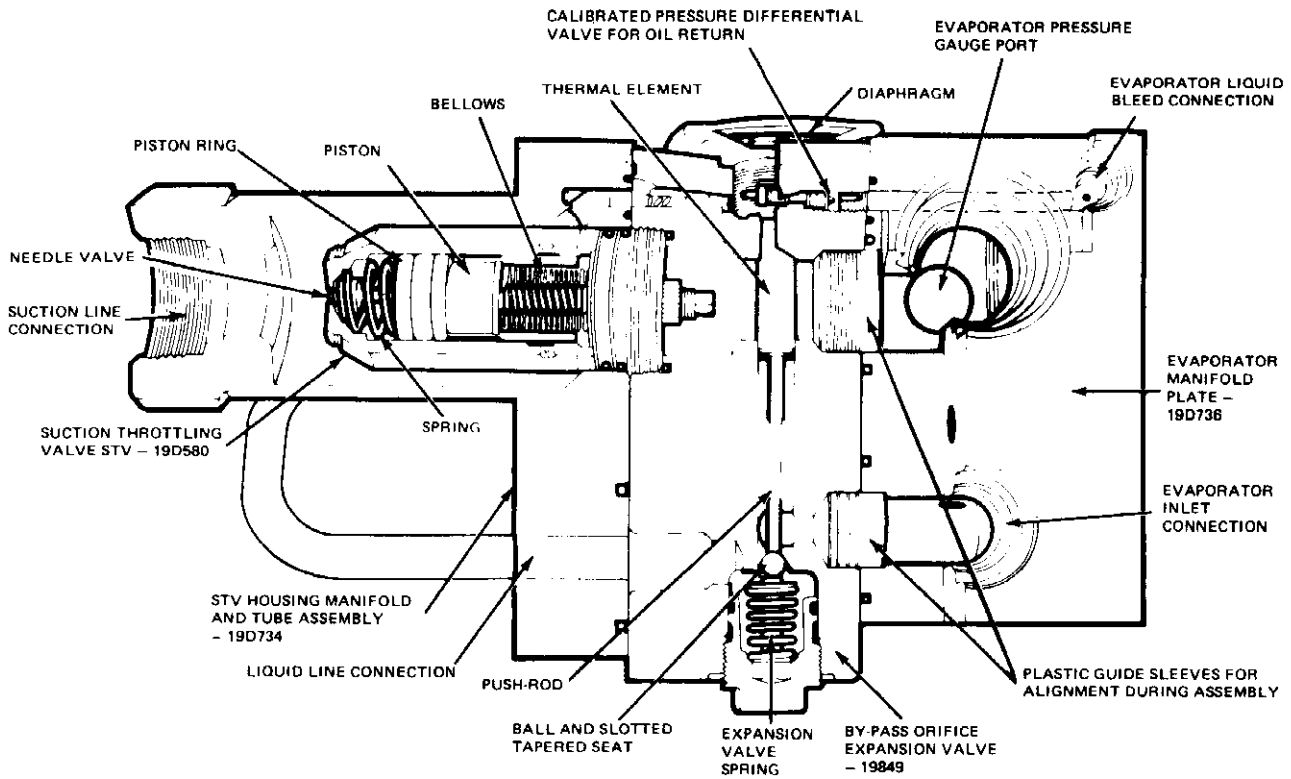


FIG. 9 By-Pass Orifice (BPO) Combination Valve Assembly—Cut-Away View L2444-2A

STV HOUSING MANIFOLD AND TUBE ASSEMBLY

The STV Housing Manifold and Tube assembly provides a housing for the suction throttling valve.

It has connections for the high pressure liquid line (lower, smaller diameter tube and fitting) and the compressor suction line on the end of the STV housing.

It is secured to the body of the expansion valve with two (2) socket head (Allen) screws torqued 4 to 6 lb ft.

INSPECTION AND ASSEMBLY REQUIREMENTS

Facing seal surfaces must be free of dirt, burrs and scratches.

All O-rings must be lubricated with clean refrigerant oil immediately prior to installation.

NOTE: At any time a hose or surface connection leak is observed, tightening the connection will only stop the leak temporarily. To correctly repair the leak, the connector or surfaces must be separated, cleaned and a new O-ring installed. The O-ring and connector surfaces should be lubricated with refrigerant oil prior to assembly.

REFRIGERANT FLOW Refer to Figure 9

1. Liquid refrigerant from the receiver/drier enters the lower (high pressure) tube of the combination valve.
2. During stabilized (vehicle shutdown) conditions, the pressure on the bottom of the expansion valve diaphragm rises above the pressure on the top of the diaphragm, closing the valve.
3. When the system is started, the pressure on the bottom of the diaphragm drops rapidly, allowing the valve to open and spew liquid refrigerant to the lower evaporator tube where it begins to vaporize.
4. The compressor suction draws the vaporized refrigerant out of the top of the evaporator at the top tube where it passes the thermal element.
5. Gas pressure in the thermal element drops when cooled and the expansion valve starts to close. Its pressure rises with evaporator superheat and opens the expansion valve, allowing more refrigerant to flow.
6. Pressure differences between the evaporator and compressor force the control piston further into the valve cylinder. This allows the refrigerant to escape out of the side slots of the STV and enter the housing or suction side of the system.
7. As the system operates, the temperature (and pressure) in the evaporator core begins to drop. If operating conditions (ambient temperature, vehicle speed, blower speed) permits the temperature of the core to approach the freezing point, the reduced pressure in the evaporator core allows the STV piston to move back and partially cover the side slots. This action "throttles" or restricts refrigerant flow through the STV and maintains the evaporator core pressure above 28.5 psi. This pressure for R-12 corresponds to a temperature of 32°F. The evaporator core is therefore kept above the temperature at which it would freeze the condensate on the outside surfaces.

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8. The liquid bleed line circuit parallels the suction throttling valve. The pressure differential valve in the circuit (no replacement part available) starts to open when the suction pressure in the STV housing is 10 psi less than the evaporator pressure. It will fully open when the suction pressure is 20 psi less than the evaporator pressure.
9. The bottom of the pressure sensing diaphragm (on top of the expansion valve) internally senses the evaporator pressure through the internal passage around the thermal element. As evaporator pressure is increased, the diaphragm flexes upward pulling the thermal element and push rod away from the ball seat of the expansion valve. The expansion valve spring forces the ball onto the tapered seat and the liquid refrigerant flow is reduced.

   As the pressure is reduced, due to restricted refrigerant flow, the diaphragm flexes downward again opening the expansion valve to provide the required controlled pressure and refrigerant flow condition.
10. The internal sensing element produces the required pressure on the top of the pressure sensing diaphragm. As the cool refrigerant passes the body of the thermal element, the gas above the diaphragm will contract and allow the expansion valve spring to close the expansion valve. When heat from the passenger compartment is absorbed by the refrigerant, it will cause the gas to expand and the push rod will again force the expansion valve to open, allowing more refrigerant to flow so that more heat can be absorbed.
11. Under low refrigerant flow conditions, where the cooling requirements are very low, the expansion valve ball will close on the slotted tapered seat and provide a small flow of refrigerant. This insures proper cooling as well as proper compressor lubrication.

DIAGNOSIS AND TESTING

ELECTRICAL

Refer to the ATC System Electrical Wiring Diagram and Continuity Test illustration (Fig. 5) to assist in performing component and system electrical wiring and continuity tests. The blower switch chart also provides blower motor voltage and current information for each blower switch position.

VACUUM

Refer to the ATC System Vacuum Schematic and Selector Test illustrations (Fig. 10) to assist in performing vacuum system and function selector valve tests. Also refer to Figs. 11, 12 and 13 – ATC system vacuum leak charts.

AIR FLOW

Refer to the ATC System Air Flow Schematic and Vacuum Control Chart (Fig. 4) to assist in performing air flow function and Vacuum Motor Application Tests.

REFRIGERANT SYSTEM

Refer to the normal system operation charts in Fig. 14 for normal center register discharge air temperatures, Fig. 15 for normal evaporator pressure gauge readings vs. altitude and Fig. 16 for normal STV/BPO refrigerant system pressures. Also refer to the problem refrigerant system diagnosis of systems with pressures outside those specified in the charts.

COLD ENGINE BLOWER CIRCUIT INTERRUPTION

1. Turn the ignition switch ON (Do not start engine).
2. Move the blower switch to HI position.
3. Move the Function Control Lever to HEAT position.

Results: a. If the engine coolant temperature is below 100° F, the blower should not operate and the outside air door should be closed.

b. If the engine coolant temperature is above 120° F, the blower should turn on and the outside air door should be open.

c. If results of a or b are not satisfactory, proceed to step 4.

4. Start the engine and operate at idle rpm.
5. Disconnect the "D" shaped connector from the engine temperature sender unit (Fig. 5). The blower should turn ON. If the blower does not turn ON, the E. V. Relay should be checked for contact continuity between switch terminals S_1 and S_2. When below 100° F the contacts should **not** have more than one ohm resistance. If one ohm or more, replace the E. V. Relay. If the E. V. Relay is OK, check for an improper ground contact in the 244 (Yellow w/White Hash) circuit of the wire harness.
6. Connect a jumper wire from frame (ground) to the 244 circuit (Yellow w/White Hash) in the "D" shaped engine temperature sender wire harness connector. The blower should turn OFF.

CAUTION: Do not accidentally ground the other terminal (I) of the "D" connector if the vehicle is equipped with a temperature gauge. Serious temperature gauge damage may result.

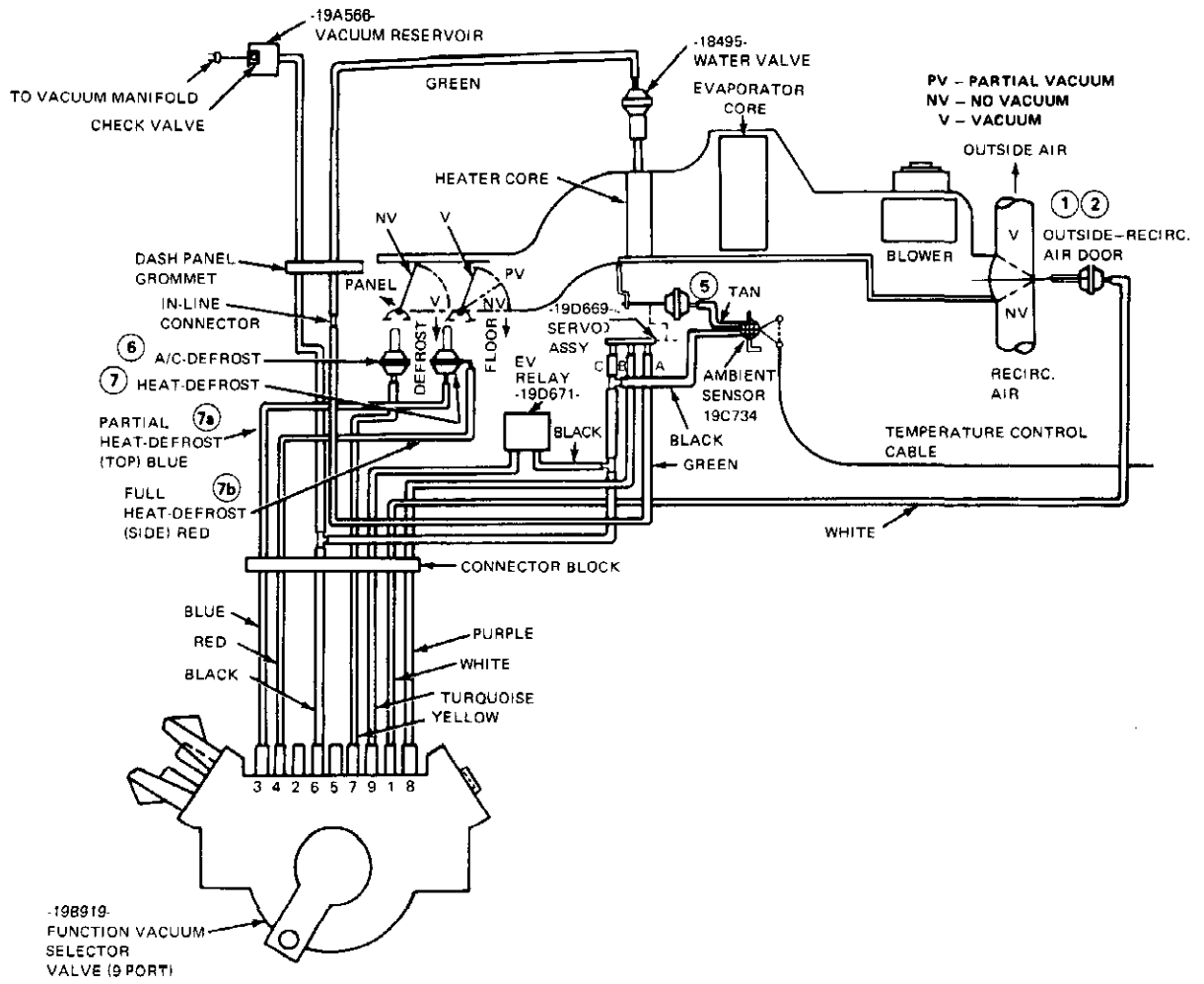
If the blower does not turn OFF, check for continuity between the coil terminals C_1 and C_2 should have continuity (approximately 31 ohms). If no continuity between terminal C_1 and C_2 exists, replace the E. V. Relay.

7. If the results in step 3a and 3b do not agree with step 5 and 6, the engine temperature sender should be further tested for improper operation. Refer to Engine temperature sender test.

ENGINE TEMPERATURE SENDER

The terminal marked "R" (vehicles with temperature gauge) or "C" (vehicles with engine termperature warning light system), should provide an engine ground circuit below 100° F and an open circuit above 120° F engine coolant temperature. If a terminal resistance of one ohm or more with the coolant temperature below 100° F, or if the circuit does not open above 120° F, replace the engine temperature sender.

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PORT	FUNCTION	FUNCTION SELECTOR VALVE LEVER POSITIONS							HOSE COLOR
		OFF	ECONOMY VENT	A/C	HI LO	HEAT	▽ DEFOG	DEFROST	
1	Outside–Recirc.	V		To 8		To 2			White 1-2
2	From EV Relay	Seal	Seal	Seal	Seal	To 1	Seal	Seal	Turquoise
3	Partial Heat–Defrost	V			V	V	V		Blue 7a
4	Full Heat–Defrost	V				V			Red 7b
5	No Function	Seal	Seal	Seal	Seal	Seal	Seal	Seal	–
6	No Function	Seal	Seal	Seal	Seal	Seal	Seal	Seal	–
7	Defrost A/C–Defrost		V	V	V				Yellow 6
8	From Diverter Valve No. 2	Seal	Seal	To 1	Seal	Seal	Seal	Seal	Purple
9	Source	V	V	V	V	V	V	V	Black

V – VACUUM BLANK – ATMOSPHERE

K3461-2B

FIG. 10 ATC System Vacuum Schematic and Selector Test

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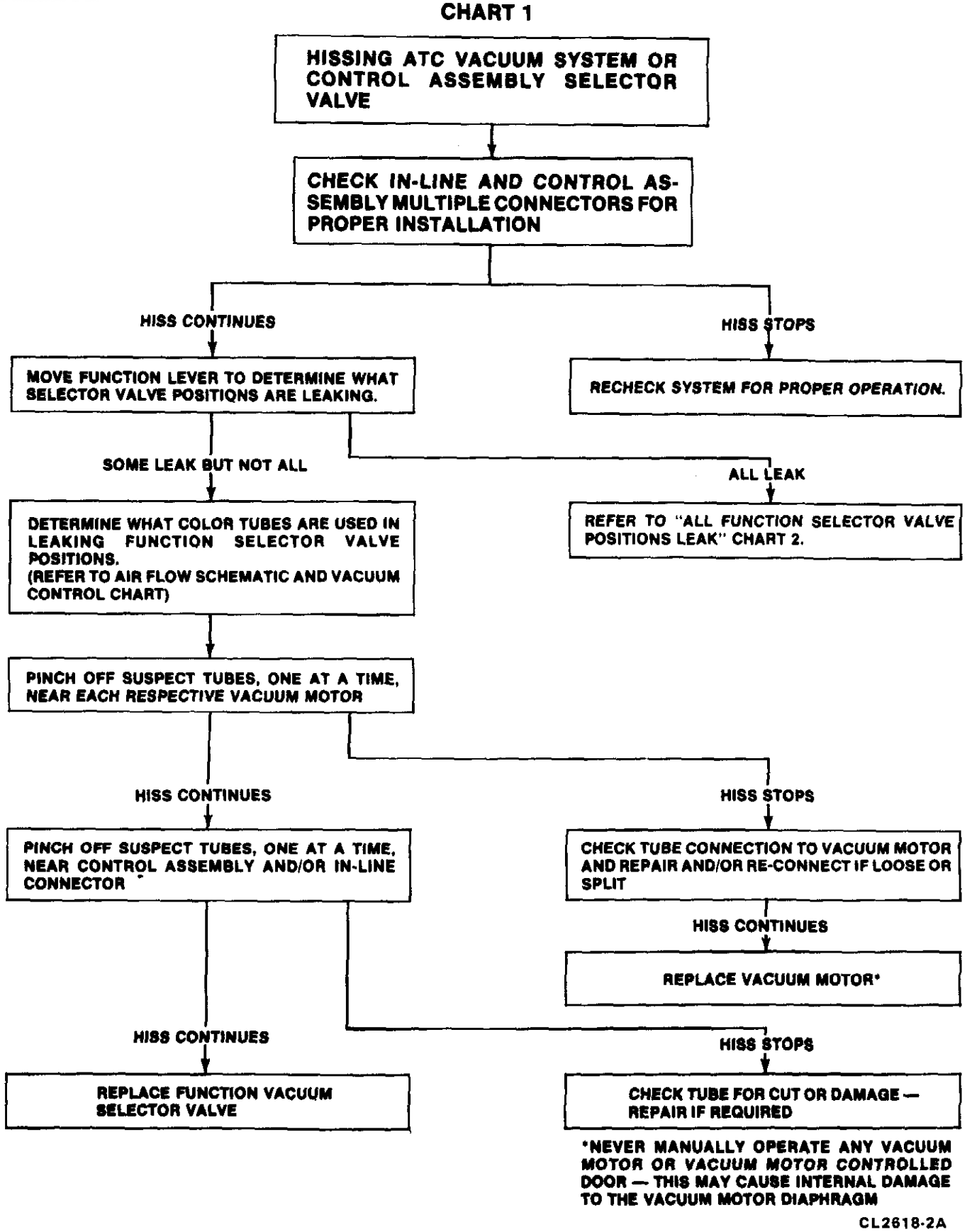
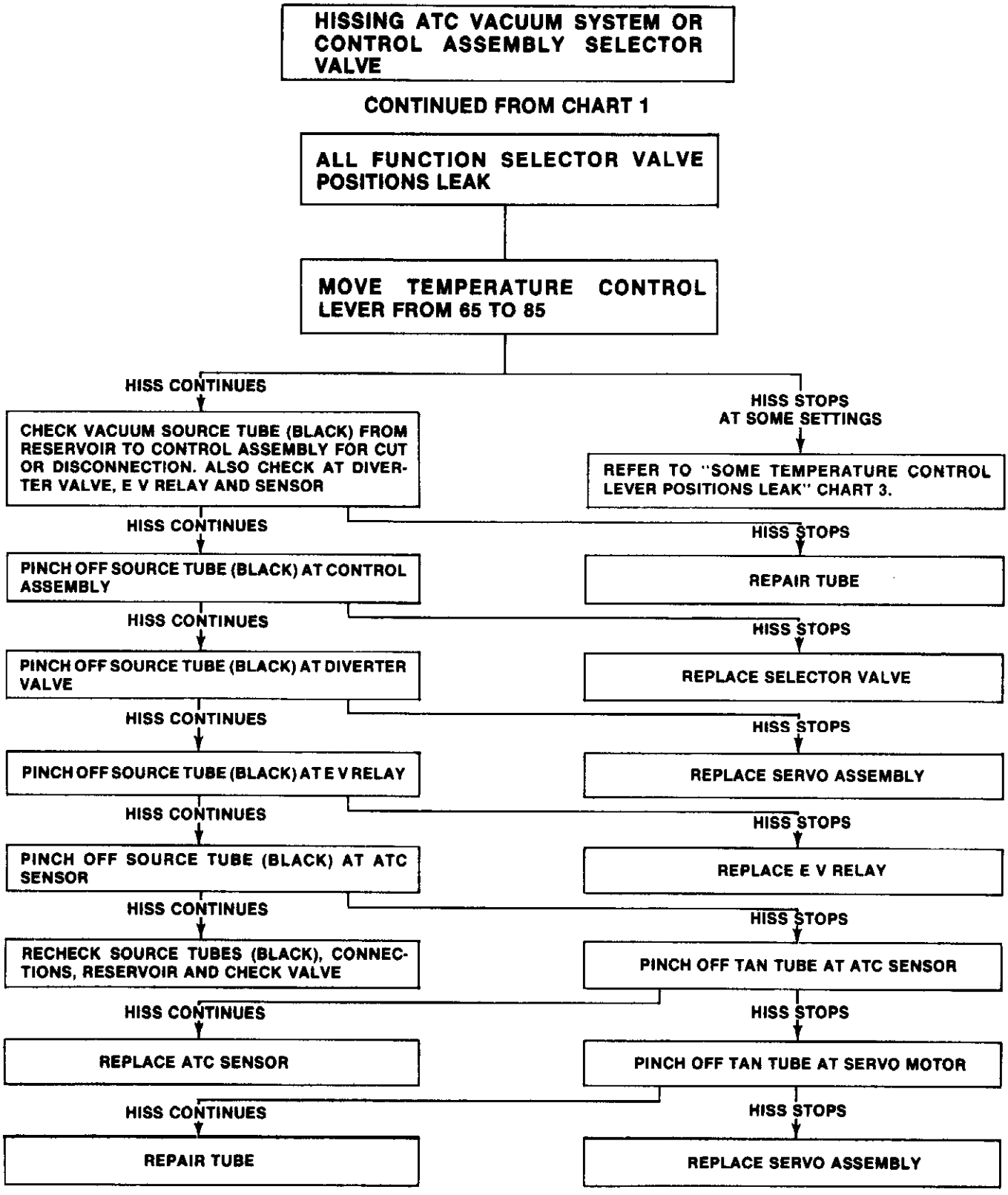


FIG. 11 Vacuum Leak Diagnosis

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CHART 2



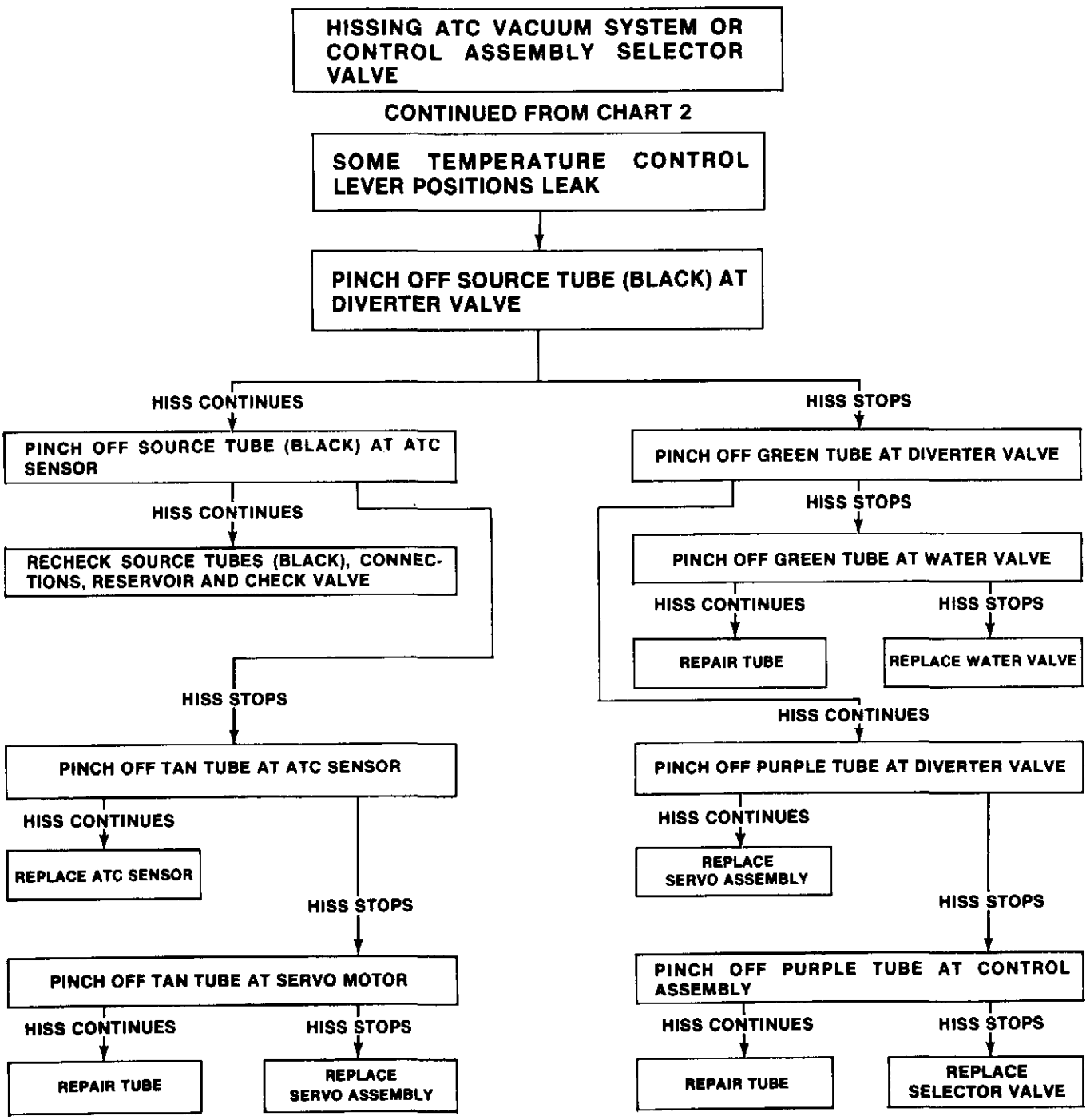
CL2619-2A

FIG. 12 Vacuum Leak Diagnosis

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CHART 3



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FIG. 13 Vacuum Leak Diagnosis

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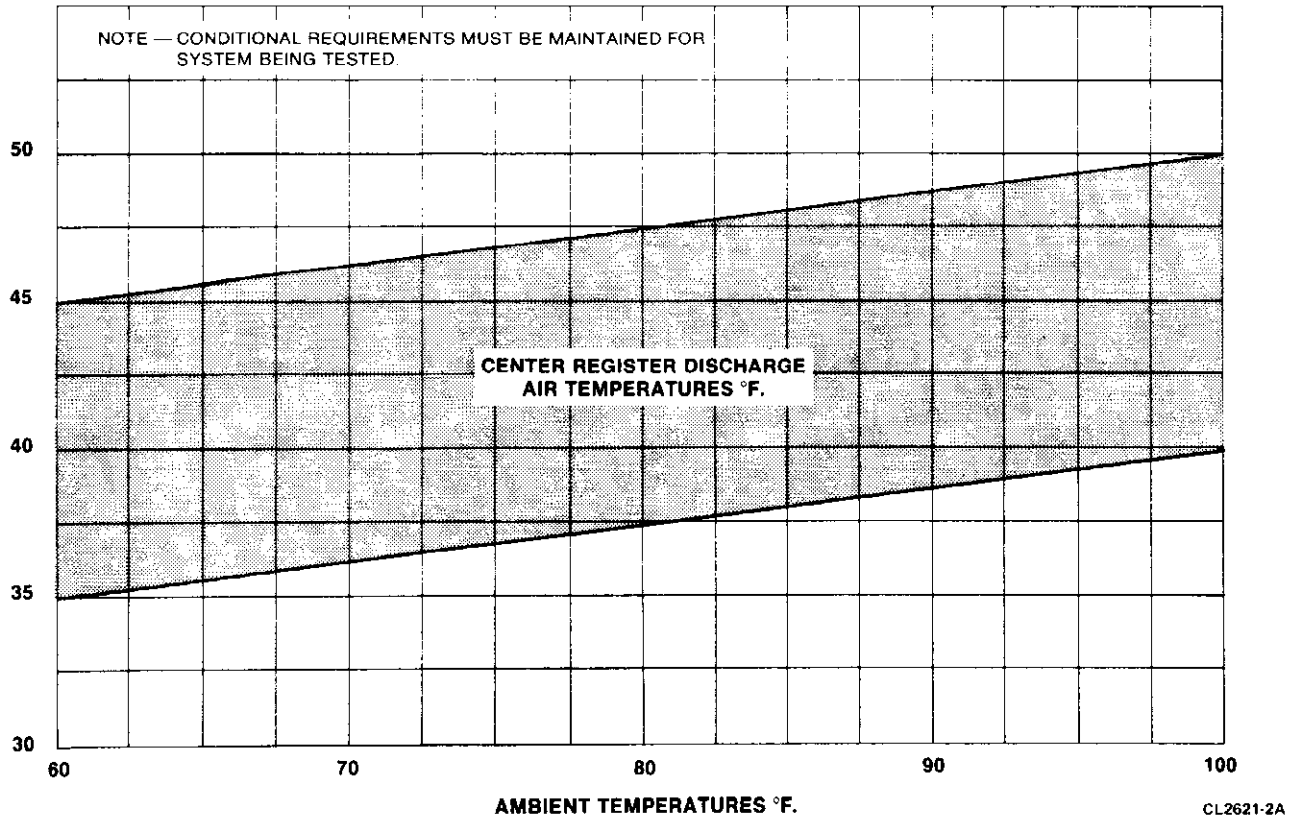


FIG. 14 Normal Center Register Discharge Temperatures

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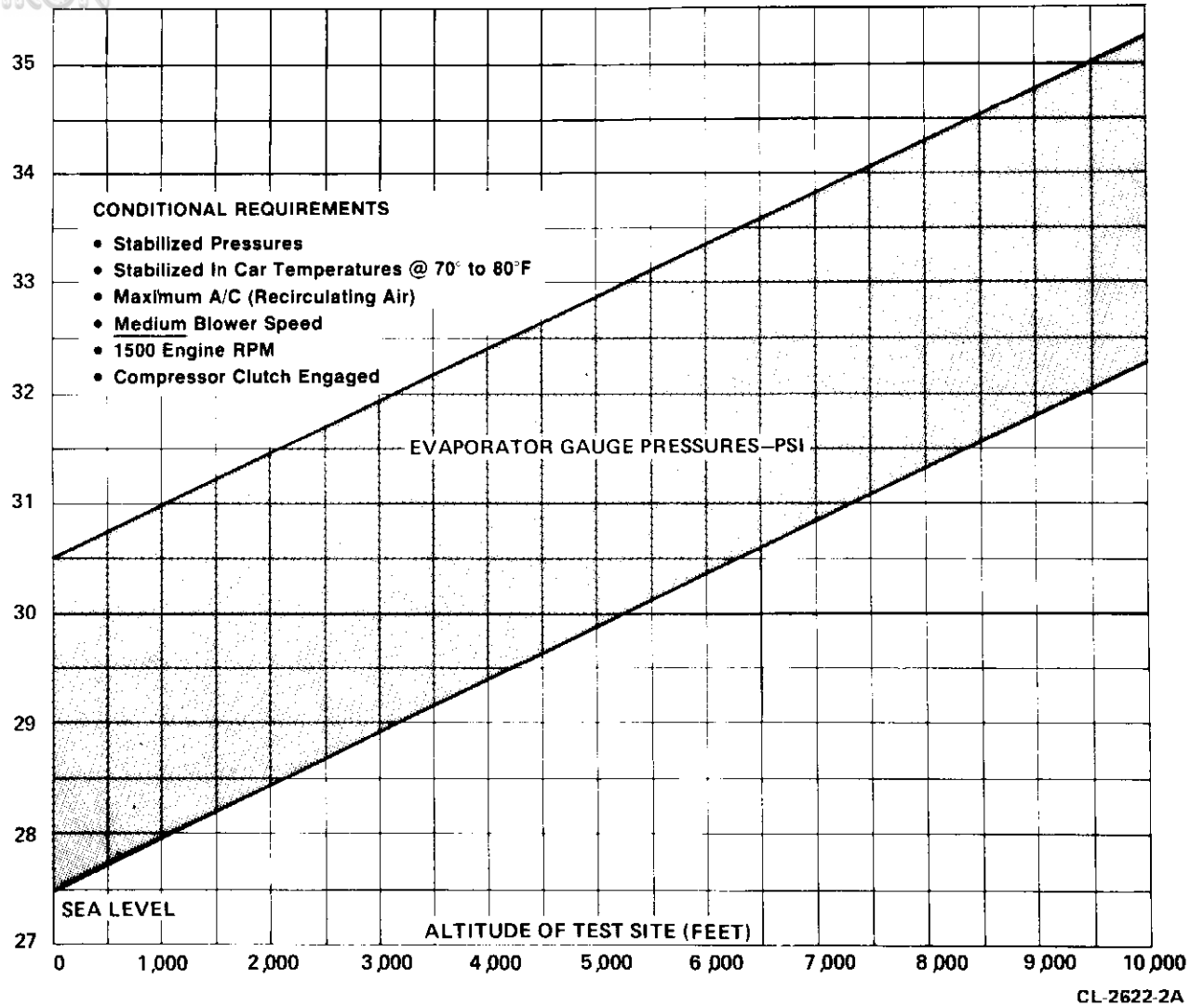


FIG. 15 Normal Evaporator Pressure Gauge Readings Versus Altitude

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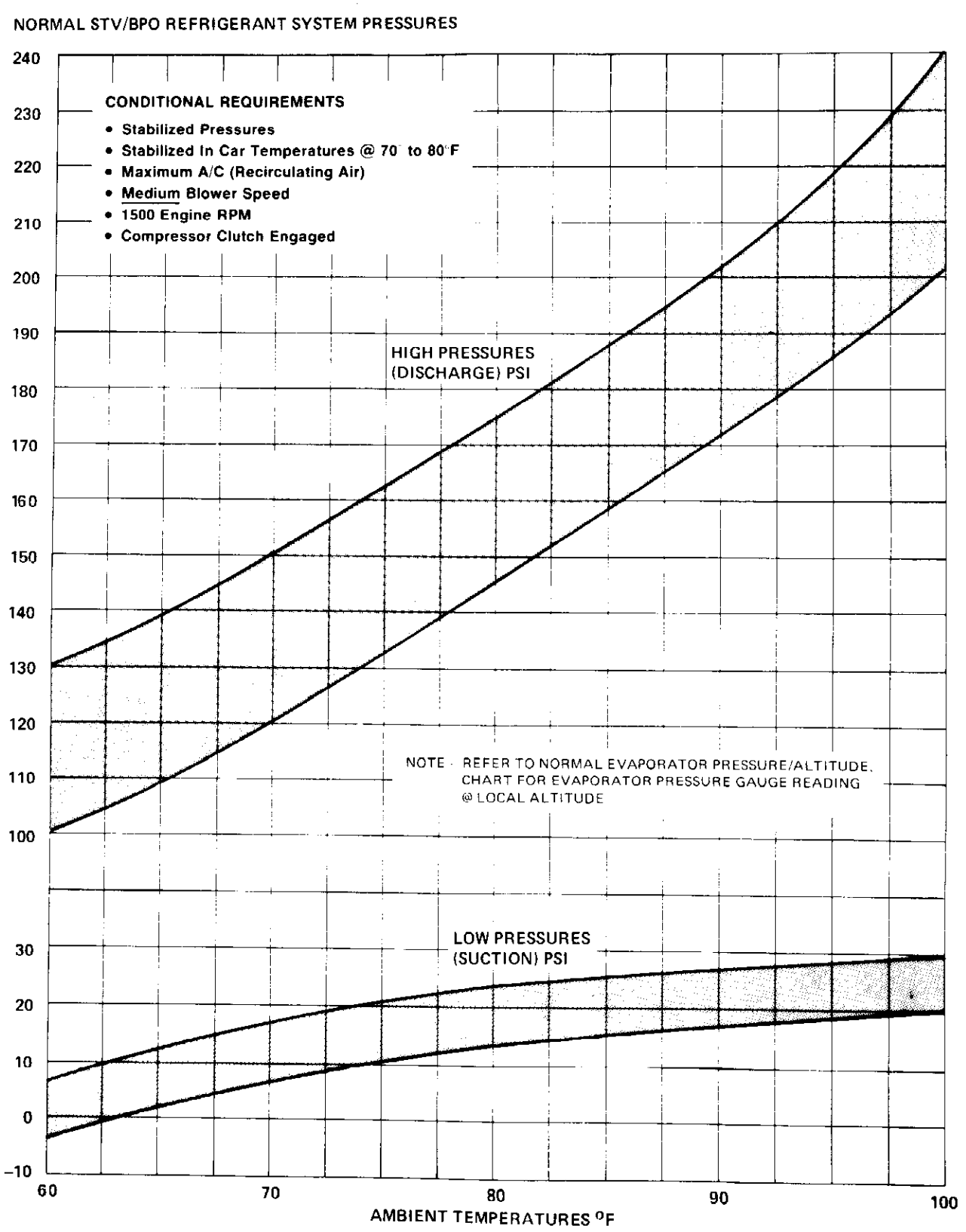


FIG. 16 Normal STV/BPO Refrigerant System Pressures

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REFRIGERANT SYSTEM PRESSURE EVALUATION

For Systems Without Low Pressure Suction Service Access Gauge Port Valve

NOTE: Normal system conditional requirements must be maintained to properly evaluate refrigerant system pressures. Refer to chart applicable to system under test.

HIGH PRESSURE @ LIQUID LINE	HIGH PRESSURE @ COMPRESSOR	EVAPORATOR PRESSURE	POSSIBLE PROBLEM/COMPONENT
HIGH	HIGH	HIGH	ENGINE OVERHEATING / EXPANSION VALVE SENSING BULB – Poor Contact, Inadequate Insulation
HIGH	HIGH	NORMAL TO HIGH	HEATER WATER VALVE – Insufficient Closure / EVAPORATOR – Too Much Air Flow - Reset Blower to Conditional Requirement / EXPANSION VALVE – Sticking Open
HIGH	HIGH	NORMAL	AIR IN REFRIGERANT SYSTEM REFRIGERANT – Overcharge
HIGH	HIGH	LOW	COMPRESSOR-TO-CONDENSER A/C LINE – Restriction; After Service Access Valve
NORMAL TO HIGH	NORMAL TO HIGH	HIGH	CONDENSER – Inadequate Air Flow (Bent Fins, Debris, Loose Radiator Fan Belt, Slipping Fan Clutch)
NORMAL TO HIGH	NORMAL TO HIGH	NORMAL TO HIGH	HUMIDITY WELL ABOVE NORMAL
NORMAL TO HIGH	NORMAL TO HIGH	NORMAL	EXCESSIVE REFRIGERANT OIL
NORMAL	NORMAL	LOW	SUCTION THROTTLING VALVE – Sticking Open – May Cause Iced-Up Evaporator, May Be Related to Moisture.
NORMAL TO ERRATIC	NORMAL TO ERRATIC	NORMAL TO ERRATIC	MOISTURE IN REFRIGERANT SYSTEM – Affects Expansion Valve and STV Functions.
ERRATIC	ERRATIC	ERRATIC	EXPANSION VALVE SENSING BULB – Kinked Capillary Tube
NORMAL TO LOW	NORMAL TO LOW	NORMAL	EVAPORATOR – Restriction, Inadequate Air Flow - Reset Blower to Conditional Requirement and/or Confirm Blower Condition
LOW	HIGH	LOW	RECEIVER/DRIER – Restriction / A/C LIQUID LINE – Restriction; Before Service Access Valve / CONDENSER – Restriction
LOW	LOW	NORMAL TO HIGH	A/C SUCTION LINE – Restriction; SUCTION ACCUMULATOR – Restriction
LOW	LOW	HIGH	COMPRESSOR – Damaged Valves - (Inadequate compression) SUCTION THROTTLING VALVE – Sticking Closed – May Be Related to Moisture.
LOW	LOW	LOW	EVAPORATOR – Iced-up / CONDENSER – Plugged / RECEIVER/DRIER – Plugged / A/C LIQUID LINE – Restriction; After Service Access Valve / EXPANSION VALVE SENSING BULB – Perforated Bulb / EXPANSION VALVE – Sticking Closed / REFRIGERANT LEAK AND/OR UNDERCHARGE COMPRESSOR-TO-CONDENSER A/C LINE – Restriction; Before Service Access Valve

ADDITIONAL POSSIBLE COMPONENTS ASSOCIATED WITH INADEQUATE COMPRESSOR OPERATION

COMPRESSOR CLUTCH – Slipping / COMPRESSOR DRIVE BELT – Loose / CLUTCH COIL – Shorted Coils; Slipping / CLUTCH COIL – Open Circuit / AMBIENT CUT-OFF SWITCH – Sticking Open / BLOWN CLUTCH CIRCUIT FUSE / Improper Clutch Circuit Contact in Control Assembly Switch

ADDITIONAL POSSIBLE COMPONENTS ASSOCIATED WITH A COMPRESSOR FAILURE

PRESSURE DIFFERENTIAL VALVE (In Liquid Bleed Line) – Sticking Closed / AMBIENT CUT-OFF SWITCH – Sticking Closed / SUCTION THROTTLING VALVE – Sticking Open / REFRIGERANT LEAK

CN4312-2A

FIG. 17 Refrigerant System Pressure Evaluation

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ADJUSTMENTS

SENSOR CALIBRATION

1. Remove the instrument panel pad and visually determine which direction to rotate the sensor calibration locking pin. Refer to Fig. 18.
2. While moving the temperature control lever, rotate the calibration locking pin into the calibration notch of the sensor control arm.
3. Check the position of the temperature control lever, it should be at 75. If it is not, loosen the cable housing-to-sensor attaching screw and move the temperature control lever to 75 while the sensor control arm is locked in the calibration position. Retighten the cable housing-to-sensor attaching screw, making sure the temperature control stays at 75 and the sensor arm stays locked.

READJUSTING SENSOR CALIBRATION POINT

If it should become necessary to change the calibration point to suit a customer, first check the sensor calibration as described in the above procedure. If OK, use the following procedure (Refer to Fig. 18):

1. Establish the customers preference and the difference between the present and desired comfort level setting.
2. Determine the direction of change.
3. To decrease or increase, adjust the temperature control lever position with the sensor arm locked in the calibration notch. Loosen the cable housing-to-sensor attaching screw, move the temperature control lever the desired amount and retighten the attaching screw.

NOTE: Move the temperature control lever HIGHER to DECREASE and LOWER to INCREASE the controlled temperature at a given setting.

CAUTION: If a readjustment of the temperature control lever of more than 4° F. is required, and the cable adjustment is correct, per Sensor Calibration Procedure above, replace the sensor assembly.

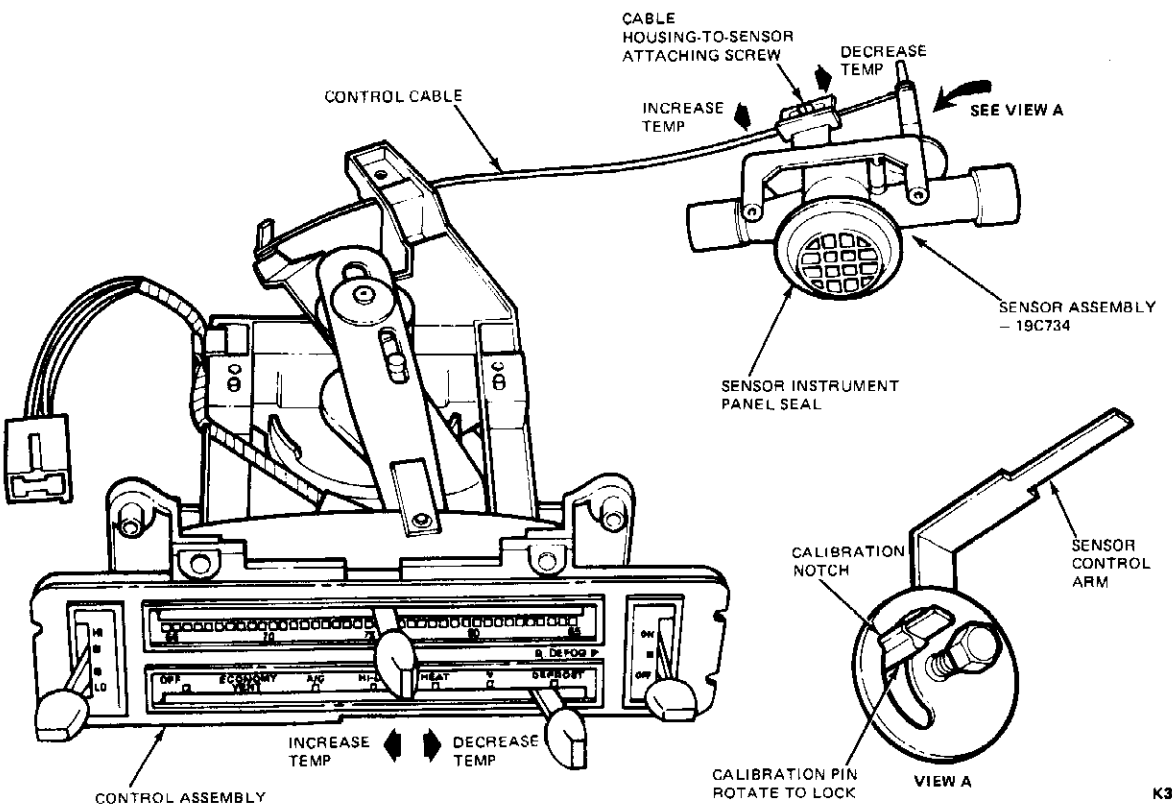


FIG. 18 ATC System Temperature Calibration

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COMPRESSOR DRIVE BELT TENSION

1. Check the belt tension with Tool T63L-8620-A or equivalent. The belt tension should be within specifications.
2. If the belt tension is not within specification, loosen the two idler pulley arm attaching bolts until they are just snug.
3. Insert the end of a ½ inch flex-handle into the square hole in the idler pulley arm and apply pressure to the idler pulley arm with the flex handle until the belt tension is within specifications. Then, tighten the idler pulley arm attaching bolts while holding pressure on the idler pulley arm. Again, check the belt tension and tighten the idler pulley arm attaching bolts to the specified torque.
4. Remove the belt tension gauge and the flex handle.

REMOVAL AND INSTALLATION

CONTROL ASSEMBLY

Removal

1. Disconnect the negative (ground) cable from the battery.
2. Remove the knob from the headlight switch following the procedure in Part 32-02.
3. Remove the headlight switch bezel.
4. Pull the control knobs from the radio shafts.
5. Remove four screws attaching the top edge of the instrument panel finish panel to the instrument panel. Then, tilt the finish panel rearward and remove the finish panel.
6. Remove four (4) screws attaching the control assembly to the instrument panel.
7. Remove the control assembly from behind the instrument panel and disconnect the vacuum harness connector and control cable.
8. Disconnect the wire connectors and remove the control assembly from the vehicle.

Installation

1. Connect the wiring to the control assembly.
2. Connect the control cable and vacuum harness connector to the control assembly.
3. Position the control assembly to the instrument panel and install the four attaching screws.
4. Position the finish panel to the instrument panel and install the four attaching screws.
5. Install the headlight switch bezel and knob and the radio control knobs.
6. Connect the negative (ground) cable to the battery.
7. Test the ATC system for proper operation.

TEMPERATURE CONTROL CABLE

Removal

1. Remove the instrument panel pad assembly. Refer to the procedure.
2. Remove the retaining bolts (2) securing the Instrument Panel-to-Cowl Brace and remove the brace.
3. Remove the seat belt chime mounting screws (2) and position the chime aside.
4. Remove the Cable Housing-to-Sensor attaching screw. Remove the cable assembly from the sensor assembly.
5. Disconnect the multiple vacuum connector from the vacuum selector valve on the control assembly.
6. Remove the push-nut securing the cable wire loop to the temperature lever shaft of the control assembly.
7. Remove the retaining screw securing the cable housing to the control assembly and disconnect the cable housing and cable wire loop from the control assembly.
8. Note the temperature control cable assembly routing and remove the assembly from the vehicle.

NOTE: The cable assembly may be temporarily kept in place as a guide for installing a new assembly.

Installation

1. Route the temperature control cable assembly into position using the previous routing as a guide.
2. Rotate the sensor control to align the calibration notch with the calibration pin and rotate the pin to lock the sensor control arm in the calibration position.
3. Slip the control cable wire loop onto the sensor control arm with the wire loop coil pointing toward the end of the control arm.
4. Position the cable housing end onto the sensor and loosely install the cable housing-to-sensor attaching screw.
5. Slip the control cable wire loop (on the control end of the cable assembly) onto the temperature control lever shaft with the wire loop coil pointing toward the end of the temperature control lever shaft.

   Install the push-nut on the temperature control lever shaft to secure the wire loop on the shaft.
7. Position the control cable housing to the control assembly bracket and install and tighten the retaining screw.
8. Move the temperature control lever to 75 and tighten the cable housing-to-sensor attaching screw to calibrate the temperature lever setting with the locked and calibrated sensor assembly.
9. Install the multiple vacuum connector on the vacuum selector valve of the control assembly.
10. Position the seat belt chime and secure with the mounting screws (2).
11. Position the seat belt chime and secure with the mounting screws (2).
12. Install the instrument panel pad assembly. Refer to the procedure.
13. Test the system for proper operation.

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BLOWER SWITCH

Removal

1. Disconnect the negative (ground) battery cable.
2. Remove the steering column opening cover located below the steering column.
3. Depress the spring and pull the knob from the blower switch shaft.
4. Remove one screw attaching the switch to the control assembly.
5. Remove the switch from the control assembly and disconnect the wire connector.

Installation

1. Connect the wire connector to the blower switch and position the blower switch to the control assembly.
2. Install the blower switch attaching screw.
3. Install the knob on the blower switch.
4. Install the steering column opening cover.
5. Connect the ground cable to the battery.
6. Test the ATC system for proper operation.

REAR DEFOG SWITCH

Removal

1. Depress the spring and pull the control knob from *the rear defog switch shaft.*
2. Perform steps 1 thru 6 of the Control Assembly Removal Procedure.
3. Remove the control assembly from behind the instrument panel.
4. Disconnect the wire harness connector from the rear defog switch.
5. Remove one screw attaching the switch and the jewel lamp assembly bracket to the control assembly and remove the rear defog switch assembly.

Installation

1. Connect the wire harness connector to the rear defog switch and position the rear defog switch and jewel lamp assembly bracket to the control assembly.
2. Install the attaching screw (1) securing the rear defog switch and jewel lamp assembly bracket to the control assembly.
3. Perform steps 3 thru 6 of the control assembly installation procedure.
4. Install the control knob on the rear defog switch shaft and test the rear defog system for proper operation.

FUNCTION CONTROL VACUUM SELECTOR VALVE

Removal

1. Perform steps 1 thru 6 of the Control Assembly Removal Procedure.
2. Disconnect the multiple vacuum connector from the function control vacuum selector valve.
3. Disconnect the electrical wire harness connectors (2) from the function control vacuum selector valve.
4. Remove the retaining screws (2) securing the function control vacuum selector valve to the control *assembly and remove the function control vacuum* selector valve.

Installation

1. Align the function lever slot with the pin on the function control vacuum selector valve, position the alignment pins of the control assembly with the alignment holes on the selector valve body and install the function control vacuum selector valve-to-control assembly retaining screws (2). Tighten *the screws to specification.*
2. Install the electrical wire harness connectors (2).
3. Install the multiple vacuum connector.
4. Perform steps 3 thru 6 of the Control Assembly Installation Procedure.

SERVO ASSEMBLY

Removal

1. *Remove the glove compartment liner.*
2. Remove the tan hose from the end of the servo motor.
3. Remove the self-threading nut retaining the vacuum harness connector to the servo diverter valve and remove the harness connector.
4. Remove the spring nut retaining the servo assembly to the blend door crank area (Fig. 19).
5. Remove two screws attaching the servo assembly to the mounting bracket. Disengage the servo arm and spring from the blend door crank arm and remove the servo assembly.

Installation

1. Position the servo assembly to the mounting bracket engaging the motor end with the bracket and the servo arm with the blend door crank arm. Install the spring nut to retain the servo arm on the crank arm.
2. Install the two servo assembly retaining screws.
3. Connect the tan vacuum hose to the servo motor and the vacuum harness connector to the diverter valve. Install the self-threading nut to retain the vacuum hose connector on the diverter valve.
4. Check the operation of the servo assembly. Then, install the glove compartment liner.

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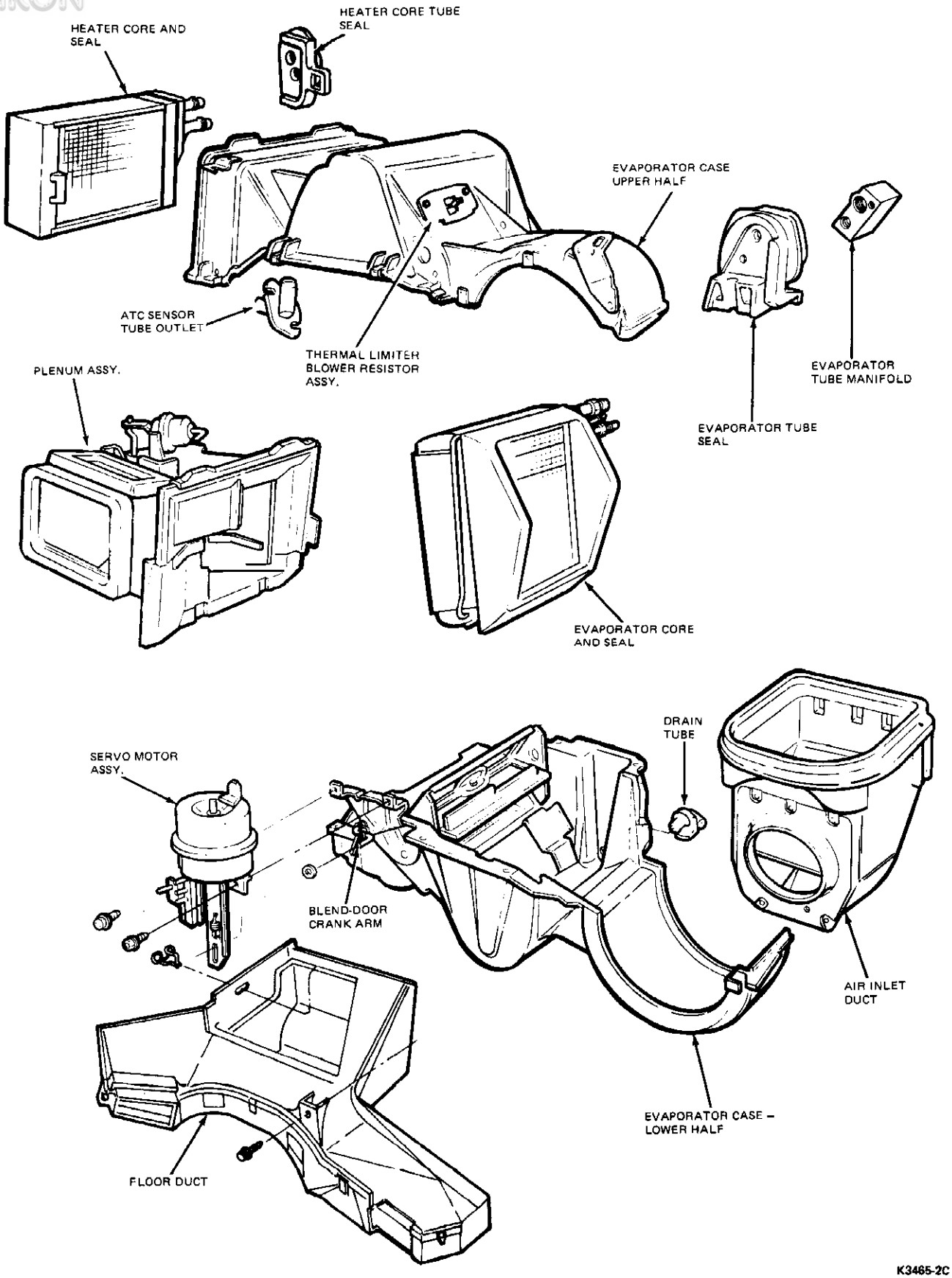


FIG. 19 ATC Evaporator Case Assembly—Disassembled

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ELECTRO VACUUM RELAY (EVR)

The E.V. Relay is located on the left end of the evaporator case below the A/C-defrost door vacuum motor.

Removal

1. Remove one screw attaching the E.V. relay to the mounting bracket.
2. Remove the self-threading nut retaining the vacuum harness connector to the relay and remove the connector from the relay.
3. Disconnect the wire harness connector from the E.V. relay and remove the relay.

Installation

1. Connect the wire harness to the E.V. relay.
2. Connect the vacuum harness connector to the E.V. relay and install the retaining nut.
3. Position the E.V. relay to the mounting bracket and install the retaining screw.

INSTRUMENT PANEL PAD

Removal

1. Using a magnetic or locking tang-type phillips screwdriver, remove the retaining screws (2) securing the leading edge of the upper finish panel to the defroster openings (Figs. 20 and 21).

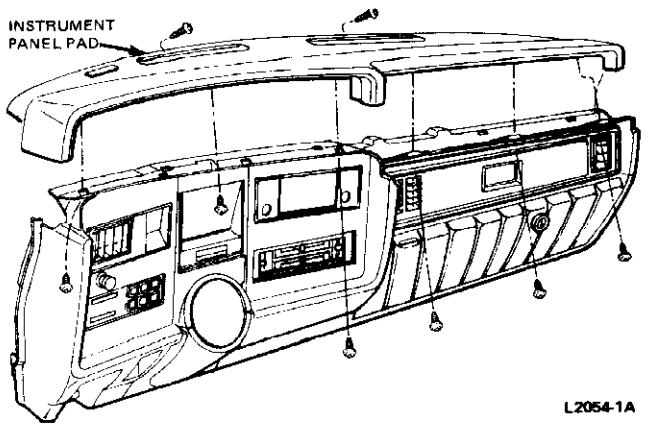


FIG. 20 Instrument Panel Pad

CAUTION: CARE SHOULD BE TAKEN TO PREVENT RETAINING SCREW LOSS IN THE DEFROSTER OUTLET OPENINGS. DAMAGE TO THE PLENUM DOORS MAY OCCUR, RESULTING IN CASE ASSEMBLY REMOVAL AND DISASSEMBLY FOR PROBLEM CORRECTION.

2. Remove the retaining screws (3) securing the instrument panel pad to the instrument panel, above the glove box door.
3. Remove the retaining screws (3) securing the instrument panel pad to the instrument panel, above the top of the instrument cluster.
4. Raise the brow edge the instrument panel pad and carefully remove the instrument panel pad and upper finish panel assembly from the vehicle.

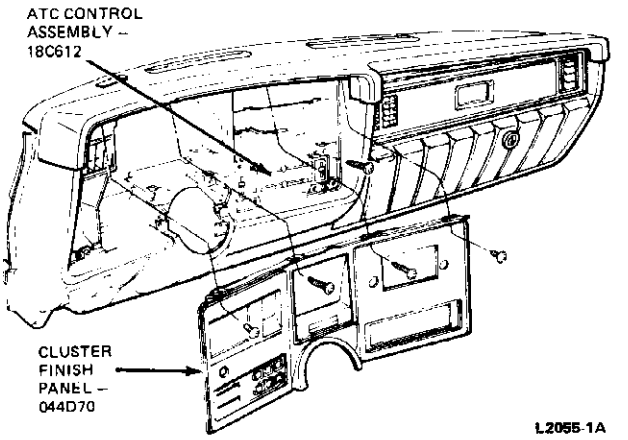


FIG. 21 Instrument Cluster Finish Panel

Installation

1. Carefully position the instrument panel pad and upper finish panel assembly onto the instrument panel (Figs. 20 and 21).
2. Using a magnet or locking tang-type phillips screwdriver, loosely install the upper finish panel retaining screws (2) in the retaining screw holes of the defroster outlet openings.

CAUTION: CARE SHOULD BE TAKEN TO PREVENT RETAINING SCREW LOSS IN THE DEFROSTER OUTLET OPENINGS. DAMAGE TO THE PLENUM DOORS MAY OCCUR, RESULTING IN CASE ASSEMBLY REMOVAL AND DISASSEMBLY FOR PROBLEM CORRECTION.

3. Loosely install the retaining screws (3) securing the instrument panel pad to the instrument panel, above the instrument cluster.
4. Loosely install the retaining screws (3) securing the instrument panel pad to the instrument panel, above the glove box door.
5. Secure the instrument panel pad and upper finish panel in position by tightening the retaining screws (8) described in Steps 2, 3 and 4 to specifications.

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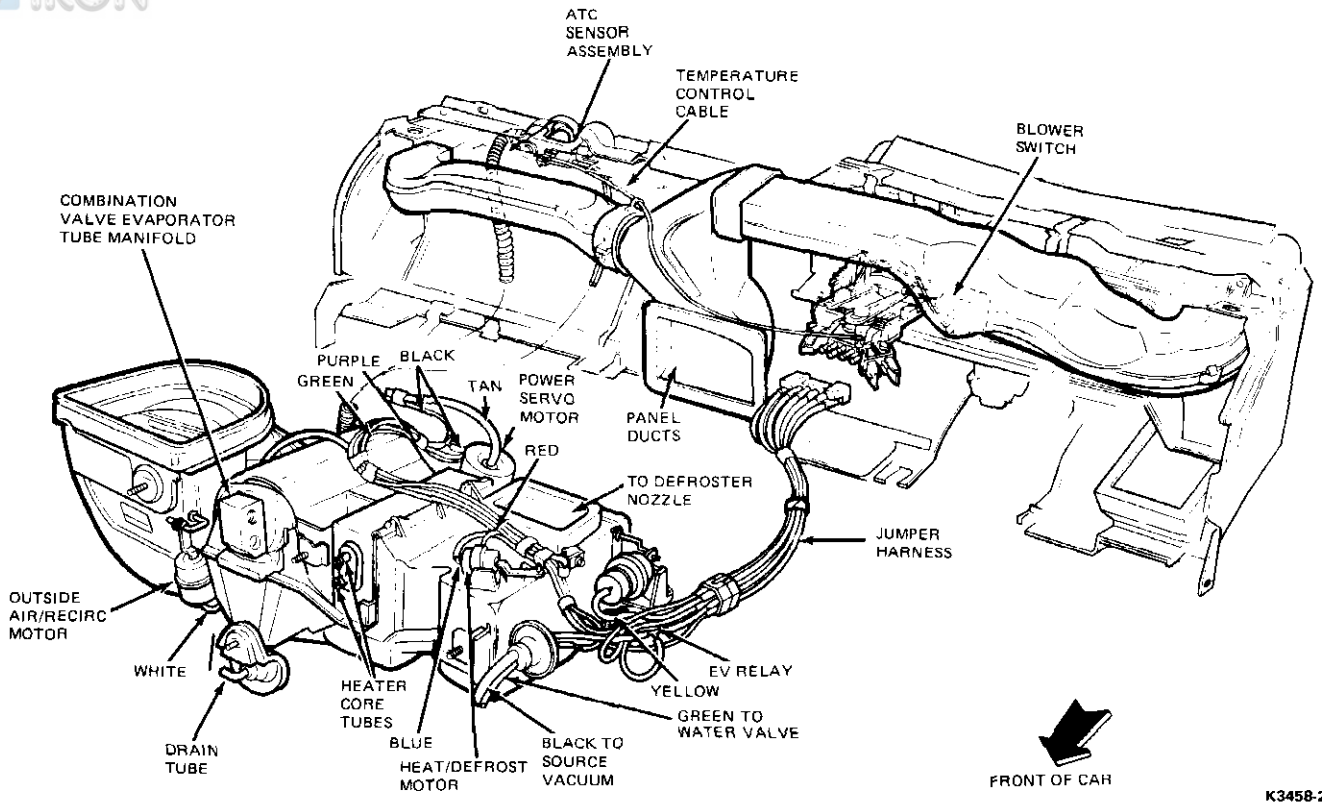


FIG. 22 Rear View of Instrument Panel—ATC

INSTRUMENT PANEL REGISTER DUCTS

Removal

1. Disconnect the ground cable from the battery.
2. Remove the instrument panel lower finish panel.
3. Loosen the front door sill plate attaching screws and remove the right and left cowl side trim panels.
4. Remove two screws and remove the steering column opening cover panel.
5. Remove the steering column-to-brake pedal support clamp and lay the steering column on the front seat.
6. Remove one screw from the top of the steering column opening attaching the instrument panel to the brake pedal support.
7. Remove the hood latch release handle and bracket from the lower edge of the instrument panel.
8. Remove the instrument panel pad following the procedure under Instrument Pad Removal.
9. Remove the radio speaker or instrument panel-to-cowl brace.
10. Remove the glove compartment liner.
11. Remove the screw attaching the brace to the lower edge of the instrument panel below the glove compartment.
12. Disconnect the vacuum hose connector and sensor tube from the sensor assembly.
13. Disconnect the speedometer cable from the speedometer following the procedure in Part 33-01.
14. Remove one screw and washer assembly attaching each lower end of the instrument panel to the side cowl (Fig. 23).
15. Remove one screw and washer assembly attaching each end of the instrument panel to the cowl at the windshield (Fig. 23) and lay the instrument panel back on the front seat. Disconnect any wires, vacuum hoses, and other components as necessary.
16. Remove one screw attaching the register ducts to each instrument panel register opening. Remove one screw attaching the center register duct to the lower edge of the instrument panel (Fig. 24), and remove the register ducts.

Installation

1. Position the register ducts to the instrument panel and install the attaching screws (Fig. 24).
2. Position the instrument panel to the cowl, making sure the center register duct is properly positioned to the plenum assembly.
3. Install one screw and washer assembly to attach each upper end of the instrument panel to the cowl at the windshield opening.
4. Install one screw and washer assembly to attach each lower end of the instrument panel to the side cowl (Fig. 24).
5. Connect the speedometer cable to the speedometer (Part 33-01).
6. Connect wires, vacuum hoses and any other components that were disconnected in step 15 during removal of the instrument panel.

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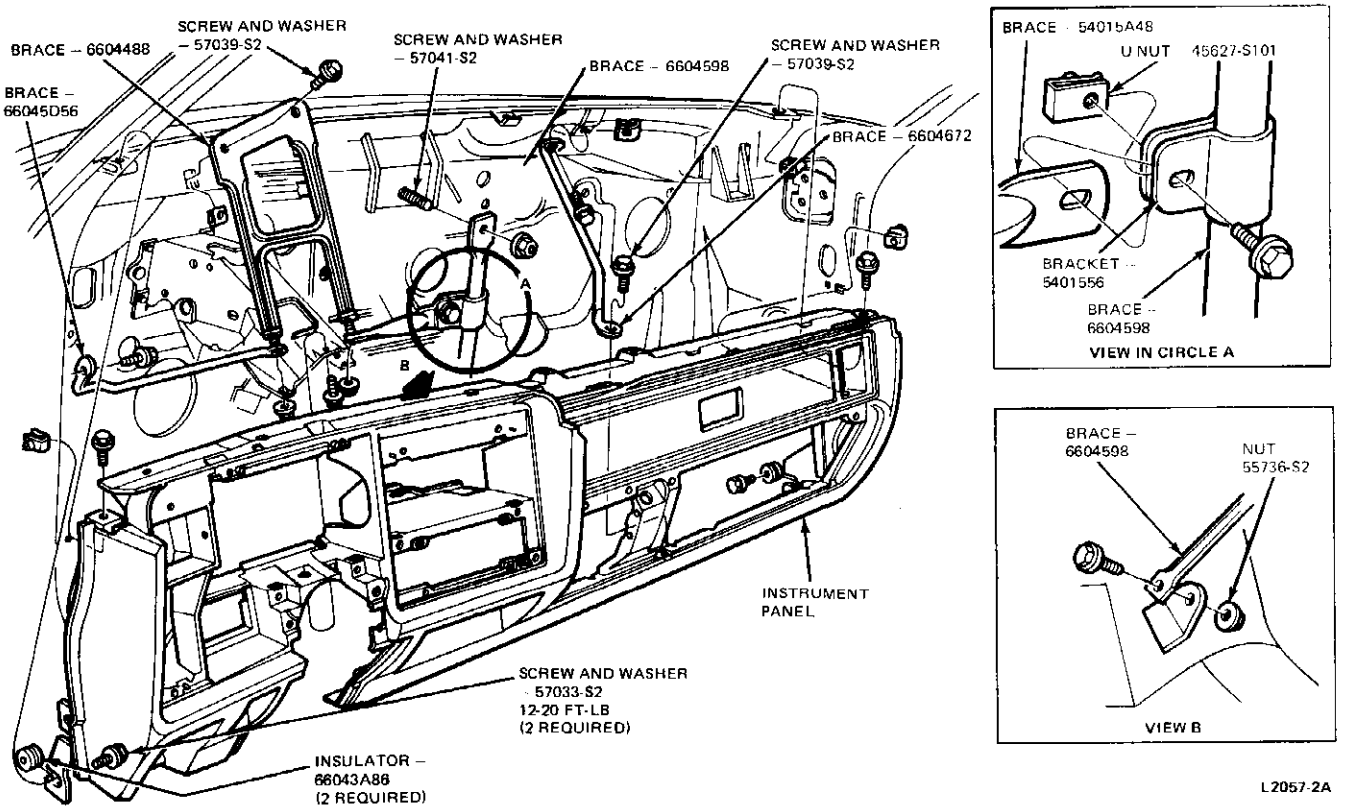


FIG. 23 Instrument Panel Installation

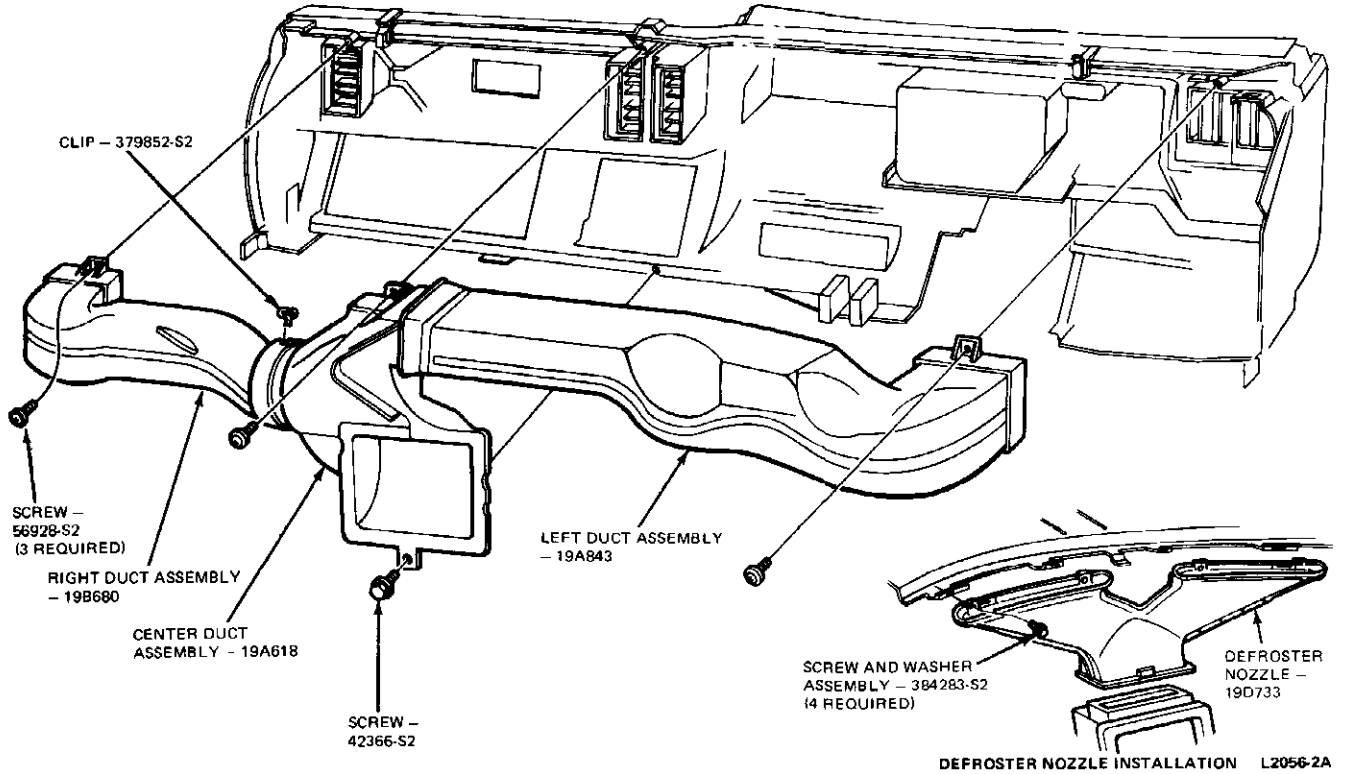


FIG. 24 Duct Assembly Installation

7. Connect the vacuum hose connector and the sensor tube to the sensor assembly.
8. Position the brace to the instrument panel below the glove compartment and install the attaching screw. Then, install the glove compartment liner.
9. Install the radio speaker or the instrument panel-to-cowl brace.
10. Install the instrument panel pad following the procedure under Instrument Panel Pad Installation.

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11. Install the screw to attach the instrument panel at the steering column opening to the brake pedal support.
12. Position the steering column to the brake pedal support and install the clamp.
13. Install the steering column opening cover panel.
14. Install the hood latch release handle and bracket on the lower edge of the instrument panel.
15. Install the right and left cowl side trim panels. Then, tighten the front door sill plate attaching screws.
16. Install the instrument panel lower finish panel.
17. Connect the ground cable to the battery.

SENSOR ASSEMBLY

Removal

1. Remove the instrument panel pad following the procedure.
2. Carefully disconnect the sensor air inlet tube and elbow from the sensor assembly (Fig. 25).
3. Remove the control cable-to-sensor attaching screw and disconnect the control cable from the sensor temperature lever (Fig. 25).
4. Disconnect the vacuum connector from the sensor assembly. Then, remove the two sensor attaching screws and remove the sensor assembly.

Installation

1. Rotate the sensor control arm to position the notch in the arm at the calibration pin (Fig. 25). Then, rotate the plastic calibration locking pin so that it engages the notch in the sensor control arm.
2. Position the sensor assembly to the instrument panel (Fig. 25) and install the two attaching screws.
3. Connect the sensor air inlet tube and elbow to the sensor.
4. Connect the vacuum harness connector to the sensor assembly (Fig. 25).
5. Position the control cable on the sensor control arm with the pigtail away from the sensor as shown in (Fig. 25).
6. Adjust the control cable as outlined under adjustments.
7. Install the instrument panel pad following the procedure.

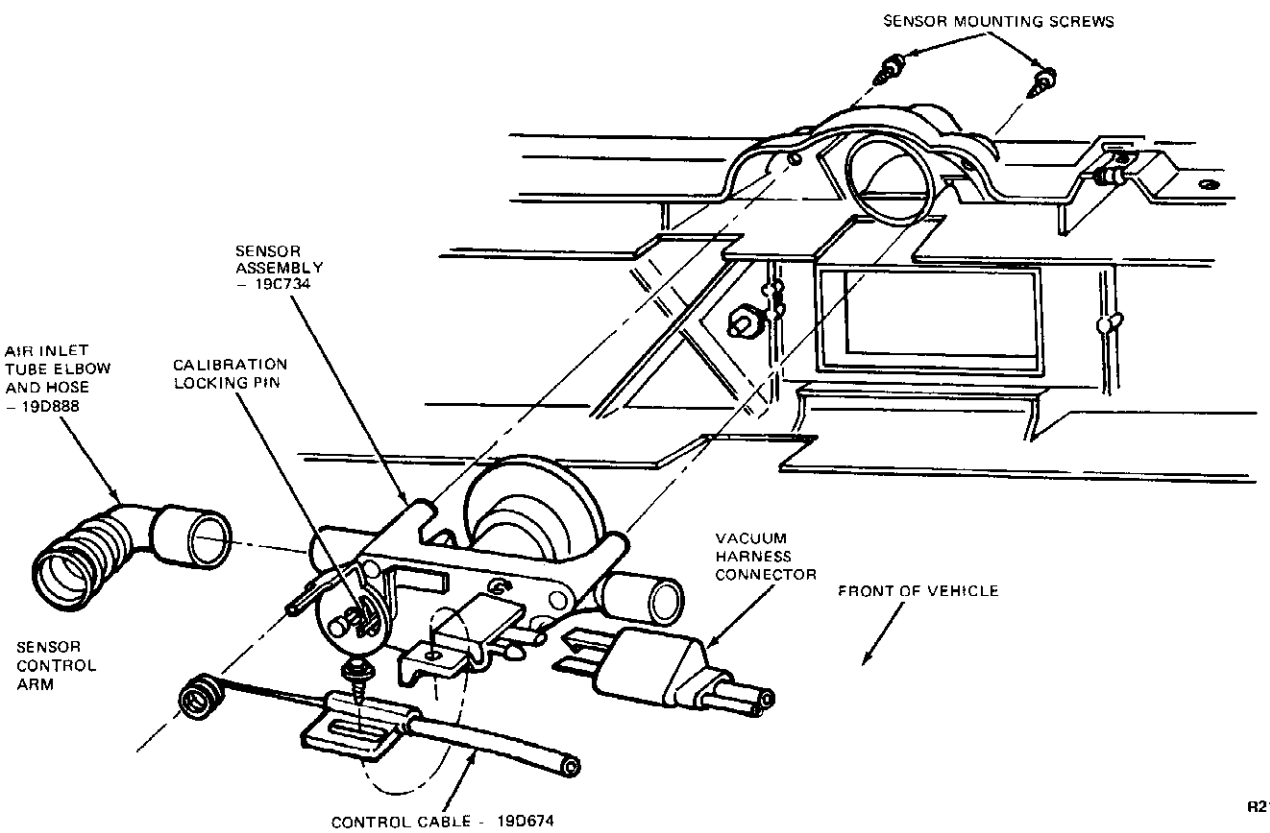


FIG. 25 Sensor Assembly Installation

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OUTSIDE - RECIRCULATING AIR DOOR VACUUM MOTOR

Removal

1. Disconnect the vacuum hose (white) from the vacuum motor.
2. Remove the attaching screws (2) securing the vacuum motor to the mounting bracket.
3. Remove the spring nut securing the vacuum motor arm on the crank arm. (Be certain the stop washer remains on the crank arm) and remove the vacuum motor.

CAUTION: NEVER MANUALLY OPERATE ANY VACUUM MOTOR OR VACUUM MOTOR CONTROLLED DOOR WHEN CONNECTED TO THE VACUUM MOTOR — THIS MAY CAUSE INTERNAL DAMAGE TO THE VACUUM MOTOR DIAPHRAGM.

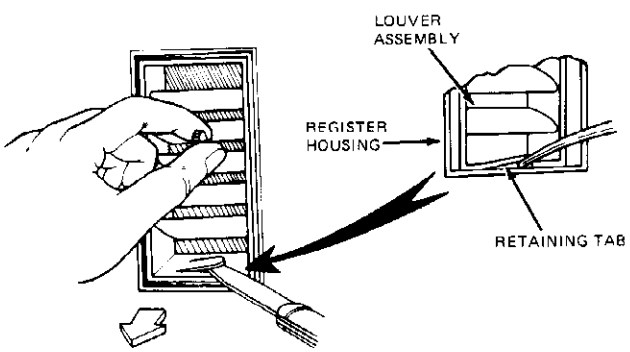
Installation

1. Check to be sure the stop washer is on the crank arm, then slide the vacuum motor arm into position on the crank arm.
2. Install the crank arm spring nut.
3. Position the vacuum to the mouning bracket and install the attaching screws (2) to secure the vacuum motor on the mounting bracket. Tighten the attaching screws to specification.
4. Connect the vacuum hose (white) to the vacuum.
5. Test the system for proper operation.

REGISTER ASSEMBLIES

Removal

1. Insert a thin blade under the retaining tab (Fig. 26) and pry the retaining tab toward the louvers until the retaining tab pivot clears the hole in the register opening.
2. Pull the register assembly end out from the housing only enough to prevent the pivot from going back into the pivot hole.
3. Repeat Step 1 for the other retaining tab and pull the register assembly from the register opening.



INSERT A THIN BLADE THROUGH THE LOUVER AND CAREFULLY PRY THE RETAINING TAB TOWARD THE LOUVERS TO ALLOW THE PIVOT TO CLEAR THE HOLE IN THE REGISTER OPENING. R2195-1A

FIG. 26 Instrument Panel Registers

Installation

The pivots on each end of the register assembly are different diameters and therefore determine the installed position of the register assembly.

1. Position the register assembly into the opening with the largest diameter pivot near the largest pivot hole.
2. Depress the retaining tabs, push the register assembly into the register opening and engage the retaining tab pivots in the pivot holes.

BLOWER MOTOR RESISTOR

Removal

1. Remove the glove compartment.
2. Working through the glove compartment opening, disconnect the wire connector from the resistor (Fig. 33).
3. Remove two screws attaching the resistor to the case and remove the resistor.

Installation

1. Position the resistor in the evaporator case opening.
2. Install the two (2) resistor attaching screws.
3. Connect the wire harness connector to the resistor and check the operation of the blower motor in all speeds.
4. Install the glove compartment.

BLOWER MOTOR AND WHEEL

Removal

1. Disconnect the ground cable from the battery.
2. Remove the lower finish plate from the instrument panel.
3. Remove the glove compartment.
4. Loosen the right door opening sill plate. Then, remove the right side cowl trim panel.
5. Remove the instrument panel to-side cowl lower right attaching bolt.
6. Remove the bolt attaching the brace to the lower edge of the instrument panel below the glove compartment.
7. Disconnect the motor wires.
8. Remove four blower attaching screws and remove the blower motor and wheel.
9. Remove the blower wheel from the blower motor. DO NOT REMOVE THE MOUNTING PLATE FROM THE BLOWER MOTOR. THE PLATE LOCATION IS CRITICAL AND SHOULD NOT BE CHANGED.

Installation

1. Position the blower wheel on the motor shaft with the flat surface on the blower hub aligned with the flat surface of the shaft.
2. Slide the blower wheel onto the motor shaft until it is fully seated. Then, install a new hub clamp spring in the position shown in Fig.
3. Position the blower motor in the blower housing and install the four attaching screws.
4. Connect the blower motor wires.
5. Install the instrument panel to right side cowl attaching bolt.
6. Install the bolt attaching the brace to the lower edge of the instrument panel.
7. Install the right side cowl trim panel and tighten the door opening sill plate attaching screws.

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8. Install the lower finish plate on the instrument panel.
9. Connect the negative (ground) cable to the battery.

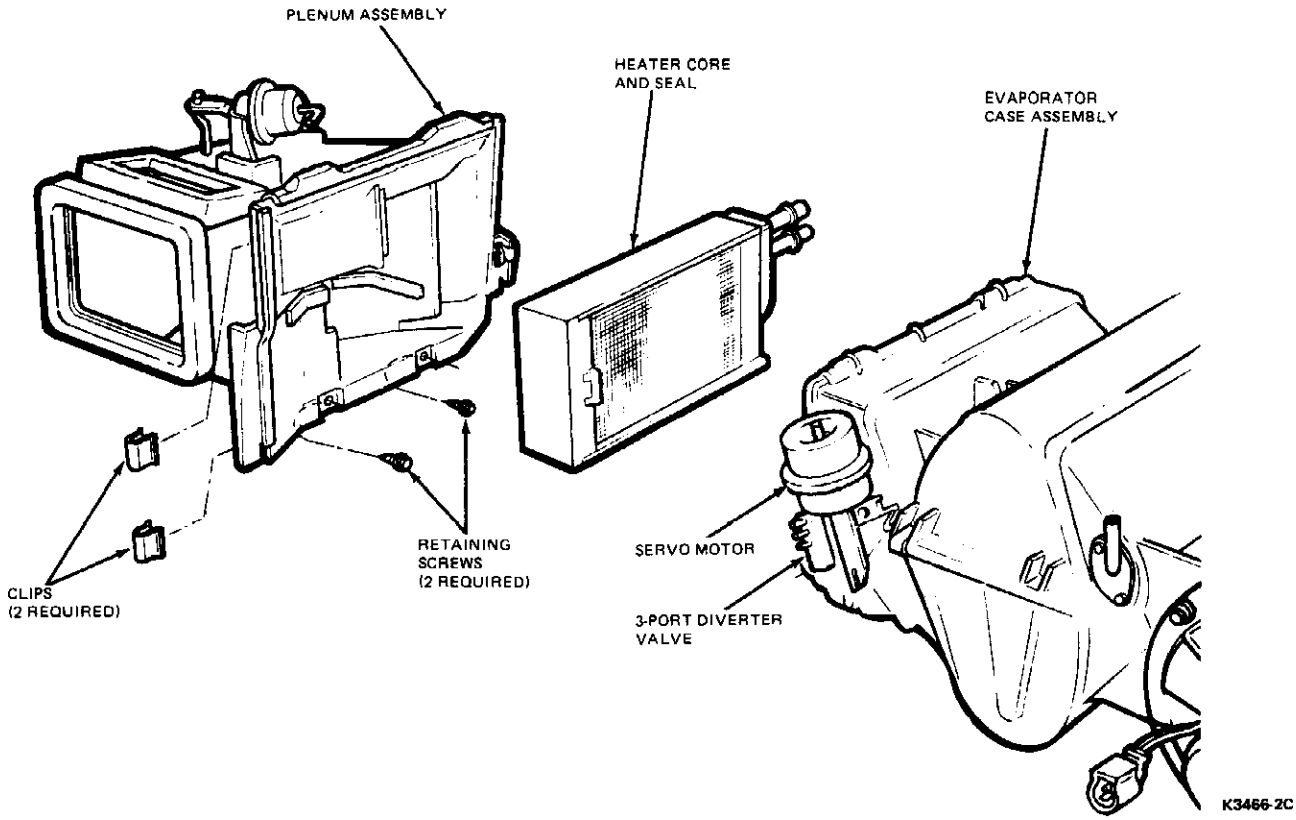


FIG. 27 Heater Core Removal

PLENUM ASSEMBLY

Removal

1. Disconnect the ground cable from the battery.
2. Remove the instrument panel lower finish panel and the support brace bolt below the glove compartment.
3. Remove the instrument panel pad following the procedure under Instrument Panel Pad Removal.
4. Loosen the right door sill plate retaining screws. Then, remove the side cowl trim panel attaching screws and remove the trim panel.
5. Remove the instrument panel lower attaching screw at the right end of the instrument panel.
6. Remove two screws and remove the floor air distribution duct from the plenum assembly.
7. Remove the radio speaker or instrument panel-to-cowl brace.
8. Remove four screws attaching the defroster nozzle to the cowl mounting tabs. Then, lift the defroster nozzle up and out from behind the instrument panel.
9. Remove the cowl-to-floor brace located at the left side of the plenum assembly.
10. Disconnect the vacuum hoses from the A/C-defrost and heat-defrost door vacuum motors.
11. Remove the retaining nut and remove the vacuum harness connector from the E.V. relay.
12. Remove the screw attaching the vacuum harness clamp to the plenum assembly.
13. Remove two heat-defrost door motor retaining nuts and swing the motor rearward.
14. Remove two screws attaching the front corner of the plenum assembly to the plenum-to-cowl mounting bracket.
15. Remove two screws attaching the lower edge of the plenum to the evaporator case.
16. Remove two clips retaining the rear edge of the plenum assembly to the evaporator case.
17. Raise the plenum assembly until the top edge of the plenum is disengaged from the evaporator case. Then, move the plenum to the left as far as possible.
18. Carefully pull rearward on the lower edge of the instrument panel and remove the plenum assembly from behind the instrument panel.

Installation

1. Carefully position the plenum behind the instrument panel and to the evaporator case.
2. Raise the plenum until the top edge is locked over the top edge of the evaporator case. Then, install the two lower attaching screws.
3. Install two clips to retain the rear edge of the plenum to the evaporator case rear edge.
4. Install two screws to attach the front corner of the plenum assembly to the mounting bracket at the cowl.
5. Position the heat-defrost door vacuum motor to the mounting bracket and install the retaining nuts.

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6. Connect the vacuum harness connector to the E.V. relay and install the retaining nut.
7. Connect the yellow vacuum hose to the A/C-defrost door vacuum motor.
8. Connect the blue vacuum hose to the end of the heat-defrost door vacuum motor and the red vacuum hose to the side of the motor.
9. Secure the vacuum harness clamp to the evaporator case with an attaching screw.
10. Install the cowl-to-floor brace at the left of the plenum assembly.
11. Position the defroster duct to the plenum assembly and the cowl mounting tabs. Then, install the four defroster duct attaching screws. USE CARE NOT TO DROP THE SCREWS DOWN INTO THE DEFROSTER OPENING.
12. Install the radio speaker or instrument panel-to-cowl brace.
13. Position the floor air distribution duct to the plenum and evaporator case and install the two attaching screws.
14. Install the instrument panel lower attaching screw at the right side cowl.
15. Install the right cowl side trim panel. Then, tighten the door sill attaching screws.
16. Install the instrument panel pad as outlined under Instrument Panel Pad Installation.
17. Install the instrument panel lower finish panel and the support brace bolt below the glove compartment.
18. Connect the ground cable to the battery and check the operation of the ATC system.

DEFROSTER NOZZLE

Removal

1. Remove the instrument panel pad.
2. Remove the radio speaker or instrument panel-to-cowl brace.
3. Remove four screws attaching the defroster nozzle to the cowl brackets at the defroster openings.
4. Lift the defroster nozzle up and remove the nozzle from behind the instrument panel.

Installation

1. Position the defroster nozzle to the top of the plenum assembly and the cowl mounting brackets.
2. Install the four attaching screws. Take care not to drop the attaching screws down the defroster duct.
3. Install the radio speaker or the instrument panel-to-cowl brace.
4. Install the instrument panel pad.

FLOOR DISTRIBUTION DUCT

Removal

1. Remove the clip securing the floor distribution duct to the left side of the plenum.
2. Remove the retaining screw (1) securing the floor distribution duct to the evaporator case.
3. Remove the floor distribution duct.

Installation

1. Position the floor distribution duct on the plenum opening.
2. Install the retaining screw (1) securing the floor distribution duct to the evaporator case.
3. Install the clip securing the floor distribution duct to the left side of the plenum.

HEATER CORE

Removal

1. Drain the engine coolant from the radiator.
2. Remove the two heater hose clamps at the heater core tubes. Remove the hoses from the tubes and plug the core tubes to prevent coolant leakage during removal of the heater core.
3. Remove the plenum assembly from the vehicle following the procedure under Plenum Assembly Removal.
4. Carefully pull the heater core from the evaporator housing using the tab moulded into the heater core seal. Disengage the heater core tubes from the dash panel seal as the core is removed. As the heater core clears the evaporator case, pull the heater core rearward and downward to clear the instrument panel.

Installation

1. Position the heater core and seal in the evaporator case making sure the dash panel seal is in the correct position.
2. Install the plenum assembly in the vehicle following the procedure under the Plenum Assembly Installation.
3. Connect the heater hoses to the heater core. The hose from the water valve should be connected to the heater core lower tube.
4. Install the heater hose clamps.
5. Fill the cooling system with the recommended mixture of coolant. Then, check the system operation and inspect for leaks.

HEAT-DEFROST OR A/C-DEFROST DOOR

Removal

1. Remove the plenum assembly. Refer to procedure.
2. Remove the push-nut and disconnect the vacuum motor actuating arm from the door crank arm. Tape the end of the crank arm to retain the stop washer and protect it from loss.

   CAUTION: NEVER MANUALLY OPERATE ANY VACUUM MOTOR OR VACUUM MOTOR CONTROLLED DOOR WHEN CONNECTED TO THE VACUUM MOTOR — THIS MAY CAUSE INTERNAL DAMAGE TO THE VACUUM MOTOR DIAPHRAGM.

3. Remove the retaining screw (1) securing the door to the crank arm loop and remove the door from the plenum housing.

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DETROIT IRON

Installation

1. Position the door onto the crank arm loop and loosely install the door retaining screw.
2. Move the door to the maximum no vacuum position and tighten the retaining screw to specification. Move the door back and forth to assure freedom of movement and readjust if necessary.
3. Check to be certain the crank arm stop washer is in position and install the vacuum motor actuating arm onto the door crank arm. Secure with a new push-nut.
4. Install the plenum assembly. Refer to Procedure.
5. Test the system for proper operation.

HEAT-DEFROST DOOR VACUUM MOTOR

Removal

1. Remove Instrument panel pad. Refer to procedure.
2. Remove retaining screws (3) securing the speaker and bracket assembly, disconnect the wire harness connector and remove the speaker and bracket assembly.
3. Remove the defroster nozzle. Refer to procedure.
4. Remove the push-nut securing the vacuum motor arm to the crank arm and disconnect the vacuum motor arm. Be certain the stop washer remains in place.
5. Disconnect the partial (top-blue) and Full (side-red) vacuum hoses from the vacuum motor.
6. Remove the nuts (2) securing the vacuum motor to the bracket and remove the vacuum motor.

CAUTION: NEVER MANUALLY OPERATE ANY VACUUM MOTOR OR VACUUM MOTOR CONTROLLED DOOR WHEN CONNECTED TO THE VACUUM MOTOR — THIS MAY CAUSE INTERNAL DAMAGE TO THE VACUUM MOTOR DIAPHRAGM.

Installation

1. Check to be certain the stop washer is in place on the crank arm and that the door operates without sticking or binding.
2. Position the opening of the vacuum motor actuating arm onto the crank arm and install a new push-nut to secure the vacuum motor actuating arm on the door crank arm.
3. Position the mounting studs at the vacuum motor into the holes of the mounting bracket and install and tighten the mounting nuts to specification.
4. Connect the partial (Top-blue) and full (Side-red) vacuum hoses to the vacuum motor.
5. Install the defroster nozzle. Refer to Procedure.
6. Position the speaker and mounting bracket and secure with the retaining screws (3).
7. Connect the speaker wire harness connector.
8. Install the Instrument Panel Pad. Refer to procedure.
9. Test the system for proper operation.

A/C-DEFROST DOOR VACUUM MOTOR

Removal

1. Remove the retaining bolts (2) securing the Instrument Panel-to-Dash Panel brace and remove the brace.
2. Remove the floor distribution duct assembly. Refer to procedure.
3. Remove the push-nut securing the vacuum motor actuating arm to the door crank arm.
4. Remove the retaining nuts (2) securing the vacuum motor to the mounting bracket and disengage the actuating arm from the door crank arm. Use a piece of masking tape to assure the crank-arm stop washer remains on the crank arm.
5. Lower the vacuum motor and disconnect the vacuum hose (yellow).

CAUTION: NEVER MANUALLY OPERATE ANY VACUUM MOTOR OR VACUUM MOTOR CONTROLLED DOOR WHEN CONNECTED TO THE VACUUM MOTOR — THIS MAY CAUSE INTERNAL DAMAGE TO THE VACUUM MOTOR DIAPHRAGM.

Installation

1. Check to be certain the stop washer is in place on the crank arm and that the door operates without sticking or binding.
2. Position the opening of the vacuum motor actuating arm onto the crank arm and install a new push-nut to secure the vacuum motor actuating arm on the door crank arm.
3. Position the mounting studs of the vacuum motor into the holes of the mounting bracket and install and tighten the mounting nuts to specification.
4. Connect the vacuum hose (yellow) to the vacuum motor.
5. Position the Instrument Panel-to-Dash Panel Brace and install and tighten the retaining bolts.
6. Install the floor distribution duct assembly. Refer to the procedure.
7. Test the system for proper operation.

OUTSIDE - RECIRCULATING AIR DOOR

Removal

1. Remove the blower motor and wheel assembly. Refer to the procedure.
2. Disconnect the vacuum hose (white) from the vacuum motor, connect a hand operated vacuum pump and evacuate the outside-recirc vacuum motor to position the door to recirculate air.
3. Remove the retaining screw securing the door to the crank arm.
4. Partially relieve the vacuum to allow the door to move to the approximate 1/2 position, pull the door off of the crank arm loop and remove out of the blower opening.

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CAUTION: NEVER MANUALLY OPERATE ANY VACUUM MOTOR OR VACUUM MOTOR CONTROLLED DOOR WHEN CONNECTED TO THE VACUUM MOTOR — THIS MAY CAUSE INTERNAL DAMAGE TO THE VACUUM MOTOR DIAPHRAGM.

Alternate Removal

Remove the retaining screws (2) securing the vacuum motor to the mouning bracket. This will relieve the spring pressure on the door and simplify removal.

Installation

1. Insert the door through the blower opening and position the door on the crank arm (with the crank arm loop pocket on bottom).
2. Loosely install the retaining screw.
3. Evacuate the door vacuum motor to the full recirculating air position to properly position the door

   or

   Alternate: If the motor was disconnected, pull down on the crank arm.
4. Tighten the door retaining screw to specification.
5. Operate the door several times to assure free operation without sticking or binding.
6. Relieve the vacuum on the vacuum motor, disconnect the hand operated vacuum pump and reconnect the vacuum hose (white) to the vacuum motor.

   or

   Alternate: Install the vacuum motor retaining screws (2) securing the vacuum motor to the mounting bracket.
7. Install the blower motor and wheel assembly. Refer to the procedure.
8. Test the system for proper operation.

BLOWER WHEEL

Removal

1. Remove the blower motor and wheel assembly from the vehicle. Refer to the procedure.
2. Remove the hub clamp spring from the wheel hub.

   NOTE: Hose clamp pliers for flat spring type clamps will simplify this operation.
3. Slide the blower wheel from the motor shaft.

Installation

1. Align the flat surface on the I.D. of the blower wheel hub with the flat surface of the motor shaft.
2. Slide the blower wheel onto the motor shaft until it is fully seated.
3. Using flat spring type hose clamp pliers, install a **new** hub clamp spring. Position clamp 90° to the flat on the motor shaft. NOTE: DO NOT RE-USE THE OLD HUB CLAMP SPRING.
4. Connect the blower to a battery and check for excessive wheel runout and/or vibration before installing the blower motor and wheel assembly in the vehicle.
5. Install the blower motor and wheel assembly in the vehicle. Refer to procedure.
6. Check the system for proper blower operation.

EVAPORATOR CASE

Removal

1. Disconnect the ground cable from the battery and partially drain the cooling system.
2. Remove the air cleaner assembly from the engine compartment.
3. Discharge the refrigerant from the system.
4. Remove the heater hoses from the heater core and plug the hoses and heater core to prevent coolant leakage.
5. Remove two screws attaching the expansion valve and STV to the evaporator manifold plate. Separate the expansion valve and STV from the evaporator manifold plate and position them to one side.
6. Remove four nuts on the engine side of the dash panel retaining the evaporator to the dash panel.
7. Remove the instrument panel pad as outlined in Group 45.
8. Remove the glove compartment and the instrument panel lower finish panel.
9. Remove four screws attaching the defroster duct to the cowl at the defroster openings and remove the defroster duct.
10. Remove the instrument panel-to-cowl upper right attaching bolt.
11. Remove the cowl-to-floor brace at the center of the instrument panel.
12. Disconnect the vacuum hose from the servo motor and the vacuum harness connector from the diverter valve.
13. Remove the spring nut retaining the servo assembly to the blend door crank arm.
14. Remove two servo retaining screws and remove the servo.
15. Disconnect the wires at the blower motor resistor and at the blower motor.
16. Loosen the right door sill plate attaching screws and remove the right cowl side trim panel.
17. Remove the bolt attaching the lower right side of the instrument panel to the cowl side panel.
18. Disconnect the evaporator case upper support from the bracket at the top of the evaporator.
19. Remove the floor air distribution duct.
20. Remove two screws and two clips retaining the plenum to the evaporator case.
21. Remove the mirror remote control and courtesy light bracket from the underside of the instrument panel.
22. Disengage the vacuum harness locator tabs from the evaporator case and disconnect the vacuum hose from the outside-recirc. door vacuum motor.
23. Remove one screw attaching the blower housing bracket to the cowl bracket.
24. Pull the evaporator case assembly away from the dash panel and separate it from the plenum. Then, raise the plenum end of the evaporator case while pulling the blower end down and out from under the instrument panel.

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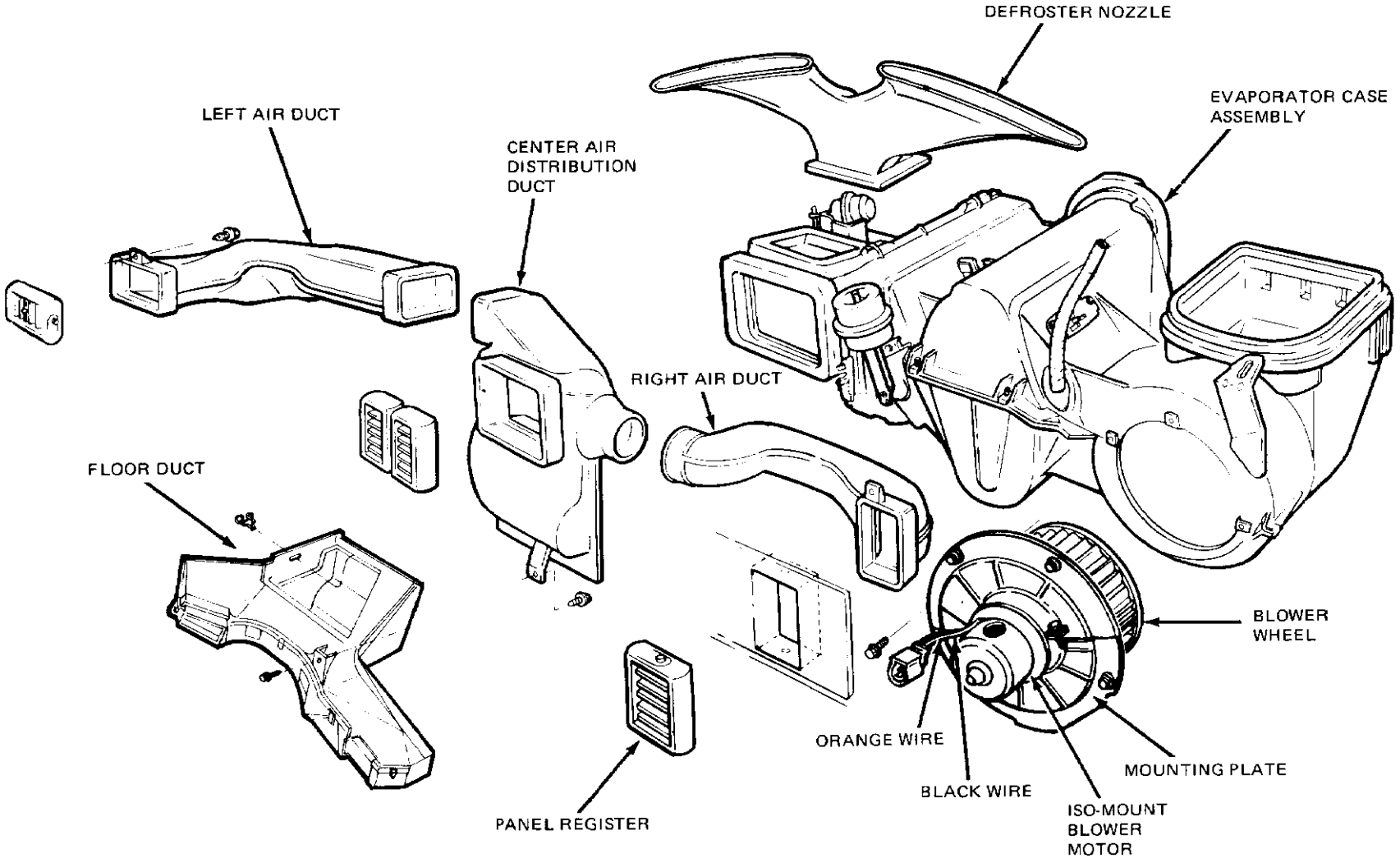


FIG. 28 Air Distribution Ducts—ATC

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Installation

1. Position the evaporator case to the dash panel and the plenum assembly. Install the two screws and two clips to retain the plenum to the evaporator case.
2. Install the four nuts to retain the evaporator case and plenum to the dash panel.
3. Position the expansion valve and STV to the evaporator manifold plate and install the two attaching screws. Use new o-rings dipped in refrigeration oil.
4. Connect the heater hoses to the heater core.
5. Position the servo assembly to the mounting bracket engaging the motor end with the bracket, and the servo arm and spring with the blend door crank arm. Install the spring nut to retain the servo arm on the crank arm.
6. Install the two servo assembly retaining screws.
7. Connect the tan vacuum hose to the vacuum motor and the vacuum harness connector to the diverter valve. Then, install the self threading nut to retain the vacuum hose connector on the diverter valve.
8. Install one screw to attach the upper support strap to the evaporator case.
9. Install the screw to attach the blower housing bracket to the cowl bracket.
10. Route the vacuum harness over the evaporator case and engage the locator tabs. Connect the white hose to the outside-recirc. door vacuum motor.
11. Connect the blower motor wires at the connector.
12. Connect the mirror remote control and the courtesy light to the instrument panel.
13. Install the floor air distribution duct.
14. Position the defroster duct to the plenum and cowl and install the four attaching screws.
15. Install the upper and lower bolts attaching the right end of the instrument panel to the cowl.
16. Install the right cowl side trim panel. Then, tighten the right door sill plate attaching screw.
17. Install the cowl-to-floor brace at the left end of the plenum assembly.
18. Install the glove compartment and the instrument panel lower finish panel.
19. Install the instrument panel pad as outlined in Group 45.
20. Connect the ground cable to the battery negative terminal.
21. Install the carburetor air cleaner.
22. Fill the cooling system with the cooland removed during removal of the evaporator case.
23. Leaktest, evacuate and charge the system.

EVAPORATOR CORE

Removal

1. Remove the evaporator case from the vehicle following the procedure listed under Evaporator Case Removal.
2. Remove the heater core from the evaporator case.
3. Remove four screws and remove the blower motor and wheel from the blower housing.
4. Remove three screws inside the blower housing and one screw outside the blower housing and separate the blower housing from the evaporator case.
5. Remove one clip and eight screws and separate the top of the evaporator case from the bottom.
6. Remove the evaporator core, seal and the evaporator manifold plate from the case lower half.
7. Remove the evaporator manifold plate from the evaporator core.
8. Remove the core seal and the tube seal from the evaporator core.

Installation

1. Position the core tube seal on the tubes. Then, install the evaporator manifold plate on the evaporator core tubes using new O-rings dipped in clean refrigeration oil.
2. Install the core seal on the core and position the core in the evaporator case.
3. Assemble the evaporator case and blower housing, making sure the blend door is positioned properly.
4. Install the blower motor and wheel in the housing.
5. Install the heater core in the evaporator case.
6. Install the evaporator core in the vehicle following the procedure under Evaporator Case Installation.

STV HOUSING MANIFOLD AND EXPANSION VALVE ASSEMBLY

Observe the Safety Precautions outlined in Part 36-31.

Removal

1. Discharge the refrigerant system.
2. Remove the (2) refrigerant lines from the STV Housing Manifold and Tube Assembly using back-up wrenches on the STV Housing Manifold hex fittings to prevent component damage.
3. Remove the (2) hex-head attaching bolts from the side of the Manifold Plate and remove the By-Pass Orifice (BPO) Expansion Valve and STV Housing Manifold and Tube Assembly from the Evaporator Manifold Plate.
4. Remove the (2) socket-head (Allen) screws attaching the STV Housing Manifold and Tube Assembly to the By-Pass Orifice (BPO) Expansion Valve body.
5. Separate the STV Housing Manifold and Tube Assembly from the By-Pass Orifice (BPO) Expansion Valve body.
6. Using Rotunda STV wrench T776-19703-D, Motorcraft Tool YT-366, or curved jaw "Channel Lock" type pliers, grasp the STV body on the surface nearest the tapered end (opposite end from the slots). Unscrew in a counter-clockwise direction and remove the STV.

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7. Remove the STV O-ring seal from the Expansion Valve body.

Installation

1. Lubricate and install (3) new O-rings, two on the STV to seal the STV Housing Manifold and one in the STV opening of the By-Pass Orifice (BPO) Expansion Valve body.
2. Thread the STV into the Expansion Valve body and tighten, hand tight, with either tool or curved jaw "Channel Lock" type pliers.

   CAUTION: TO PREVENT STV DAMAGE, GRASP THE BODY OF THE STV ON THE END NEAREST THE TAPER, OPPOSITE FROM THE SLOTTED END.

3. Lubricate and install the two remaining O-rings in the STV Housing Manifold and Tube Assembly.
4. Place the STV Housing Manifold and Tube Assembly over the STV and position against the Expansion Valve body.
5. Install the (2) socket-head (Allen) screws and torque to 4 - 6 lbs. ft.
6. Lubricate and install (3) new O-rings on the Evaporator Manifold Plate.
7. Position the By-pass Orifice (BPO) Expansion Valve and the STV Housing Manifold and Tube Assembly on the Evaporator Manifold Plate. Install the (2) hex-head attaching bolts and torque to 4 - 8 Ft.-Lb.
8. Lubricate and install (2) new O-rings on the refrigerant line fittings.
9. Install the refrigerant lines, using a back-up wrench on the STV Housing Manifold and Tube Assembly hex fittings to prevent component damage.
10. Evacuate, leak check, and recharge the refrigerant system to specifications.

WATER VALVE

Removal

1. Loosen the radiator cap, open the radiator drain cock and partially drain the coolant from the engine cooling system. Close the radiator drain cock.
2. Disconnect the vacuum hose (green) from the vacuum motor.
3. Loosen the hose clamps (2) securing the heater core inlet hose to the water valve.
4. Disconnect the Engine-to-Water Valve inlet hose.
5. Disconnect the water valve from the heater core inlet hose and remove the water valve.

Installation

1. Position and install the water valve into the heater core inlet hose.

   NOTE: THE ARROW ON THE SIDE OF THE VALVE SHOULD POINT TOWARD THE HEATER CORE INLET TUBE.

2. Connect the Engine-to-Water Valve inlet hose and tighten the water valve hose clamps (2) to specification.
3. Connect the vacuum hose (green) to the water valve vacuum motor.
4. Refill the engine cooling system to proper level with a 50-50 mix of coolant and water.
5. Move the function control lever to HEAT and start the engine to refill the heater core and hoses.
6. Recheck the engine coolant level after operating the engine and, if necessary, add additional 50-50 mixed coolant to proper level.
7. Check the system for proper operation.

AMBIENT CUT-OFF SWITCH

Removal

1. Remove one screw attaching the horn to the hood latch support. Then, disconnect the wire and remove the horn.
2. Reach down between the grille and remove one screw attaching the ambient cut-off switch to the hood latch support brace (Fig. 29).
3. Disconnect the wires at the connector and remove the switch.

Installation

1. Position the ambient cut-off switch to the hood latch support brace and install the attaching screw.
2. Connect the wires at the connector.
3. Install the horn and connect the horn wire.

CONDENSER AND/OR RECEIVER-DRIER

Removal

1. Discharge the refrigerant from the system following recommended procedures and safety precautions.
2. Remove the hood latch attaching bolts and remove the hood latch and hood latch support from the vehicle.
3. Remove one screw attaching the ambient cut-off switch to the hood latch support brace. Disconnect the wires at the connector and remove the switch.
4. Disconnect the refrigerant lines from the condenser.
5. Remove the two nuts retaining the bottom of the condenser to the mounting brackets (Fig. 30).
6. Remove two screws attaching the condenser upper brackets to the radiator support and remove the condenser from the vehicle.
7. Disconnect the two refrigerant lines from the receiver-drier, remove the attaching screws, and remove the receiver-drier.

Installation

1. Transfer the two refrigerant tubes to the new condenser. Use new O-rings dipped in refrigeration oil.
2. Position the receiver-drier to the condenser. Use new O-rings dipped in refrigeration oil on the tube fittings. Install the receiver-drier attaching screws.
3. Transfer the mounting studs and upper mounting brackets to the new condenser.

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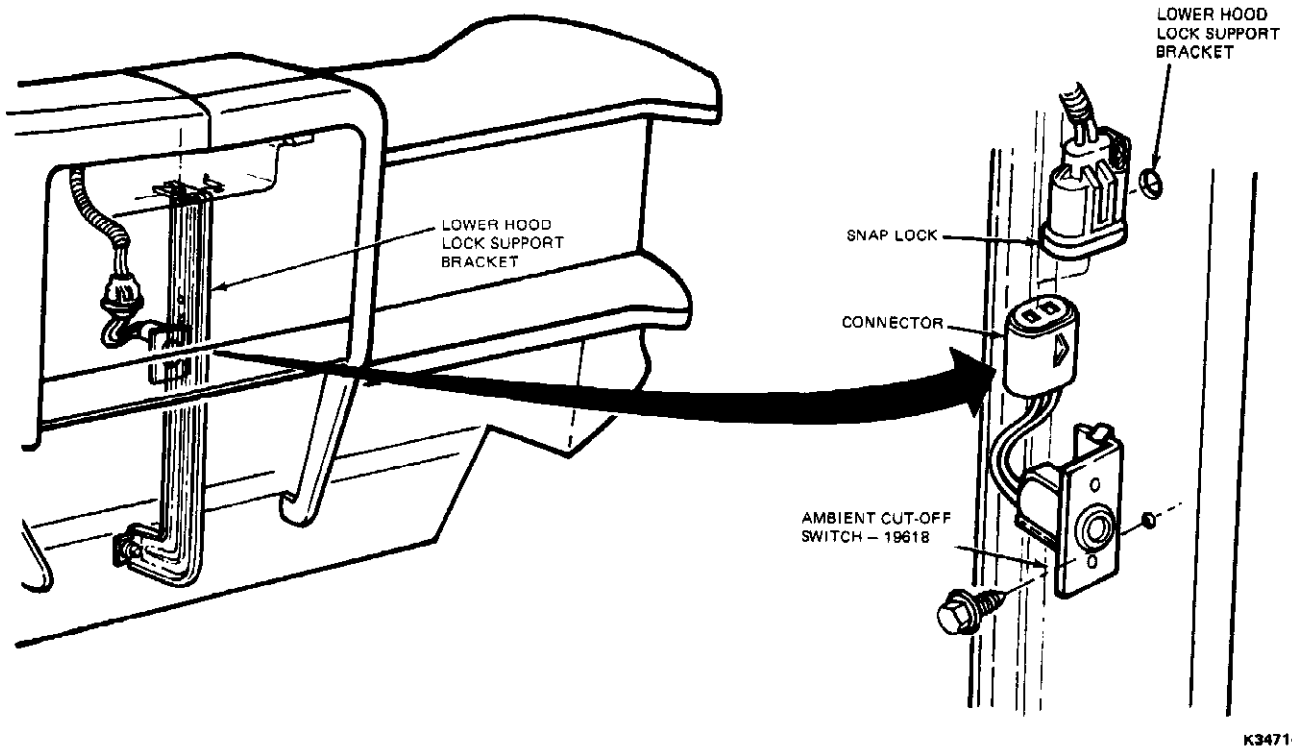


FIG. 29 Ambient Cut-Off Switch Installation

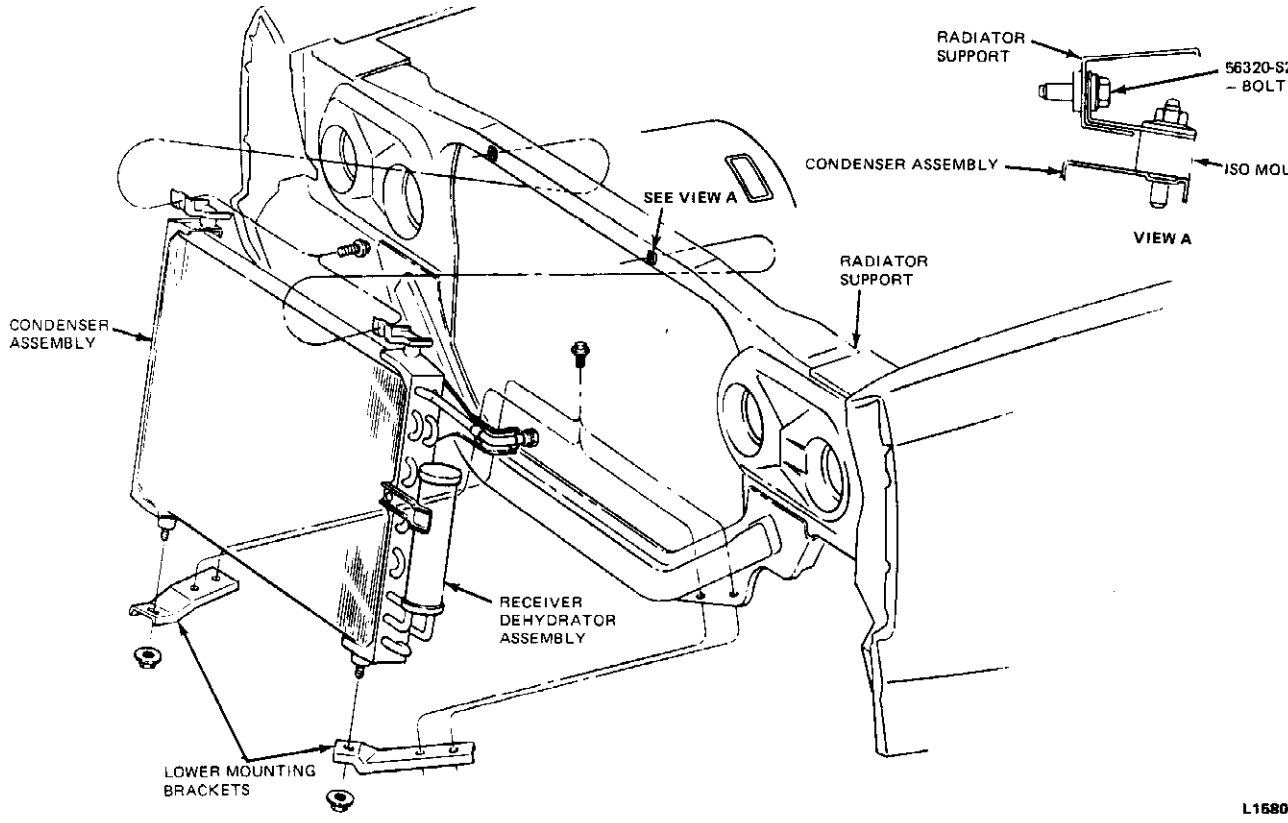


FIG. 30 Condenser Installation

4. Position the condenser in the vehicle and install the bolts attaching the upper mounting brackets to the radiator support.
5. Install the nuts to attach the lower studs to the mounting brackets.
6. Install new O-rings dipped in refrigeration oil on the refrigerant tubes and connect the refrigerant lines to the condenser.
7. Leak test, evacuate and charge the refrigerant system.

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8. Position the ambient cut-off switch to the hood latch support brace and install the attaching screw. Then, connect the wires at the connector.
9. Install the hood latch support and hood latch.

COMPRESSOR

Removal

1. Discharge the refrigerant from the A/C system observing all safety precautions.
2. Loosen the two idler pulley attaching bolts (Fig. 31), and remove the drive belt from the compressor pulley.
3. Remove the bolt attaching the refrigerant line manifold to the end of the compressor (Fig. 31).
4. Separate the refrigerant line manifold from the compressor and cap the manifold to prevent the entry of dirt or other contaminating materials.
5. Disconnect the clutch feed wire.
6. Disconnect the three braces from the rear of the compressor (Fig. 31).
7. Remove three compressor front attaching bolts and remove the compressor from the vehicle.
8. Remove the clutch and pulley from the compressor following the procedure in Part 36-34.

Installation

1. Install the clutch and pulley on the compressor following the procedure in Part 36-34.
2. Position the compressor to the mounting bracket end braces and install the three front attaching bolts.
3. Install three bolts to attach the three rear braces to the compressor.
4. Tighten the compressor attaching bolts to specification
5. Install the refrigerant line manifold on the compressor using new O-rings dipped in refrigerant oil. Tighten the manifold attaching bolt to specification.
6. Install the drive belt on the compressor pulley and adjust the drive belt tension following the procedure under Adjustments.
7. Connect the clutch wire to the clutch.
8. Leak test, evacuate and charge the refrigerant system following established procedures and observing all safety precautions.

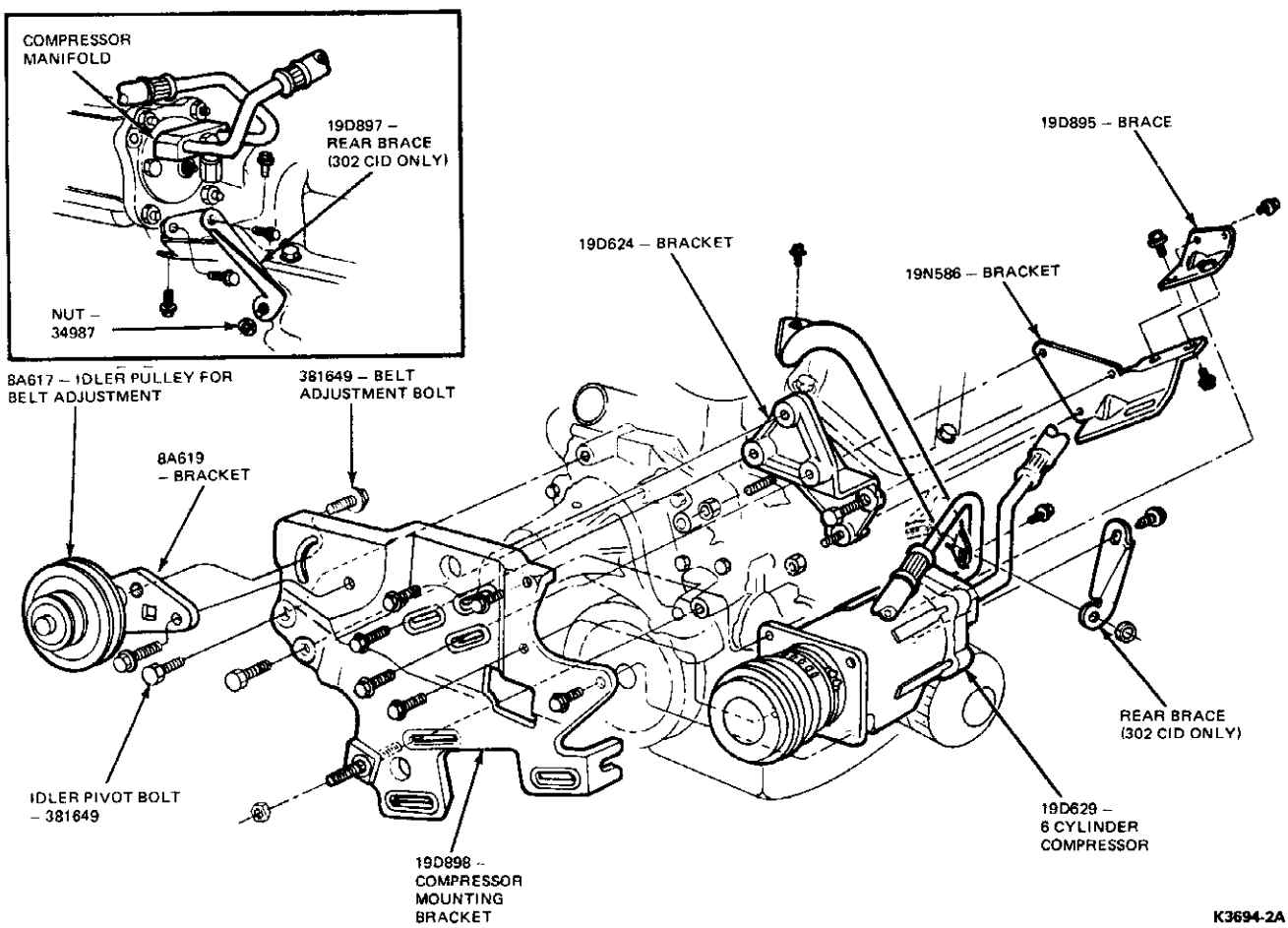


FIG. 31 Compressor Installation

A/C AND HEATER HOSE ROUTING

Refer to Fig. 32 for the installation and routing or replacement of A/C and Heater hoses.

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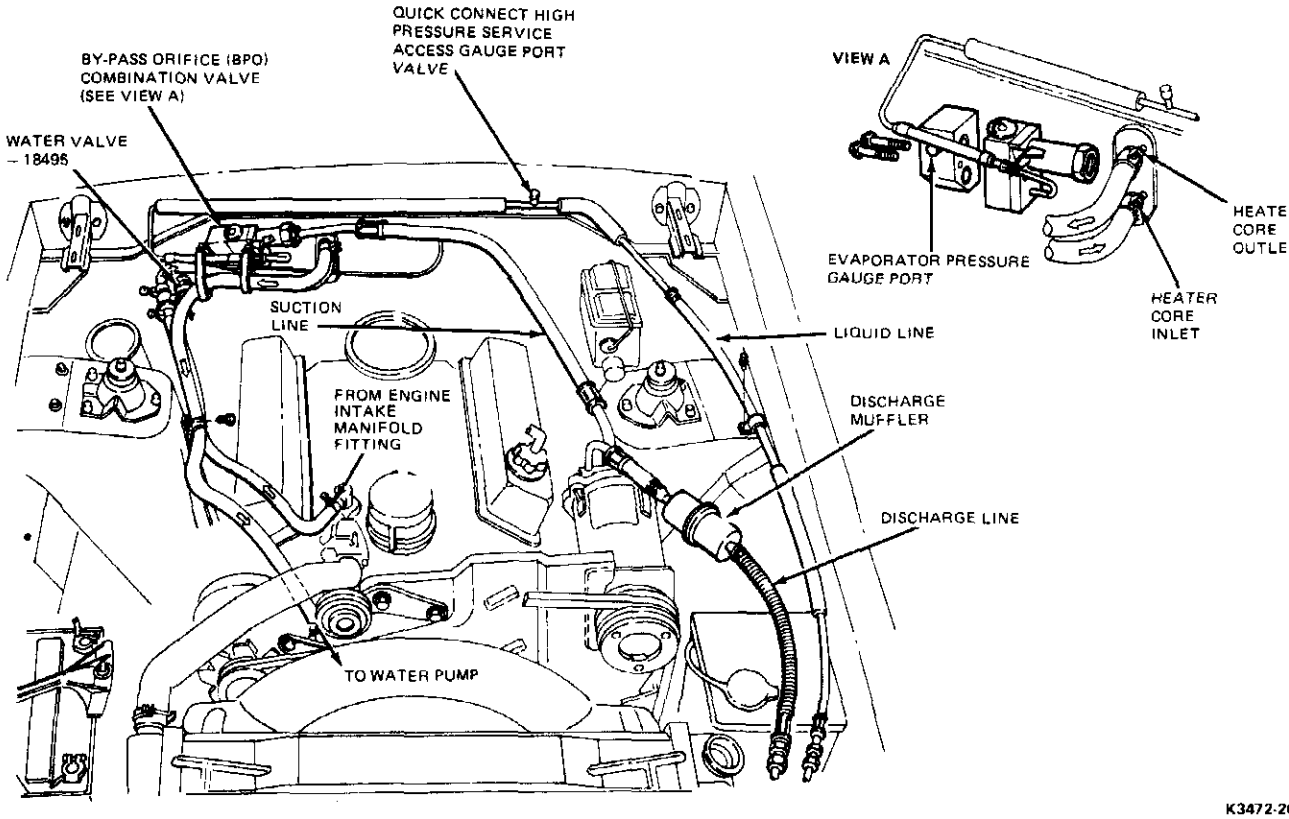


FIG. 32 Engine Compartment Hose Routings

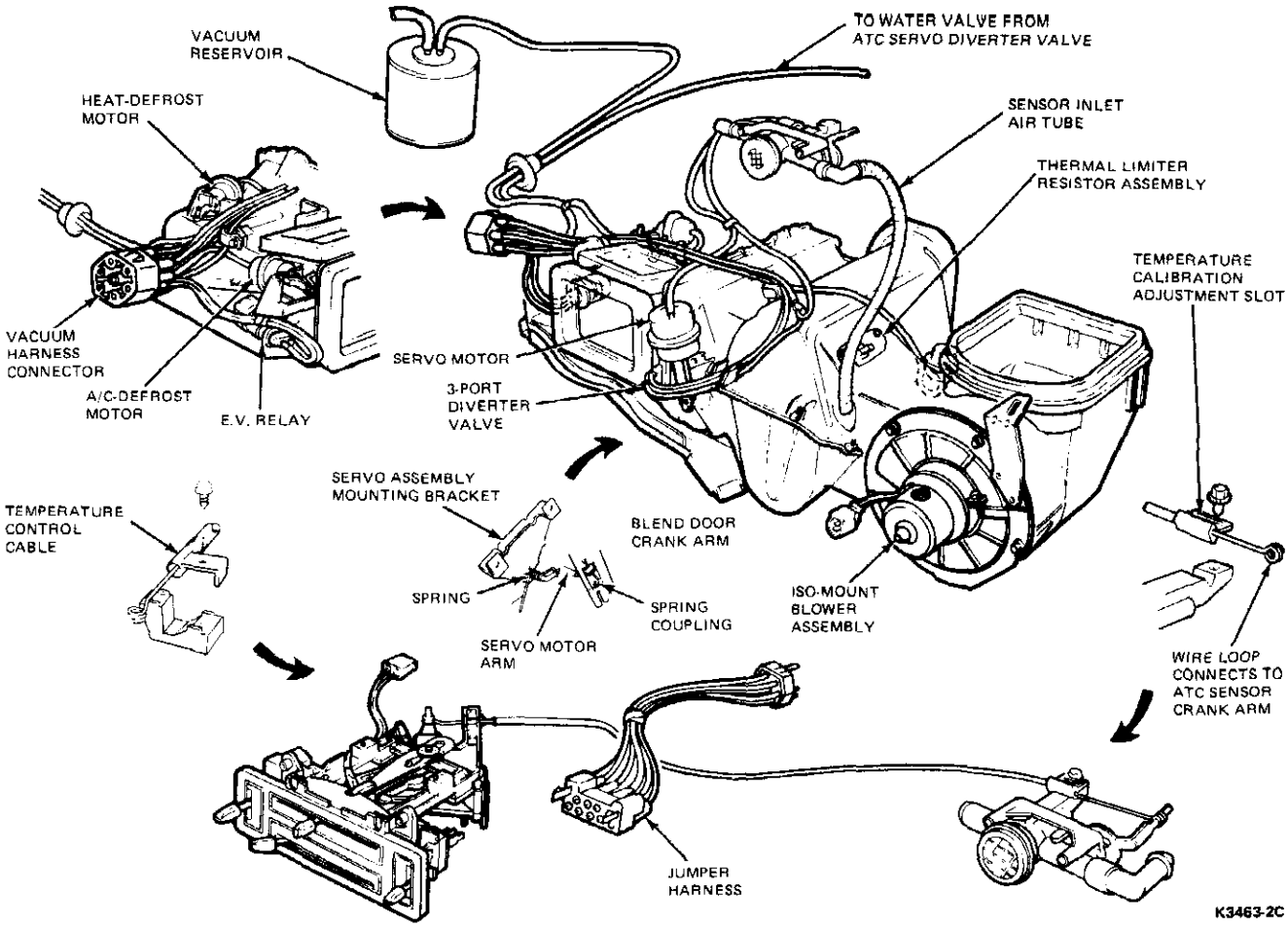


FIG. 33 ATC Vacuum Hose Routings

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DETROIT IRON

SPECIFICATIONS

ELECTRICAL

System Protection		
Clutch Circuit	20 Amp Fuse (Yellow, 7AG-20 or AGW-20) in Panel F-9	
Blower Circuit	35 Amp Fuse (Silver, 8AG-35 or AGX-35) in Panel F-3	
Blower Motor Current Draw		
Switch Setting	Amps	Volts
Low	8	5
Medium Low	11	7
Medium High	20	10
High	25	14
Magnetic Clutch		
Current Draw — Approximately 3.44 Amps @ 12.8 Volts.		
Illumination		
Control Assembly	One ICP-161 Bulb	

REFRIGERANT

Capacity	4 Lbs. Plus 1/4 Lb., Minus 0 64 Oz. Plus 4 Oz., Minus 0 1.814 Kg Plus .113 Kg, Minus 0
Type	Refrigerant 12 (R-12)

COMPRESSOR — 6 CYLINDER

Type — Swash Plate — Three Double Acting Pistons — Axial Type

Cylinder Bore	1-1/2 Inches
Stroke	1-3/16 Inches
Rotation	Clockwise
Refrigeration Oil	
Type	TL 4538 Texaco 525 Viscosity
Capacity	10-1/2 Fluid Ounces (Ford D1VY-19557-A)
Drive Belt Tension	
New	120-160 Lbs.
Used	(after operation for 10 minutes or more) 75-120 Lbs.

TORQUE SPECIFICATIONS

Compressor-To-Mounting Bracket Bolt	20 to 30 lb-ft
Idler Pulley Arm-To-Mounting Bracket Bolt	30 to 45 lb-ft
Heater Hose Clamps	13 to 18 lb.in.
Combination Valve Screws:	
Manifold to Expansion Valve	4 to 8 lb-ft
STV Housing to Expansion Valve	4 to 6 lb-ft

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Automatic Temperature Control

PART 36-74

LTD II, Cougar, Thunderbird and Continental Mark V

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Operation	74-1
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DESCRIPTION

The Automatic Temperature Control System is a split case design, independent blower system and will automatically control the temperature and reduce the relative humidity of air inside the car. Two slide control levers are provided to maintain the desired temperature and system function. The system (Fig. 1) will deliver heated or cooled air to maintain the car interior temperature and will maintain the set comfort level automatically. The blower speed can be adjusted for more or less air as desired, depending on the operating condition.

Automatic control of temperature is maintained in both summer and winter. In hot weather, it will cool the car to the pre-set comfort level and then modulate cooling to whatever is required to maintain the desired temperature.

In mild weather, the interior of the vehicle is heated or cooled automatically as required to maintain comfort. In cold weather, provision is made in the HEAT position of the function lever to delay the operation of the system until engine coolant has warmed enough to minimize the discharge of cold air from the heater outlets. The system will then heat the car to the desired temperature and level out to maintain the pre-set temperature.

During operation, outside air is drawn from the cowl vent just below the windshield at all times, except during maximum cooling in the A/C function lever position when recirculated air is used.

The system utilizes what is called a "reheat" method to provide conditioned air to the car interior. With this method all air flow from the blower passes through the evaporator core, where it is cooled and dehumidified. Temperature is then regulated by reheating a portion of the cooled dry air and blending it with the remaining cool air to the desired temperature. Temperature blending of the evaporator outlet air is automatically varied by the temperature blend door which controls the amount of cooled air that flows through or around the heater core where it is mixed and directed into the distribution plenum. The air is finally diverted to the heater ducts, (Figs. 3 and 4) the defroster nozzles, or the panel (A/C) registers according to the selected function lever position.

CONTROL LEVER OPERATION

The Automatic Temperature Control includes a function control slide lever for OFF, ECONOMY-VENT, A/C, HI-LO, HEAT, DEFOG (▽) and DEFROST that determines the manner in which the system will operate, a calibrated temperature control slide lever for setting the desired comfort temperature and a blower switch to control the volume of air movement. Each position of the function control lever and blower switch is detented for positive engagement. The blower switch provides four manually selected blower speeds. The switch can be operated in any position to select the desired amount of air flow.

AUTOMATIC TEMPERATURE CONTROL OPERATION

The electrical and air flow schematics and vacuum charts shown in Figs. 1, 2, and 3 may be used in conjunction with the following explanation to clarify system operations:

Temperature control of the ATC system is primarily determined by the vacuum modulation produced by the mechanical sensor assembly that controls the servo vacuum motor. Discharge air flow is manually controlled by the control head assembly. Temperature control is

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accomplished by means of a control cable between the control head assembly and sensor assembly. The location of ducts and vacuum motors are shown in Figs. 4 and 5.

The sensor assembly (Figs. 6 and 7) is basically a bimetal operated vacuum modulator. The sensor directly converts air temperature into corresponding values of modulated vacuum. The bimetal senses in-car temperature and is mechanically linked to an internal vacuum modulator to directly control and regulate a vacuum which is proportional to temperature. The bimetal and vacuum modulator are placed within a plastic aspirator. Air is diverted by an air scoop near the high pressure side of the blower (before the evaporator) through a tube to the sensor assembly. The air flows through the aspirator which draws vehicle interior air over the in-car bimetal. This combined air is then exhausted from the sensor underneath the instrument panel where it will not be felt by the passengers or driver.

The modulated vacuum from the sensor is directly connected to the large calibrated vacuum motor portion of the servo assembly. The modulated vacuum controls and positions the blend door attached to the arm of the servo motor assembly. The calibrated vacuum motor moves the blend door to mix various proportions of hot air from the heater core and cold air that has by-passed the heater core. Vehicle air temperatures produce compensating discharge air temperatures, i.e., high vehicle interior temperatures produce high sensor output vacuums which position the blend door to deliver cool discharge air. Low vehicle interior temperatures produce low sensor vacuum levels which cause warm discharge air.

Blower motor speed is manually controlled to satisfy the operator. There are four switch positions to provide four blower speeds. Low speed is automatic in all positions. A vacuum diverter valve, a part of the power servo assembly and also attached to the arm of the servo motor, turns off the water valve under maximum cooling conditions, and controls the outside air/recirc door for maximum cooling conditions when the function control lever is in the A/C position.

COMPONENTS

Servo Assembly (Fig. 8)

The servo assembly is a large calibrated vacuum motor and vacuum diverter valve. The calibrated vacuum motor provides specific temperature blend door positions for given vacuum levels. The attached vacuum diverter valve controls water valve operation and recirc or outside air operation.

Electro-Vacuum Relay (E.V.R.)

E.V.R. is a combination normally closed vacuum solenoid valve and a single pole single throw normally closed electrical relay, both are actuated by one electrical coil. The E.V.R. receives an automatic signal from the engine water temperature switch and performs two functions in the system. It is used during cold engine operation, in the HEAT function lever position, to lock-out blower operation simultaneously, and to switch the system to recirculating air until the engine coolant warms up to about 115°F.

Control Assembly (Figs. 9 and 10)

The control head consists of three main parts: 1) the function selector—a nine-port vacuum selector valve combined with two cam operated electrical switches; 2) blower switch—an electrical switch that provides four speeds of blower operation; and 3) the temperature control lever which connects through a Bowden control cable to the sensor assembly.

1. The 9-port vacuum selector valve is very similar to the manual A/C 9-port vacuum selector valve. It directs source vacuum to various vacuum motors and connects the vacuum from the electro-vacuum relay to the outside air-recirc door in HEAT (See Vacuum Schematic - Fig. 2). A single pole and double pole cam operated electrical switch is also controlled by the vacuum selector. The combination of these cam operated electrical switches controls the electrical supply to the A/C clutch and blower switch.
2. The four-position blower switch is identical to the manual A/C-heater system blower switch.
3. The temperature control lever is connected to the sensor assembly by a Bowden cable control wire. Movement of the control lever from 65°F to 85°F causes a corresponding movement on the pre-load (bias) portion of the sensor assembly, and determines the temperature that the system will maintain.

Resistor Assembly

The blower motor resistor assembly is located on the evaporator assembly and is identical to the manual A/C heater resistor assembly. There are three resistance elements mounted on the resistor board to provide four blower speeds. Depending on the blower switch position, series resistance is added or shorted out of the blower motor circuit to decrease or increase speed.

Water Temperature Switch

In the HEAT position only, a ground circuit from the E.V. relay to the engine water temperature switch prevents blower operation until the engine coolant temperature reaches about 115°F. This minimizes any cold air discharge from the heater ducts. See Figs. 1 and 2. The E.V. relay also provides vacuum to position the outside air/recirc door in recirc during cold engine operation.

SYSTEM AIR FLOW

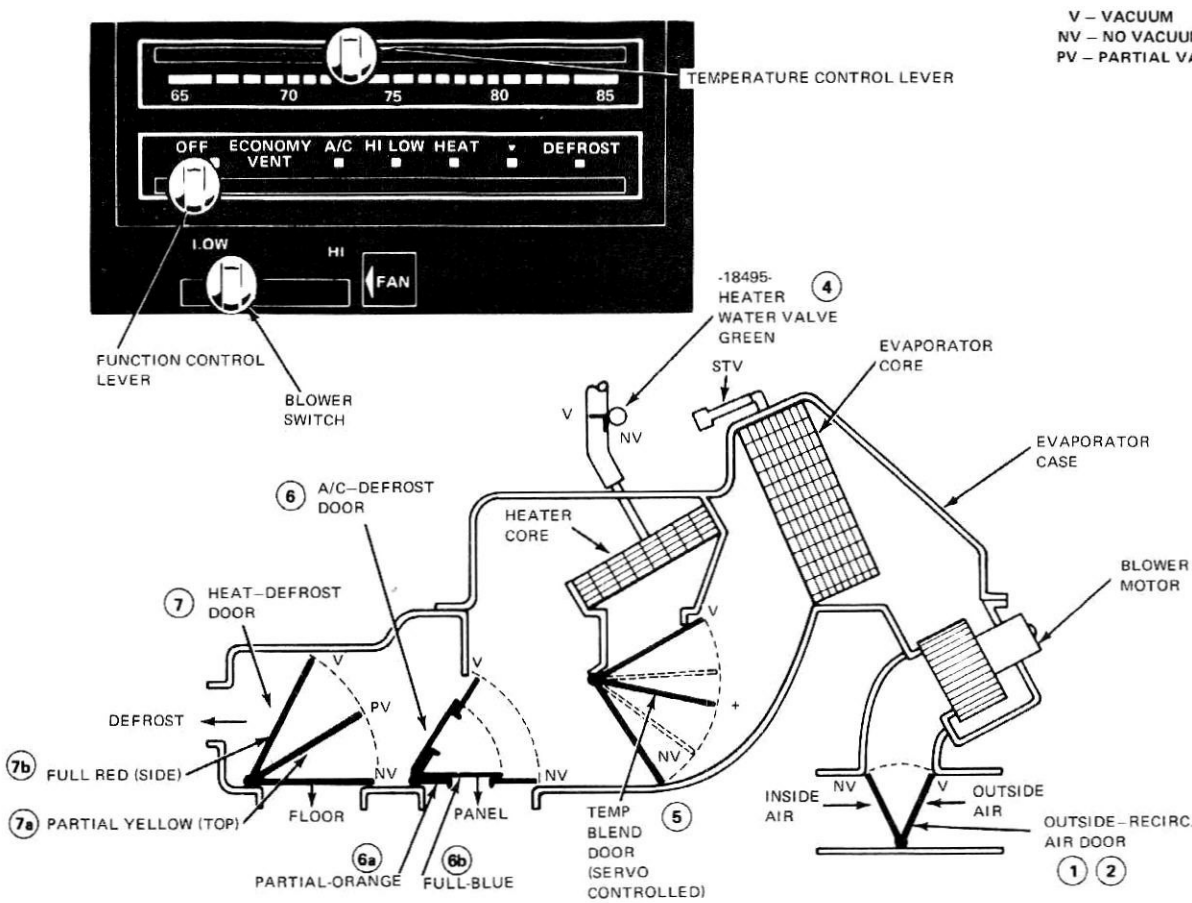
Fig. 2 contains system vacuum schematics and vacuum motor charts which illustrate vacuum routings and air flow during the various system conditions. Fig. 1 is a system electrical wiring diagram including continuity test information.

Off Position

In Off position the outside-recirc air door is in recirculating position. The A/C-heat door is in the heat (no vacuum) position, and the heat-defrost door is in the heat (full vacuum) position. The blower is off and the temperature blend door and water valve assume a position depending on the modulated vacuum from the sensor to the power servo.

NOTE: A modulated vacuum is produced in ALL function control lever positions and is entirely

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LTD II, COUGAR, THUNDERBIRD AND MARK V AUTOMATIC TEMPERATURE CONTROL SYSTEM VACUUM MOTOR TEST CHART

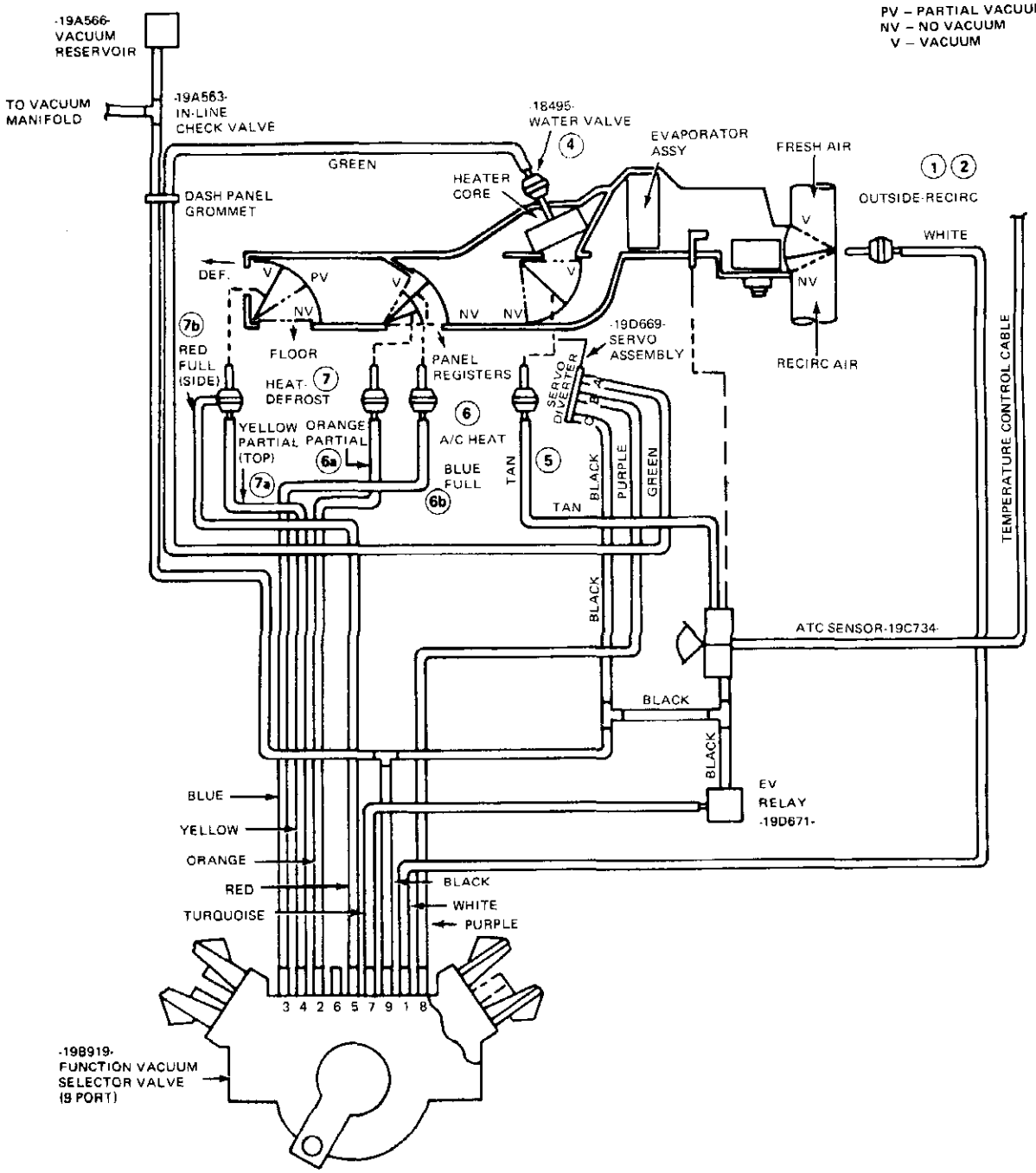
FUNCTION CONTROL LEVER POSITION	ATC REQUIREMENT	VACUUM MOTORS APPLIED WITH VACUUM						
		OUTSIDE – RECIRC.	WATER VALVE * *	TEMP. BLEND +	A/C–HEAT		HEAT–DEFROST	
					PARTIAL	FULL	PARTIAL	FULL
OFF	–	1 - 2	**	+	–	–	7a	7b
ECONOMY VENT	Cool	–	4	5	6a	6b	7a	7b
	Mid	–	–	+	6a	6b	7a	7b
	Warm	–	–	–	6a	6b	7a	7b
A/C *	Cool	1 - 2 * *	4	5	6a	6b	7a	7b
	Mid	–	–	+	6a	6b	7a	7b
	Warm	–	–	–	6a	6b	7a	7b
HI - LO *	Cool	–	4	5	6a	–	7a	7b
	Mid	–	–	+	6a	–	7a	7b
	Warm	–	–	–	6a	–	7a	7b
HEAT	Cool	–	4	5	–	–	7a	7b
	Mid	–	–	+	–	–	7a	7b
	Warm	1 - 2 †	–	–	–	–	7a	7b
▽ (DEFOG) *	Cool	–	4	5	–	–	7a	–
	Mid	–	–	+	–	–	7a	–
	Warm	–	–	–	–	–	7a	–
DEFROST *	Cool	–	4	5	–	–	–	–
	Mid	–	–	+	–	–	–	–
	Warm	–	–	–	–	–	–	–
VACUUM LINE COLOR CODE		WHITE	GREEN	TAN	ORANGE	BLUE	YELLOW (TOP)	RED (SIDE)

* COMPRESSOR CLUTCH ENGAGED WHEN AMBIENT CUT-OFF SWITCH IS CLOSED
† DELAYED BY ENGINE TEMP. SENDER AND E.V. RELAY UNTIL 130°F. ENGINE COOLANT TEMP.
* * DEPENDENT ON HEATING/COOLING REQUIREMENT OF SERVO DIVERTER VALVE
\+ MODULATED VACUUM
– NO VACUUM

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FIG. 1 ATC System Air Flow Schematic and Vacuum Control Chart for LTD II, Cougar, Thunderbird and Continental Mark V

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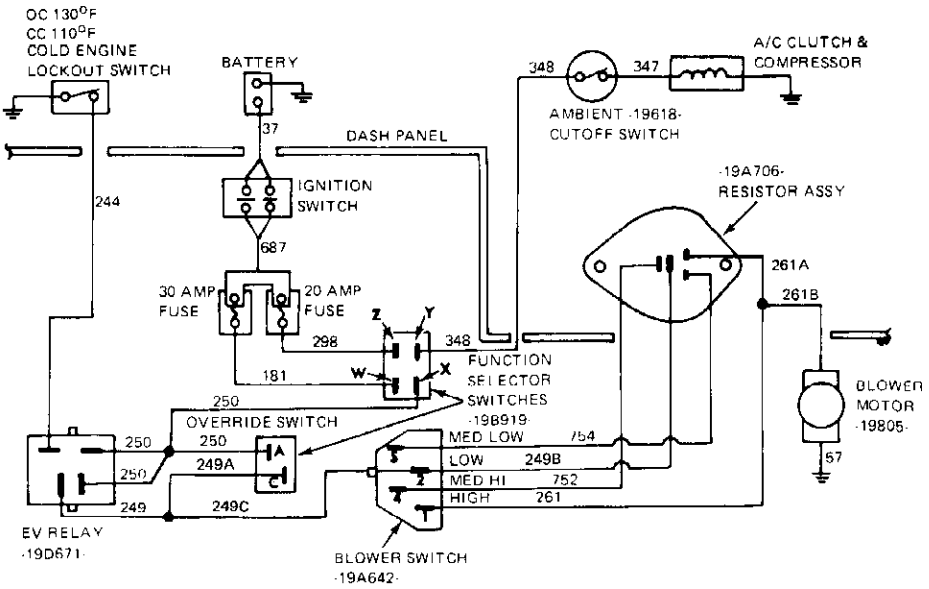
PORT	FUNCTION	FUNCTION SELECTOR VALVE LEVER POSITIONS							HOSE COLOR
		OFF	ECONOMY VENT	A/C	HI-LO	HEAT	▽ DEFOG	DEFROST	
1	Outside–Recirc.	V		To 8		To 7			White 1-2
2	Partial A/C–Heat		V	V	V				Orange 6a
3	Full A/C–Heat		V	V					Blue 6b
4	Partial Heat–Defrost	V	V	V	V	V	V		Yellow 7a
5	Full Heat–Defrost	V	V	V	V	V			Red 7b
6	No Function	Seal	Seal	Seal	Seal	Seal	Seal	Seal	
7	From EV Relay	Seal	Seal	Seal	Seal	To 1	Seal	Seal	Turquoise
8	From Servo Diverter Port B	Seal	Seal	To 1	Seal	Seal	Seal	Seal	Purple
9	Source Vacuum	V	V	V	V	V	V	V	Black

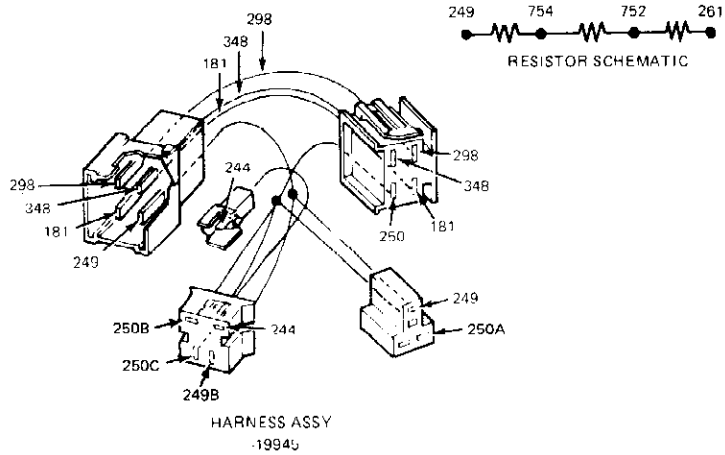
V – VACUUM BLANK ATMOSPHERE

K3500-2A

FIG. 2 ATC System Vacuum Schematic and Selector Test for LTD II, Cougar, Thunderbird and Continental Mark V

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FUNCTION SELECTOR SWITCH -198919-							
SWITCH SCHEMATIC	OFF	ECONOMY VENT	A/C	HI-LO	HEAT	▽ DEFOG	DEFROST
A—C	A - C	A - C	A - C	A - C	Open	A - C	A - C
X Y W Z	None	W - X	W - X Y - Z	W - X Y - Z	W - X	W - X Y - Z	W - X Y - Z

BLOWER SWITCH -19A642-			
BLOWER SPEED	TERMINAL CONNECTIONS	CURRENT IN CAR (AMPS)	BLOWER VOLTAGE
Low	2	6	5
Med Low	2 - 5	10	7
Med High	2 - 4 - 5	17	10
High	2 - 1 - 4	25	12.4

CIRCUIT NO.	WIRE COLOR
57	Black
347	Black W/Yellow Hash
348	Lt. Green W/Purple Hash
298	Purple W/Orange Hash
181	Brown W/Orange Stripe
752	Yellow W/Red Dot
754	Lt. Green W/White Hash
37	Yellow
687	Gray W/Lt. Blue Stripe
249	Dk. Blue W/Lt. Gr. Stripe
250	Orange
261	Orange W/Black Stripe
244	Yellow W/White Hash

LA491-2A

FIG. 3 ATC System Electrical Wiring Diagram and Continuity Test for LTD II, Cougar, Thunderbird and Continental Mark V

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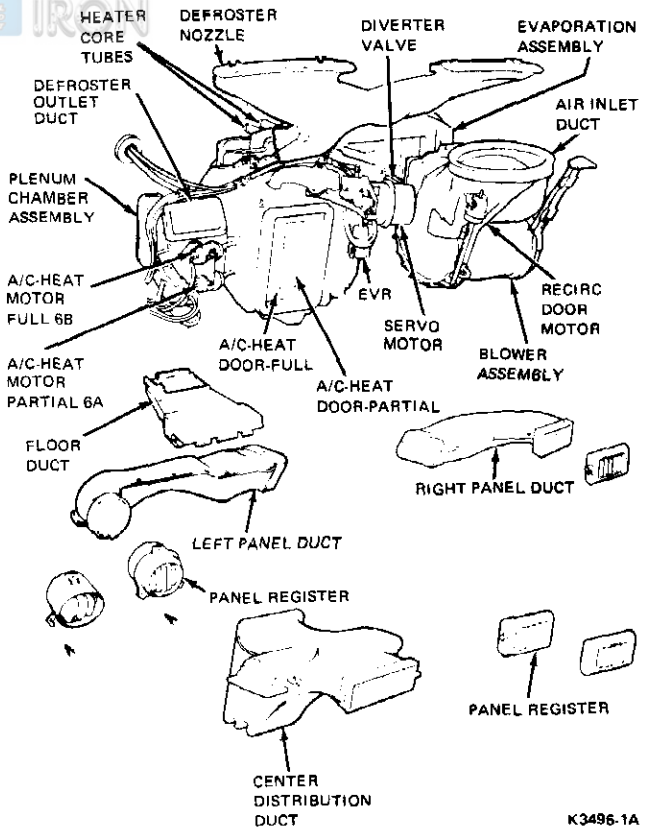


FIG. 4 Air Distribution Ducts, LTD II, Thunderbird and Cougar

dependent on the temperature lever setting and existing in-vehicle temperature conditions.

Economy-Vent Position

In ECONOMY-VENT position, outside air is directed through the panel (A/C) registers with automatic control of discharge air temperatures and water valve actuation. However, refrigerated cooling is not available. ECONOMY-VENT and HEAT positions provide the most economical operations because the compressor does not operate.

A/C Position—Maximum Cooling (Recirculate)

With the functional lever in A/C position and the car *interior temperature considerably above the* temperature setting, the modulated vacuum is high at the servo motor, causing:

1. The outside-recirc door to go to the recirc position;
2. The water valve to close;
3. The temperature blend door to close, allowing all *air to by-pass the heater core. Air is drawn from* the passenger compartment, directed through the evaporator core where it is cooled and returned to the car interior through the panel (A/C) ducts and registers.

A/C Position—Modulated Cooling (Outside-Air)

When the interior car temperature and the temperature setting are nearly balanced, the temperature blend door is actuated to near the mid-position, allowing air door to open and the water valve to turn on. The blend door has moved to a position where part of the air leaving the evaporator core is *directed through the heater core where it is warmed.* Blend air (the combination of cooled and heated air) is then mixed in the plenum and directed into the car

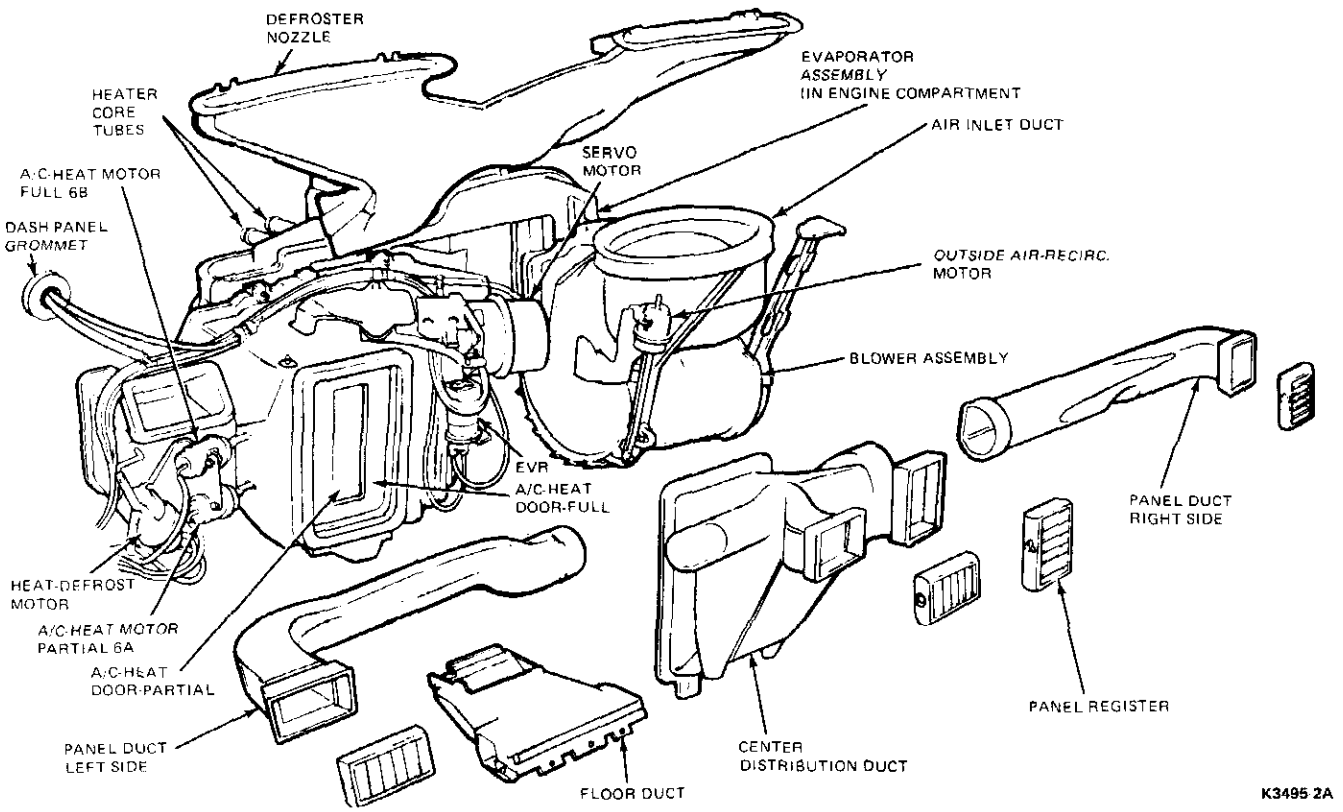


FIG. 5 Air Distribution Ducts, Continental Mark V

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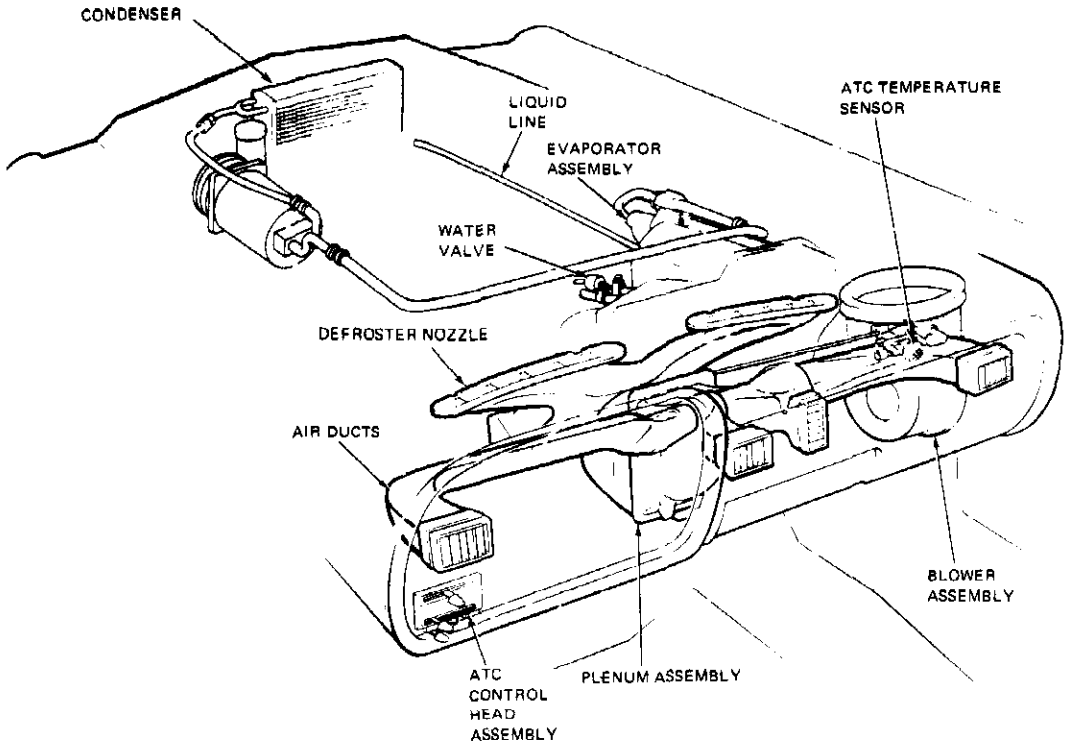


FIG. 6 Location of System Components, Continental Mark V

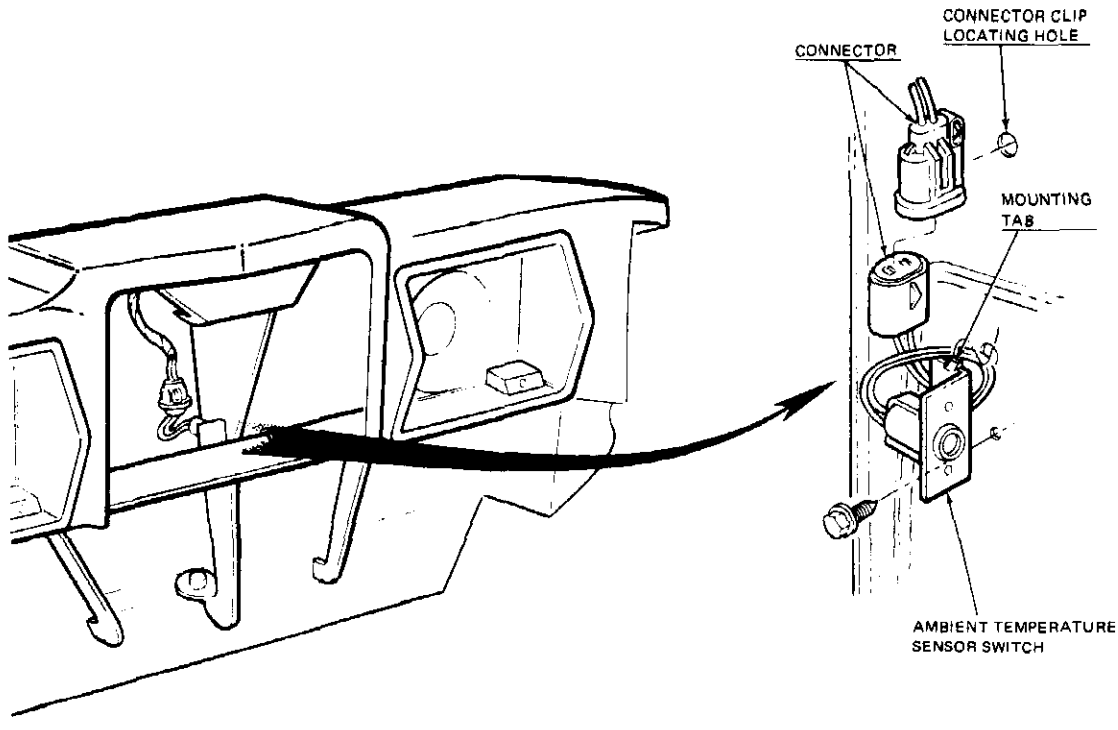


FIG. 7 Ambient Temperature Sensor Switch Installation

interior through the panel (A/C) ducts and registers. The position of the temperature blend door changes automatically to maintain the temperature selected. If the in-car temperature rises above the temperature lever setting, the blend door moves to admit more cooled air and less heated air. If the in-car temperature drops

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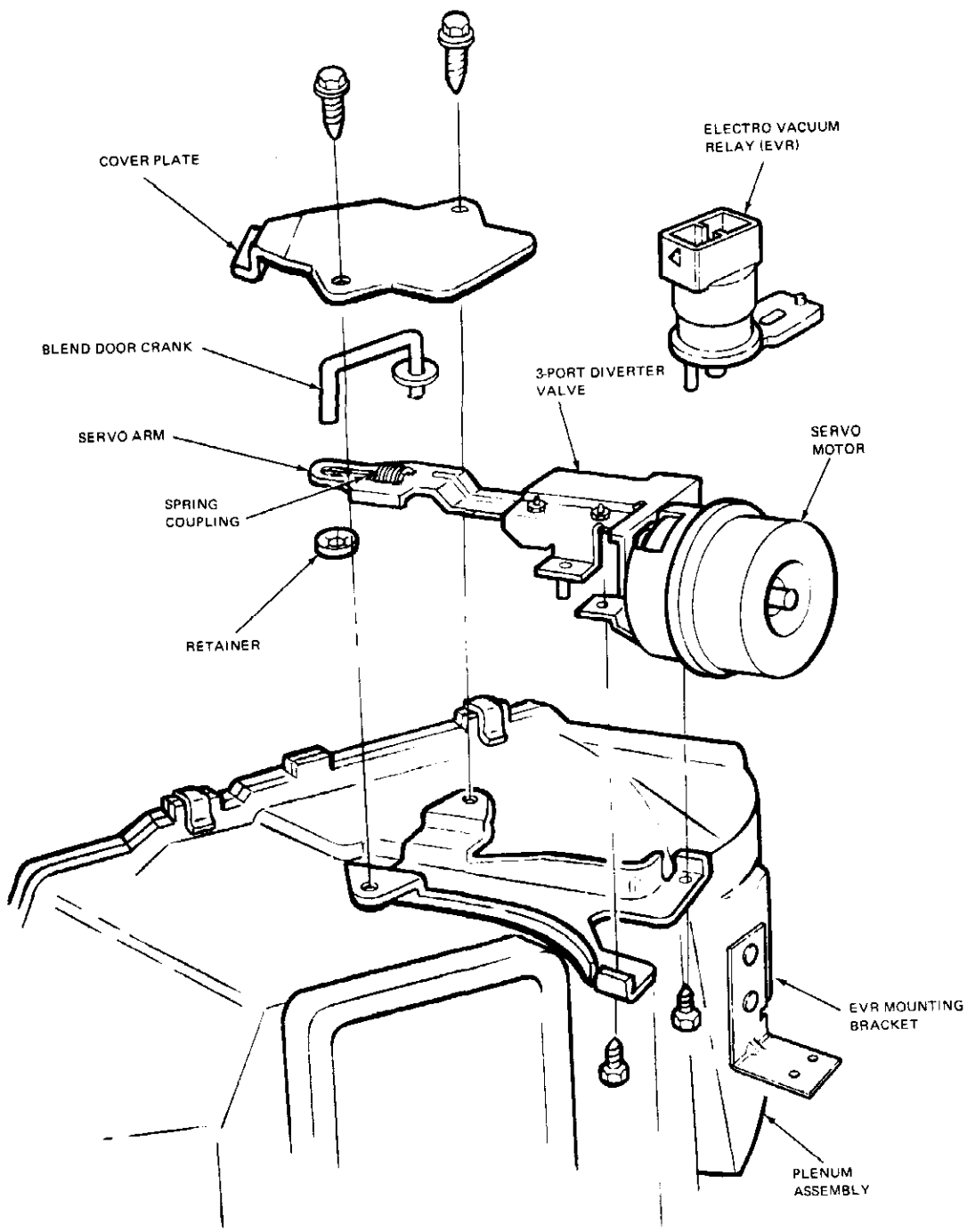


FIG. 8 Servo Motor Installation

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below the setting, the blend door moves to admit more heated air and less cooled air.

HI-LO Positions

Operation is similar to that described in the A/C position paragraphs, except that airflow is divided between the panel registers and floor ducts. The system will not recirculate interior air for maximum cooling.

Heat Position—Maximum Heating

With the function control lever in the HEAT position and the car interior temperature below the temperature setting, the modulated vacuum is low, causing the water valve to open and the temperature blend door to fully open. Blower operation will be delayed until the engine coolant reaches about 115°F, then the air is forced by the blower through the evaporator and all of the air passes through the heater core before being distributed through the heater (floor) ducts into the car interior. A portion of this air is diverted to the defroster nozzles.

Heat Position—Modulated Heating

When the interior car temperature and the temperature setting are nearly balanced, the temperature blend door has moved to a position so that only part of the air leaving the evaporator core is directed through the heater core where it is warmed. Blended air (the mixture of outside air and heated air) then is directed into the car interior. The A/C clutch does not operate in this position.

Defog (▽) Position

In DEFOG (▽) operation is the same as the heating position, except that the A/C-Heat doors are in the Heat (no vacuum) position and the heat-defrost door is in a partial position. There is no blower delay. The air flow is directed to the defroster nozzles and the floor outlets. The A/C clutch will also be engaged when the outside air temperature is sufficiently high enough to close the ambient cutoff switch. This assists in reducing the windshield fogging by dehumidifying the outside air.

Defrost Position

When the function lever is in the DEFROST position, the A/C-heat doors and the heat-defrost door are in the full defrost (no vacuum) positions so that all incoming air is directed to the defroster nozzles with a slight bleed to the floor. The temperature blend door modulates in this position but maximm heat can be obtained only by moving the temperature lever to the highest temperature position. The A/C clutch also operates in this position to dehumidify the air and reduce windshield fogging when the outside temperature is warm enough to close the ambient cut-off switch.

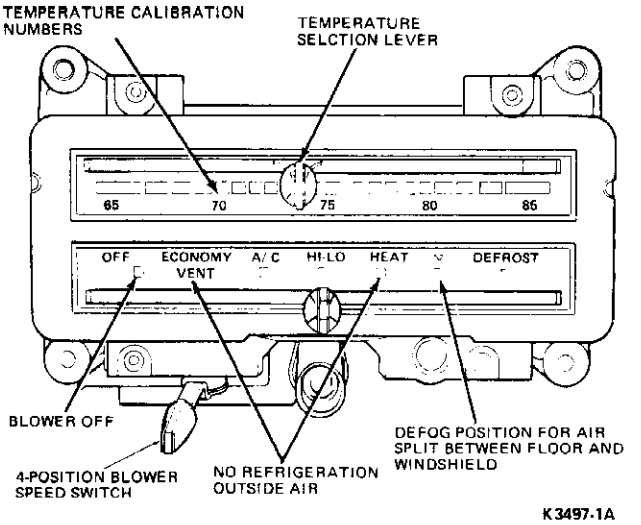


FIG. 9 ATC Control Assembly Functions

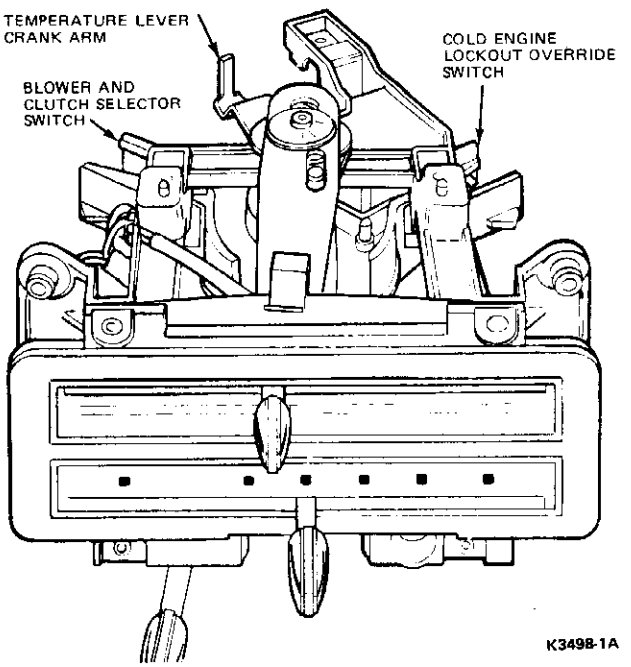


FIG. 10 ATC Control Head, Top View

ADJUSTMENTS

SENSOR CALIBRATION (FIG. 13)

1. Remove the instrument panel pad (right-hand applique on the Continental Mark V) and visually determine which direction to rotate the sensor calibration locking pin. Loosen the sensor and bracket from the instrument panel on the Continental Mark V.
2. While moving the temperature control lever, rotate the calibration locking pin into the 75°F. calibration notch of the sensor control arm.
3. Check the position of the temperature control lever, it should be at 75. If it is not, loosen the bowden cable housing-to-sensor attaching screw and move the temperature control lever to 75 while the sensor control arm is locked in the calibration position. Retighten the bowden cable housing-to-sensor attaching screw, making sure the temperature control stays at 75 and the sensor arm stays locked.

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DETROIT IRON

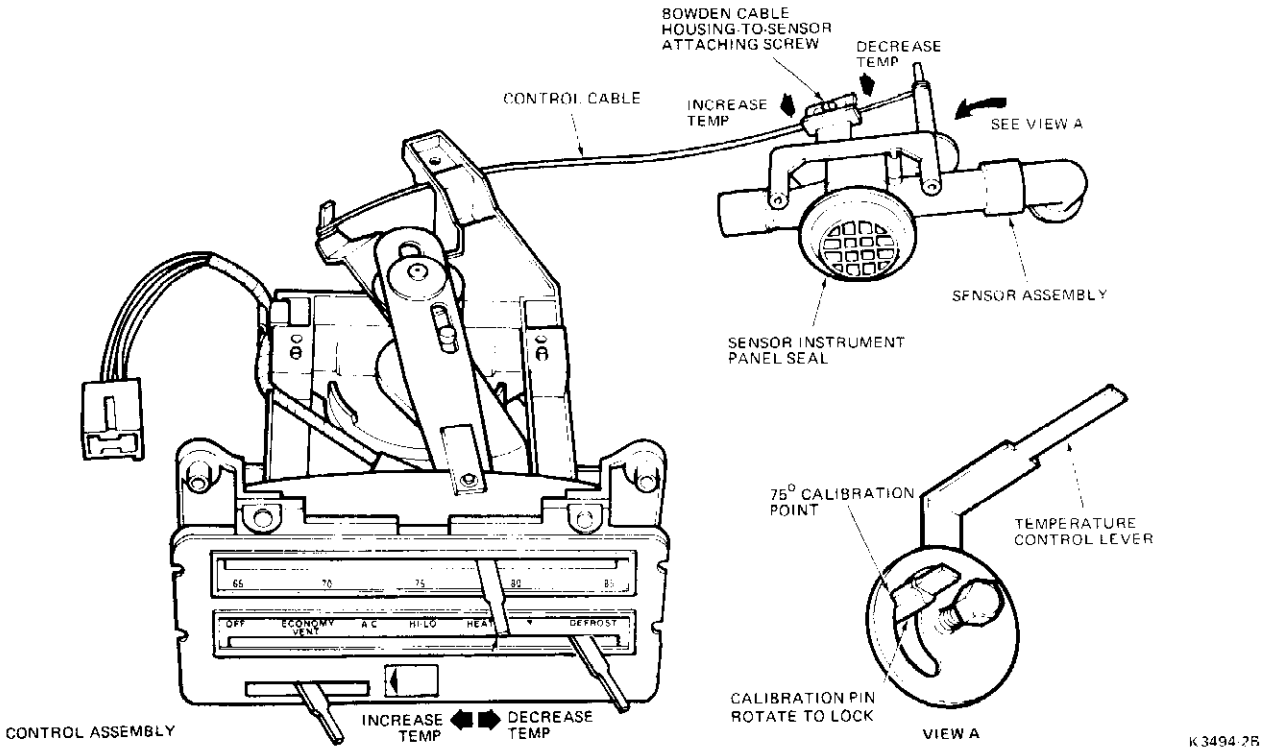


FIG. 11 A.T.C. System Temperature Calibration

READJUSTING CALIBRATION POINT

If it should become necessary to change the calibration point to suit a customer, first check the sensor calibration as described in the above procedure. If OK, use the following procedure:

1. Establish the customers preference and the difference between the present and desired comfort level setting.
2. Determine the direction of change.
3. To decrease or increase, adjust the temperature control lever position with the sensor arm locked in the 75°F. calibration notch. Loosen the bowden cable housing-to-sensor attaching screw, move the temperature control lever the desired amount and retighten the attaching screw.

NOTE: Move the temperature control lever HIGHER to DECREASE and LOWER to INCREASE the controlled temperature at a given setting.

CAUTION: If a readjustment of the temperature control lever of more than 4°F. is required, and the cable adjustment is correct, per Sensor Calibration Procedure above, replace the sensor assembly.

REMOVAL AND INSTALLATION

SENSOR ASSEMBLY

Remove the instrument panel pad to gain access to the sensor assembly on the LTD II, Cougar, and Thunderbird and the right hand instrument panel applique on the Continental Mark V. Carefully disconnect the inlet air elbow, the vacuum connector and control cable. Remove two (2) mounting screws, and remove the sensor (sensor and bracket on Mark V). On Mark V, disconnect the control cable **after** removing the sensor and bracket.

To install, rotate the sensor control arm to the mid position and turn the plastic calibration pin to the locked 75°F. position. Install the sensor, connect the inlet air elbow and vacuum connector. Connect the control cable to sensor control arm and adjust cable with reference to Sensor Calibration Procedure in Section VI. On Continental Mark V, connect and adjust the cable before mounting the sensor and bracket to the instrument panel.

ELECTRO VACUUM RELAY (EVR)

1. The EVR is located on the plenum assembly below the servo motor. See Fig. 12.
2. Remove EVR mounting screw from bracket on plenum assembly.
3. Disconnect the vacuum connector and electrical connector. Carefully exert outward pressure on the two locking tabs on the connector to remove connector.
4. Reverse this procedure to install.

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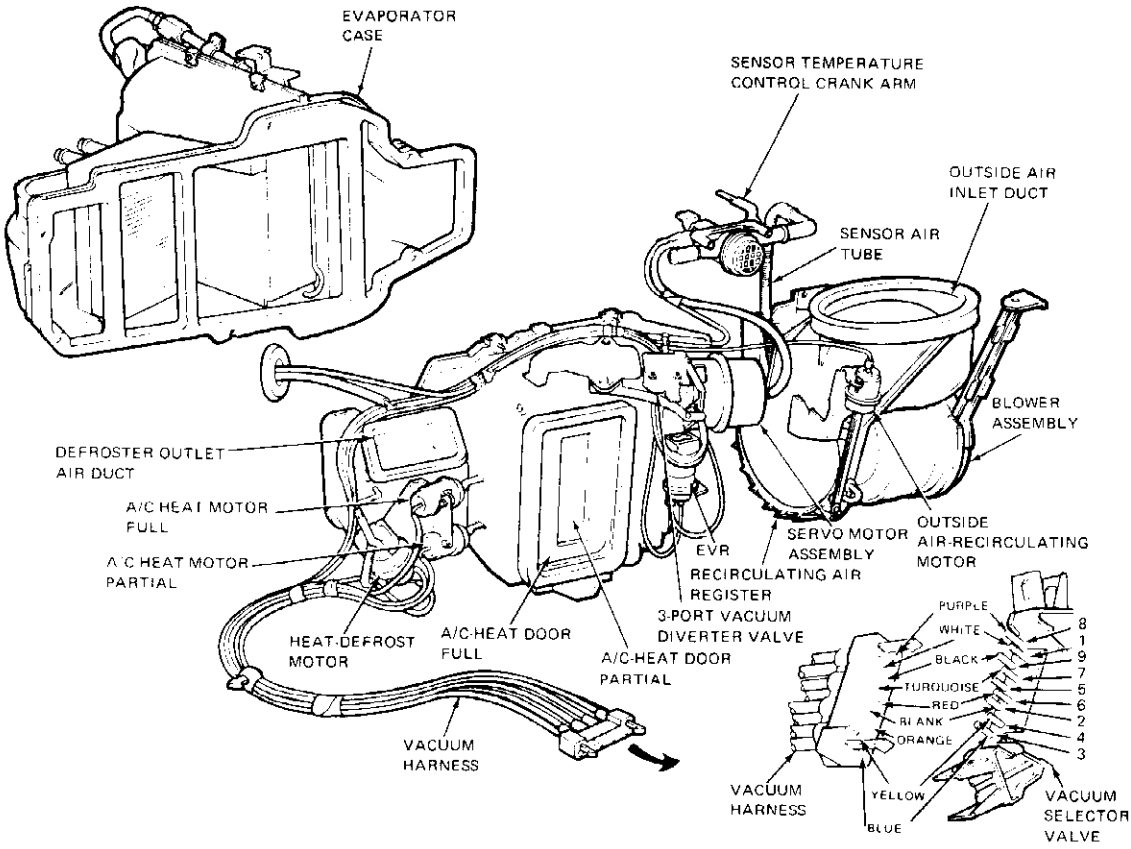


FIG. 12 ATC Vacuum System Locations

SERVO ASSEMBLY

1. Remove the ATC plenum.
2. Remove tan hose from servo motor.
3. Remove one (1) retaining nut and remove vacuum multiple connector from diverter valve.
4. Remove cover plate (2 screws) over temperature blend door crank arm.
5. Remove retainer from temperature blend door crank arm. Avoid bending the crank arm.
6. Remove two (2) servo mounting screws, remove the servo arm and tension spring from the temperature blend door crank arm and remove the servo assembly.
7. Install a new servo assembly by reversing the above procedure.

CONTROL HEAD ASSEMBLY

1. Remove A/C control knobs and accessory switch knob.
2. Remove two (2) lower control assembly attaching screws.
3. Remove two (2) upper control assembly attaching screws.
4. Remove temperature control cable from control head (1 screw).
5. Disconnect multiple vacuum harness connector from the 9-port vacuum selector valve.
6. Disconnect electrical wiring connectors from blower switch, override switch, selector switch, illumination bulb and rear defogger switch.
7. Reverse the above procedure to install and check the temperature control cable adjustment using Sensor Calibration Procedure in Section VI, Paragraph 3. Adjust if required.

RESISTOR ASSEMBLY

1. Disconnect the electrical connector.
2. Remove the resistor assembly from the evaporator assembly (Fig. 13). To install, reverse the above procedure.

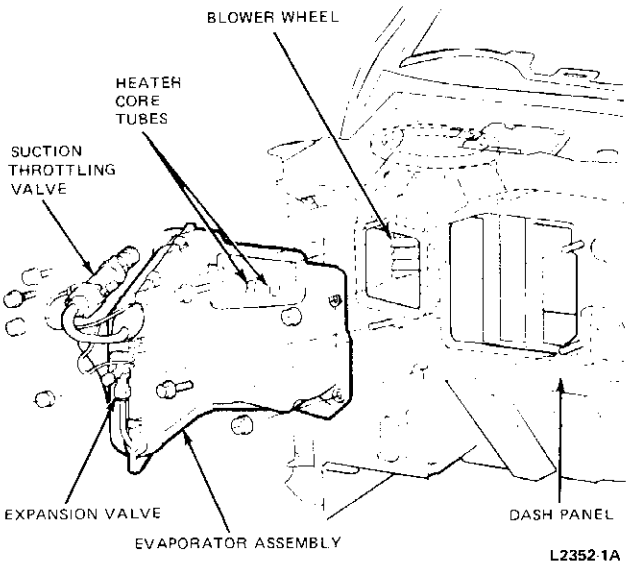


FIG. 13 Evaporator Assembly Installation

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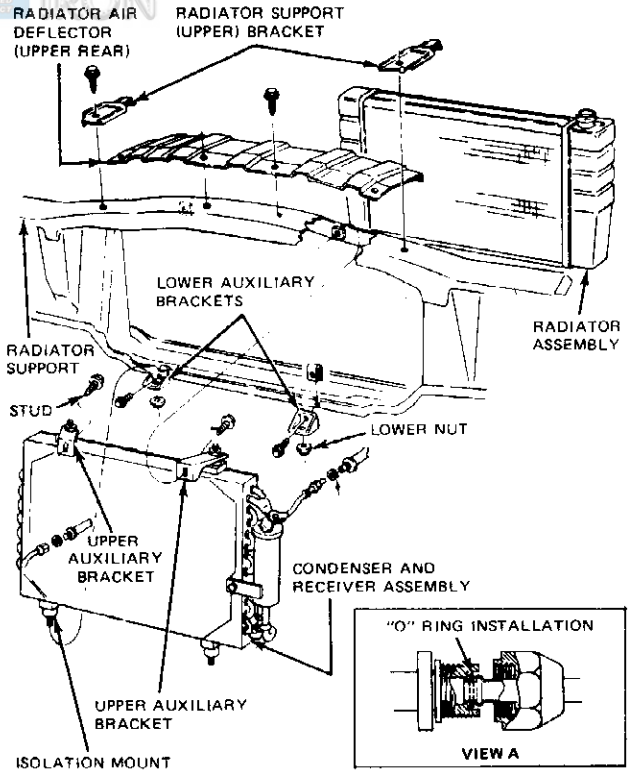


FIG. 14 Condenser Installation—Continental Mark V

CONDENSER (FIG. 14)

1. The Continental Mark V condenser is serviced by removing the plastic shield (four screws), the upper radiator mounts (2 screws), the upper condenser mounting brackets at radiator support (2 screws), the upper condenser brackets and mounts (2 nuts), the liquid line to condenser bracket (1 screw), and the liquid and discharge lines.
2. The condenser assembly is serviced by removing four nuts at the isolation mounts, one screw at the liquid line to condenser bracket, and the liquid and discharge lines.

SPECIFICATIONS

Refrigerant Capacity: 4½ lbs; + ¼ lbs, — 0 lbs.

Protective Device: - 20 amp fuse in clutch circuit; 30 amp fuse in blower circuit.

Control Illumination - one ICP-161 bulb.

Blower Motor Current (Amps) and Voltage:

Low - 6 amps - 5 volts

Medium Low - 10 amps - 7 volts

Medium High - 17 amps - 10 volts

High - 25 amps - 12.4 volts

Compressor - Mark V:

Type - Swash Plate - Three double acting pistons - axial type

Cylinder Bore - 1-1/2 inches

Stroke - 1-3/16 inches

Displacement - 12.6 cubic inches

Rotation - Clockwise

Type of Oil - TL4538 Texaco 525 Viscosity Refrigeration Oil or equivalent

Oil Capacity - 10-1/2 ounces (Ford Part No. D1VY-19577-A)

Clutch - Magnetic - Approximately 3.44 amps @ 12.8 volts

Compressor - LTD II, Thunderbird and Cougar

Displacement - 10.3 cubic inch (York and Tecumseh)

Oil Capacity - York - 10 oz.

Tecumseh - 11 oz.

Oil Specification - ESA -M2C31-A (Ford Part No. C9AZ-19577-A)

Clutch - Magnetic - Approximately 3.75 amps @ 12.8 volts

Compressor Drive Belt Tension

New: 120 to 160 lbs.

Used: 75 to 120 lbs. (after operation for 10 minutes or more)

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Rear Window Defogger

PART 36-80

SUBJECT	PAGE
DESCRIPTION AND OPERATION	80-1
REMOVAL AND INSTALLATION	
Defogger Motor	80-1
REMOVAL AND INSTALLATION (Cont'd.)	
Defogger Switch	80-1
SPECIFICATIONS	80-3

CK3428-2B

DESCRIPTION AND OPERATION

The rear window defogger is an integral unit and is located in the center of the package tray (Fig. 1). Inside air is drawn into the defogger assembly through the front part of the grille and is discharged towards the rear window through the rear part of the grille. The two-speed defogger blower switch is located next to the heater or heater-air conditioner blower switch on the instrument panel.

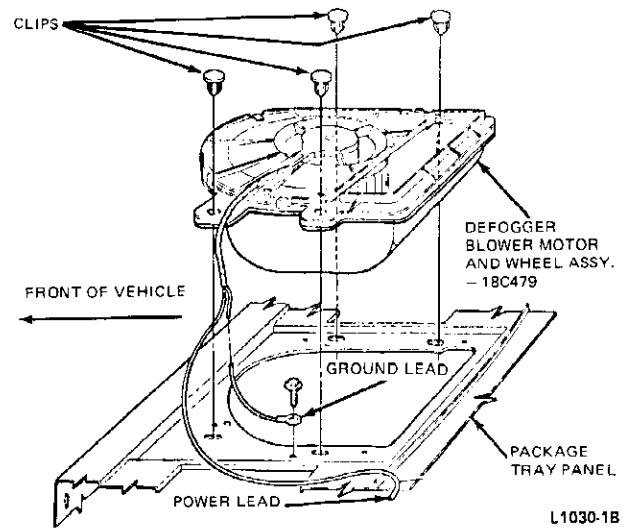


FIG. 1 Defogger Motor Installation (Ford Shown)

REMOVAL AND INSTALLATION

DEFOGGER MOTOR

1. From inside the luggage compartment, disconnect the motor power lead.
2. Remove the defogger grille which retains the defogger assembly (Fig. 2 or 3) by removing either 4 twist lock clips or 4 retaining nuts located beneath the package tray (inside the luggage compartment).
3. Lift the defogger from the package tray support, remove the ground wire retaining screw, and remove the assembly.
4. Motors are not serviced separately. Complete blower packages are supplied incorporating balanced motor and wheel assemblies.

DEFOGGER SWITCH

To replace the defogger switch, separate the control assembly from the instrument panel, as outlined in the respective vehicle section. Then, remove the switch from the control assembly.

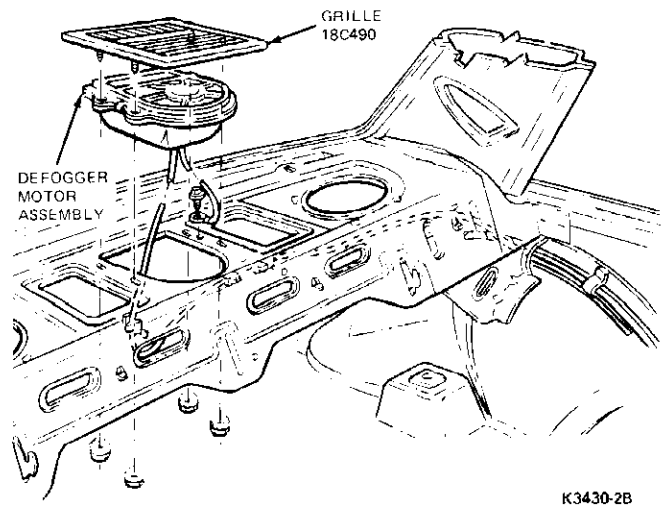


FIG. 2 Rear Window Defogger—Fairmont and Zephyr

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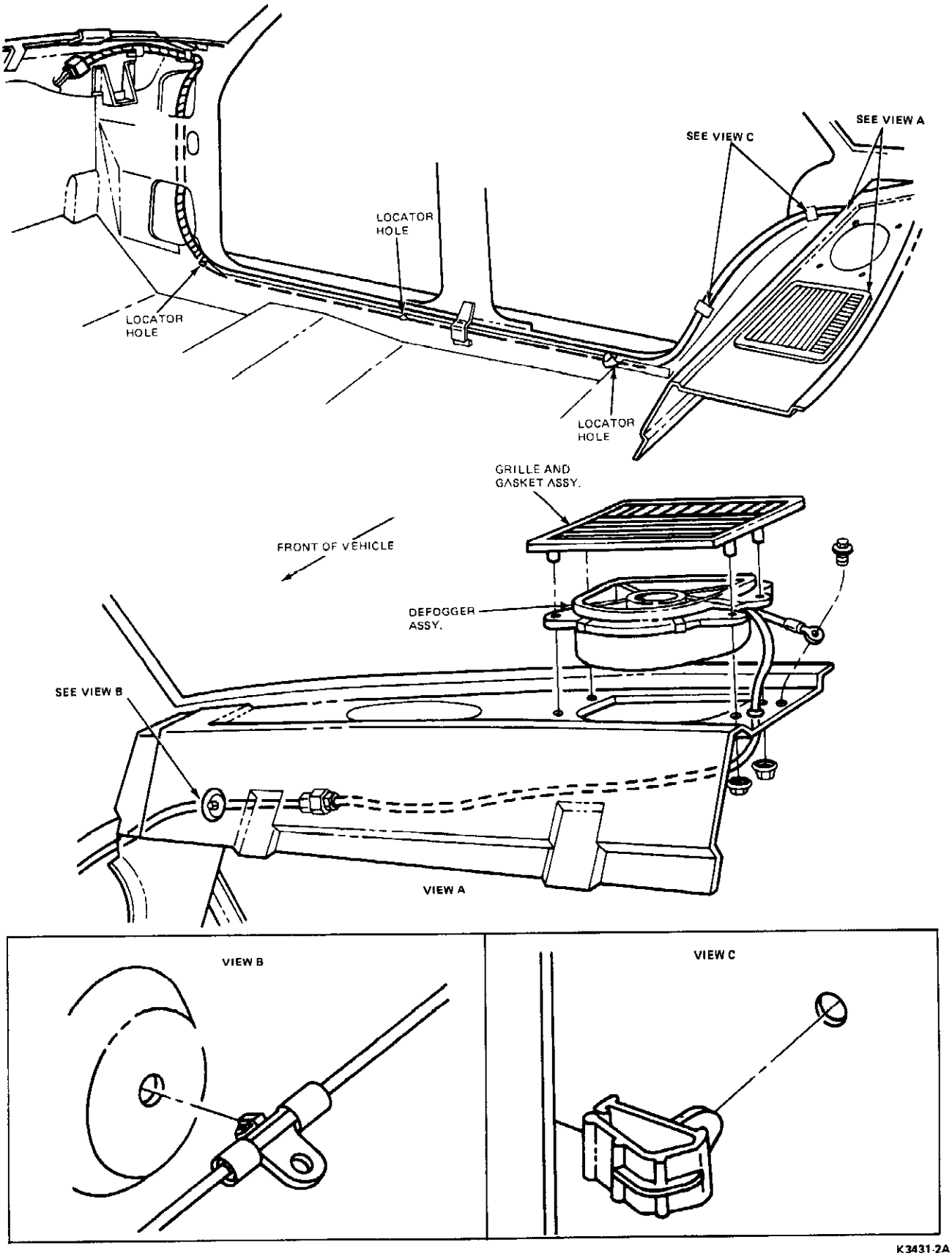


FIG. 3 Rear Window Defogger—Granada and Monarch

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SPECIFICATIONS

DEFOGGER BLOWER MOTOR

Speed	Voltage	Maximum Amps
High	12.8	1.8
Low	6.4	–

CK3432-2A

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Heated Rear Window System

PART 36-86

All Models

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Back Window Grid Wire Test	86-2
Control Switch Continuity Test	86-3
Relay Tests	86-3
REMOVAL AND INSTALLATION	
Control Switch	86-3
Heated Rear Window	86-3
Relay	86-3
MAJOR REPAIR OPERATIONS	
Lead Wire Repair	86-4
Rear Window Grid Wire Repair	86-4

CK3429-2B

DESCRIPTION AND OPERATION

GENERAL

The heated back window system consists of a control switch, a relay, and a series of grid wires baked on the inside surface of the back window.

When the switch is moved to the ON position, current is directed through the relay to the grid wires on the rear window. The heated grid wires keep the rear window clear of fog or ice.

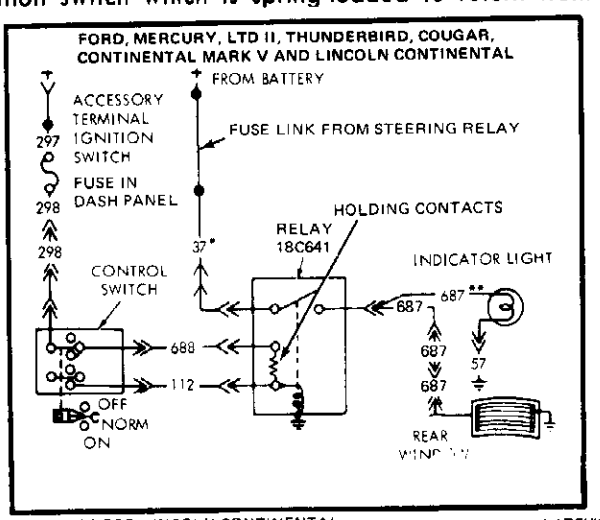
All systems are basically the same, using a latching relay system.

LATCHING RELAY SYSTEM

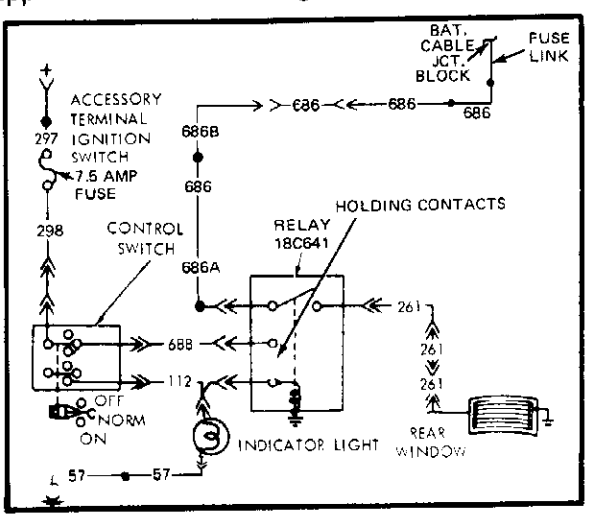
Power for the relay coil comes from the accessory terminal of the ignition switch to the heated rear window control switch. This power is available whenever the ignition switch is in the Run or Accessory positions.

The heated rear window control switch is a three-position switch which is spring-loaded to return from ON or OFF to its CENTER or NORMAL position. In the NORMAL position, the switch connects power from the ignition switch through wire 688 to the internal holding contacts in series with the relay coil (Fig. 1). As soon as the switch is moved to ON position, it also connects power to energize the relay coil, thereby causing the normally open relay load contacts and holding contacts to close and provide power to the warning indicator lamp in the instrument panel and the rear window grid wires. Even after current is cut off by the spring-loaded switch returning to the NORMAL position, current is provided to the relay coil through the holding contacts (Wire 688) to maintain the relay coil energized and the relay contacts closed. In this way, the warning indicator lamp and the rear window grid wires will continue to receive power.

The relay is called a latching relay because it turns on and remains latched with only a momentary application of a control signal.



*37 IS 686 FOR LINCOLN CONTINENTAL
**687 IS 186 FOR LINCOLN CONTINENTAL



LATCHING RELAY SYSTEM

L1607-2H

FIG. 1 Heated Rear Window Wiring Diagram

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TESTING

BACK WINDOW GRID WIRE TEST

1. Using a strong light inside the vehicle, visually inspect the wire grid from the outside (Fig. 3). A broken grid wire will appear as a brown spot.
2. Run the engine at idle. Set the control switch to ON. The indicator lamp should come on.
3. Working inside the car with a 12-volt DC voltmeter, contact the broad red-brown strips on the back window. The meter should read 10-13 volts. A lower voltage reading indicates a loose ground wire (pigtail) connection at the ground side of the glass.
4. Contact a good ground point with the negative lead of the meter. The voltage reading should not change.
5. With the negative lead of the meter grounded, touch each grid line of the heated back window at its mid-point with the positive lead. A reading of approximately 6 volts indicates that the line is good. A reading of 0 volts indicates that the line is broken between the mid-point and the side of the line. A reading of 12 volts indicates that the circuit is broken between the mid-point of the grid line and ground.

   In the latter case, either the grid line would be broken between the mid-point and the passenger side, or the ground wire (pigtail) connection at the passenger end of the glass would be loose (Fig. 3).

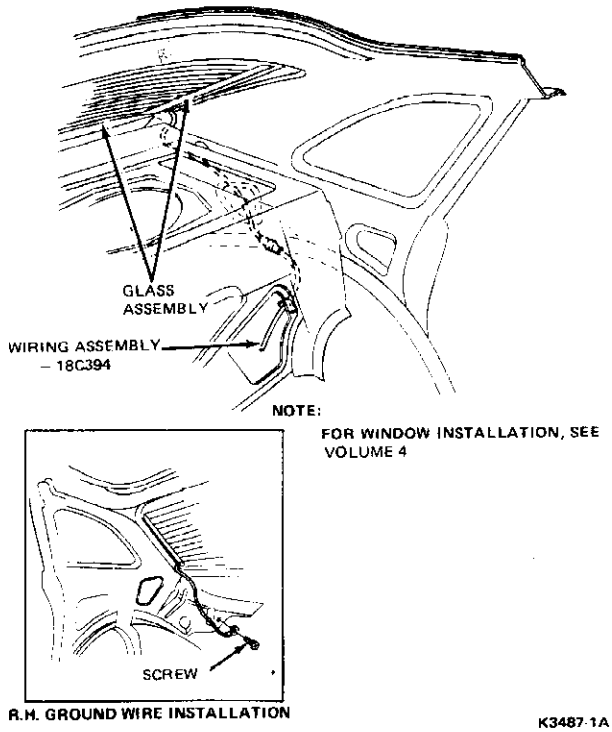
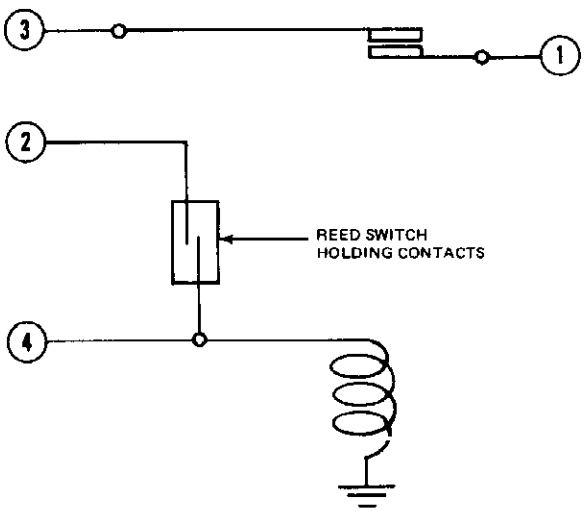


FIG. 3 Typical Heated Rear Window System—Thunderbird, LTD II and Cougar Shown



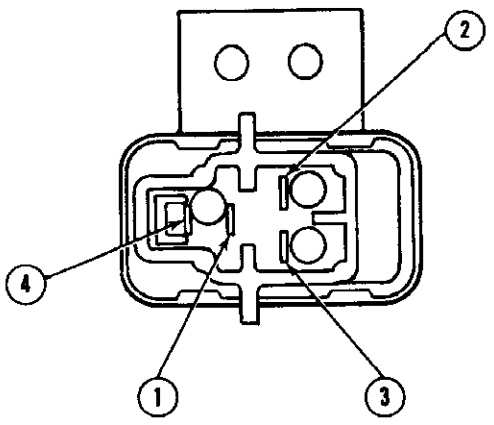


FIG. 2 Latching Relay Test

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RELAY TESTS

LATCHING RELAY

1. Ground the relay case and connect a jumper wire between pins 1 and 2 (Fig. 2). Connect a 12 V test lamp between pin 3 and ground.
2. Apply power to pin 2. The test lamp should not light.
3. Momentarily short pins 2 and 4. The test lamp should come on and stay on after the short is removed.

CONTROL SWITCH CONTINUITY TEST

For each of the switch positions, there should be continuity between the terminals as follows: Normal position—continuity between 2 terminals; ON position—continuity between all terminals; and OFF position—no continuity between any terminals.

REMOVAL AND INSTALLATION

RELAY

To remove the relay, remove the attaching screw and lower the relay from its mounting. Disconnect the wires from the relay and remove the unit from the vehicle.

The locations of the relays on the various car lines are as follows:

FORD, AND MERCURY

The relay is mounted on a bracket under the lower edge of the instrument panel at the left side.

COUGAR, THUNDERBIRD AND LTD II

The relay bracket is mounted on the instrument panel left end panel above the headlamp switch. The instrument panel pad must be removed for access to the relay.

PINTO AND BOBCAT

The relay is mounted on the upper portion of the instrument panel to the right hand side above the glove box.

MUSTANG

The relay is mounted onto a brace between the steering column Y-brace and the left-hand cowl side panel under the instrument panel.

CONTINENTAL MARK V

The relay is mounted under the instrument panel onto a brace which is alongside the brake pedal support bracket.

LINCOLN CONTINENTAL

The relay is mounted to a bracket under the instrument panel between the glove box and ash tray.

GRANADA, MONARCH AND VERSAILLES

The relay is attached to the right-hand lower reinforcement, near the instrument panel.

FAIRMONT AND ZEPHYR

The relay is mounted on the relay mounting bracket above the glove box (must be) removed for service).

CONTROL SWITCH

FORD MERCURY

Remove the knob from the heated rear window control switch lever. Remove the ash tray and ash tray retainer. From beneath the instrument panel, remove the screw retaining the switch to the mounting bracket. Pull the switch away from the instrument panel. Disconnect the multiple connector from the switch and remove the switch.

PINTO AND BOBCAT

The lever-type switch is located on the lower edge of the instrument panel to the left of the steering column. To replace the switch, loosen the knob set screw and remove the knob. Then, take out the two attaching screws, disconnect the connector, and remove the switch.

LTD II, COUGAR, THUNDERBIRD, CONTINENTAL MARK V, GRANADA, MONARCH, VERSAILLES, FAIRMONT AND ZEPHYR

The sliding lever type switch is mounted on the lower *right hand corner of the heater or A/C* control assembly. To replace the switch, first remove the control assembly as outlined in the pertinent Shop Manual Part.

With the control head dismounted from the instrument panel, remove the switch-to-control head mounting screw, disconnect the wiring connector and remove the heated back window switch.

LINCOLN CONTINENTAL

Remove the map lamp housing from the instrument panel (3 retaining screws). Disconnect the multiple connector from the heated rear window control switch. Depress the two switch retaining clips, and pull the switch from the map lamp housing (Fig. 3).

Snap the new switch into the map lamp housing. Connect the wiring connector to the switch, and install the map lamp housing to the instrument panel.

HEATED REAR WINDOW

Disconnect the wire leads at each end of the glass. Remove the window as outlined in Part 43-16.

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MAJOR REPAIR OPERATIONS

REAR WINDOW GRID WIRE REPAIR

Any break in the line longer than one inch cannot be repaired. The back window must be replaced. For breaks less than one inch long use the following procedure:

1. Mark the location of the break on the outside of the window.
2. Using fine steel wool, lightly rub the line inside the repair area. Then, clean the repair area with alcohol.
3. Apply a two inch long strip of cellulose tape on each side of the broken line and parallel to it. The break in the line should be at the center of the tape, and the gap between the tape strips should be only as wide as the line.
4. Mix the repair coating (ECCOCOAT CC-2 or equivalent) until it is of uniform consistency with the silver particles mixed throughout the fluid and apply it to the break with a small brush. Apply a heavy coat extending approximately 1/4 inch on either side of the break.
5. Allow the coating to dry at least 30 minutes, then apply a second heavy coat extending about 1/4 inch on either side of the break.
6. Allow to dry for three or four hours, then remove the tape. **Do not scour or clean the area with alcohol, highly abrasive materials or sharp instruments. After 24 hours, the repaired area may be cleaned with a mild window cleaner.**
7. Test the back window grid wire, as described under Testing.

LEAD WIRE REPAIR—PINTO AND BOBCAT ONLY (Fig. 4)

1. Allow the back window to warm up to room temperature for a half hour to an hour.
2. Clean the bus bar in the area to be repaired using fine steel wool (3/0 to 4/0 grade).
3. Restore the area where the bus bar terminal was originally attached by applying three coats of Eccocoat CC-2 or equivalent. Allow approximately ten minutes drying time between coats.
4. Working as quickly as possible to avoid overheating the glass, tin the bus bar with solder in the area where the terminal will be re-attached.

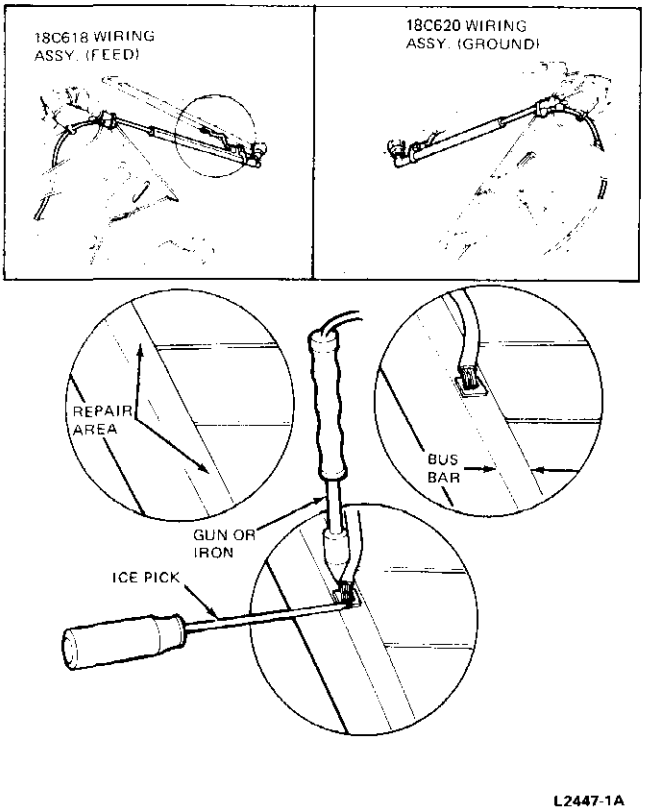


FIG. 4 Heated Back Window Repair

5. Using a heat gun or heat lamp, pre-heat the glass in the solder area to 120°-150°F just prior to soldering the terminal on.
6. Position the terminal on the bus bar in the area that was tinned and hold it in place with an ice pick or screwdriver.
7. Apply soldering heat to the pad of the terminal until the solder flows. NOTE: To avoid damaging the bus bar, remove the soldering gun or iron as soon as the solder flows.
8. Start the vehicle, turn the heated back window on and leave it on for 5 minutes. Inspect the terminal and apply Eccocoat CC-2 or equivalent to the required area.

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DETROIT IRON

SPEED CONTROL

GROUP 37

PART TITLE	PART NO.	PART TITLE	PART NO.
Speed Control System	37-01	Sure-Track Brake System	37-20

CL2307-2B

Speed Control System

PART 37-01

Applies to All Except Pinto, Bobcat, and Mustang II

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CL2308-2B

DESCRIPTION AND OPERATION

SPEED CONTROL

The speed control system is composed of the **OFF-ON** switch and the **SET-ACC and COAST** switches, a servo (throttle actuator) assembly, a speed sensor, an amplifier assembly and the necessary wires, check valve assembly, vacuum reserve tank and vacuum hose to connect the components. The switches are located in the steering wheel spokes. The amplifier assembly is located under the instrument panel. The servo assembly (throttle actuator) is mounted in the engine compartment and connects to the throttle linkage with a bead chain. The speed control sensor is located in the engine compartment on Continental Mark V and Lincoln Continental. The sensor is located in the passenger compartment on Ford, Mercury, LTD II, Thunderbird, Ranchero, Granada, Monarch and Cougar XR-7 vehicles. The vacuum reservoir is located near the left or right fender apron. To operate the speed control system the engine must be running and the vehicle speed above 30 mph. Manifold vacuum is constantly supplied when the engine is running. When the on/off switch in the steering wheel is actuated to the **ON position the system is made ready to accept a set speed** signal. When the vehicle has been accelerated and stabilized at a speed over 30 mph and the **ON switch engaged, the operator may quickly depress and release the set/accelerate button. This speed**

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will be maintained until a new speed is set by the operator, the brake pedal is depressed, or the system is turned OFF.

DECREASING SET SPEED

The vehicle speed may be reduced by applying the brake and then resetting the speed using the foregoing method or by depressing the coast switch. When the vehicle has slowed to the desired speed the coast switch is released and the new speed is set automatically. If the vehicle speed is reduced below 30 mph, the operator must manually increase the speed and reset the system.

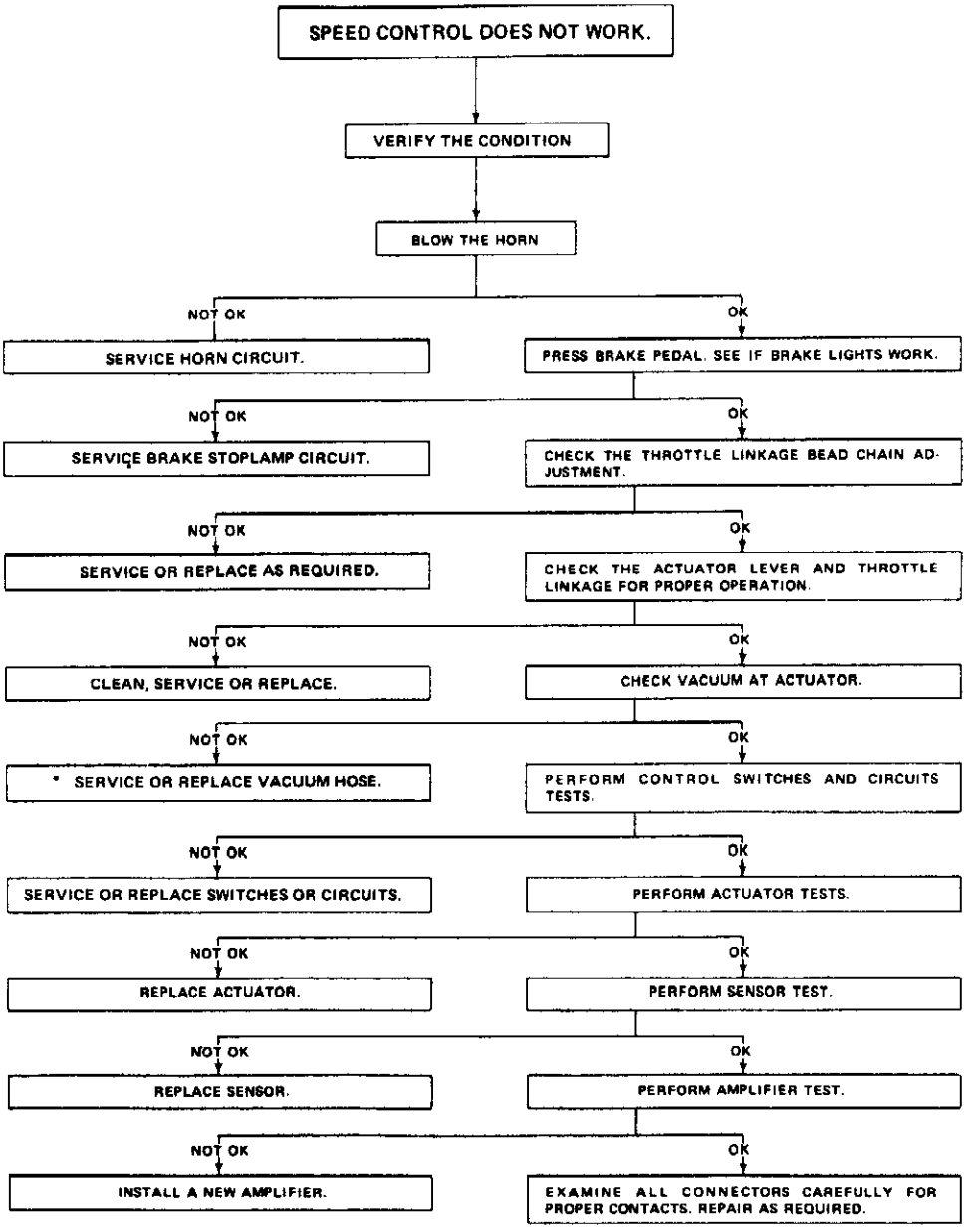
INCREASING SET SPEED

The vehicle set speed may be increased at any time by depressing the accelerator until the higher speed is reached and stabilized, then depressing and releasing the set speed button.

Speed may also be increased by depressing the set/accelerate switch button (at speeds over 30 mph) and holding it in that position. The vehicle will then automatically increase speed. When the desired rate of speed is attained and the button is released, that new set speed will be maintained.

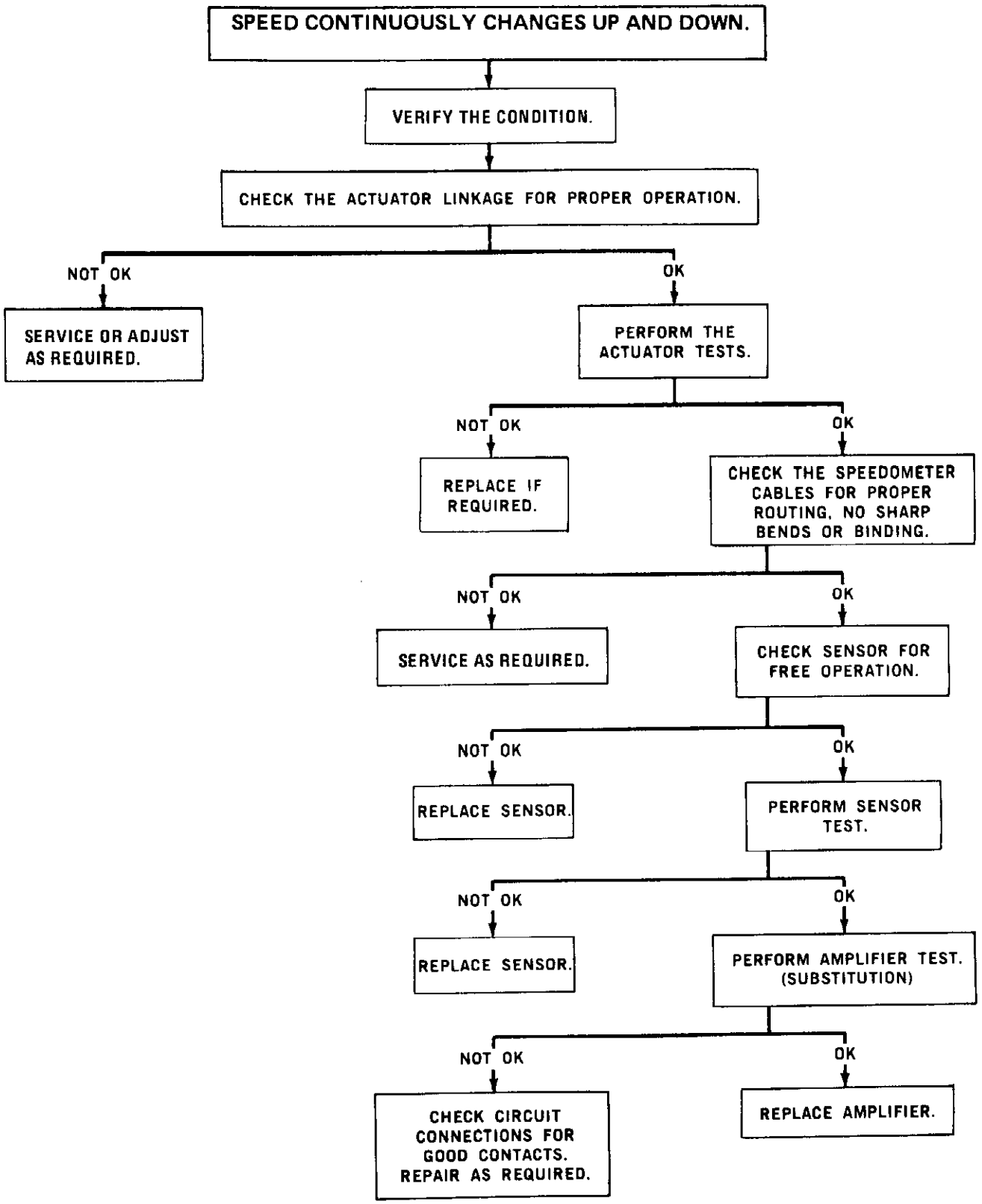
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DIAGNOSIS



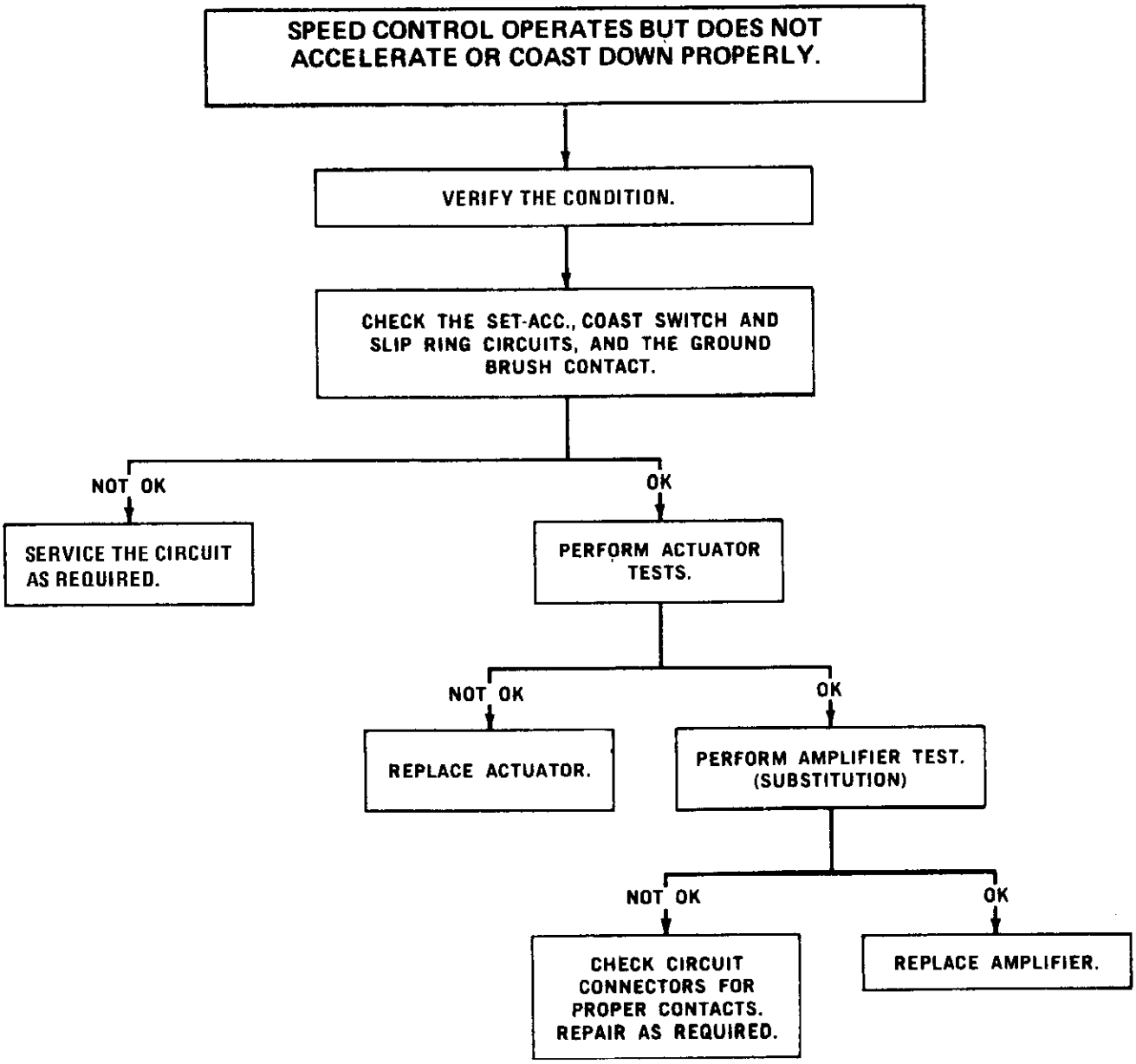
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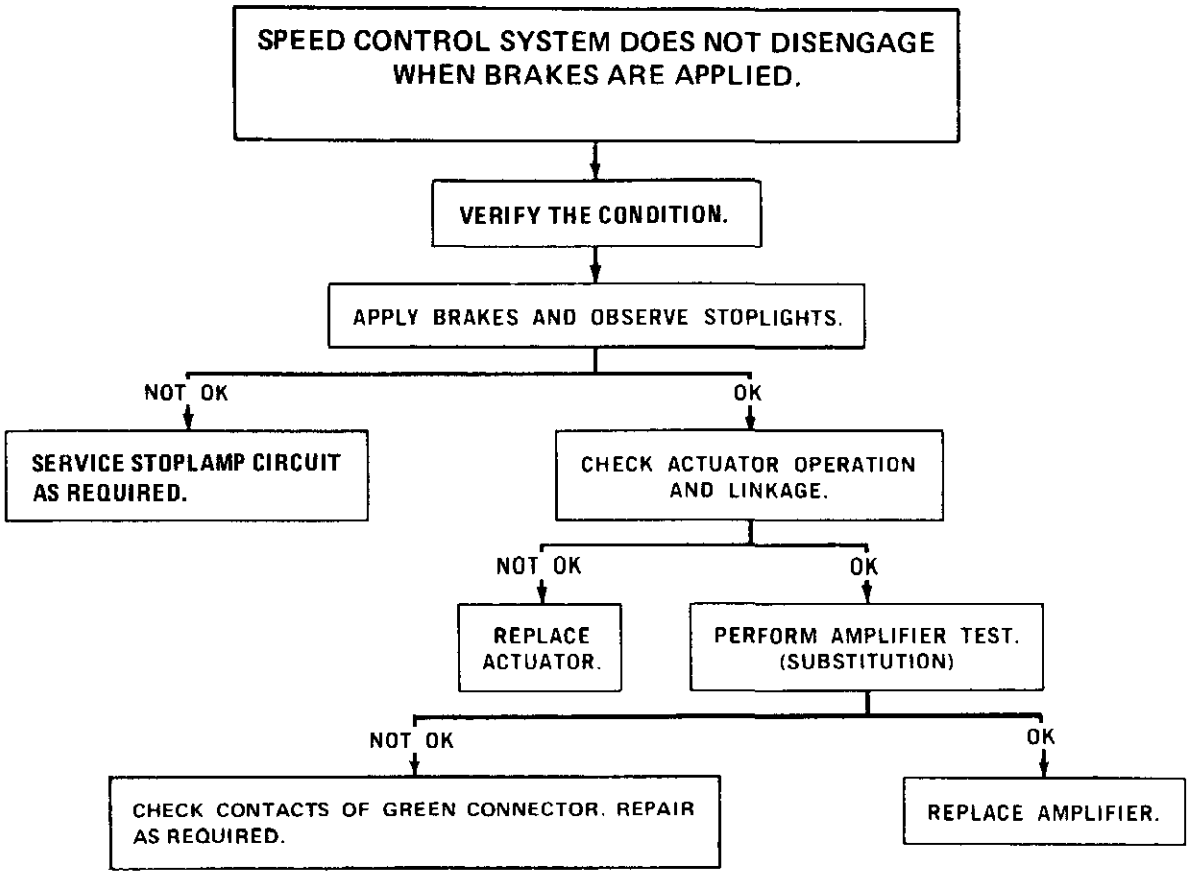
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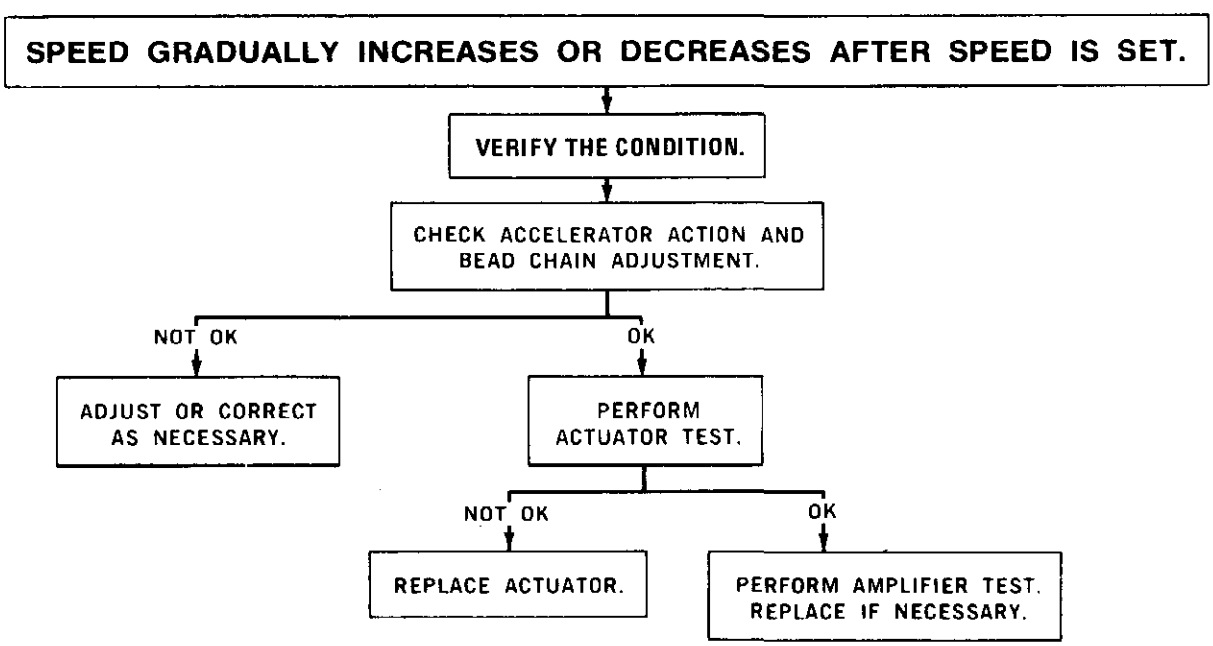
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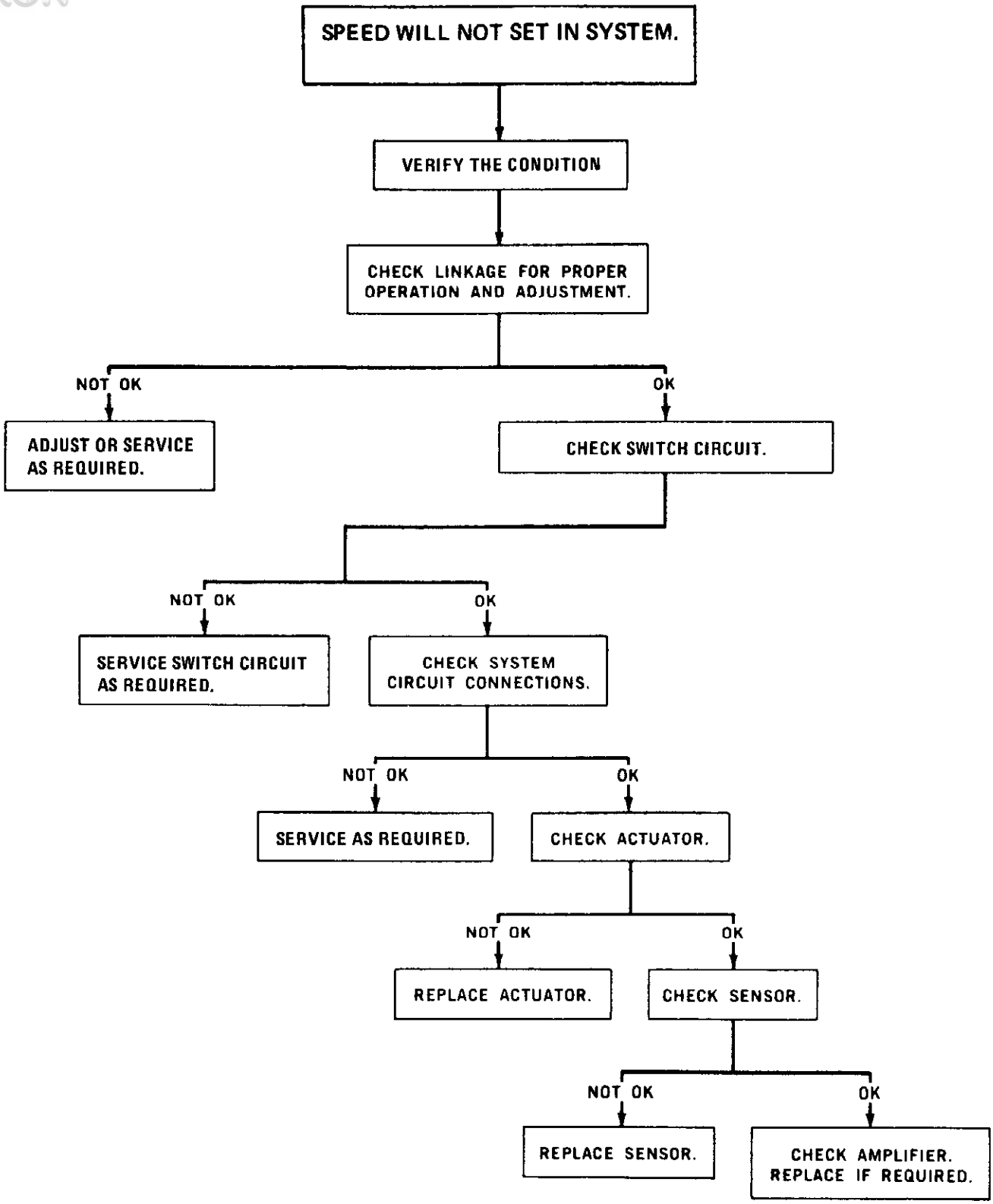
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TESTING

Speed control system tests should be performed using the Tester ARE-22015. If the ARE-22015 Tester is not available, use the following procedures.

VISUAL INSPECTION

A visual inspection is an important part of the system test. When performing a visual inspection, check all items for abnormal conditions such as bare, broken or disconnected wires and damaged vacuum reserve tanks and hoses. For the speed control system to function properly, it is necessary that the speedometer cables be properly routed and securely attached. All vacuum hoses must be securely attached and routed with no sharp bends or kinks. The servo (throttle actuator) and throttle linkage should operate freely and smoothly. **The bead chain should have no more than 1/4 inch free play. Electrical connections must be complete and tight. The wiring harness must be properly routed. Look for damaged wiring insulation or evidence of shorts.** Any problems revealed by the visual inspection should be corrected before further tests of the speed control system are made.

CONTROL SWITCHES TEST

Disconnect the 6 way connector at the amplifier assembly. See Figs. 1 through 12 and perform the following checks:

1. Connect a voltmeter between the Light Blue-Black Hash lead and ground. Depress the "ON" button and check for battery voltage.
2. Turn off key and connect an ohmmeter between the Light Blue-Black Hash lead and ground.
3. Rotate the steering wheel throughout its full range while making the following checks:
   a. Depress the "OFF" button and check for a reading between 0 and 1 ohm.
   b. Depress the "SET" button and check for a reading between 714 and 646 ohms.
   c. Depress the "COAST" button and check for a reading between 126 and 114 ohms.

   If resistance values are within specification, but needle fluctuates, remove the steering wheel and clean the ground brush contact surfaces and the turn signal brush contact surfaces.

   If resistance values are above the allowable limits, check the switch assemblies and ground circuit in the steering column.

SPEED SENSOR TEST

Connect the 6 way connector at the amplifier assembly, Figs. 1 through 5 and connect an ohmmeter between the wire connector terminals (Dark Green-White Stripe and Black) at the speed sensor end. A reading of approximately 40 ohms should be obtained. A reading of 0 ohms indicates a shorted coil and a maximum reading indicates an open coil. Replace the sensor in either case.

If the ohmmeter records 40 ohms and the speedometer operates properly within needle waver, the speed sensor is probably good. A speed sensor of known good quality can also be substituted in place of the existing sensor to check for proper operation.

SERVO ASSEMBLY TEST

Disconnect the ball chain from the throttle linkage in the system drawings Figs. 2, 3, 5, 7, 9 and 12. Separate the 8 way connector at the amplifier. Connect an ohmmeter between the Orange-Yellow hash and Gray-Black hash wire leads at the 8 way connector. A resistance of approximately 85 ohms should be obtained. Connect the ohmmeter between the Orange-Yellow hash mark and White-Pink hash mark wire leads. A resistance of approximately 85 ohms should be obtained. Reconnect the ball chain to the carburetor.

Start the engine, and with the servo disconnected from the amplifier, connect the Orange-Yellow hash mark lead of the servo to the battery positive terminal. Connect the White-Pink hash mark lead of the servo to ground, and momentarily touch the Gray-Black hash mark lead of the servo to ground. The servo throttle actuator arm should pull in. The arm should hold in that position or slowly release. When the White-Pink hash mark wire is removed from ground, the servo should release. Replace the servo if it fails any part of the proceeding test. If the Orange-Yellow hash mark lead is shorted to either the White-Pink hash mark or Gray-Black hash mark leads, it may be necessary to replace the amplifier.

AMPLIFIER TEST

CAUTION: Do not use a test lamp to perform the following tests as excessive current draw will damage electronic components inside the amplifier. **Use only a voltmeter of 5,000 ohm/volt rating or higher.**

"ON" CIRCUIT TEST

Turn on the ignition switch and connect a voltmeter between the Light Blue-Black hash mark lead and ground in the amplifier 6-way connector. The voltmeter should read battery voltage when the "ON" switch on the steering wheel is depressed and held. If voltage is not available check the horn relay circuit and perform control switch test. Release the "ON" button; battery voltage should remain at the blue wire indicating the "ON" circuit is engaged. If the voltage does not remain, check for ground on the amplifier (black wire on the 6-way connector). Also check the fuse and/or circuit breaker and/or hang in a known good amplifier and recheck for a good "ON"circuit.

"OFF" CIRCUIT TEST

With the ignition on and the voltmeter connected to the Lt. Blue-Black hash mark wire, depress the OFF switch on the steering wheel. Voltage on the blue wire should drop to zero indicating the ON circuit is de-energized. If the voltage does not drop to zero, perform the control switch test. If the switches check OK hang in a known good amplifier and recheck the OFF circuit as above.

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CIRCUIT NUMBER	PRIMARY COLOR	SECONDARY	STRIPE	HASH MK.	DOTS
1	DK. BLUE				
460	YELLOW	LT. BLUE			X
57	BLACK				
150	DK. GREEN	WHITE	X		
475	DK. GREEN	WHITE		X	
151	LT. BLUE	BLACK		X	
296	WHITE	PURPLE	X		
149	BROWN	LT. GREEN		X	
148	YELLOW	RED		X	
147	PURPLE	LT. BLUE		X	
146	WHITE	PINK		X	
145	GRAY	BLACK		X	
144	ORANGE	YELLOW		X	
5	ORANGE	LT. BLUE	X		
9	LT. GREEN	ORANGE	X		
511	LT. GREEN				

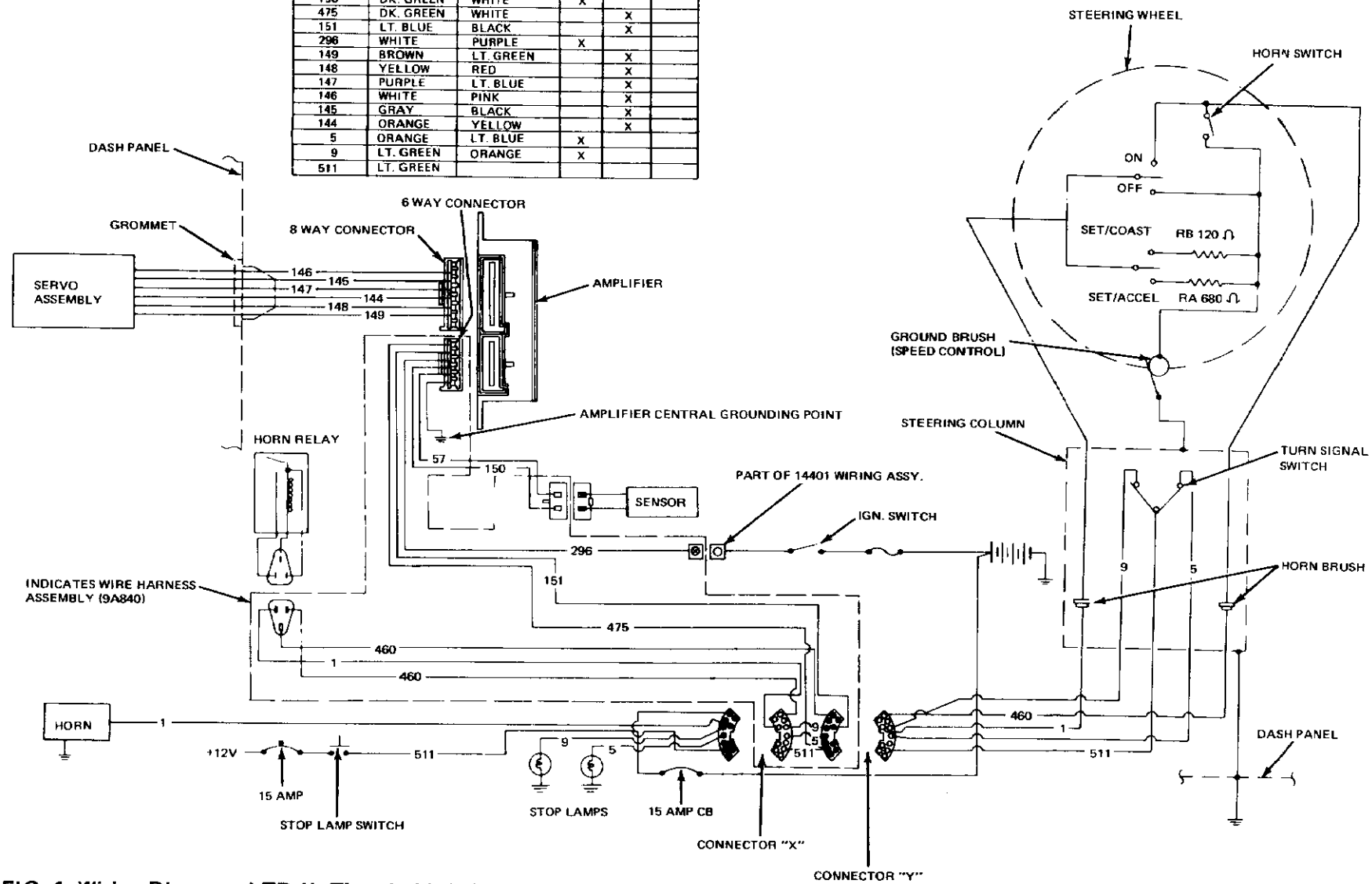


FIG. 1 Wiring Diagram—LTD II, Thunderbird, Cougar XR-7 and Ranchero

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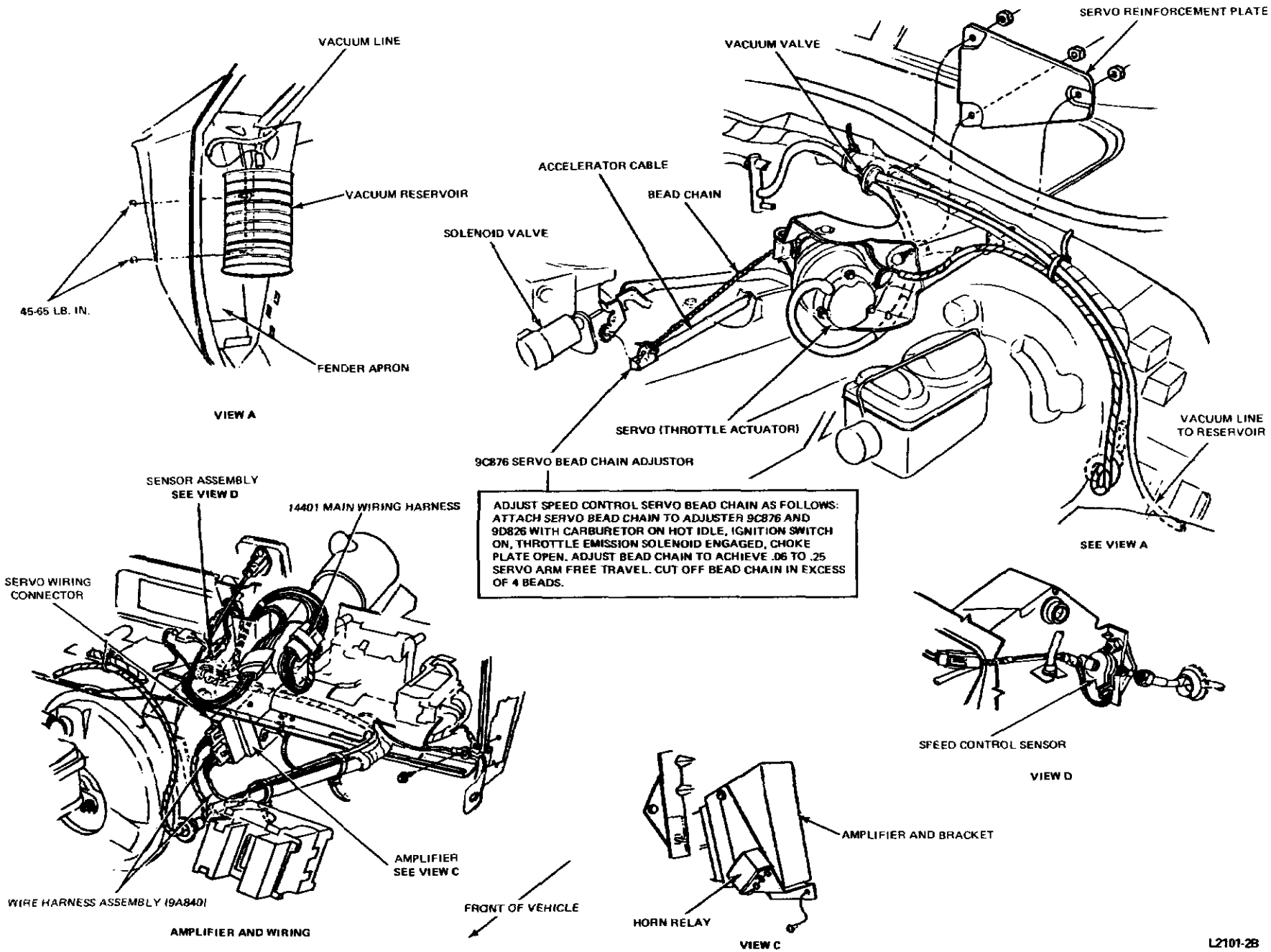


FIG. 2 Speed Control System—LTD II, Thunderbird, Cougar XR-7 and Ranchero—5.8L and 6.6L (351M and 400 CID) Engines

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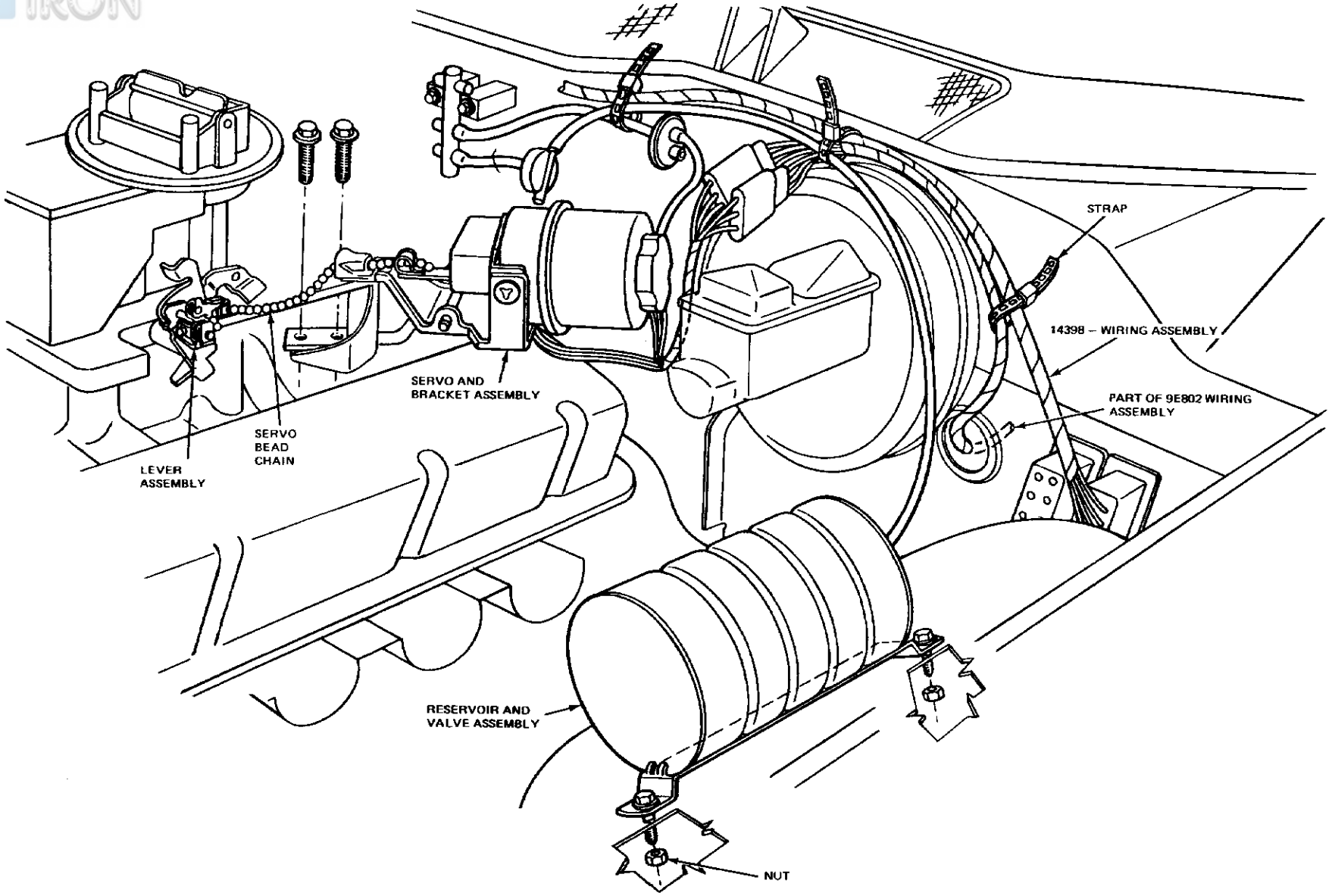


FIG. 3 Speed Control System—LTD II, Thunderbird, Cougar XR-7 and Ranchero—5.0L (302 CID) Engine

L2386-2A

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CIRCUIT NUMBER	PRIMARY COLOR	SECONDARY	STRIPE	HASH MK.	DOTS
1	DK. BLUE				
460	YELLOW	LT. BLUE			X
57	BLACK				
150	DK. GREEN	WHITE	X		
475	DK. GREEN	WHITE		X	
151	LT. BLUE	BLACK		X	
296	WHITE	PURPLE	X		
149	BROWN	LT. GREEN		X	
148	YELLOW	RED		X	
147	PURPLE	LT. BLUE		X	
146	WHITE	PINK		X	
145	GRAY	BLACK		X	
144	ORANGE	YELLOW		X	
5	ORANGE	LT. BLUE	X		
9	LT. GREEN	ORANGE	X		
511	LT. GREEN				

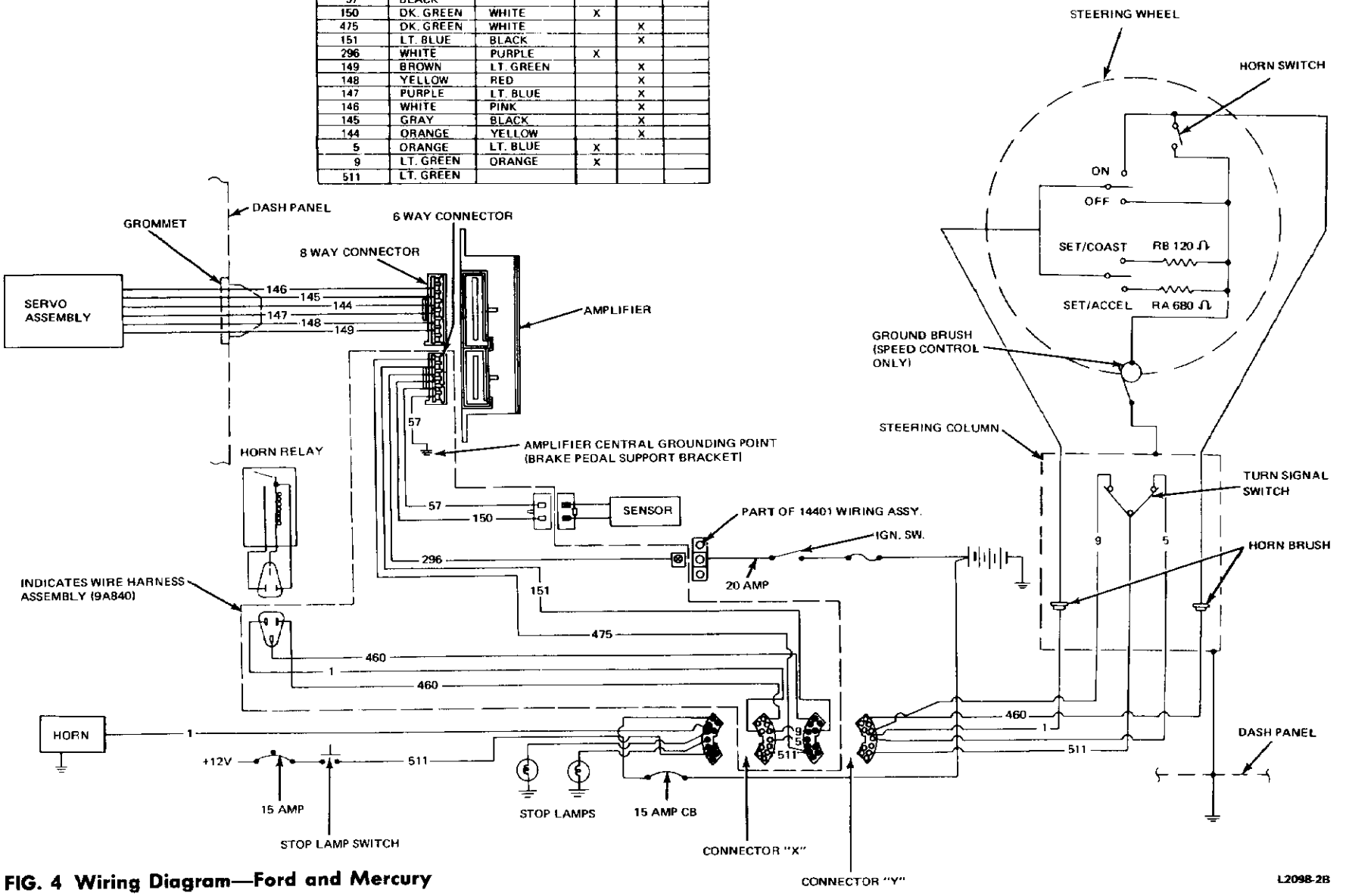


FIG. 4 Wiring Diagram—Ford and Mercury

L2098-2B

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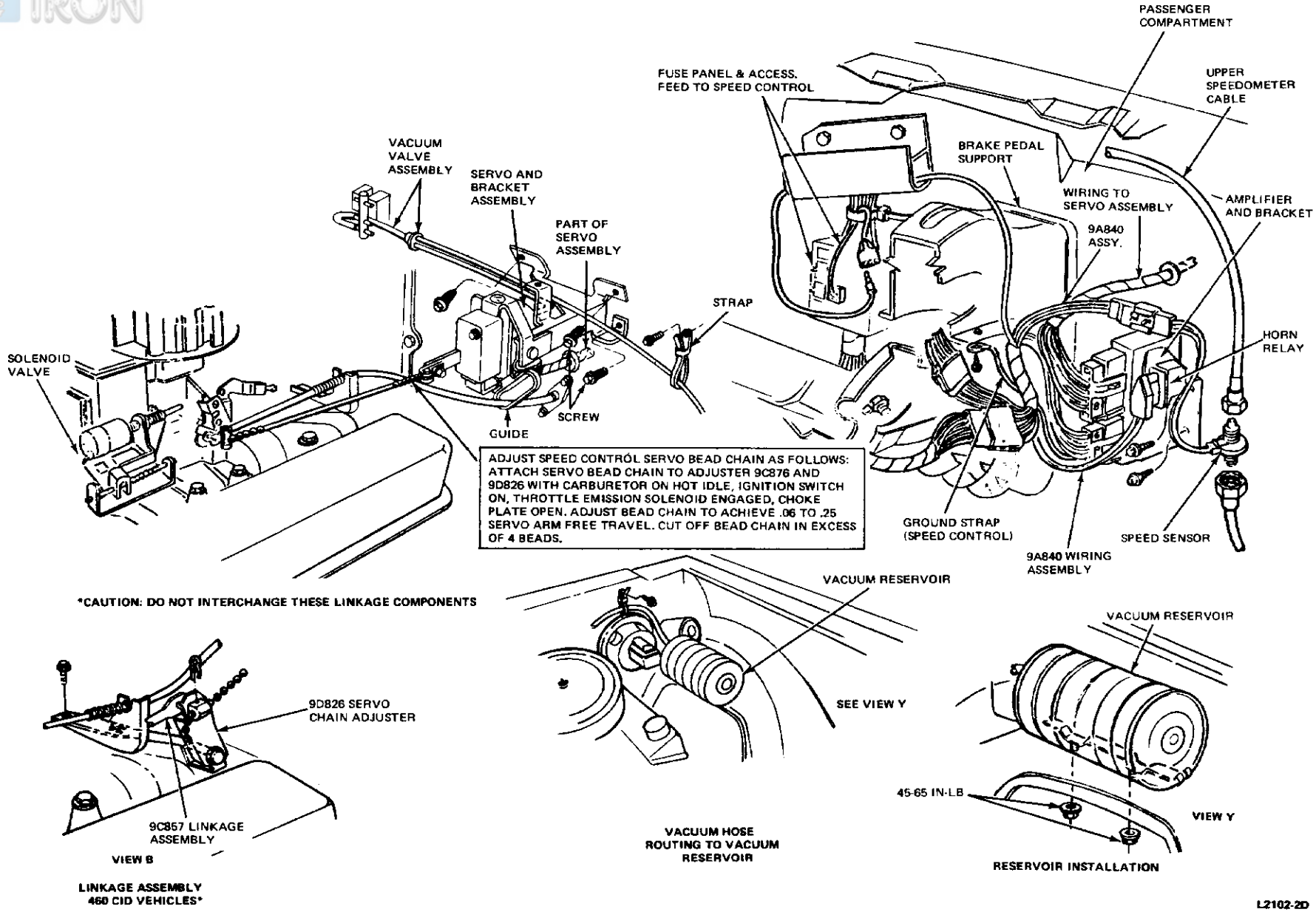


FIG. 5 Speed Control Systems—Ford and Mercury

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CIRCUIT NUMBER	PRIMARY COLOR	SECONDARY	STRIPE	HASH MK.	DOTS
1	DK. BLUE				
460	YELLOW	LT. BLUE			X
57	BLACK				
150	DK. GREEN	WHITE	X		
475	DK. GREEN	WHITE		X	
151	LT. BLUE	BLACK		X	
296	WHITE	PURPLE	X		
149	BROWN	LT. GREEN		X	
148	YELLOW	RED		X	
147	PURPLE	LT. BLUE		X	
146	WHITE	PINK		X	
145	GRAY	BLACK		X	
144	ORANGE	YELLOW		X	
5	ORANGE	LT. BLUE	X		
9	LT. GREEN	ORANGE	X		
511	LT. GREEN				

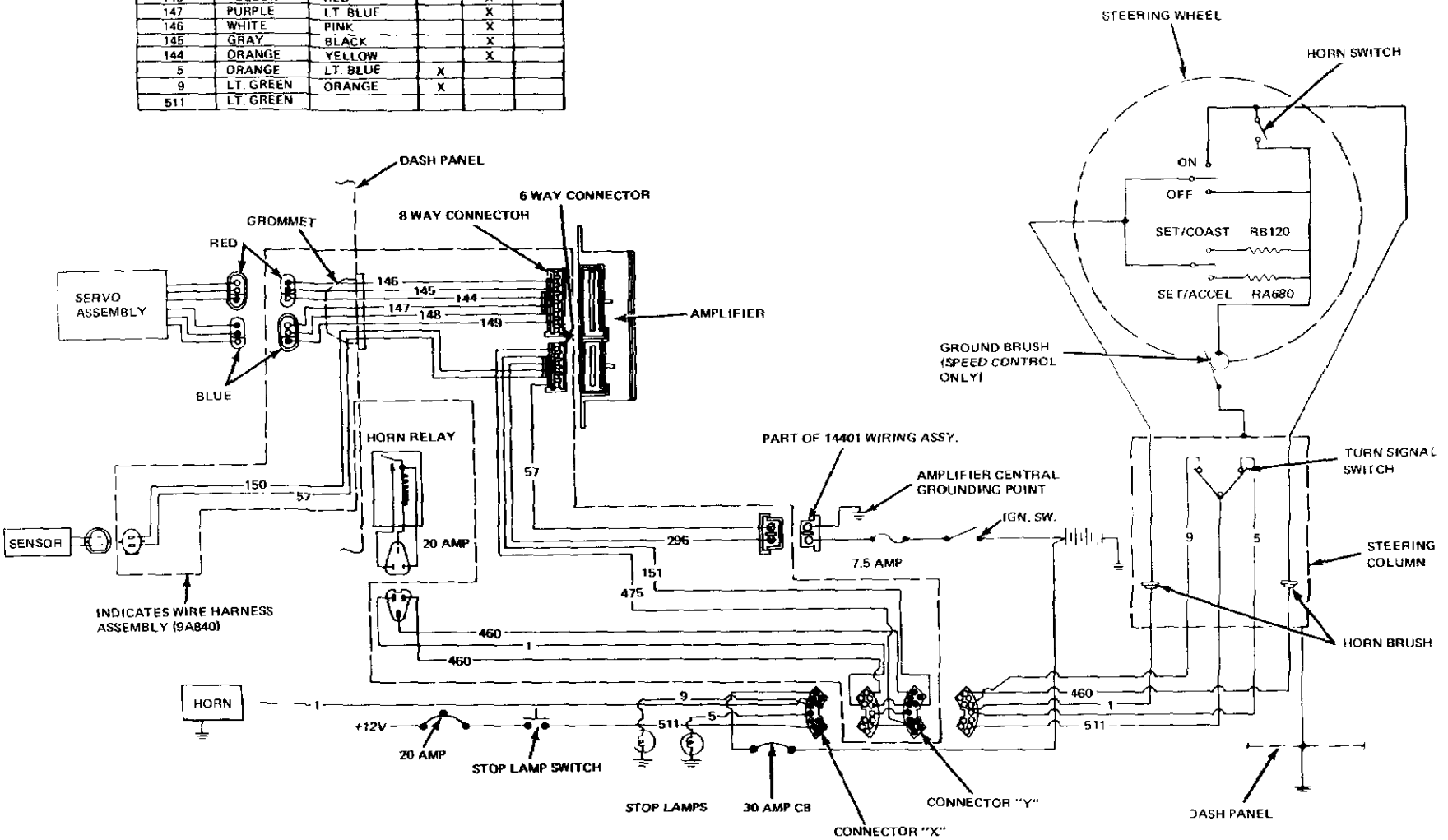
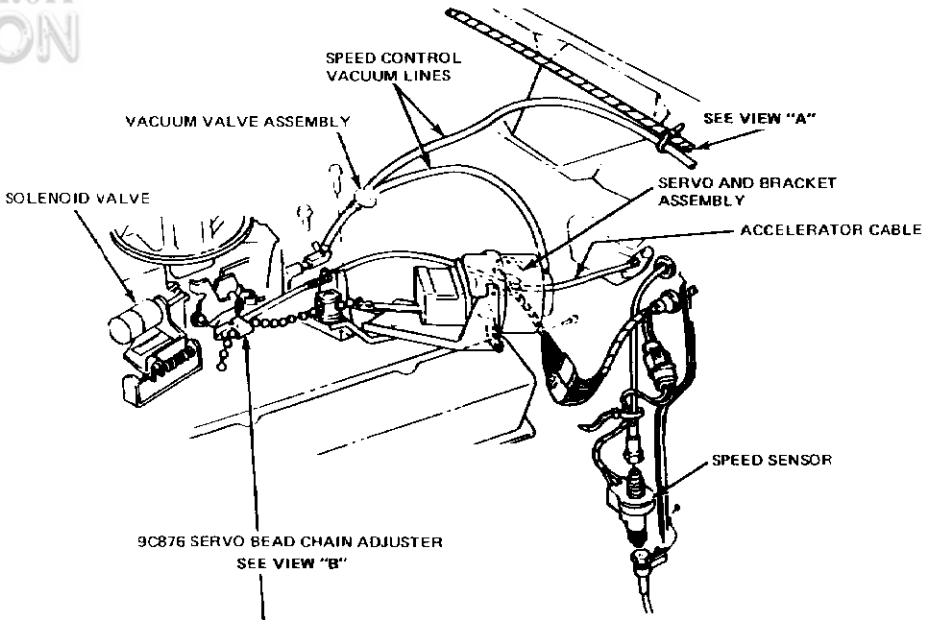


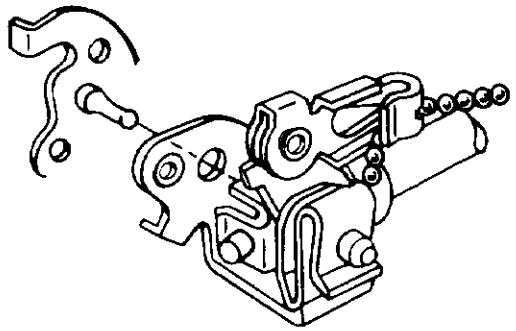
FIG. 6 Wiring Diagram—Continental Mark V

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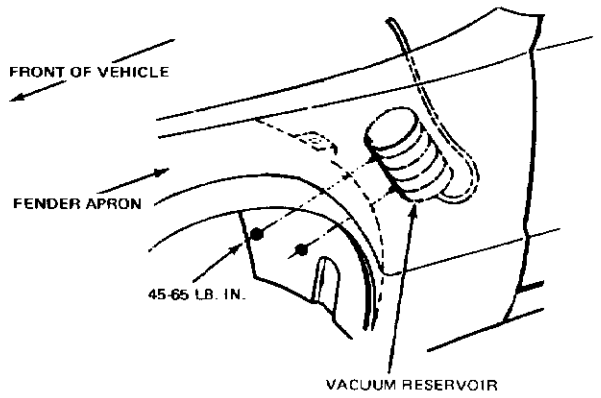
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ADJUST SPEED CONTROL SERVO BEAD CHAIN AS FOLLOWS: ATTACH SERVO BEAD CHAIN TO ADJUSTER 9C876 AND 9D826 WITH CARBURETOR ON HOT IDLE, IGNITION SWITCH ON, THROTTLE EMISSION SOLENOID ENGAGED, CHOKE PLATE OPEN. ADJUST BEAD CHAIN TO ACHIEVE .06 TO .25 SERVO ARM FREE TRAVEL. CUT OFF BEAD CHAIN IN EXCESS OF 4 BEADS.



VIEW B



VIEW A

NOTE: SPEED CONTROL IS STANDARD EQUIPMENT ON ALL MARK V VEHICLES

LZ103-2C

FIG. 7 Speed Control Systems—Continental Mark V

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CIRCUIT NUMBER	PRIMARY COLOR	SECONDARY	STRIPE	HASH MK.	DOTS
1	DK. BLUE				
460	YELLOW	LT. BLUE			X
57	BLACK				
150	DK. GREEN	WHITE	X		
475	DK. GREEN	WHITE		X	
151	LT. BLUE	BLACK		X	
298	PURPLE	ORANGE		X	
149	BROWN	LT. GREEN		X	
148	YELLOW	RED		X	
147	PURPLE	LT. BLUE		X	
146	WHITE	PINK		X	
145	GRAY	BLACK		X	
144	ORANGE	YELLOW		X	
5	ORANGE	LT. BLUE	X		
9	LT. GREEN	ORANGE	X		
511	LT. GREEN				

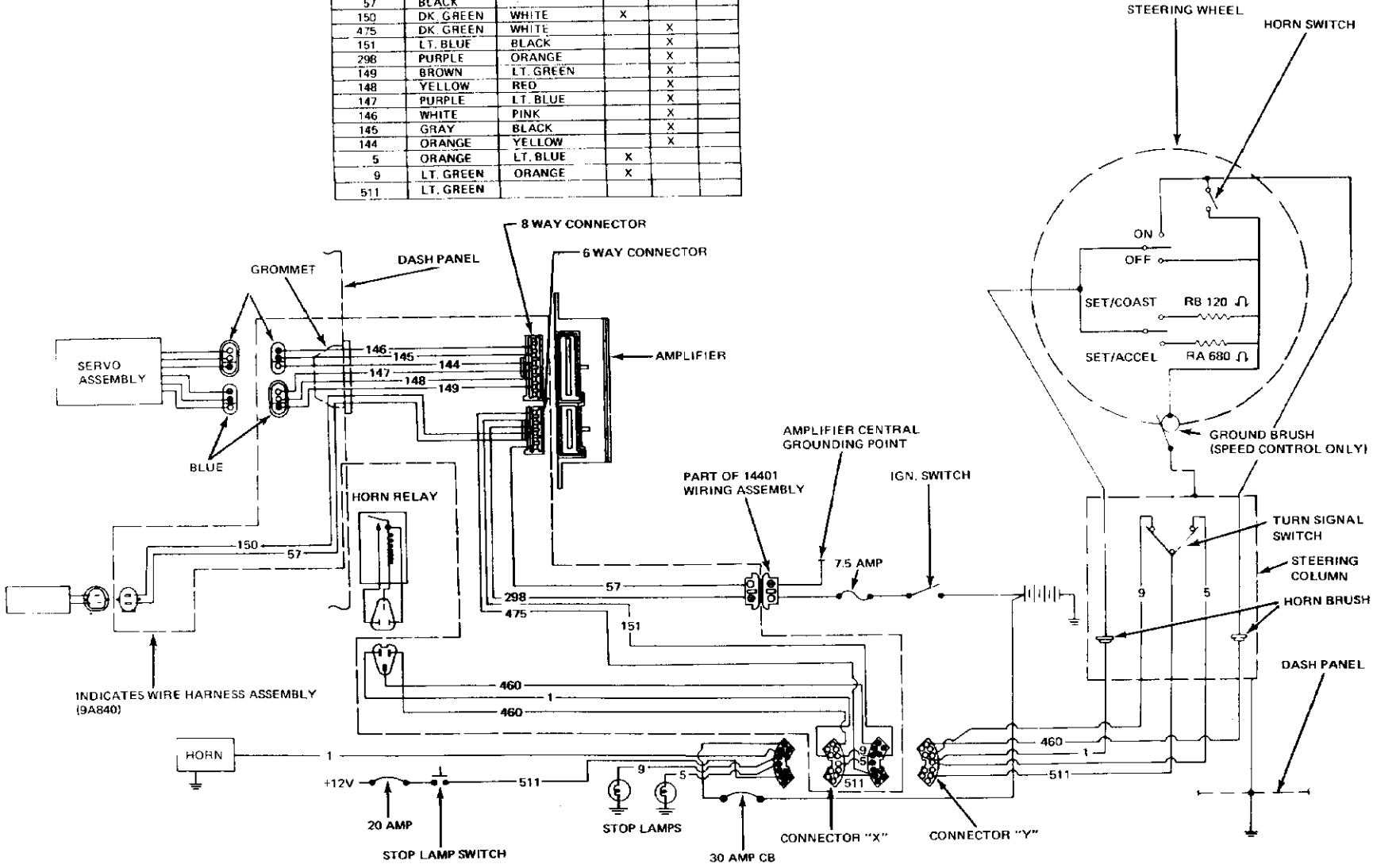


FIG. 8 Wiring Diagram—Lincoln Continental

L2100-2A

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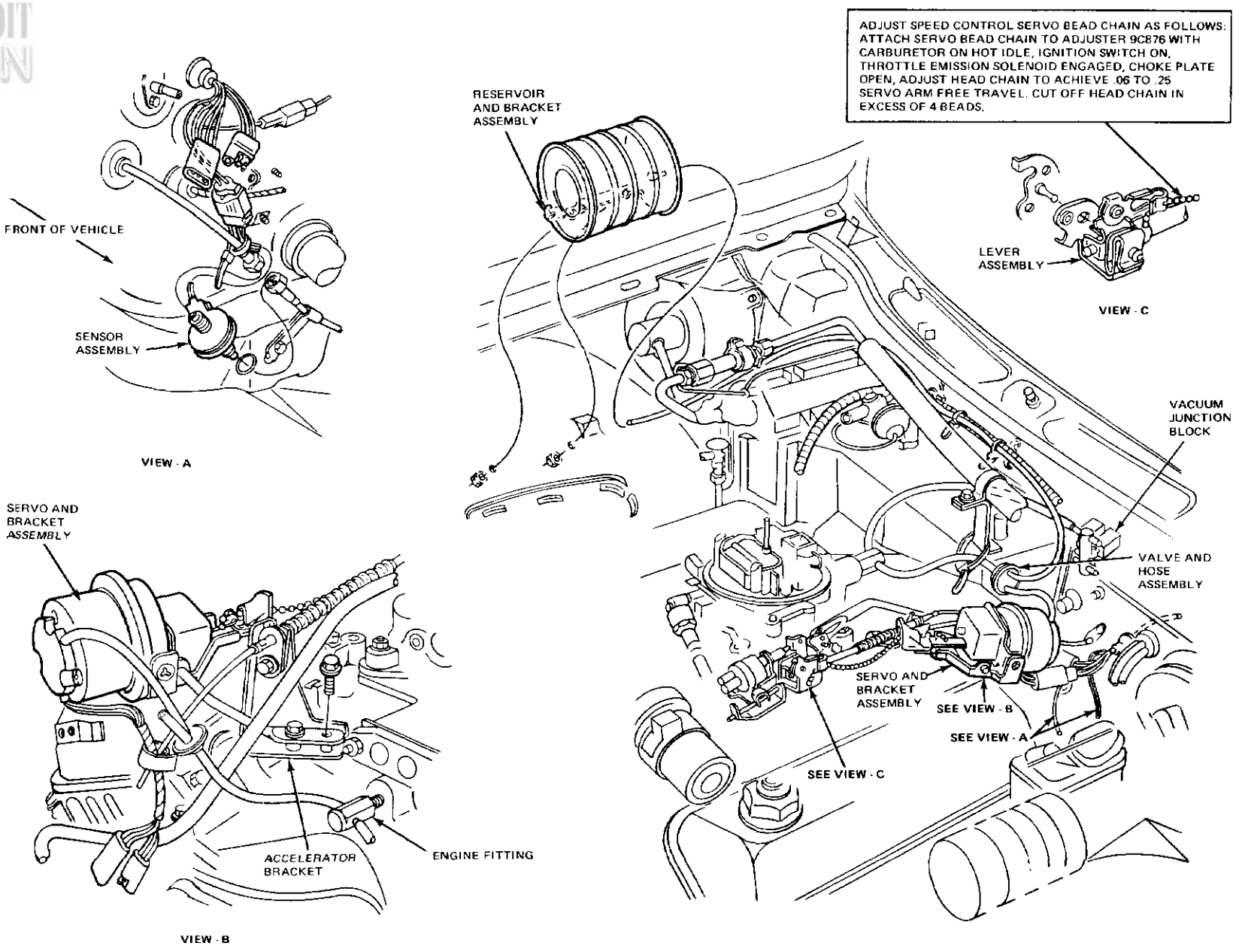


FIG. 9 Speed Control System—Lincoln Continental

L2104-2C

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CIRCUIT NUMBER	PRIMARY COLOR	SECONDARY →	STRIPE	HASH MK	DOTS
1	DK BLUE				
460	YELLOW	LT BLUE			X
57	BLACK				
150	DK GREEN	WHITE	X		
475	DK GREEN	WHITE		X	
151	LT BLUE	BLACK		X	
296	WHITE	PURPLE		X	
149	BROWN	LT GREEN		X	
148	YELLOW	RED		X	
147	PURPLE	LT BLUE		X	
146	WHITE	PINK		X	
145	GRAY	BLACK		X	
144	ORANGE	YELLOW		X	
810	RED	LT GREEN		X	
57A	BLACK				
460 A	YELLOW	LT BLUE			X

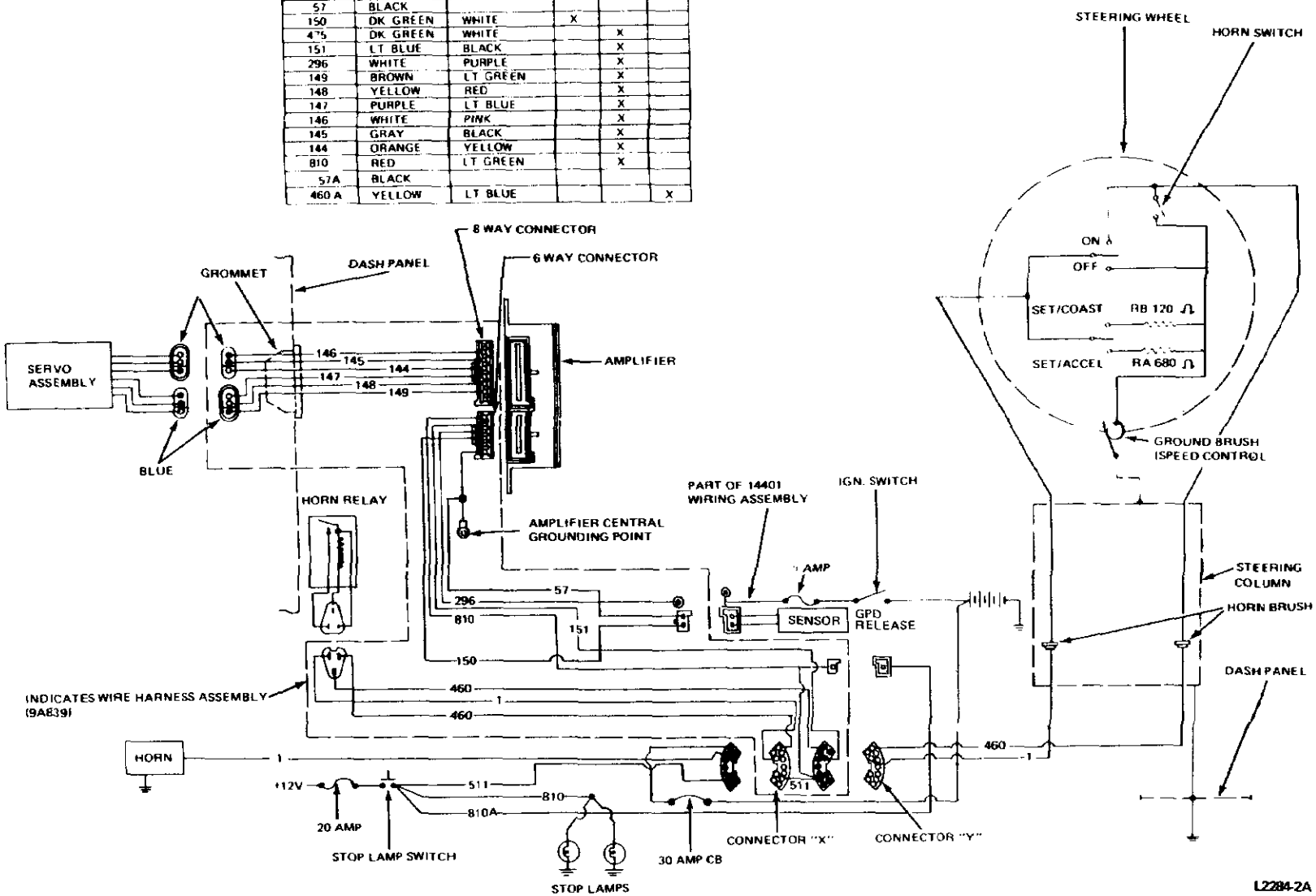


FIG. 10 Speed Control Wiring Schematic—Granada

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CIRCUIT NUMBER	PRIMARY COLOR	SECONDARY	STRIPE	HASH MK	DOTS
1	DK BLUE				
460	YELLOW	LT BLUE			X
57	BLACK				
150	DK GREEN	WHITE	X		
475	DK GREEN	WHITE		X	
151	LT BLUE	BLACK		X	
296	WHITE	PURPLE		X	
149	BROWN	LT GREEN		X	
148	YELLOW	RED		X	
147	PURPLE	LT BLUE		X	
146	WHITE	PINK		X	
145	GRAY	BLACK		X	
144	ORANGE	YELLOW		X	
810	RED	LT GREEN		X	
57A	BLACK				
460 A	YELLOW	LT BLUE			X

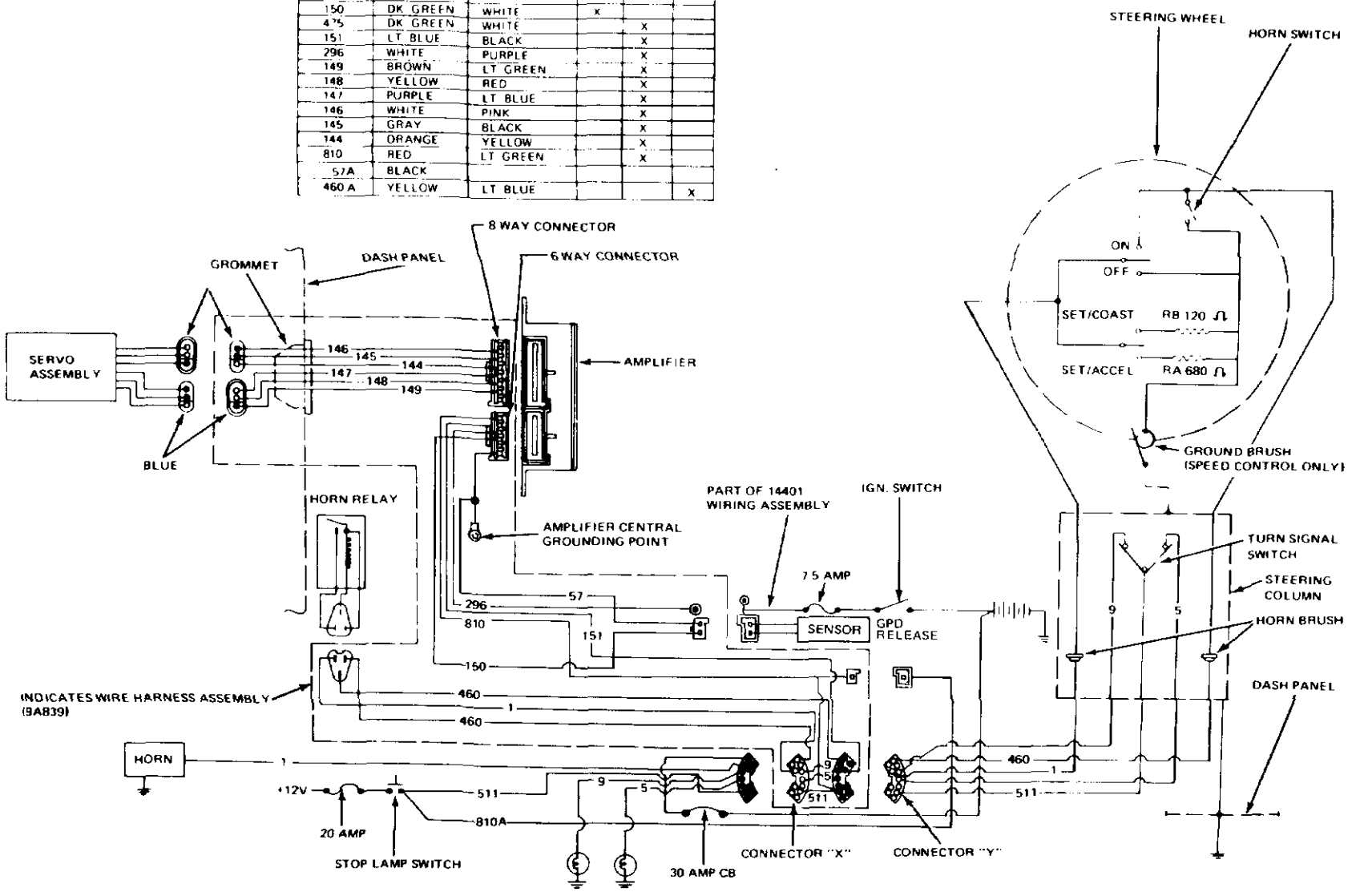
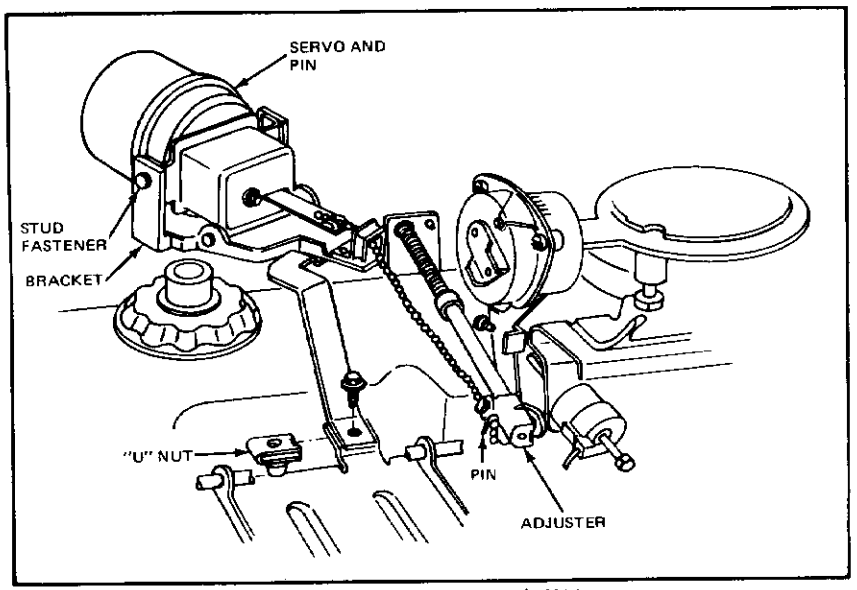
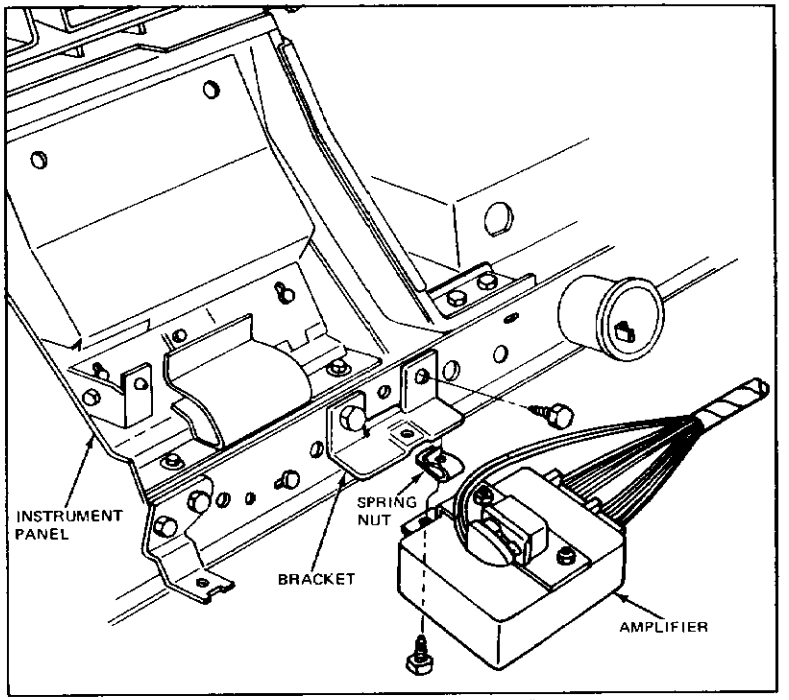


FIG. 11 Speed Control Wiring Schematic—Monarch and Versailles

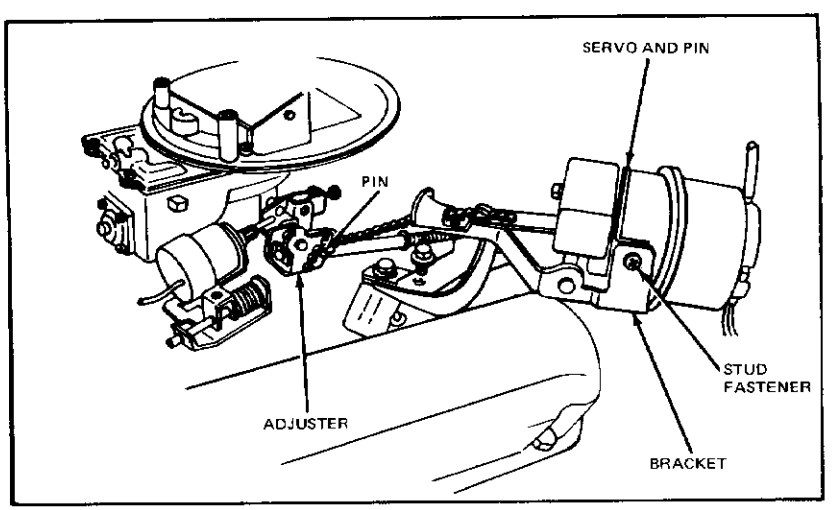
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SERVO WITH 4.1L (250 CID) ENGINE



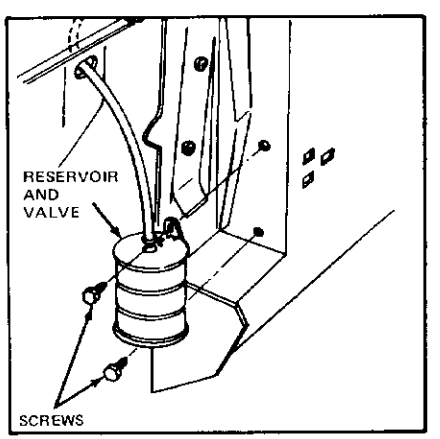
AMPLIFIER AND BRACKET



SERVO WITH 5.0L (302 CID) ENGINE

NOTE:

ADJUST SPEED CONTROL SERVO BEAD CHAIN AS FOLLOWS: ATTACH SERVO BEAD CHAIN TO ADJUSTER 9C876 AND 9D826 WITH CARBURETOR ON HOT IDLE, IGNITION SWITCH ON, THROTTLE EMISSION SOLENOID ENGAGED, CHOKE PLATE OPEN. ADJUST BEAD CHAIN TO ACHIEVE .06 TO .25 SERVO ARM FREE TRAVEL. CUT OFF BEAD CHAIN TO EXCESS OF 4 BEADS.



TANK INSTALLATION

L2294-2A

FIG. 12 Speed Control System—Granada, Monarch and Versailles

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DETROIT IRON

SET-ACCELERATE CIRCUIT TEST

With the ignition on, the voltmeter connected to the Light Blue-Black hash mark wire in the 6-way connector-to-ground depress the "ON" switch then hold Set-Accel button on steering wheel. Voltmeter should indicate approximatley 10 volts. Rotate the steering wheel back and forth and watch the voltmeter for fluctuations. If the voltage varies more than 0.5 volt, perform the control switch test.

COAST CIRCUIT TEST

With the ignition on and the voltmeter connected to the Light Blue-Black Hash mark wire in the 6 way connector-to-ground depress then "ON" switch, then hold the coast down button on steering wheel. Voltmeter should indicate approximately 6 volts. If all the functions check "OK" perform the servo check and sensor test and hang in a known good amplifier.

Do not substitute a new amplifier for the old amplifier until the actuator coils have been tested. Refer to the Servo Assembly (Throttle Actuator Test).

SIMULATED ROAD TEST

1. Raise the rear wheels clear of the floor. Block front wheels securely. Use floor stands to support the rear axle securely. Never use a floor jack to support the center of the rear axle while making the following tests.
2. Start the engine.
3. Shift the transmission to drive.
4. Turn on the speed control.

   CAUTION: IF ANY TIME DURING THE FOLLOWING STEPS THE SYSTEM SHOULD APPEAR TO GO OUT OF CONTROL AND OVERSPEED, BE PREPARED TO TURN THE SYSTEM OFF AT ONCE WITH THE "OFF" SWITCH OR THE IGNITION SWITCH.
5. Accelerate and hold at 35 MPH.
6. Press and release the set speed button. Hold foot pressure very lightly on accelerator pedal. Normally the speed will continue at 35 MPH for a short period of time and then gradually start surging.
7. Press the off button. The engine should drop back to idle. Stop the rear wheels with the brakes.
8. Press "ON" button, accelerate and hold the speed at 35 MPH.
9. Press and hold the set/accel. button. Slowly remove the foot from the accelerator. The engine speed should gradually increase.
10. When the speed reaches 50 MPH, release the set/accel. button. The surging should start soon.
11. Press the "COAST" button and hold. The engine should idle. Slow the rear wheels to 35 MPH.
12. Release the "COAST" button. Speed should set in. Surging should soon start.
13. Press the brake pedal. The system should shut off, the engine to idle and the brakes stop the wheels.

When performing these tests keep the vehicle speeds within reasonably low limits. If the system does not perform as normally expected, make note of the malfunction.

SUPPLY CIRCUIT

Blow the horn with the ignition switch in the ON position and the transmission in neutral. This test will determine whether there is power in the horn circuit to the steering wheel. If the horn does not blow, perform the horn relay circuit and ground circuit tests.

BRAKE STOPLAMP SWITCH AND CIRCUIT TEST

To be performed when brake application will not disconnect the speed control.

1. Check for stoplight operation with a maximum brake pedal effort of 6 lbs. If more than 6 lbs. effort is required, check the brake pedal actuation and stoplight switch. Repair or replace as required.
2. If stoplights work properly check the battery voltage on the White-Purple Stripe or Purple-Orange Hash lead at the 6-way connector. Depress the brake pedal until the stoplights are lit. Check voltage on the Dark Green-White Hash lead at the 6-way connector. The difference between the two voltage readings must not exceed 1.5 volts. If a voltage difference greater than 1.5 volts is found, the high resistance in the stoplight circuit must be found and corrected. There should be no voltage present on the Dark Green-White Hash lead with the brake lights off.
3. If the stoplights do not work, the stoplight switch, supply circuit, or bulbs must be checked.

HORN RELAY CIRCUIT TEST

1. Locate horn relay wire connector marked "X" and "Y" on the wiring diagram (Figs. 1, 4, 5, 8, 10 and 11).
2. Using the connector "X" shown on wiring diagram, locate the yellow-light blue wire. With a voltmeter, measure for battery voltage (approximately plus 12 volts) on the male side of the connector.
3. Using the connector "Y" (shown on wiring diagram) locate the yellow-light blue dot wire. Connect a voltmeter to the female side of the connector and check for approximately plus 12 volts.
4. With the voltmeter still connected to the female lead in Step 3, depress the horn switch. The voltmeter should read zero.
5. If the above checks prove satisfactory, connect the voltmeter to the male side of the dark blue wire in the connector "X" shown on wiring diagram. Depress the horn switch and read the meter. The reading should be 12 volts and the horn should operate.
6. If the horn does not operate, the horn failure is in the circuitry between the connector and the horn and should be repaired. If intermittent horn blow is encountered when a door is closed or when going over road bumps, tap the side of the horn relay. If the horn blows when the relay is tapped, the horn relay should be replaced.

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ADJUSTMENTS

LINKAGE ADJUSTMENT

Adjust the bead chain to obtain 1/16-1/4 inch actuator arm free travel when the engine is at hot idle. The adjustment should be made to take as much slack out of the bead chain as possible **without restricting the carburetor lever from returning to idle.** The tighter the bead chain the better performance on the speed control system. On vehicles equipped with a solenoid throttle positioner, perform this adjustment by opening the throttle slightly with the ignition switch in the ON position.

REMOVAL AND INSTALLATION

CONTROL SWITCHES

Removal

1. Remove the two attaching screws holding the pad assembly to the steering wheel.
2. Lift up the pad assembly to expose the horn and speed control wire terminals. Disconnect and remove the pad assembly.
3. Remove the four lower retaining nuts holding the speed control switches and trim plate retainer to the pad assembly.
4. Disconnect the wiring connector on the rear of the pad assembly and remove the switch and trim retainer assembly.
5. The speed control switch assembly may now be removed by snapping the switches out of the plastic trim retainer.

Installation

1. Snap the switch into the trim plate retainer and position the wires through the center hole in the pad assembly.
2. Install the four trim retaining nuts by pushing them onto the plastic studs of the trim plate. Connect the wiring connector on the rear of the pad assembly.
3. Attach the wires to the steering wheel hub and the high foam pad to the steering wheel with the two retaining screws (Fig. 13).

GROUND BRUSH

Removal

1. Remove the steering wheel for access.
2. Snap the brush assembly out of the turn signal switch.

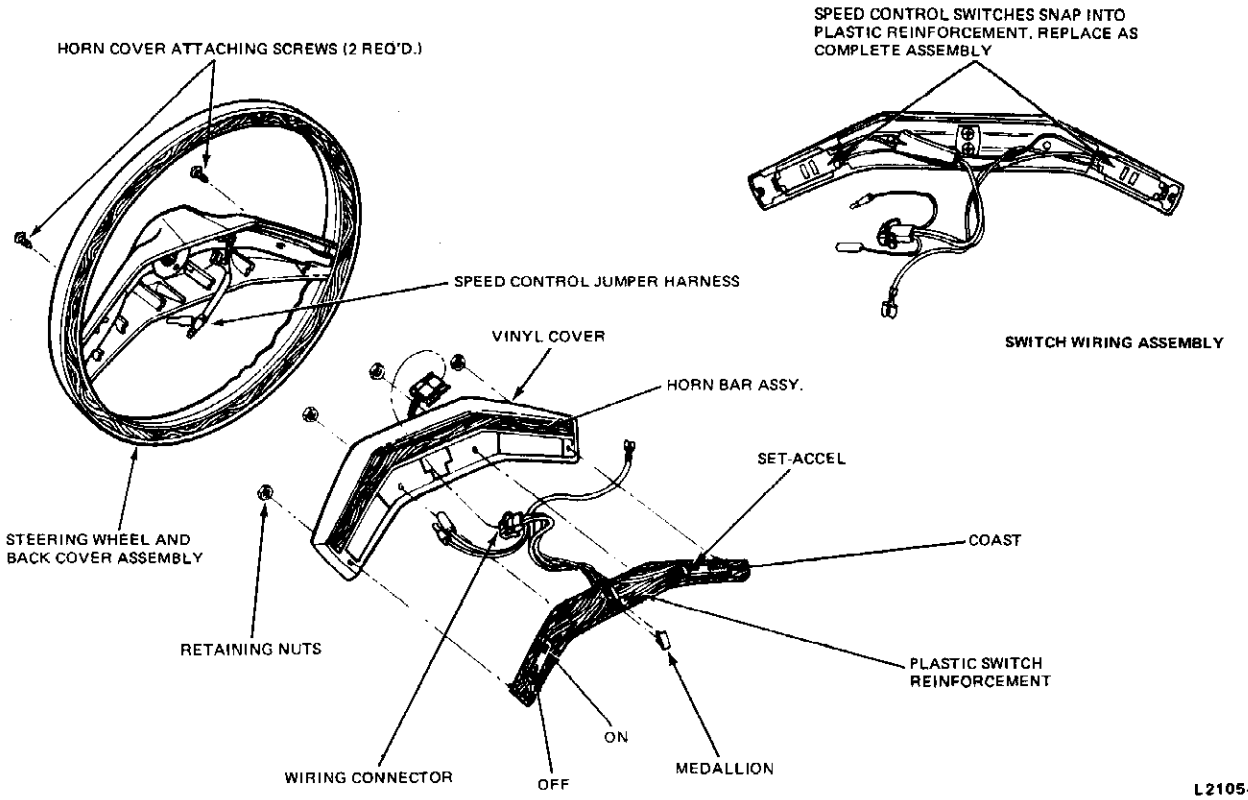


FIG. 13 Speed Control Switch Removal and Installation

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DETROIT IRON

Installation

1. Install the ground brush in the turn signal switch. (If the turn signal switch was lifted off the column when removing the ground brush, install the turn signal switch.)
2. Install the steering wheel trim pads and the steering wheel (Fig. 14).

SPEED SENSOR

Removal

1. Separate the electrical connector leading to the amplifier assembly.
2. Disconnect the upper and lower speedometer cables at the speed sensor.
3. Remove the speed sensor.

Installation

1. Install the speed sensor.
2. Install O-ring seals on sensor (Lincoln Continental and Continental Mark V).
3. Connect the upper and lower speedometer cables.
4. Connect the electrical connector leading to the amplifier assembly.

AMPLIFIER ASSEMBLY

NOTE: On some vehicles, the amplifier assembly includes a horn relay. In these cases, the horn relay also has to be disconnected and connected during removal and installation of amplifier.

Removal

1. Disconnect the 6 and 8 way connectors at the amplifier (Figs. 1 through 12).
2. Remove the attaching screws or nuts that fasten the amplifier bracket to the vehicle. On Continental Mark V the attaching screws allow removal of the amplifier alone omitting steps 3 and 4 for these models.
3. Remove the amplifier assembly and mounting bracket from the vehicle.
4. Remove the amplifier assembly from the mounting bracket.

Installation

1. Install the amplifier on the mounting bracket.
2. Attach the amplifier assembly and mounting bracket to the vehicle with the attaching screws or nuts.
3. Connect the 6 and 8 way connectors to the amplifier.
4. Test the system for proper operation.

SERVO ASSEMBLY (THROTTLE ACTUATOR)

Ford, Mercury, LTD II, Thunderbird, Ranchero and Cougar XR-7—All Except 5.0L (302 CID) Engines

Removal

1. Disconnect the wiring harness connector under the instrument panel at the amplifier.
2. In the engine compartment, remove the grommet from the dash panel and carefully pull the harness and connector through the dash panel opening.
3. Disconnect the ball chain. Disconnect the vacuum hose at the servo assembly.
4. Remove the pins retaining the servo assembly to the mounting bracket. Remove the servo assembly.

Installation

1. Position the servo assembly to the bracket and install the retaining pins. Connect the vacuum hose.
2. Route the lead through the dash panel and push the grommet in place.
3. Under the instrument panel, connect the servo assembly connector to the amplifier.
4. In the engine compartment connect the chain to the lever assembly. Refer to Adjustments.

LTD II, Thunderbird, Cougar, Granada, Monarch and Versailles—With 5.0L (302 CID) Engines

Removal

1. Disconnect the wiring harness connectors under the hood at the servo assembly (Figs. 1, 3, 6, 7, 8, 9, 10, 11 and 12).
2. Disconnect the ball chain at the carburetor. Disconnect the vacuum hose at the servo assembly.
3. Remove the pins retaining the servo assembly to the mounting bracket and remove the servo assembly.

Installation

1. Position the servo assembly to the bracket and install the retaining pins. Connect the vacuum hose.
2. Connect the ball chain at the carburetor (Refer to Adjustments).
3. Connect the wiring harness connectors under the hood at the servo assembly.

VACUUM RESERVOIR

LTD II, Thunderbird, Ranchero and Cougar (Figs. 1 and 2)

Removal

1. Under the hood, locate the vacuum line to the vacuum reservoir. Disconnect the line at the vacuum valve and remove the line from the attaching straps along the dash panel.
2. Working inside the left front fender well, remove three screws retaining the plastic splash shield to the fender apron. Remove the shield.
3. Remove the two screw/washer assemblies in the fender apron above the splash shield area and three screws attaching the lower rear underside of the fender to the body and sound deadner panel.
4. Remove four screws holding the fender apron to the fender starting at the lower rear edge of the wheel opening and working toward the center.
5. Remove the two nuts holding the vacuum reservoir to the fender apron. Remove the reservoir by spreading the lower rear portion of the fender and fender apron sufficiently to allow clearance for the reservoir and vacuum line assembly. Care should be taken not to damage the vacuum line which must be pulled through from the engine compartment during reservoir removal.

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Installation

1. Install the vacuum reservoir and hose assembly behind the fender apron and thread the vacuum line through the proper opening into the engine compartment.
2. Install the reservoir to the fender apron and securely attach the two retaining nuts.
3. Install and tighten to specification: three lower fender to body screws; four fender to fender apron attaching screws; and two screw/washer assemblies to the fender apron above the splash shield area.
4. Install the splash shield and retaining screws. Tighten screws securely.
5. Install the vacuum line through the retaining straps at the dash panel and attach to the vacuum valve.

Continental Mark V (Figs. 6 and 7)

Removal

1. Under the hood, locate the vacuum hose to the vacuum reservoir. Disconnect the line at the vacuum valve and remove the line from the attaching strap along the upper cowl.
2. Inside the left front fender well, starting at the rear and continuing to the centerline of the wheel opening, remove all the fender apron attaching screws.
3. Remove the two screws attaching the lower rear flange of the fender to the body.
4. Remove the two nuts holding the vacuum reservoir to the fender apron. Remove the reservoir by spreading the lower rear portion of the fender and fender apron sufficiently to allow clearance for the reservoir and vacuum hose assembly to drop down and out from behind the apron.

CARE SHOULD BE TAKEN NOT TO DAMAGE THE VACUUM LINE OR THE CHROME ROCKER MOULDING TRIM DURING THE REMOVAL PROCEDURE.

Installation

1. Install the vacuum reservoir and hose assembly behind the fender apron and thread the hose through the proper opening into the engine compartment.
2. Install the reservoir to the fender apron and securely attach the two retaining nuts.
3. Install and tighten to specification: two lower rear fender to body attaching screws, and all fender apron attaching screws.
4. Install the vacuum line through the retaining strap at the upper cowl and attach to the vacuum valve.

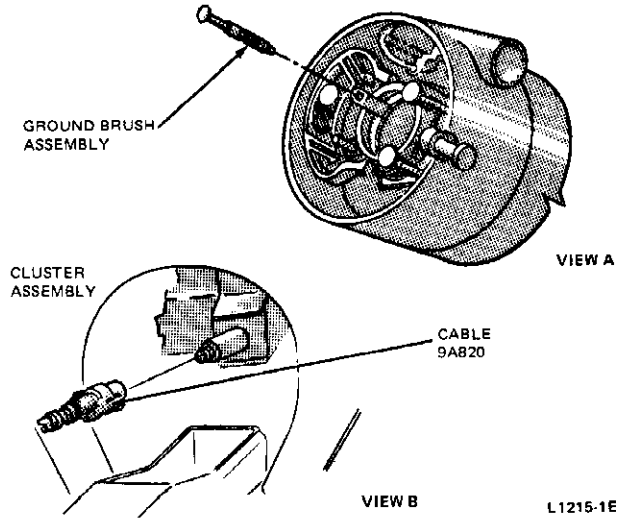


FIG. 14 Ground Brush Installation

Ford, Mercury and Lincoln Continental (Figs. 4 and 5)

Removal

1. From the underside of the fender well, remove two nuts that hold the vacuum reservoir to the fender apron.
2. Inside the engine compartment, remove the vacuum line from the reservoir and remove the reservoir.

Installation

1. Install the vacuum reservoir to the fender apron with two retaining nuts. Tighten to 45-65 in-lbs torque.
2. Install the vacuum line to the reservoir.

Granada, Monarch and Versailles (Figs. 10, 11 and 12)

Removal

1. Under the hood, locate the vacuum line to the vacuum reservoir. Disconnect the line at the vacuum valve and remove the line from the the attaching straps along the dash panel.
2. Working inside the left fender well, remove the plastic splash shield.
3. Remove the two screws holding the vacuum reservoir to the left-hand door pillar and remove reservoir.

Installation

1. Install the vacuum reservoir to the left-hand door pillar with 2 screws.
2. Install the plastic splash shield and retaining screws. Tighten screws securely.
3. Install the vacuum line through the attaching straps along the dash panel and connect to the vacuum valve.

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Sure-Track Brake System

PART 37-20

Applies to Lincoln Continental and Continental Mark V

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CL2309-2B

DESCRIPTION

The Sure-Track brake system is available as optional equipment on the Lincoln Continental and Continental Mark V passenger cars when equipped with 4-wheel power disc brakes.

The design features are as follows:

1. A hydraulic rear brake actuator is powered by hydraulic pressure from the power steering pump.
2. The location of the actuator is on the left-hand frame rail behind the No. 1 cross-member.
3. A new computer control module with solid state electronic components.

Figs. 1 through 3 show the complete sure-track systems for each of the subject car lines.

SENSOR ASSEMBLY

The sensor is mounted on the rear axle drive pinion on all Sure-Track equipped vehicles.

COMPUTER CONTROL MODULE

The computer is mounted on a bracket on the forward surface of the glove box on Lincoln Continental; behind the right side dash applique on Continental Mark V.

ACTUATOR ASSEMBLY

The hydraulic actuator differs in appearance and size from the vacuum actuator used in prior years. It is a two piece iron casting approximately 7 inches long and 4 inches in diameter. The two castings are separated by a gasket which divides the power steering section (front half) from the brake section (rear half). Externally there are five fluid ports, three for power steering and two for hydraulic brake connections as shown in Fig. 4.

NOTE: The hydraulic actuator is serviced as a unit and under no circumstances should it be disassembled in the field.

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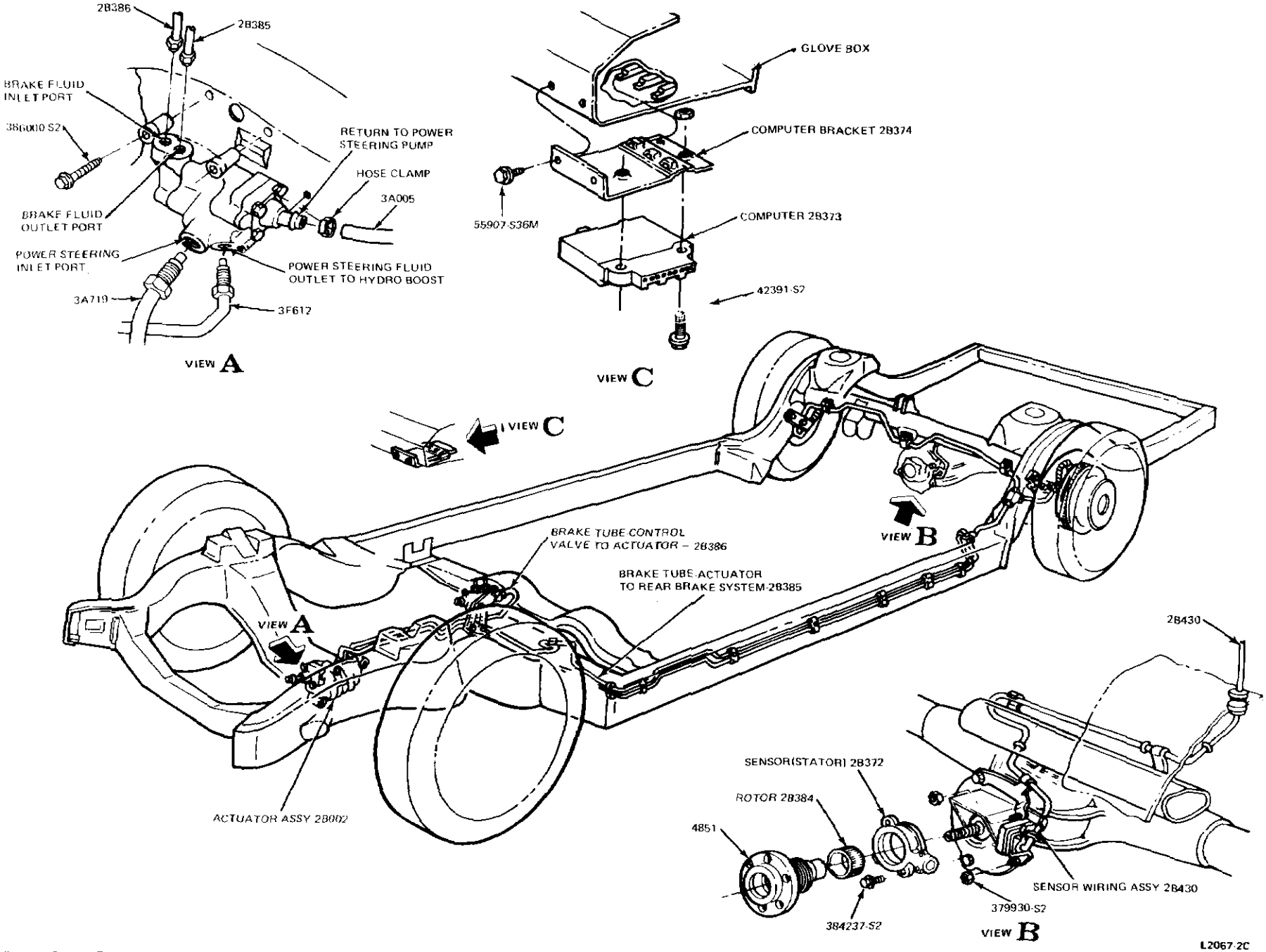


FIG. 1 Sure-Track Brake System—Lincoln Continental

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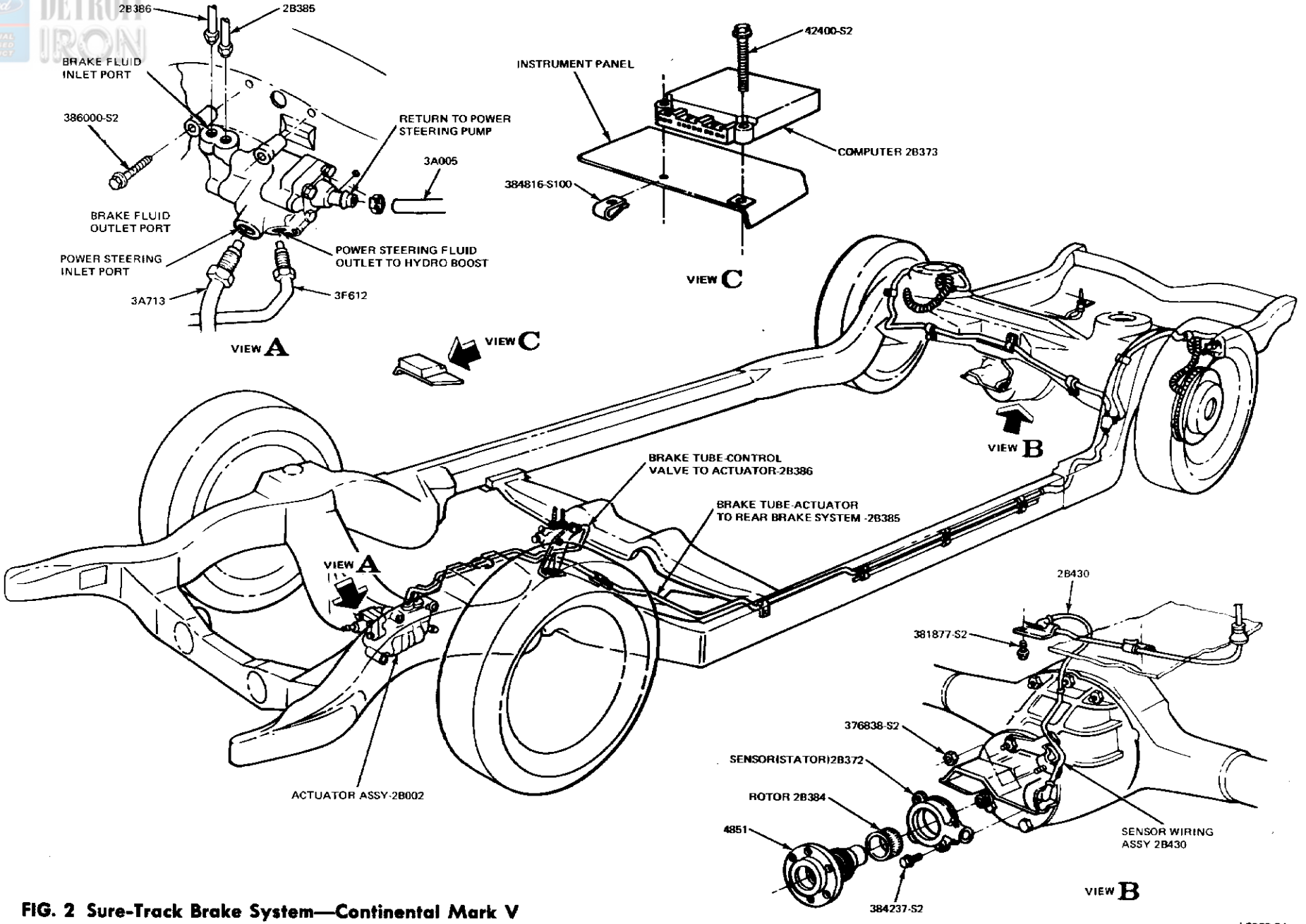


FIG. 2 Sure-Track Brake System—Continental Mark V

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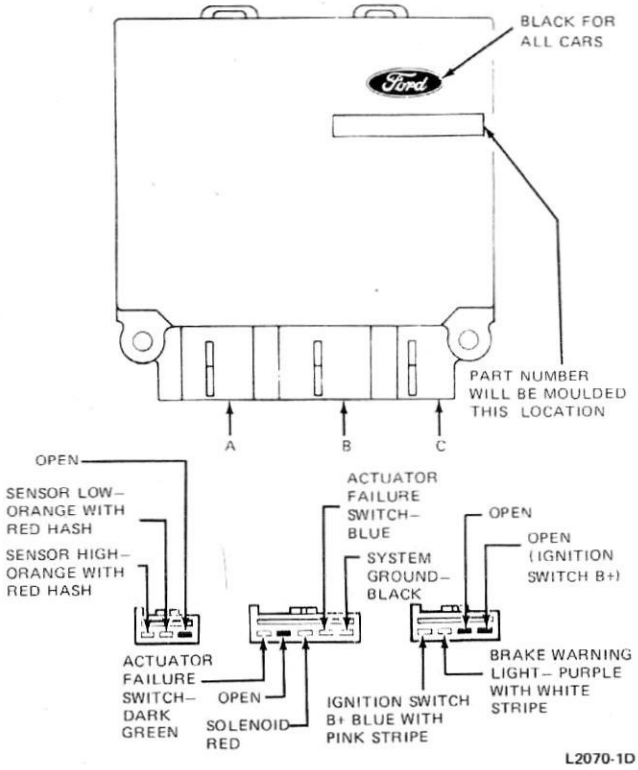


FIG. 3 Computer Control Module—Sure-Track Brake System

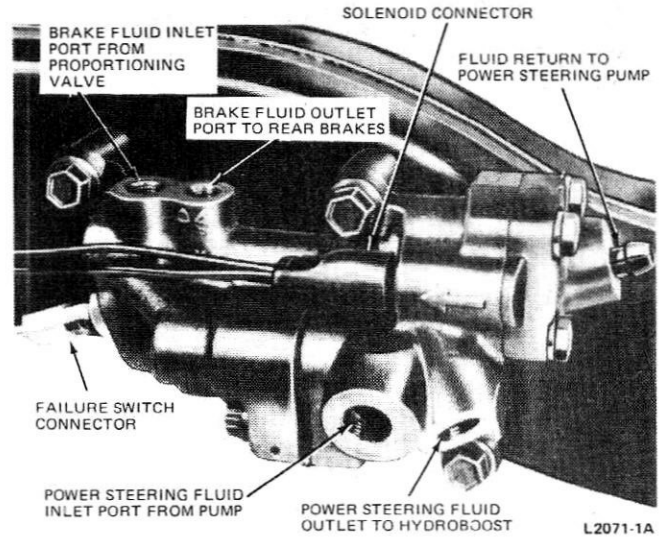


FIG. 4 Actuator Assembly—Sure-Track Brake System

OPERATION

SENSOR

When the driveshaft rotates, a variable frequency AC voltage is generated by the sensor in proportion to the speed of the driveshaft. This voltage is transmitted to the computer control module.

COMPUTER CONTROL MODULE

The computer module receives the voltage generated by the sensor, and continually measures driveshaft speed by monitoring the frequency of the sensor output. When the frequency drops abruptly below a predetermined level due to rapid deceleration (maximum braking condition), the module sends an electric current to the actuator solenoid. This current energizes the solenoid, which activates the actuator and releases the rear brakes. When the driveshaft rpm increases, the module interrupts the current flow to the solenoid, reapplying the rear brakes. This sequence of events occurs at a rate of up to 4 cycles per second until the vehicle speed drops below 6 mph or the brakes are released by the driver.

ACTUATOR

When the Sure-Track is not operating (normal driving), the solenoid is in the released position (Fig. 5). In this position the solenoid is not energized, and the solenoid valve spring holds the solenoid valve (vent to power steering reservoir) closed. The expansion piston is balanced between power steering pressure and brake pressure, and the brake fluid inlet check valve is held open by the expansion piston, allowing rear brake fluid to flow through the expansion chamber to the rear brakes.

When the car wheels decelerate rapidly (impending skid during braking), the computer module sends an electric current to the actuator solenoid. The energized

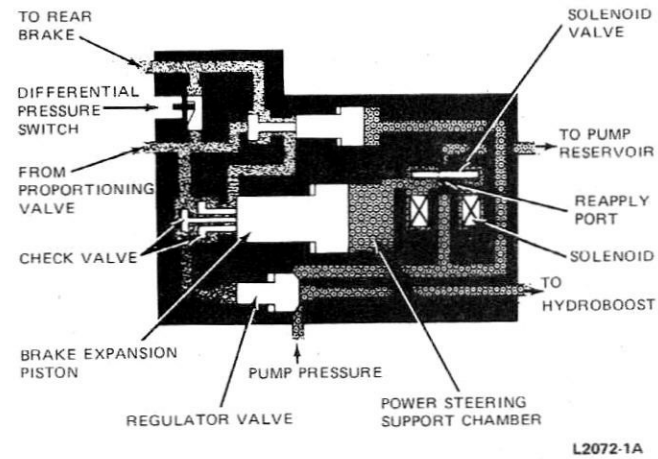


FIG. 5 Schematic—Actuator In Normal Position

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solenoid opens the solenoid valve and closes the reapply port (power steering pump fluid pressure). This vents the support chamber to the power steering pump reservoir, resulting in decreased pressure. As the pressure decreases, the expansion piston is forced forward by brake fluid pressure. Forward movement of the piston closes the brake fluid inlet check valve. As the piston continues to move forward, the volume of the expansion chamber is continuously increasing, reducing rear brake lines pressure and releasing the rear brakes (Fig. 6).

With the solenoid in the activated position, the rear brakes are released and the driveshaft speed increases as the rear wheels return to vehicle speed. As the driveshaft speed increases, the computer module shuts off the electrical signal and de-energizes the solenoid. The solenoid valve returns to its original position, causing the power steering pressure in the support chamber to increase, moving the piston back in the brake pressure chamber, opening the brake fluid inlet check valve and reapplying the rear brakes.

The actuator continues to cycle (release, reapply, release, reapply) until the brakes are released by the driver.

Since the skid control actuator cycles only if the rear wheels approach lockup, it is desirable to provide another method of actuating the system to exercise the seals periodically. Therefore, the control solenoid is functioned through one cycle each time the ignition key is turned to RUN. When this cycle occurs, an extremely faint click may be heard near the actuator.

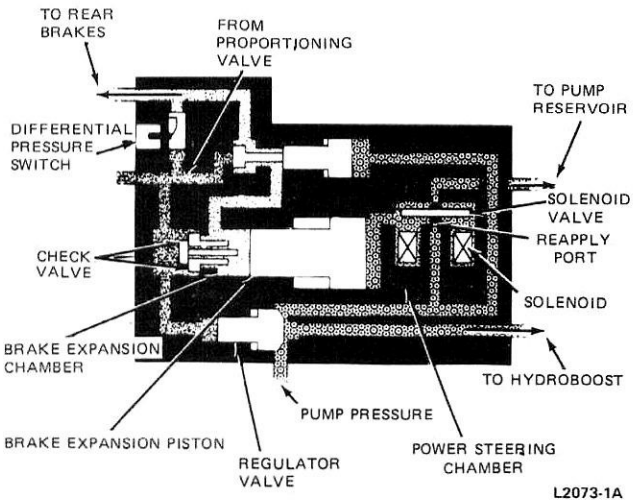


FIG. 6 Schematic—Actuator In Activated Position

DIAGNOSIS AND TESTING

See Fig. 14 for Diagnostic Chart.

The Sure-Track assembly is only one component in the braking system. Complaints concerning the Sure-Track may be related to problems in either the power steering circuit or with the service brakes. Therefore, before performing any tests, check and eliminate them as a possible source of the problem. Note the customer complaint, then verify the problem by driving the vehicle and comparing to a known quality vehicle.

CAUTION: A ROAD TEST SHOULD BE MADE ONLY WHEN THE OPERATOR IS SURE THAT THE BRAKES WILL STOP THE VEHICLE.

A functional test of the system can be performed if a road test is not advisable. To check skid control function, proceed as follows:

FUNCTION TEST

1. Raise the rear wheels of the vehicle off the floor.
2. Start engine, place transmission in drive and bring wheel speed up to 30 mph.
3. Apply the brakes quickly and firmly (spike) with throttle still applied and observe the rear wheels. If the skid control system is functioning properly, it will cycle 5 or 6 times or until the brake pedal is released.

ELECTRICAL CONTROL SYSTEM

Electrical power is provided to the Sure-Track brake system when the ignition switch is turned to the "run" position. The brake warning light will come on for a short period (approximately .2 seconds) indicating the Sure-Track system is functioning. Fig. 7 is a wiring schematic of the Sure-Track brake system.

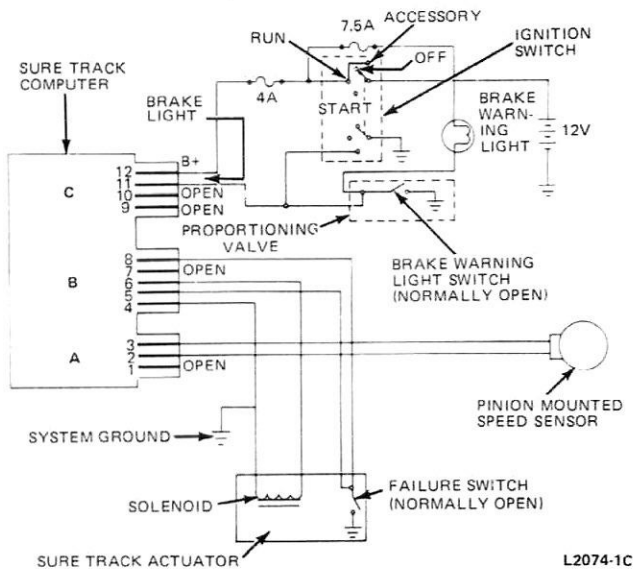


FIG. 7 Wiring Diagram—Sure-Track Brake System

Circuit protection is provided by a four ampere fuse located in the fuse panel on Continental Mark V and Lincoln Continental.

TO PREVENT DAMAGE TO THE COMPUTER MODULE, DO NOT USE A FUSE OTHER THAN FOUR AMPERES (AGA4)

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TESTING

The computer module has the ability to detect an open sensor circuit, an open actuator solenoid circuit, an excessively long output pulse to the solenoid, and an open failure switch connector at the actuator. The brake warning light comes on 4 to 6 seconds after any of the above conditions occur. When the brake warning light comes on, the sure-track system becomes inoperative and the braking system returns to normal operation. The failure warning light will also come on immediately after the ignition switch is turned to start if the sure-track fuse is defective or the primary power is interrupted.

SENSOR TEST

Be sure to calibrate ohmmeter on the RX100 scale.

1. Remove sensor plug A from the computer module (Fig. 8).

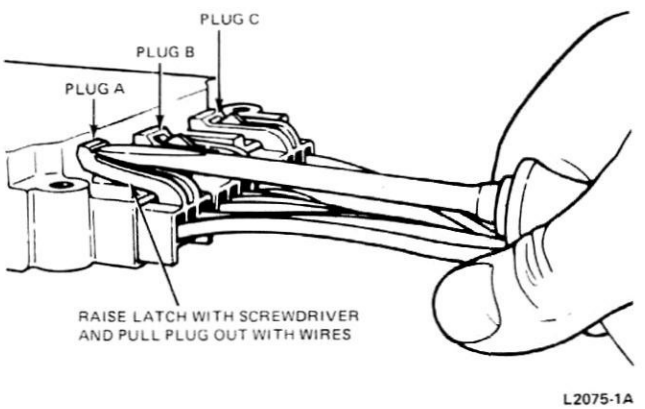


FIG. 8 Removing Sensor Plug From Computer Module

2. Connect an ohmmeter between pins two and three of the sensor connector. Resistance should be 2,400 to 3,200 ohms (Fig. 9).
3. Connect an ohmmeter between chassis ground and either pin of the sensor connector (Fig. 10). Resistance should be infinite.
4. If the resistance is not within the limits on both checks, remove the connector from the sensor at the rear axle pinion housing.
5. Repeat the resistance checks (Steps 2 and 3 above), at the terminals on the sensor.
6. If the resistance at the solenoid terminals is not within the limits on both checks, replace sensor assembly.
7. If the resistance is within the limits on both checks, the problem is in the wiring harness between the sensor and the module.

SENSOR OUTPUT VOLTAGE TEST

The output voltage of the sensor can be monitored if a voltmeter capable of measuring AC voltage is

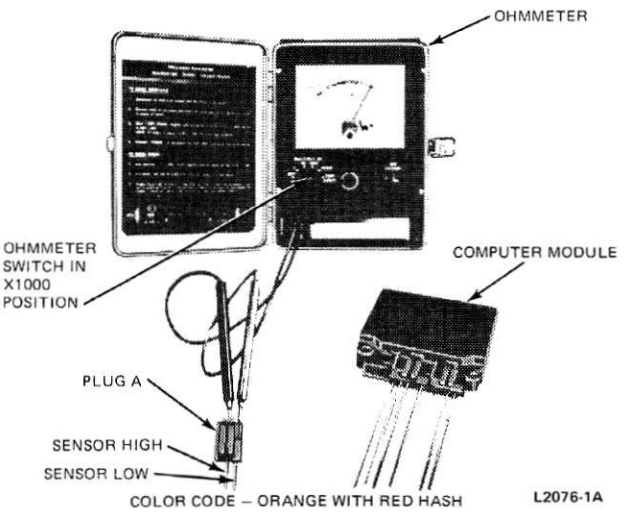


FIG. 9 Testing Sensor Circuit

available. Disconnect plug A at the computer module and connect the AC voltmeter to pins two and three. Raise the rear wheels off the ground and run at 30 mph. Voltage should be above 5 volts AC.

SOLENOID TEST

Be sure to calibrate ohmmeter on the RX1 scale.

1. Remove plug B from the computer module (Fig. 11).
2. Connect an ohmmeter between pin six (solenoid high) (red wire) and pin four (system ground) (black wire) of the plug. Resistance should be 2 to 8 ohms.
3. If the resistance is lower than 2 ohms, inspect the solenoid wiring for a grounded condition.
4. If the resistance is higher than 8 ohms, connect ohmmeter to terminals on solenoid.
5. If resistance is between 2 and 8 ohms, inspect solenoid wiring harness for an open condition or for poor terminal contact at the solenoid connector or at the intermediate connector on the engine compartment harness.
6. If the resistance is not between 2 and 8 ohms, replace the actuator assembly.

SYSTEM GROUND TEST

Be sure to calibrate ohmmeter on the RX1 scale.

1. Remove plug B from the module (Fig. 12).
2. Connect an ohmmeter between chassis ground and system ground (Black) lead of the plug. Resistance should be lower than one ohm.
3. If the resistance is higher than one ohm, check the system ground wiring for a loose or broken wire and

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DETROIT IRON

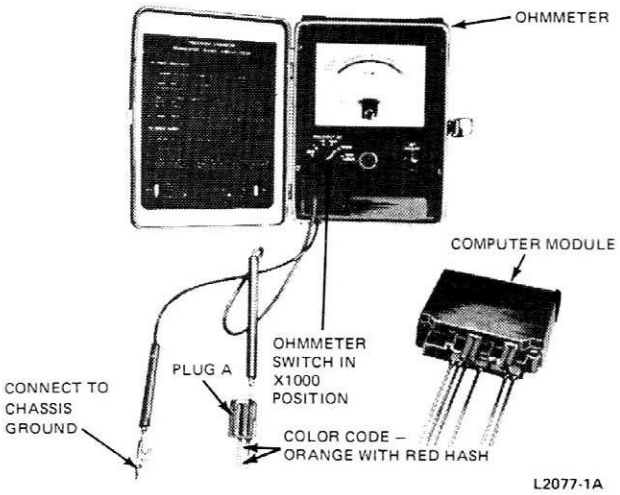


FIG. 10 Testing Sensor Circuit Leakage to Ground

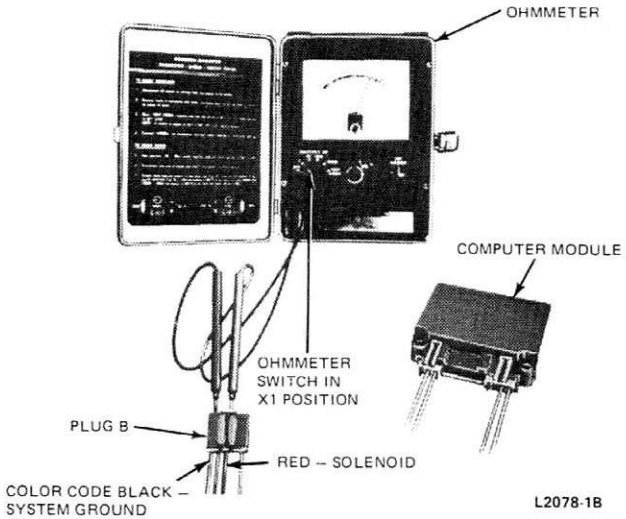


FIG. 11 Testing Solenoid Circuit

repair as required. The system ground is located at the left-hand side of the instrument panel assembly on the end panel on Lincoln Continental; below and outboard of the fuse block on Continental Mark V.

FAILURE SWITCH TEST

Be sure to calibrate ohmmeter to the scale being used.

1. Remove plug B from the module (Fig. 13).
2. Connect the ohmmeter between pin five (Dark Green) failure switch and pin eight (Blue) failure switch. Resistance should be less than one ohm.
3. Connect the ohmmeter between chassis ground and one of the two pins for the failure switch. Resistance should be infinite.
4. If the resistance is not within limits on both tests, check the intermediate connector in the engine compartment and the failure switch connector at the actuator.
5. If all connections are made, check for electrical continuity in wiring harness between the actuator failure switch connector and connector B at the module. If continuity is found OK, and failure switch has not been shuttled due to brake release during sure-track cycling, replace actuator.

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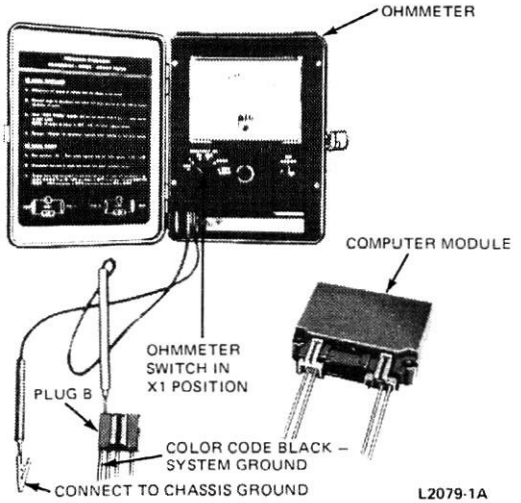


FIG. 12 Testing System Ground

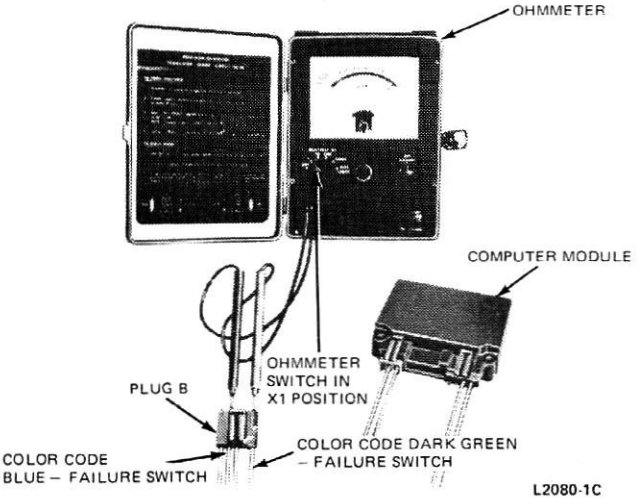


FIG. 13 Testing Failure Switch Circuit

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DETROIT IRON

DIAGNOSTIC CHART
SURE-TRACK BRAKE SYSTEM

The hydraulic skid control system does not have the audible actuator cycle characteristics of earlier systems, instead, as a proveout function, the brake warning light can be used to diagnose the sure-track system. Normal function of the brake warning light allows the light to flash on and then go out as soon as the ignition key is turned to the run position. The warning light should also go on and stay on while the key is held in the start position. The start position checks only the three-way switch for the hydraulic system not the sure-track system. When the brake warning light is on momentarily with the ignition key in run, the actuator solenoid is also momentarily energized; however, it usually cannot be heard unless the vehicle is raised on a hoist and a second person touches the actuator as it cycles.

Condition	Possible Cause	Resolution
1. Brake warning light comes on immediately and stays on after key is turned to run position.	• Check sure-track 4 amp. fuse. • Differential valve shuttled. • Short in brake warning light ground circuit. • Open B+ lead to module. • Shorted B+ lead to module.	• Replace fuse. • Refer to Hydraulic Brake System Diagnostic Procedure. • Remove plug "C" from module, turn ignition to RUN. If light comes on, locate and repair short. • Check B+ wiring and connectors for open circuit and repair as required. • Check B+ wiring and connectors for short circuit and repair as required. • Perform Solenoid Test as repair as required.
2. Brake warning light flashes and then comes on and stays on 4-6 seconds after ignition key is turned to RUN position.	• Open speed sensor, circuit connections and/or circuitry. • Open actuator failure switch, circuit connections and/or circuitry. • Closed actuator differential failure switch in actuator. • Open actuator solenoid, circuit connections and/or circuitry.	• Check sensor, harness connections at computer module, in trunk, and at sensor and repair as required. (See Sensor Test.) • Check failure switch, connections at actuator, computer module, and in engine compartment. Service as required. (Perform Failure Switch Test.) • Perform Failure Switch Test. • Perform hydraulic brake system diagnostic procedure. • Check solenoid plus connectors at computer module in passenger compartment and at actuator. Service as required. (Perform Solenoid Test.)
3. Brake warning light does not flash and go out as soon as the key is turned to RUN position and: a) Brake warning light comes on when the key is turned to START. b) Brake warning light DOES NOT come on when key is turned to START.	• Loose or missing skid control ground wire. • Connectors loose or not connected to skid control module. • Skid control module not installed. • Burned out brake warning light bulb. • Loose or broken wire in brake warning light circuit.	• Service ground wire (perform System Ground Test.) • Replace and/or repair connectors. • Install skid control module. • Replace bulb. • Replace or repair wire.
4. Brake warning light operates normally (flashes) and skid control system cycles during rough road conditions or normal braking.	• Loose ground connection. • Loose sensor connection. • Faulty sensor or sensor rotor. • Loose B+ and failure light connector at computer module.	• Perform System Ground Test procedure. • Check sensor connection at computer module, in trunk and at sensor. Repair as required. • Perform sensor test. • Check plug "C" and repair as required.
5. Brake warning light operates normally (flashes) and actuator cycles slowly or not at all during maximum braking condition.	• Shorted sensor circuit or defective sensor or rotor. • Plugged actuator filter.	• Perform Sensor Test. • Replace actuator.

If the corrections listed in Steps 1 through 5 above do not correct the observed condition, it may be necessary to replace the computer module.

L2081-2C

FIG. 14 Diagnosis Chart— Sure-Track Brake System

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REMOVAL AND INSTALLATION

SENSOR ROTOR

Removal

1. Raise the vehicle on a hoist.
2. Mark the companion flange and the universal joint flange with a center punch, prior to disassembly to assure assembly in the original position to maintain drive shaft positioning.
3. Remove the four bolts that connect the companion flange to the drive pinion flange.
4. Attach the universal joint flange holding Tool T68P-4851-A to the universal joint flange and remove the retaining nut from the drive pinion (Fig. 15).
5. Install Tool T65L-4851-A on the drive pinion flange and remove the flange and rotor assembly from the rear axle drive pinion (Fig. 16).
6. Install the rotor remover Tool T69P4621-A or T71P-4621-A on the flange and rotor assembly and press the rotor from the companion flange (Fig. 17).

Installation

1. Position the drive pinion flange on a press, place the rotor and rotor installer Tool T60P-2B385-A on the drive pinion flange (Fig. 18) and press onto the pinion flange until the flange end bottoms on the shoulder in the tool.
2. Install the drive pinion flange and rotor assembly on the drive pinion shaft splines. Position the flange replacer tool on the pinion shaft and press the flange on the pinion shaft (Fig. 19).
3. Install the drive pinion flange retaining nut on the drive pinion shaft. Hold the pinion flange with the flange holding Tool T68P-4851A and tighten the pinion nut to 180-220 ft-lb torque.
4. Position the companion flange and universal joint flange with the punch marks aligned, install the retaining bolts and nuts and tighten to 70-90 ft-lb torque.
5. Perform functional test.

SENSOR ASSEMBLY

Removal

1. Remove companion flange as described above.
2. Remove the nut that retains the wiring harness tube assembly bracket on the pinion bearing retainer housing.
3. Remove the two nuts that retain the wiring harness and tube assembly bracket on the rear axle carrier assembly studs (right side of carrier on Continental Mark V and the left side of Lincoln).
4. Move the wiring harness and bracket forward off the carrier studs and disconnect the plug from the sensor connector.
5. Remove the three bolts that hold the sensor assembly on the drive pinion bearing retainer housing and remove the sensor assembly.

   Insert a screwdriver in the drain hole in the bottom of the pinion bearing retainer housing and pry the sensor assembly from the retainer housing. Do not pry between the sensor wire connector and casting and the edge of the bearing retainer housing, as damage to the wire connector could result.

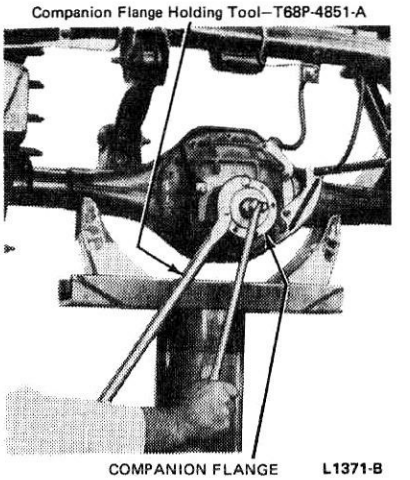


FIG. 15 Removing Pinion Shaft Nut

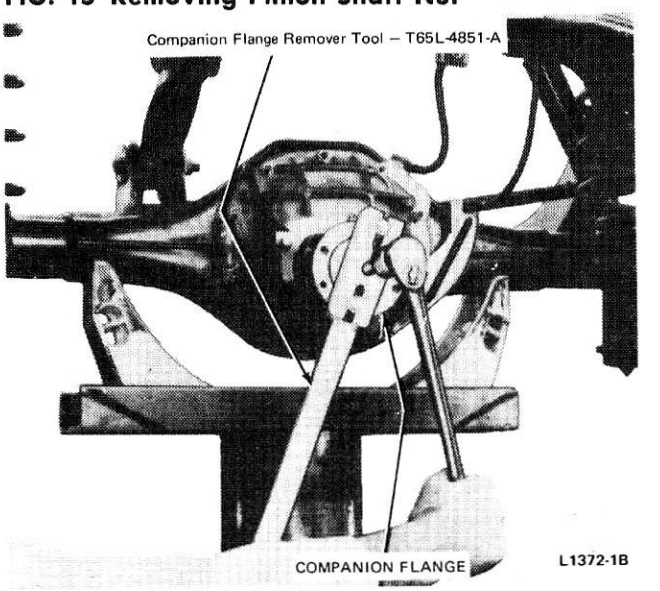


FIG. 16 Removing Companion Flange and Rotor

Installation

1. Position the sensor assembly on the drive pinion bearing retainer housing, install the three attaching bolts, and tighten to 16-24 ft-lb torque.
2. Connect the harness plug to the connector on the sensor assembly and position the wiring harness and tube assembly bracket on the carrier studs.
3. Install the two carrier housing stud nuts on the housing studs and tighten to 30-40 ft-lb torque (right side of carrier on Continental Mark V and the left side of carrier for Lincoln Continental).
4. Install the wiring harness and tube bracket retaining screw at the pinion bearing retainer housing and tighten to 30-45 ft-lb torque.

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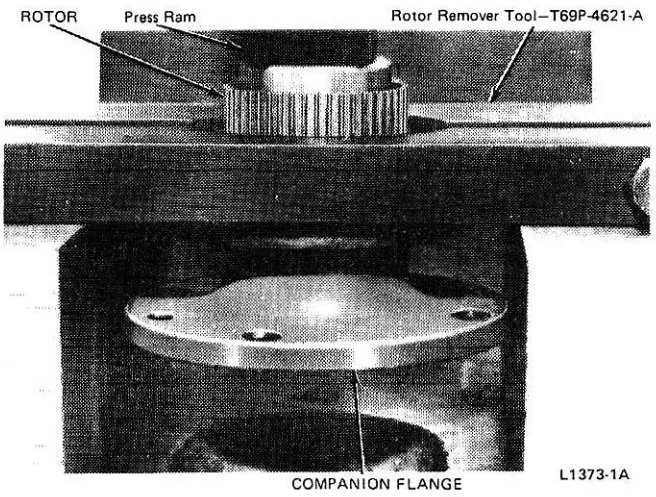


FIG. 17 Removing Sensor Rotor

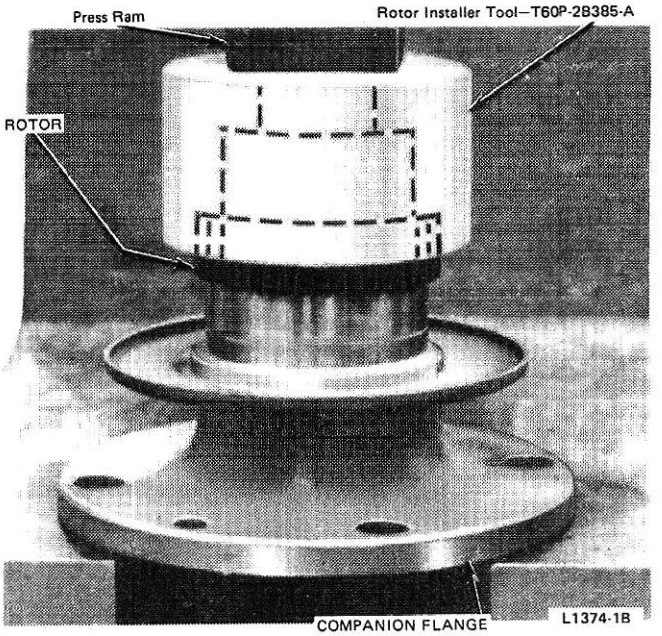


FIG. 18 Installing Sensor Rotor

COMPUTER CONTROL MODULE

Lincoln Continental

Removal

1. Remove the two (2) screws that retain the computer module on the module mounting bracket and lower the module (Fig. 1).
2. Remove three (3) wiring harness connector plugs from the module by raising latching fingers with a small screwdriver and pulling the connector free; then remove the control module from the vehicle (Fig. 8).

Installation

1. Connect the three (3) wire harness plugs into the new module receptacles. The plugs are designed to prevent incorrect connection.
2. Position the computer module on the mounting bracket, install the two (2) attaching screws, and tighten securely.
3. Raise rear wheels on vehicle until they are free of the floor and verify correct operation of the sure-track brake system. See Function Test Section of Diagnosis and Testing Procedure.

Continental Mark V

Removal

1. Remove four (4) screws in applique panel above glove box and remove panel.
2. Remove three (3) wiring harness connector plugs from the module by raising latching fingers with a small screwdriver and pulling the connector free.
3. Remove the two (2) screws that retain the computer module to the instrument panel and remove the module (Fig. 2).

Installation

1. Connect the three (3) wire harness plugs into the new module receptacles. The plugs are designed to prevent incorrect connections.

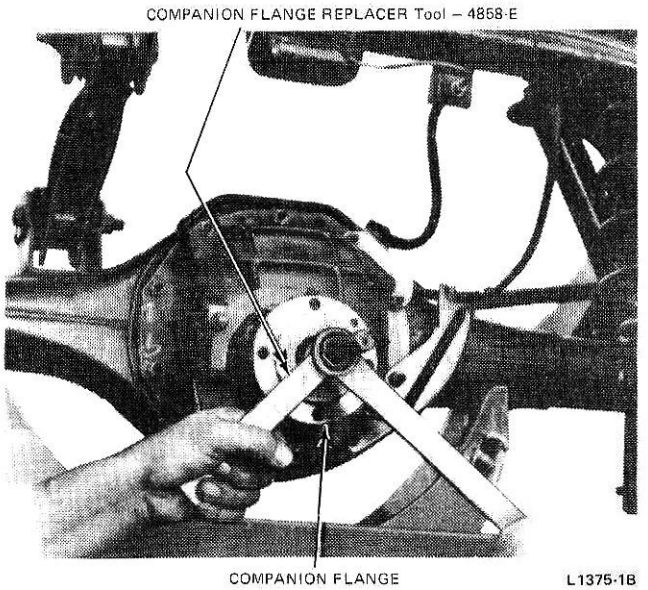


FIG. 19 Installation of Companion Flange

2. Position the computer module on the instrument panel, install the two (2) attaching screws and tighten securely.
3. Position applique panel above glove box and install four (4) attaching screws.
4. Raise rear wheels of vehicle until they are free of the floor and verify correct operation of the sure-track brake system.

Actuator Assembly

Removal

1. Raise the vehicle on a hoist.
2. Disconnect the solenoid and failure switch connectors from the actuator (Fig. 4).
3. Disconnect and plug the power steering pressure connections at the actuator (Fig. 4).
4. Disconnect the power steering return hose (hose clamped fitting) and plug.

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5. Disconnect the hydraulic brake lines at the actuator and cap the lines (Fig. 4).
6. Remove the three (3) bolts attaching the actuator to the frame. Lower the actuator around the stabilizer bar.

Installation

1. Remove all protective plugs and caps from the actuator.
2. Place the actuator in position on the vehicle and install the attaching bolts to specified torque.
3. Connect the hydraulic brake tubes to the actuator and tighten the tube nuts to the specified torque (Fig. 4).
4. Connect the power steering fluid return hose to the actuator and tighten the hose clamp to specified torque (Fig. 4).
5. Inspect the "O" ring seals on the tube ends and replace if damaged. Connect the power steering pressure hoses to the actuator and tighten the tube nuts to specified torque (Fig. 4).
6. Connect the solenoid and failure switch plugs at the actuator (Fig. 4).
7. Bleed the rear brake system.
8. Check the power steering pump reservoir and refill if necessary with power steering fluid ESW-M2C128-A, B.
9. Remove the coil wire so the engine will not start. Fill the power steering pump reservoir and, while engaging the starter, cycle the steering wheel and apply the brake pedal to distribute the fluid. Check the fluid level and add as required. Install the coil wire, start the engine and cycle the steering wheel and apply the brake pedal. Check for fluid leaks.
10. If the power steering pump still has a whine-type noise after completion of Step 9, it will then be necessary to purge the system of trapped air.
11. Raise the rear wheels. Run the rear wheels up to about 35 mph and attempt to hold speed while applying brakes to verify proper operation of the sure-track system.

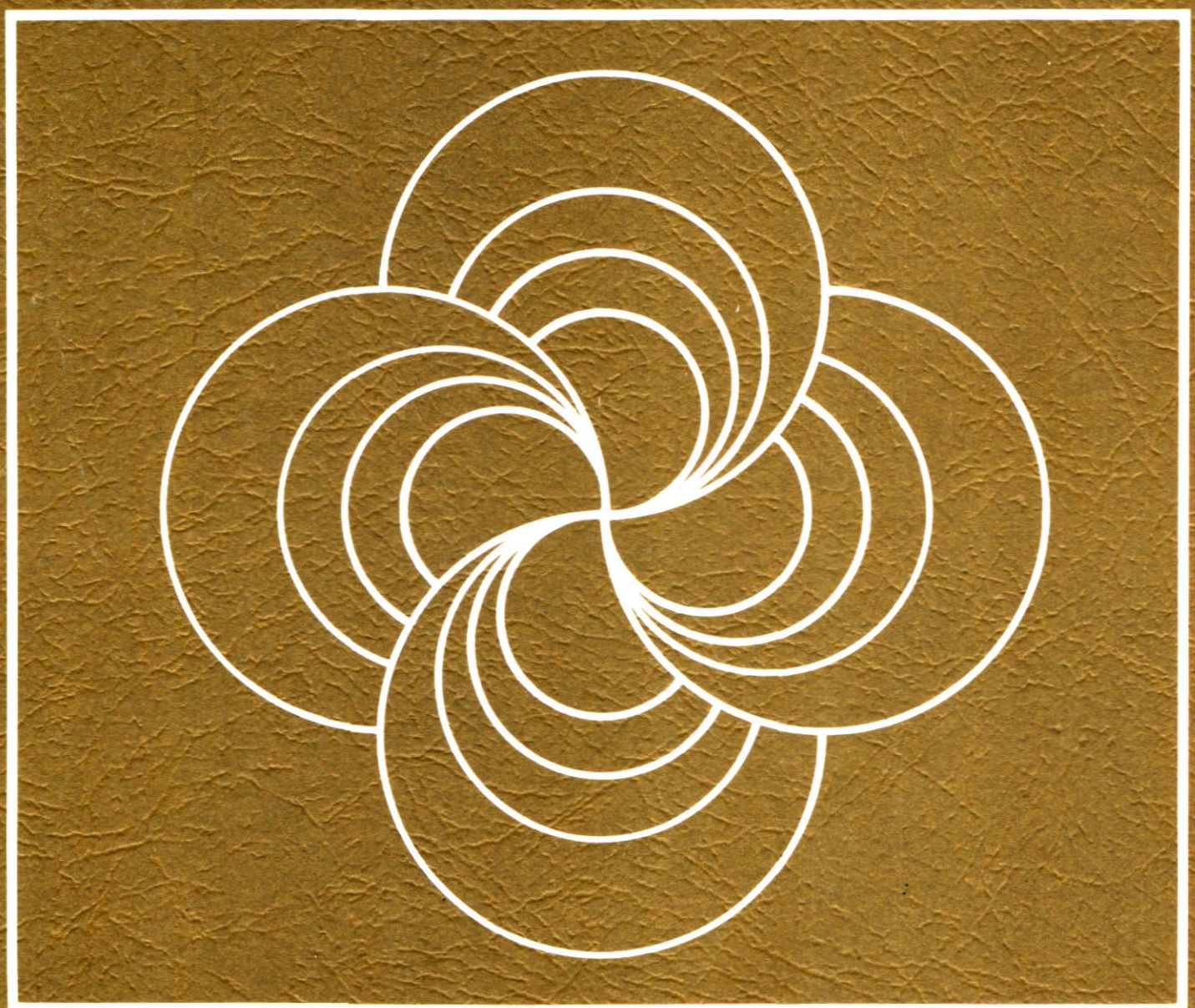
CAUTION: Always place floor stands under the rear axle housing. Securely block front wheels. Never run the engine with the transmission in any drive range using only a floor jack.

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Ford

75 ANNIVERSARY

1978 Car Shop Manual Volume 4 Body



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GROUP 41 (70000)

WINDOW GLASS AND MECHANISMS
GROUP 42 (70000)

STATIONARY WINDOW GLASS
GROUP 43 (7000)

DOORS, HOOD, TRUNK AND TAILGATE
GROUP 44 (16000 & 70000)

INTERIOR TRIM
GROUP 45 (70000)

TOP AND EXTERIOR FINISHES

BODY SHELL, EXTERIOR TRIM, FRAME & UNDERBODY
GROUP 47 (70000)

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foreword...

This 1978 Car Shop Manual has been prepared to provide information covering normal service repairs and maintenance for 1978 Ford Passenger Cars manufactured in the United States and Canada. It is divided into five volumes, each covering a specific major area:

Volume 1 – Chassis
Volume 2 – Engine
Volume 3 – Electrical
Volume 4 – Body
Volume 5 – Maintenance and Lubrication.

Information in each volume is divided into Groups covering a general system. The table of contents on the cover of each volume indicates the Group title, number, and volume in which each Group is located.

For 1978, the basic part number for components covered in the Groups is also included in parenthesis after the Group number.

Example: Cooling System (General System Covered in Group) Group 27 (Group Number) (8000) (Basic Part Number for Cooling System Components)

Some components covered within a Group do not have the same basic part number. In these cases, more than one part number will appear on the Group index.

Example: Gasoline Engines (General System Covered in Group) Group 21 (6000 (Basic Part Number for Gasoline Engine Components) & 9000) (Intake and Exhaust Manifold Basic Part Number Only)

For easy reference, information in each Group has been divided into smaller units or Parts. There is one Part for each component in the system, as well as a General Service Part in some Groups to cover procedures common to several components within the Group. In general, each Part contains the Description, Operation, Diagnosis and Testing, Removal and Installation and Disassembly and Assembly procedures for the component covered in the Part. Diagnosis Charts are also included in some Parts to help you systematically locate and service conditions encountered. In most cases, specifications are included at the end of each Part.

To aid in locating specific items in this manual, the index at the front of each volume provides an alphabetical listing, with page number, for all Parts in the volume. The tab locator on the right side of this index will help you find the first page of each Group.

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On the first page of each Group there is an index listing the Part title and Part number for each component covered within the Group. The first page of each Part contains an index to locate service operations covered in that Part. This Group-Part breakdown is also indicated in the page number located at the top of each page.

Example: **11-02-21** = **(Group) 11 — (Part) 02 — (Page) 21**

Metric conversion tables have been included at the back of each volume to aid in converting specifications in this manual to the metric equivalent.

The descriptions and specifications in this manual were in effect at the time this manual was approved for printing. Ford Motor Company reserves the right to discontinue models at any time, or change specifications or design without notice and without incurring obligation.

Ford Parts and Service Division
Training and Publications Department

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DETROIT IRON

IDENTIFICATION CODES

GROUP 40

Car Identification Codes

PART 40-01

GENERAL DESCRIPTION

OFFICIAL VEHICLE IDENTIFICATION NUMBER

The official Vehicle Identification Number (VIN) (Fig. 1) for title and registration purposes is stamped on a metal tab that is fastened to the instrument panel close to the windshield on the driver's side of the car and is visible from outside.

VEHICLE CERTIFICATION LABEL

The Vehicle Certification Label (V.C Label) (Fig. 1) is attached to the rear face of the left front door on all 4-door models, Mustang II and Cougars, and to the left door lock pillar on all other 2-door models. The upper half of the label contains the name of manufacturer, month and year of manufacture, Gross Vehicle Weight

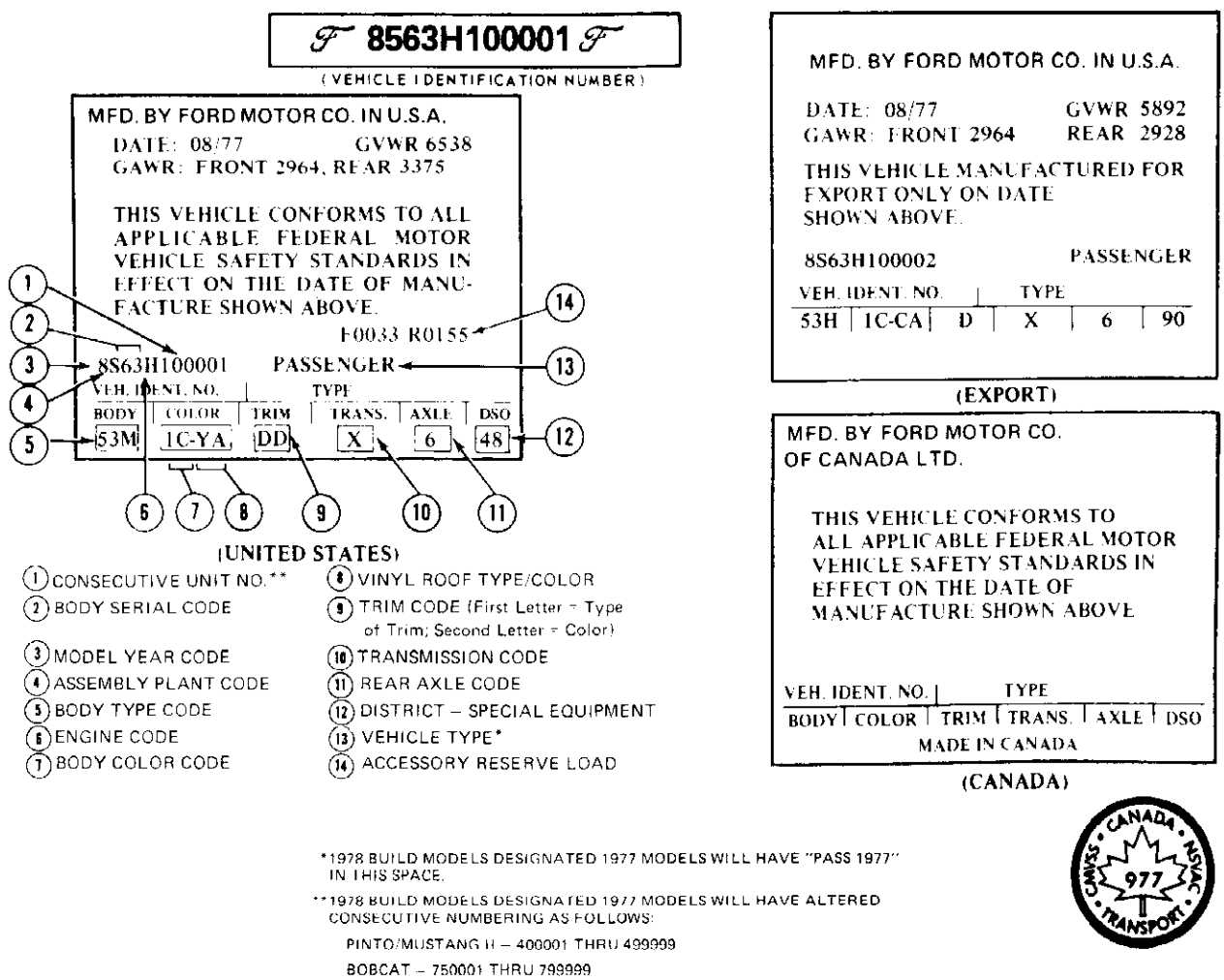


FIG. 1 Vehicle Identification and Certification Labels

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Rating (GVWR), Gross Axle Weight Rating (GAWR), and the certification statement.

The V.C. label also contains the Vehicle Identification Number. This number is also used for warranty identification of the vehicle. The first number indicates the model year. The letter following the model year number indicates the manufacturing assembly plant.

The next two numbers designate the Body Serial Code followed by a letter expressing the Engine Code.

The last six digits of the Vehicle Identification Number indicate the Consecutive Unit Number of each unit built at each assembly plant. The Consecutive Unit Numbers begin as follows:

100,001—Ford, LTD II, Ranchero, Mustang II, Thunderbird, Granada, Fairmont, and Pinto.

500,001—Mercury, Cougar, Zephyr, Monarch and Mercury Bobcat.

800,001—Lincoln Continental, Versailles and Continental Mark V.

The remaining information on the V.C. Label consists of the following vehicle identification codes:

The BODY code is two numerals and a letter identifying the body style.

The COL (color) code is a number and letter code indicating the exterior paint color code and vinyl roof type and color (if equipped).

The TRIM code consists of a two-letter or a letter-number combination designating the interior trim.

The AXLE code is a number or letter indicating the rear axle ratio and standard or locking type axles.

The TRNS. code is a number or letter indicating the type of transmission.

The DSO code, consisting of two numbers, designates the district in which the car was ordered and may appear in conjunction with a Domestic Special Order or Foreign Special Order number when applicable. Ford of Canada DSO codes consist of a letter and number.

The following charts provide the various codes and their respective identification:

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DETROIT IRON

IDENTIFICATION CODES

ASSEMBLY PLANT CODES

Code Letter	District
A	Atlanta
B	Oakville (Canada)
E	Mahwah
F	Dearborn
G	Chicago
H	Lorain
J	Los Angeles
K	Kansas City
P	Twin Cities
R	San Jose
S	Allen Park (Pilot)
T	Metuchen
U	Louisville
W	Wayne
X	St. Thomas
Y	Wixom
Z	St. Louis

ENGINE CODES

Codes	No. of Cyls.	Displacement Litres	CID
A	8	7.5	460-4V
C	8	7.5	460-4V (Police Interceptor)
F	8	5.0	302-2V
H	8	5.8	351-2V
L	6	4.1	250-1V
S	8	6.6	400-2V
T	6	3.3	200-1V
Y	4	2.3	139-2V (2.3L)
Z	6	2.8	169-2V (2.8L)

TRANSMISSION CODES

Codes	Type
	MANUAL
1	3 Speed
5	4 Speed Overdrive
6	4 Speed @
7	4 Speed (b)
	AUTOMATIC
V	XP (C-3)
W	XP (C-4)
X	FMX]
U	XPL (C-6)
Z	XPL (Special)

@ Borg-Warner (b) Hummer

DISTRICT CODES LINCOLN-MERCURY

Code	District
00	Special
11	Boston
15	New York
16	Philadelphia
17	Washington
21	Atlanta
22	Dallas
23	Jacksonville
26	Memphis
31	Buffalo
32	Cincinnati
33	Cleveland
34	Detroit
41	Chicago
42	St. Louis
46	Twin Cities
51	Denver
52	Los Angeles
53	Oakland
54	Seattle
84	Home Off. Reserve
90's	Export

FORD OF CANADA

Mercury Code	Region	Ford Code
A1	Central	B1
A2	Eastern	B2
A3	Atlantic	B3
A4	Midwestern	B4
A6	Western	B6
A7	Pacific	B7
12	Export	12

REAR AXLE RATIO CODES

Conventional Lock		Ratio
Y		3.08
B		2.47
1	J	2.50
8		2.73
2		2.75
3		2.79
6	Ø	3.00
4		3.18
7		3.40

DISTRICT CODES FORD

Code	District
00	Special
11	Boston
12	Buffalo
13	New York
14	Pittsburgh
15	Newark
16	Philadelphia
17	Washington
21	Atlanta
22	Charlotte
23	Memphis
24	Jacksonville
25	Richmond
26	New Orleans
28	Louisville
41	Chicago
42	Cleveland
43	Milwaukee
45	Lansing
46	Indianapolis
47	Cincinnati
48	Detroit
52	Dallas
53	Kansas City
54	Omaha
55	St. Louis
56	Davenport
57	Houston
58	Twin Cities
71	Los Angeles
72	San Jose
73	Salt Lake City
74	Seattle
75	Phoenix
76	Denver
83	Government
84	Home Off. Reserve
85	American Red Cross
86	Recreational Veh. Pool
87	Body Company
89	Transportation Services
90's	Export

EXTERIOR PAINT COLOR CODES

Code	Ref. #	Color
1C	1724	Black
1G	5299	Silver Met.
1N	5476	Dove Gray
1P	5523	Med. Gray Met.(Tie Tone only)
1Q	5527	Med. Silver Met.
2M	3413	Dark Red
2R	5440	Brt. Red
2U	5455	Lipstick Red
3G	5094	Brt. Dk. Blue Met.
3U	5467	Lt. Blue
31	5499	Midnight Blue
34	5041	Med. Blue
46	5328	Dk. Jade Met.
47	5404	Lt. Green
4V	5233	Dk. Yellow Green Met.
5Q	5477	Dk. Brown Met.
6E	5080	Brt. Yellow
6P	5406	Cream
6U	5441	Lt. Tan
7Q	5479	Lt. Aqua Mt.
7S	5489	Dk. Emerald Met.
8G	5466	Vista Orange
8H	5470	Tan
8K	5486	Brt. Saddle Met.
8N	5496	Dk. Cordovan Met.
8P	5471	Lt. Cordovan
8Y	5494	Champagne Met.
83	5524	Chamois
84	5525	Dk. Cordovan
9D	5418	White

(RPO) UNIQUE COLORS (NON POLISH) "D"

2Y	5492	Rose Met.
3V	5480	Brt. Blue Met.
6V	5298	Tan Met.
	5460	Med. Gold Met.
7H	5482	Brt. Aqua Met.
7L	5483	Lt. Jade Met.
7T	5490	Med. Emerald Met.
8J	5484	Med. Tan Met.
8W	5491	Chamois Met.

(RPO) DIAMOND BRIGHT (POLISH) "W"

2S	5444	Dk. Red Met.
2G	5070	Med. Red Met.
32	5511	Med. Blue Met.
8V	5495	Med. Ember Met.
8Z	5510	Med. Nectarine Met.
1R	5512	Lt. Silver Met.

(RPO) DIAMOND FLARE (POLISH) "G"

1J	5411	Silver Met.
1L	5472	Black Met.
2T	5462	Rose Met.
6Y	5461	Brt. Yellow Gold Met.
7B	5463	Crystal Jade Met.

CY1411 2L

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BODY SERIAL AND STYLE CODES

Vehicle	Body Serial Code	Body Style Code	Body Type	Model
PINTO	10	62B	2-Dr. Sedan	Base
	11	64B	3-Dr. Sedan	Base
	12	73B	Wagon	Base
BOBCAT	20	64H	3-Dr. Sedan	U.S.A. & Canada
	22	73H	Wagon	U.S.A. & Canada
	23	62B	2-Dr. Sedan	Canada Only
	24	64B	3-Dr. Sedan	Canada Only
	25	73B	Wagon	Canada Only
MUSTANG II	02	60F	2-Dr.	Base
	03	69F	3-Dr.	Base
	04	60H	2-Dr.	Ghia
	05	69R	3-Dr.	Mach I
GRANADA	82	54H	4-Dr. Sedan	Base
	81	66H	2-Dr. Sedan	Base
MONARCH	34	54H	4-Dr. Sedan	Base
	33	66H	2-Dr. Sedan	Base
VERSAILLES	84	54M	4-Dr. Sedan	Base
LTD II	25	65B	2-Dr. Hardtop	LTD II S
	27	53B	4-Dr. Pillar Hardtop	LTD II S
	30	65D	2-Dr. Hardtop	LTD II
	31	53D	4-Dr. Pillar Hardtop	LTD II
	43	71K	LTD II Squire	Wagon
	47	97D	500	LTD II
	48	97R	GT	Ranchero
	49	97K	Squire	
FAIRMONT	92	54B	4-Dr. Sedan	Base
	91	66B	2-Dr. Sedan	Base
	93	66R	2-Dr. Sedan	Sport Coupe
	94	74B	Wagon	
COUGAR	92	53D	4-Dr. Pillar Hardtop	Cougar
	91	65D	2-Dr. Hardtop	Cougar
	93	65L	2-Dr. Hardtop	Cougar XR-7
THUNDERBIRD	87	60H	2-Dr. Pillar Hardtop	Base
FORD	52	60D*	2-Dr. Pillar Hardtop	Custom 500
	53	53D	4-Dr. Pillar Hardtop	Custom 500
	62	60H	2-Dr. Pillar Hardtop	LTD
	63	53H	4-Dr. Pillar Hardtop	LTD
	64	53L	4-Dr. Pillar Hardtop	LTD Landau
	65	60L	2-Dr. Pillar Hardtop	LTD Landau
	72	71D	Custom 500/LTD II	Wagon
	74	71H	LTD	Wagon
MERCURY	62	53H	4-Dr. Pillar Hardtop	Marquis (FLD)
	61	65H	2-Dr. Hardtop	Canada Only
	66	53L	4-Dr. Pillar Hardtop	Grand Marquis
	65	65L	2-Dr. Hardtop	Grand Marquis
	64	53K	4-Dr. Pillar Hardtop	Marquis Brougham
	63	65K	2-Dr. Hardtop	Marquis Brougham
	74	71K	Marquis**	Wagon
CONTINENTAL MARK V	89	65D	2-Dr. Hardtop	Base
LINCOLN CONTINENTAL	81	60B	2-Dr. Pillar Hardtop	Base
	82	53B	4-Dr. Pillar Hardtop	Base
ZEPHYR	32	54D	4-Dr. Sedan	Base
	31	66D	2-Dr. Sedan	Base
	35	36R	2-Dr. Sedan	Sport Coupe
	36	74D	Wagon	

CY1615-2E

VINYL ROOF TYPE AND COLOR IDENTIFICATION

Code	Vinyl Type	Code	Vinyl Type
W	Lugano Full	Z	Valino Front Half
X	Lugano Half	T	Valino Coach
K	Lugano Front Half	B	Crosshatch Full
M	Lugano Coach	R	Crosshatch Half
D	Milano Full	S	Levant Full
E	Milano Half	E	Levant Half Rear (Mustang Dev.)
F	Milano Halo	G	Odense Full
Q	Cayman Full	N	Odense Half
U	Cayman Half	A	Odense Front Half
V	Valino Full		
Y	Valino Half		

Code	Vinyl Color	Code	Vinyl Color
A	Black	F	Cordovan
B	Blue, Medium	K	Cordovan, Light
S	Blue, Midnight		Gold, Galveston
5	Blue, Wedgewood	E	Gray, Dove
T	Brown, Dark	R	Jade, Dark
V	Camel, Lt.	M	Jade, Light
Y	Camel, Medium	4	Jade, Medium
U	Chamois	3	Jade, Wedgewood
6	Champagne, Light	D	Red/Russet
J	Champagne, Midnight	P	Silver
		W	White

When a Vinyl Roof is installed the type and color codes will be reflected after the two digit Exterior Paint Color Code.
Example: Code – 1CYA = 1C–Black Car, YA–Valino Black Half Roof.

CY1615-2E1

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SEATS

GROUP 41 (70000)

PART TITLE	PART NO.	PART TITLE	PART NO.
Conventional Rear Seats	41-14	Reclining Seat Back	41-30
Fold Down Rear Seats	41-20	Seat Back Latch – Automatic	41-28
Head Restraints	41-40	Seat Back Latch – Manual	41-25
Lumbar Power Seat	41-35	Seat and Shoulder Belts	41-50
Power Seat – 4-Way	41-07	Seat Tracks – Manual	41-01
Power Seat – 6-Way	41-08	Seat Trim	41-60

CR2002-2B

Seat Tracks -- Manual

PART 41-01

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION	01-1	REMOVAL AND INSTALLATION	01-1
ADJUSTMENTS	01-1		

CR2009-2B

DESCRIPTION AND OPERATION

SEAT TRACKS—MANUAL

On the Ford and Mercury the drivers seat release handle is located at the lower left side of the seat cushion, and the passenger seat release handle (Bucket and Split Bench), is located at the lower right side of the seat cushion. On all other car lines with manual seat tracks, the seat release handle is located at the front (Bucket and Split-Bench). Tripping the seat release handle will allow forward or rearward movement of the seat assembly.

ADJUSTMENTS

TIE ROD

The tie rod adjustments are made individually for each pair of tracks and affects (only) the track farthest away from the seat release handle. All seat tracks do not have tie rods for adjustment. See Figs. 1 through 8. If the latch retaining the track fails to release(on tie rod equipped vehicles), turn the adjusting turnbuckle **clockwise,** just enough to shorten the tie rod travel and release the track latch (Figs. 1 through 8). If the latch fails to secure the seat travel, turn the adjusting turnbuckle **counterclockwise** to allow the latch to fully engage the locking position.

REMOVAL AND INSTALLATION

Removal

Manual seat tracks are retained to the floor pan by studs with nuts and washers, or screws (washer head type). The nuts and/or screws retaining the seat tracks are removed from inside and/or underneath the vehicle (Figs. 1 through 8).

1. Remove the seat track retaining screws and/or nuts and washers from inside or underneath the vehicle. Then, lift the seat and seat track assembly from the vehicle.
2. Place the seat and seat track assemblies on a clean working area and disconnect the adjusting springs (Figs. 1 through 8).
3. Remove the seat track-to-seat cushion attaching screws and remove the seat cushion from the tracks.
4. Disconnect the latch tie rod from the seat tracks.
5. If the seat tracks are being replaced, transfer the retracting springs, spacers, anti-squeak, seat side shields to the new track assembly.

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Installation

1. Mount the seat tracks with the side shield supports (if so equipped) to the seat cushion, and connect the tie rod to the two tracks as they are being positioned.
2. Install the seat track-to-seat cushion retaining screws and tighten to specifications shown in appropriate figures (Figs. 1 through 8).
3. Connect the adjusting springs between the seat tracks and seat cushion.
4. Place the seat assembly into the vehicle and insure proper alignment.
5. Then, install the screws and/or nuts and washer assemblies and tighten to specification shown in appropriate figures (Figs. 1 through 10).

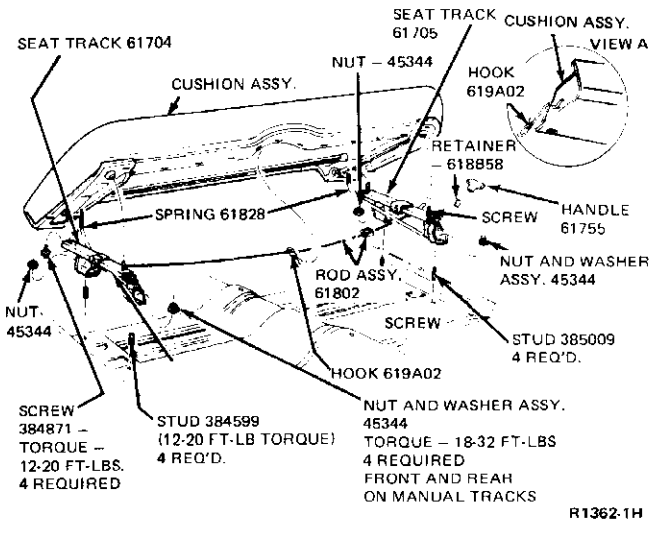


FIG. 1 Manual Seat Track Installation—Full Bench Seat—Ford and Mercury

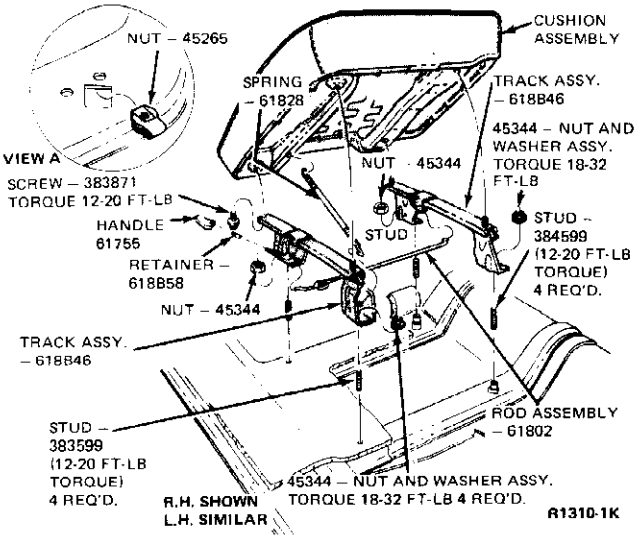


FIG. 2 Manual Seat Track Installation—Split Bench Seat— Ford and Mercury

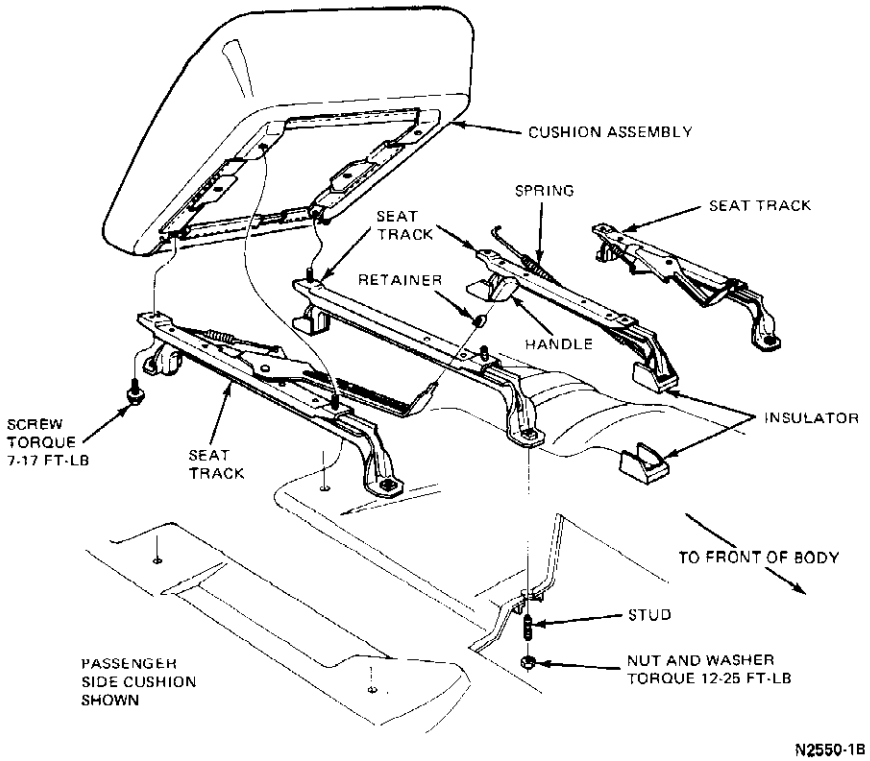


FIG. 3 Manual Seat Track Installation—Bucket Seat—Pinto and Bobcat

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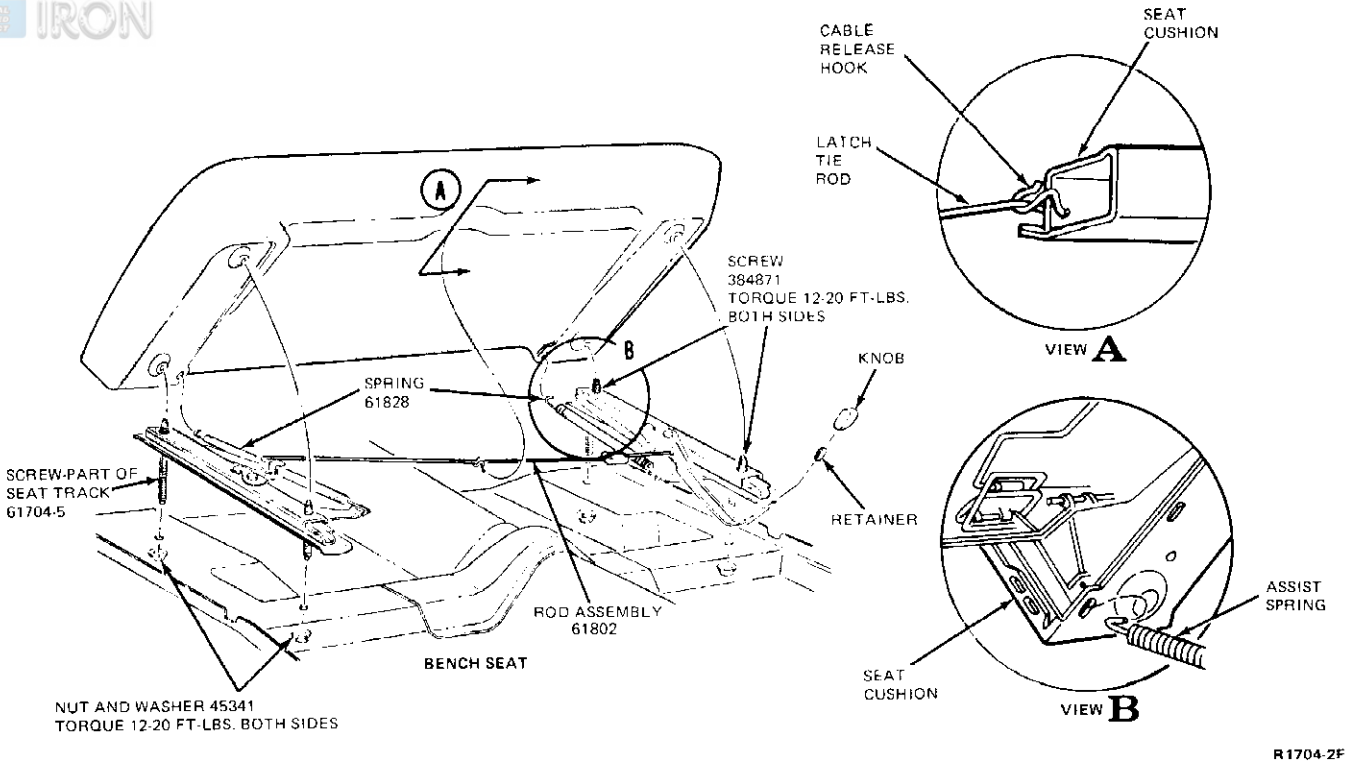


FIG. 4 Manual Seat Track Installation—Bench Seat—Zephyr, Granada and Monarch

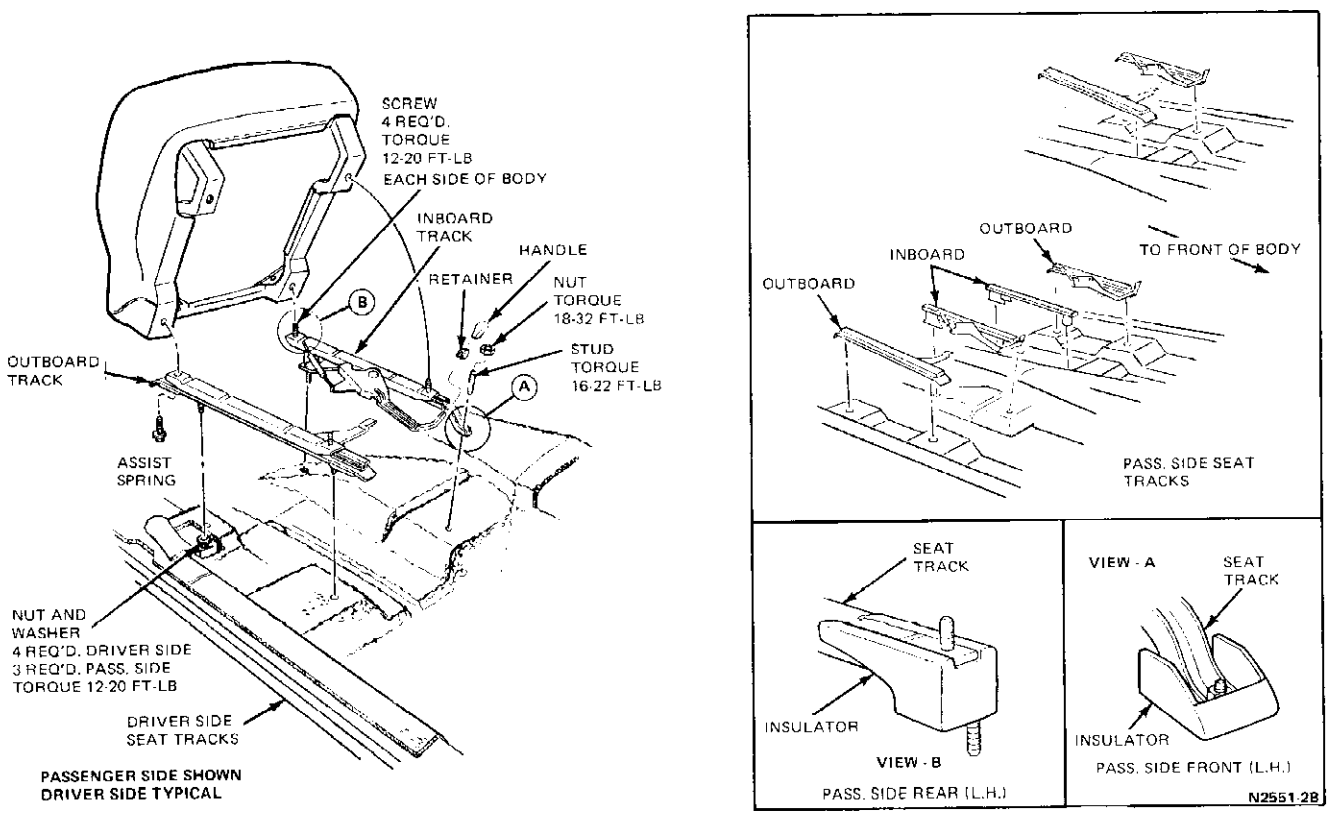


FIG. 5 Manual Seat Track Installation—Bucket Seat—Granada and Monarch

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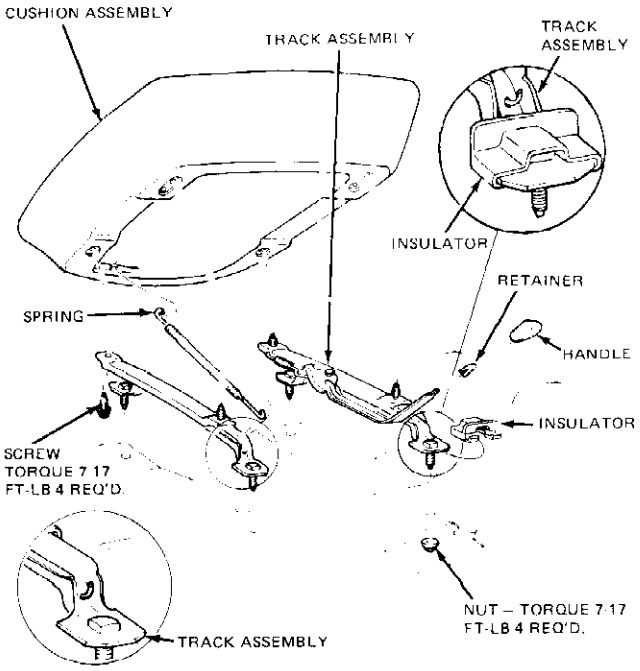


FIG. 6 Manual Seat Track Installation—Bucket Seat—Mustang II

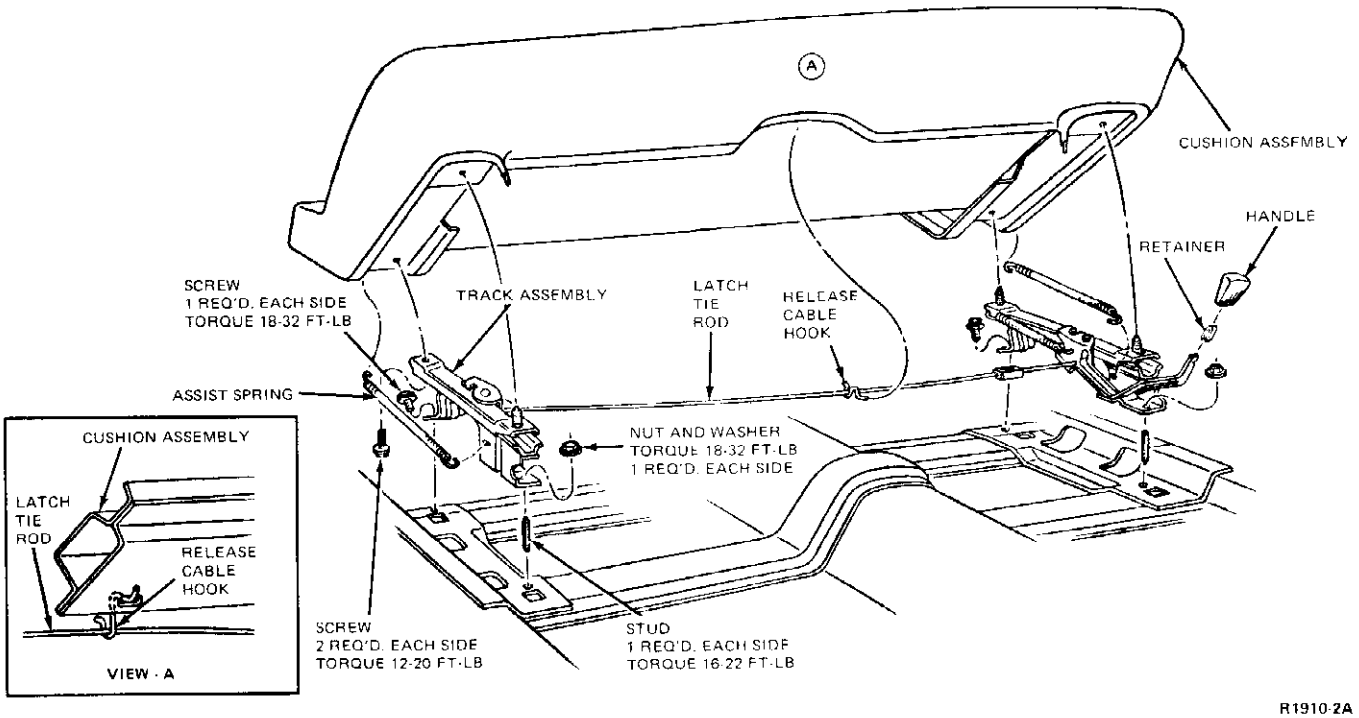


FIG. 7 Manual Seat Track Installation—Bench Seat—LTD II, Thunderbird and Cougar

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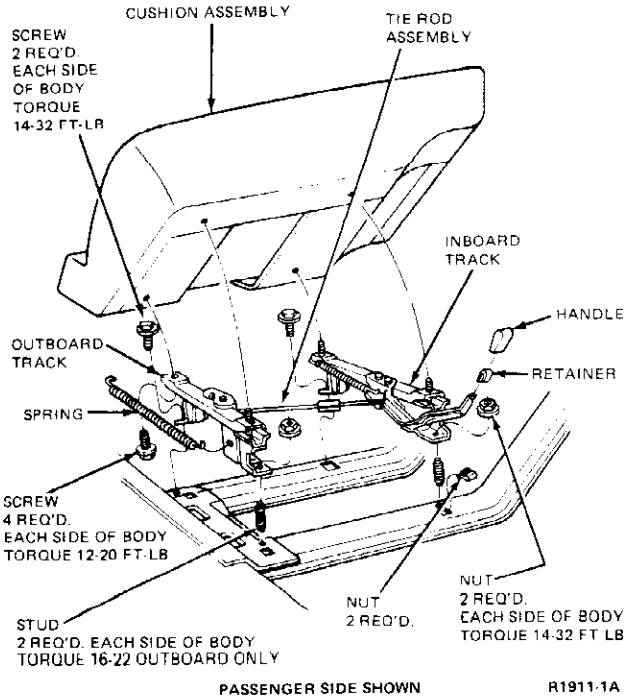


FIG. 8 Manual Seat Track Installation—Split Bench and Bucket on LTD II, and Cougar—Split Bench on Thunderbird and Continental Mark V

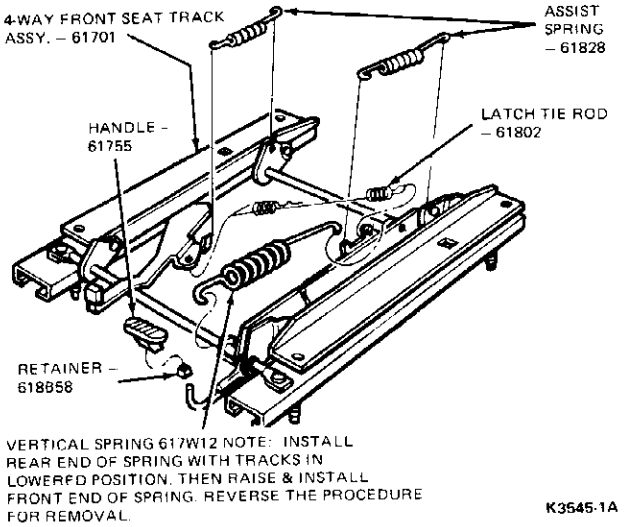


FIG. 9 4 Way Manual Track Bucket Drivers Seat

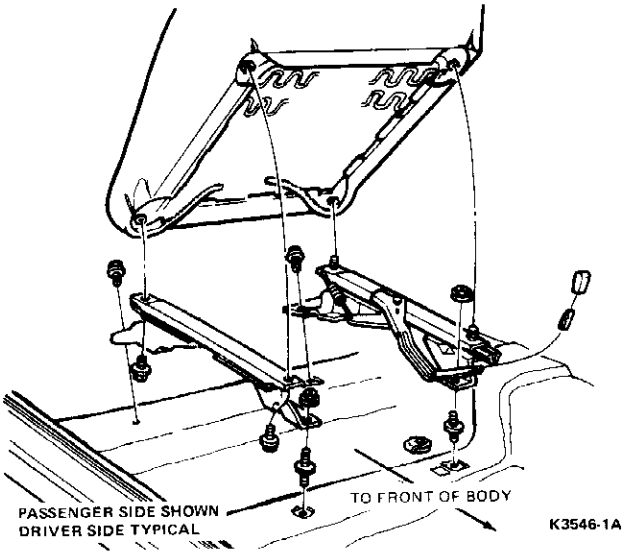


FIG. 10 Fairmont and Zephyr Bucket Seat

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Power Seat--4-Way

PART 41-07

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION	07-1	REMOVAL AND INSTALLATION	07-1
TESTING	07-1	DISASSEMBLY AND ASSEMBLY	07-3

CR2010-2B

DESCRIPTION AND OPERATION

The 4-way power seat mechanism provides fore and aft movement of the driver's (bucket or flight bench) seat, as well as up and down movement of the front edge of the seat, resulting in a tilting action. The seat is driven by an electric dual motor through two gear boxes and two flexible drive cables to provide the desired movement. A control switch, located on the driver's side in the left lower seat side shield, directs current to the motor.

TESTING

Disconnect motor leads from circuit. Connect ground and positive lead wires from the battery to the motor. Motor should operate in one direction. Reverse leads at the motor connector. Motor should run in the reverse direction.

If the motor does not operate the seat tracks, inspect the tracks for possible binds and gear transmission lock-up. Also, inspect the tracks and drive mechanism for foreign material that may cause binding. Test switch as described in Fig. 1.

REMOVAL AND INSTALLATION

Removal

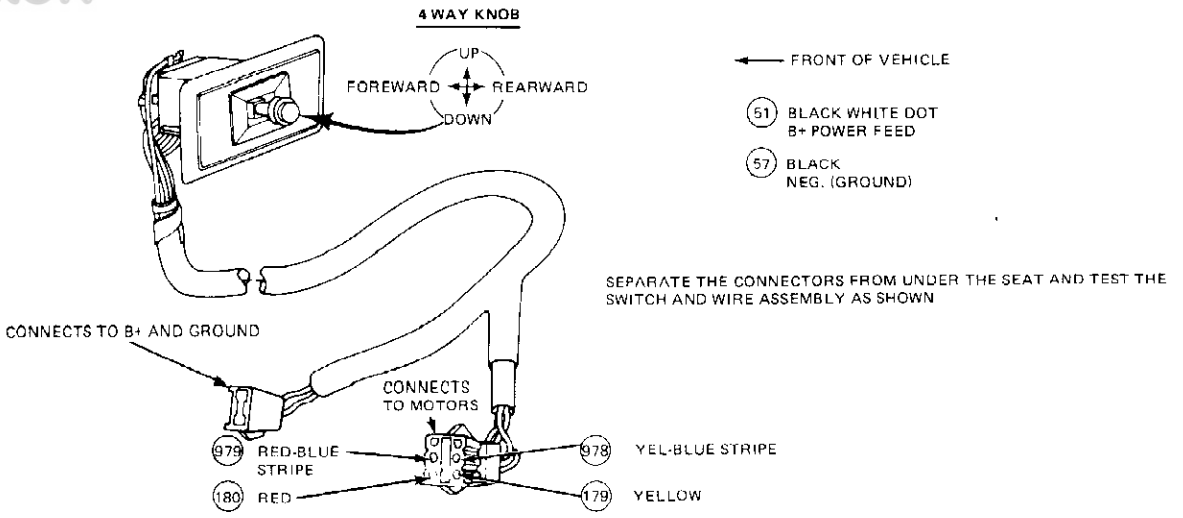
1. Using the control switch, raise the seat and position it to the rearmost position.
2. Remove the seat track rear attaching screws (Fig. 2).
3. Remove the outboard seat track front attaching screw and the inboard seat track attaching nuts.
4. Disconnect the feed and switch wiring connectors and remove the driver's seat assembly from the vehicle and place on a clean work surface.

Installation

1. Position the seat in the vehicle and connect feed and switch wiring. Be careful not to pinch or damage wiring.
2. Install the front and rear attaching screws and nut and washer and tighten to specifications shown in Fig. 2 and connect the seat sensor switch.
3. Using the control switch, test the operation of the seat in all positions.

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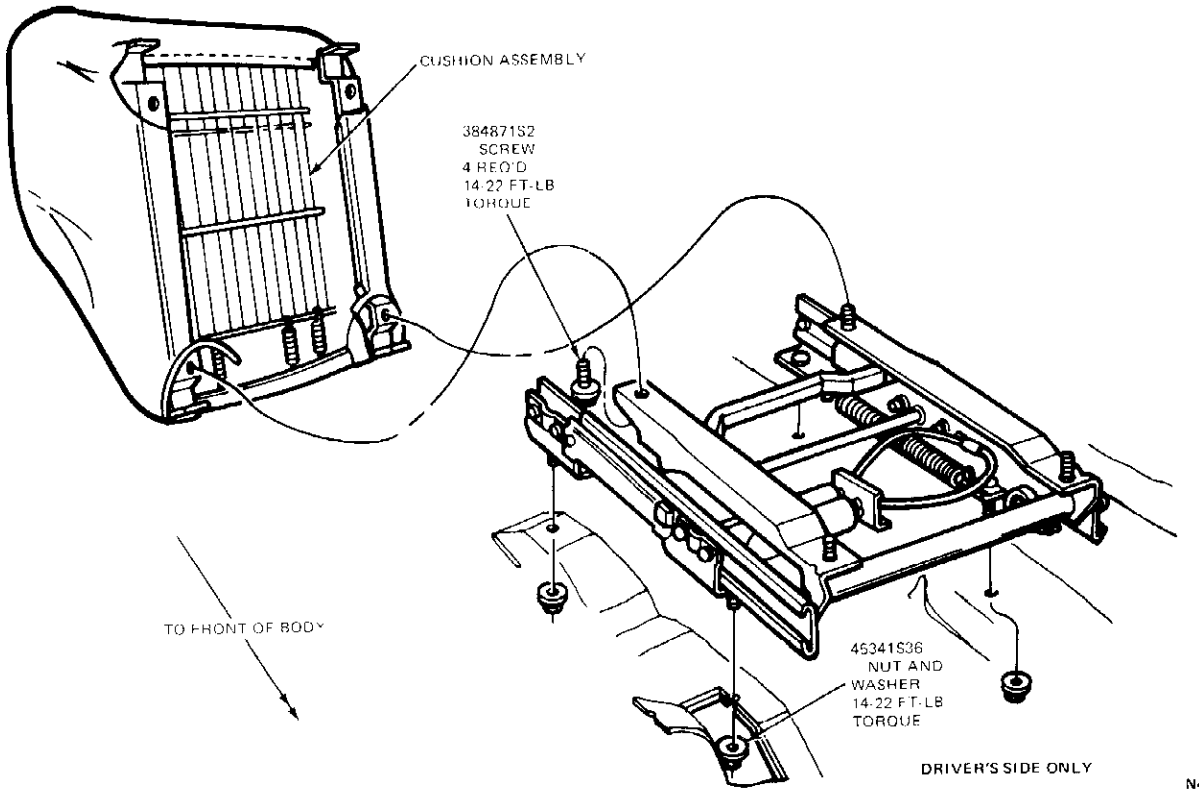
DETROIT IRON



CONNECT ONE SIDE OF OHMMETER OR TEST LIGHT TO CIRCUIT #51		CONNECT ONE SIDE OF OHMMETER OR TEST LIGHT TO CIRCUIT #57	
SWITCH POSITION	CONTINUITY BETWEEN TERMINALS	SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
NEUTRAL	51 AND NONE	NEUTRAL	57 AND 179-180-978-979
UP	51 AND 978	UP	57 AND 179 180-979
DOWN	51 AND 979	DOWN	57 AND 179-180-978
FOREWARD	51 AND 180	FOREWARD	57 AND 179-978-979
REARWARD	51 AND 179	REARWARD	57 AND 180-978-979

R1967-2A

FIG. 1 Power Seat Switch Tests—Granada, Monarch and Versailles



N4096-2B

FIG. 2 Seat and Track Installation 4-Way Power

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DISASSEMBLY AND ASSEMBLY

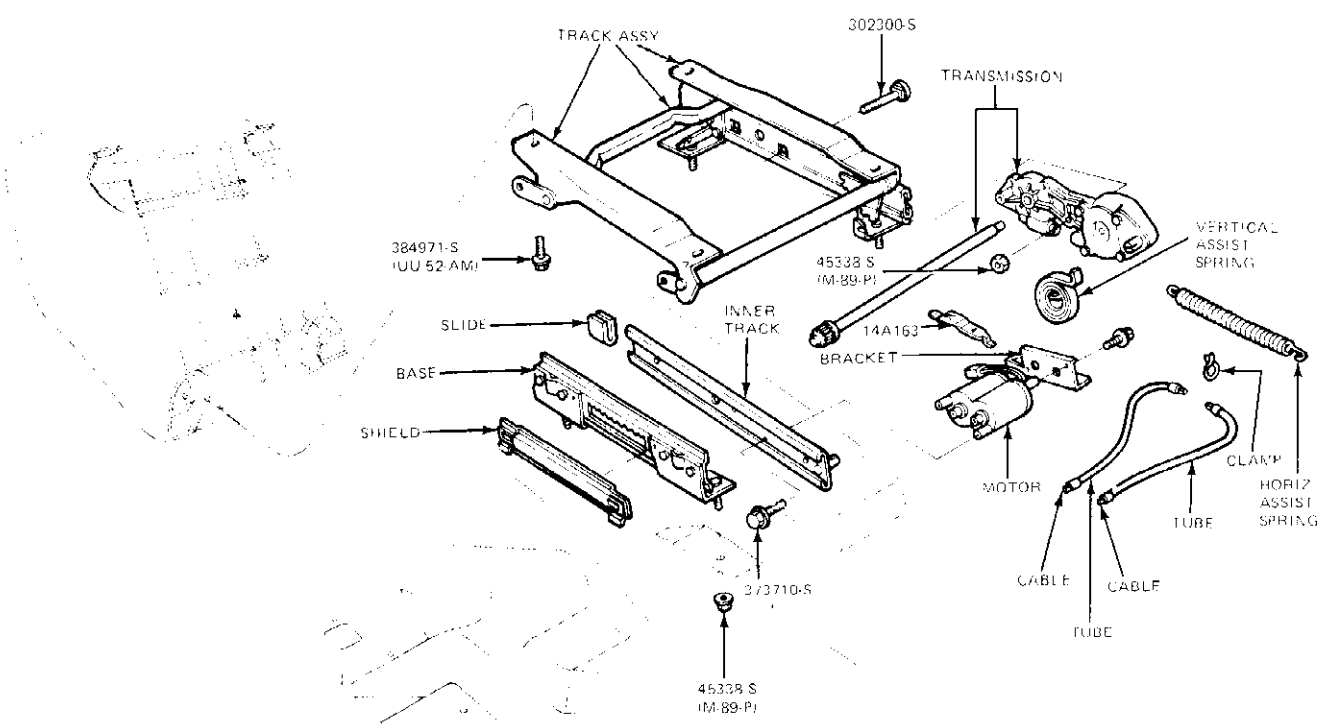
FOUR WAY POWER SEAT—SPLIT BENCH

Disassembly

1. Remove the motor mount bracket mounting bolts from the motor mount bracket to motor. Disconnect the hose clamps (2) from the drive input shafts.
2. Manually position the seat track in the full-up, and mid-horizontal position. To do this, insert the square end of a drive cable in the vertical drive and manually turn the drive unit until it is in the full-up position. Using the horizontal drive unit, insert the cable drive and manually turn it to the mid-horizontal position.
3. Remove the clock springs using vise grips. Remove the horizontal assist spring.
4. Remove the cotter pins from the pivot pins on the secondary track.
5. Remove the retaining rings from the horizontal pinions (primary and secondary tracks).
6. Remove the base and carriage from the secondary track by driving the pinion gear through the carriage rack.
7. Remove the bolts (2) and nuts (2) on the primary track that retain the drive assembly to the carriage.
8. Move the horizontal pinion rack gear manually (using the procedure in step 2) to gain access to the retaining hair pins, holding the vertical clevis pins.
9. Replace the inoperative drive assembly.

Assembly

1. Position the drive assembly, inserting the horizontal pinion into the pinion cage.
2. Install the drive assembly retaining nuts and hair pins into the front vertical drive.
3. Manually position the front vertical drive in the full up position. Also manually position the horizontal drive to the extreme forward position.
4. Using vise grips, pre-load the front clock spring and install the spring on the spring stud. Position the horizontal spring assembly in stud location and assemble to primary track.
5. Assemble the secondary track by inserting the horizontal pinion gear in the extreme forward position in the pinion cage. Be sure that the front and rear torsion bar holes are aligned with the pivot pins, on the secondary carriage. Also properly seat the pinion gear bushing in the carriage.
6. Install the cotter pins (2) and snap rings (2) on the horizontal pinions.
7. Install the motor mounting bracket and connect the drive cables (2) to the drive unit (2) assembly.



N2104 2B

FIG. 3 Exploded Seat Track Assembly—Four-Way

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Power Seat -- 6-Way

PART 41-08

SUBJECT	PAGE
DESCRIPTION AND OPERATION	08-1
TESTING	08-3
DIAGNOSIS	08-5
REMOVAL AND INSTALLATION	
Motor and Drive Cables	08-8
Right or Left Track	08-8
REMOVAL AND INSTALLATION (Cont'd.)	
Seat Track	08-7
MAJOR REPAIR OPERATIONS	
Lincoln Continental Seat Track (Bench Seat)	08-8
Six Way Power Seat – Full Bench	08-12
Six Way Power Seat – Split Bench	08-10

CR2011-2B

DESCRIPTION AND OPERATION

The 6-way power seat (Figs. 1 and 2) provides horizontal, vertical and vertical tilt adjustments. It consists of a reversible three armature motor (TRI-MOTOR), a switch and housing assembly, vertical gear drives and horizontal rack and pinion drives.

The mechanical portion of the seat track in the horizontal drive consists of a rack and pinion on each track. The pinion housing and motor is attached to the movable section of the track. When the switch is actuated, the front armature is energized and the horizontal drive units are activated. The seat is then propelled forward or rearward by the pinion gears traveling in a rack in each lower track section.

In the vertical drive, worm gear mechanisms are utilized. The drive units are located in the front and rear of the left hand track (standard bench). When the switch is actuated, the center and rear armatures are energized simultaneously and the vertical drive units are activated. The seat is then propelled up or down by the worm gears.

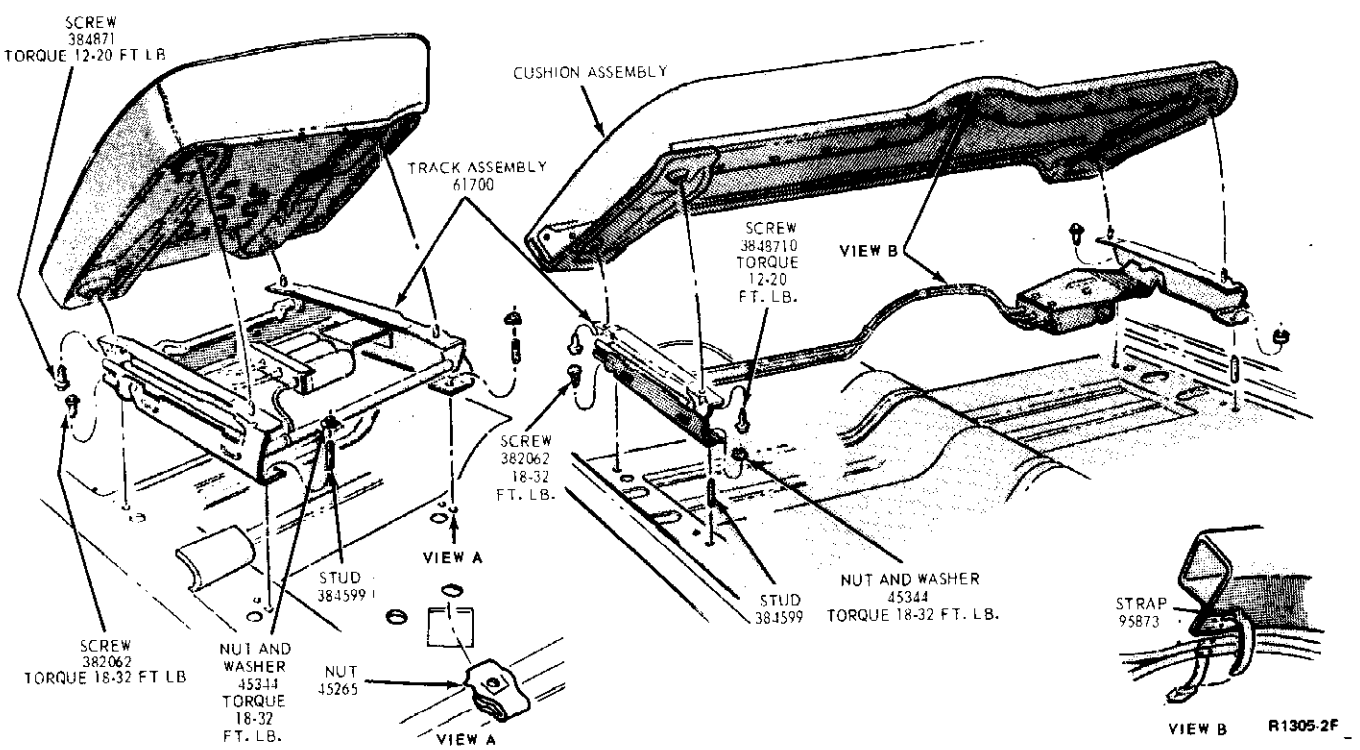


FIG. 1 Six-Way Power Seat Tracks Bench and Split Bench Ford and Mercury

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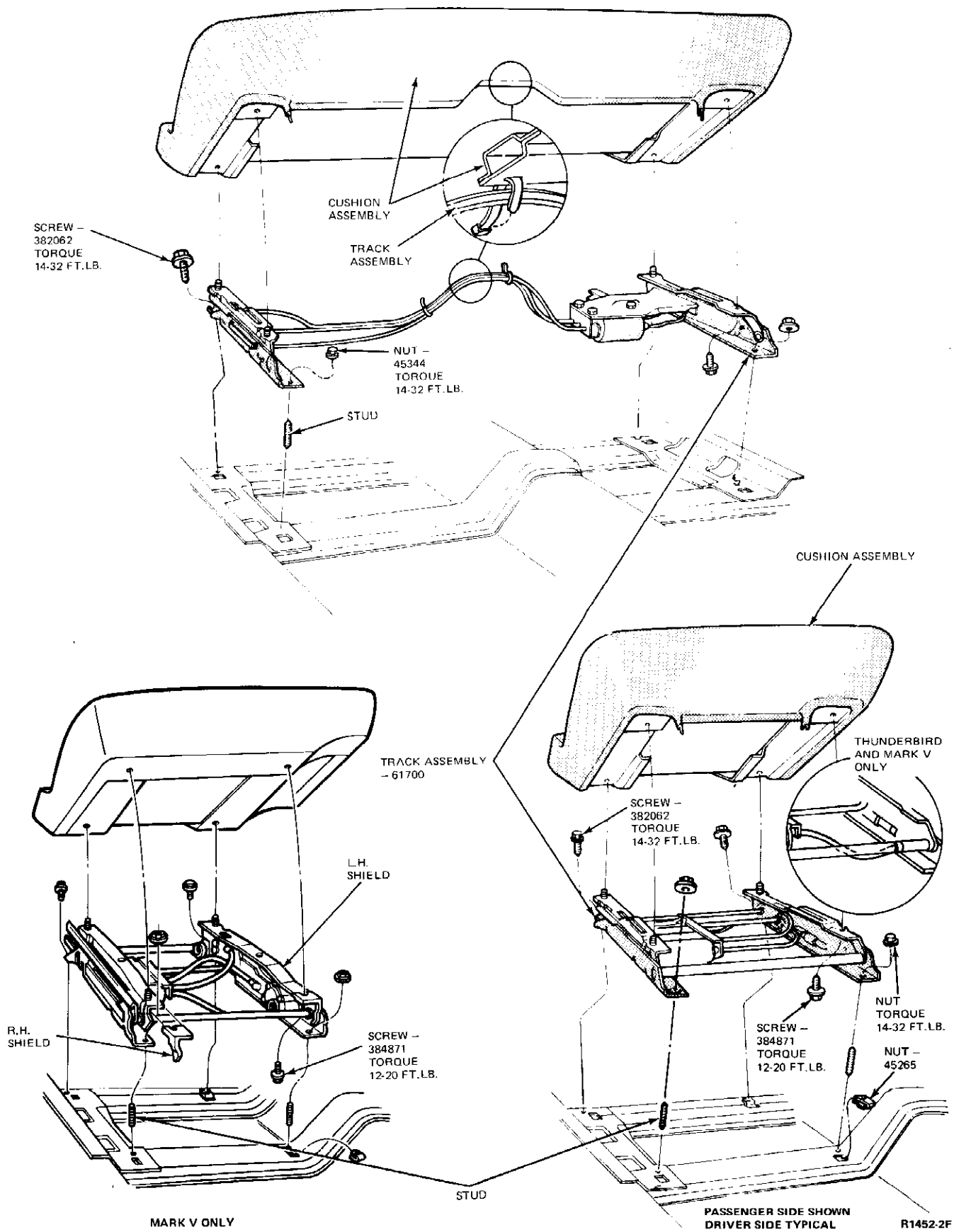


FIG. 2 Six-Way Power Seat Tracks Bench and Split Bench—LTD II, Cougar, Thunderbird, Lincoln Continental and Continental Mark V

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When the tilt switch is actuated, the center armature drives the front vertical worm gear and moves the seat to the desired position. When the rear tilt switch is actuated, the rear armature drives the rear vertical worm gear and moves the seat to the desired position.

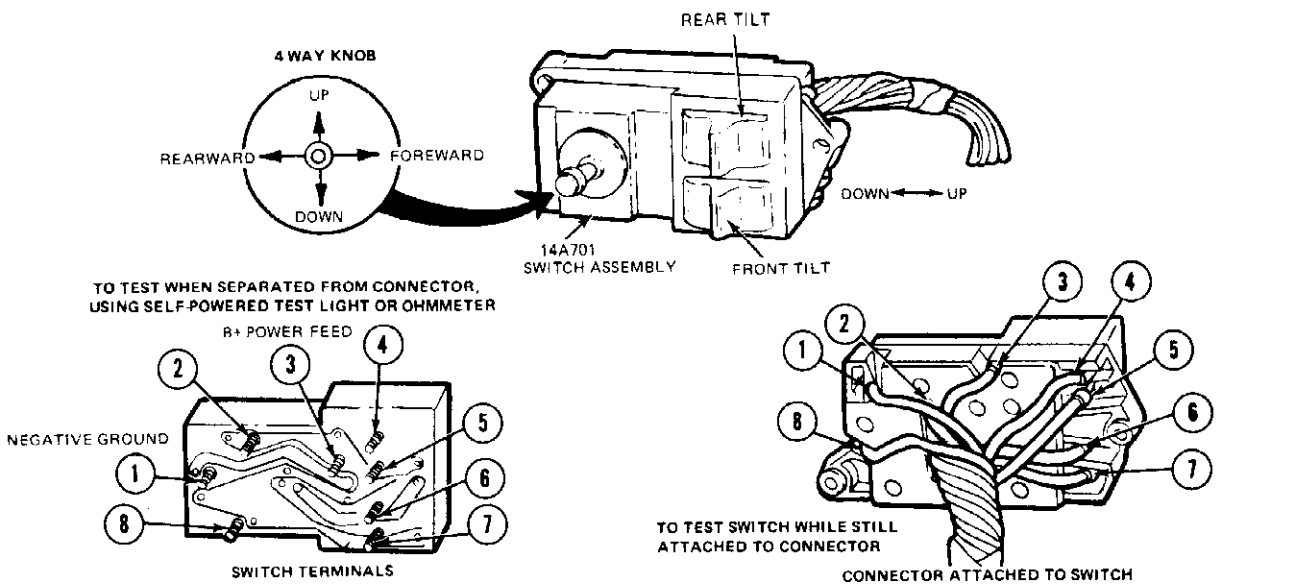
The power seat circuit is protected either by a 20 or 30 amp circuit breaker. The circuit breaker is mounted on the starter solenoid (Ford, Thunderbird, LTD II and Cougar) and, in the fuse panel (Lincoln Continental and Continental Mark V).

Both the horizontal and vertical drive units are servicable individually. The motor assembly which contains three armatures is serviced only as an assembly. The flexible shafts are serviced individually and can be removed by removing the securing corbin clamps.

The switch and housing assembly is serviceable separately.

TESTING

The power seat switch tests are shown in Figs. 3 and 4.



SWITCH POSITIONS

4-WAY KNOB	REAR TILT	FRONT TILT	CONTINUITY
NEUT.	NEUT.	NEUT.	1-2-4-5-6-7-8 (# 3 ISOLATED)
FOREWARD	NEUT.	NEUT.	2-3, 1-4-5-6-7-8
REARWARD	NEUT.	NEUT	3-8, 1-2-4-5-6-7
UP	NEUT.	NEUT.	3-4-6, 1-2-5-7-8
DOWN	NEUT.	NEUT.	3-5-7, 1-2-4-6-8
NEUT.	UP	NEUT.	3-6, 1-2-4-5-7-8
NEUT.	DOWN	NEUT.	3-7, 1-2-4-5-6-8
NEUT.	NEUT.	UP	3-4, 1-2-5-6-7-8
NEUT.	NEUT.	DOWN	3-5, 1-2-4-6-7-8

SWITCH POSITIONS

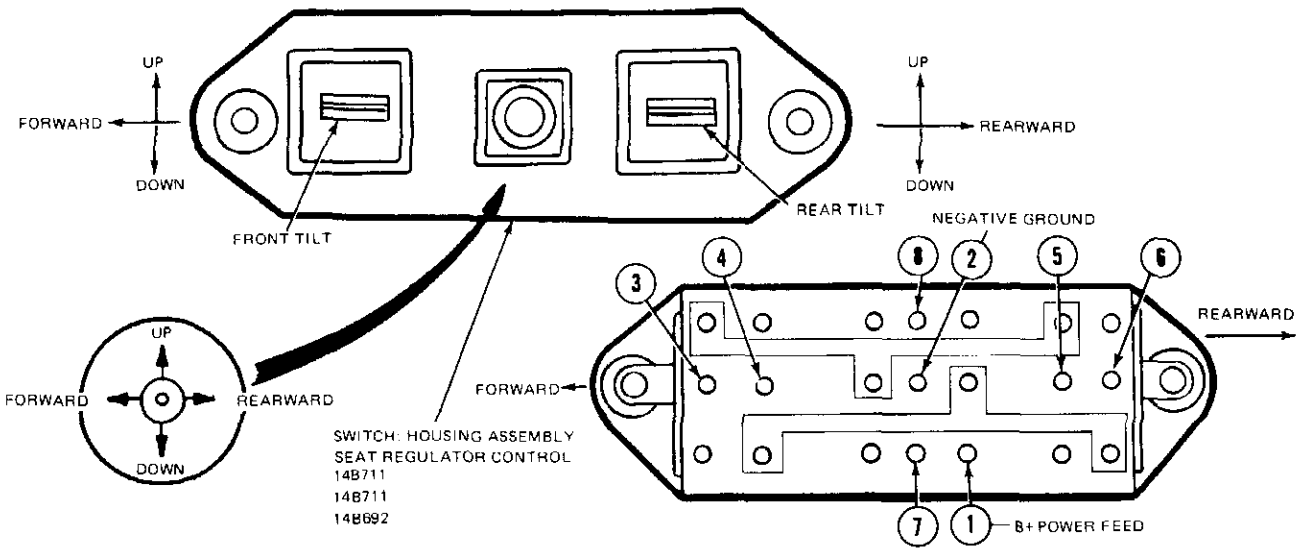
4-WAY KNOB	REAR TILT	FRONT TILT	POWER ①	GROUND ①
NEUT.	NEUT.	NEUT.	3 ONLY	1-2-4-5-6-7-8
FOREWARD	NEUT.	NEUT.	2-3	1-4-5-6-7-8
REARWARD	NEUT.	NEUT.	3-8	1-2-4-5-6-7
UP	NEUT.	NEUT.	3-4-6	1-2-5-7-8
DOWN	NEUT.	NEUT.	3-5-7	1-2-4-6-8
NEUT.	UP	NEUT.	3-6	1-2-4-5-7-8
NEUT.	DOWN	NEUT.	3-7	1-2-4-5-6-8
NEUT.	NEUT.	UP	3-4	1-2-5-6-7-8
NEUT.	NEUT.	DOWN	3-5	1-2-4-6-7-8

①TERMINAL NO. 1 IS ALWAYS GROUNDED AND TERMINAL NO. 3 IS ALWAYS HOT.

N2469-2E

FIG. 3 Power Seat Switch Tests—Armrest Mounted Switch—Lincoln Continental and Continental Mark V

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SWITCH POSITION

4-WAY KNOB	REAR TILT	FRONT TILT	CONTINUITY
NEUT. (DEAD)	NEUT. (DEAD)	NEUT. (DEAD)	2-3-4-5-6-7-8, 1 ISOLATED
FORWARD	NEUT. (DEAD)	NEUT. (DEAD)	1-7, 2-3-4-5-6-8
REARWARD	NEUT. (DEAD)	NEUT. (DEAD)	1-8, 2-3-4-5-6-7
UP	NEUT. (DEAD)	NEUT. (DEAD)	1-4-6, 2-3-5-7-8
DOWN	NEUT. (DEAD)	NEUT. (DEAD)	1-3-5, 2-4-6-7-8
NEUT. (DEAD)	UP	NEUT. (DEAD)	1-6, 2-3-4-5-7-8
NEUT. (DEAD)	DOWN	NEUT. (DEAD)	1-5, 2-3-4-6-7-8
NEUT. (DEAD)	NEUT. (DEAD)	UP	1-4, 2-3-5-6-7-8
NEUT. (DEAD)	NEUT. (DEAD)	DOWN	1-3, 2-4-5-6-7-8

TEST SWITCH WITH SELF POWERED TEST LIGHT OR OHMMETER WHEN SWITCH IS DISCONNECTED FROM WIRING

N2490-2C

FIG. 4 Power Seat Switch Tests—Seat Mounted Switch—Ford, Mercury, Thunderbird, LTD II and Cougar

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DETROIT IRON

DIAGNOSIS

Consult the following diagnosis charts for conditions encountered in the power seat system.

CONDITION	POSSIBLE CAUSE	RESOLUTION
1. Inoperative – All Modes.	A. Circuit Breaker Open.	Wait 90 seconds and try again.
	B. Circuit Breaker Damaged.	Check circuit breaker (Test for 12 volts each terminal). Replace if circuit breaker fails test. Check circuit for short between circuit breaker and switch. Repair if necessary.
	C. Terminal Connector (Motor to Harness) pulled apart (under seat).	Reconnect.
	D. Switch Damaged. Test: As shown in Figure No. 1 (Part 41-07). Granada, Monarch, Versailles Figure No. 2 Lincoln, Mark V (Figure No. 3). Ford, Mercury, LTD II, Cougar (Figure No. 4).	Replace switch.
	E. Ineffective Ground.	Check and repair if required.
	F. Motor Damaged. Test: Disconnect motor leads from circuit. Connect ground and positive lead wires from the battery to the motor. Motor should operate in one direction. Reverse leads at the motor connector. Motor should run in the reverse direction. If the motor does not operate the seat tracks, inspect the tracks for possible binds and/or gear transmission lock-up condition. Also, inspect the tracks and drive mechanism for foreign material that may cause binding.	Replace motor.

CN2857-2B

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CONDITION	POSSIBLE CAUSE	RESOLUTION
2. Inoperative – One Mode, Either Direction.	A. Switch worn or damaged.	Same as above No. 1D.
	B. Terminal connector (motor to switch) pulled apart.	Reconnect.
	C. Motor worn or damaged.	Same as above No. 1F.
	D. Cable disengaged from motor or transmission.	Engage cable – install spring clamps. Check cable for square formed ends – replace if frayed or distorted. Check for proper cable length as specified in parts information source. Check motor and transmission cable entry holes for square opening.
	NOTE: Before engaging cables, insure RH & LH bench seat tracks are synchronized with each other.	
	E. Transmission worn or damaged.	Replace transmission.
	F. Insufficient length.	Replace cable with proper length specified in parts information source.
3. Noisy Cable.	A. Insufficient cable length.	Replace cable with proper length specified in parts information source.
	B. Disengaged from transmission or motor drive hole.	Check for proper engagement and presence of spring clamps. Engage cables and install spring clamps if required.
	C. Frayed cable ends.	Replace cable.
	D. Broken cable.	Remove broken cable ends from the tube and replace cable.
	E. Lack of lubrication.	Remove cable from the tube and apply Polyethylene Grease Part No. D0AZ-19584 A or equivalent, to the cable and assemble.
4. Horizontal Chucking.	A. Horizontal movement over 1/32".	Replace transmission if pinion gear permits carriage to move over 1/8" fore and aft. Replace mounting base if movement occurs without pinion gear moving.
	B. Out of round pinion gear.	Replace transmission.
	C. Missing slide.	Install slide (4) required each side.
5. Binding.	A. Loose transmission attaching nuts.	Tighten transmission attaching nuts (2) required, (Torque 7-12 ft-lbs).

CN2857-2B1

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CONDITION	POSSIBLE CAUSE	RESOLUTION
6. Seat Cushing Rocking.	A. Loose cushion attaching screws.	Tighten the (4) cushion to track attaching screws (Torque 12-20 ft-lbs).
7. Seat Looseness.	A. Loose track to floor attaching nuts.	Tighten the (4) track to floor attaching nuts (Torque 14-32 ft-lbs).
	B. Floor carpet or deadener interference.	Check floor mounting surface for any obstruction and remove if required
8. Upper and Lower Track Looseness (Vertical Chucking).	A. Missing spring (clock type).	Install spring.
	B. Missing slide.	Install slide (4) required each side.
9. Inoperative Vertical Mode.	A. Missing pinion gear retaining pin.	Engage pinion gear. Replace pin through attaching hole in pinion gear shaft.
	B. Transmission worn or damaged.	Replace transmission.
	C. Broken cable	Replace cable.
10. Inoperative Horizontal Mode.	A. Missing horizontal assist spring.	Install spring.
	B. Broken horizontal assist spring.	Replace spring.
	C. Disconnected horizontal assist spring.	Connect spring.
	D. Transmission worn or damaged.	Replace transmission.
	E. Cable worn or damaged.	Replace cable.
11. Lateral Chucking.	A. Missing slide.	Install slide (4) required each side.
12. Binding or Slow Operation.	A. Floor attaching screws torqued with tracks positioned tight against rear or front stops.	Loosen floor attaching nuts. Cycle tracks – position tracks away from stops – tighten attaching nuts (Torque 14-32 ft-lbs).
	B. Broken rear assist spring (vertical or horizontal).	Replace spring.
	C. Low charge battery.	Check for proper state of charge – at least 1.200 specific gravity. Charge as specified.

CN2857-2B2

REMOVAL AND INSTALLATION

SEAT TRACK

Removal

1. Remove the nuts and washers and/or bolts retaining the seat track assembly to the floor pan (Figs. 1 and 2).
2. Lift the seat up enough to disconnect the seat motor wires. Then, remove the two bolts attaching the seat belts-to-floor and disconnect the multiple connector. Remove the seat and track assembly from the vehicle.
3. Place the seat upside down on a clean bench.
4. Remove the shield(s) from the outboard side of the seat cushion (if so equipped).
5. Remove two bolts attaching each track to the seat frame and remove the track assembly from the seat.

Installation

1. Position the track assembly to the seat cushion. With a Thunderbird or Continental Mark V track, install the side shield support(s) between the track and cushion (if so equipped).
2. Install the four track-to-cushion attaching screws and washers and tighten to specification shown Figs. 1 and 2. To be sure that the two tracks are mounted in parallel, move the J-nut at the right front corner so that the distance between the tracks at the front equals that at the rear. Measurement should be made between the track base channels.
3. Install the side shield(s) to the seat cushion (if so equipped).
4. Connect the seat control to the track assembly at the connectors.
5. Position the seat and track assembly in the vehicle and connect the seat motor wires at the connector and the seat sensor switch wires. Install the two bolts attaching the seat belts to the floor and connect the multiple connector.
6. Install the seat track-to-floor pan retaining nuts and/or bolts and tighten to specification shown in Figs. 1 and 2.

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RIGHT OR LEFT TRACK

Removal

1. Remove nuts and washers and/or bolts retaining the seat track to the floor pan (Figs. 1 and 2).
2. Lift the seat up enough to disconnect the seat motor wires. Then, remove the two bolts attaching the seat belts to floor. Remove the seat and track assembly from the vehicle.
3. Remove the right and left cushion side shields from the seat cushion (if so equipped).
4. Remove the retaining clamps and disconnect the drive cables from the seat tracks.
5. If the motor mounting bracket is attached to the track being replaced, remove the bracket-to-track screws and remove the bracket, motor and drive cables as an assembly. If the motor mounting bracket is not attached to the track being replaced, remove the three motor-to-mounting bracket screws and remove the motor and drive cables as an assembly.

Installation

1. Position the side shield support(s) (if so equipped) and then the replacement track to the seat frame. Install the attaching bolts and washers and tighten to specification shown in Figs. 1 and 2.
2. If the motor mounting bracket was attached to the track that was replaced, position the bracket, motor and drive cable assembly to the track and install the two bracket-to-track screws; otherwise, position the motor and drive cables and install the three motor-to-bracket screws.
3. Connect the drive cables to the tracks and install the retaining clamps.
4. Install the right and left cushion side shields (if so equipped).
5. Position the seat and track assembly into the vehicle and connect the motor. Install the two bolts attaching the seat belts to the floor and connect the multiple connector.
6. Install the four seat track-to-floor pan retaining nuts and washers and tighten to specification shown in Figs. 1 and 2.
7. Check the operation of the seat.

MOTOR AND DRIVE CABLES

Removal

1. Remove nuts and washers retaining the seat track to the floor pan (Figs. 1 and 2).
2. Lift the seat and disconnect the seat motor and seat sensor switch connector. Remove the two bolts attaching the seat belts to floor and disconnect the multiple connector. Then, remove the seat and seat track from the vehicle.
3. Remove three motor assembly to mounting bracket attaching bolts.
4. Remove the clamps retaining the drive cables to the seat tracks. Then, open the wire retaining straps and remove the motor assembly and cables from the seat track assembly.
5. Remove the cable retaining brackets and remove the drive cables from the motor assembly.

Installation

1. Position the cables and retaining brackets to the motor and install the retaining screws.
2. Position the cables to the seat tracks and the motor to the mounting bracket.
3. Install the three motor-to-mounting bracket attaching bolts.
4. Install the clamps retaining the drive cables to the seat tracks.
5. Insert the motor wire in the wire straps and connect the wire at the connector.
6. Position the seat and track in the vehicle and connect the seat motor. Install the two bolts attaching the seat belts to the floor and connect the multiple connector.
7. Install the seat track-to-floor pan retaining nuts and washers and tighten to specification shown in Figs. 1 and 2.
8. Check the operation of the seat.

MAJOR REPAIR OPERATIONS

LINCOLN CONTINENTAL BENCH SEAT TRACK

To replace any component of a seat track, remove the track as outlined under Removal and Installation and disassemble the track as required to replace the damaged component.

On each power seat assembly, each track uses a vertical assist spring. The motor and mounting bracket is bolted to the left seat track. The Lincoln Continental left seat track is the primary seat track. The right seat track is the secondary seat track (Fig. 5).

Two vertical drive units (front and rear) and one horizontal drive unit are located in both the primary (left) and secondary (right) tracks (Fig. 6).

Disassembly

1. Remove the motor bracket mounting bolts (3) from the motor mount bracket to motor (Fig. 6).
2. Disconnect the cable housing hose clamps (3) and remove the terminal block connector from the terminal block bracket (Fig. 6).
3. When disassembling an inoperative seat track, it is helpful to position the track upper channel in the full up position (Fig. 8). If the channel is not in the up position, insert the square end of the drive cable into one of the vertical drive couplings, and manually turn the vertical drive to the full up position (Fig. 8). Once the vertical drive is run

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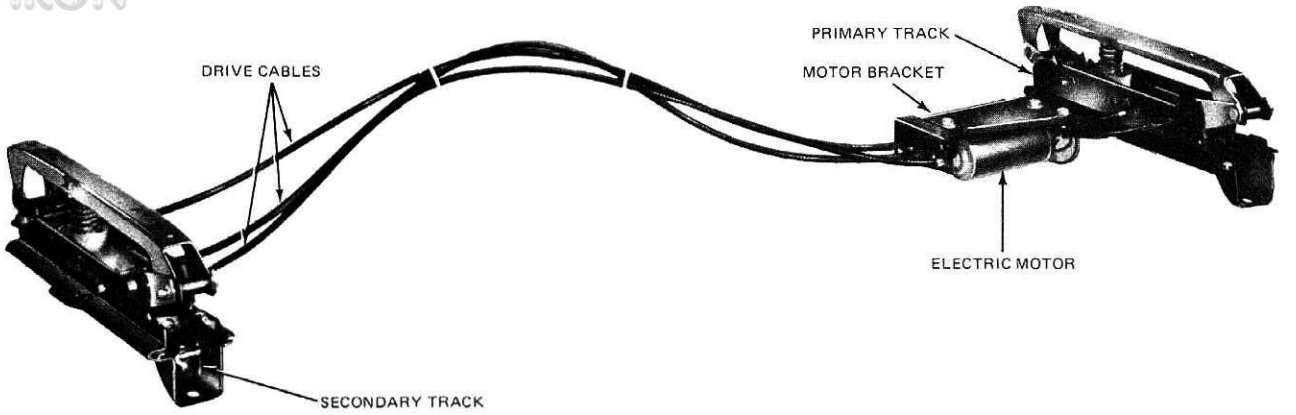


FIG. 5 Six Way Bench Power Seat Assembly—Lincoln Continental

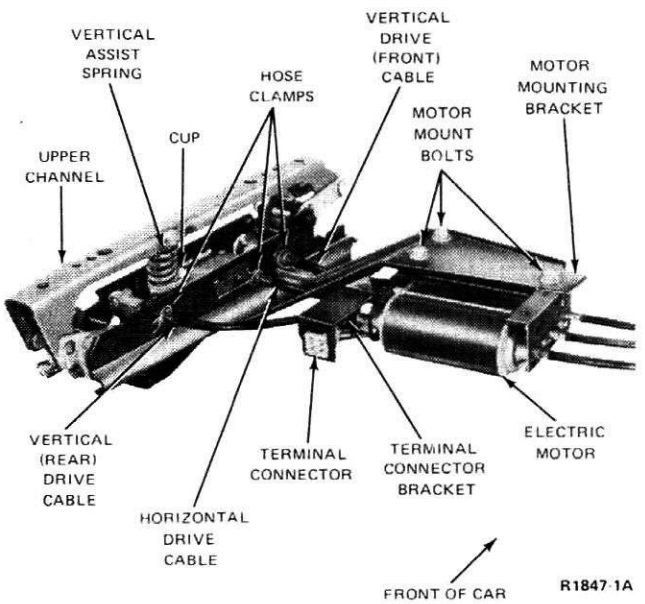


FIG. 6 Primary Seat Track Components, Bench Seat

against the stop, it is necessary to back it off 1/4 turn. This is done to provide working clearance. If the vertical drive is inoperative, insert the drive cable into the drive coupling and turn it to the full forward position. Again, back off from the full stop position 1/4 turn.

4. When taking apart the primary (left) track, hold the upper front channel against the vertical assist spring while removing the front clevis pin (Fig. 7). **CAUTION: Release the upper channel carefully so that the upper channel will not spring open quickly. The upper channel is under spring tension.** Remove the assist spring and cup (Fig. 9).

The secondary (right) track upper channel is removed in the same manner as described above.

5. Remove the roll pin from the rear end of the two side rails. Also remove the front and rear pivot bolts and nuts (Fig. 9).

When disassembling the primary (left) track, remove the through bolts (2) and nuts (2) that retain the horizontal drive and motor mount bracket to the side

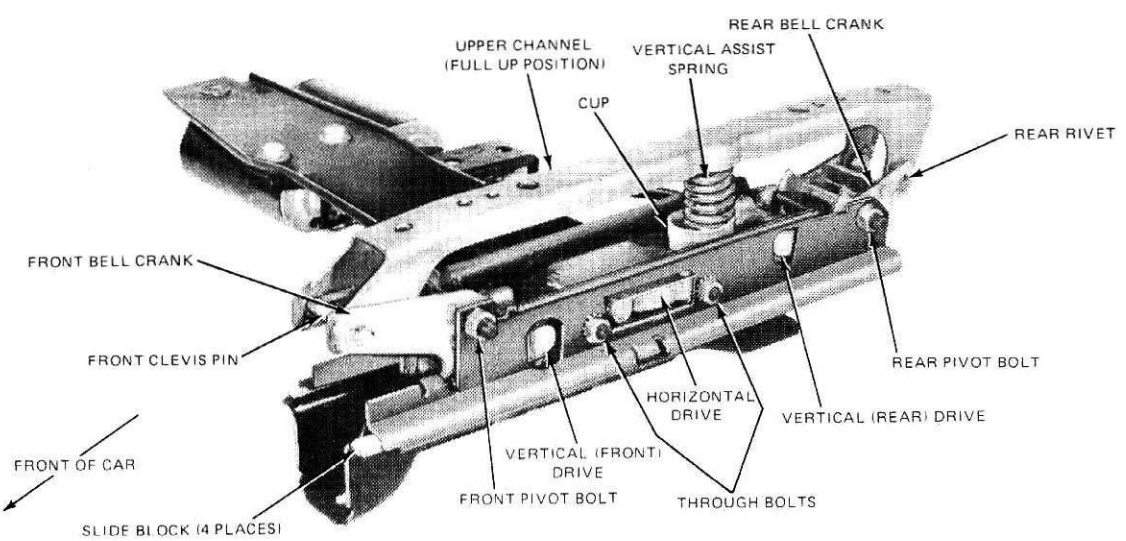


FIG. 7 Primary Seat Track Components—Lincoln Continental

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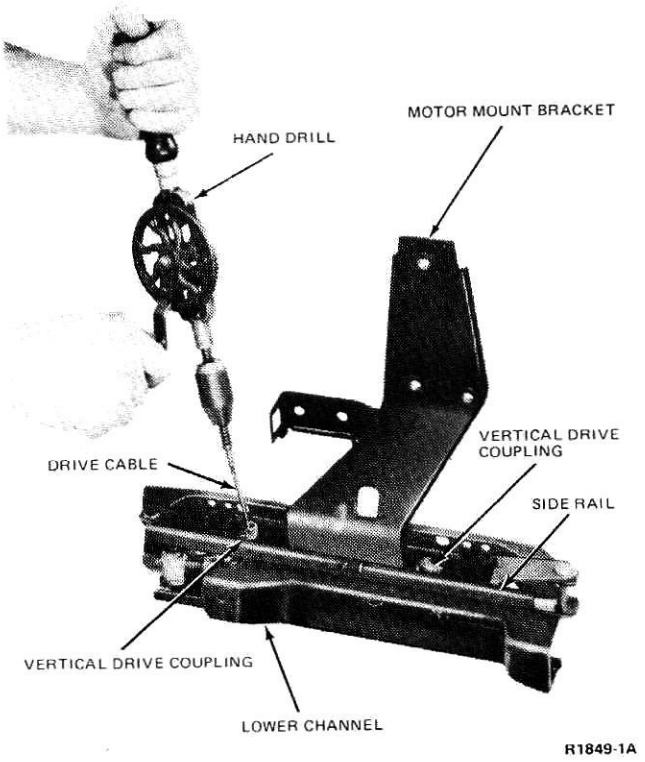


FIG. 8 Positioning the Upper Channel in the Full Up Position

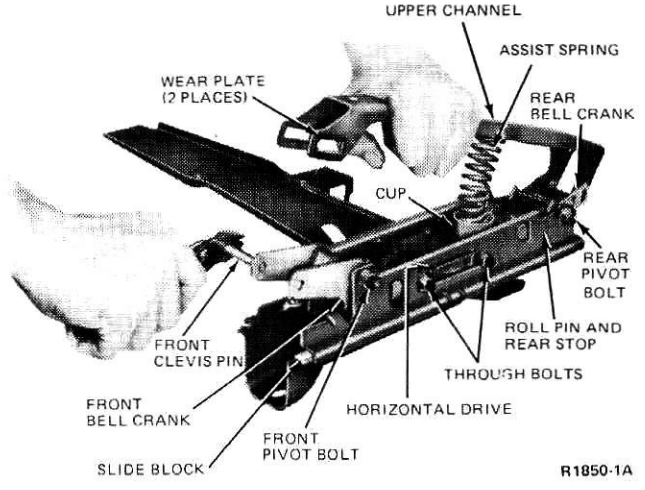


FIG. 9 Removing the Upper Channel—Lincoln Continental, Bench Seat

rails. Remove the motor mounting bracket. Lift the drive carriage and drive assembly out of the base channel.

When disassembling the secondary (right) track, remove the through bolts (2) and nuts (2) from the side rails. Lift the horizontal drive carriage out of the base channel. If the horizontal drive is inoperative replace it.

If the front vertical drive is inoperative remove the front bell crank assembly by unscrewing the front bell crank from the screw. If the rear vertical drive is inoperative, remove the roll pin and rotate the rear bell crank off the drive screw. Replace the defective vertical drive.

Assembly

1. Install the rear bell crank to the vertical drive by turning it onto the threaded drive screw. If either of the vertical drives are being replaced, mount the new drive to the carriage by installing the roll pin into the correct roll pin hole.
2. Properly position the four horizontal slide blocks on the base channel as shown (Fig. 10).
3. Install the horizontal drive to the drive carriage.
4. Install the drive carriage by positioning the pinion retainer block (Fig. 10), in the full forward position before engaging the pinion with the horizontal rack. Make sure the pinion is retained by the retainer block.
5. Install the through bolts (2) that hold the motor bracket (primary track), the horizontal drive and slide rails (2) together (Fig. 7).
6. Align the vertical drive (front and rear) bell crank bolt holes manually, by turning the vertical drive(s) input coupling(s) (Fig. 8). Secure the motor bracket bolts evenly. Manually turn the vertical drive to the stop position in the full up mode.
7. Install the roll pin at the rear end of the side rails (2).
8. With the primary (left) track, install the vertical assist spring and cup in the drive carriage. The boss on the cup should enter the hole in the bottom of the carriage. Install the wear plates, one on each side of the front upper channel. Force the upper channel down, against the spring and secure the forward end to the front bell crank (Fig. 9).
9. Connect the drive cables (3) to the drives (3). Secure the hose clamps. Connect the terminal block to the terminal block bracket. Secure the motor to motor mount bracket with the attaching bolts (3) (Fig. 6).

SIX WAY POWER SEAT—SPLIT BENCH

Disassembly

1. Remove the motor mount bracket mounting bolts from the motor mount bracket to motor. Disconnect the hose clamps (3) from the drive input shafts (Fig. 11).
2. Manually position the seat track in the full up, and mid-horizontal position. To do this, insert the square end of a drive cable in one of the vertical drives and manually turn the drive unit until it is in the full up position. Using the horizontal drive unit, insert the cable drive and manually turn it to the mid-horizontal position.
3. Remove the front and rear clock springs using vise grips (Fig. 12).
4. Remove the cotter pins from the pivot pins on the secondary track (Fig. 13).
5. Remove the retaining rings from the horizontal pinions (primary and secondary tracks).
6. Remove the base and carriage from the secondary track by driving the pinion gear through the carriage rack (Fig. 14).

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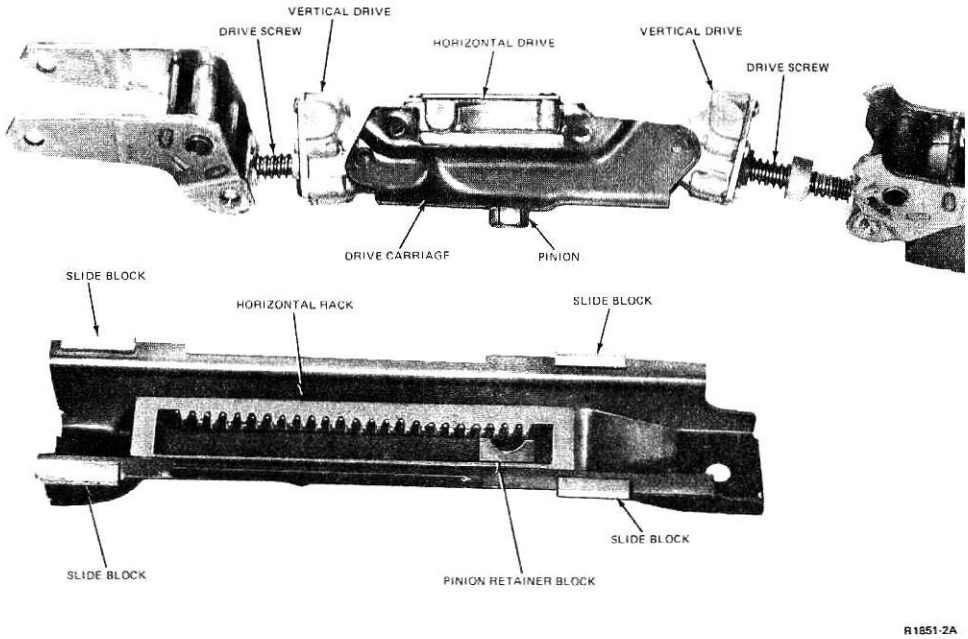


FIG. 10 Pinion, Horizontal Rack and Pinion Retainer Block—Lincoln Continental, Bench Seat

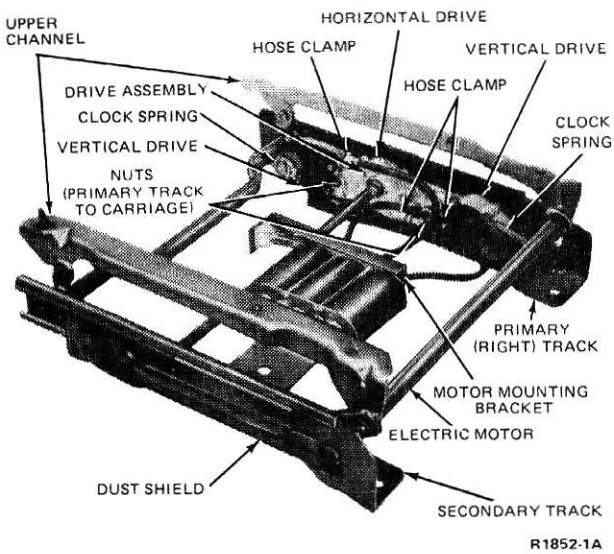


FIG. 11 Six Way Power Seat Track Assembly—Split Bench Full Up and Mid-Horizontal Position Shown

7. Remove the bolts (2) and nuts (2) on the primary track that retain the drive assembly to the carriage (Fig. 11).
8. Move the horizontal pinion rack gear manually (using the procedure in Step 2), to gain access to the retaining hair pins, holding the vertical clevis pins.
9. Replace the inoperative drive assembly.

Assembly

1. Position the drive assembly, inserting the horizontal pinion into the pinion cage (Fig. 14).
2. Install the drive assembly retaining nuts and hair pins into the front and rear vertical drives (2).

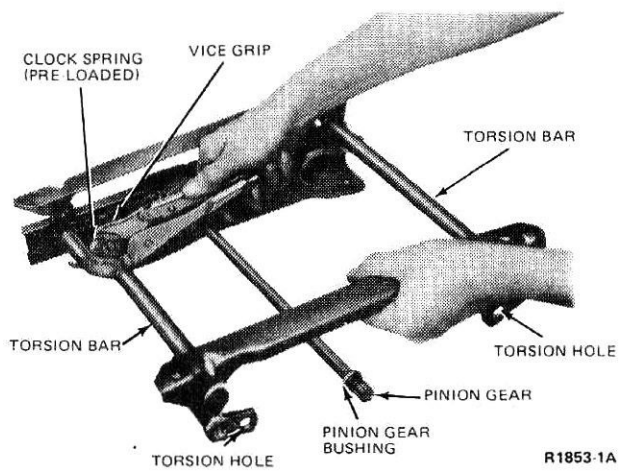


FIG. 12 Removing the Clock Springs

3. Manually position the front and rear vertical drives in the full up position. Also manually position the horizontal drive to the extreme forward position.
4. Using vise grips, pre-load the front and rear clock springs and install the springs on the spring studs (Fig. 12).
5. Assemble the secondary track by inserting the horizontal pinion gear in the extreme forward position in the pinion cage. Be sure that the front and rear torsion bar holes are aligned with the pivot pins, on the secondary carriage. Also properly seat the pinion gear bushing in the carriage (Fig. 12).
6. Install the cotter pins (2) and snap rings (2) on the horizontal pinions.
7. Install the motor mounting bracket and connect the drive cables (3) to the drive unit (3) assembly.

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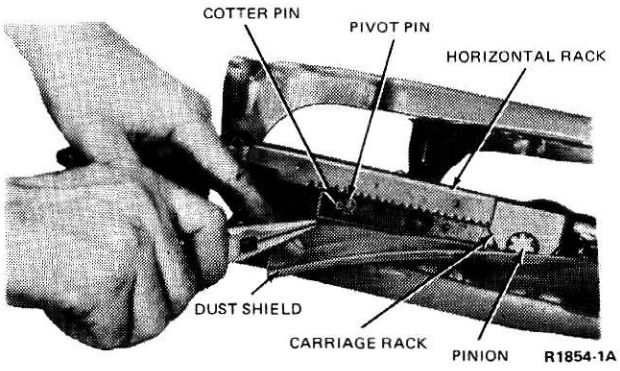


FIG. 13 Removing the Cotter Pins from the Pivot Pins

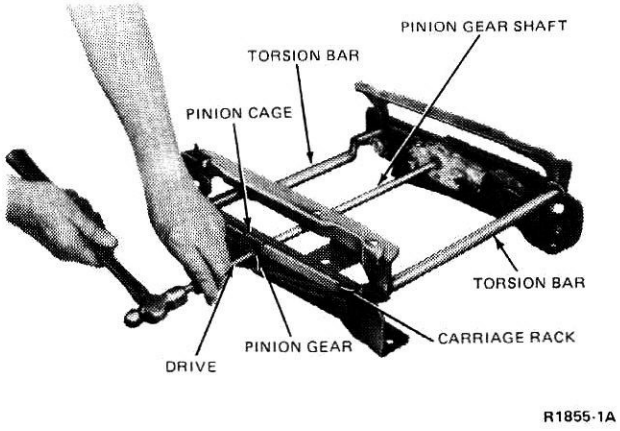


FIG. 14 Driving the Pinion Gear Through the Carriage Rack

SIX WAY POWER SEAT—FULL BENCH

The six way power seat full bench seat tracks (Fig. 15) are serviced in the same way as the split bench primary seat track. The difference is that the bench seat adjusters are both primary tracks. The right primary track has a horizontal assist spring that helps the right track in moving forward. Refer to Split Bench Major Repair Operations for servicing the full bench seat tracks.

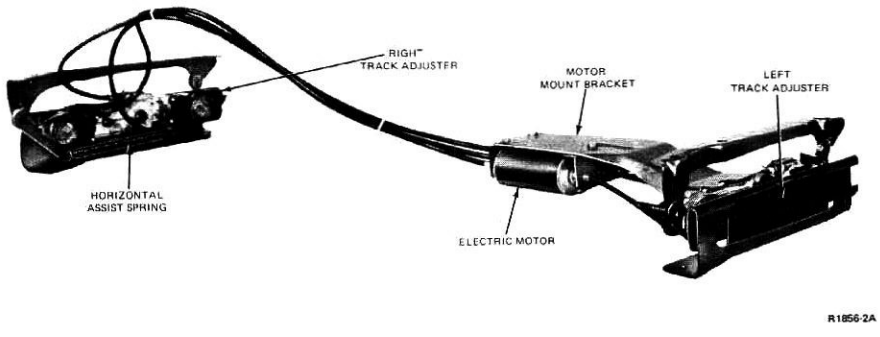


FIG. 15 Six Way Power Seat Assembly—Full Bench—Ford, Mercury, LTD II, Cougar and Thunderbird

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DETROIT IRON

Conventional or Split Rear Seats

PART 41-14

CR2012-A

REMOVAL AND INSTALLATION

CONVENTIONAL REAR SEATS

ALL MODELS EXCEPT PINTO, BOBCAT AND MUSTANG II

Removal

1. Apply knee pressure to the lower portion of the rear seat cushion; then push rearward to disengage the seat cushion from the retainer brackets (Fig. 1).
2. Remove one of the rear quarter arm rests (if so equipped), to remove the seat back assembly.
3. Remove the seat back lower retaining screws (Fig. 2).
4. Grasp the seat back assembly at the bottom and lift up to disengage the hanger wire from the retainer brackets.
5. Remove the seat back assembly from the vehicle.

Installation

1. Position the seat back assembly into the vehicle so that the hanger wire is engaged with the retaining brackets (Fig. 2).
2. Install the seat back lower retaining screws and tighten securely.
3. Position the seat cushion assembly into the vehicle.
4. Apply knee pressure to the lower portion of the seat cushion assembly and push rearward and down to lock the seat cushion into position (Fig. 1).
5. Install the rear quarter arm rest (if removed).
6. Check rear seat cushion to be certain it is secured into its floor retainer.

Pinto, Bobcat and Mustang II

Removal

1. Remove the two lower retaining screws securing the rear seat cushion (Fig. 3) and remove the seat cushion from the vehicle.
2. Remove the two lower retaining screws securing the rear seat back.
3. Then, grasp the seat back assembly at the bottom and lift up to disengage it from the retainers (Fig. 3).
4. Remove the rear seat back assembly from the vehicle.

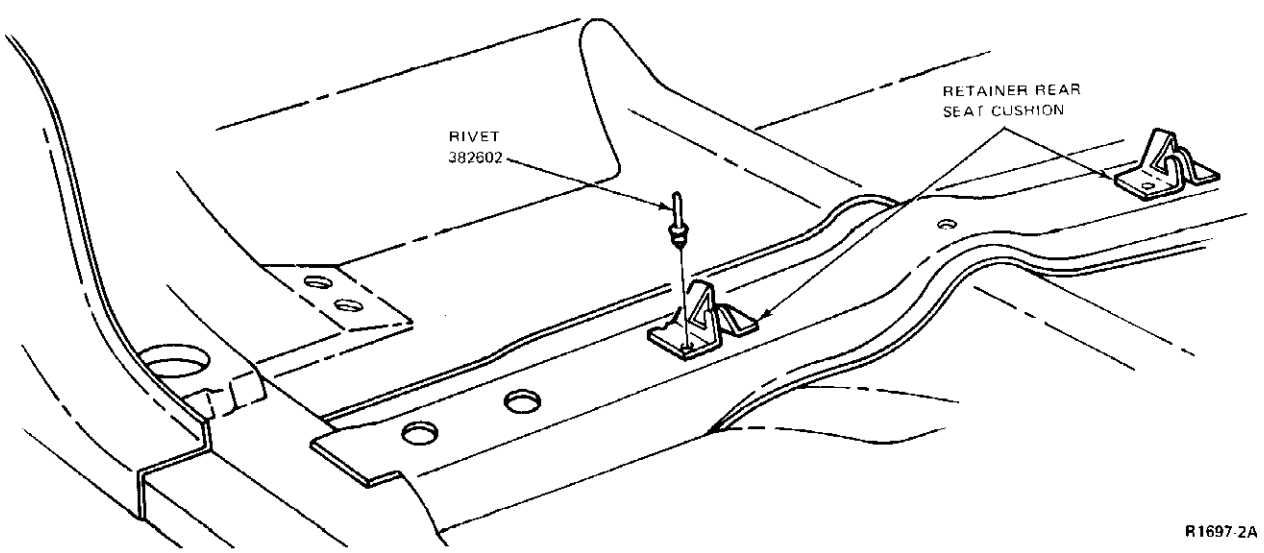


FIG. 1 Rear Seat Cushion Retainer—Ford and Mercury—Lincoln Continental, Mark V, LTD II, Thunderbird, Cougar, Fairmont and Zephyr have welded retainer. Others similar.

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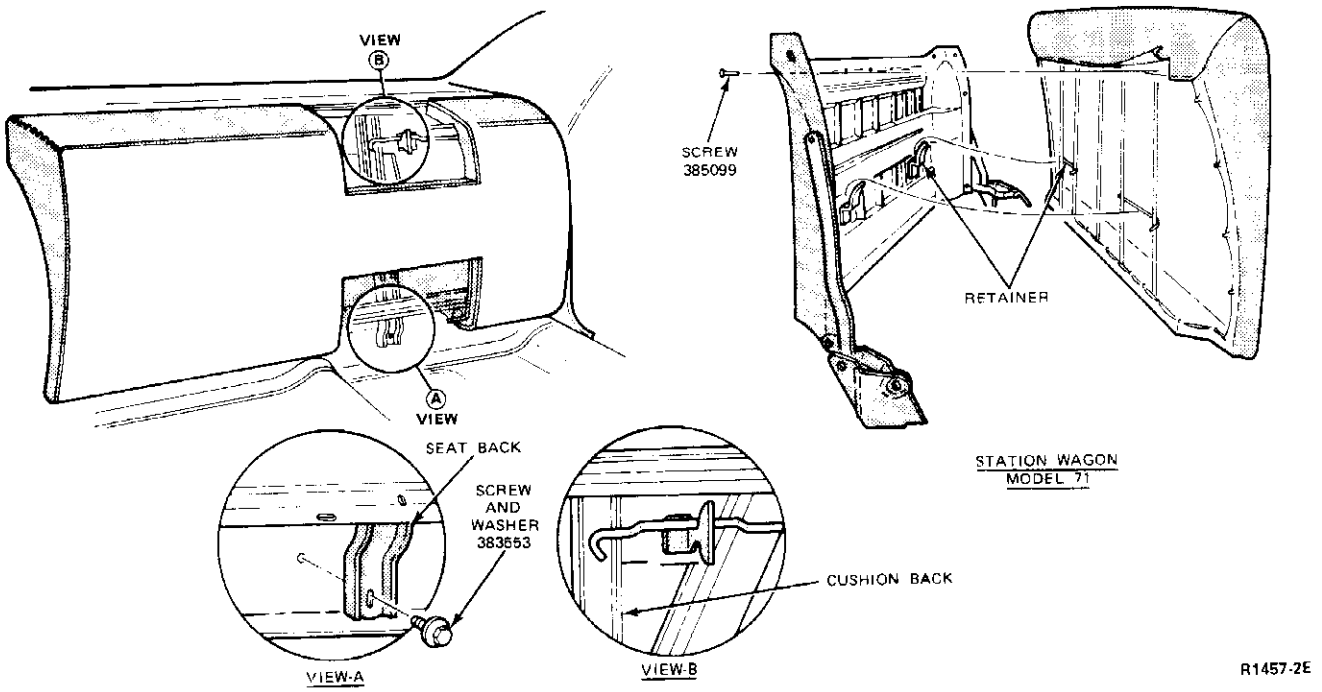


FIG. 2 Rear Seat Back Installation—Typical

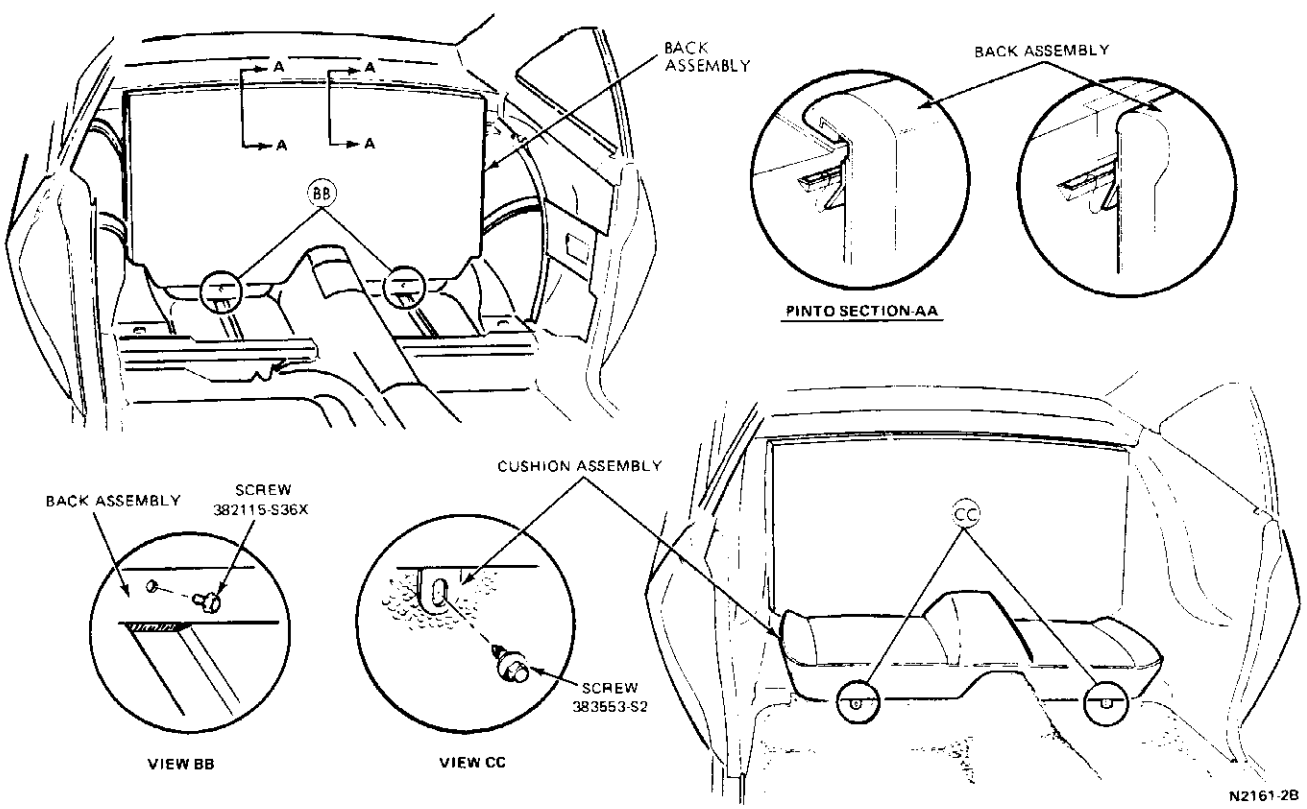


FIG. 3 Rear Seat Back and Cushion Installation—Pinto, Bobcat, Mustang II, Granada, Monarch and Versailles

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Installation

1. Position the rear seat assembly to all four retainers and install the two lower retaining screws. Tighten securely.
2. Position the rear seat cushion into the vehicle and install the two lower retaining screws. Tighten securely.

SPLIT REAR SEATS

PINTO, BOBCAT AND MUSTANG II

There are individual pad and frame assemblies for the rear seats to give a bucket-seat type appearance. Removal and Installation procedure is similar to conventional rear seat procedure.

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Fold Down Rear Seats

PART 41-20

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Second Seat Back Latch Striker	20-1
Stowage Compartment Door Latch	20-1
REMOVAL AND INSTALLATION	20-1

CR2013-2B

ADJUSTMENTS

REAR SEAT AND AUXILIARY FLOOR

Pinto, Bobcat and Mustang II

Vertical adjustment for the seat back latch striker can be made by loosening the four attaching nuts, and moving the striker plate up and down to obtain proper engagement to the seat back latch (Fig. 1).

Lateral adjustment of the seat back latch can be made by removing the rear seat back, loosening the 2 latch attaching screws and moving the latch inboard or outboard as required to properly engage the latch striker.

Ford, Mercury, Fairmont and Zephyr

There are four adjustment locations on all station wagon models for the folding second seat, and rear auxiliary floor seats. See Figs. 2 through 4.

PANEL EXTENSION REAR SEAT BACK FLOOR

Should the rear seat back extension panel become difficult to fold in a locking position, loosen the two attaching bolts on each side of the seat. Move the panel extension fore or aft to obtain proper locking position.

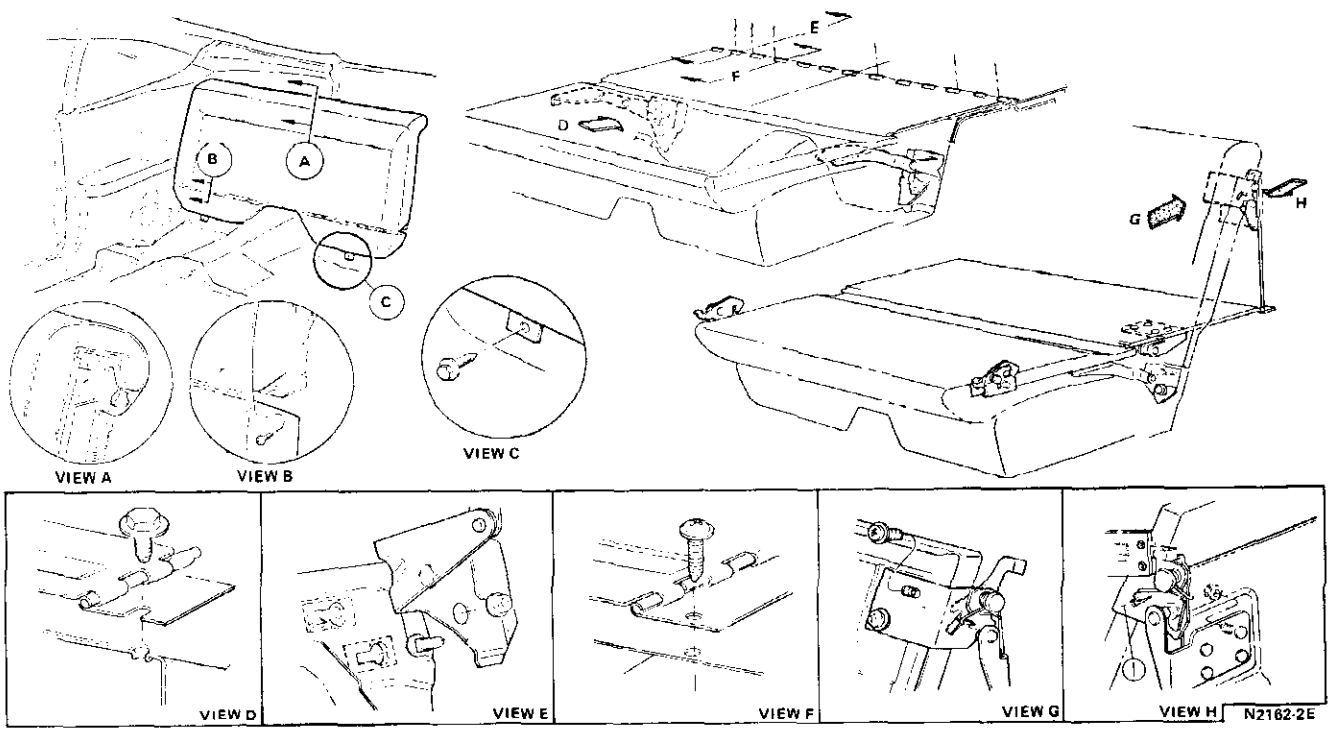


FIG. 1 Fold-Down Rear Seat Back Installation—Mustang II Shown—Pinto and Bobcat Similar

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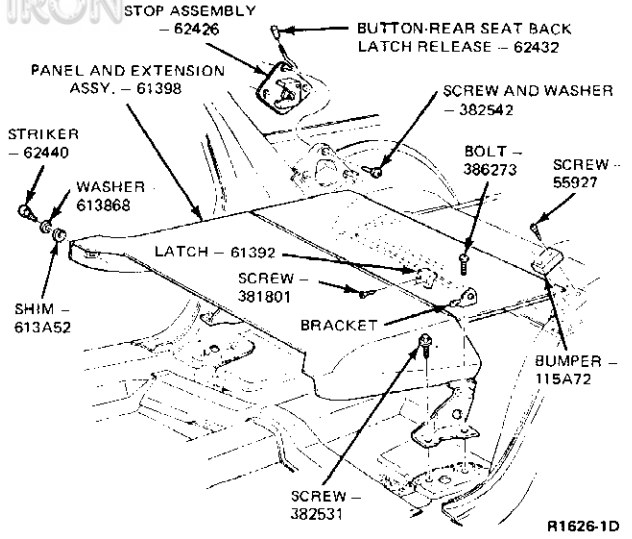


FIG. 2 Rear Seat Back Floor Extension Panel – Ford and Mercury

SECOND SEAT BACK-LATCH-STRIKER

The striker adjustment to the second rear seat stop assembly is made by turning the striker in or out to obtain the desired locking clearance. Install shims (not more than 4), and tighten to 20 ft-lbs. See Fig. 2.

The Ford and Mercury adjustment is located on the right side of the back seat.

AUXILIARY SEAT BACK-LATCH

The release handle and latch assembly located on each side of the auxiliary seat back has an up and down adjustment. (See Figs. 3 and 4.)

Loosen the two screws directly behind the seat back latch assembly to obtain the desired locking clearance. Install shims if required and tighten to specification.

STOWAGE COMPARTMENT DOOR-LATCH

To adjust the latch assembly, loosen the two screws holding the lock assembly, and raise or lower the lock to obtain desired position. Add shims if required and tighten the attaching screws. See Fig. 4.

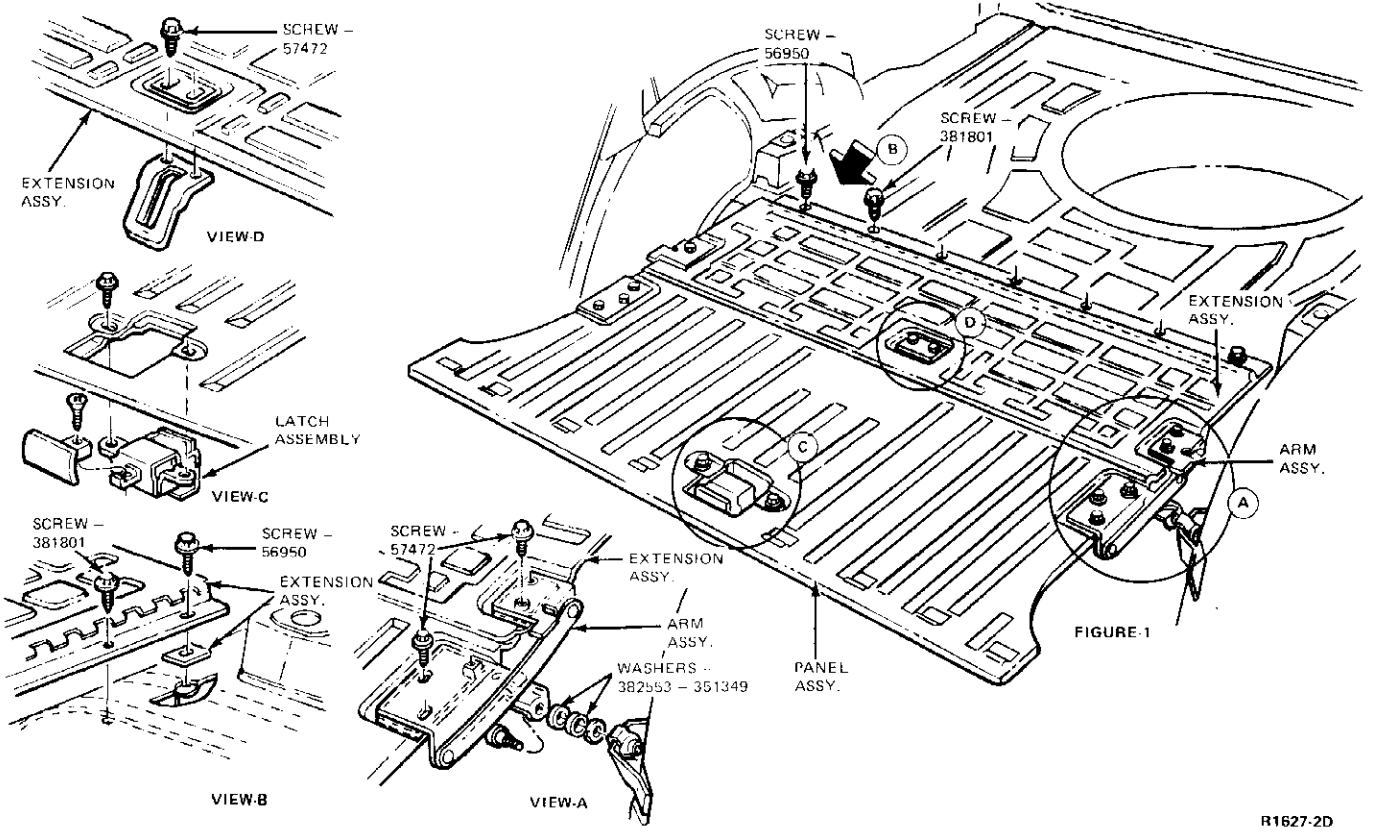


FIG. 3 Folding Seat—Load Floor—Fairmont and Zephyr

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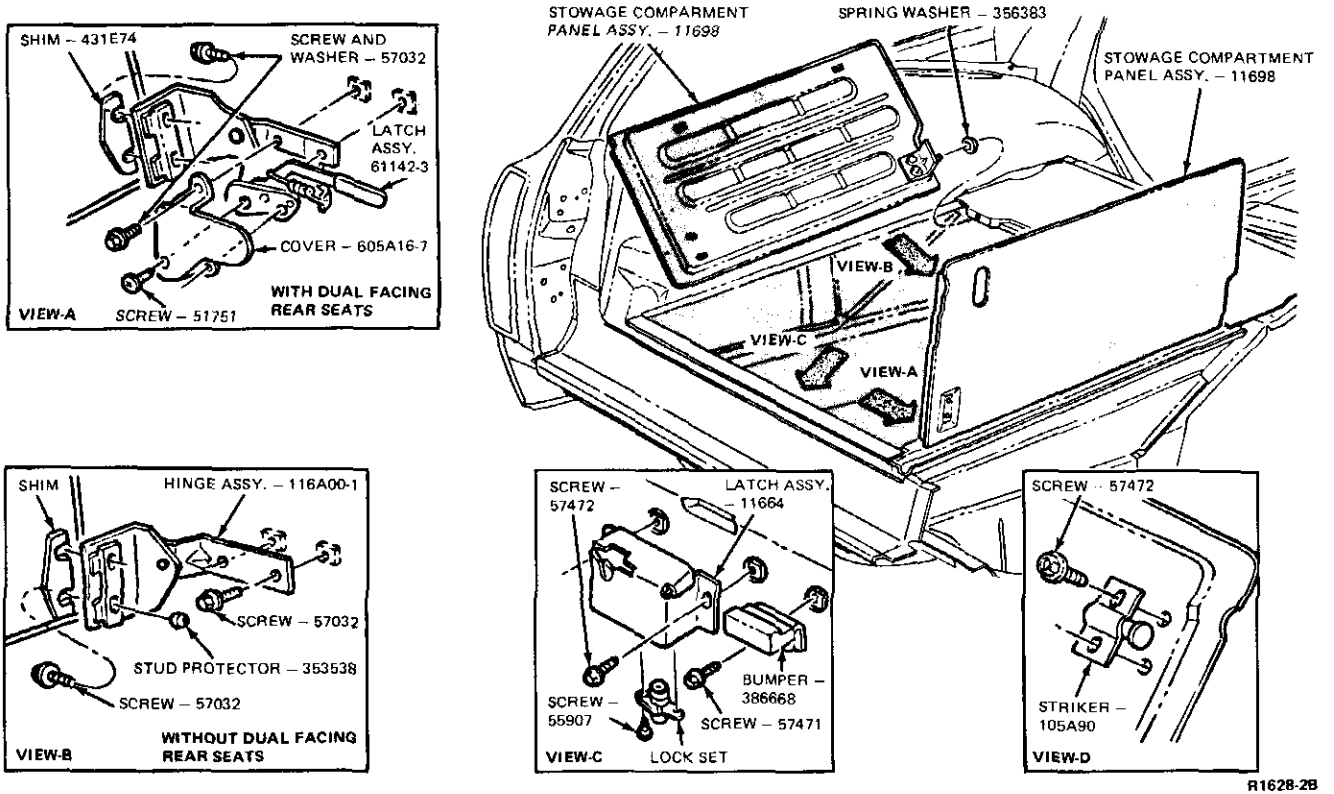


FIG. 4 Rear Seat Auxiliary Floor Ford—Mercury

REMOVAL AND INSTALLATION

Refer to the illustrations shown in Fig. 1 through 5 and Fig. 2 in Part 41-14.

Removal

1. Remove the two lower retaining screws securing the rear seat back to the floor.
2. On the Mustang II, Bobcat and Pinto, rotate the bottom kidney pads up and remove the two screws retaining the upper back to the folding floor.
3. Lift up and disengage the upper clips of the rear seat back from the top of the folding floor.

Installation

1. Center the seat back on the folding floor and push down, engaging the upper channel of the back to the top of the folding floor.
2. On the Mustang II, Bobcat and Pinto, rotate kidney pads up and install 2 screws retaining the upper seat back to the folding floor.
3. Install two screws engaging the kidney pads to the floor pan.
4. Position the rear seat cushion into the vehicle and install the two lower retaining screws.

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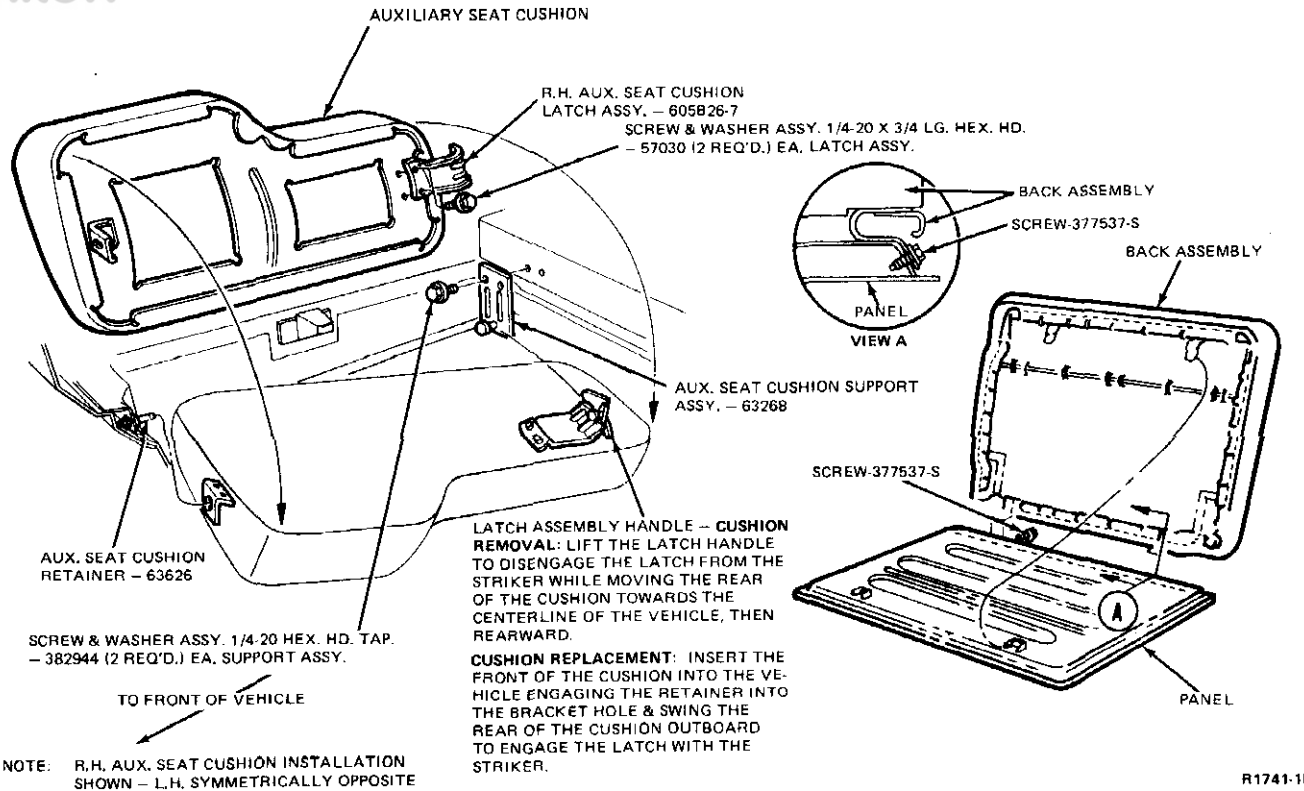


FIG. 5 Auxiliary Seat Cushion and Back Installation—Ford and Mercury

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Seat Back Latch--Manual

PART 41-25

CR2014-2B

DESCRIPTION AND OPERATION

All folding seats have a latch designed to hold the seat back in the normal position. For rear seat passenger entry and exit, a latch handle is located on the left side of all bucket and split bench seats (drivers side), and on the right side of all bucket and split bench seats, (passenger side). See Figs. 1 through 3.

If the seat back will not latch in position or the latch mechanism will not unlock, remove the seat trim as required to inspect the latch mechanism. Then, replace any damaged parts to put the latch system in proper working order. See Figs. 1 through 3.

Check the front seat back latches (two door models *only) for smooth operation.* The latch should not stick or bind. *Also check to be sure that the latch restrains* the seat back from moving forward.

An inertia seat back latch system is used for all two door Fairmont-Zephyr and full bench seat equipped Granada-Monarchs. With the inertia seat back latch system it will not be necessary to actuate the latch handle when folding the front seat back forward for rear seat passenger entry or exit. The inertia latch assembly remains unlocked with normal usage and locks when the vehicle experiences deceleration.

The bucket seat back latch is unique with the latch assembly installed in the seat back with an opening to facilitate the latch engaging the seat cushion striker. The bucket seat has no visible release handle but the latch assembly is provided with a hidden lever type handle to manually unlock the seat back if required after it has been triggered. A printed notice is molded *into the seat back trim panel latch pod to call owner* attention to this provision.

The bench seat back latch mechanism is also unique and is incorporated into the cushion and back pivot attachment. It has a visible release handle to manually unlock the latch if required. See Figs. 4, 5 and 6.

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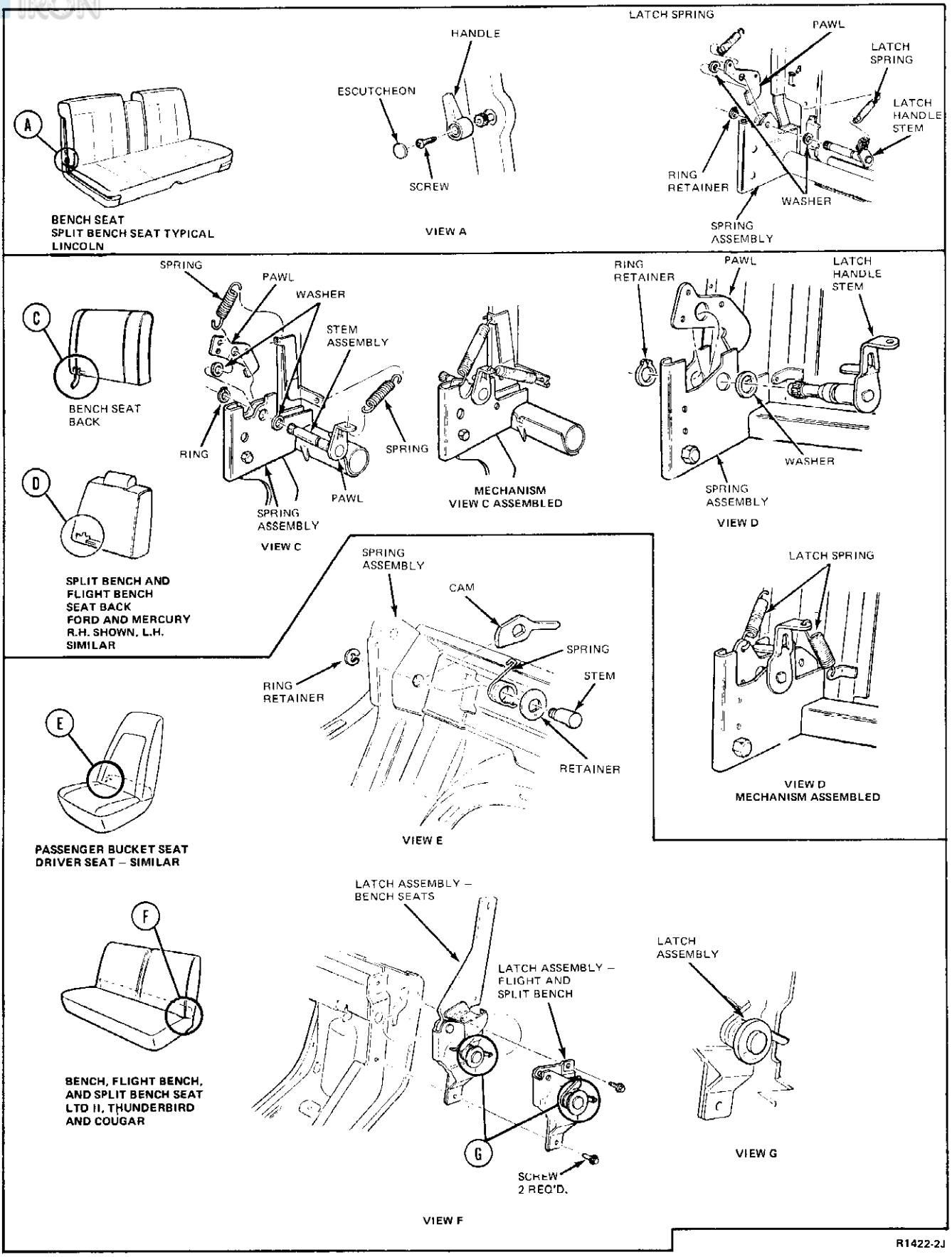


FIG. 1 Front Seat Back Latching Mechanism Typical Left and Right Side

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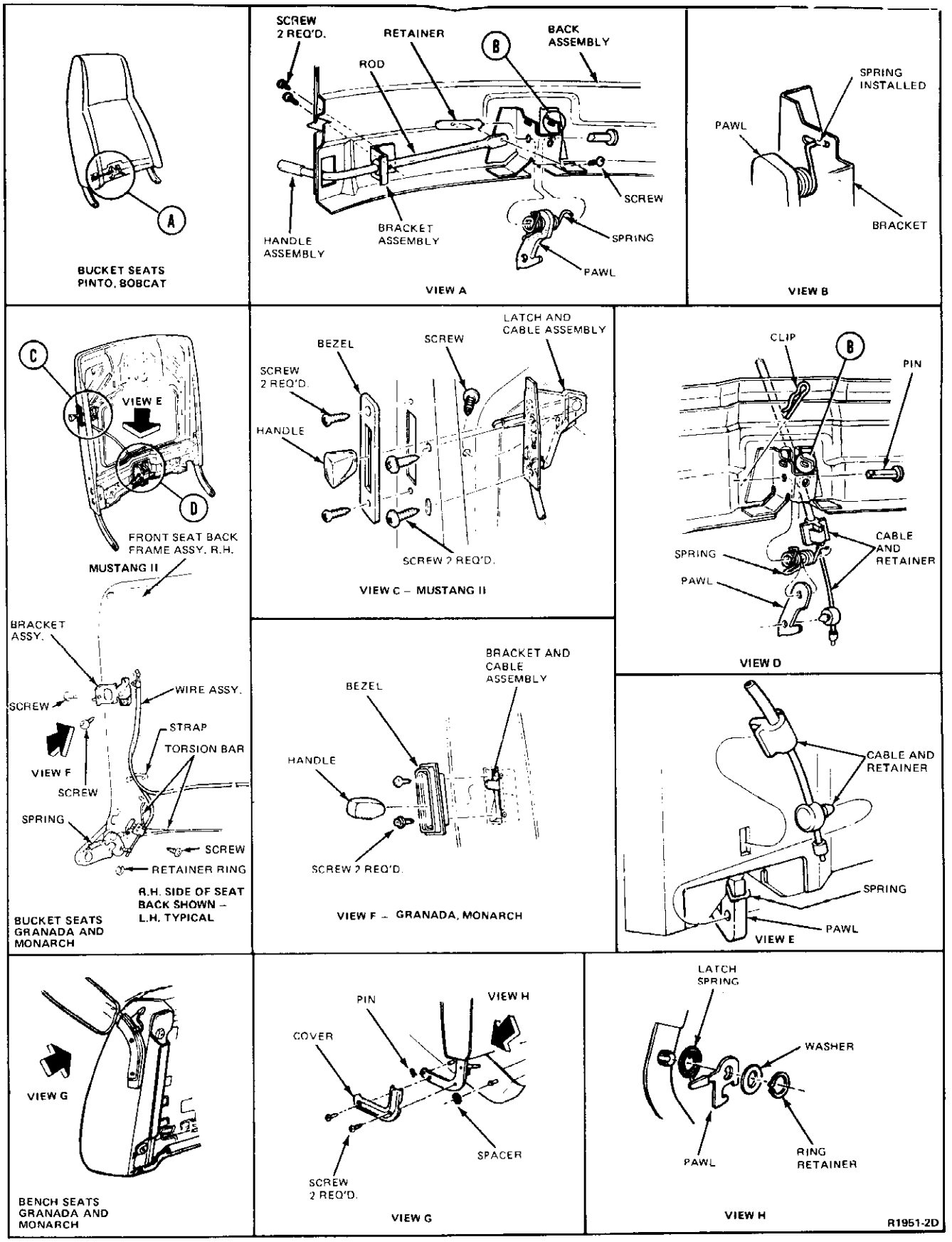


FIG. 2 Front Seat Back Latching Mechanism Typical Left and Right Side

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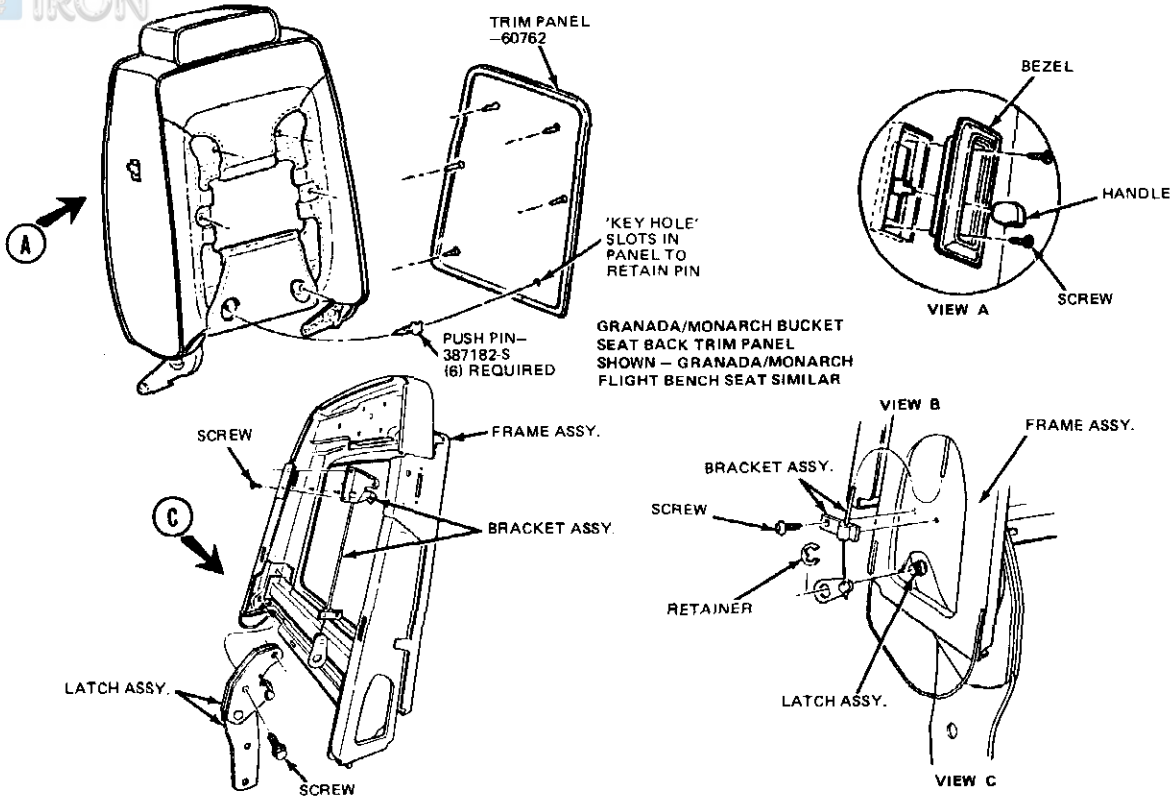


FIG. 3 Front Seat Back Latching Mechanism—Granada and Monarch Flight Bench

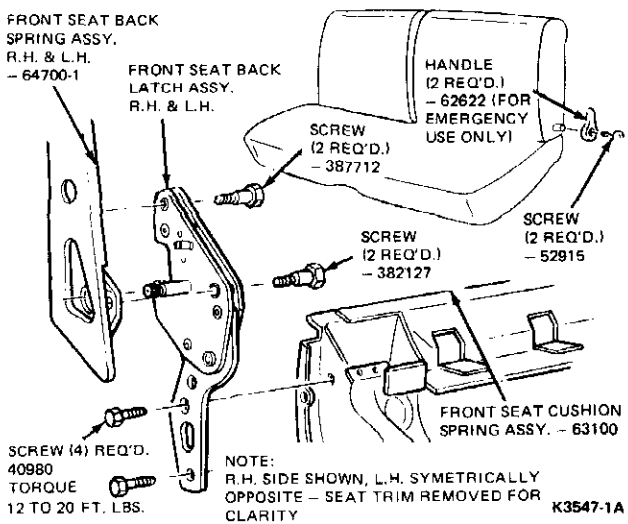


FIG. 4 Fairmont, Zephyr, Granada and Monarch Two-Door Models—Front Bench Seat Back Latch Mechanism

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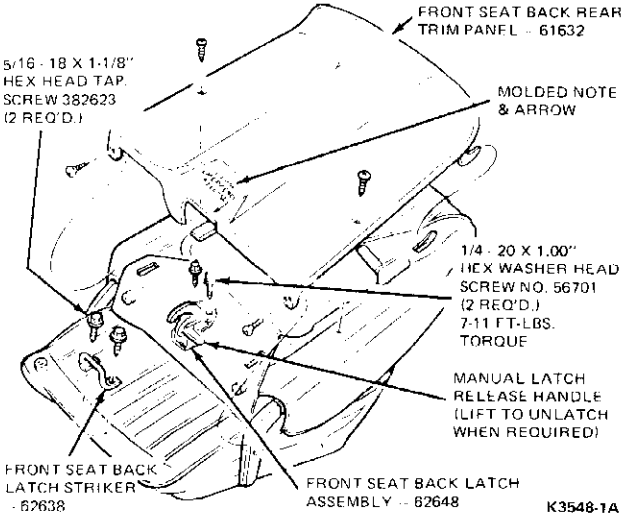


FIG. 5 Fairmont and Zephyr—Two-Door Bucket Seat Back Latch Mechanism

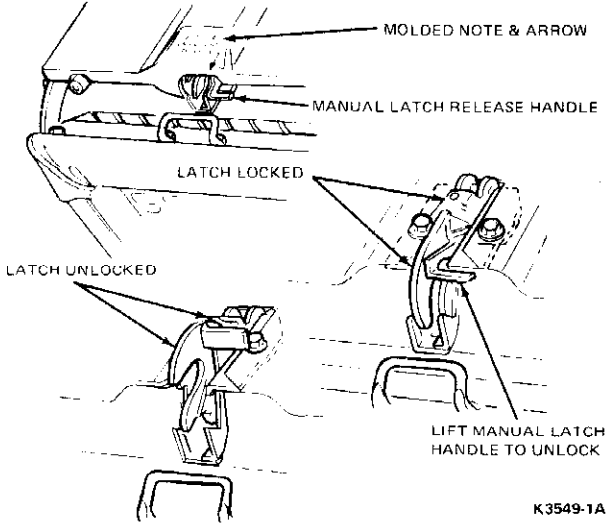


FIG. 6 Fairmont and Zephyr—Two-Door Bucket Seat Back Latch Operation

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DETROIT IRON

Seat Back Latch -- Automatic

PART 41-28

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DESCRIPTION AND OPERATION	28-1
TESTING	
Relay Test	28-4
Solenoid Test	28-4
REMOVAL AND INSTALLATION	
Relay	28-4
Solenoid	28-4
Wiring Routes	28-4

CR2015-2B

DESCRIPTION AND OPERATION

Both front seat back latches automatically release when either front door is opened. In each front door hinge pillar there is a switch connected to battery power. Opening the door closes the switch and sends power to energize a relay. When the relay is closed, it sends power to two solenoids, one mounted on each seat back (Figs. 1 through 4). The actuating rod of the solenoid is connected to the latch pawl. When the solenoid is energized it operates the pawl to release the latch. If the electric system does not function, the latch can be released manually by moving the seat back release handle. If the seat back fails to release automatically when the door is opened, remove the seat back trim cover and/or carpet far enough to inspect and test latch mechanism. See Figs. 1, 2 and 3. **NOTE: After performing any work on the seat back latches, check for smooth operation of the latches. The latch should not stick or bind. Check that the latch does restrain the seat back from moving forward. Be sure that the latches function both automatically and manually.**

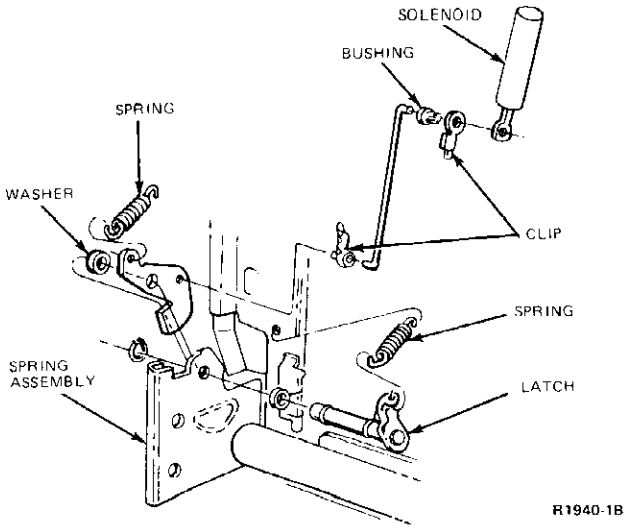


FIG. 1 Seat Back Latch—Automatic—Lincoln Continental 2-Door Models

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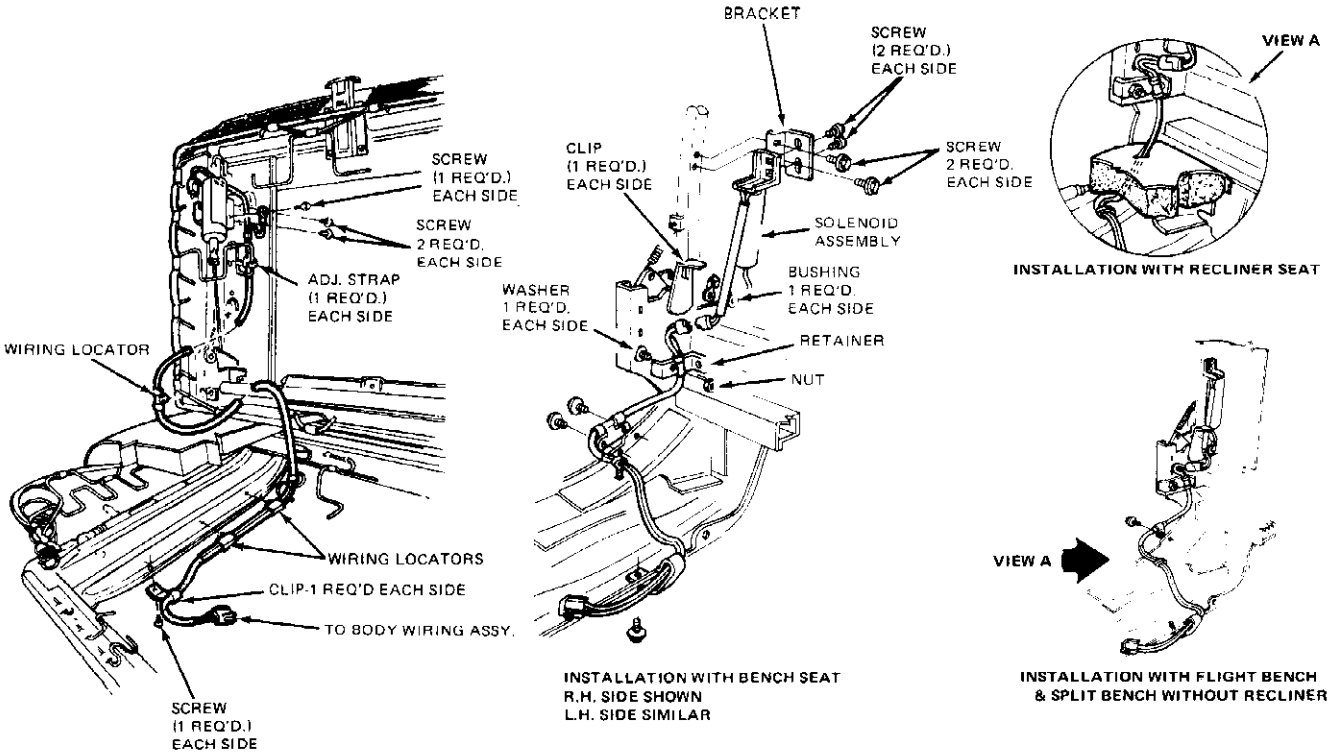
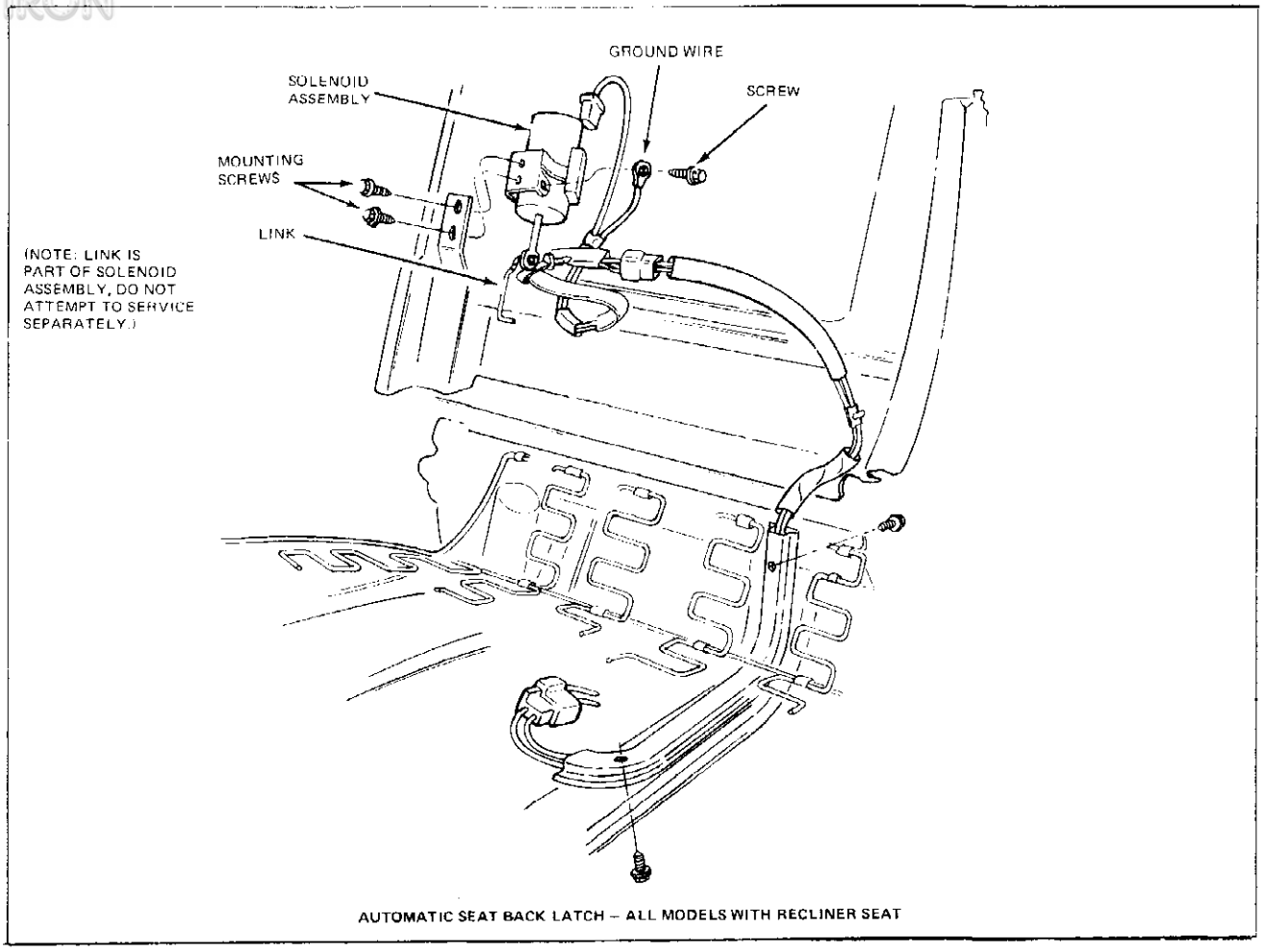


FIG. 2 Seat Back Latch—Automatic—Ford and Mercury 2-Door Models

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DETROIT IRON



AUTOMATIC SEAT BACK LATCH – ALL MODELS WITH RECLINER SEAT

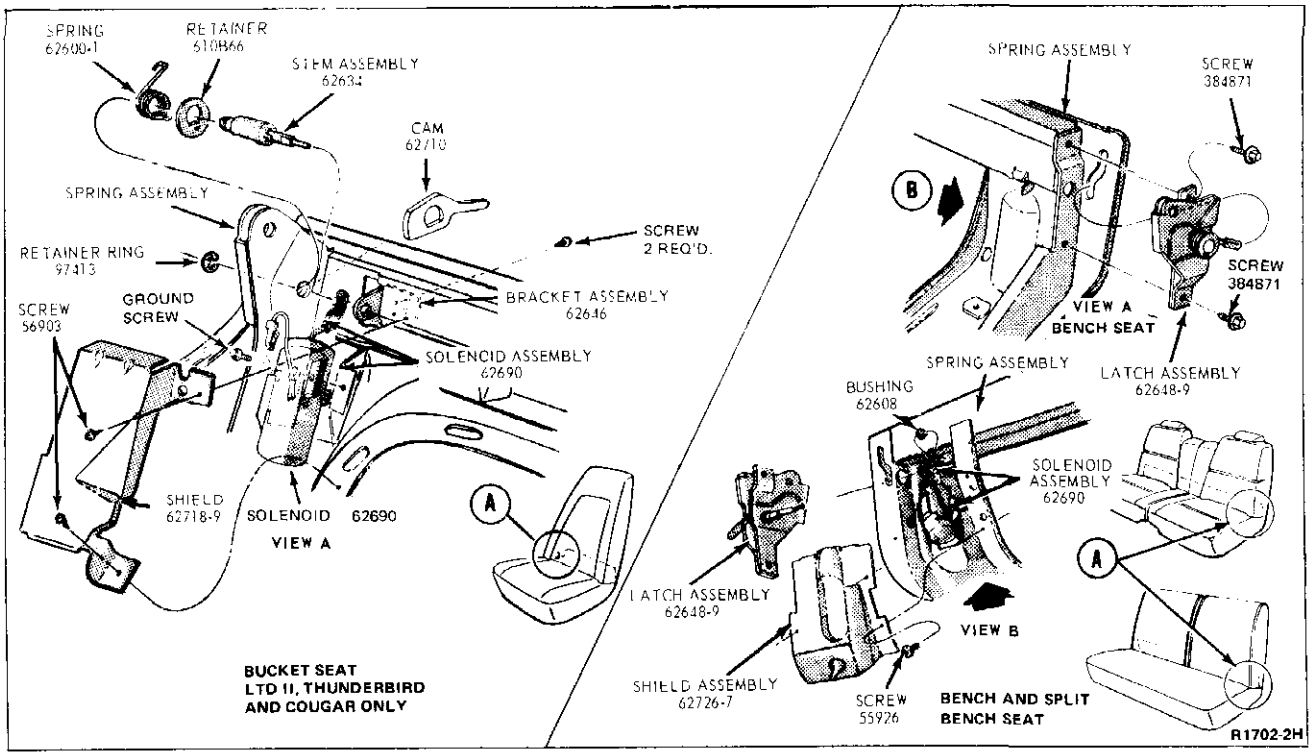


FIG. 3 Seat Back Latch—Automatic—LTD II, Cougar, Thunderbird, Continental Mark V

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TESTING

SOLENOID TEST

Remove the solenoid and connect battery power to the connector terminal and ground the case of the solenoid assembly to the negative side of the battery. If the solenoid plunger does not move quickly, replace the solenoid.

NOTE: Solenoid must be held in normal installed position for this test.

RELAY TEST

See Removal and Installation for relay locations. Disconnect the relay connector, noting the color of the three wires at each terminal, and remove the relay. Connect battery power to the relay (positive post to the pink-white stripe wire terminal and negative post to the relay case). Connect a self powered test light between the other two relay terminals. If the test light does not light, replace the relay.

REMOVAL AND INSTALLATION

RELAY

The relay is mounted in various locations according to car line as follows: Lincoln Continental, on the front floor pan assembly under the passenger's seat; Thunderbird in brake pedal support left-hand side; Continental Mark V, on the brake pedal support bracket to the right of the fuse panel; Ford and Mercury on the instrument panel center reinforcement, above tunnel; and LTD II and Cougar inside the left-hand cowl side panel assembly. The Granada and Monarch relay is mounted at the right side of the instrument panel (Fig. 4).

Disconnect the battery negative post. Disengage the 3-way hardshell connector from the relay. Remove the mounting screws and remove the relay.

When installing the relay, be sure to engage the 3-way hardshell connector to the relay.

SOLENOID

Ford, Mercury, Lincoln Continental, and Continental Mark V. Also Recliner Seat on LTD II, Cougar, Thunderbird and Continental Mark V.

Remove the seat back trim cover far enough for access (Figs. 1, 2 and 3). Disconnect the wires at the connector plug. Remove the clip that connects the solenoid plunger to the latch pawl, and remove the solenoid mounting screws (Figs. 1, 2 and 3). Remove the solenoid from the seat assembly and, at the same time, disengage the plunger rod from the latch pawl.

LTD II, Cougar, Thunderbird and Continental Mark V (Without Recliner)

Cut the hog rings from the carpet to gain access to the solenoid assembly. Remove the three shield retaining screws and disconnect the wires at the connector plug. Remove the two solenoid assembly retaining screws (Fig. 3). Then, loosen the two back pivot bracket assembly screws and slide the latch assembly out for enough to remove the solenoid and link from the latch stem. To install, reverse the procedures.

Granada and Monarch

For Removal and Installation procedure, refer to Fig. 4.

WIRING ROUTES

Refer to Figs. 5 and 6 for correct wiring routes.

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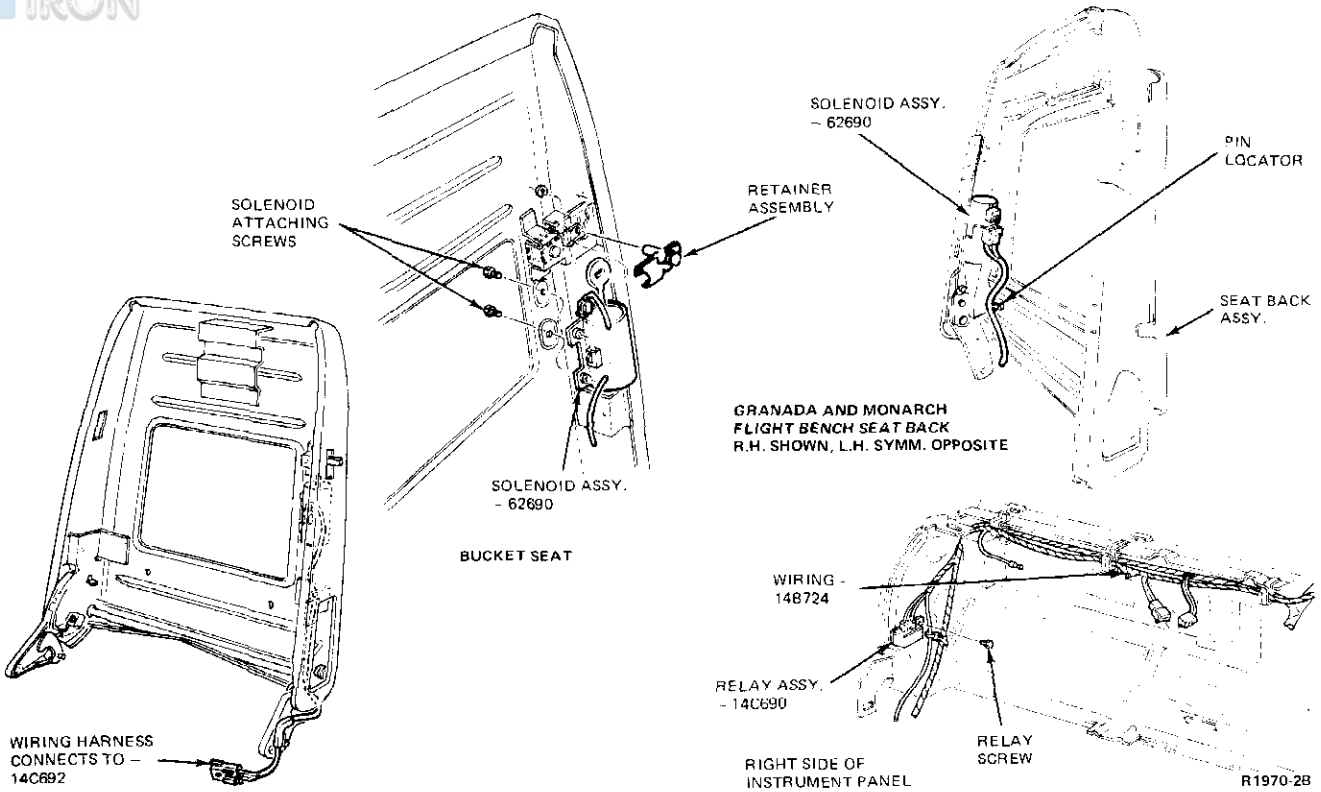
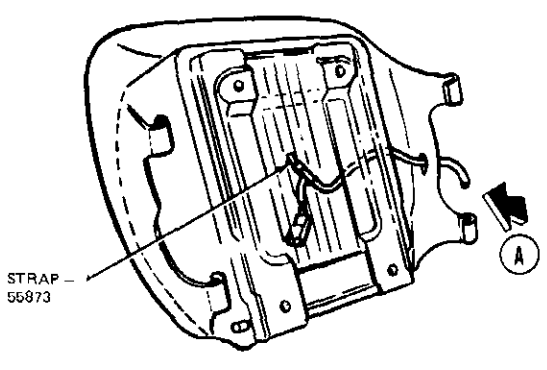
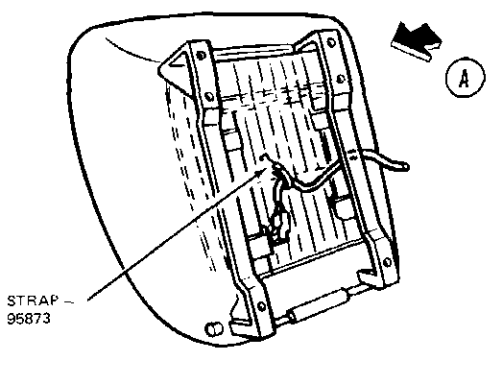


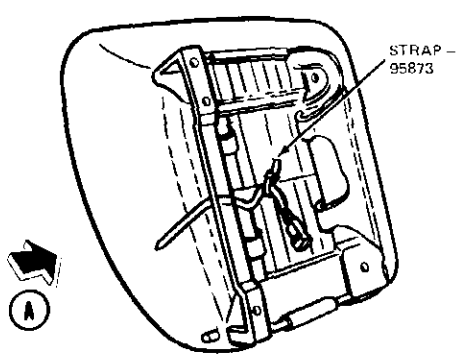
FIG. 4 Seat Back Latch—Automatic—Granada and Monarch



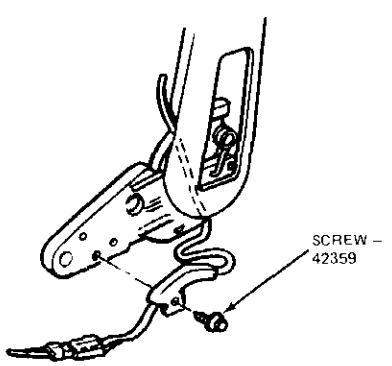
ROUTING OF 14C692 WIRING ASSY. (L.H.) WITH POWER SEAT OPTION



ROUTING OF 14C692 WIRING ASSY. (L.H.) MANUAL



ROUTING OF 14C692 WIRING ASSY. (R.H.)



VIEW - A

INSTALLATION OF WIRING RETAINER
L.H. SHOWN, R.H. SYMM. OPPOSITE
N2858-2A

FIG. 5 Automatic Seat Back Latch (Bucket Seats)

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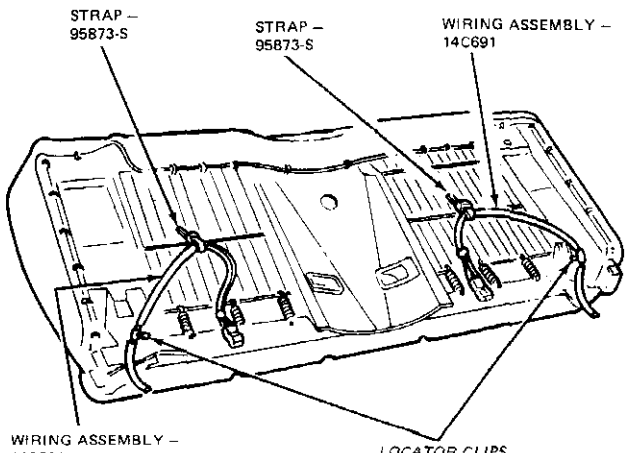


FIG. 6 Automatic Seat Back Latch—Flight Bench Seats—Typical

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DETROIT IRON

Reclining Seat Back

PART 41-30

DESCRIPTION AND OPERATION

The mechanical reclining seat back is available on all vehicles except Pinto, Bobcat and Mustang II.

The reclining seat is adjusted by a recliner handle on the seat cushion right side of the passenger seat (inboard side of both seats—backs on the Granada, Monarch, and Versailles bucket seat cars). To recline the seat, turn the handle and push the seat back to the desired position and release the handle. Spring action will return the seat to normal position when the handle is released at the seat back. See Figs. 1 through 4. For Ford, Mercury and Lincoln Continental, push the handle forward to release the seat back, recline or return seat. For Continental Mark V, LTD II, Cougar and Thunderbird, push the release handle rearward to release the seat back, recline or return seat.

If the reclining seat will not fold down or return to its normal position, it will be necessary to remove the seat cushion or back trim cover, carpet and/or seat back trim panel far enough to inspect the recliner mechanism. Then replace any damaged parts to put the recliner system in proper working order (Figs. 1 through 4).

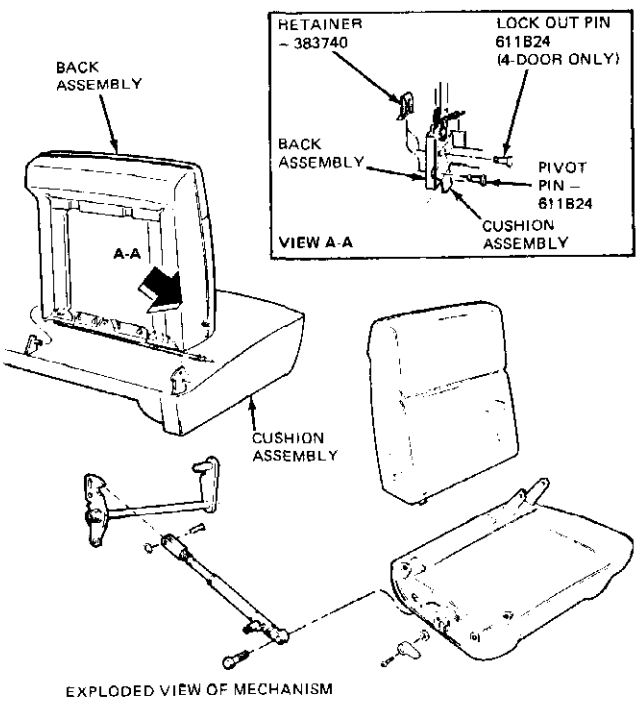
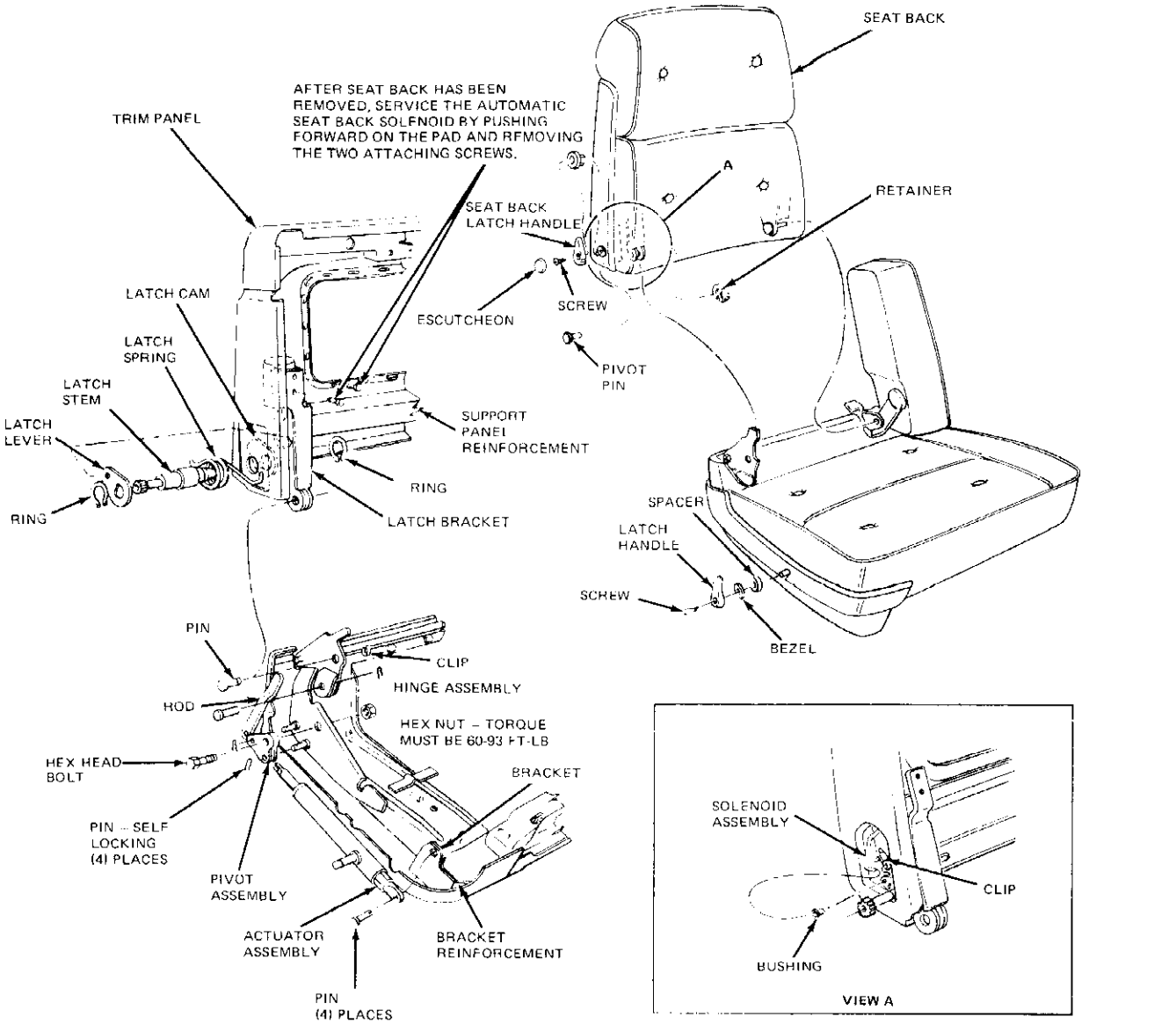


FIG. 1 Reclining Seat Back Installation—Lincoln Continental

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R1789-2E

FIG. 2 Reclining Seat Latch and Mechanisms—Thunderbird and Continental Mark V Shown—Typical for Cougar and LTD II

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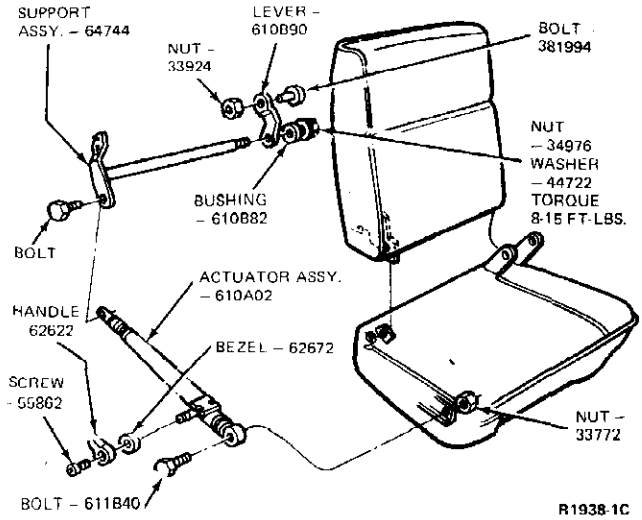


FIG. 3 Reclining Seat Latch and Mechanisms— Ford and Mercury

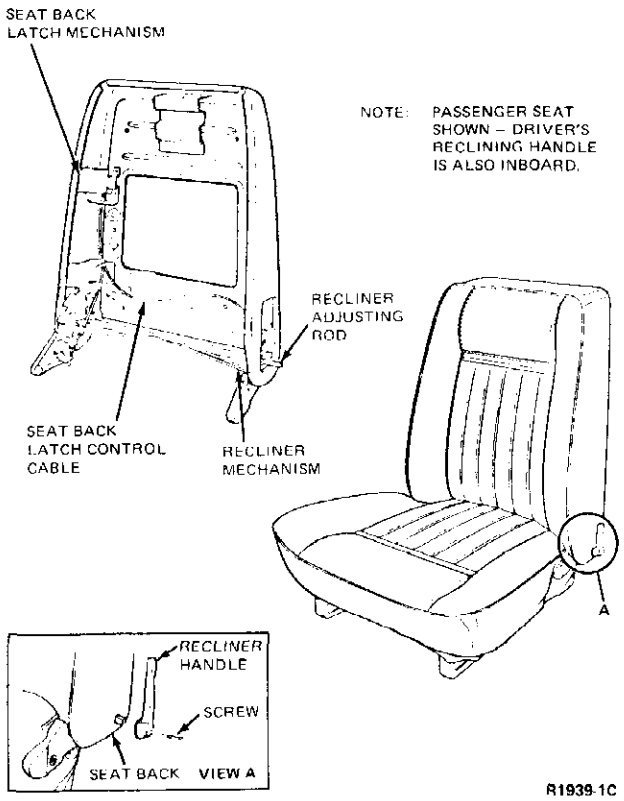


FIG. 4 Reclining Seat and Mechanisms— Granada and Monarch Shown— Versailles Similar

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Lumbar Power Seat

PART 41-35

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION	35-1	TESTING	35-4
REMOVAL AND INSTALLATION	35-1		

CR2017-2B

DESCRIPTION AND OPERATION

LUMBAR POWER SEAT

The lumbar power seat provides adjustable control of the contour of the driver's seat. It enables the driver to select the amount of support he desires for the lumbar region of his back (Fig. 1).

It consists of a reversible motor driven directly off of the battery, a driver controlled switch for reversing the motor's direction of rotation and a mechanical drive train from the motor output shaft to a metal plate which is driven forward and backward to effect the change in seat contour. The drive train consists of a flexible drive cable, a gearbox with a worm shaft output and a lever between the worm shaft and seat plate (Fig. 2).

When the lumbar power seat control switch is pressed to the forward (OUT) position, the motor drives the contour plate toward the forward maximum support position. When this switch is pressed to the rear (IN) position the motor drives the contour plate toward the back minimum support position. When the switch is released the contour plate remains in the position selected by the driver. The range of plate travel is 1.9 inches. The lumbar power seat adjuster mechanism is installed into the seat back assembly as a complete assembly.

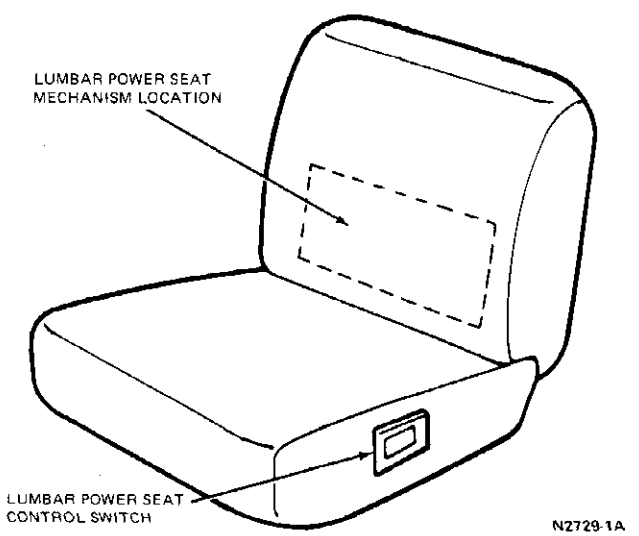


FIG. 1 Lumbar Power Seat

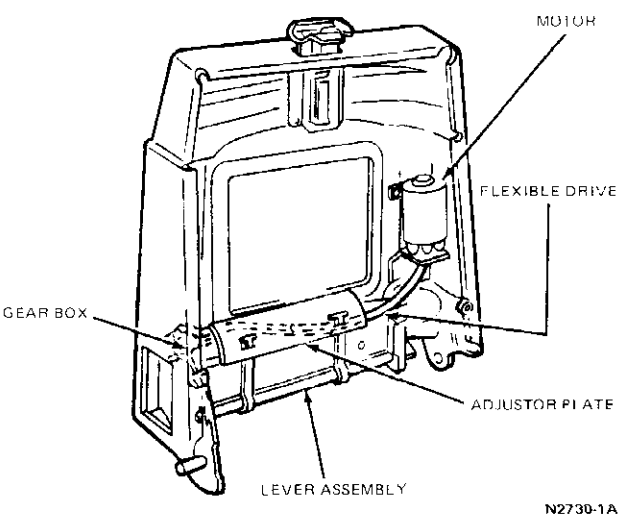


FIG. 2 Lumbar Power Seat Mechanism

REMOVAL AND INSTALLATION

Removal

1. Disconnect the seat back control wiring assembly connector sleeve from the body main wiring assembly. Use Fig. 3 as a guide.
2. Remove the driver's seat and track assembly from the vehicle and place on a clean work surface. Refer to Group 41 for removal procedure of the complete seat and track assembly.

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DETROIT IRON

3. Use a putty knife or a similar tool to pry loose the four retaining clips which secure the front seat back rear panel assembly to the back assembly of the front seat on those vehicles equipped with the optional Midas trim (Fig. 4).
4. Remove the front seat back shield assembly four retaining screws and separate the shield from the seat back (Fig. 4).
5. Disconnect the front seat back control wiring assembly at the motor connector and wiring locator retainer (Fig. 3).
6. Tilt the seat back assembly forward and disengage the outboard retainer and pivot pin (Fig. 3).
7. Disengage the inboard pivot pin from the center pivot hole and remove the seat back assembly from the cushion and place on a clean work surface.
8. Disengage the front seat back cover plastic retainers and four hog rings and pull back the cover sufficiently to gain access to the adjustor assembly attaching screws (Fig. 4).
9. Remove the five attaching screws which secure the adjustor assembly to the front seat back pad (Fig. 5).
10. Slide the front seat back pad adjuster assembly downwards so that it slides out the bottom of the seat back between the seat back pad and frame.
11. Cut and remove the three plastic ties holding the motor wiring and motor drive cable together.
12. Remove the lower two motor mounting screws and separate the motor and bracket assembly (Fig. 6).
13. Unsnap the motor wiring connector from the retainer and remove the motor and bracket assembly.
14. Remove the two shaft support bracket attaching bolts and separate the bracket from the support assembly and the shaft assembly (Fig. 6).
15. Remove the shaft assembly and spacer from the drive levers and the support assembly.
16. Remove the two plate attaching retainers, pins, and springs and disengage the plate from the shaft assembly (Fig. 6).
17. Remove the two gear assembly attaching bolts and nuts and cable retainer (Fig. 6).
18. Disengage and remove the cable assembly from the gear assembly (Fig. 6).
19. Remove the gear assembly and the drive assembly.
20. Remove the front seat back latch handle attaching screw and remove the handle (Fig. 3).
21. Remove the four front seat cushion side shield assembly attaching screws (Fig. 3).
22. Remove the two front seat back switch bezel attaching nuts and remove the side shield and bezel from the cushion (Fig. 3).
23. Disconnect the control switch assembly from the seat back control wiring assembly and remove the switch (Fig. 3).
24. Turn the front seat cushion upside down and remove the two wiring shield attaching screws and remove the seat back control wiring assembly

Installation

1. Turn the front seat cushion upside down and insert the seat back control wiring assembly. Fasten in place with the two wiring shield attaching screws (Fig. 3). Return seat cushion to upright position.
2. Connect the control switch assembly to the seat back control wiring assembly (Fig. 3).
3. Insert the front seat back switch bezel in the front seat cushion side shield assembly and push threaded studs on the bezel through the control switch assembly. Install the attaching nuts and tighten (Fig. 3).
4. Position the front seat cushion side shield assembly to align the shield screw holes with those in the seat cushion (Fig. 3). Install and tighten the four front seat cushion side shield assembly attaching screws.
5. Insert the front seat back latch handle through the shield onto the seat cushion latch and attach with screw (Fig. 3).
6. Connect the flexible drive cable to the gear assembly using the cable retainer and mount the gear assembly to the support assembly with attaching bolts.
7. Install the two plate attaching retainers, pins, and springs to attach the plate to the shaft assembly.

   NOTE: A No. 8-32 x 1-1/2 inch pan head screw can be used as a service replacement for the pin and a No. 8-32 hex nut and washer can be used for the retainer.
8. Install the shaft assembly through the drive assembly the spacer and into the support assembly. Insert the other end of the shaft assembly into the shaft support bracket and mount the shaft support bracket to the support assembly (Fig. 6).
9. Mount the motor and bracket assembly to the support assembly using the mounting screws.
10. Snap the motor wiring connector into the retainer on the motor and bracket assembly.
11. Use tape or adjustable straps to bundle the drive cable and wiring harness together (Fig. 6).
12. Slide the assembled front seat back pad adjuster assembly up into position between the seat back pad and frame and secure it to the front seat back pad using the five attaching screws (Fig. 5).
13. Insert the front seat back cover plastic retainers and hog rings to replace the plastic back cover.
14. Mate the seat back assembly to the cushion by inserting the inboard pivot pin in the pivot holes of the back assembly and cushion pivot brackets.
15. Tilt the seat back assembly forward and insert the outboard retainer and pivot pin (Fig. 3).
16. Connect the front seat back control wiring assembly at the motor connector and wiring locator retainer (Fig. 3).
17. Install the front seat back shield assembly on the seat back using the four retaining screws (Fig. 4).
18. Secure the front seat back rear panel assembly to the back assembly of the front seat on those vehicles equipped with the optional Midas trim, using the four retaining clips (Fig. 4).

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19. Install the driver's seat and track assembly in the vehicle. Refer to Group 41 for installation procedure of the complete seat and track assembly.

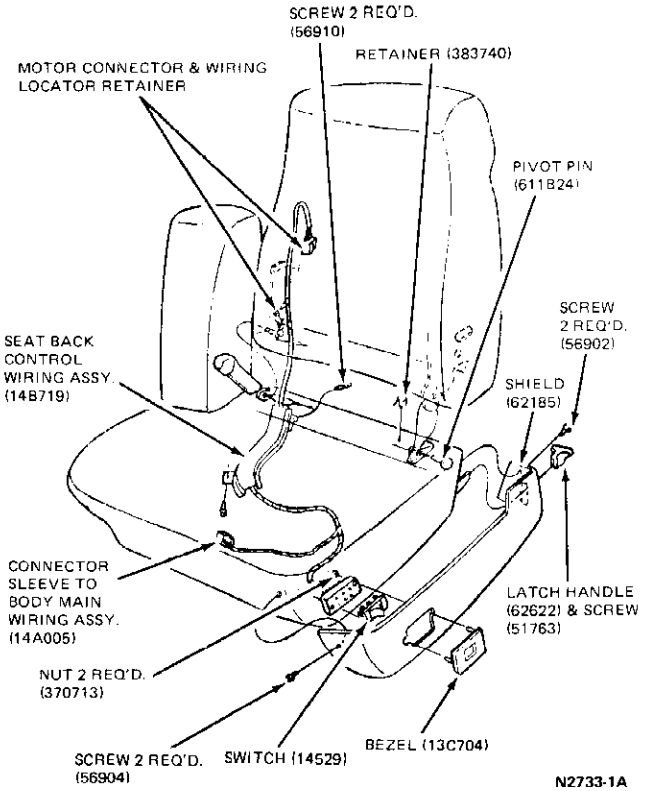


FIG. 3 Lumbar Power Seat Wiring—Driver's Side

20. Connect the seat back control wiring assembly connector sleeve from the body main wiring assembly (Fig. 3).

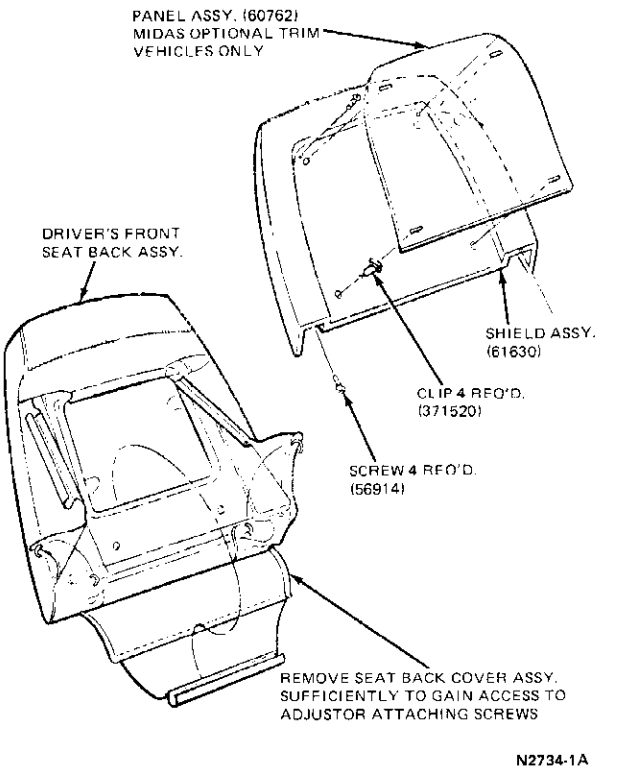


FIG. 4 Driver's Side Front Seat Back Panel Assembly

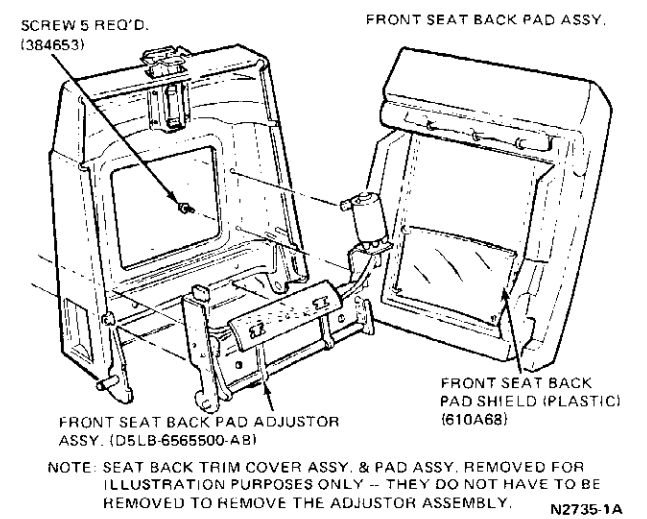


FIG. 5 Driver's Side Front Seat Back Internal Assemblies

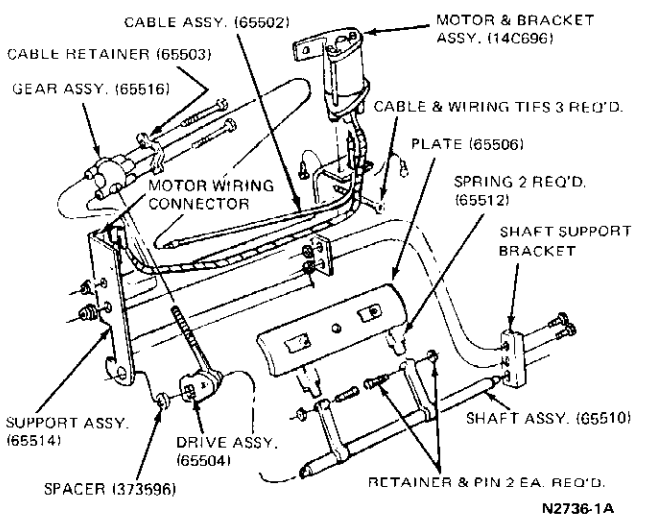


FIG. 6 Driver's Side Front Seat Back Pad Adjuster Assembly

TESTING

To test the current draw of the lumbar power seat adjuster assembly motor, remove the adjuster assembly from the front seat back assembly using the procedure provided under Removal and Installation and remove the motor from the adjuster assembly as instructed in this procedure.

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Test Procedure

1. Connect an external power source (Power Pac or equivalent or a fully charged battery) to the motor with an ammeter in series as shown in Fig. 7.
2. Observe the current draw. It should not exceed specifications and should not fluctuate. Reversal of the motor wire connections will reverse the direction of motor rotation. If current draw exceeds the specified value check for binding of the motor shaft and replace the motor if the binding is not correctable.

SEAT SWITCH TEST

Testing of the lumbar power seat adjuster switch should be performed with the switch removed from the vehicle. Use a self-powered test light or an ohmmeter.

TEST PROCEDURE

1. With the switch in the neutral position, there should be continuity between terminals 1 and 3, 2 and 5, and 4 and 6 (Fig. 8).
2. With the switch toggle pushed downward, there should be continuity between terminals 2, 4 and 5, and 1 and 3. Terminal 6 should be disconnected from every other terminal.
3. With the toggle switch pushed upward, there should be continuity between terminals 2, 3 and 5, and 4 and 6. Terminal 1 should be disconnected from any other terminal.
4. If the switch does not test correctly, replace the switch.

WIRING CHECKS

Refer to the wiring diagram in Fig. 9 when performing continuity checks between the battery and switch and between the switch and motor.

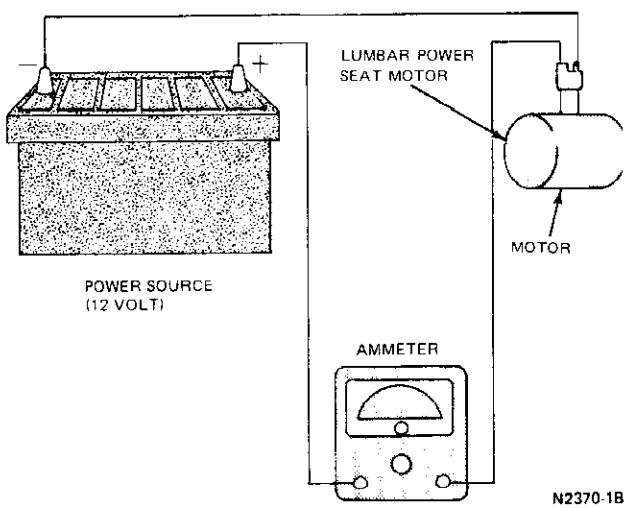


FIG. 7 Adjuster Motor Current Draw Test

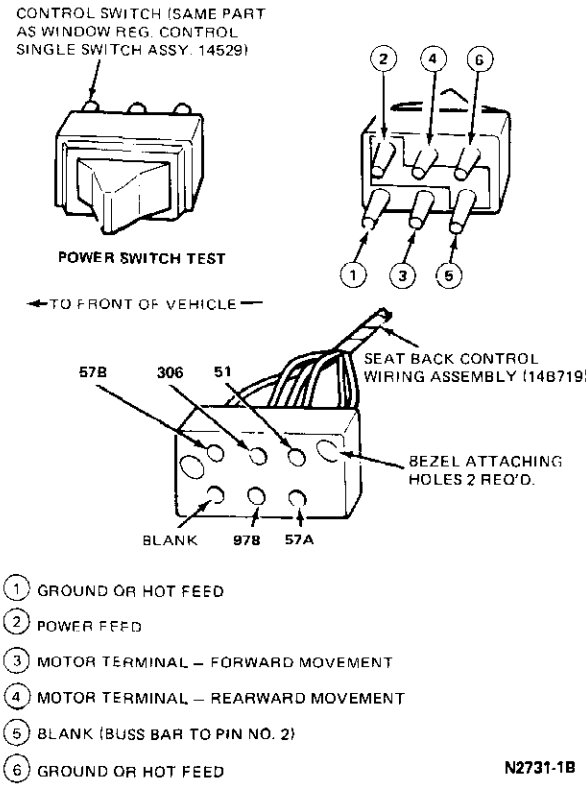


FIG. 8 Switch Pin Locations

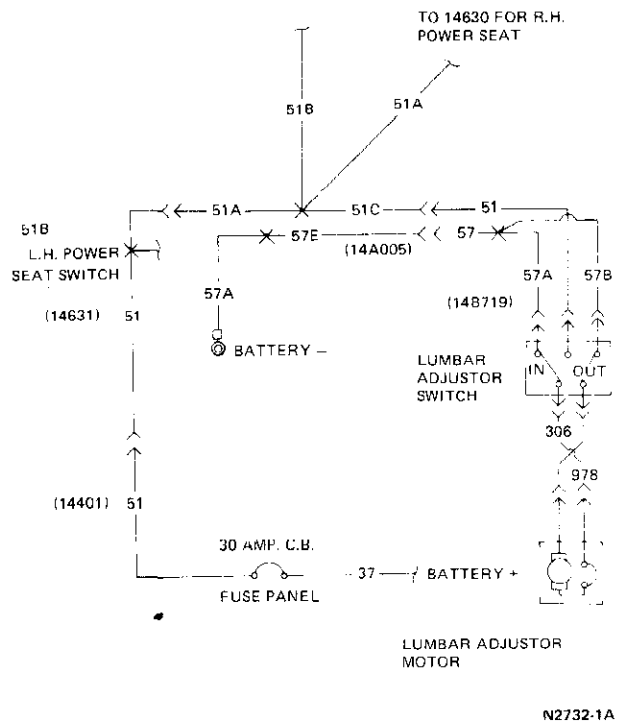


FIG. 9 Wiring Diagram

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Head Restraints

PART 41-40

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DESCRIPTION AND OPERATION	40-1
REMOVAL AND INSTALLATION	
Head Restraints	40-2
REMOVAL AND INSTALLATION (Cont'd.)	
Mounting Bracket and Catch Assembly	40-2

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DESCRIPTION AND OPERATION

All vehicles (except high back bucket seats) are equipped with a single post-design head restraint.

The head restraint has a single post with notch, to engage a spring-loaded catch in the mounting bracket assembly. The mounting bracket assembly retains the post and guide sleeve, as shown in Fig. 1. The mounting bracket assembly is mounted to a part of the seat back assembly. A shoulder strap loop attaches to the head restraint on Ford and Mercury 2-door models and Mark V.

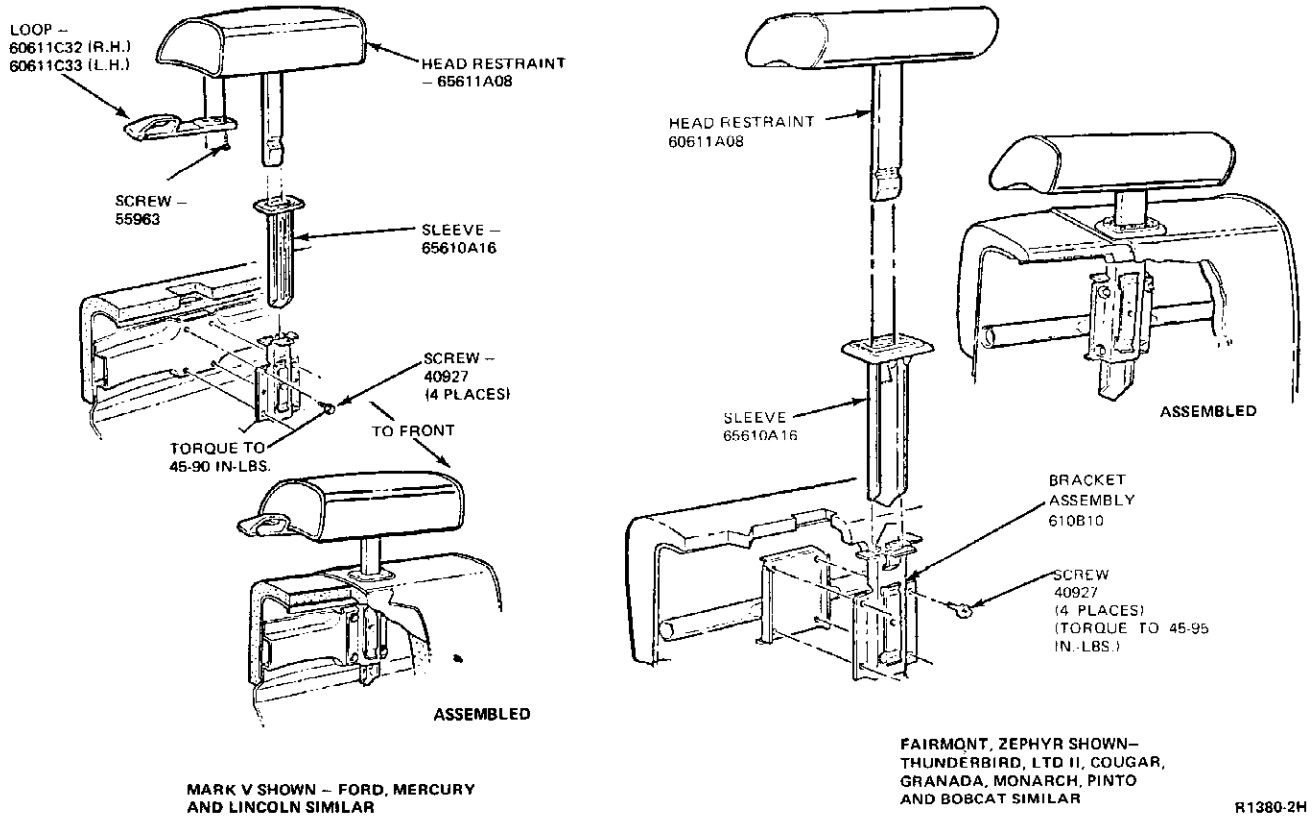


FIG. 1 Front Seat Headrest Installation—Typical

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REMOVAL AND INSTALLATION

HEAD RESTRAINT

Removal

The head restraint is removed by pulling the head restraint post upward and out of the guide sleeve and mounting bracket.

If the mounting bracket spring clip will not disengage from the detent on the head restraint post to allow removal (Fig. 1), insert a 12-inch length of thin flat stock into the sleeve at the front side of the post and push the spring clip out of the detent while withdrawing the head restraint.

The guide sleeve is removed by pulling the sleeve out of the mounting bracket after first removing the head restraint. Occasionally, it may be necessary to trip the locking tab on the guide sleeve in order to remove it from the bracket (Fig. 1). Insert a short piece of wire having a hooked end into the sleeve, hook onto the locking tab and pull it inward. On cars equipped with the flight or split bench seat, it may be necessary to remove the front seat back trim panel to release the head restraint.

Installation

The head restraint is installed by inserting the post into the sleeve in the seat back. It can be adjusted by applying hand pressure, either upward or downward, to the center area of the head restraint assembly. The head restraint must operate smoothly throughout its full range of travel and must remain in any fixed position.

MOUNTING BRACKET AND CATCH ASSEMBLY

Remove the head restraint and post assembly from the sleeve and remove the sleeve. Remove the seat back trim cover for access, and remove the screws that retain the mounting bracket to the mounting in the seat back.

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Seat and Shoulder Belts

PART 41-50

Installation, Removal, Usage and Maintenance Instructions

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MAJOR REPAIR OPERATIONS	
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Seat and Shoulder Harness Belt With Damaged Anchor Plate Threads	50-15
Seat Belt With No Anchor Plate Thread Damage	50-15

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GENERAL INFORMATION

SEAT AND SHOULDER BELTS

There are two distinct front outboard seat belt systems. One system, used in previous years, is the **three point system.** A new system is also used and it is called the **continuous loop system.**

The three point system has a fixed tongue on the front outboard lap/shoulder belt and two retractors. The continuous loop system has a movable tongue on the front outboard lap/shoulder belt and only one retractor.

The seat belts and shoulder belts are factory installed in their proper locations. If the seat belts or shoulder belts are removed for any reason, they should be installed as shown in Figs. 3 through 16. Sealer should be placed around all seat belt anchor bolt holes in the floor pan. Tighten the anchor bolts to the specification shown at the end of this Part.

Belt assemblies must be installed in matched sets as received and **must not be interchanged between vehicle models.**

If a component portion (buckle portion, retractor portion, etc.) of a **seat belt or shoulder belt assembly is nonfunctional or damaged, the entire assembly (buckle, tongue and shoulder harness portions) must be replaced.** The replacement assembly must be installed as a matched set and the identification labels on all portions must bear exactly the same code, and manufacturer's name. Under no circumstances are seat belt or shoulder belt components to be replaced as individual components.

DESCRIPTION AND OPERATION

Both systems incorporate a buzzer (except Versailles which has a chime) and light warnings. The seat belt warning light illuminates for about eight seconds after the ignition switch is turned on—regardless of seat belt usage. The seat belt warning buzzer or chime is grounded by a switch in the left lap retractor, on the three point system and by a switch in the left inboard buckle on the continuous loop system. The seat belt warning buzzer or chime will sound for approximately eight seconds unless the driver's belt is used.

When the occupant restraint system for front outboard passengers is a 3-point system, with the outboard lap belt and shoulder harness are sewn together at the tongue. To secure the belts, the tongue is inserted into the buckle.

ADJUSTMENTS

On the three point system, the webbing for the lap belt extends from a belt retractor that automatically

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locks when the belt is being worn. This lock prevents the belt from being pulled out further, but allows the belt to retract, and thus maintains a snug fit around the user for optimum safety. This lap belt retractor is located **on** or **in** the rocker panel (depending on car line and model).

With the continuous loop system, the outboard lap/shoulder belt uses a common sliding tongue. To secure, insert the tongue into the inboard buckle.

The webbing for the lap belt is anchored to the side of the sill without a retractor.

On both systems, the shoulder harness webbing has the other end fixed in a retractor, which is located in or on the rocker, in the "B" pillar post or in the quarter panel (depending on car line and model). The Mustang II, Pinto, Bobcat, Fairmont, Zephyr, Ford, Lincoln, Granada and Monarch (2-doors) shoulder harness retractor is located in the quarter panel. The Continental Mark V shoulder belt retractor is located in the headlining above the opera window. This webbing then passes through a guide on the Ford and Lincoln Continental above and behind the occupant's shoulder which directs the webbing at the proper downward angle over the occupant's shoulder and chest, and attaches to the lap belt connector. **The shoulder harness retractor is designed to let the webbing freely move in or out at all times, except during vehicle deceleration, when it is automatically locked by a mechanically actuated inertia sensor** (Fig. 1).

The inboard belt with the buckle passes through the seat on bench seat installations and directly to a fixed anchorage on the floor on bucket seat installations. Attaching the tongue and buckle secures the occupant with both lower and upper restraints. This attachment of the tongue and buckle can be accomplished by a single continuous movement.

The 2-point system (lap belts only) continues for the front seat center position and all rear seat positions.

CONTINUOUS LOOP SYSTEM (SLIDING TONGUE, WITHOUT COMFORT REGULATOR)

FRONT LAP-SHOULDER BELTS

Fastening Belts

After entering your car, adjust the front seat to obtain the best position for your driving comfort and visibility. Then use the following procedure for fastening belts.

Pull the lap-shoulder belt from the retractor so that the shoulder portion of the belt crosses your shoulder and chest and insert the belt tongue into the proper buckle until you hear a snap and feel it latch.

Adjusting Shoulder Portion

The shoulder restraint portion of the belt adjusts automatically to a snug position. The inertia reel allows freedom of movement; locking tight only on hard braking or impacts of approximately 5 mph (8 km/h) or more. The reel cannot be made to lock by jerking on the webbing.

Adjusting Lap Portion

The lap portion of the belt adjust automatically.

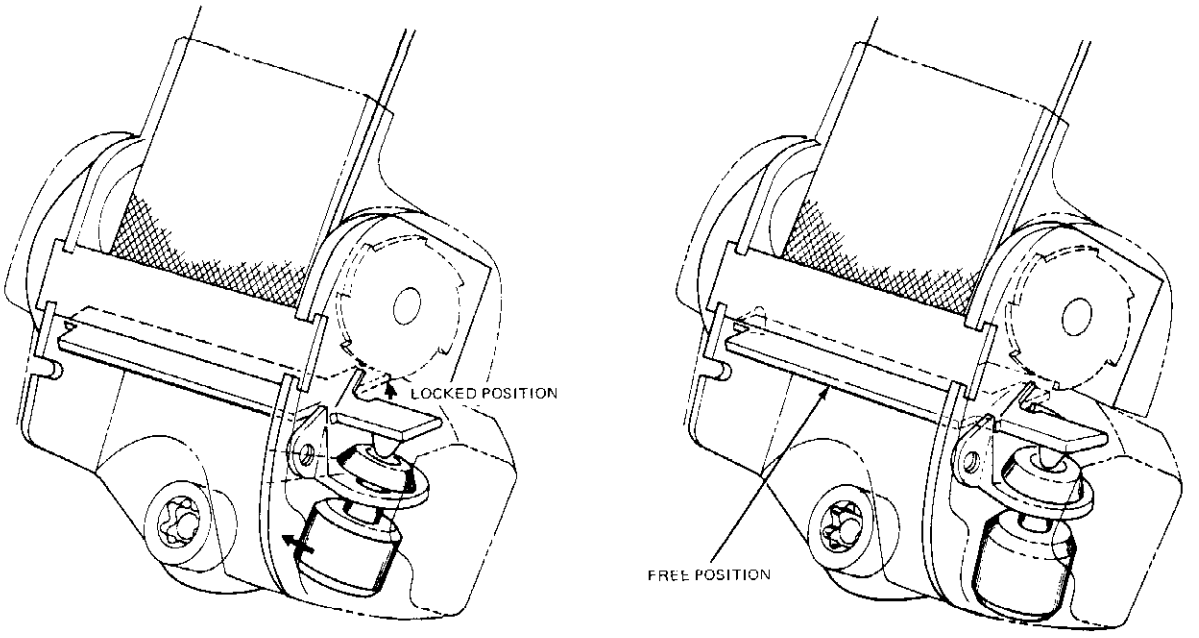


FIG. 1 Shoulder Harness Retractor—Three Point System

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REAR LAP BELTS

To Fasten Belts

Pull the belt out of the retractor with a steady motion and insert the tongue into the buckle. Adjust belt snugly around the hips (never across the waist) by allowing slack to return to the retractor. Failure to do so may result in unnecessary injury in the event of a collision.

CONTINUOUS LOOP SYSTEM (WITH ONE-WAY TONGUE AND COMFORT REGULATOR)

Perform the same operations as continuous loop without comfort regulator, with the following additions.

ADJUSTING SHOULDER PORTION (With Comfort Regulator)

To relieve belt pressure on your shoulder after the belt is fastened, a shoulder harness comfort regulator has been installed in the shoulder retractor. This regulator allows you to adjust your shoulder belt to a position for a comfortable shoulder harness length. This comfort regulator operates similar to a "window shade" mechanism, and is used in the following manner:

1. Close the door.
2. Pull several inches of shoulder belt away from your body and release.
3. Pull down a small amount of shoulder belt and release.

CAUTION—An adjustment that results in more slack than is required in order to insert a first between the shoulder belt and the chest may reduce the restraint system effectiveness. Pull and release until the slack is correct.

COMFORT REGULATOR RELEASE

The comfort regulator is designed to automatically release when the respective front door is opened. As the seat belt is unbuckled, it should be hand-guided back to the retractors to prevent the belt tongue from striking occupants or objects nearby during retraction.

THREE-POINT SYSTEM—EXCEPT VERSAILLES

To fasten the front lap shoulder belts after entering the car on the three point system, adjust the front seat to obtain the best position for your driving comfort and visibility. Then, use the following sequence for fastening belts.

1. Pull the lap-shoulder belt from the retractor in one continuous motion, so shoulder portion of belt crosses your shoulder and chest and insert the belt tongue into the proper buckle. If the pulling motion is interrupted while extending the belt, it may be necessary to return the lap belt to the stowed, or fully retracted positon, in order to release the stop mechanism in the lap portion of the belt.
2. Adjust lap portion of seat belt snugly **around the hips** —not the waist, by allowing any excess belt to return into the retractor.
3. The shoulder restraint portion of the belt adjusts automatically to a snug position. The inertia reel attached to the shoulder belt allows freedom of movement, locking tightly only on hard braking or impacts of approximately 5 mph or more. The reel cannot be made to "lock up" by jerking on the webbing.

THREE-POINT SYSTEM—VERSAILLES

1. Pull lap shoulder belt from retractor so that shoulder portion of belt crosses shoulder and chest. Insert belt tongue into buckle.

ADJUSTING LAP BELT (FREE WHEELING FEATURE INCORPORATED AFTER DECEMBER, 1977)

The lamp belt retractor is designed to "free wheel" while the occupant is buckling up. This electrical device allows the driver and/or right passenger to extend or retract the webbing without lock up until the tongue has been inserted in the buckle. ADJUST LAP PORTION OF BELT ACROSS THE HIPS (never across the waist) by allowing any excess belt into the retractor.

ADJUSTING SHOULDER PORTION (With Comfort Regulator)

To relieve tension on your shoulder after the belt is fastened, a shoulder harness comfort regulator has been installed in the shoulder retractor. This regulator allows you to adjust your shoulder belt to a comfortable length and obtains proper amount of slack. This comfort regulator operates similar to a shade mechanism, and is used in the following manner:

1. Pull several inches of shoulder belt away from your body and release.
2. Pull down a small amount of shoulder belt and release.

Comfort Regulator Release

The comfort regulator is designed to release when the door is opened.

FRONT CENTER LAP BELT

The center seat belts do not have retractors. To lengthen the belt, tip the tongue.

To fasten the belt, insert the tongue into the open end of the buckle until you hear a snap. Shorten the belt, if necessary, by pulling on the loose end of the webbing. The belt should be snug across **the hips; never across the waist.**

WEBBING CANNOT FULLY RETRACT FROM LAP BELT RETRACTOR

ALL MODELS EXCEPT FAIRMONT, ZEPHYR, VERSAILLES, GRANADA, MONARCH, MUSTANG II, PINTO, BOBCAT (2-DOOR) AND LTD II AND COUGAR (4-DOOR)

1. Pull webbing from the shoulder harness retractor, allowing the lap belt to retract fully into the retractor. Pull webbing from the lap belt retractor.
2. If OK, withdraw lap belt webbing and buckle up while sitting in seat. Repeat five times to insure proper operation. If not OK, replace the seat belt assembly.
3. If the webbing cannot be pulled from lap belt retractor, unsnap retractor cover door and disengage locking bar from the ratchet gear (Fig. 2). (Use a small commom screwdriver which has no burrs or sharp edges.) Hold the locking bar down

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and pull the webbing from the retractor. Inspect the webbing for foreign material and/or twist and remove. Allow webbing to retract into the retractor. Withdraw lap belt webbing and buckle up while sitting in seat. Repeat five times to insure proper operation. If not OK, replace the seat belt assembly.

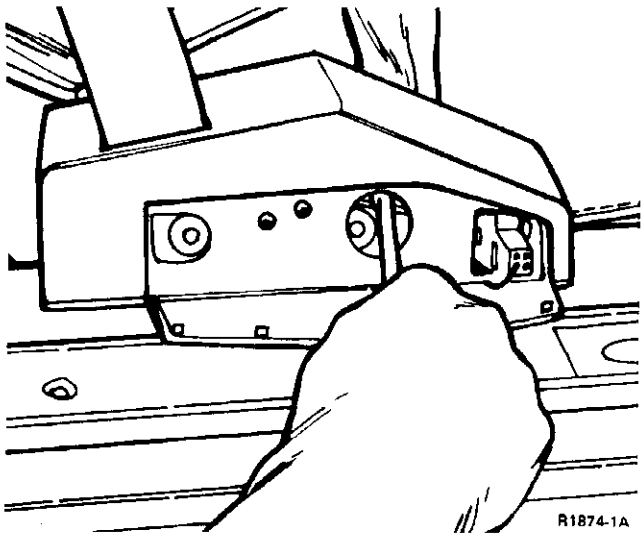


FIG. 2 Disengaging Seat Belt Retractor Locking Bar

LTD II AND COUGAR—(4 Door Models)

1. Pull webbing from the shoulder harness retractor, allowing lap belt to retract into the retractor. Pull webbing from the lap belt retractor.
2. If OK, withdraw lap belt webbing and buckle up while sitting in seat. Repeat five times to insure proper operation. If not OK, replace the seat belt assembly.
3. If the webbing cannot be pulled from lap belt retractor, remove center pillar trim cover and seat belt retractor. Pull the retractor cover away from retractor frame at the area of the attaching bolt hole and disengage locking bar from the ratchet gear. (Use a small commom screwdriver which has no burrs or sharp edges.) Hold the locking bar down and pull the webbing. Inspect the webbing for foreign material or twisting. Remove foreign material or roping/twisting. Allow webbing to retract back into retractor. Cycle retractor five times, if not OK, replace the seat belt assembly.
4. If OK, reinstall in vehicle. Withdraw lap belt webbing and buckle up while sitting in seat. Repeat five times to insure proper operation. If not OK, replace the seat belt assembly.

Thunderbird, Fairmont, Zephyr and Versailles—All Models

1. If lap belt does not fully retract, pull webbing from the shoulder harness retractor, allowing lap belt to retract fully back into the retractor. Pull webbing from the lap belt retractor.
2. If OK, withdraw lap belt webbing and buckle up while sitting in seat. Repeat five times to insure proper operation. If not OK, replace the seat belt assembly.
3. If the webbing cannot be pulled from the lap belt retractor, visually check the webbing inside the snout (look down the snout opening) for foreign material or twisting. Remove roping by untwisting belt. Remove foreign material with tweezer or any appropriate tool that does not have burrs or sharp edges that would damage the webbing. Allow webbing to retract back into retractor. Withdraw lap belt webbing and buckle up while in seat. Repeat five times to insure proper operation.
4. If not OK, tighten the webbing on the spool in the retractor, by trying to pull the webbing from the retractor. (Use both hands to pull webbing.) Allow webbing to retract by pushing the webbing into the retractor. Withdraw webbing and inspect for foreign material or twisting. Remove foreign material or roping/twisting. Withdraw lap belt and buckle up while in seat. Repeat five times to insure proper operation. If not OK, replace the seat belt assembly.

LAP BELT RETRACTOR DOES NOT LOCK

ALL MODELS EXCEPT PINTO, BOBCAT, MUSTANG II, GRANADA, MONARCH, FAIRMONT, ZEPHYR, VERSAILLES (2-DOOR) AND LTD II AND COUGAR (4-DOOR)

1. Withdraw a minimum of 18 inches of webbing from lap belt retractor and check for lock-up. (Retractor must lock-up after 18 inches of webbing withdrawal.) Return 2 inches into retractor and pull out.
2. Unsnap retractor cover door and check locking bar spring. Pull webbing from the lap belt retractor and check for broken spring on locking bar by moving locking bar away from ratchet gear. (Use a small commom screwdriver which has no burrs or sharp edges.) Spring should force locking bar back into engagement with ratchet gear (Fig. 2).
3. If not OK, replace the seat belt assembly. If OK, check locking bar for foreign material. Remove foreign material. Withdraw lap belt webbing and buckle up while sitting in seat. Repeat five times, to insure proper operation. If not OK, replace the seat belt assembly.

VERSAILLES

1. Fasten the seat belt. Pull on the lap belt webbing, the retractor should be locked if O.K., unbuckle, allow the lap belt retractor to fully retract.
2. Repeat Step 1 five (5) times to insure proper operation.
3. If not O.K., replace the seat belt assembly for that seating position.

NOTE: There are two ways to stop the retractor from "free wheeling." One is to "buckle up" and the retractor will lock immeidately. The second way is to pull approximately 12" of webbing from the lap belt retractor, wait approximately 15 seconds and a thermal timer will deactivate the "free wheeling" feature.

LTD II AND COUGAR (4 Door Models)

1. Withdraw a minimum of 18 inches of webbing from lap belt retractor and check for lock-up. (Retractor

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must lock-up after 18 inches of webbing withdrawal.) Return 2 inches into retractor and pull out.

2. Remove center pillar trim cover and seat belt retractor. Pull the retractor cover away from retractor frame at the area of attaching bolt hole and check for broken spring on locking bar, by moving locking bar away from ratchet gear. (Use a small common screwdriver which has no burrs or sharp edges). Spring should force locking bar back into engagement with ratchet gear (Fig. 2).
3. If not OK, replace seat belt assembly. If OK, check locking bar for foreign material. Remove foreign material. Withdraw lap belt webbing and allow to retract. Repeat five times to insure proper operation. If not OK, replace seat belt assembly. If OK, install in vehicle and withdraw lap belt and buckle up while sitting in seat. Repeat five times to insure proper operation. If not OK, replace seat belt assembly.

REMOVAL AND INSTALLATION

FRONT SEAT BELT RETRACTOR AND HARNESS ASSEMBLY

2-DOOR MERCURY, COUGAR, LTD II, THUNDERBIRD, AND RANCHERO

NOTE: Fig. 3 shows the front seat belt, shoulder harness, inboard and outboard locations. Tool T70P-2100B and T77L-2100A (or equivalent) should be used for Removal and Installation. Refer to Group 45 for trim removal.

1. Fold back the 9 inch sling "boot" cover (portion covering the roof rail anchor bolt) and remove the anchor bolt.
2. Unlatch the inboard attachment boot cover and remove the anchor bolt attaching the front inboard belt and buckle assembly.
3. Remove the belt and buckle assembly by pulling the attaching anchor plate through the seat grommet.
4. Flip over the cover on the dual retractor boot (mounted on top of the sill).
5. Remove the two (2) anchor bolts attaching the dual retractor assembly and remove the retractor assembly.

Installation

To assemble, reverse the preceding steps. Torque all bolts to 22-32 ft-lbs. Cycle system several times to assure proper retractor operation.

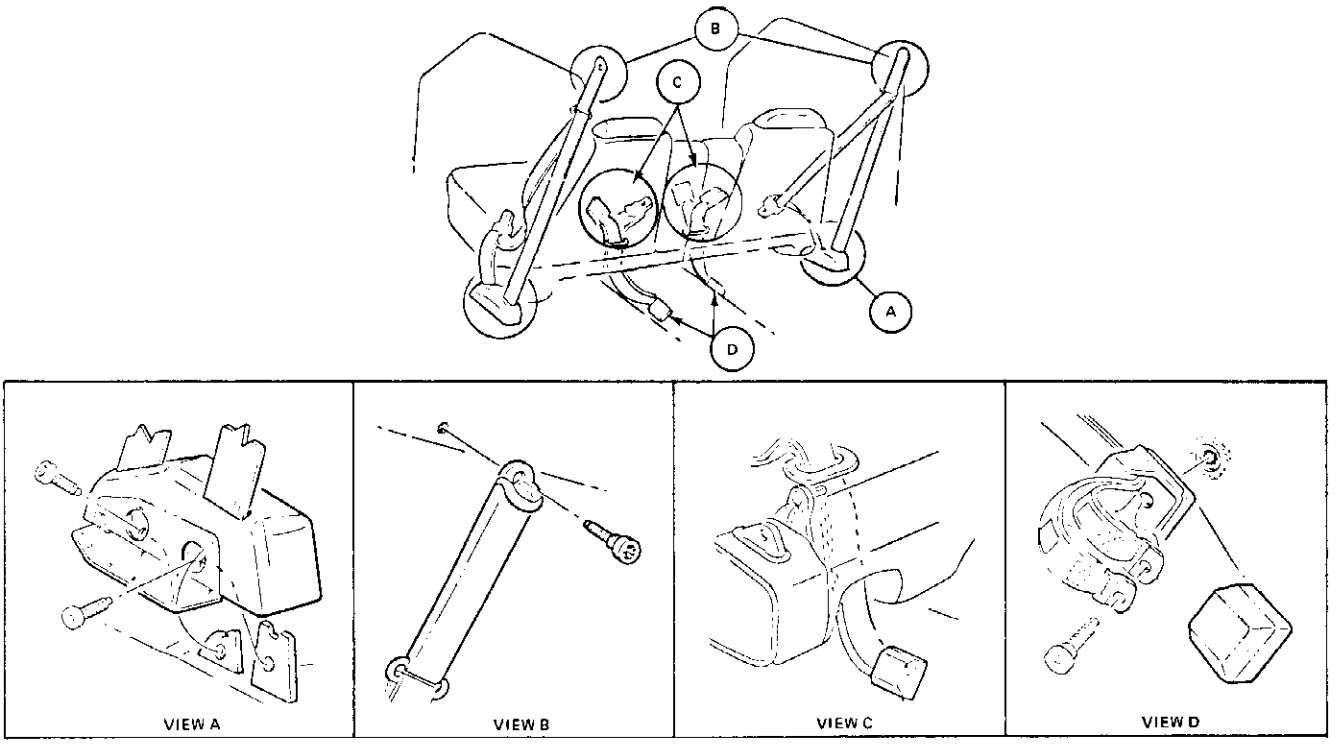


FIG. 3 Front Seat Belt Installation—Mercury, Thunderbird, LTD II, Cougar and Ranchero—2-Door Models

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4-DOOR FORD, MERCURY AND LINCOLN CONTINENTAL

Removal

1. Unsnap the cover on upper "D" ring attachment and remove the attaching bolt (Fig. 4).
2. Remove upper and lower "B" pillar trim panels.
3. Remove the bolt from the upper retractor and remove the retractor from the pillar.
4. Unsnap the driver's side front cover from the retractor on top of sill and disconnect electrical connector.
5. Unsnap the other cover on the retractor assembly, remove the attaching bolt and remove the retractor assembly.
6. With the seat in full forward position, remove the center anchor cover by spreading sides and lifting off cover.
7. Remove bolt attaching buckle ends.
8. Connect the driver's side electrical connector to the retractor assembly and install the access covers.
9. Install the "B" pillar retractor assembly and tighten to specification.
10. Install the lower and upper "B" pillar trim panels.
11. Install the shoulder harness and bolt to the "B" pillar and "D" ring attachment and tighten to specification. Make sure there is no twist in the webbing.

Installation

To assemble, reverse the preceding steps. Torque all attaching bolts to 22-32 ft-lbs. Cycle system several times to assure proper operation of retractors.

4-Door LTD II and Cougar

1. Unsnap the cover on upper "D" ring attachment and remove the attaching bolt (Fig. 5).
2. Remove upper and lower "B" pillar trim panels.
3. Disconnect driver's side electrical connector from the lower retractor.
4. Remove the bolt from the upper retractor and remove the retractor from pillar.
5. Remove the bolt from the lower retractor and remove the retractor assembly.
6. With seat in full forward position, remove center anchor cover by spreading sides and lifting off cover.
7. Remove the bolt attaching the buckle ends.
8. Pull the buckle through the seat assembly.

Installation

To assemble, reverse the preceding steps. Torque all attaching bolts to 22-32 ft-lbs. Cycle system several times to assure proper operation of retractors.

Pinto/Bobcat and Mustang II (All Models) Granada/ Monarch (Two-Door Models)

Removal

1. Remove the outboard front seat belt-to-sill attaching bolt and rubber washer (Fig. 6, View AA).
2. Unsnap the Guide Cover at the upper attachment and remove the Seat Belt Guide attaching bolt. (Fig. 6, View BB).
3. Remove the rear seat cushion and back (refer to Part 41-14 and 41-20).

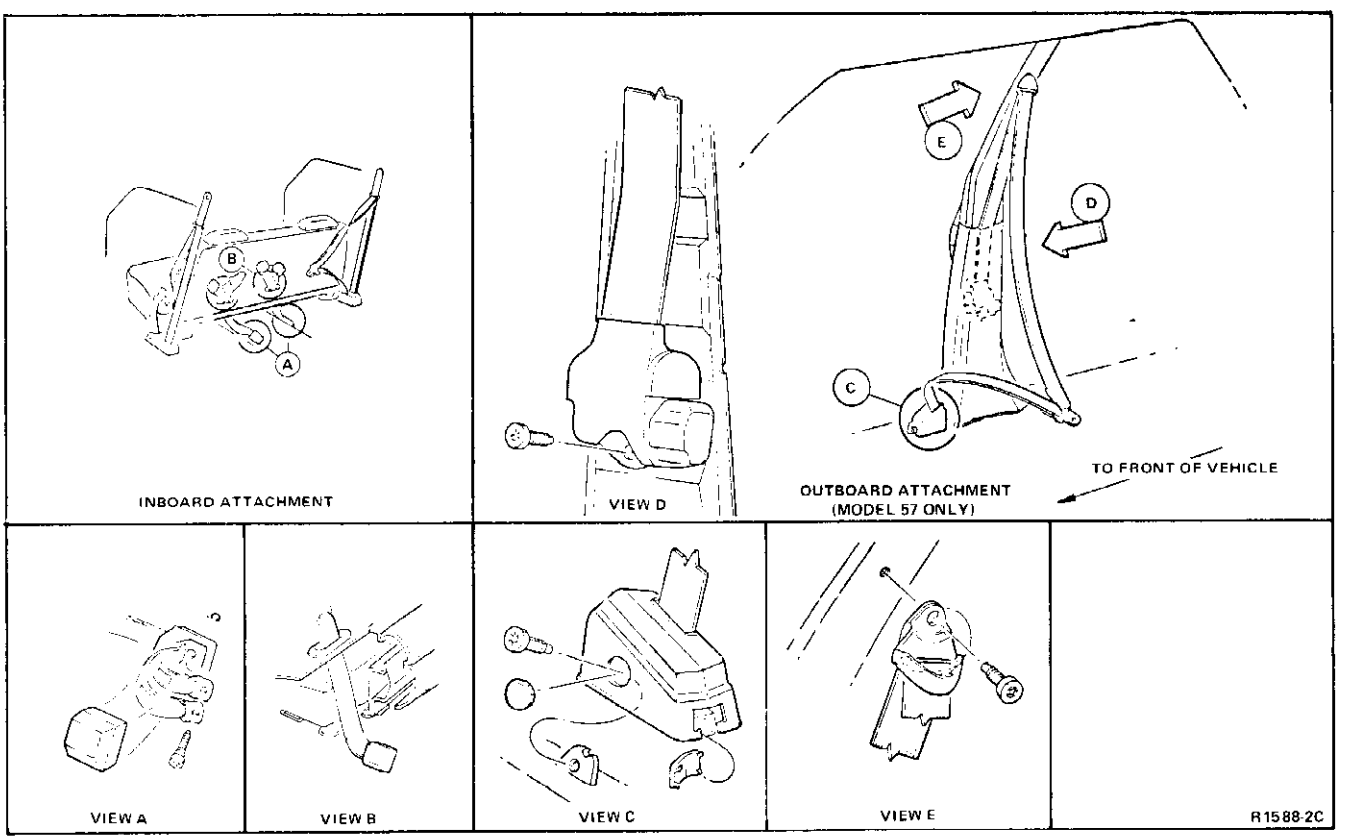


FIG. 4 Front Seat Belt Assemblies—Ford, Mercury and Lincoln Continental—4-Door Models

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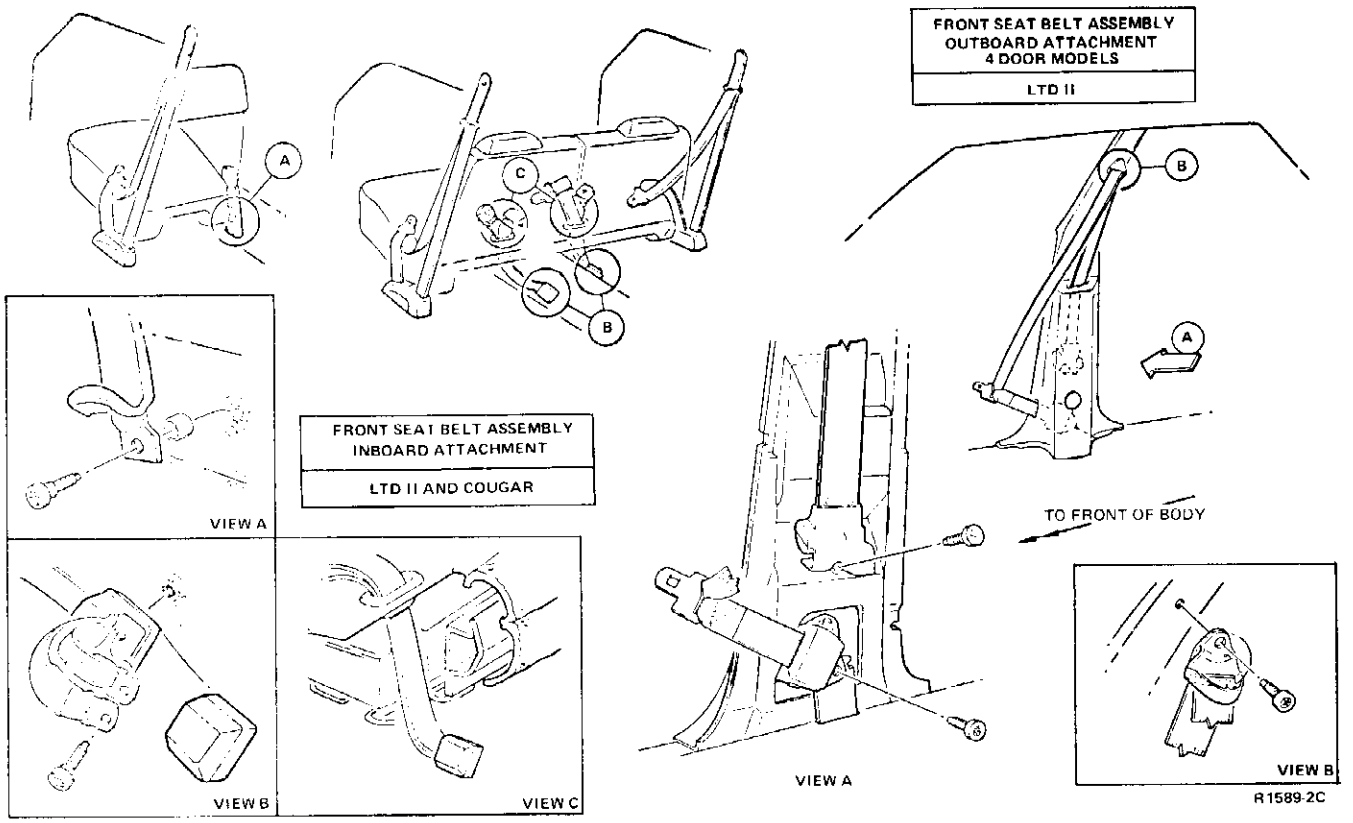


FIG. 5 Front Seat Belt Assemblies—LTD II and Cougar—4-Door Models

4. For Pinto, Bobact and Mustang, remove the quarter trim panel. On Mustang Ghia and Granada/Monarch remove the roof side rear trim panel before the quarter trim panel. (Refer to Part 45-03.) (Fig. 6, Views CC—1, 2, 3, 4 and 5.)
5. Disengage the front seat belt opening bezel from the opening in the quarter trim panel for the standard Mustang, Pinto and Bobcat. Remove the belt from the existing slit in the bezel and panel. For Mustang Ghia and Granada/Monarch models, disengage the belt from the exit slit in the roof side rear trim panel.
6. Remove the quarter panel mounted retractor attaching bolt and remove the outboard front seat belt assembly from the vehicle. (Fig. 6, Views DD—1, 2, and 3.)

   NOTE: Pinto and Bobcat station wagons outboard front seat belt sill attaching end, boot, guide, tongue and stop must be threaded through the inside quarter panel from the top after removing the retractor.
7. RH Inboard Front Seat Belt and Buckle removal procedure is: With the seat in the forward position to provide access, lift or slide the lower end of the buckle end boot, remove the front seat belt and buckle assembly attaching bolt and remove the assembly from the vehicle. (Fig. 6, Views EE—1 and 2.)
8. LH Inboard Front Seat Belt and Buckle Assembly: With the seat forward, disconnect the seat belt warning buzzer wiring connector at the lower end of the LH buckle end boot, lift or slide (as applicable) the lower end, remove the attaching bolt and remove the assembly from the vehicle.

Installation

To re-assemble, reverse the preceding steps. Torque all attaching bolts to 22-32 ft-lbs and cycle the system several times to assure proper operation of the retractor.

Granada/Monarch Four-Door Models—Front

Removal

1. Remove the outboard front seat belt-to-floor attaching bolt (Fig. 7, View AA).
2. Unsnap the "D" Ring Guide Cover at the upper attachment and remove the belt guide attaching bolt (Fig. 7, View BB).
3. Remove the Center Pillar trim (Refer to Part 45-03) and disengage the belt from the slot in the center body pillar inside finish panel (Fig. 7, View CC).
4. Remove the center pillar mounted retractor attaching bolt and remove the outboard front seat belt assembly from the vehicle (Fig. 7, View DD).
5. RH Inboard Front Seat Belt and Buckle Assembly: With the seat forward, lift the lower end of the boot and remove the front seat belt and buckle assembly attaching bolt. Remove assembly from vehicle (Fig. 7, View EE—1 and 2).
6. LH Inboard Front Seat Belt and Buckle Assembly: With the seat forward, disconnect the seat belt warning wiring connector at the lower end of the boot. Remove the attaching bolt. Remove the assembly from the vehicle.

Installation

To assemble, reverse the preceding steps. Torque all attaching bolts to 22-32 ft-lbs. Cycle the system several times to assure proper operation of the retractor.

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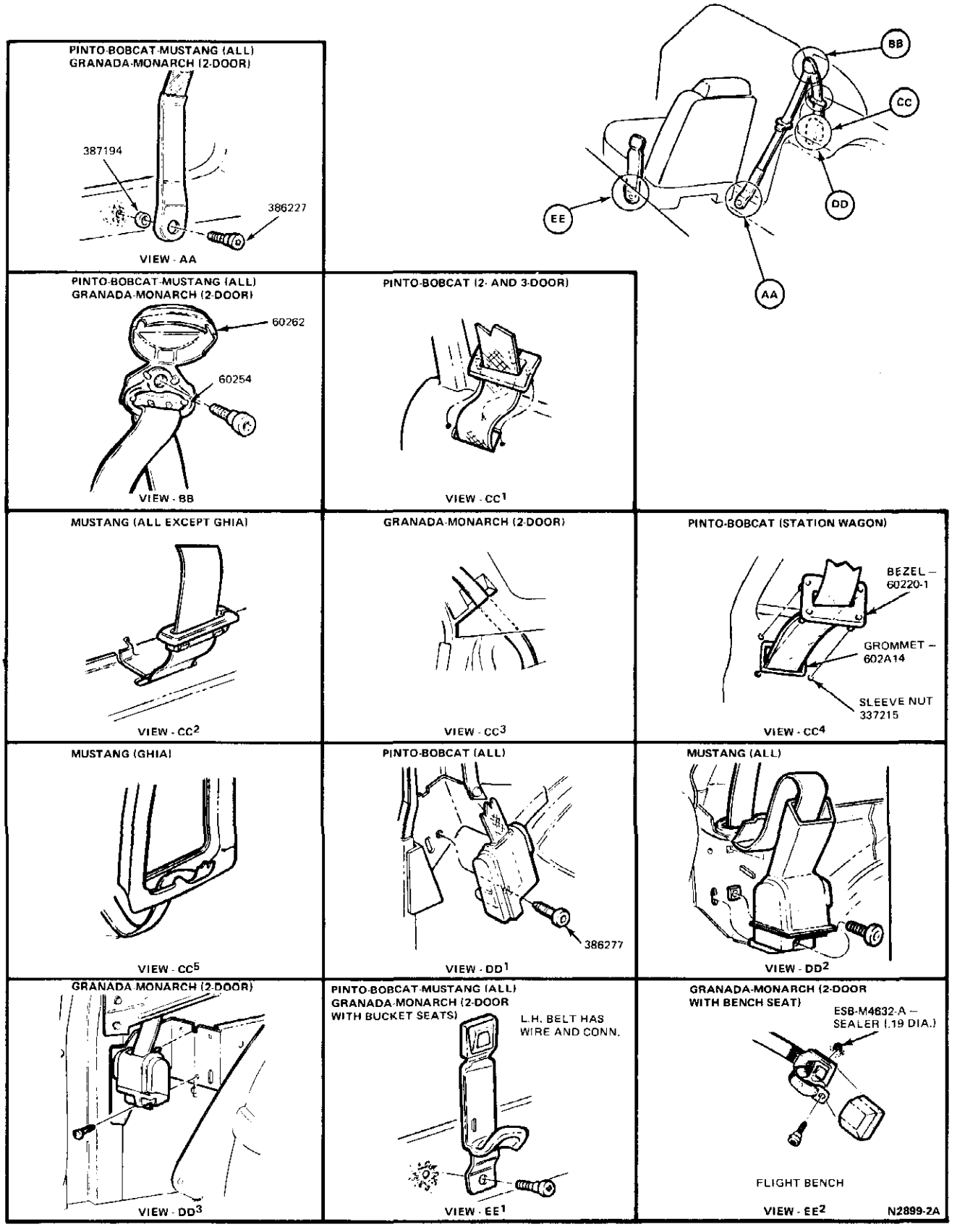


FIG. 6 Front Outboard Seat Belts—Pinto, Bobcat and Mustang II (All Models); Monarch and Granada (2-Door Models)

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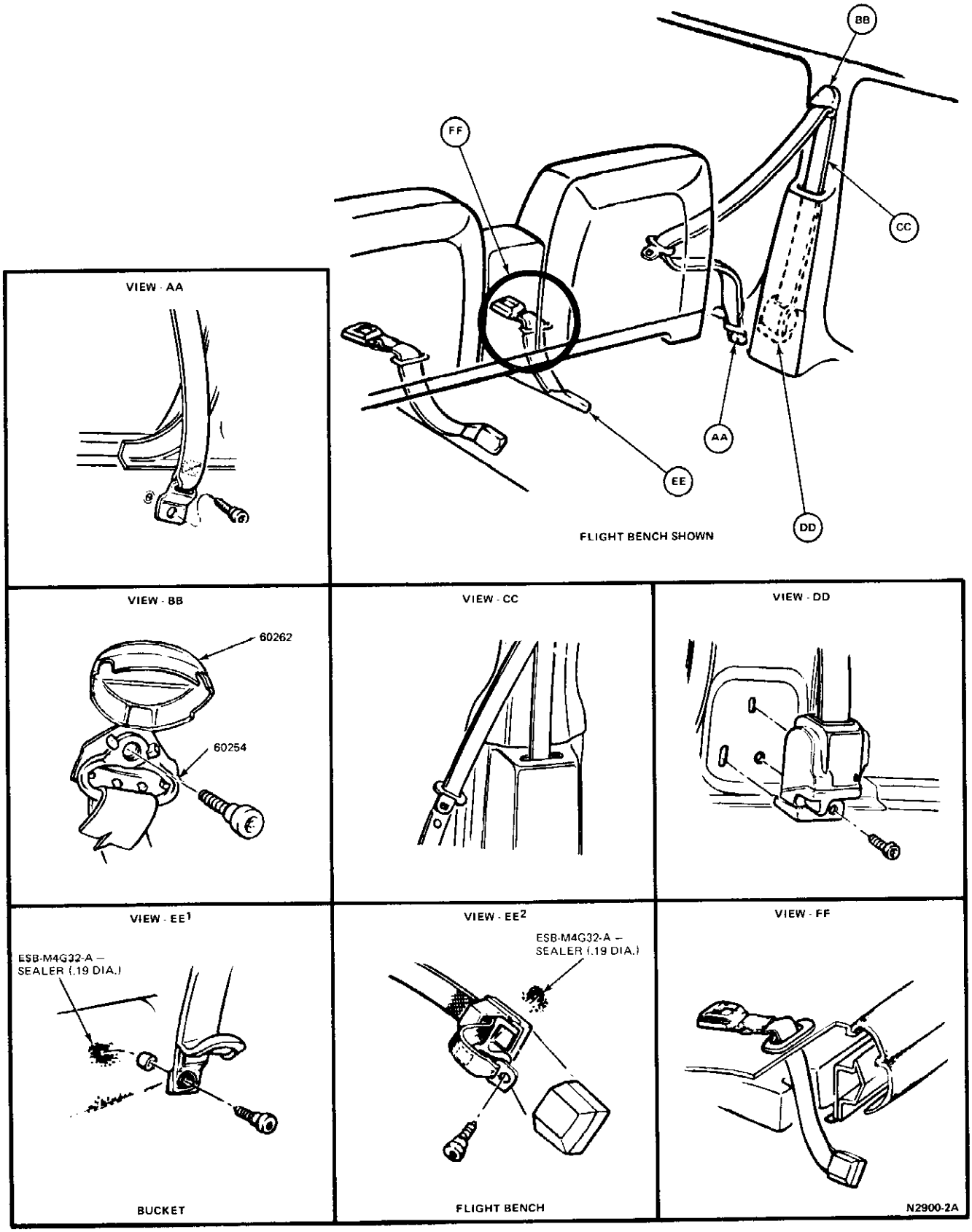


FIG. 7 Front Outboard Seat Belts—Granada and Monarch (4-Door Models)

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Continental Mark V

NOTE: Fig. 8 Views A, B, C show the Front Seat Belt and Shoulder Belt Inboard and Outboard Locations. Tool T70P2100B should be used for Removal and Installation. Refer to Group 45 for Trim Removal.

Removal

1. Remove the shoulder belt retractor cover attaching screws (2).
2. Remove the shoulder belt retractor attaching screws (2). Lower Assy. to rear floor (Fig. 8).
3. Unsnap "footman's loop".
4. Remove the plug from the front of the lap belt retractor cover. (Driver's side only.)
5. Disconnect the driver's side seat belt electrical connector from left lap belt retractor.
6. Remove the plug from the side of the lap belt retractor.
7. Remove the one bolt from the lap belt retractor assembly and remove the retractor assembly.
8. With the seat in the full forward position, remove the center anchor cover by spreading the sides and lifting off the cover.
9. Remove the bolt attaching the buckle ends.
10. Pull the buckle ends through the seat assembly.

Installation

To assemble, reverse the preceding steps. Torque all attaching bolts to 22-32 lbs-ft and cycle the system several times to insure proper operation of the retractor.

2-Door Ford and Lincoln Continental

1. Unsnap the cover on upper "D" ring attachment and remove the attaching bolt (Figs. 9 and 10).
2. Remove quarter trim panels, Part 43-05.
3. Lincoln Continental Only—Remove the four (4) screws retaining the seat belt guide.
4. Remove the bolt from the "B" pillar retractor and remove the retractor from the pillar.
5. Unsnap the driver's side front cover from the retractor on top of sill and disconnect electrical connector.
6. Unsnap the other cover on the retractor assembly, remove the attaching bolt and remove the retractor assembly.
7. Remove the seat belt loop retainer from seat assembly.
8. With the seat in full forward position, remove the center anchor cover by spreading sides and lifting off cover.
9. Remove bolt attaching buckle ends.
10. Pull buckle through seat assembly.
11. Thread the center belt through the seat cushion bezel and insert.
12. Position the center belt assembly, install the attaching bolt, tighten to specification and install the center anchor cover.
13. Install the lower retractor (one (1) bolt) and tighten to specification.
14. Connect the driver's side electrical connector to the retractor assembly and install the access covers.

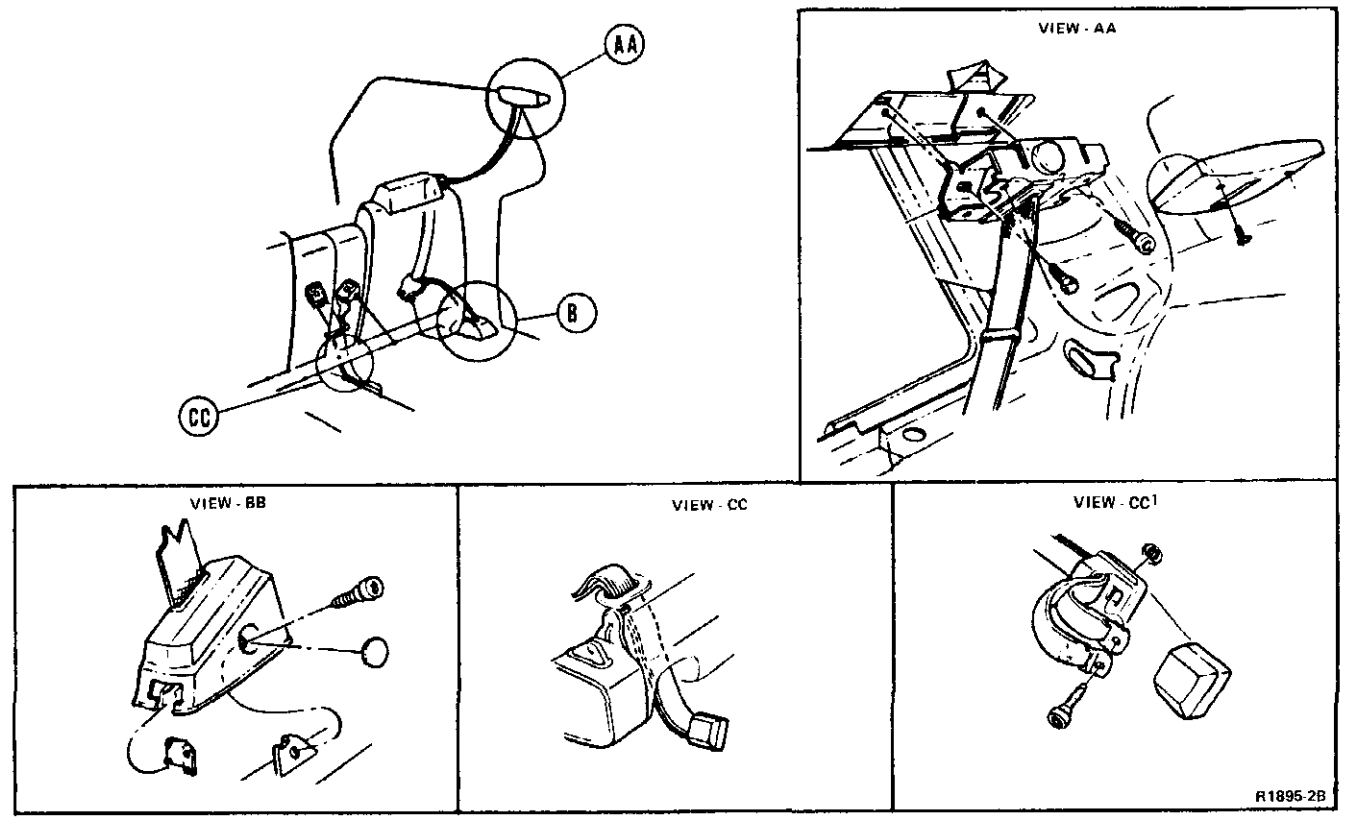


FIG. 8 Front Seat Belt Assembly Continental Mark V—All Models

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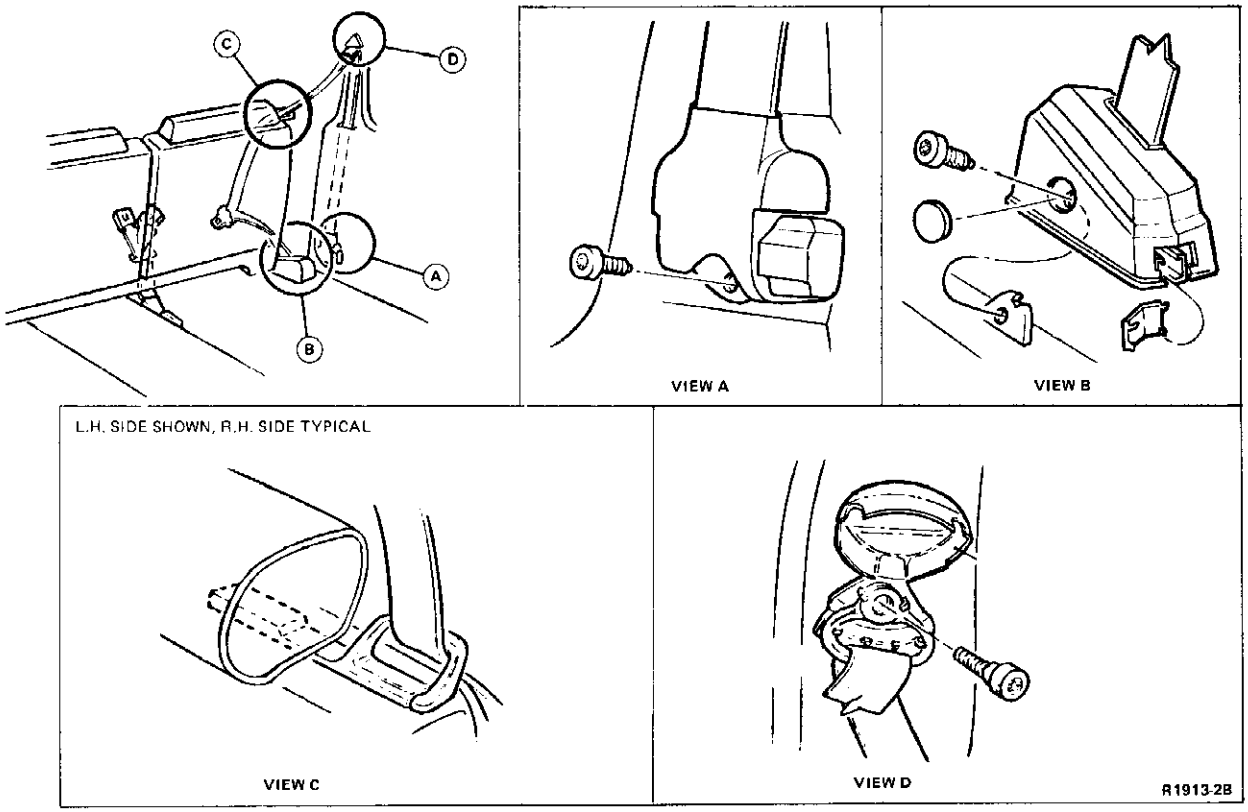


FIG. 9 Front Seat Belt Assemblies—Ford—2-Door Models

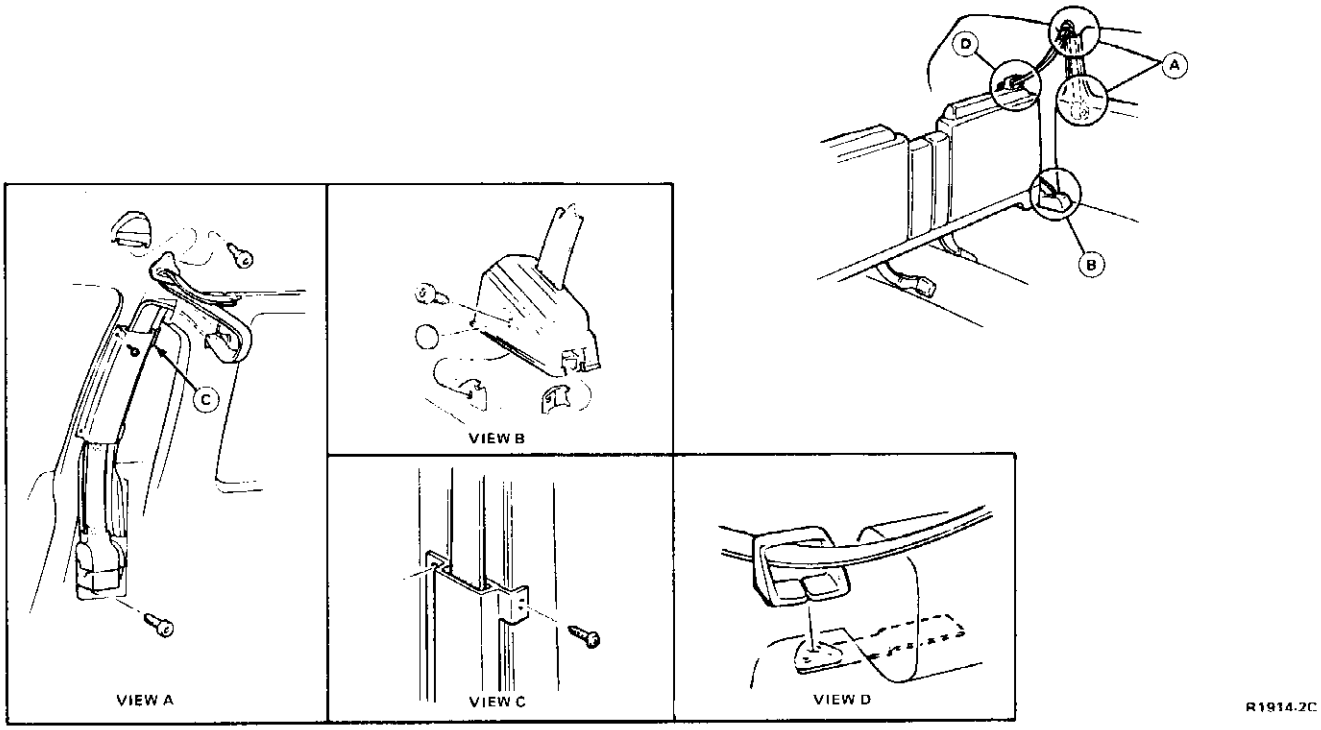


FIG. 10 Front Seat Belt Assemblies—Lincoln Continental—All Models

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15. Install the "B" pillar retractor assembly and tighten to specification.
16. Lincoln Continental Only—Install the seat belt guide with four (4) retaining screws.
17. Install quarter trim panels.
18. Install the shoulder harness and bolt to the "B" pillar and "D" ring attachment and tighten to specification. Make sure there is no twist in the webbing.
19. Install seat belt loop retainer to top of seat assembly.

VERSAILLES OUTBOARD FRONT SEAT BELT RETRACTOR AND HARNESS ASSEMBLIES

Removal

1. Remove the bolt attaching the shoulder harness "D" ring on "B" pillar.
2. Remove the front seat assembly (Part 41-01).
3. Remove the scuff plate.
4. Remove "B" pillar trim covers.
5. Remove shoulder harness retractor attaching bolt and disconnect wiring connector.
6. Remove shoulder harness retractor from "B" pillar and place on rear floor.
7. Remove the screw from the lap belt retractor cover.
8. Free the retractor cover. Unthread the belt from the cover and remove the lap belt retractor assembly (two bolts). Thread the retractor through the hole *in the carpet*.
9. Disconnect the electrical connector at the retractor cover on the driver's side only.
10. Remove the outboard seat belt retractors and harness assembly from the vehicle.

Installation

1. To assemble, reverse the preceding steps.
2. Torque all attaching bolts to 22-32 ft-lbs. Cycle the system several times to assure proper operation of the retractor. Make sure the webbing is not twisted.

VERSAILLES INBOARD FRONT SEAT BELT ASSEMBLY

Removal

1. Adjust the seat full forward.
2. On bucket seats, lift the lower end of the boat and remove the seat belt attaching bolt. (See Fig. 11 View EE1.) On flight bench seats, slide the seat bolt cover from over the attaching bolt (Fig. 11 View EE2) and remove the seat belt bolt.
3. Remove the inboard belt assembly from the vehicle.

Installation

1. To assemble, reverse the preceding steps.
2. Torque all attaching bolts to specification.
3. Cycle the system several times to assure proper operation of the buckle.

FAIRMONT AND ZEPHYR—2-DOOR MODELS

Removal and Installation

1. Remove quarter trim panel and position seat belt components as shown in Fig. 12.
2. Install anchor bolt and thread shoulder belt through the slot in the quarter trim panel. Install trim panel.

FAIRMONT AND ZEPHYR—4-DOOR MODELS

1. Move seat to forward position. Position all seat belt components as shown in Fig. 13.
2. Thread the buckle end anchor through the seat cavity. Slip half the boot over the anchor end. Install the anchor bolt and slip the boot on. Connect buckle.
3. Position washer to seat belt anchor and install anchor bolt.
4. Open the "O" ring cover, slip it behind the "O" ring and install the anchor bolt. Snap cover closed.

REAR SEAT BELT RETRACTOR ASSEMBLY AND/OR CENTER SEAT BELT

2-Door Pinto, Bobcat and Mustang II

Removal

1. Remove the left scuff plate assembly.
2. Remove the rear seat cushion and back assembly as shown in Part 41-14 or Part 41-20 (whichever is applicable).
3. Remove the seat belt bezel from the quarter trim panel (Fig. 14).
4. Remove the quarter trim panel. See Part 45-03.
5. Remove the retractor assembly and/or center seat belt assembly and anchor bolts.

Installation

1. Reverse removal procedure.
2. Position center seat belt assembly, if removed, and torque anchor bolts to 22-32 ft-lbs.

FAIRMONT AND ZEPHYR (Except Wagons)

1. Remove the lower rear seat cushion. Position all seat belt components as shown in Fig. 16. Install all anchor bolts to 22-32 ft-lbs torque.
2. All seat belt anchorages for front and rear seat belt assemblies are built-in. The anchor tabs have to be positioned according to specification.

FAIRMONT AND ZEPHYR (Station Wagon)

1. Remove rear seat cushion.
2. Slide retractor assembly under the trim panel and thread the torque through the opening in the trim panel.
3. Install the anchor bolt and tighten to 22-32 ft-lbs torque.
4. Slip the seat belt bezel over the seat belt tongue and insert the bezel in the trim panel.
5. Reinstall the rear seat.

ALL EXCEPT PINTO, BOBCAT, MUSTANG II, FAIRMONT AND ZEPHYR

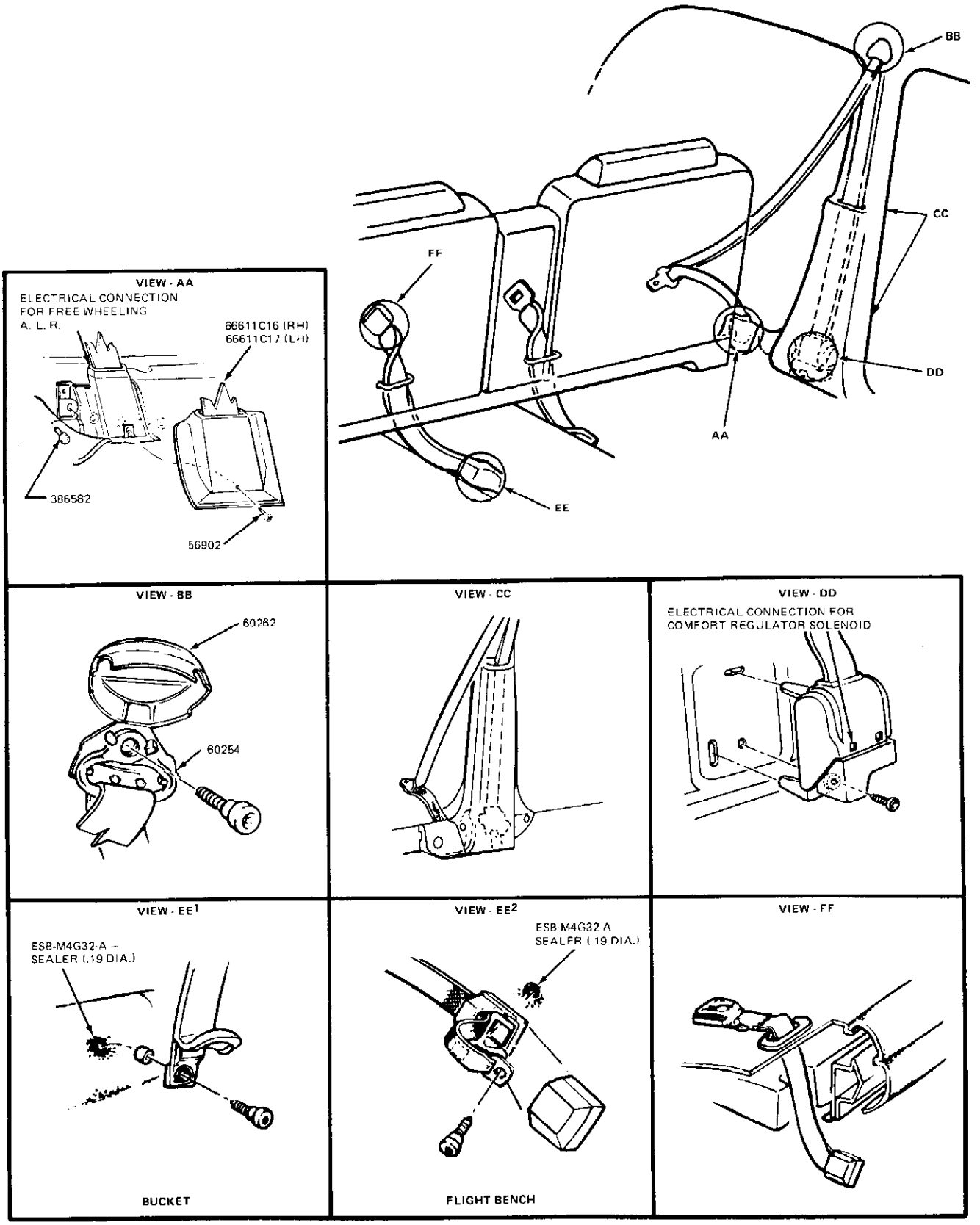
Removal

To remove the rear seat belt retractor and/or seat belt assembly it will be necessary to remove the rear seat cushion and back assembly (Fig. 15). Refer to Part 41-14. Then, remove the seat belt and/or retractor bolt and remove the assembly.

Installation

1. Position the retractor assembly, install the attaching bolts and tighten to specification. The anchor tabs have to be positioned according to general specifications. Torque anchor bolts to 22-32 ft-lbs.

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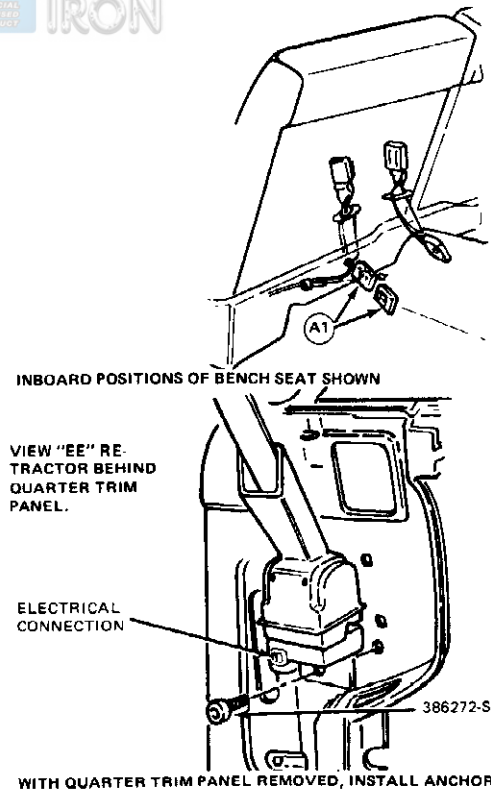


N4080-2B

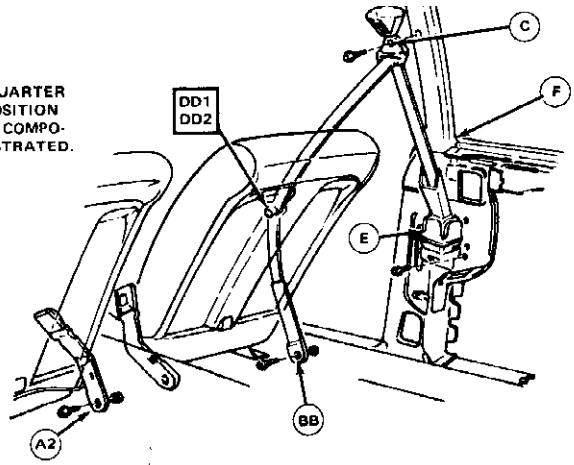
FIG. 11 Front Seat Belt Assembly—Versailles

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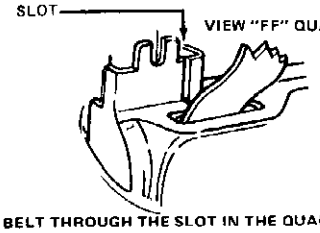
DETROIT IRON



REMOVE THE QUARTER TRIM PANEL. POSITION THE SEAT BELT COMPONENTS AS ILLUSTRATED.



BUCKET SEATS SHOWN, SHOULDER BELT ATTACHMENTS ARE THE SAME FOR BENCH SEAT. L.H. & R.H. SYMMETRICALLY OPPOSITE.



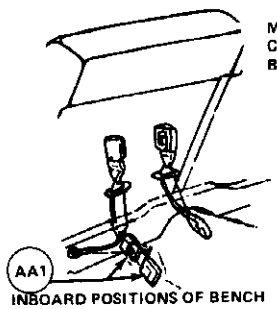
THREAD THE SHOULDER BELT THROUGH THE SLOT IN THE QUARTER TRIM PANEL. INSTALL THE TRIM PANEL. REFER TO SHOP MANUAL, VOL. 4, GROUP 41-14 THROUGH 20 AND 45-03. 1 THROUGH 14 FOR TRIM PANEL AND REAR SEAT REMOVAL AND INSTALLATION.

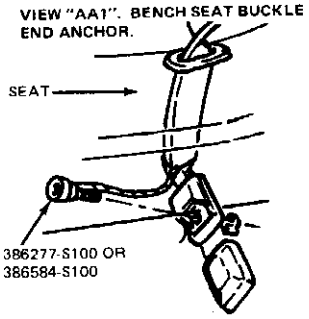
N4305-2A

FIG. 12 Front Seat Belt Assembly—Fairmont and Zephyr—2-Door Models

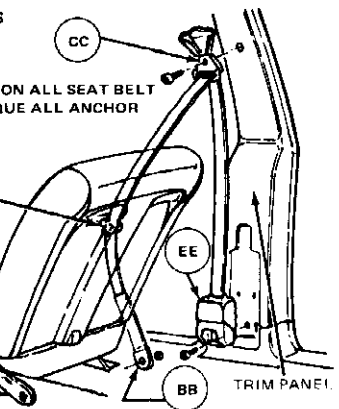
FRONT SEAT AND SHOULDER BELT INSTALLATION INSTRUCTIONS
CONTINUOUS LOOP SEAT BELT SYSTEM
FAIRMONT/ZEPHYR 4-DOOR – 1978

MOVE THE SEAT TO THE FORWARD POSITION FOR SEAT BELT INSTALLATION. POSITION ALL SEAT BELT COMPONENTS AS ILLUSTRATED AND INSTALL ALL SEAT BELT ANCHOR BOLTS. TORQUE ALL ANCHOR BOLTS 22 32 FOOT-POUNDS.



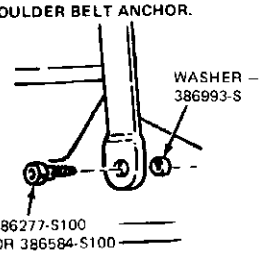


THREAD THE BUCKLE END ANCHOR THROUGH THE SEAT CAVITY. SLIP ½ THE BOOT OVER THE ANCHOR END AND INSTALL THE ANCHOR BOLT. SLIP THE BOOT ON. (L.H. ONLY, CONNECT BUZZER).



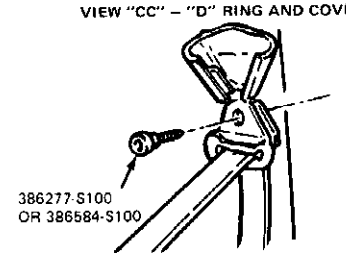
BUCKET SEATS SHOWN, SHOULDER BELT ATTACHMENTS ARE THE SAME FOR BENCH SEAT. L.H. AND R.H. SYMMETRICALLY OPPOSITE.

VIEW "AA2" AND "BB". OUTBOARD BUCKLE END ANCHOR FOR BUCKET SEATS AND SHOULDER BELT ANCHOR.



POSITION WASHER AND SEAT BELT ANCHOR. INSTALL ANCHOR BOLT.

VIEW "CC" – "D" RING AND COVER.



OPEN THE "D" RING COVER. SLIP IT BEHIND THE "D" RING AND INSTALL ANCHOR BOLT. SNAP COVER CLOSED.

N4306-2A

FIG. 13 Front Seat Belt Assembly—Fairmont and Zephyr—4-Door Models

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MAJOR SERVICE OPERATIONS

SEAT AND SHOULDER BELTS

The seat belts and shoulder belts are factory installed in their proper locations. If the belts are removed for any reason, they should be installed as shown in Figs. 3 through 16. Sealer should be placed around all seat belt anchor bolt holes in the floor pan. Tighten the anchor bolts to specification, shown at the end of this Part.

SEAT BELT WITH NO ANCHOR PLATE THREAD DAMAGE

1. Remove the damaged bolt for the anchor reinforcement and discard.
2. Install a new bolt with the same part number as indicated at the end of this Part and tighten to specification.

SEAT AND SHOULDER HARNESS BELT WITH DAMAGED ANCHOR PLATE THREADS

1. Remove the broken or stripped bolt and discard.
2. Drill out the internal threads in the seat belt anchor plate with a 27/64 inch drill. (Shoulder belt 13/32 inch drill.)
3. Re-thread the anchor plate with a 1/2-13 tap (seat belt).
4. Blow out the chips.
5. Install the attachment parts in the sequence shown in Figs. 3 through 16, whichever is applicable. Tighten the replacement bolt to specification, as shown at the end of this Part. Original parts are to be replaced with the repair parts indicated in the seat belt parts replacement charts at the end of this Part. Unless specified in the chart, use original parts.
6. When repairing a multiple belt and attachment, install nut (382599-S100) to the bolt in the tunnel area from the underside of the floor pan. Tighten to specification, shown at the end of this Part.

CLEANING

Seat and Shoulder Belt Webbing

Clean the belt webbing with any mild soap solution recommended for cleaning upholstery or carpets; follow instructions provided with soap. **Do not bleach or re-dye the webbing because it may weaken it.**

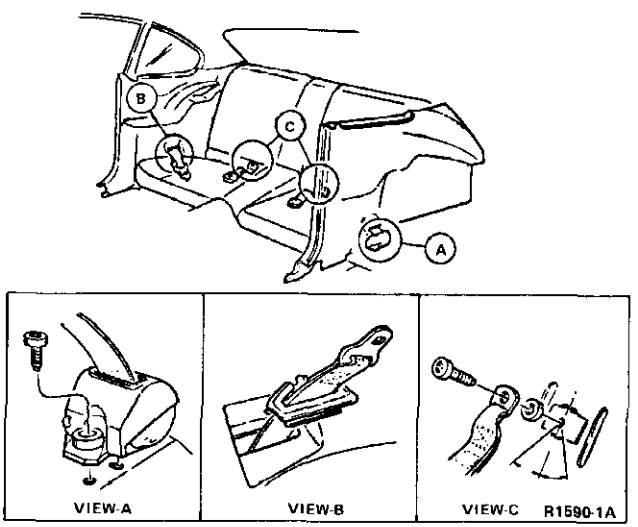
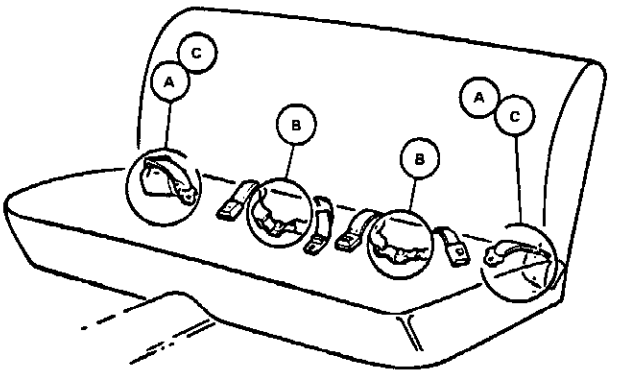
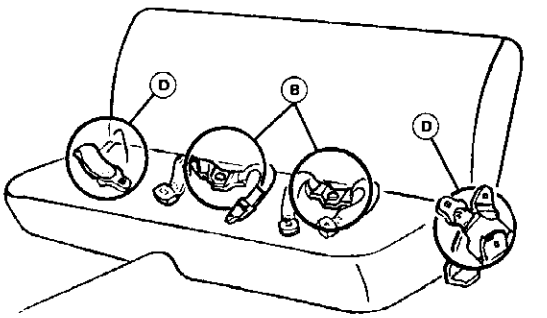


FIG. 14 Rear Seat Belt Assemblies—Mustang II, Pinto and Bobcat—2-Door Models

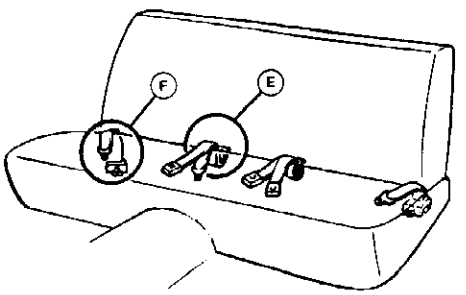
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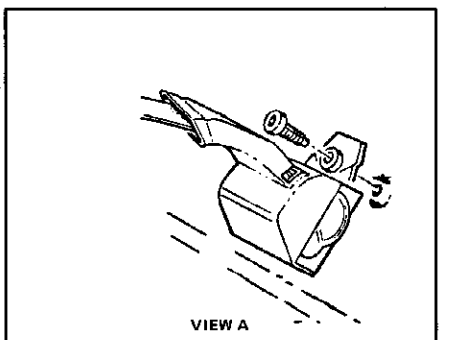
ALL SEDANS AND HARDTOPS
EXCEPT GRANADA AND MONARCH
FAIRMONT, ZEPHYR, AND VERSAILLES



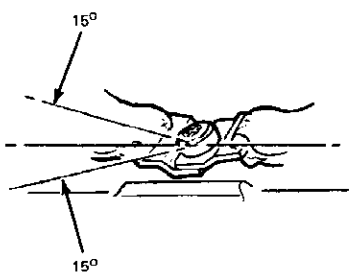
ALL STATION WAGONS EXCEPT PINTO,
BOBCAT, FAIRMONT AND ZEPHYR

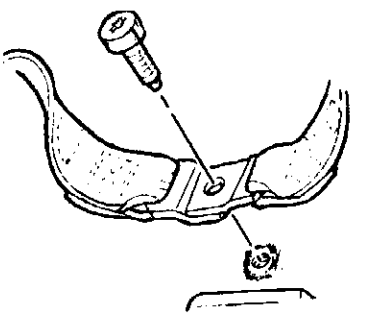


GRANADA, MONARCH, FAIRMONT,
ZEPHYR AND VERSAILLES

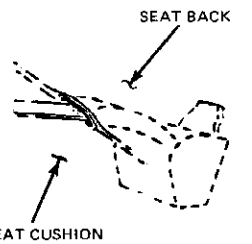


VIEW A

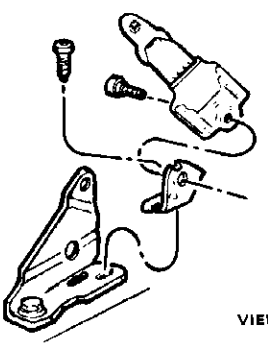




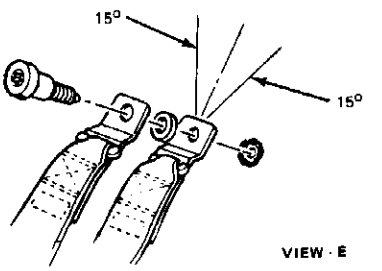
VIEW B



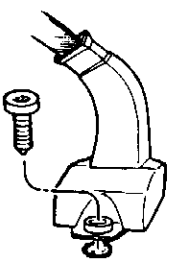
VIEW C



VIEW D



VIEW - E



VIEW - F

R1592-2C

FIG. 15 Rear Seat Belt Assemblies—Typical—Except Mustang II, Pinto and Bobcat

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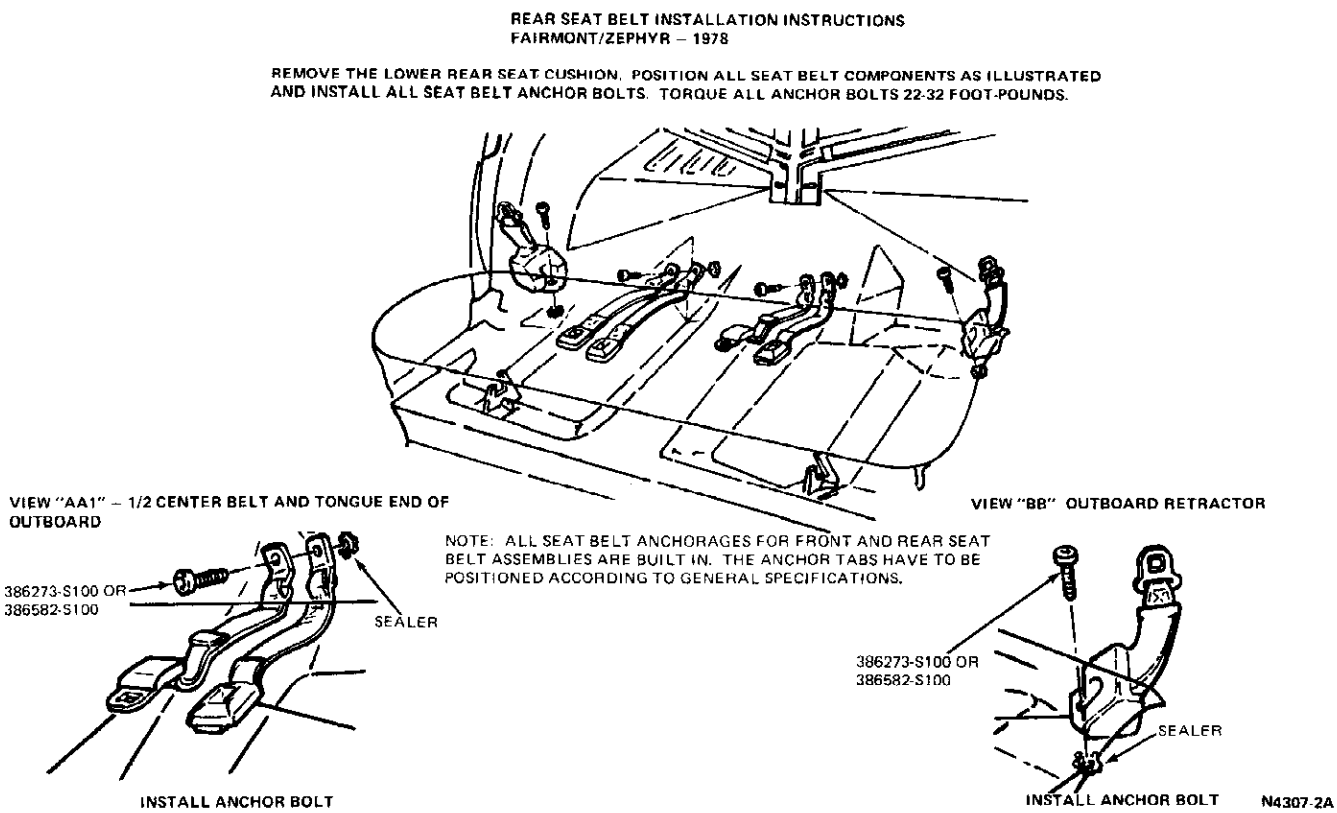


FIG. 16 Rear Seat Assembly—Fairmont and Zephyr (Except Wagon)

SPECIFICATIONS

PARTS REPLACEMENT CHART – SEAT AND SHOULDER BELT WITH DAMAGED WELD NUT ANCHOR PLATE THREADS

ORIGINAL PARTS – SEAT BELT			REPLACEMENT PARTS – SEAT BELT		
Part No.	① Code Letter	Part Name	Part No.	① Code Letter	Part Name
386273-S100	IA	Bolt – 7/16-20 x 1.38 Pan Head Tapping	383531-S36	X	Bolt – 1/2-13 x 1.38 Pan Locking
386274-S100	IB	Bolt – 7/16-20 x 1.75 Pan Head Tapping (.50 Shoulder)	383753-S36	Y	Bolt – 1/2-13 x 1.75 Pan Locking (.50 Shoulder
D2AB-65612A16-AA	–	Spacer – Serrated 1/2 x .30	382553-S100	–	Washer 9/16 Flat To Be Used With Repair of 386274-S100 Bolt Only When Required.
382629-S100	–	Washer – .463/.443 I.D. Plate (1.80 Dia. .190 Thick)	382522-S100	–	Washer – 1/2 Flat (1.30 Dia. .190 Thick)
382583-S100	–	Washer – 1/2 Serrated (.18 Thick)	382533-S100	–	Washer – 1/2 Flat (.25 Thick)
3862702-S100	IF	Bolt – 7/16-20 x .88 Pan Head Tapping	383437-S36	W	Bolt – 1/2 x 13 Pan Locking
386276-S100	IL	Bolt – 7/16-20 x 1.75 Pan Shoulder Tapping (.75 Shoulder)	383754-S36	Z	Bolt – 1/2-13 x 2.25 Pan Locking (.88 Shoulder)
386277-S100	IK	Bolt – 7/16-20 x 1.38 Pan Shoulder Tapping (.50 Shoulder)	385709-S36	T	Bolt – 1/2-13 x 1.38 Pan Head Shoulder Locking
REPLACEMENT PARTS – SHOULDER BELT			**ORIGINAL PARTS – SHOULDER BELT**		
Part No.	① Code Letter	Part Name	Part No.	① Code Letter	Part Name
386278-S100	ID	Bolt – 3/8-16 x 1.50 Pan Head Tapping	386274-S100	IC	Bolt – 7.16-20 x 1.75 Pan Head Tapping

① Identification letter on top of bolt head or face of spacer.
NOTE: Bolt torque must be maintained at 20-30 ft-lbs. Replacement parts – 22-32 ft-lbs.

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DETROIT IRON

Seat Trim

PART 41-60

SUBJECT	PAGE
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Back Cover – Bucket and/or Split Bench Front Seat	60-1
Back Cover – Rear Seat	60-2
Center Arm Rest – Front Seat	60-2
REMOVAL AND INSTALLATION (Cont'd.)	
Center Arm Rest Cover – Front Seat	60-2
Center Arm Rest Cover – Rear Seat	60-2
Cushion Cover – Bench Type Front Seat	60-1
Cushion Cover – Rear Seat	60-2
High Back Cover – Bucket Seat	60-1

CR2020-2B

GENERAL INFORMATION

The following seat trim removal and installation procedures generally apply to all car lines.

If some of the steps do not apply to the particular vehicle being serviced, proceed to the next step and review the appropriate illustrations shown. Unless otherwise noted, the illustrations shown in this section are **typical of all bucket, bench and split bench (front seat assemblies), arm rests (front and rear), and rear seat cushion and back assemblies.**

See appropriate Figs. 1 through 21. Seat trim replacement requires removal and installation of seat components such as seat tracks, seat assemblies and head restraints. Refer to the applicable Shop Manual Parts in Group 41 for these procedures.

REMOVAL AND INSTALLATION

BACK COVER-BUCKET AND/OR SPLIT BENCH FRONT SEAT

1. Tilt the seat back forward, remove the seat back pivot covers and remove the bolts and/or pins and retainers from the seat back assembly pivot arm.
2. Remove the seat back latch handle and escutcheon.
3. Remove the seat back assembly (lift outboard side and pull seat back out of inboard pin socket), and place on clean bench.
4. Remove the seat back trim robe panel, moulding and shields (retained by trim clips and/or tabs and screws) from the seat back (if so equipped).
5. Cut the hog rings and/or disengage the plastic retainers from the seat back frame assembly flange and remove the cover.
6. Transfer all bolster tie-down wires to their listings in the new cover assembly.
7. Install the cover assembly.
8. Install the hog rings that retain the cover or attach the plastic retainers to the frame assembly flange.
9. Install the seat back trim panel, shield and mouldings to the seat back assembly.
10. Install the seat back latch handle and escutcheon.
11. Position the seat back assembly to the seat cushion and install the retaining bolts, pins and retainers and the pivot covers.
12. Check the seat back latch operation to be sure that the seat back assembly holds in the locked position.

HIGH BACK COVER-BUCKET SEAT

To replace the Pinto/Bobcat high back cover (bucket seat), follow the procedures outlined for Back Cover Bucket and Split Bench in this Section and refer to the illustrations shown. The removal and installation procedures are typical.

CUSHION COVER-BENCH TYPE FRONT SEAT

Remove the seat and track assembly from the vehicle as outlined in the applicable seat section (Group 41). Remove the seat back from the cushion. To replace the cushion cover, follow the cushion cover removal and installation procedures under Rear Seat Cushion and

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Front Seat Arm Rest Removal and Installation in this Section. The procedures are typical.

BACK COVER-BENCH TYPE FRONT SEAT

Remove the seat and track assembly from the vehicle as outlined in the applicable seat section (Group 41). Remove the seat back from the cushion. To replace the seat back cover, follow the Seat Back Cover Removal and Installation procedures in this Section. The procedures are typical.

CENTER ARM REST-FRONT SEAT

The front seat center arm rest on the Lincoln Continental requires removal of the hog rings retaining the arm rest cover to the seat cushion assembly. Cut the hog rings from underneath the front seat cushion assembly. Then, lift the flap and remove the screw retaining the arm rest assembly to the seat cushion. Remove the arm rest assembly.

On the LTD II, Cougar, Thunderbird and Continental Mark V, remove the arm rest pivot covers to gain access to the bolts attaching the arm rest to the seat cushion assembly. Then, remove the two attaching bolts and remove the arm rest assembly.

On the Mercury remove front seat back from cushion and seat back shields to get at hog rings to remove arm rest. Then, remove the hog ring(s) retaining the flap assembly to gain access to the retaining nuts. Remove the four nuts retaining the back and strainer assembly to the seat back frame assembly and remove the arm rest.

CENTER ARM REST COVER-FRONT SEAT

Disengage the hog rings and the cover from the retainers (staples) on Lincoln Continental. Then, remove the arm rest cover.

The arm rest cover on the LTD II, Granada, Monarch, Fairmont, Versailles, Zephyr, Cougar, Ford, Mercury, Thunderbird and Continental Mark V, is retained with a zipper. Unzip the zipper and remove the arm rest cover assembly.

CUSHION COVER-REAR SEAT

1. Remove the rear seat cushion from the vehicle. See Group 41.
2. Disengage the button assemblies from their respective retainers and remove the buttons. **The retainers will be damaged upon removal and should be discarded.**
3. Cut the hog rings from the cushion cover and/or disengage the plastic retainers from the seat cushion flange and remove the cover.
4. Transfer all bolster tie-down wires to their respective listings in the new cover assembly.
5. Position the cover over the cushion assembly. Secure the plastic retainers to the seat flange assembly (if so equipped).
6. Install the necessary hog rings, buttons and (new) retainers and install the cushion assembly into the vehicle.

BACK COVER-REAR SEAT

1. Remove the rear seat cushion and rear seat back assembly from the vehicle, and remove the center arm rest (if so equipped) from the rear seat back as outlined in the removal procedure under Center Arm Rest Cover-Rear Seat.
2. Disengage the button assemblies from their respective retainers on the rear side of the seat back and remove the buttons.
3. With the front side down on a bench, cut the hog rings that retain the cover to the spring assembly and/or disengage the plastic retainers from the seat cushion flange assembly.
4. Remove the cover from the seat back assembly.
5. Transfer all bolster tie-down wires to their respective listings in the new cover assembly.
6. Position the cover over the cushion assembly.

   Position the plastic retainer(s) over the spring flange assembly.
7. Install the necessary hog rings, buttons and (new) retainers and install the rear arm rest to the seat back assembly (if so equipped).
8. Install the seat back and seat cushion into the vehicle.

CENTER ARM REST COVER-REAR SEAT

1. Remove the rear seat cushion and rear seat back assembly from the vehicle as outlined in Group 41.
2. Cut the retaining hog rings and remove the rear cover from the arm rest opening in the seat back.
3. Cut the hog rings that attach the arm rest flap to the rear seat back.
4. Remove the four bolts that attach the arm rest link and vertical strainer assembly to the rear seat back and remove the arm rest assembly.
5. Remove the flap-to-arm rest staples, the cover-to-arm rest staples and slip the cover off the pad and base assembly.
6. Slip the new cover over the pad and base assembly and install the arm rest staples and hog rings.
7. Assemble the center arm rest to the rear seat back and install the four vertical strainer-to-seat back attaching screws.
8. Fasten the arm rest flap to the rear seat back with hog rings.
9. Install the rear seat back assembly and the rear seat cushion in the vehicle.

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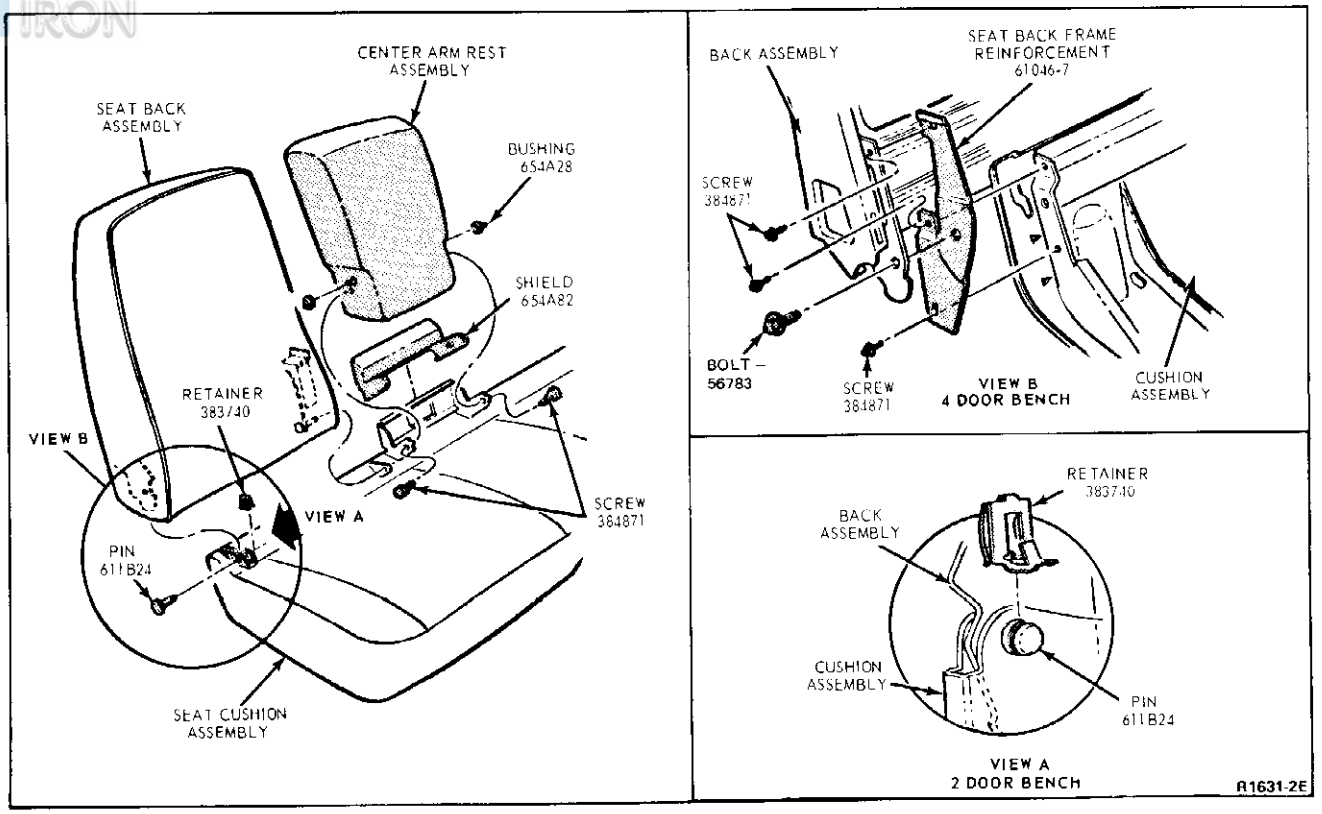


FIG. 1 Front Seat Back and Center Arm Rest—Split Bench—Thunderbird, Continental Mark V, LTD II and Cougar

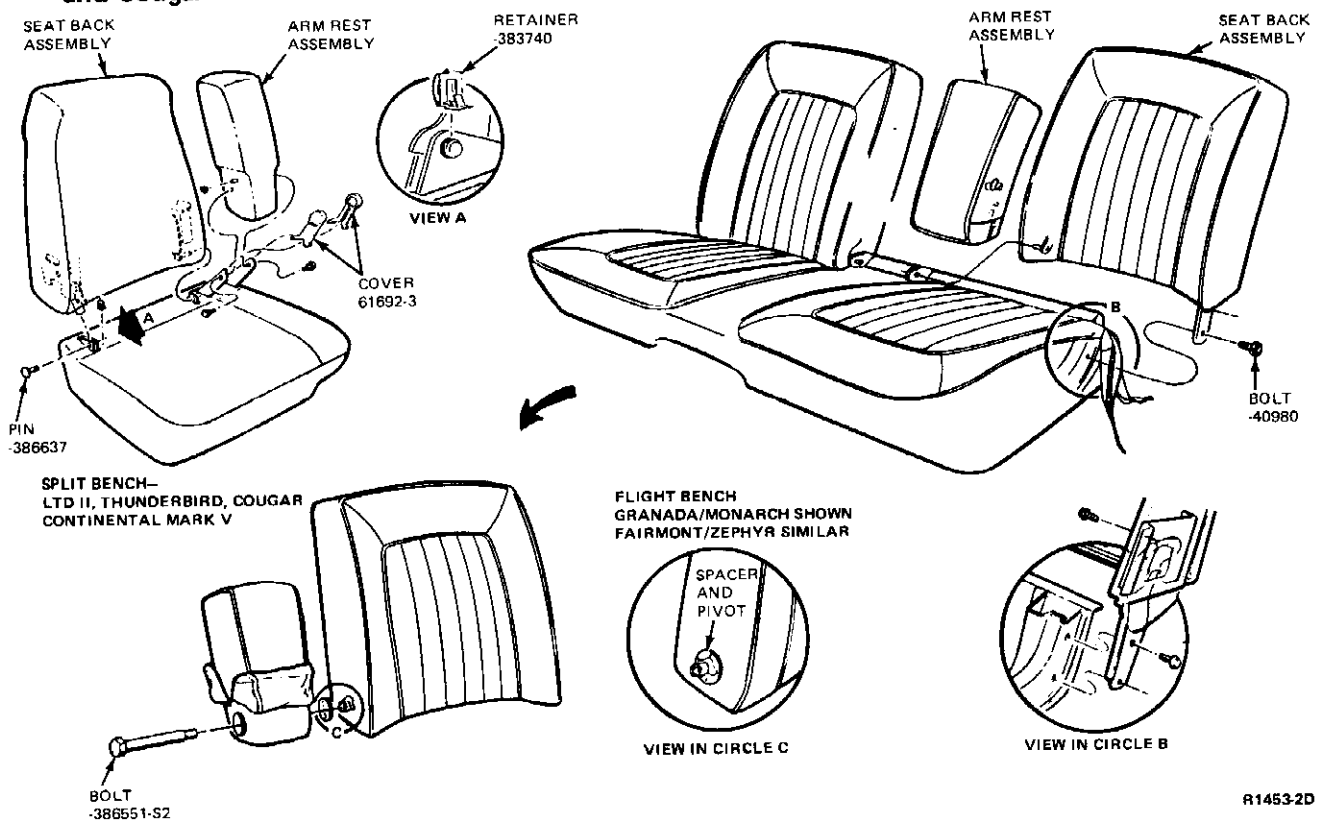


FIG. 2 Front Seat Back and Center Arm Rest—Split Bench—Thunderbird, Continental Mark V, LTD II and Cougar

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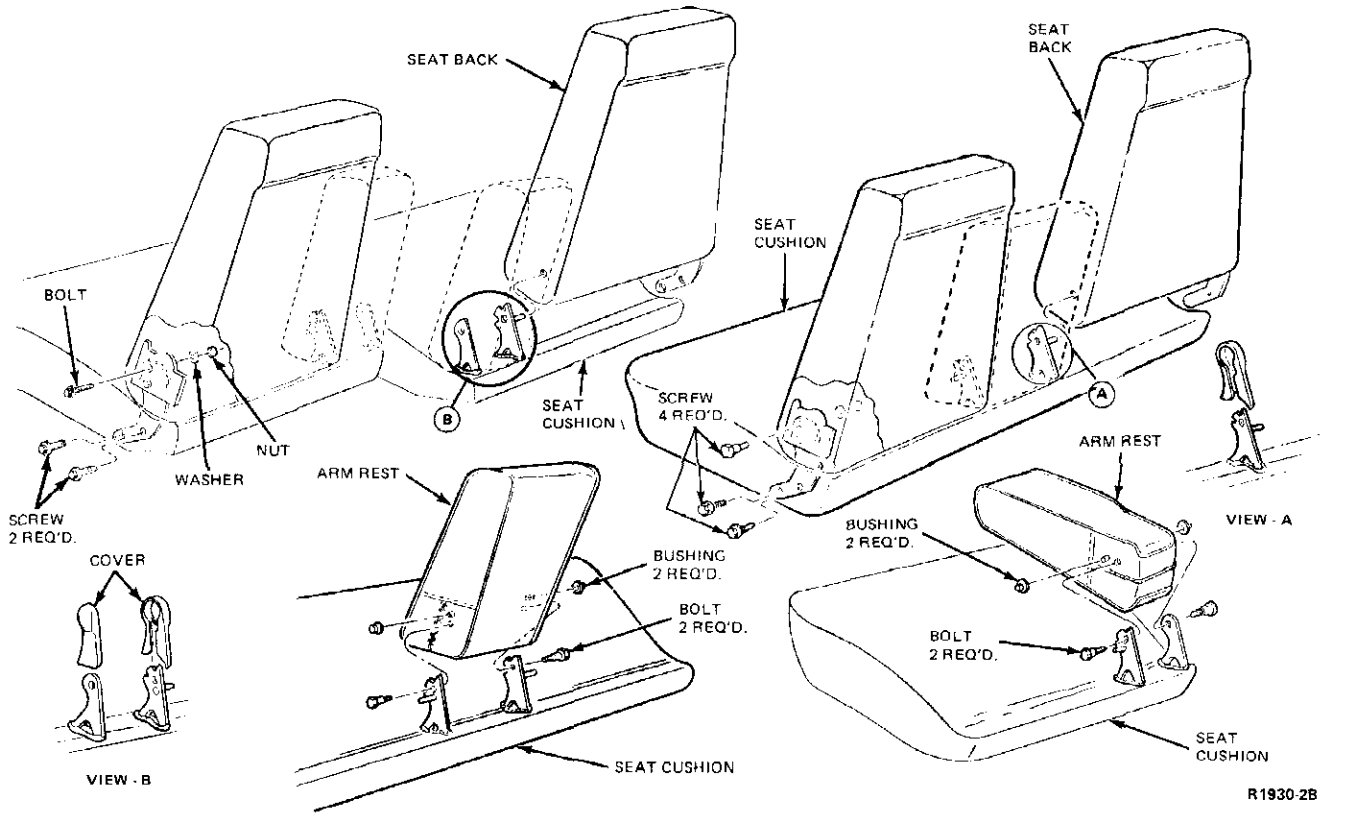


FIG. 3 Front Seat Back and Center Arm Rest—Flight-Bench and Split-Bench—Ford and Mercury

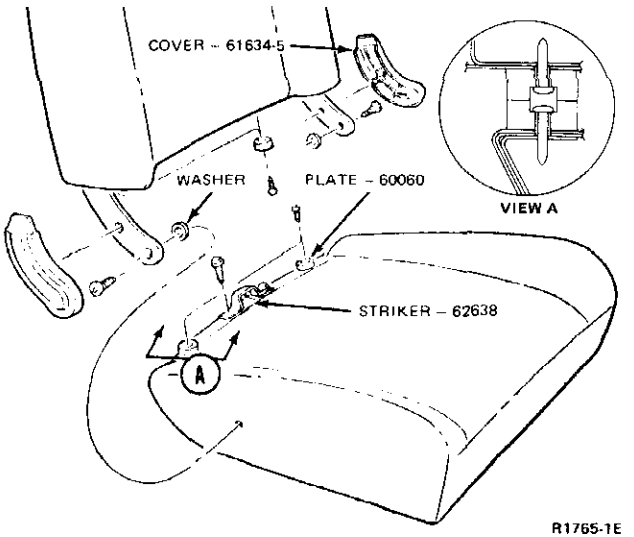


FIG. 4 Front Seat Back and Cushion Assembly—Pinto, Bobcat and Mustang II

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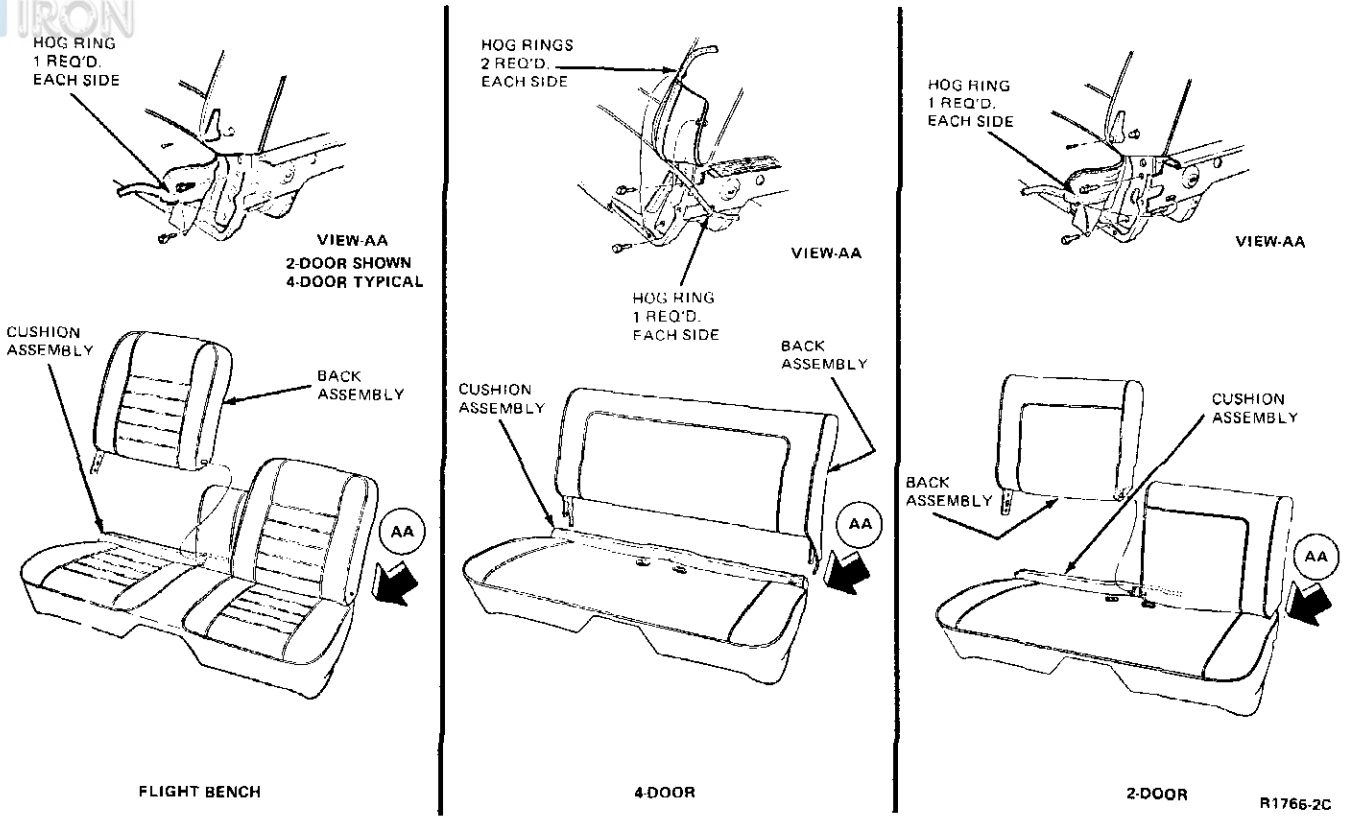


FIG. 5 Front Seat Back-to-Cushion —Fairmont and Zephyr

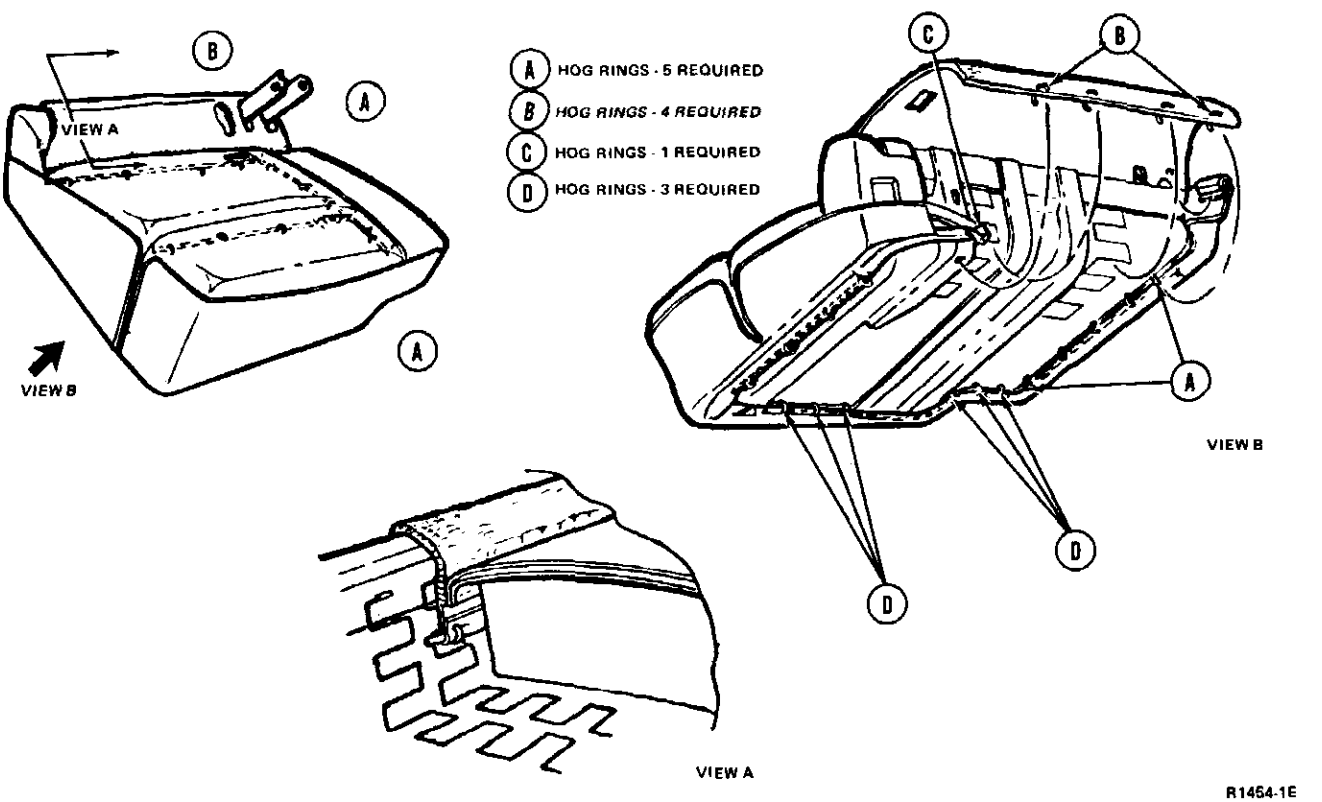


FIG. 6 Front Seat Cushion Cover Installation—Split Bench—Thunderbird and Continental Mark V Shown—Typical

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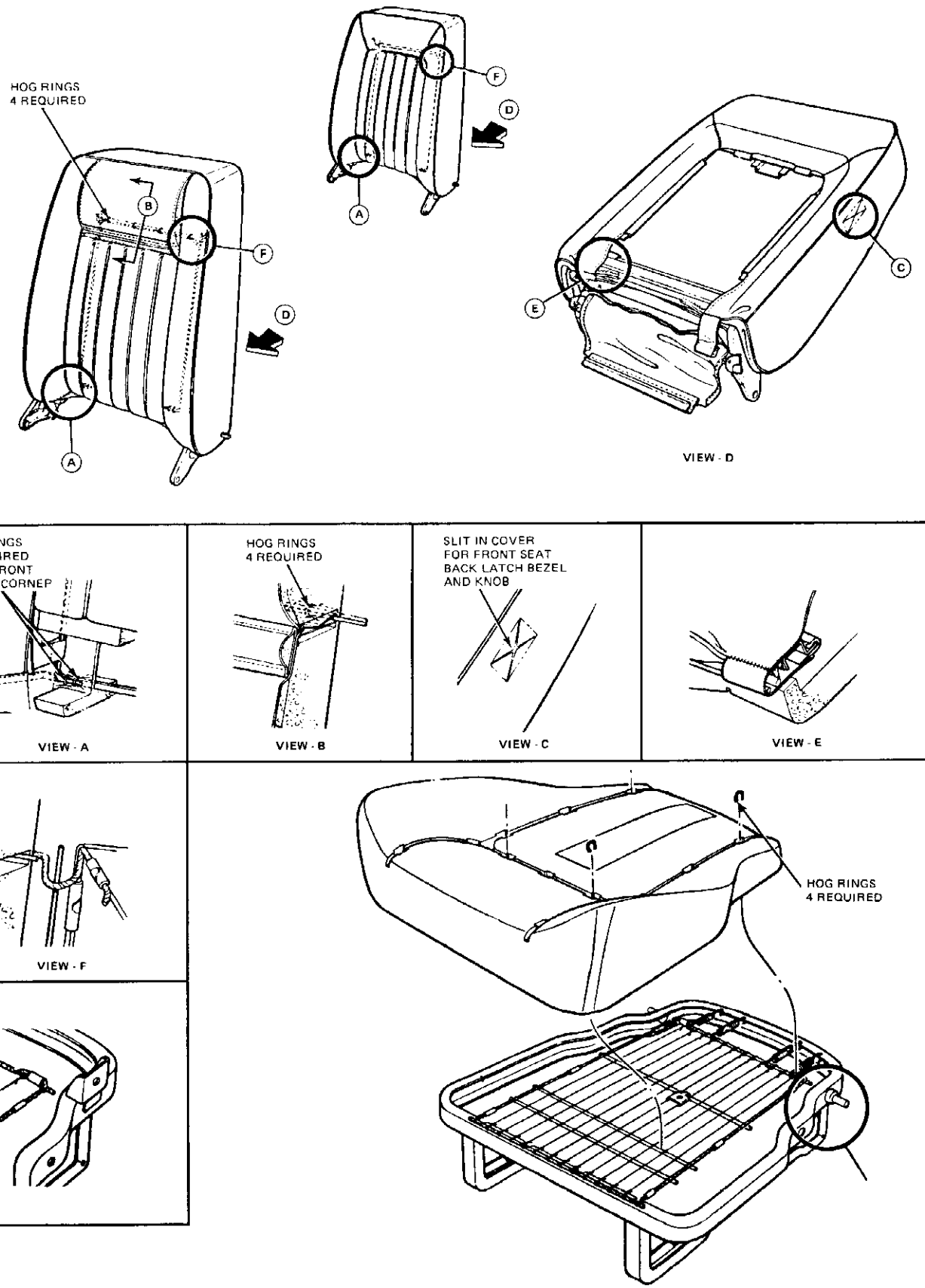


FIG. 7 Front Bucket Seat Cushion and Seat Back Installation—Fairmont, Zephyr, Granada, Monarch and Versailles—Typical

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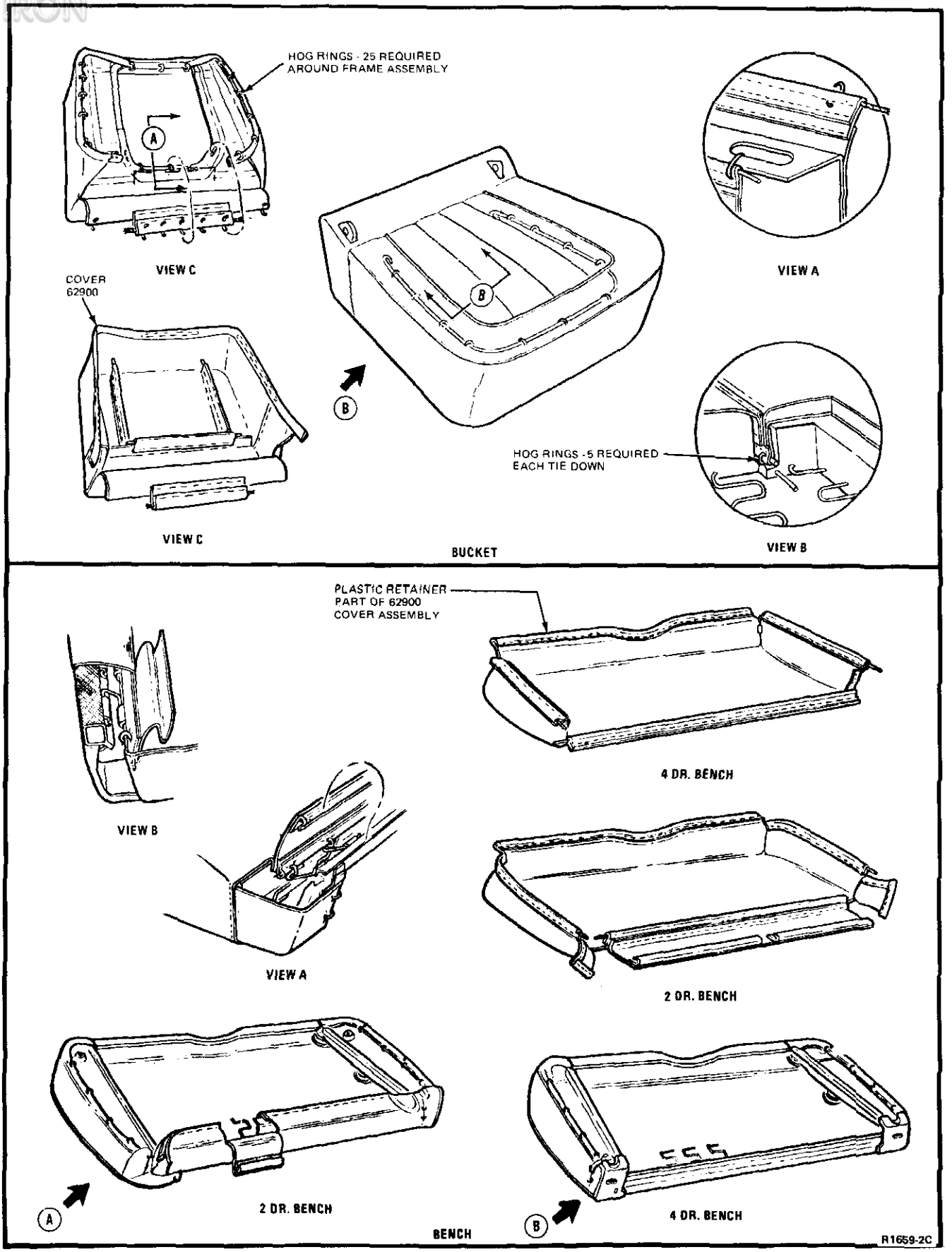
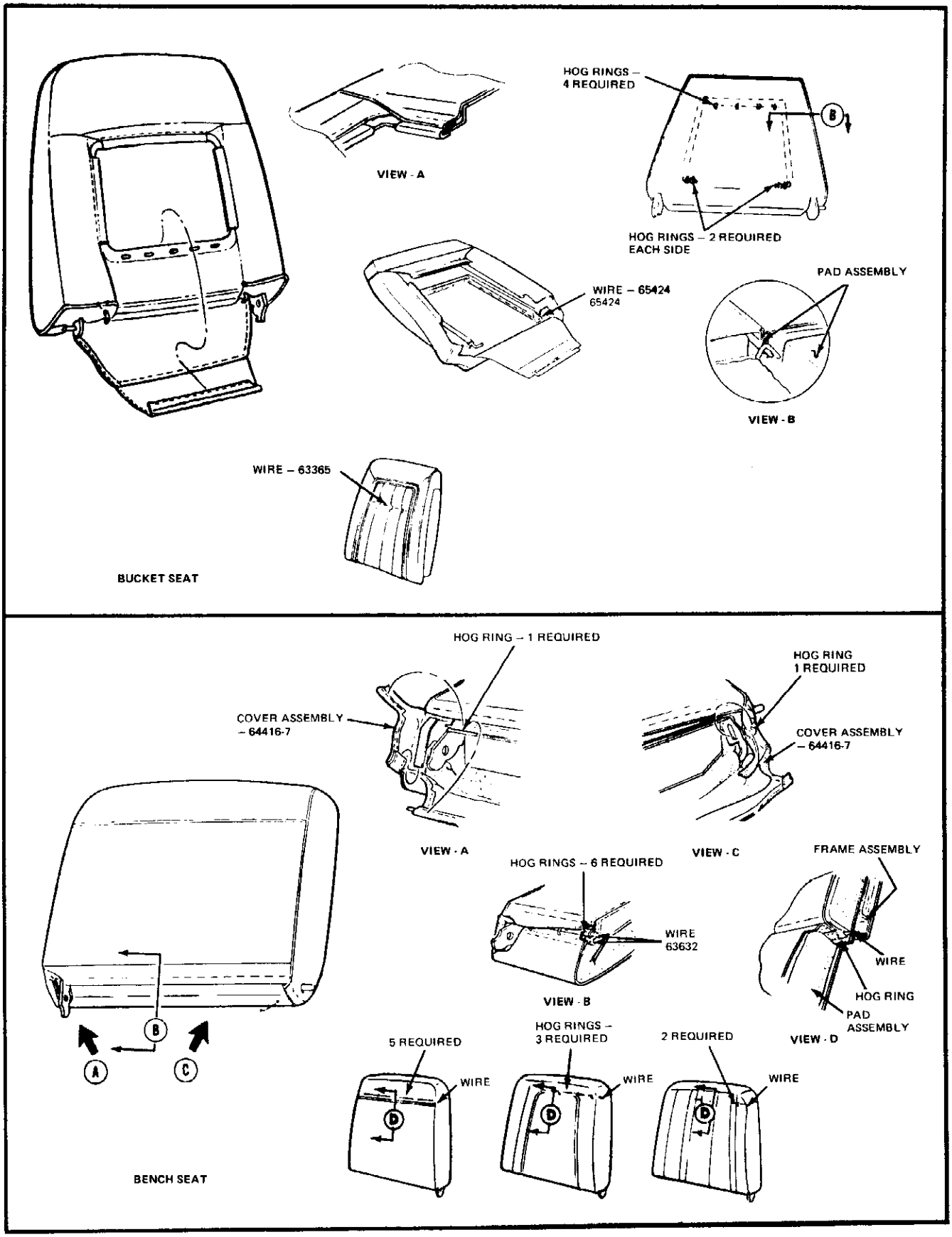


FIG. 8. Front Seat Cushion Cover Installation—Bucket and Bench Seat—LTD II, Thunderbird and Cougar—Typical

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FIG. 9 Front Seat Back Cover Installation—Bench and Bucket—LTD II, Thunderbird and Cougar

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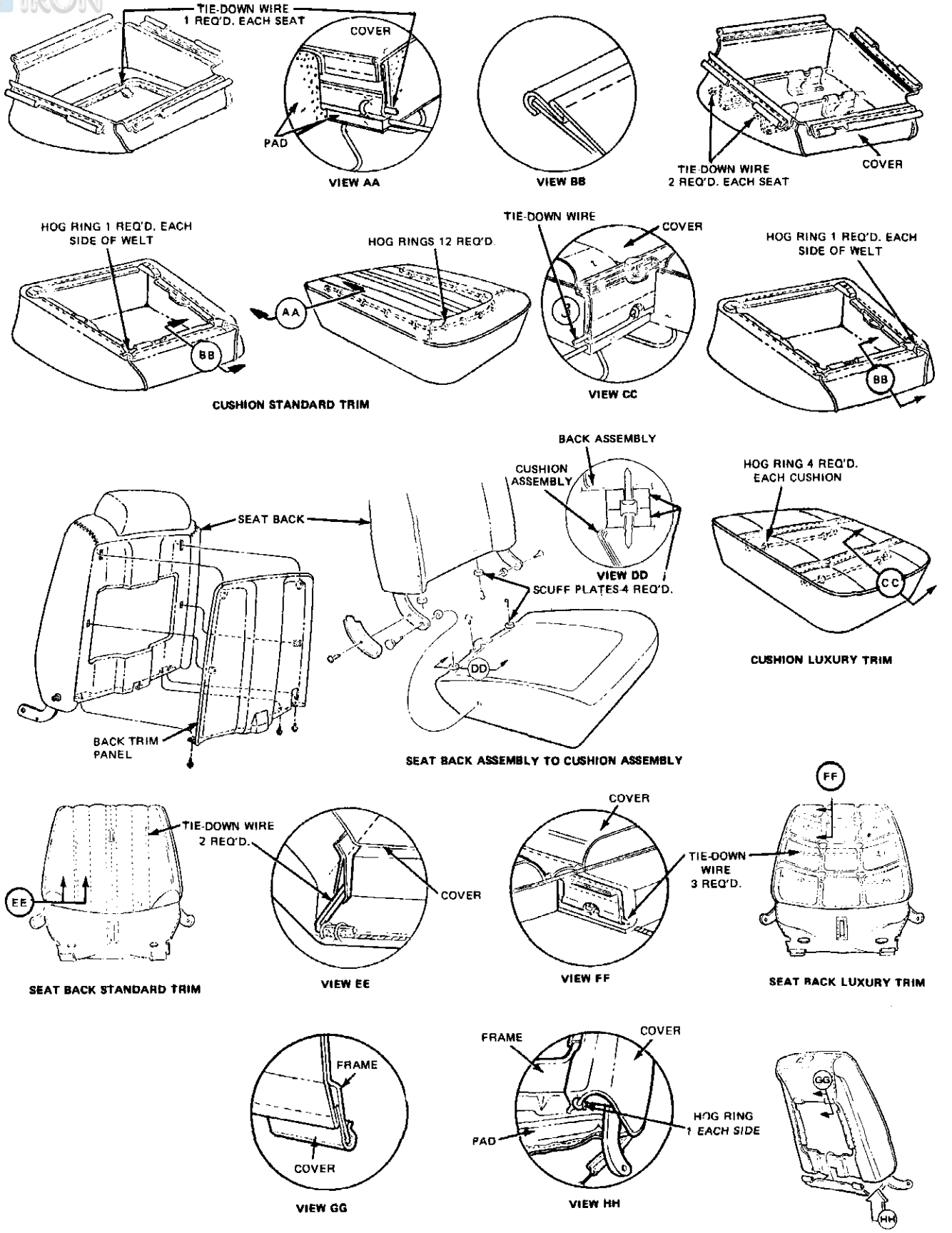


FIG. 10 Front Seat Assembly—Mustang II, Bobcat and Pinto

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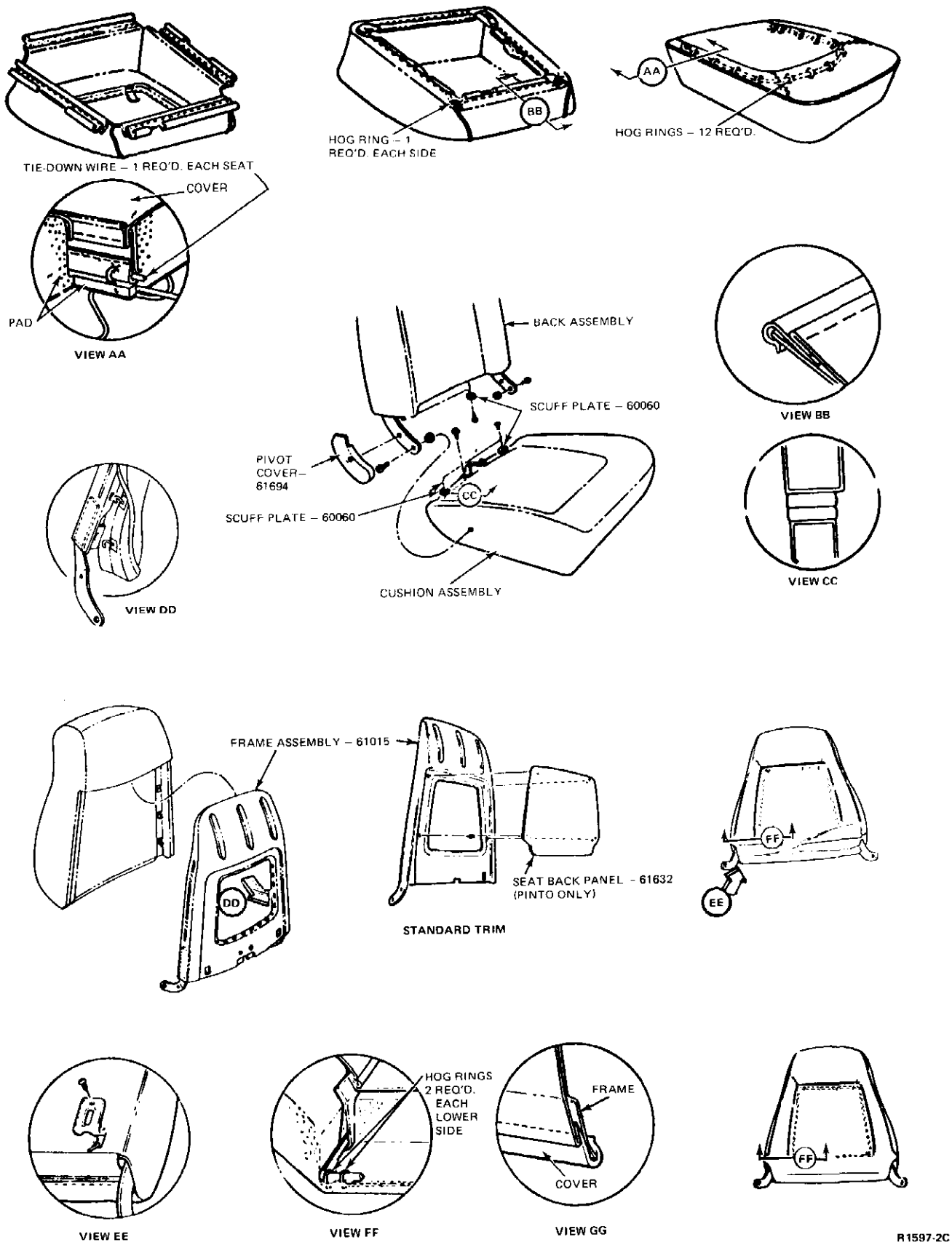
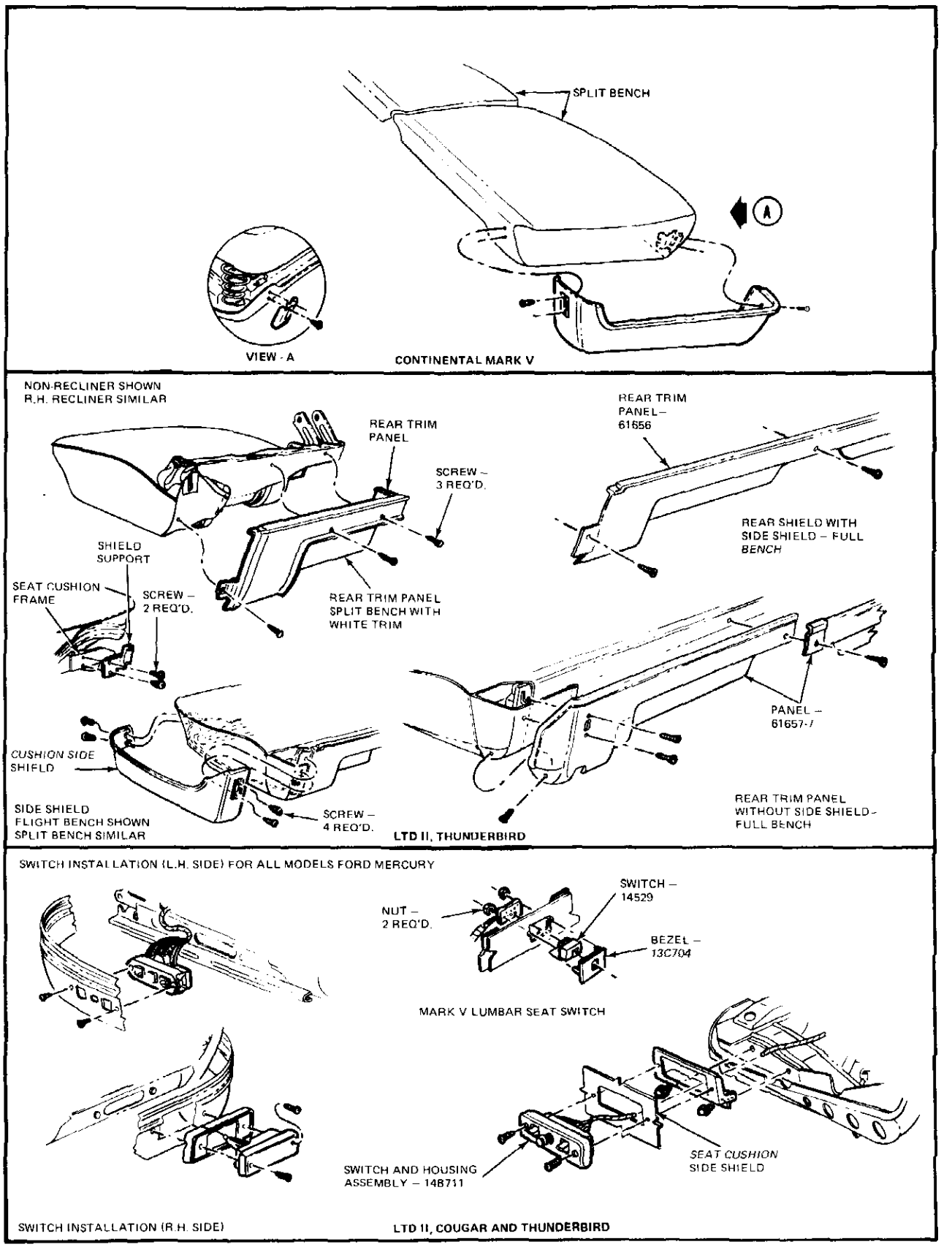


FIG. 11 Front Seat Assembly—Pinto and Bobcat

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R1455-2J

FIG. 12 Seat Shields—LTD II, Cougar, Ford, Mercury, Thunderbird and Continental Mark V

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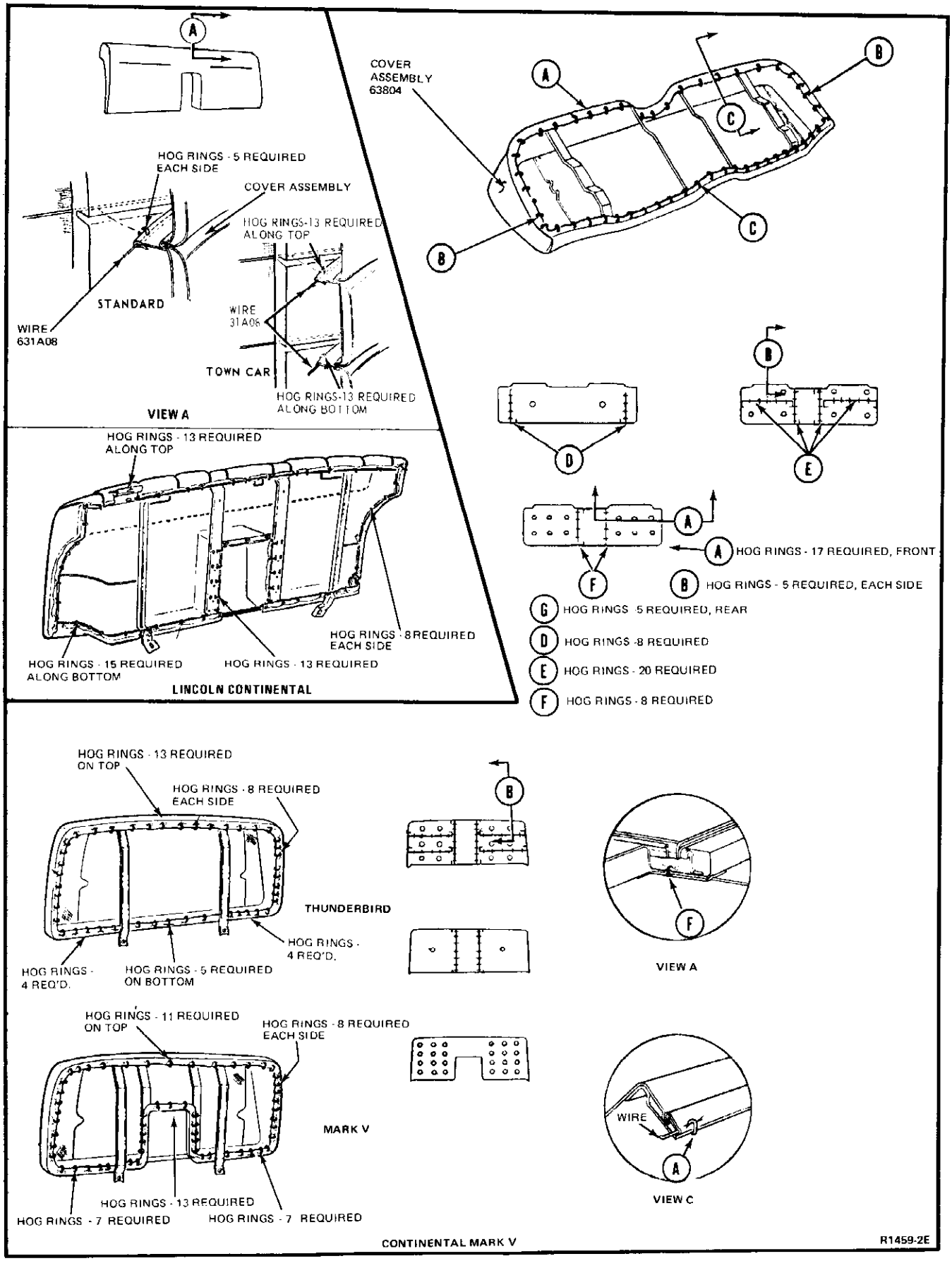


FIG. 13 Rear Seat Cover Installation—Lincoln Continental and Continental Mark V

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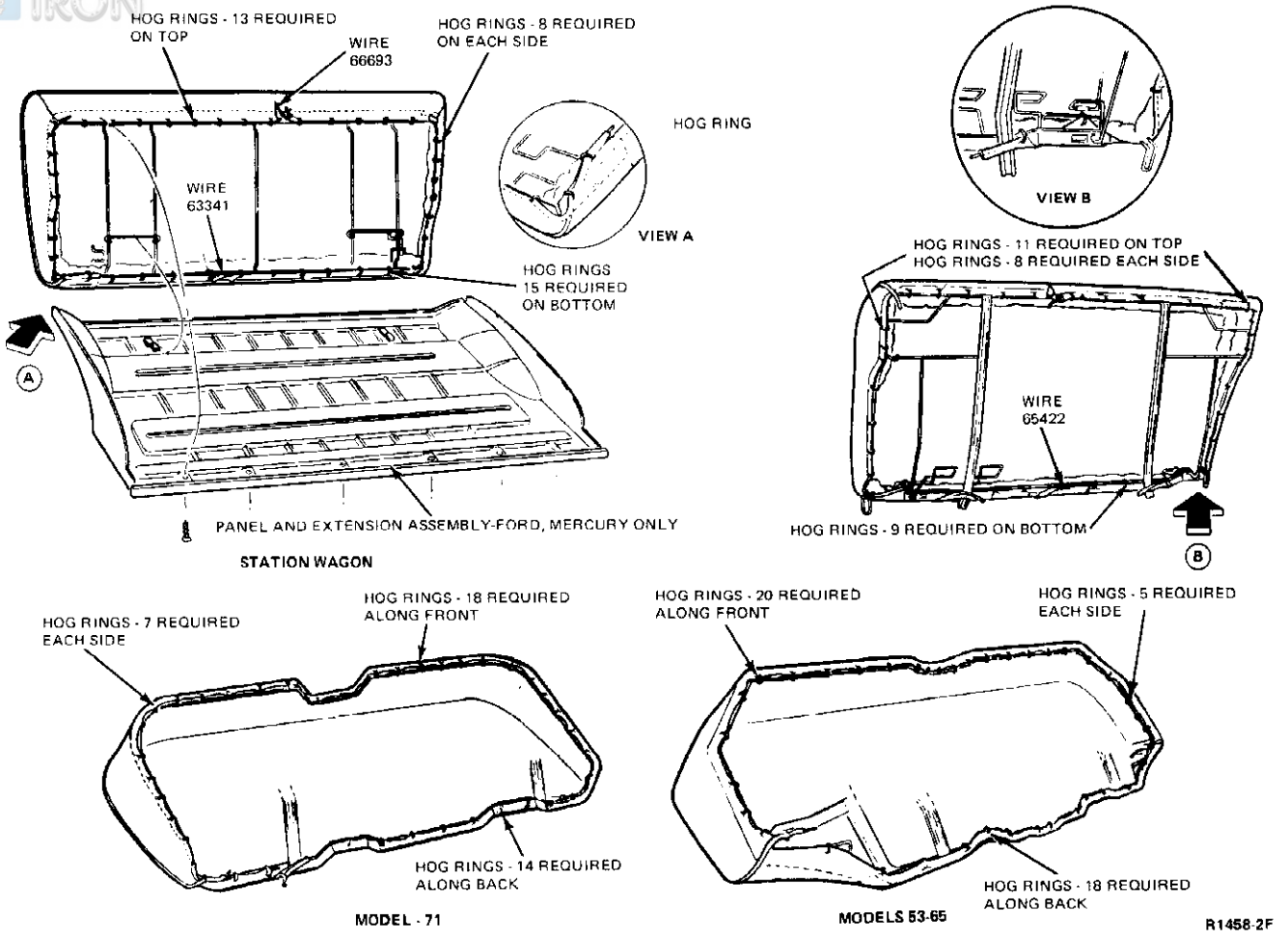
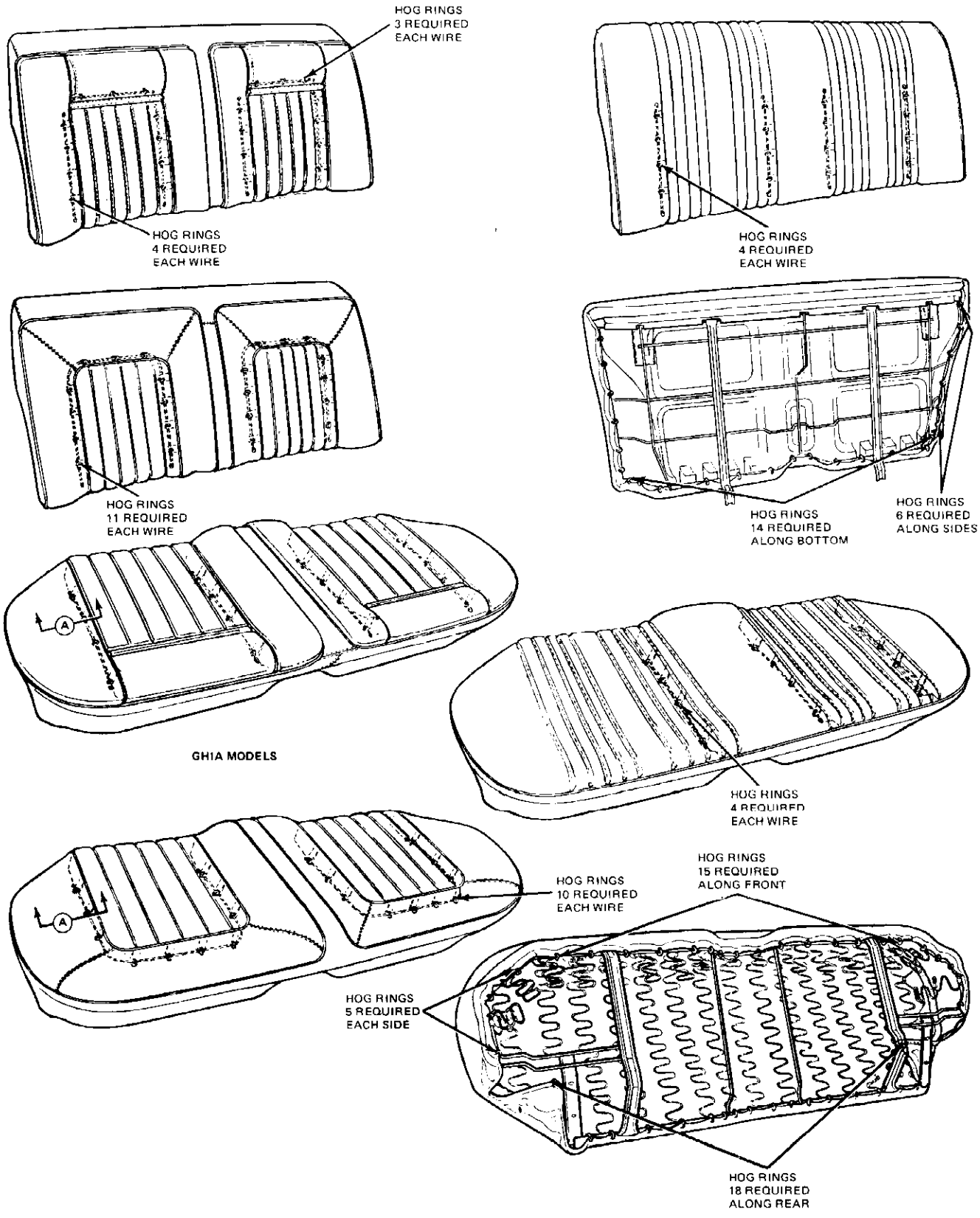


FIG. 14 Rear Seat Cover Installation

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FIG. 15 Rear Seat Cushion and Seat Back Cover Installation—Granada, Monarch and Versailles

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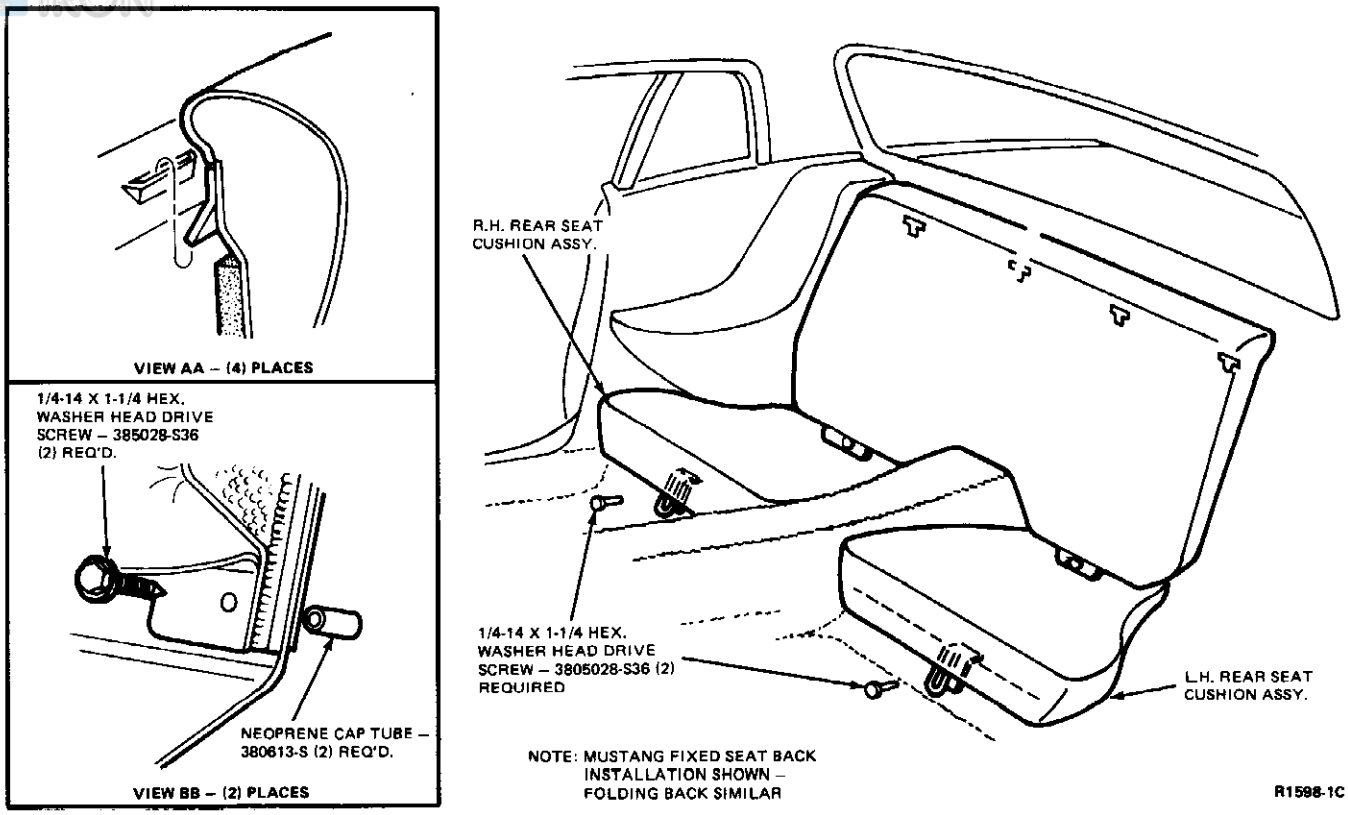


FIG. 16 Rear Seat Cushion Cover Installation—Mustang II, Bobcat and Pinto—Typical

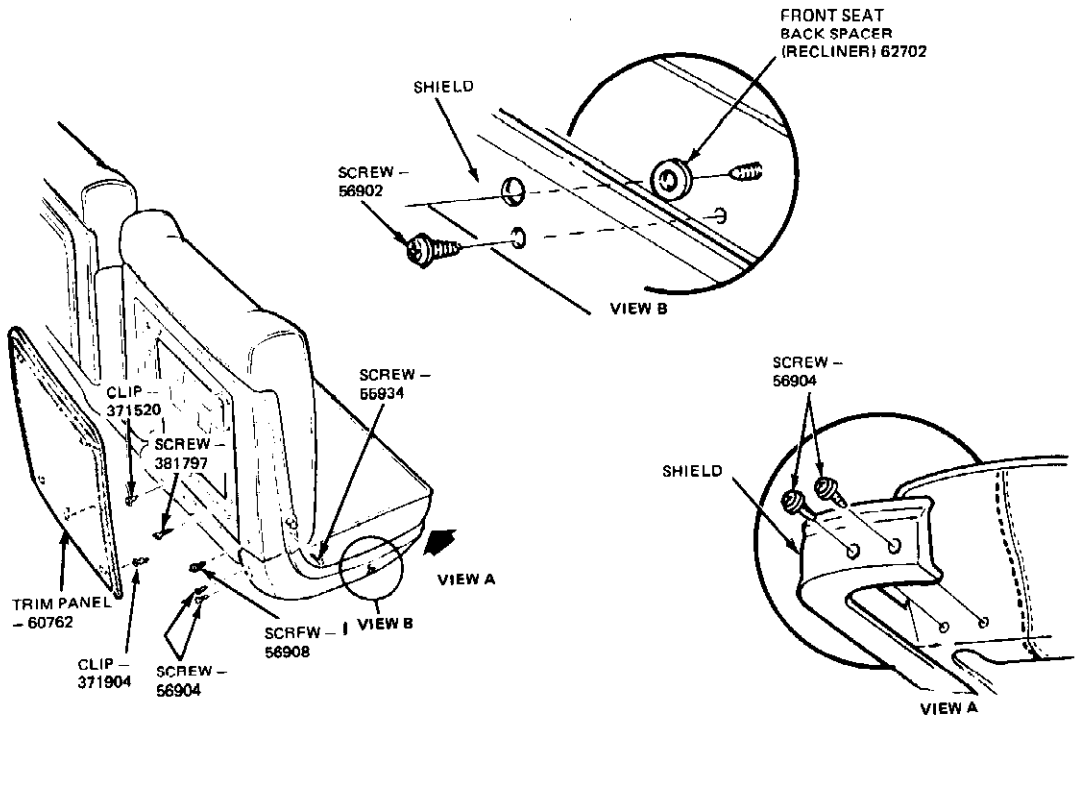


FIG. 17 Front Seat Back—Trim Panel Installation—Typical

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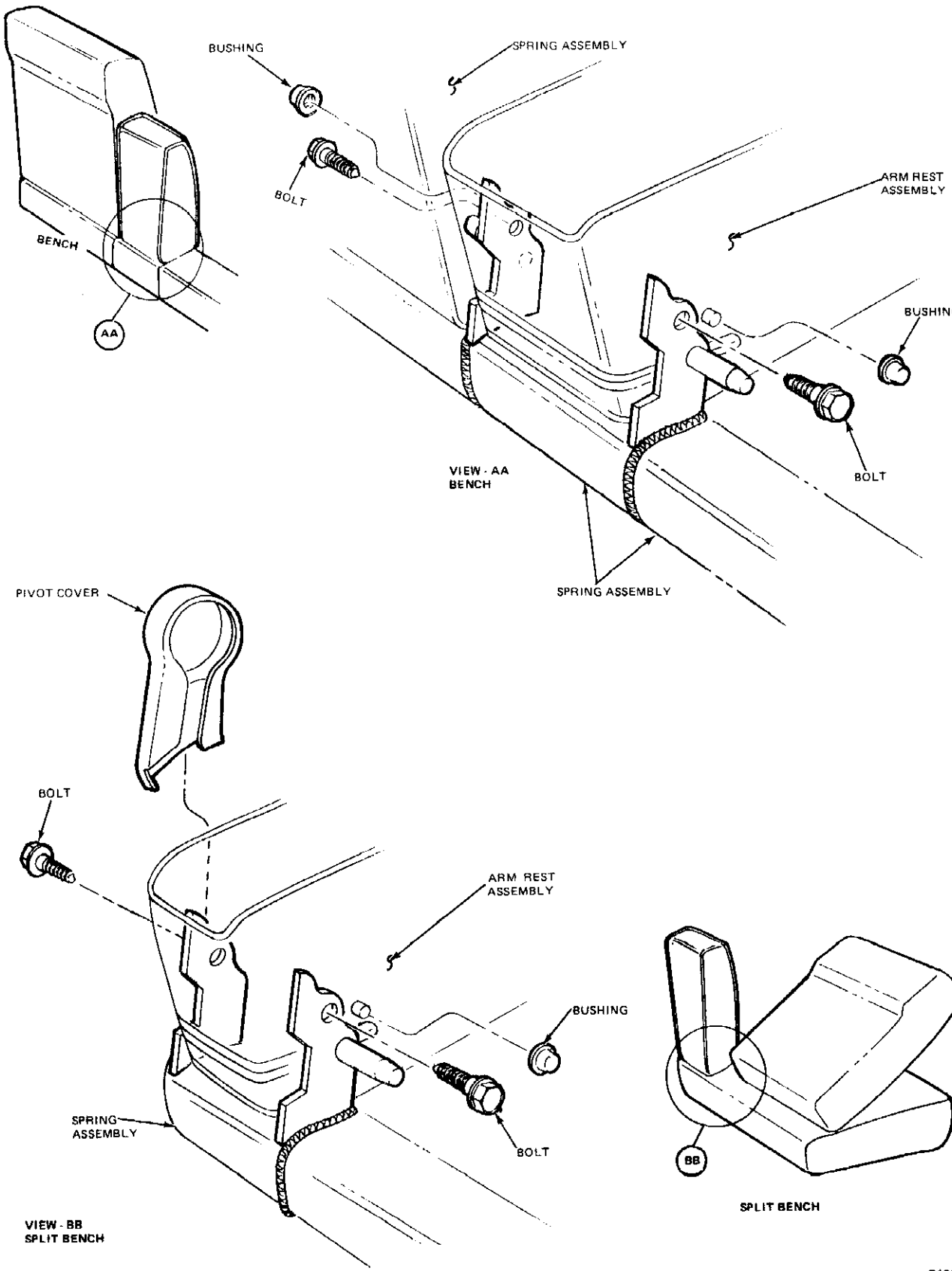


FIG. 18 Front Seat Arm Rest Installation—Lincoln Continental

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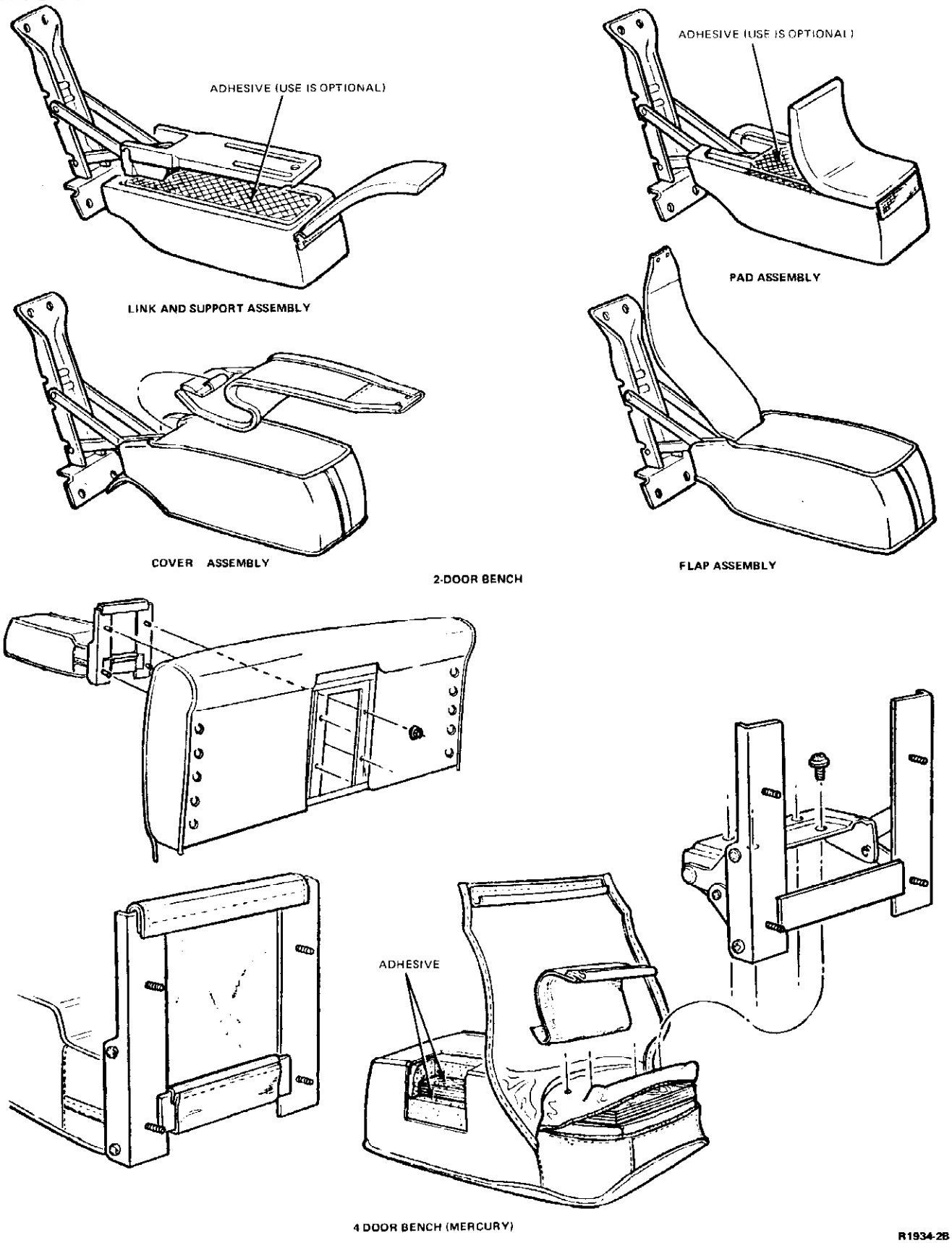


FIG. 19 Front Seat Center Arm Rest Installation—Ford and Mercury

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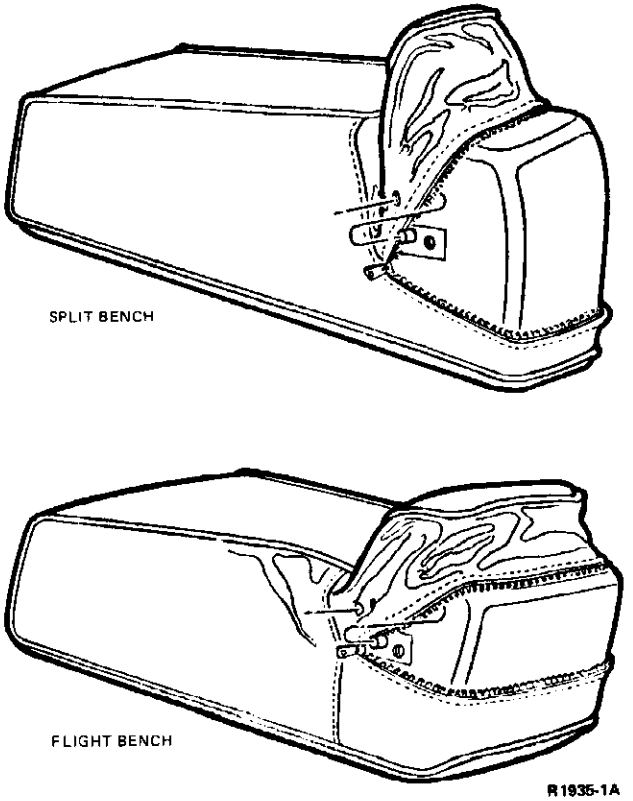


FIG. 20 Front Seat Center Arm Rest Cover Installation—LTD II, Cougar, Lincoln, Ford, Thunderbird and Continental Mark V

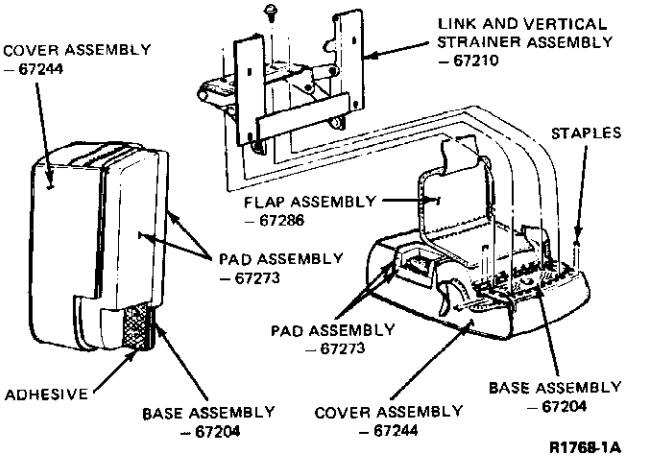


FIG. 21 Rear Seat Center Arm Rest Installation—Lincoln Continental Shown—Typical

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DETROIT IRON

WINDOW GLASS AND MECHANISMS

GROUP 42

PART TITLE	PART NO.
Dual U-Run Front Door Window Mechanism	42-03
Mini-Vent Window Mechanism	42-08
Pivot Type Quarter Window	42-33
Single Tubular Run Front Door Window Mechanism	42-07
Single Tubular Run Rear Door Window Mechanism	42-24
Stationary Quarter Window Glass	42-38
Tailgate Window Glass and Mechanism – Dual Action Gate	42-41
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Window Glass and Mechanisms General Service

PART 42-01

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GENERAL INFORMATION

The door window mechanism should be well lubricated to provide ease of operation. The window glass mechanism should be lubricated whenever the glass channel or window regulator is removed or excessive effort is required to operate the windows. To lubricate a door window mechanism, apply an even coating of Polyethylene grease (19584) or equivalent to the window regulator rollers, shafts and the entire length of the roller guides as illustrated by the shaded areas in Fig. 1.

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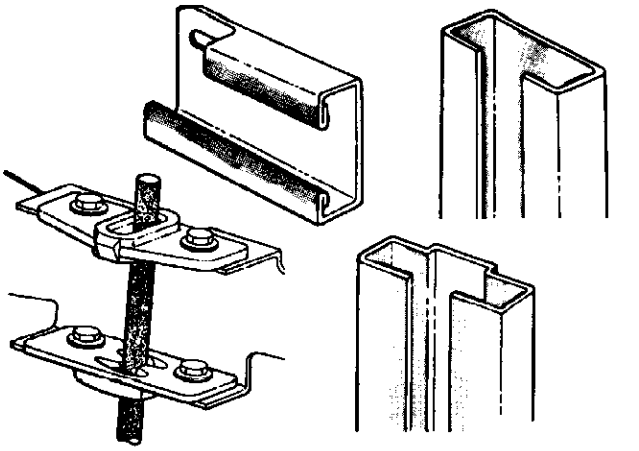


FIG. 1 Window Mechanism Lubrication Points

TESTING

POWER WINDOW MOTOR TEST—PERMANENT MAGNET TYPE

To test the current draw of a power window motor, remove the motor and drive assembly from the vehicle. Refer to the specific part of Group 42 for the removal procedure.

Test Procedure

1. Connect an external power source (power-pac or a fully charged battery) to the motor with an ammeter in series as shown in Fig. 2.

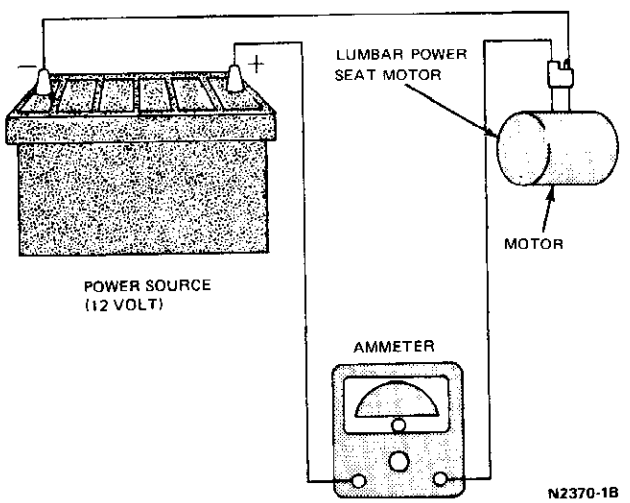


FIG. 2 Power Window Motor Current Draw Test—Permanent Magnet Motor

2. Operate the motor and observe the current draw. The current draw for the no-load test should not exceed specification (at end of this part) and should not fluctuate. Reversal of the motor wire connections will reverse the direction of motor rotation. Replace the motor if the current draw exceeds specification.

POWER WINDOW SWITCH TESTS

MASTER SWITCH—WITH REAR DOOR WINDOWS

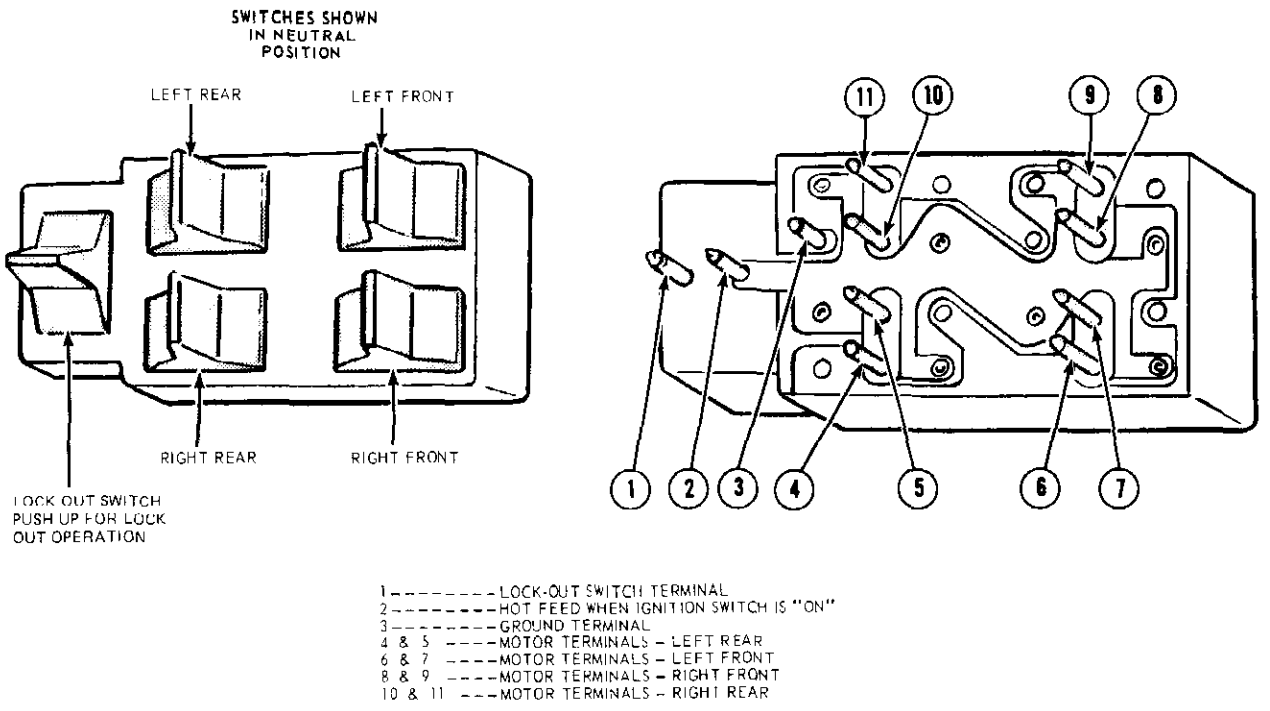
Testing of the power window master switch should be performed with the switch removed from the vehicle. Use a self-powered test light or an ohmmeter.

Test Procedure

1. Clip one test lead probe on pin No. 3 (Fig. 3) which is grounded.
2. With all switches in the neutral position, pins No. 4 through 11 should have continuity to pin No. 3.
3. Push any one or all four window switches forward (toward front of car when in installed position). All odd numbered pins of the switch(es) pushed forward should loose continuity to pin No. 3.
4. Push any or all four window switches rearward (toward rear of car when in installed position). All even numbered pins (4 through 11) of the switch(es) pushed rearward should loose continuity to pin No. 3.
5. Remove the test lead from pin No. 3 and connect it to pin No. 2 (hot feed pin). With all switches in the neutral position, only pin No. 1 should have continuity to pin No. 2.
6. Push any one or all four switches forward and hold in that position. All odd numbered pins of switches pushed forward should have continuity to pin No. 2.
7. Pull any one or all four switches rearward and hold in that position. All even numbered pins of switches pulled rearward should have continuity to pin No. 2.
8. If any one switch does not test as stated, replace the complete switch assembly.

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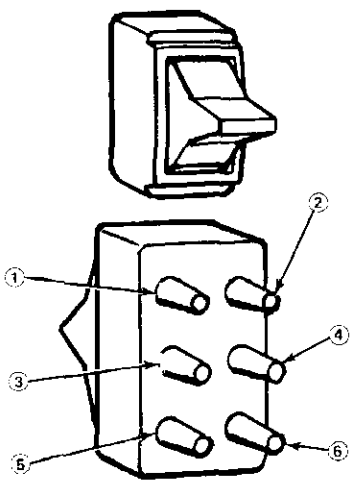
FIG. 3 Power Window Master Switch Pin Connections and Locations—4 Door Models—Lincoln, Ford, Mercury, LTD II, Cougar, Granada, Monarch and Versailles

Single Switch—All Models With Power Windows

The Thunderbird, LTD II and Cougar 2-door models use two of the single switches as a master switch instead of the multiple master switch. They should be tested in the same way as the standard single switch.

Test Procedure

1. Use a self-powered test light or an ohmmeter, to test the power window switch.
2. With the switch in the neutral position, there should be continuity between terminals 1 and 3, 2 and 5, and 4 and 6. (Fig. 4).
3. With the switch toggle pushed downward, there should be continuity between terminals 2, 4 and 5, and 1 and 3. Terminal 6 should be disconnected from any other terminal.
4. With the toggle switch pushed upward, there should be continuity between terminals 2, 3 and 5, and 4 and 6. Terminal 1 should be disconnected from any other terminal.
5. If the switch does not test as stated, replace the switch.



SINGLE POWER WINDOW SWITCH TEST

1. POWER FEED, OR GROUND FROM DRIVERS SWITCH (ALLOWS OPERATION OF INDIVIDUAL WINDOWS FROM L.F. DOOR)
2. HOT FEED FOR SINGLE SWITCH (BUS BAR TO PIN NO. 5)
3. MOTOR TERMINAL – UP
4. MOTOR TERMINAL – DOWN
5. HOT FEED
6. *POWER FEED, OR GROUND FROM DRIVERS* SWITCH (ALLOWS OPERATION OF INDIVIDUAL WINDOWS FROM L.F. DOOR)

N2468-1C

FIG. 4 Power Window Single Switch Pin Locations—All Models

MASTER SWITCH—WITHOUT QUARTER WINDOWS

The quarter window switches were deleted from the rear seat area and from the left front multiple switch and housing—Lincoln Continental, Thunderbird, Continental Mark V and Mercury. Refer to Fig. 7 for test procedures.

The Granada, Monarch and Versailles door switches are shown in Fig. 8 and the test procedures are shown in Figs. 3 and 4.

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REMOVAL AND INSTALLATION

POWER WINDOW RELAY

THUNDERBIRD, LTD II AND COUGAR

Removal

1. Disconnect the ground cable from the battery.
2. Remove one screw attaching the relay to the left-hand cowl, behind the trim panel.
3. Disconnect the wires from the relay and remove the relay.

Installation

1. Connect the wires to the relay.
2. Position the relay to the L.H. cowl on LTD II and Cougar and install the one attaching screw.
3. Connect the battery ground cable, and check the operation of the power window.

GRANADA, MONARCH AND VERSAILLES

1. Disconnect the battery ground cable and locate the relay on the R.H. end panel.
2. Disconnect the connector from the relay and remove the retaining screw. Remove the relay.
3. Install the relay to the R.H. end panel and connect the multiple connector.
4. Connect the battery ground cable.

FORD AND MERCURY

1. Disconnect the battery ground cable and locate the relay at the #1 crossmember, under the driver's seat.
2. Disconnect the connector from the relay and remove the retaining screws. Remove the relay.
3. Install the relay to the No. 1 crossmember and connect the multiple connector.
4. Connect the battery ground cable.

LINCOLN CONTINENTAL

1. Locate the relay on the headlamp switch cover.
2. Disconnect the multiple connector and remove the relay retaining screws. Remove the relay.
3. Install the relay on the head lamp switch cover and connect the multiple connector.

POWER WINDOW SWITCH

Ford, Mercury, Lincoln Continental and Continental Mark V

1. Remove the screw from the front end of the bezel and lift the bezel and switch away from the arm rest (Fig. 5).
2. Remove the bezel and nut from the mirror remote control (left front door only).
3. Remove two nuts (screws for Mark V and Lincoln) from the bezel studs and separate the switch(es) from the bezel.
4. Pull the switch from the switch connector.
5. Position the switch to the connector and press together firmly.
6. Position the switch(es) to the bezel and install the two retaining (screws for Mark V and Lincoln) nuts.
7. Install the bezel and nut on the outside mirror remote control.
8. Position the switch and bezel to the arm rest and install the retaining screw.

LTD II, Thunderbird, Granada, Monarch, Versailles and Cougar

1. Remove the switch bezel retaining screw from the bottom side of the switch. Then, pivot the lower edge of the bezel out and up to remove the bezel.
2. The switch is held in place by the electrical contact pins. To remove the switch, carefully pry the switch from the connector with a small screwdriver.
3. Position the switch to the connector and press firmly into place.
4. Install the bezel on the switch and install the bezel retaining screw.
5. Install the switch in the vehicle.

POWER WINDOW SWITCH CONNECTOR WIRE REMOVAL

If replacement of the switch connector or a wire leading to the connector is necessary, the wire(s) can be removed from the connector without disassembling the connector.

To remove a wire from the connector, insert a needle-like tool in the edge of the pin hole (Fig. 6), and bend the terminal in. Then, pull the wire and terminal from the connector. To install the terminal in the connector, open the terminal and insert it into the wire hole.

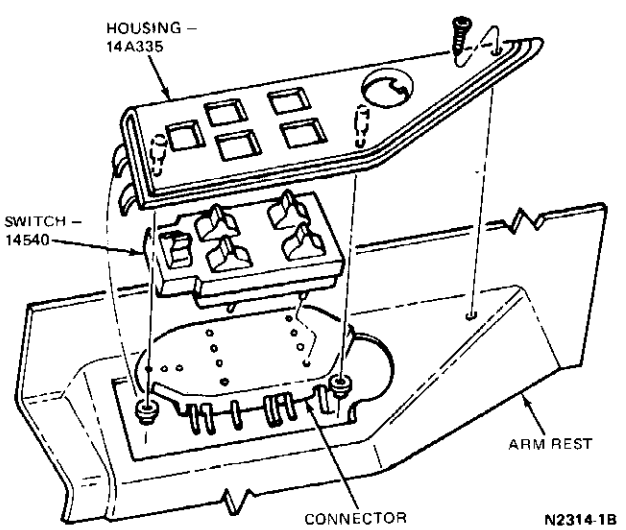


FIG. 5 Typical Arm Rest Mounted Power Window Switch Installation—Ford and Mercury

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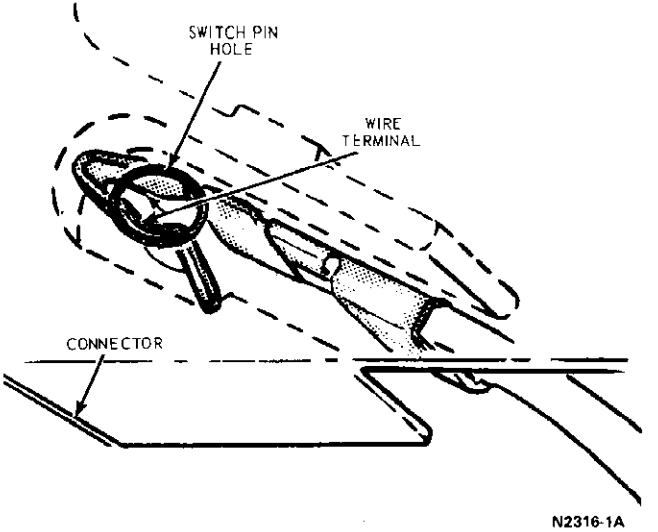
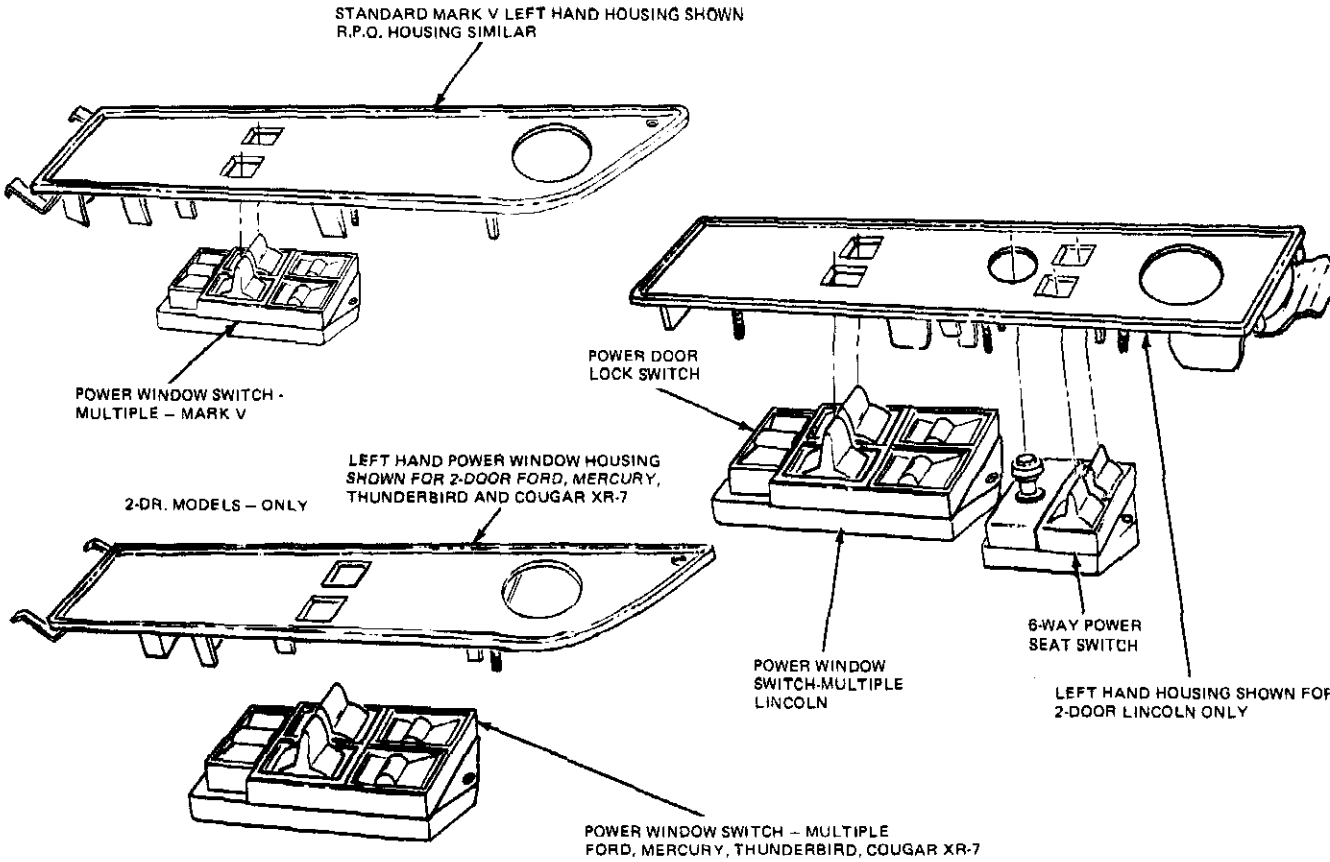
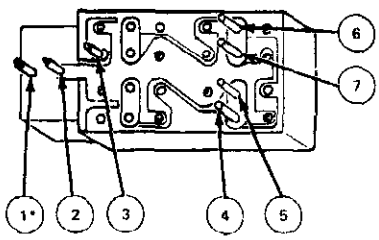


FIG. 6 Power Window Switch Connector Wire Terminal Removal

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MULTIPLE POWER WINDOW SWITCH TEST – *THUNDERBIRD AND LINCOLN CONTINENTAL*



CONNECT ONE SIDE OF AN OHMMETER OR TEST LIGHT TO TERMINAL #2 (BATTERY TERMINAL)

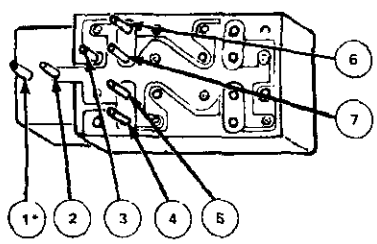
WINDOW SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
NEUTRAL	#2 ONLY
BOTH SWITCHES FORWARD	#2 & 5-7
BOTH SWITCHES REARWARD	#2 & 4-6

CONNECT ONE SIDE OF AN OHMMETER OR TEST LIGHT TO TERMINAL #3 (GROUND TERMINAL)

WINDOW SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
NEUTRAL	#3 & 4-5-6-7
BOTH SWITCHES FORWARD	#3 & 4-6
BOTH SWITCHES REARWARD	#3 & 5-7

*THE LOCKOUT SWITCH WILL HAVE CONTINUITY BETWEEN TERMINALS #1 AND #2 WHEN THE SWITCH IS IN THE CENTER POSITIONS.

MULTIPLE POWER WINDOW SWITCH TEST – FORD AND MERCURY



CONNECT ONE SIDE OF AN OHMMETER OR TEST LIGHT TO TERMINAL #2 (BATTERY TERMINAL)

WINDOW SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
NEUTRAL	#2 ONLY
BOTH SWITCHES FORWARD	#2 & 5-7
BOTH SWITCHES REARWARD	#2 & 4-6

CONNECT ONE SIDE OF AN OHMMETER OR TEST LIGHT TO TERMINAL #3 (GROUND TERMINAL)

WINDOW SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
NEUTRAL	#3 & 4-5-6-7
BOTH SWITCHES FORWARD	#3 & 4-6
BOTH SWITCHES REARWARD	#3 & 5-7

*TERMINAL #1 REMAINS IN THE MULTIPLE SWITCH ASSEMBLY BUT IS NOT ELECTRICALLY CONNECTED (DO NOT TEST FOR CONTINUITY).

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FIG. 7 Power Window Master Switch Pin Connections and Locations Thunderbird, Lincoln Continental, Continental Mark V, Ford, Mercury and Cougar XR7

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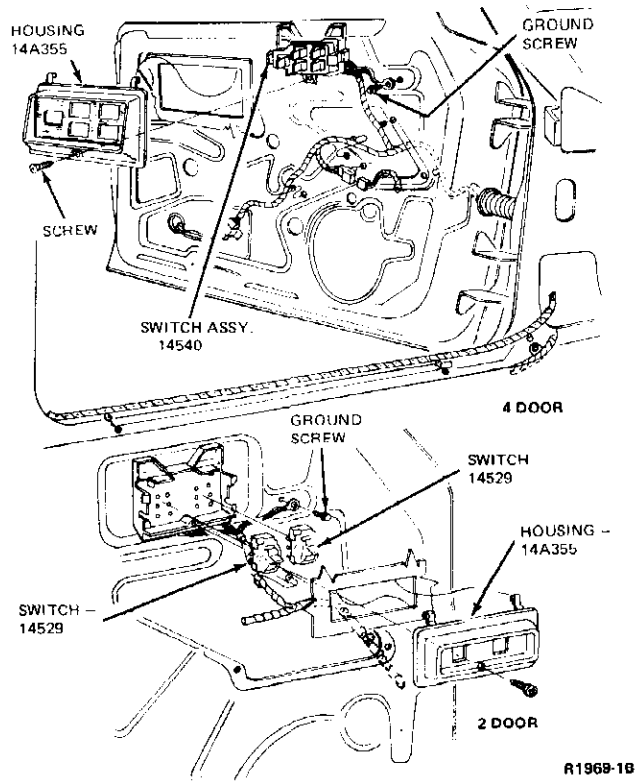


FIG. 8 Power Window Master Switch—LTD II, Cougar, Granada and Monarch

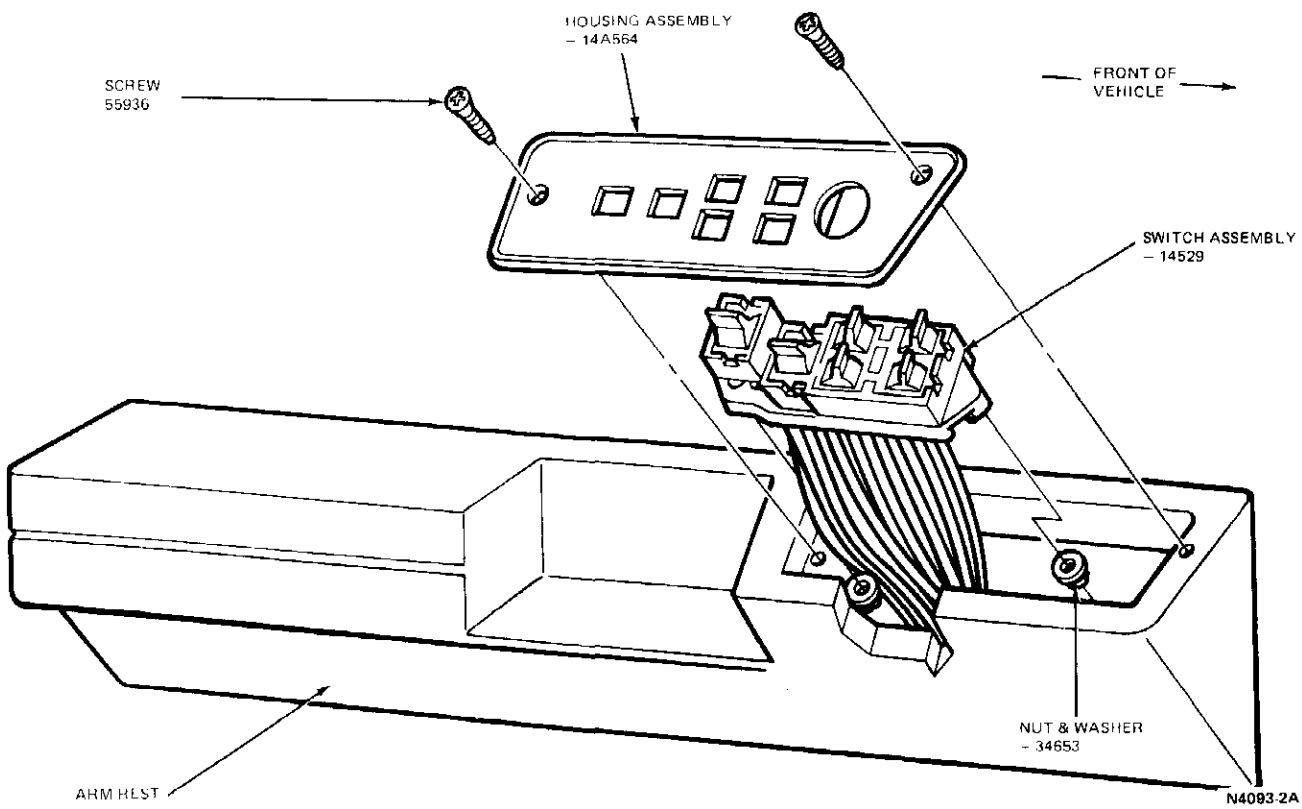


FIG. 9 Power Window Master Switch—Versailles

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SPECIFICATIONS

WINDOW MOTOR CURRENT DRAW

No Load	5 amperes or less at 12.8 volts

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DETROIT IRON

Dual U-Run Front Door Window Mechanism

PART 42-03

Pinto and Bobcat Only

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Glass	03-1
REMOVAL AND INSTALLATION (Cont'd.)	
Glass Run	03-2
Window Regulator	03-2
SPECIFICATIONS	03-3

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ADJUSTMENTS

See Fig. 1.

PINTO AND BOBCAT

To obtain proper alignment of the glass to the door glass runs and the door frame follow the adjustments in the order given.

1. Cycle the window to the full up position.
2. Remove the door trim panel and watershield (Fig. 1).
3. Loosen the upper and lower guide attaching screw and nut (Items C and A).
4. Loosen the glass run adjusting screw (Item B).
5. Position the glass firmly into the upper rear corner and rear edge of the door window frame run. Hold glass in this position and tighten the lower guide attaching screw and then the upper guide attaching nut (Items A and C).
6. Assure that the glass is in the outboard position within the glass run and tighten the bracket assembly glass run adjusting screw (Item B).
7. Lower the door glass so the top edge of glass is flush with the door belt opening. Position the door window upper front stop assembly to the quadrant and tighten securely.
8. Cycle the glass and check for binds. If no binds are found install the watershield and door trim panel.

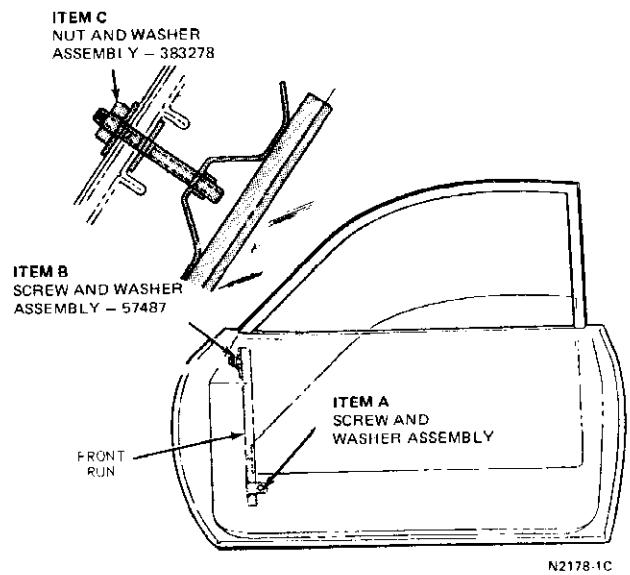


FIG. 1 Front Door Window Mechanism Adjustment—Pinto and Bobcat

REMOVAL AND INSTALLATION

GLASS

PINTO AND BOBCAT

Removal

1. Remove the trim panel and watershield from the door.
2. Lower the glass until the bracket rivets to the glass are visible at the access hole in the door inner panel.
3. Remove the center pins of the two rivets attaching the door glass to the glass bracket with a drift punch. Then remove the rivets by drilling the head from the rivet with a 1/4 inch drill.

   DO NOT ATTEMPT TO PRY THE RIVETS OUT AS DAMAGE TO THE GLASS AND GLASS BRACKET COULD RESULT.
4. Push the (2) rivets from the glass and glass bracket and lift the glass up and out of the door.

Installation

1. Install the Spacer (263A82) and Retainer Assy. (234A46) into the two 1/2 inch dia. holes in the

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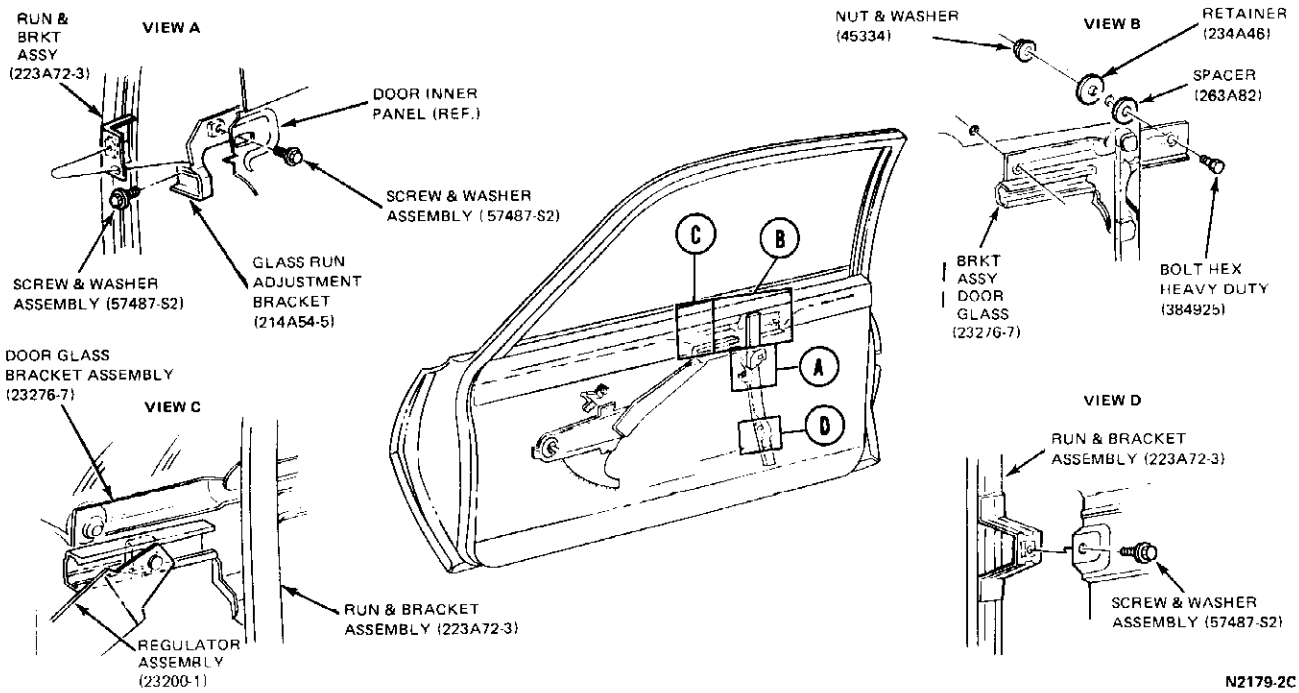


FIG. 2 Front Door Window Mechanism—Pinto and Bobcat

Door Glass (21410-1) and install the glass through the door belt opening (Install glass front end first).

2. Position the glass to the door glass bracket and install (2) 1/4"-20 x 1" bolts 384925-S36 & (2) 1/4"-20 nut and washer assemblies (45334-S2) to attach the glass to glass bracket. Tighten to 6-11 ft-lb torque.
3. Install the watershield and door trim panel.

WINDOW REGULATOR

PINTO AND BOBCAT

Removal

1. Remove the door trim panel and watershield and support the glass in the up position.
2. Remove the center pin from the (3) regulator attaching rivets with a drift punch. Then, drill the head from each rivet using a 1/4 inch drill and remove the rivet.
3. Disengage the regulator arm from the glass bracket, and remove the regulator from the door.

Installation

1. Position the regulator in the door and insert the roller into the glass bracket channel.
2. Position the regulator to the inner panel and install (3) 1/4"-20 x 1/2" screw and washer assemblies (Part 57487-S2) to attach the regulator to the inner panel. Tighten the screws securely with (3) 1/4"-20 nut and washer assemblies (45334-S2).
3. Check the operation of the window mechanism and install the watershield and door trim panel.

GLASS RUN

Pinto and Bobcat

Removal

1. Remove the door trim panel and watershield.
2. Support the glass in the up position.
3. Remove the (2) rivets attaching the glass to the glass bracket. Remove the center pin from the rivet with a drift punch. Then drill the head from each rivet using a 1/4 inch drill and remove the rivet.
4. Remove the (2) screw and washer assemblies attaching the glass run to the inner panel. Tilt the upper portion of the run rearward to disengage the window bracket from the regulator arm roller.
5. Remove the run and bracket assembly and the glass bracket from the door access hole.

Installation

1. Assemble the glass bracket, and the glass run adjusting bracket on the run and bracket assy. and lubricate the run and roller/guides with a thin coating of Polyethylene Grease (C4AZ-19584-A). Assure that all the rollers and guides are evenly coated with Polyethylene Grease or equivalent prior to installing.
2. Install the run and bracket assembly, glass bracket and glass run adjusting bracket through the access hole in the door inner panel and position the glass bracket guide on the regulator arm roller.
3. Loose assemble the run and bracket assembly upper and lower attaching screws to the door inner panel.
4. Remove the glass support and install the glass to the glass bracket using (2) 1/4"-20 x 1" Bolt Hex Head (384925-S36) or equivalent.

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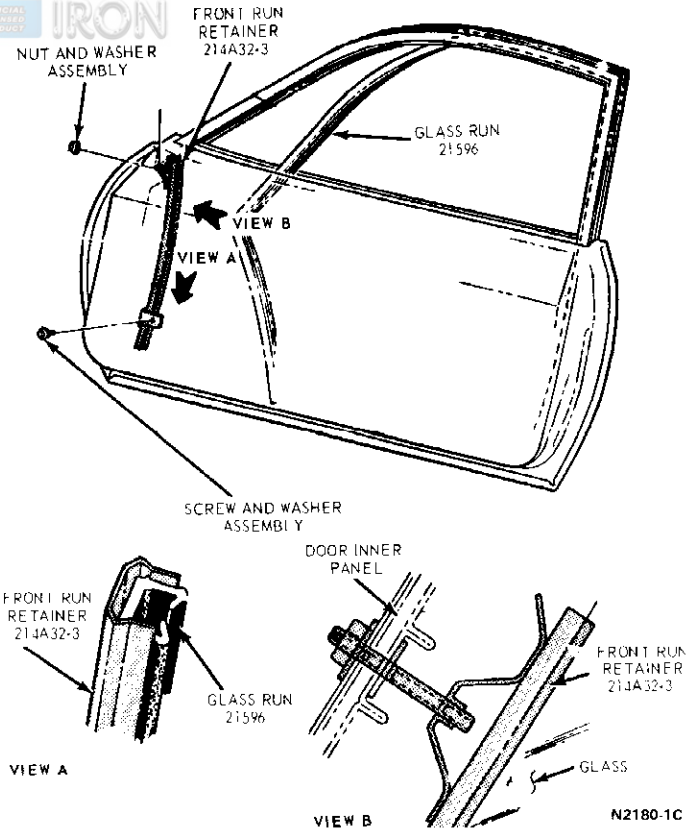


FIG. 3 Door Glass Run—Typical

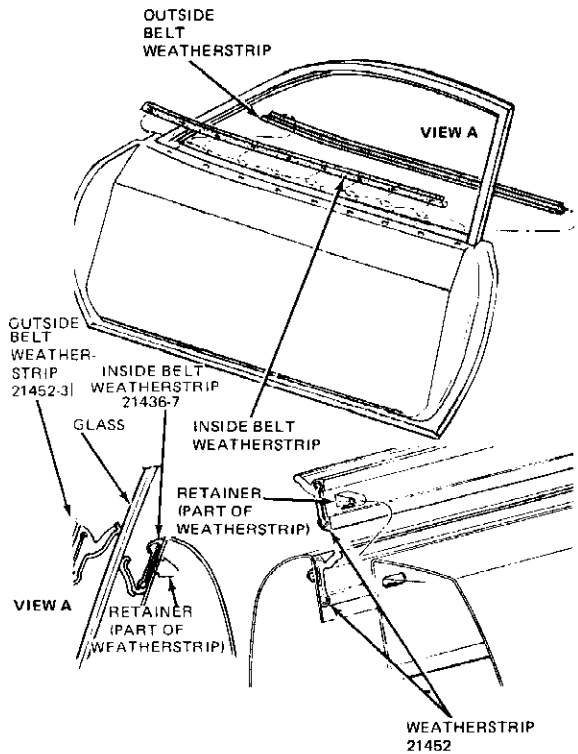


FIG. 4 Door Belt Weatherstrip

5. Tighten upper and lower run and bracket assembly screws.
6. Adjust the glass as outlined in the adjustment section of this procedure.
7. Install watershield and door trim panel.

BELT WEATHERSTRIP

1. Lower the window.
2. Pry the weatherstrip retainers out of the retainer holes in the glass opening flange (Fig. 6), and remove the weatherstrip. Use care not to chip the paint at the glass opening flange.
3. To install, position the weatherstrip to the door and push the retainers firmly into the holes.

SPECIFICATIONS

DUAL U-RUN FRONT DOOR WINDOW MECHANISM TORQUE SPECIFICATIONS

Description	Torque – Pinto, Bobcat
Glass Run Retainer Attaching Screws	6-11 ft-lbs.
Window Regulator Attaching Screws – 2-Door	6-11 ft-lbs. with 1/4 x 20 x 1/2 Inch Screw
– 4-Door	–
Equalizer Arm to Door Inner Panel	6-11 ft-lbs.

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Single Tubular Run Front Door Window Mechanism

PART 42-07

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Run	07-5
REMOVAL AND INSTALLATION (Cont'd.)	
Window Drive	07-5
Window Motor	07-5
Window Regulator	07-4
SPECIFICATIONS	07-5

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ADJUSTMENTS

ALL MODELS EXCEPT FAIRMONT, ZEPHYR, GRANADA, MONARCH AND VERSAILLES

Separate adjustment steps are given for each adjustment so that a partial glass adjustment can be performed. If a complete glass adjustment is required, follow the adjustments in the order given. All window mechanism adjustments must be performed with the door trim panel and watershield removed. After the adjustment(s) are completed, install the watershield and trim panel.

Glass Position—Fore and Aft

It is necessary to reposition the glass in the opening if the glass has been removed or if extreme door hinge adjustments are performed. To reposition the glass, remove the trim panel and watershield. Then, loosen the upper attaching screw and upper guide (Item A, Fig. 1), and reposition the glass. Position the upper guide and tighten the upper run attaching screw after glass is moved to desired position.

Stabilizer Adjustment

The stabilizers are used to support the glass at the belt line. The trim panel must be removed to adjust the stabilizers. Then, with the glass in the up position, push the front stabilizer firmly against the glass surface and tighten the attaching screw (Item B, Fig. 1). Repeat the procedure for the rear stabilizer.

Glass In-Out

The in-out adjustment is used to obtain a good seal with the weatherstrip at the top edge of the glass. This adjustment is made by repositioning the guides with respect to the glass bracket. To adjust the in-out of the glass, loosen the two lower guide attaching screws (Items C, Fig. 1), and move the top edge of the glass inward or outward as required to obtain a good seal with the weatherstrip; then, tighten the lower guide attaching screws. **On the right door, tighten the lower guide rear screw first and then tighten the front screw.** After the guide attaching screws have been tightened, again check the glass-to-weatherstrip fit for a good seal. Readjust the in and out tilt of the glass if a good air tight seal is not achieved.

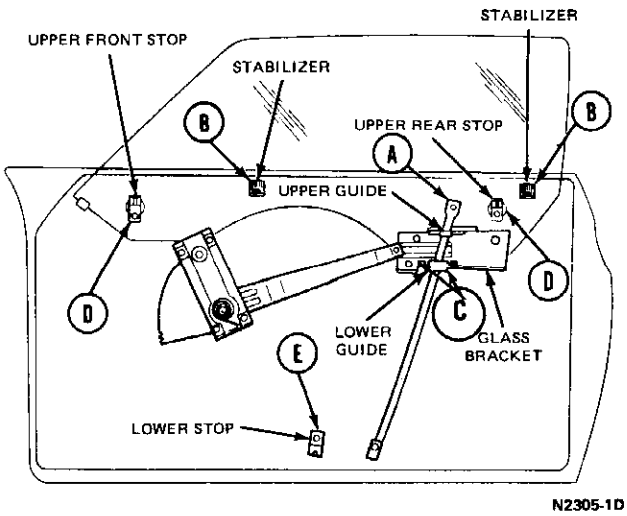


FIG. 1 Single Tubular Run Front Door Window Mechanism Adjustment—All Except Granada and Monarch

Upper Stop Adjustment

The upper stop adjustments are used to limit the up travel of the glass to maintain a constant glass height when the glass is raised to the full closed position. The door trim panel must be removed to adjust the up stops. To adjust the stops, raise the window to the up position. Check to be sure that there is no interference when the door is opened. Then, position the up stop brackets down against the glass stops, and tighten the stop bracket attaching screw (Item D, Fig. 1). Use this procedure for both the front and rear upper stops.

Lower Stop Adjustment

The lower stop is used to control the depth the glass can be lowered into the door. To adjust the lower stop, remove the door trim panel. Loosen the lower stop retaining screw (Item E, Fig. 1), and lower the glass until

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the top edge is flush to 1/4 inch above the outer panel. Then, lift the stop against the glass bracket and tighten the retaining screw.

Granada, Fairmont, Zephyr Sporty Coupe, Monarch and Versailles (Fig. 2 and 3)

1. Loosen attaching hardware until lower guide and rear retainer lower attachments are loose.
2. Raise glass with window regulator into glass run. If necessary, position glass manually forward and rearward to obtain a proper sealed glass edge.
3. Tighten tube nut (top) to 6-11 ft-lbs torque.
4. Tighten lower tube attaching bolt to inner panel. Tighten lower guide bolts (2).
5. Lower window half way and tighten lock side retainer attachment (2-door models only).

REMOVAL AND INSTALLATION

GLASS—GRANADA AND MONARCH

Removal

1. Remove the door trim panel and watershield.
2. Remove one screw attaching each glass stabilizer to the inner panel, and remove the stabilizers (Fig. 4).
3. Remove the upper front and rear stop brackets from the door inner panel (Fig. 4).
4. Remove the center pin from the rivets attaching the glass bracket to the glass (Figs. 2, 3 and 4) with a drift punch. Then, remove the rivets by drilling the head from the rivet with a 1/4 inch drill. **Do not attempt to pry the rivets out as damage to the window mechanism could result.**
5. Push the rivets from the glass and glass bracket. Move the glass forward in the door until the rear upper stop is aligned with the access notch in the inner panel at the belt line. Lift the rear of the glass up and out of the door. Then, move the glass rearward until the front upper stop is aligned with the access hole, and remove the glass.
6. Remove the rivets from the upper stops following the procedure given in steps 4 and 5 for rivet removal. Then, remove the stops from the glass.

Installation

1. Position the upper stops to the glass and install each stop on the glass with a 1/4-20 x 1 inch hex bolt and a 1/4-20 nut and washer assembly. Tighten the nut to 6-11 ft-lb torque.
2. Insert the glass into the door using the access notch for clearance of the upper stops.
3. Position the glass to the glass bracket and install three 1/4-20 x 1 inch bolts and three 1/4-20 nuts to attach the glass to the glass bracket. Tighten the nut to 6-11 ft-lb torque.

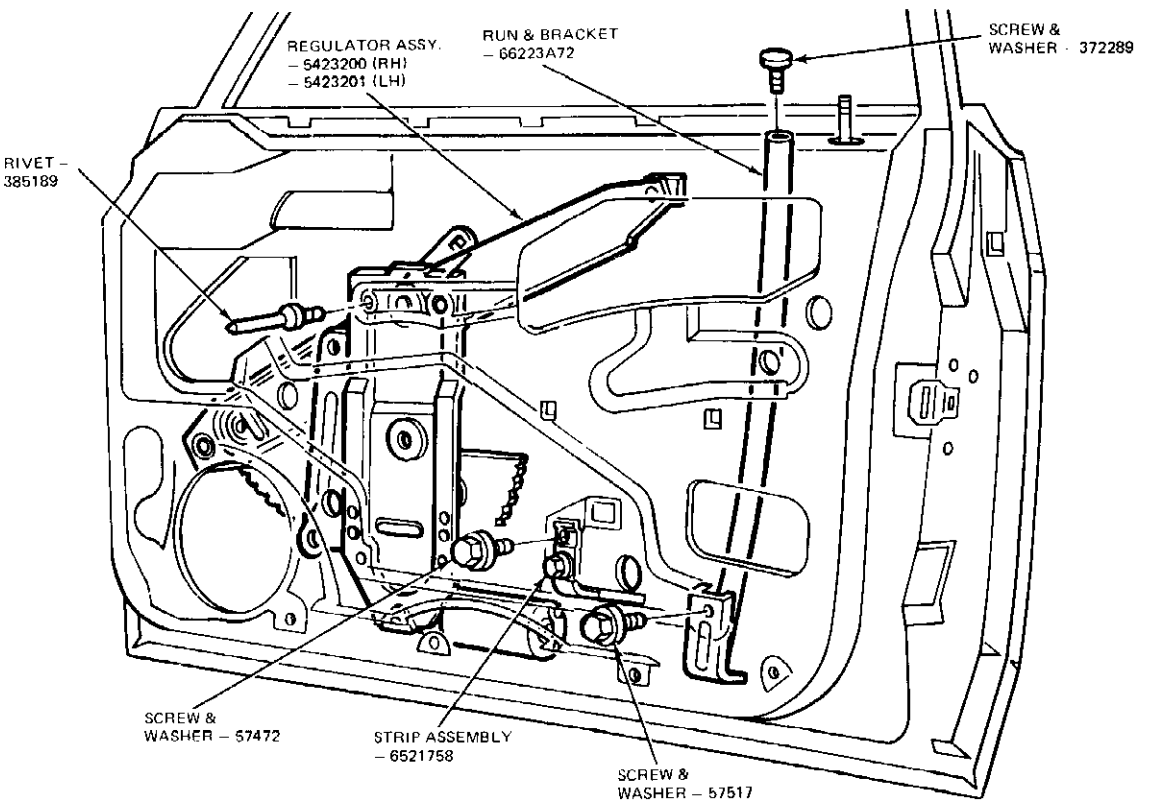
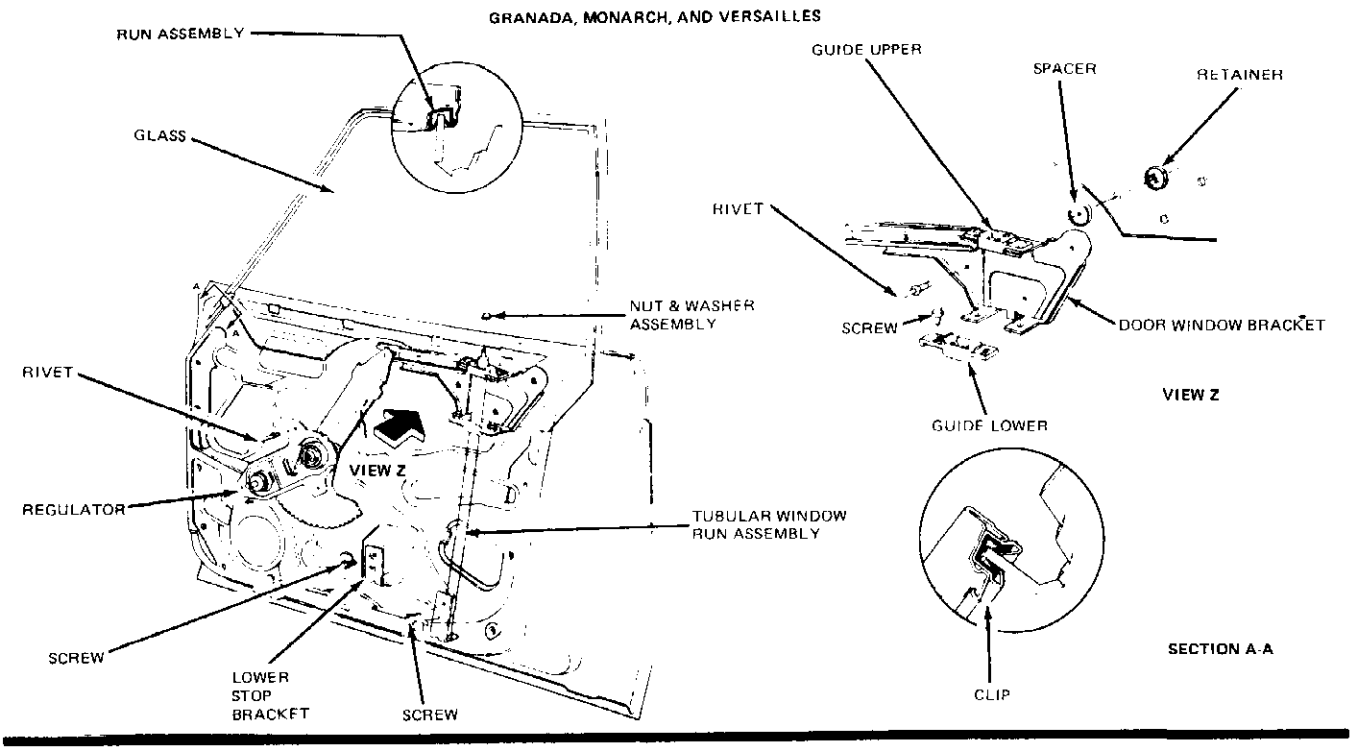


FIG. 2 Adjustment Points—Granada, Fairmont, Zephyr, Monarch and Versailles Door (2-Door Models)

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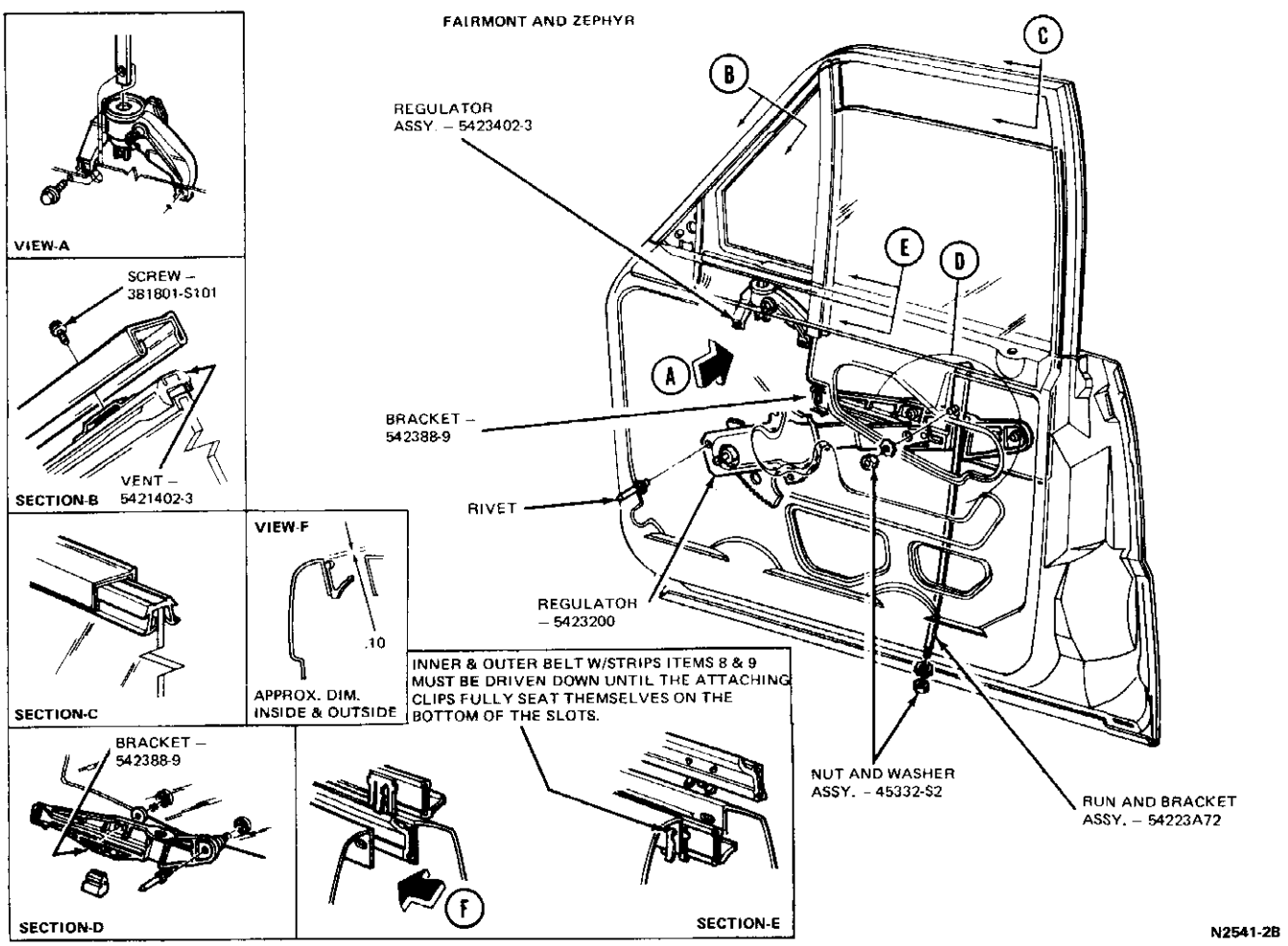


FIG. 3 Adjustment Points—Granada, Fairmont, Zephyr, Monarch and Versailles Front Door (4-Door Models)

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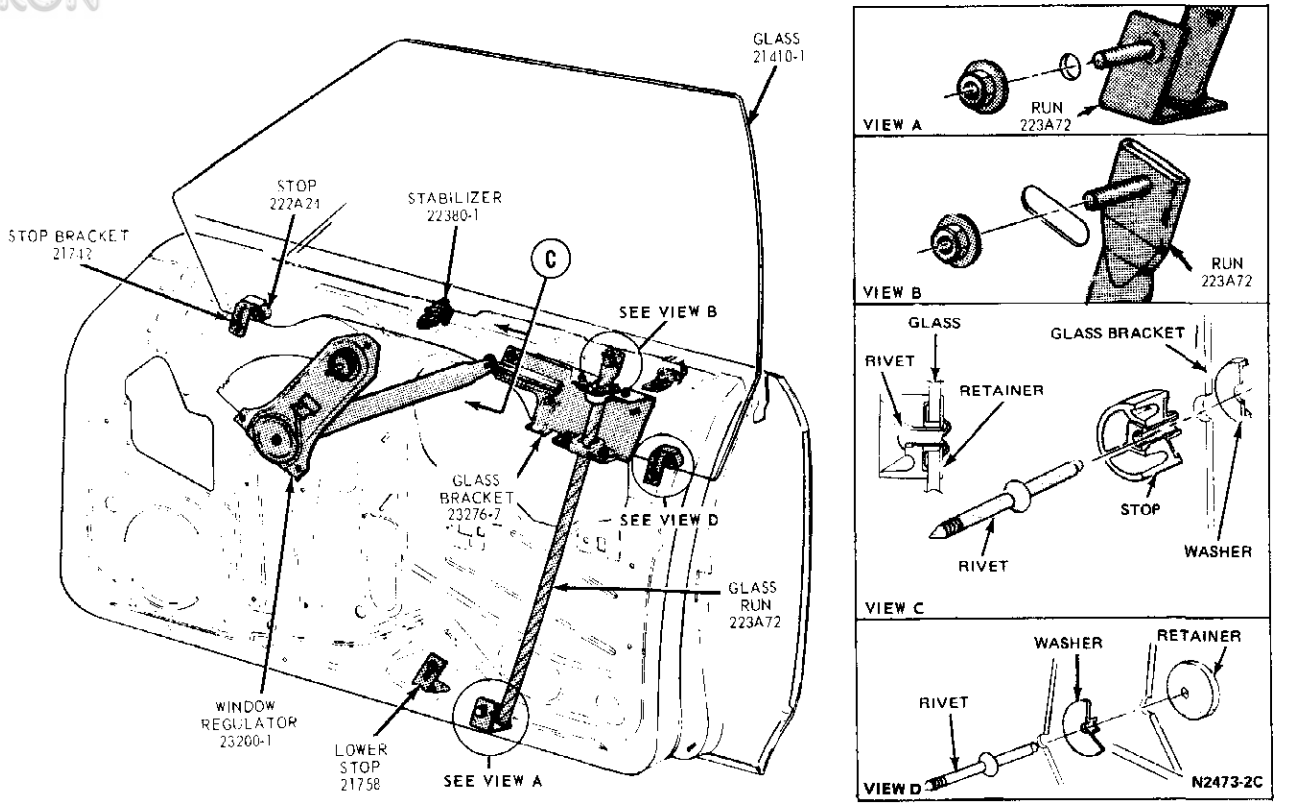


FIG. 4 Typical Front Door Window Mechanism for Frameless Glass

4. Install the upper front and rear stop brackets (Fig. 4).
5. Install the glass stabilizers and adjust the glass, stabilizers and upper stops as outlined in the Adjustment Section.
6. Install the watershield and door trim panel.

GLASS—FAIRMONT AND ZEPHYR

Removal

1. Remove the window regulator handle (1 screw), the door arm rest (3) screws, the inside door handle escutcheon cup (1 screw) and the vent window knob handle (1 screw).
2. Remove the door trim panel and water shield.
3. Revise the door glass to full up position and remove the (3) screws retaining the vent window regulator.
4. Lower the door glass to the full down position and remove the door weatherstrip from the vent window division bar and the top of the door frame.
5. Remove the (3) screws retaining the vent window frame to the door frame and tilt the top of the vent frame rearward and upward to remove from the door.

NOTE: It is not necessary to remove the inner and outer door belt weatherstrips however, use care when removing and installing the vent frame to eliminate possible damage to the ends of the belt weatherstrips. An application of silicone or soap solution will facilitate the removal and installation of the vent frame to its proper position.

Installation

1. Reverse removal procedure.

WINDOW REGULATOR

Removal

1. Remove the door trim panel and watershield and support glass in up position.
2. If equipped with electric windows (except Ford, Mercury, Thunderbird, Lincoln Continental and Continental Mark V), remove the center pin from the motor bracket-to-inner panel attaching rivet with a drift punch. Then, drill the head from the rivet with a 1/4 inch drill and remove the rivet. Disconnect the motor wires at the connector.
3. Remove the center pin from the regulator attaching rivets with a drift punch. Then, drill the head from the regulator attaching rivets with a 1/4 inch drill.
4. Disengage the regulator arm from the glass bracket, and remove the regulator from the door.
5. If equipped with electric windows, mount the regulator assembly in a vise. Drill a 5/16 inch hole through the regulator sector gear and the regulator plate. Install a 1/4 inch bolt and nut in the hole to prevent the sector gear from moving when the motor and drive assembly is removed. Remove the motor assembly from the regulator and install it on a new regulator.

Installation

1. Lubricate the window mechanism as outlined in Part 42-01.

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2. Install nut and retainer assemblies on the regulator mounting plate and motor support bracket at the rivet attaching holes.
3. Position the regulator in the door and insert the roller into the glass bracket channel.
4. Position the regulator to the inner panel and install 1/4-20 x 1/2 inch screw and washer assemblies to attach the regulator to the inner panel. Tighten the screws securely.
5. If equipped with electric windows, install a 1/4-20 x 1/2 inch screw and washer assembly to attach the motor bracket to the inner panel (except Ford, Mercury, Thunderbird, Lincoln Continental and Continental Mark V). Connect the motor wires at the connector.
6. Check the operation of the window mechanism, and install the watershield and door trim panel.

WINDOW MOTOR AND/OR DRIVE

Removal

1. Remove the trim panel and watershield.
2. Remove any door mounted radio speakers, (if so equipped).
3. All models except Ford, Mercury, Thunderbird, Lincoln Continental and Continental Mark V have holes punched in the door panel for motor and drive removal. On models without access holes, use the dimples located on the inner door panel to drill three 3/4 inch holes in the door for access to the motor and drive attaching screws.

   The holes should be drilled with the glass in the UP position. The hole saw pilot drill should be as short as possible, about 1/4 inch beyond the saw.
4. Disconnect the motor wires at the multiple connector.
5. Working through the 3/4 inch holes, remove the three motor and drive-to-regulator attaching screws. Then, remove the motor and drive from the door.

Installation

1. Position the motor and drive to the regulator and install the three screws **just snug-not tight.**
2. Connect the motor wires at the connector and cycle the glass to assure gear engagement. After the gears are engaged, tighten the three motor and drive attaching screws.
3. Install body tape over the drilled hole on Ford, Mercury, Thunderbird, Continental Mark V and Lincoln Continental models.
4. Install the radio speaker (if so equipped and removed).
5. Check the window operation. Then, install the watershield and trim panel.

GUIDES AND/OR RUN

Removal

1. Remove the door trim panel and watershield.
2. Support the glass in the UP position.
3. Remove the two attaching screws from the upper and lower guides.
4. Remove the glass run upper and lower attaching screw (Figs. 2, 3 and 4), and remove the run and guides from the door.
5. Remove the guides from the top end of the run.

Installation

1. Install the guides on the run and lubricate the run as shown in Part 42-01.
2. Position the run and guides into the door, and install the run upper and lower attaching screws (Figs. 2, 3 and 4).
3. Position the guides to the glass bracket and install the attaching screws.
4. Remove the glass support and adjust the window mechanism as outlined in the Adjustment Section of this Part.
5. Install the watershield and door trim panel.

SPECIFICATIONS

SINGLE TUBULAR RUN FRONT DOOR WINDOW MECHANISM TORQUE SPECIFICATIONS

Description	Torque
Glass Stop Attaching Screw	6-11 ft-lbs
Run Attaching Screws	6-11 ft-lbs
Stabilizer Attaching Screws	6-11 ft-lbs
Upper Stop Bracket	6-11 ft-lbs
Regulator-to-Inner Panel	6-11 ft-lbs
Guide-to-Glass Bracket	6-11 ft-lbs

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DETROIT IRON

Power Mini-Vent Window

PART 42-08

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CR2024-2B

DESCRIPTION

Continental Mark V mini-vent systems operate in the same manner as the Lincoln Continental; however, the internal control mechanisms are quite different. The adjustments for the door glass are similar; however, the adjustment for the mini-vent window assembly is entirely different.

The mini-vent front door window electric mechanism has a single tubular run with a slidedown vent glass. One switch controls the operation of both the vent and main side glass. When the window switch is moved to the lower position, the vent lowers into the door first. When the vent is completely down, the main glass lowers into the door. The glass and vent operates in reverse (glass and then vent) when raising the window. The vent or main glass may be stopped in any position between open and closed.

NOTE: To ensure proper Mini-Vent Window operation, remember to apply the special Mini-Vent lubricant to all areas shown in Fig. 19.

ADJUSTMENTS

LINCOLN CONTINENTAL ONLY— MAIN GLASS ADJUSTMENT (REFER TO FIGS. 1 THROUGH 4)

The main glass of the system shifts slightly as the vent reaches the end of its cycle. Therefore, if you check the door window adjustments with the vent window down, you will find that they change after the vent window is raised. **Always make sure that the vent window *is fully raised when checking any adjustment.***

Fore and Aft Adjustment

Both fore and aft and equalizer adjustments are used in combination to get a good fit of the door glass along the A-post (parallel to weatherstrip retainer) and the top of the door glass. It is important that any fore and aft adjustment of the run is accompanied by an upper guide tilt adjustment to maintain a good fit to the A-post. **Do not try to adjust the glass parallel to the B-pillar.**

When re-adjusting the system, with the tilt or fore and aft, the rear up-stop should be loosened and the last component secured.

To adjust the glass forward or rearward, loosen the glass run upper attaching screw (Fig. 1), and the rear up-stop. Then, position the glass forward or rearward as required, and tighten the glass run upper attaching screw. To tilt the glass forward or rearward, loosen the screws attaching the upper guides to the guide plate (Fig. 1). Then, rock or tilt the glass forward or rearward as necessary, and tighten the attaching screws. Adjust the rear up-stop if no other adjustments are to be *performed.*

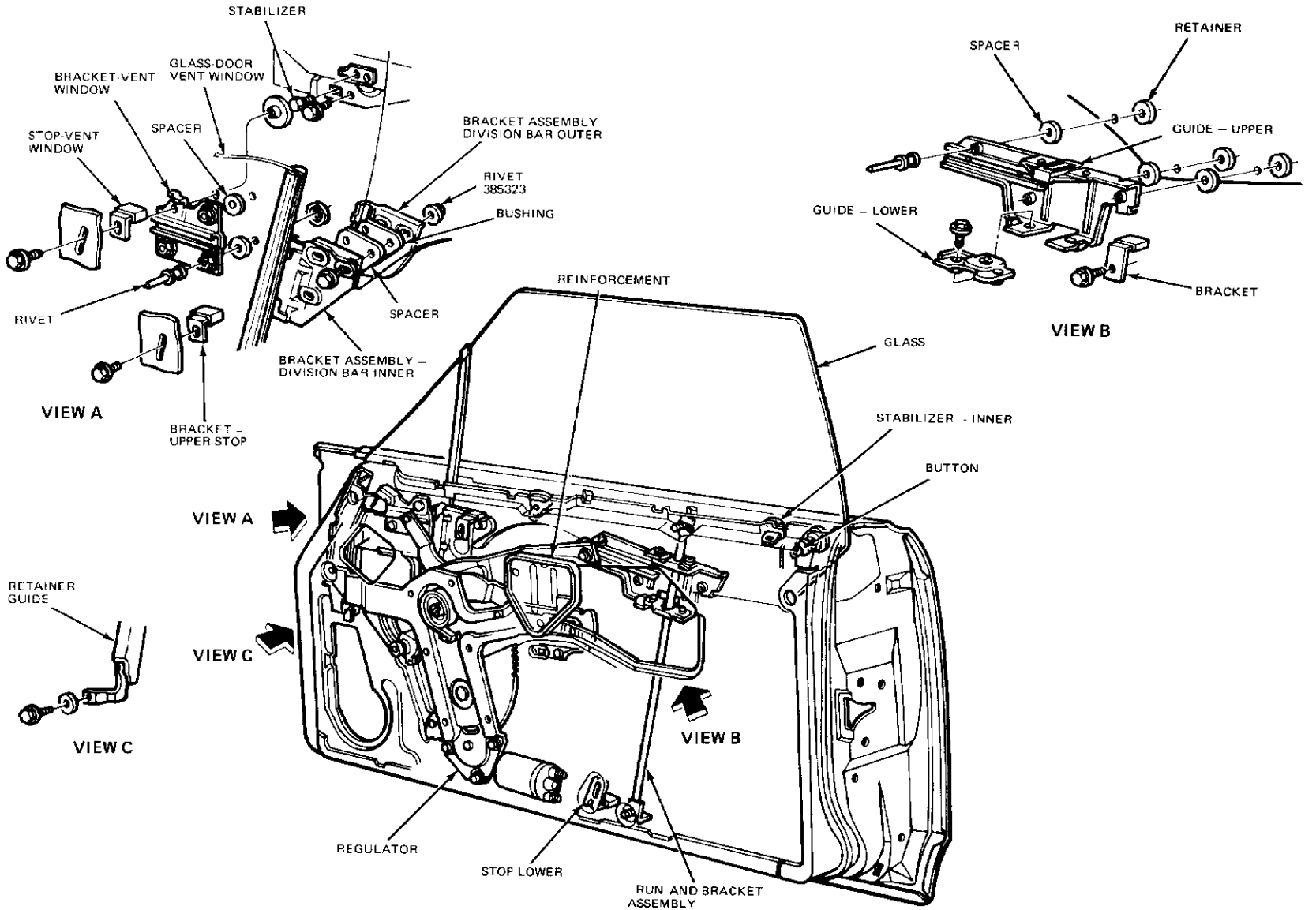
Glass In-Out Tilt

The in-out tilt adjustment is used to obtain a good seal against the weatherstrip along the top edge of the glass. This adjustment can be made by loosening the screws attaching the lower plastic guide to the guide plate bracket (Fig. 1). Then, move the glass top edge in or out to obtain a good seal with the roof rail weatherstrip, and tighten the guide attaching screws. The rear up-stop should be loose during this adjustment.

Up Adjustment

With the main glass in the full UP position, cycle the vent glass until the vent window cap is raised above the door belt line. Loosen the regulator arm roller attachment and both up-stops. Manually lift the door glass bracket assembly until the top edge of the door

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N2515-2C

FIG. 1 Mini-Vent Window System Lincoln Continental 4-Door Shown—2-Door Typical

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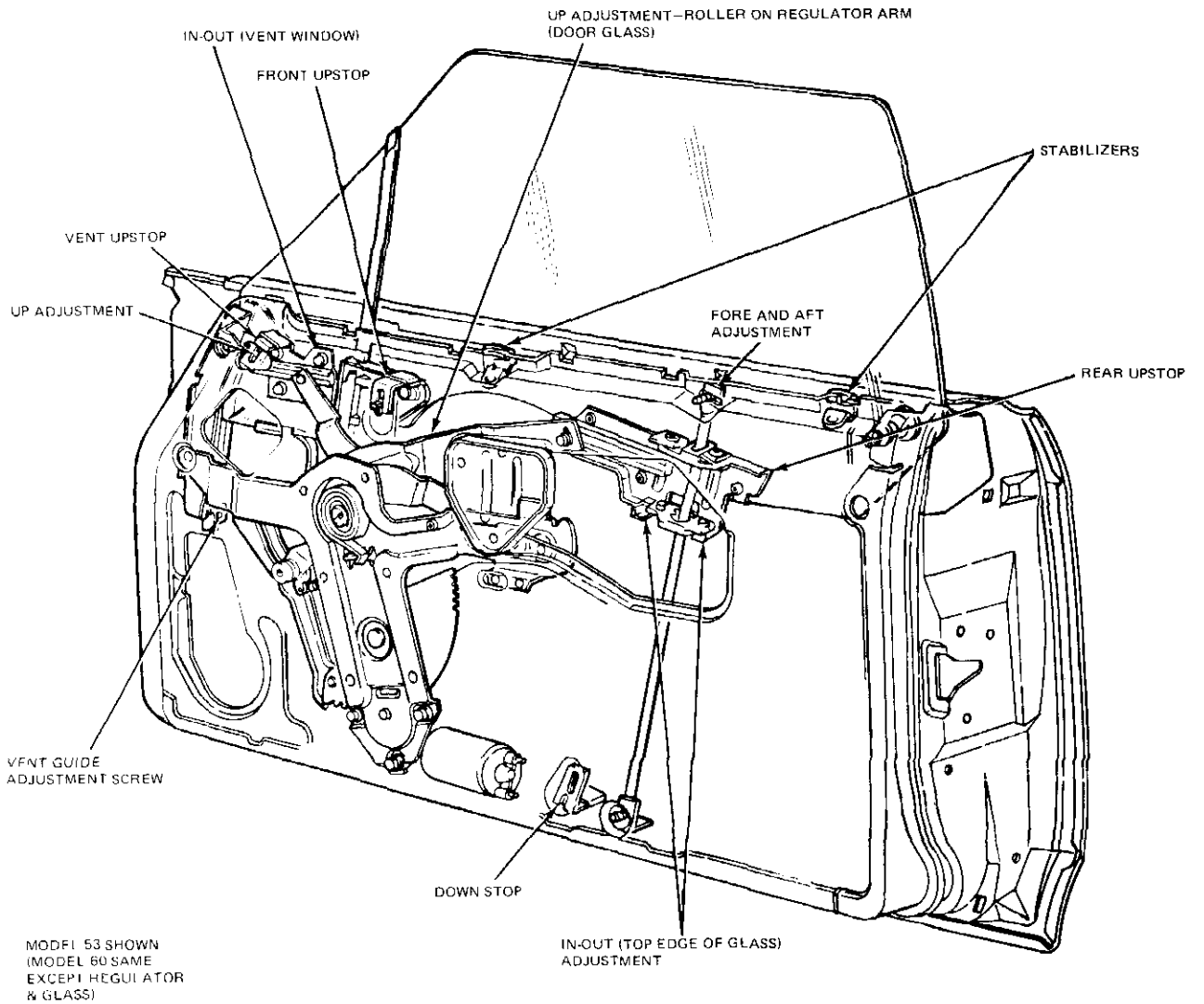


FIG. 2 Door Glass Adjustments—Lincoln Continental

glass seats into the weatherstrip sufficiently to obtain a good seal, especially at the upper rear corner of the glass. Tighten all attachments to 6-11 ft-lbs torque. **If the UP position of the glass must be re-adjusted, both door glass stops must be loose and the up or down adjustment made with the regulator arm roller only.**

Upper Stop Adjustment

Raise the glass to the UP position, checking to be sure that the top edge of the glass contacts the weatherstrip sufficiently to provide a good seal. Then, position the upper front stop bracket down against the glass stop and tighten the attaching screw. Position the upper rear stop down against the glass bracket and tighten the attaching screw.

Stabilizer Adjustment

The stabilizers are used to support the glass at the door belt line. To adjust, raise the glass to the full UP position. Loosen the stabilizer attaching screw and rotate the stabilizer against the glass. Tighten the stabilizer attaching screws.

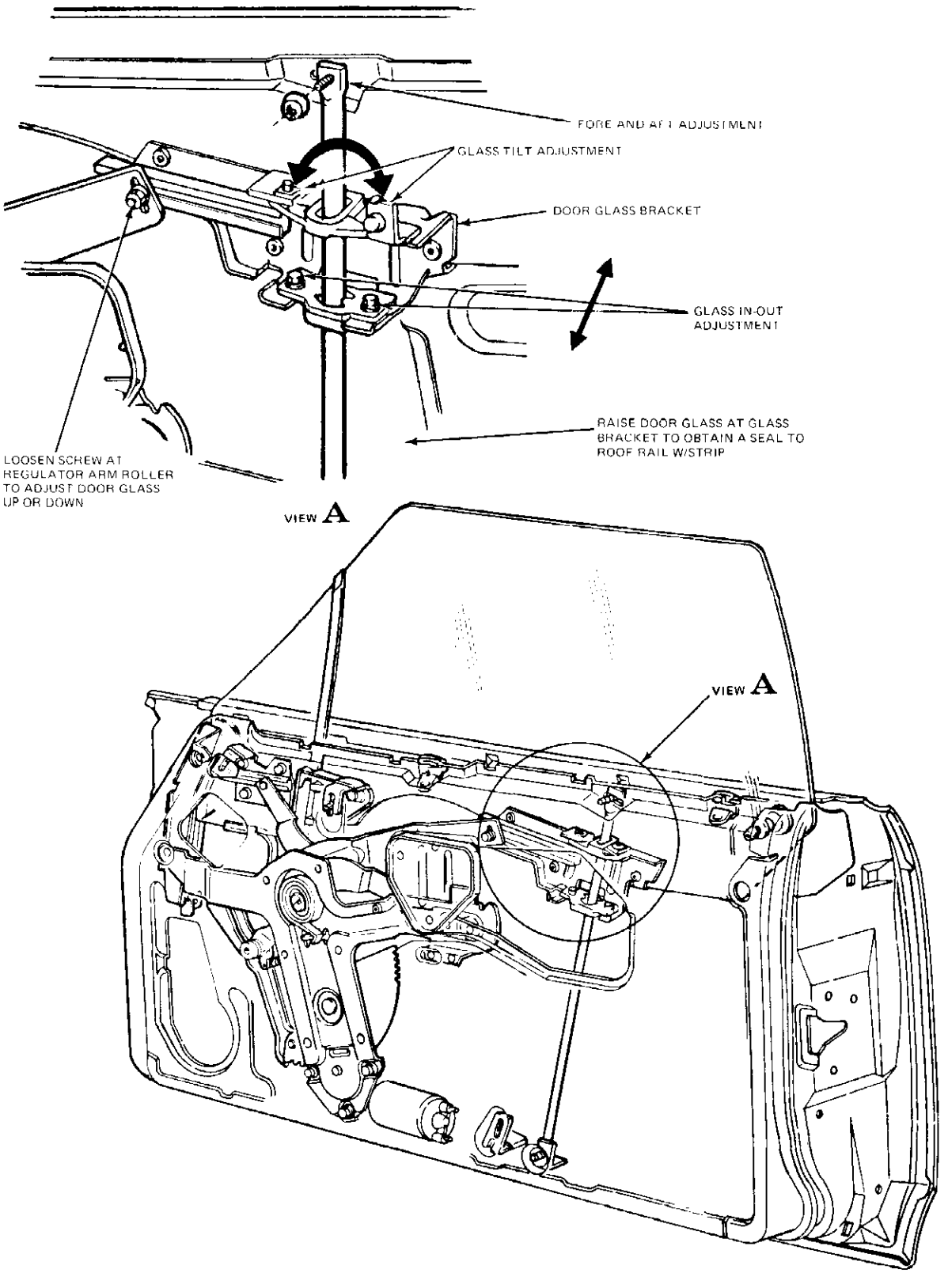
Down Stop Adjustment

The down stop should be adjusted so that the main glass is between flush and 1/4 inch above the belt weatherstrip with the window in the full DOWN position.

Front Door Vent Window Guide Adjustment

The front guide is held in position by a retainer attached to the door hinge pillar by a screw. To adjust the front guide, loosen the screw and lower the door window and vent glasses. The front guide locates itself in the adjustment slot. Before tightening the retainer screw check the vent glass for proper installation into the front guide.

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N2517-2B

FIG. 3 Door Glass Adjustments—Lincoln Continental

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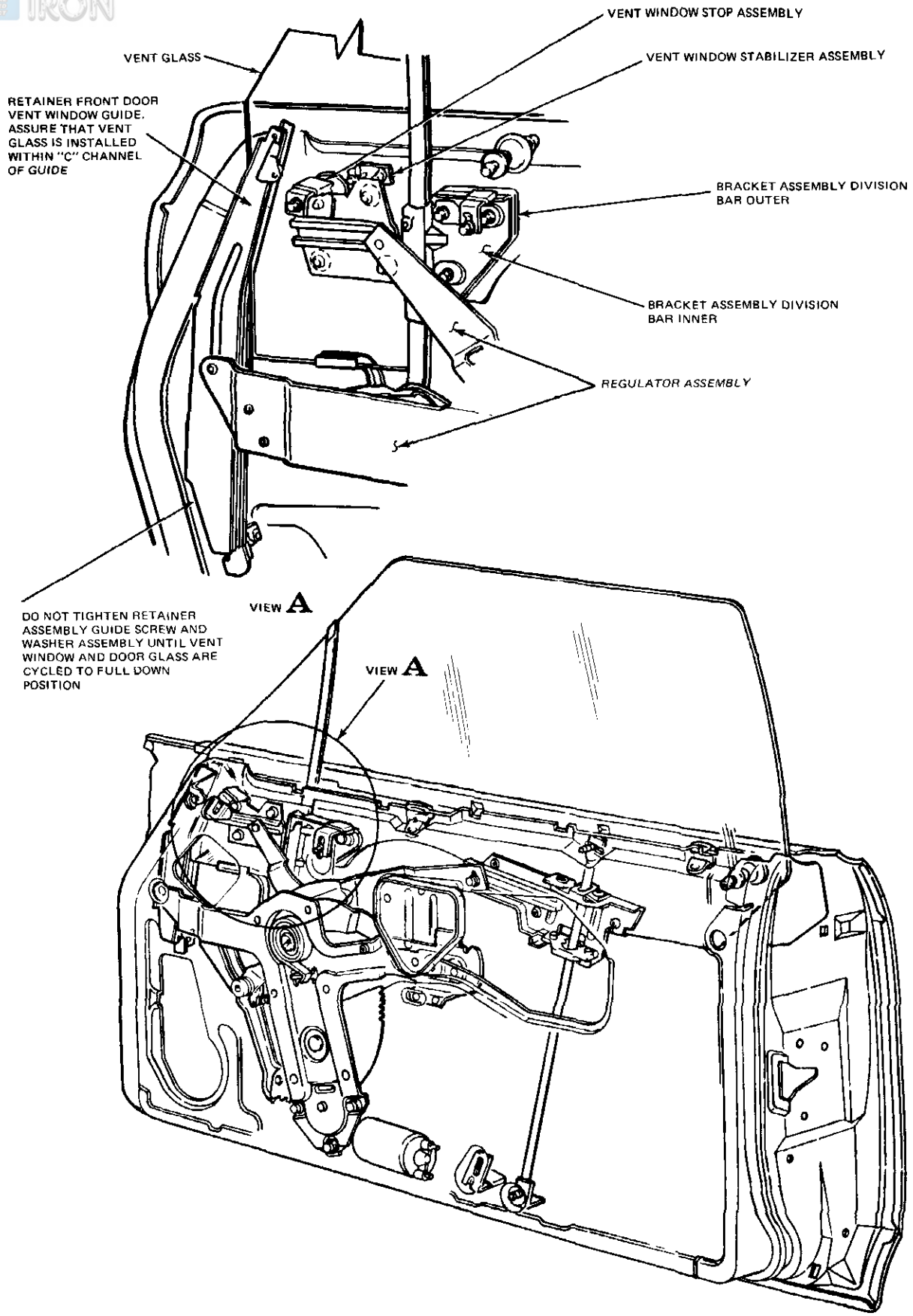


FIG. 4 Mini-Vent Glass Adjustment—Lincoln Continental

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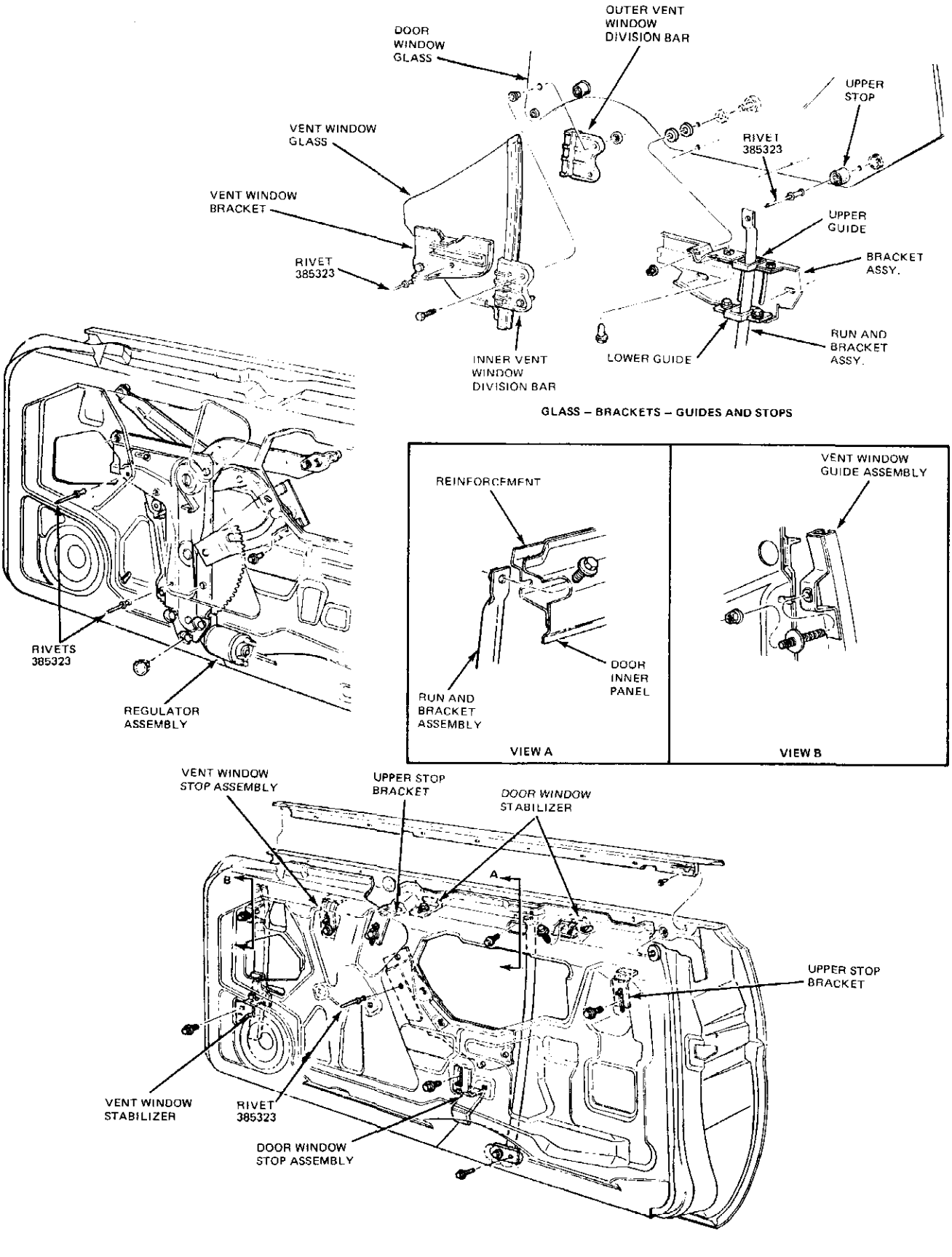


FIG. 5 Mini-Vent Window System—Continental Mark V

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VENT GLASS ADJUSTMENT

There are two basic vent window adjustments; an in-out adjustment and an up-stop adjustment.

In-Out Adjustment

To adjust the vent window in or out at the belt line, first remove the weatherstrip end cap from the front edge of the door. With the weatherstrip end cap removed, insert a 7/16 inch open end wrench through the access opening in the door and adjust the acorn-head adjusting bolt as necessary. Turning the adjusting bolt in or out will move the mini-vent in and out. The vent assembly should be adjusted so that a parallel dimension is obtained between the door outside belt and the vent glass assembly. However, in some instances, it may be necessary to position the vent glass inboard to secure a good seal to the A-post.

This is the only adjustment that can be performed on a mini-vent window system without removing the trim panel. If the vent is adjusted inboard with the acorn bolt, make sure that the vent glass raises full UP when cycled. If the vent does not go full UP, remove the trim panel and adjust the vent up-stop.

Up-Stop Adjustment

The vent up-stop can be adjusted up or down through an access hole in the door inner panel. The up-stop should be adjusted so that the vent glass is flush with the leading top edge of the door glass. The division bar cap will extend slightly above the two pieces of glass when they are flush.

Re-check the in-out adjustment after adjusting the up-stop. If a main glass re-adjustment is performed, the vent up-stop may have to be re-positioned to maintain flushness to the main glass.

CONTINENTAL MARK V MAIN AND VENT GLASS ASSEMBLY ADJUSTMENTS (REFER TO FIGS. 5 THRU 8)

The door trim panel and watershield must be removed prior to any adjustment.

Fore and Aft Adjustment

The fore and aft adjustment of the entire door glass and mini-vent assembly can be made by loosening the front vent channel attachment and the 3 bolts in the glass bracket (Fig. 6). Then, position the glass fore or aft as required.

It will also be necessary to adjust the equalizer assembly to obtain a proper glass-to-weatherstrip relationship.

NOTE: If sluggish or binding window operation develops, loosen the front vent channel upper attachment lock nut and cycle the system. The vent channel may not be properly set with the tube upper channel.

Equalizer Adjustment

This adjustment pertains to the relationship of the glass-to-weatherstrip at the roof rail and the windshield "A" post.

If the glass system is "tilted" in the opening, where the forward or rearward ends of the glass are low to its respective weatherstrip, the system can be rotated in the opening by loosening the upper plastic guide attachments on the main glass brackets, and rocking the glass on the tubular run (Fig. 7).

Flipper Arm Adjustment

An adjustable "flipper arm" at the end of the main glass drive arm is provided to establish the full up position of the main glass assembly.

If you find, after you have adjusted the equalizer, that you are unable to get the top edge of the glass into the weatherstrip, check the "up-stops" to make sure they are not improperly positioned. Next, loosen the (2) bolts retaining the flipper arm to the drive arm, and adjust the flipper arm upward to obtain the needed height (Fig. 7).

CAUTION: This is a very critical adjustment. Improper adjustment could cause sluggish or slow operation of the entire system. Allow from 1/8" to 3/16" of slot opening above the bolt washer for proper set (see Fig. 7).

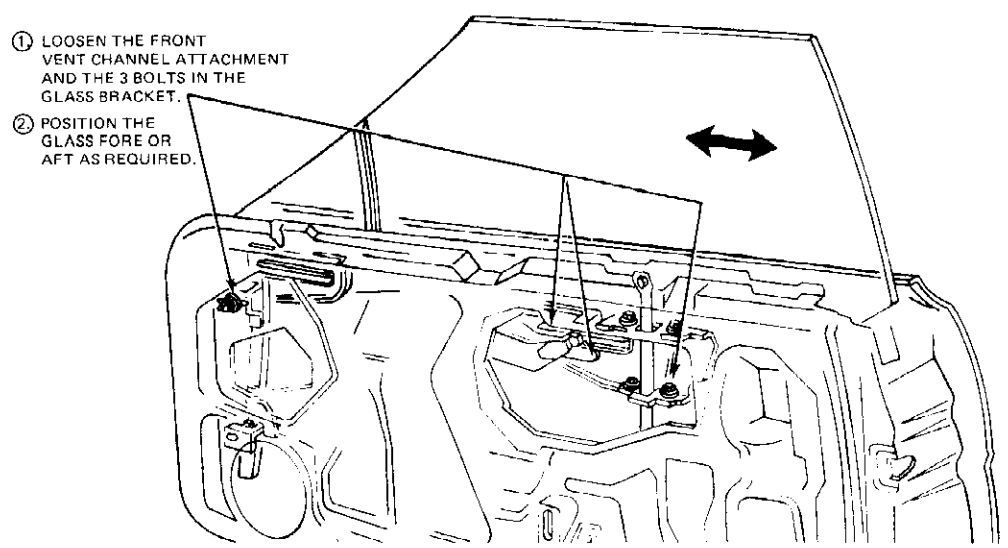


FIG. 6 Main and Vent Glass Fore-Aft Adjustment—Continental Mark V

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In-Out Adjustment

Make the "in-out" adjustment by loosening the screws attaching the lower plastic guide to the guide plate bracket and moving the window assembly in or out at the roof rail weatherstrip. The glass should be off the stops to make this adjustment (Fig. 8).

Stabilizer Adjustment

There are two stabilizers on the main glass assembly (Fig. 8). One stabilizer is mounted forward of the tube and one rearward.

Raise the window to the full-up position, loosen the retaining bolt on the stabilizer and slide in or out to a finger tight fit to the glass.

MINI-VENT ADJUSTMENTS

Refer to Figs. 9 thru 12

There are three adjustments for the mini-vent assembly; an up-stop, in-out and a vent full-up adjustment.

Also, it's important that the lower mini-vent channel blade attachment be properly positioned in the fork retainer.

Vent-Up-Stop-Adjustment

1. To obtain a parallel fit of the leading edge of the mini-vent glass to the main glass assembly, loosen the vent up-stop attachment and position up or down as required (Fig. 9).

In-Out Adjustment

1. To adjust the in-out relationship of the mini-vent glass to the main glass assembly, loosen the mini-vent channel upper adjustable attachment lock nut (Fig. 10).
2. Using a 9/32" Allen wrench, turn the adjustable screw right (inboard) or left (outboard) to obtain a parallel relationship of the mini-vent glass to the main glass assembly.

NOTE: It's a good idea to sight down the glass assemblies from the rear of the door, to make sure that the mini-vent and main glass assemblies are parallel.

This will prevent improper inboard/outboard channel adjustment that can cause the mini-vent to be out of line with the main glass assembly. This condition may bind the vent brackets and result in a mini-vent that will lower, but not raise.

Vent Full-Up Position Adjustment

1. Loosen the two bolts retaining the vent arm cam plate on the regulator assembly and position the moveable cam plate to the lowest side of the attaching slots on the door inner panel (Fig. 11).
2. If you are unable to get the mini-vent assembly raised to the full-up position by adjusting the stops and the cam plate, you may have to elongate the lower adjustment slot in the door inner panel at the regulator cam plate attachment.

Channel Blade Attachment Position

The lower mini-vent channel blade attachment **must** be properly positioned between the two fork rubber prongs. The prongs are designed with a specified clearance between them, to allow the lower channel to "float" during window operation (Fig. 12). If not properly positioned, the mini-vent may bind-up, causing it to lower but not raise.

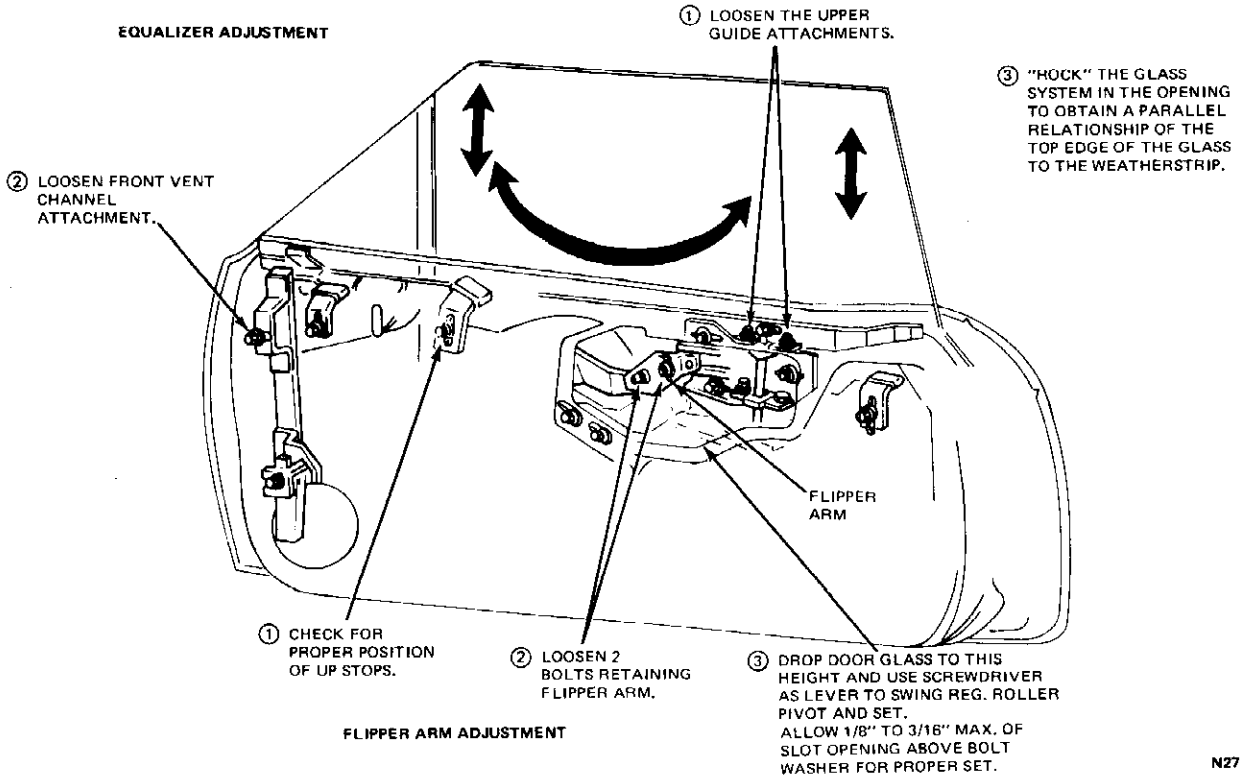


FIG. 7 Main and Vent Glass—Equalizer Adjustment and Flipper Arm Adjustment—Continental Mark V

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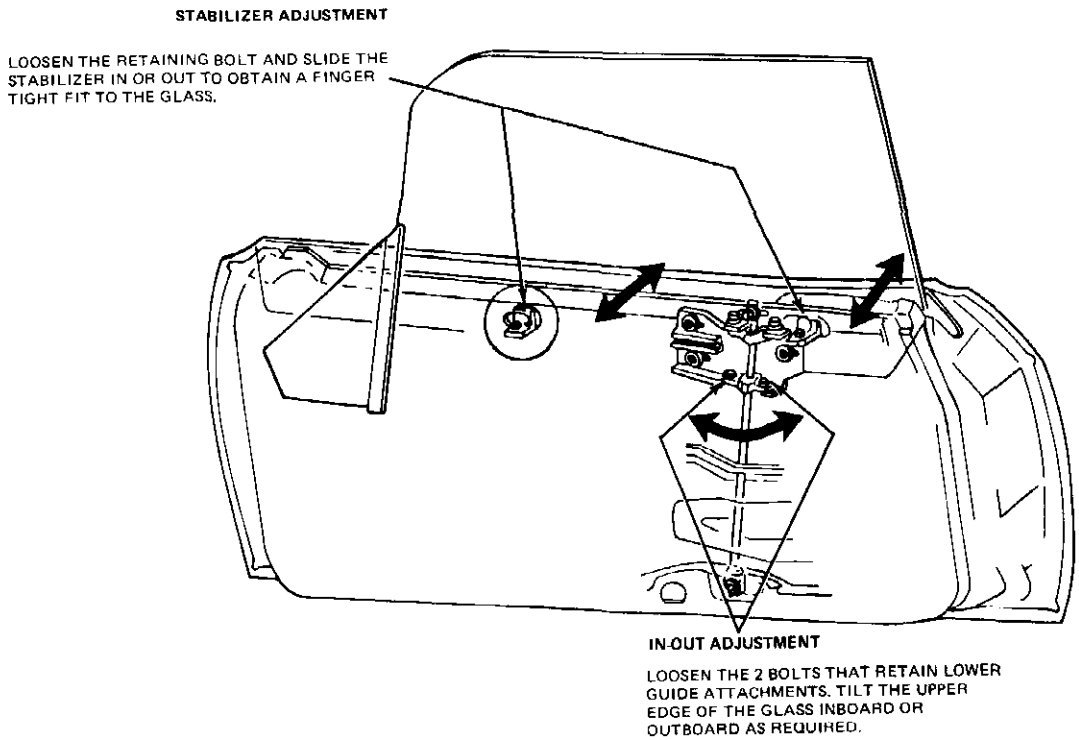


FIG. 8 Main and Vent Glass Stabilizer Adjustment and In-Out Adjustment—Thunderbird and Continental Mark V

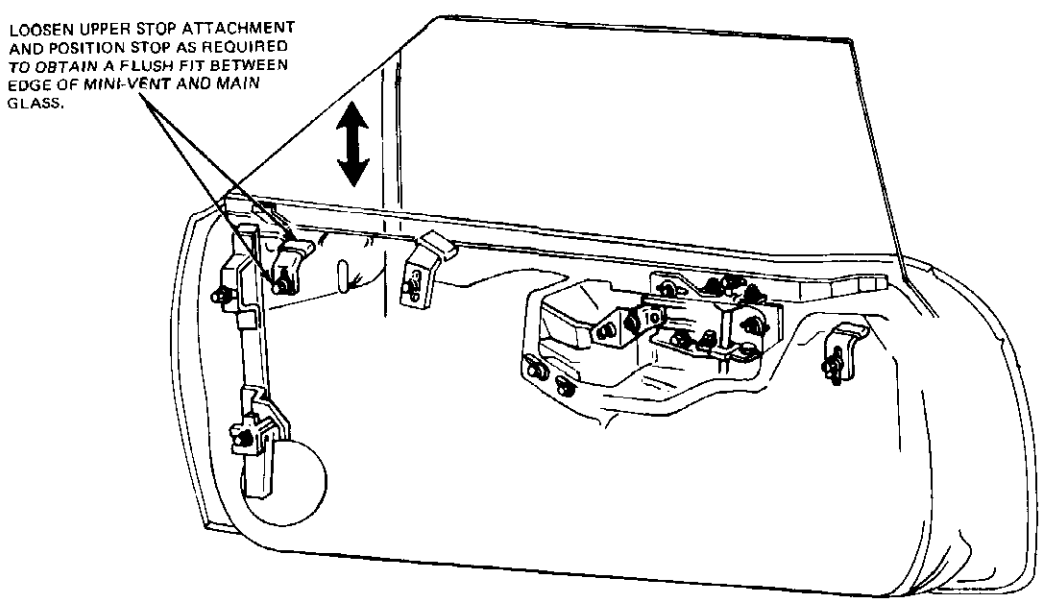


FIG. 9 Mini-Vent Up Stop Adjustment—Continental Mark V

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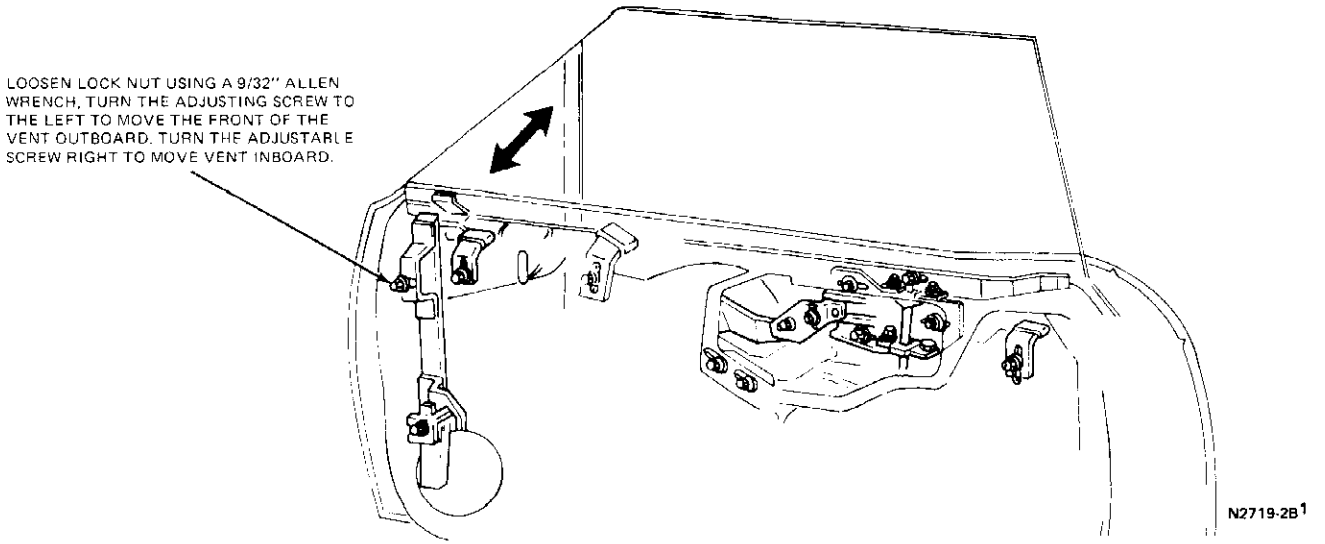


FIG. 10 Mini-Vent In-Out Adjustment—Continental Mark V

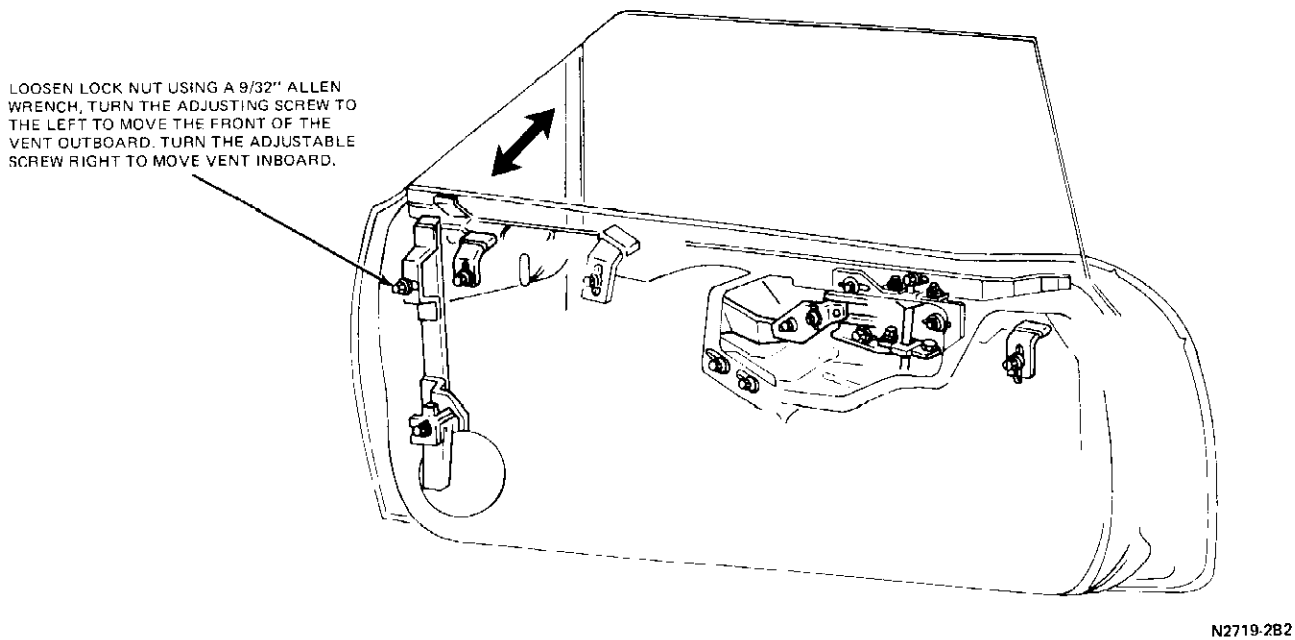


FIG. 11 Mini-Vent Full Up Position Adjustment—Continental Mark V

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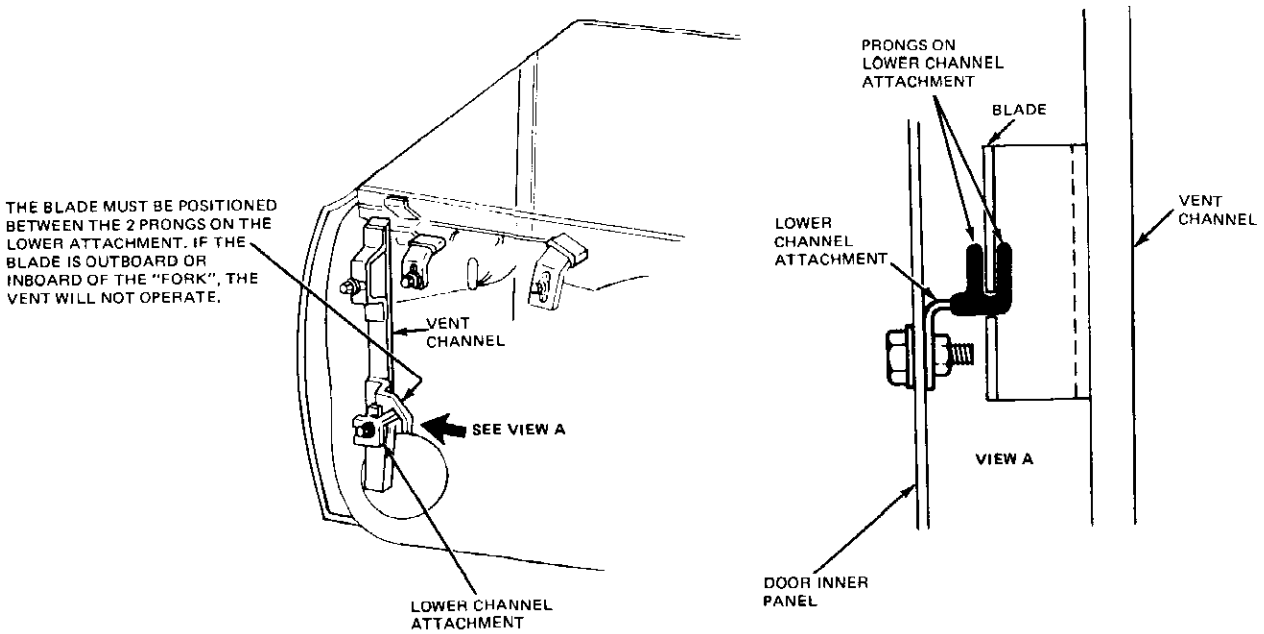


FIG. 12 Mini-Vent Channel Blade Attachment

REMOVAL AND INSTALLATION

DOOR AND VENT GLASS ASSEMBLY

The door and vent glass are to be removed from the vehicle as a single unit. Refer to Figs. 1, 13 and 14.

Removal

1. Remove the door trim panel and watershield.
2. Remove the screws attaching the weatherstrip end-caps at the rear and front end of the door.
3. Remove the door outside belt moulding. (Loosen the door glass down-stops to gain access to the screw attachments).
4. Loosen the stabilizer attaching screws and remove the stabilizers.
5. Remove the front and rear upper stop brackets.
6. Cycle the vent to the full down position and remove the vent roller from the vent guide. Also lower the door glass sufficiently to remove its attaching rivets from the bracket (approximately 3 inches).
7. Remove the three (3) door glass-to-glass bracket retaining rivets. When removing the rivets, first knock out the center pin or mandrel of the rivet with a drift punch or similar tool.

   Then, drill out the remainder of the rivet using a 1/4 inch drill. DO NOT ATTEMPT TO BREAK OR PRY OUT THE RIVET, AS THIS WILL BREAK THE GLASS.
8. Rotate and lift the door glass and vent up and out at the rear of the door, as an assembly.

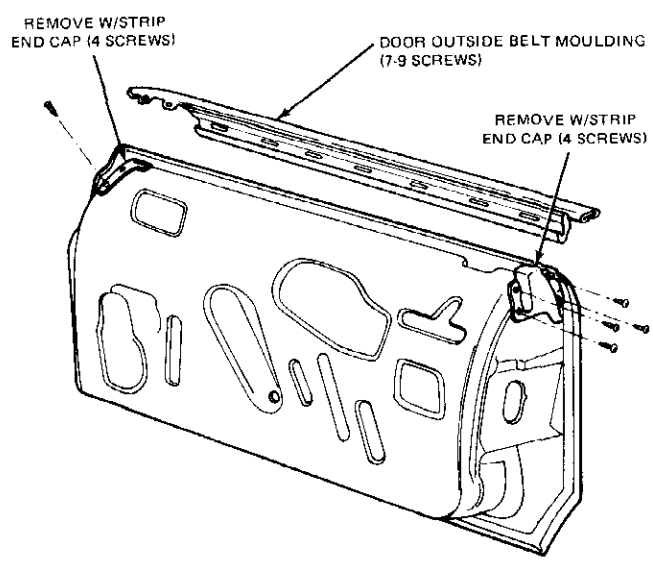
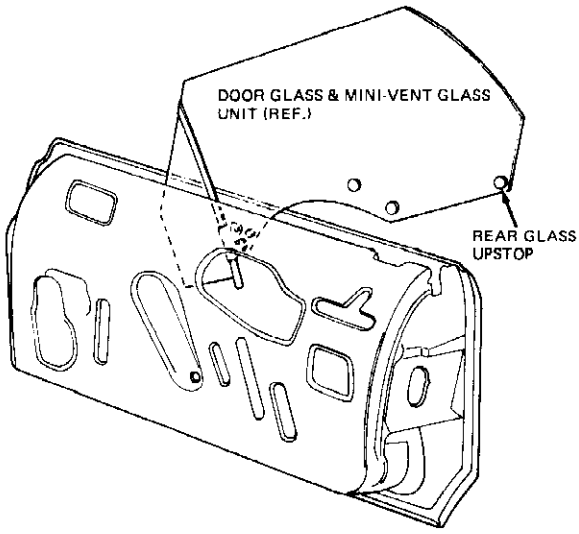


FIG. 13 Door and Vent Glass Removal

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REMOVE THE DOOR GLASS AND MINI-VENT GLASS AS A UNIT. GUIDE THE REAR GLASS UPSTOP THROUGH THE OPENING AT THE REAR OF THE DOOR AS SHOWN (NOTE: THE DOOR W/STRIP END CAPS AND DOOR OUTER BELT MOULDING MUST BE REMOVED FOR ADEQUATE CLEARANCE FOR GLASS REMOVAL)

N2520-1A

FIG. 14 Removing Door and Mini-Vent Glass

Installation

Refer to Figs. 15 and 16.

The vent and door glass are pre-assembled and installed as a unit, as shown in Fig. 15. Sliding efforts must also be checked prior to installation, as shown in Fig. 16.

1. Lower the vent glass prior to loading, so that the vent cap is 3 to 4 inches above the vent brackets. Be sure that the vent glass is positioned within the front window guide retainer assembly and that the vent roller is in the C-channel of the vent window bracket.
2. Feed the regulator roller into the glass bracket C-channel and assemble the door glass to the regulator glass bracket using (3) 1/4-20 x 1 inch bolts, nuts and washers to replace the original rivets. Drop the regulator arm approximately one to two inches for clearance, and use one bolt as a drift to assure proper glass position when installing the other two bolts to the glass. Run the glass to the full UP position to complete installation. Torque the bolts to 6-11 ft-lbs.
3. Install the door outside moulding.
4. Install the front and rear up-stop brackets.
5. Install the two stabilizers (leave loose until the glass adjustment is made).
6. Install the weatherstrip front and rear end-caps.
7. Adjust the system following the procedures under Adjustment.
8. Install the watershield and the door trim panel.

WINDOW REGULATOR

Removal

Refer to Figs. 1, 17 and 18.

1. Remove the glass and vent from the door, as outlined in this Section.
2. Remove the door glass run upper and lower attaching screws, and remove the run, glass bracket and guides from the door. **Do not loosen the upper and lower guides on the bracket.**
3. Disconnect the regulator motor wires at the connector.
4. Using a drift punch, remove the center pin from the (4) rivets attaching the door and regulator reinforcement and the (9) rivets attaching the regulator and motor support to the door inner panel.
5. Finish removing the (13) rivets with a 1/4 inch drill.
6. Remove the reinforcement plate from the door inner panel.
7. Remove the regulator from the door through the upper rear opening, motor end first.
8. Remove the rivets and drillings from inside the door.
9. Mount the regulator in a vise. Drill a 5/16 inch diameter hole through the regulator sector gear and the regulator plate. Install a 1/4 inch bolt and nut in the hole to prevent the sector gear from moving when the motor and drive are removed. Remove the motor and drive assembly.

Installation

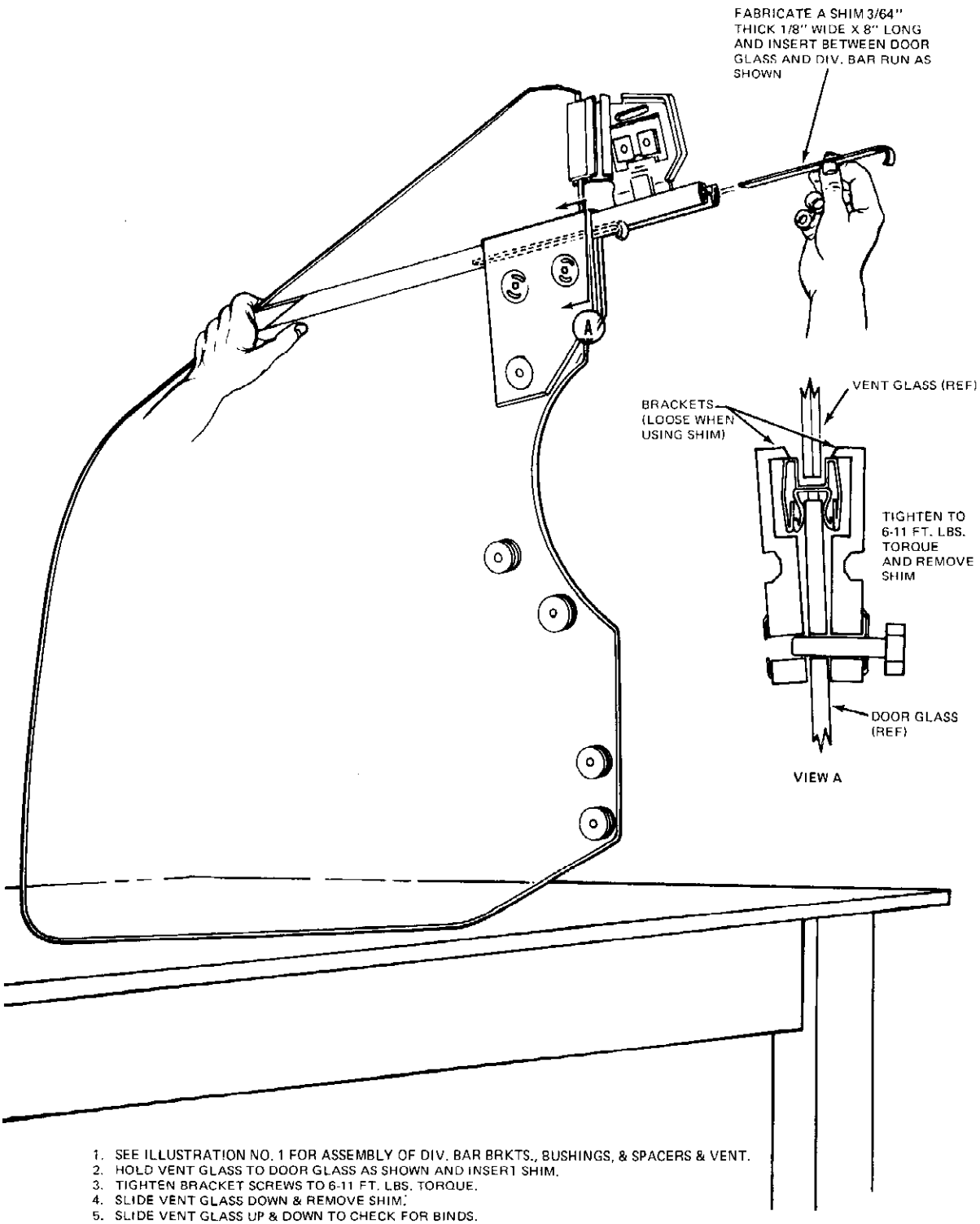
NOTE: Hand tools capable of setting 1/4 inch blind rivets are available to dealers or can be obtained from Townsend-Textron or USM Corp. or an equivalent supplier. If blind rivet hand tools are available, reinstall rivets instead of screw and washer assemblies.

1. Position the regulator arm as shown in Fig. 17 and insert the regulator into the large access hole in the door upside down, gradually turning the regulator to the upright position as it is installed.
2. Install (5) 1/4-20 x 1/2 inch screw and washer assemblies into the five holes across the top of regulator and through the door inner panel. Install the matching nuts and washers, but do not tighten.
3. Connect the regulator motor wires and cycle the regulator quadrant gear as required, to install the remaining (4) 1/4-20 x 1/2 inch screw and washer assemblies. Tighten all (9) attaching screws to 6-11 ft-lbs torque.

   All nine screw and washer assemblies must be installed with the head of the screw on the regulator and motor support panel side of the door panel. This will prevent the screw thread from interferring with links, gears, etc.
4. Install the door and window regulator reinforcement using (4) 1/4-20 x 5/8 inch screw and washer assemblies for retention.
5. Install the run, glass bracket and guides in the door.
6. Install the glass and vent assembly into the door.
7. Adjust the window mechanism as outlined in the Adjustment section of this Part.

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DETROIT IRON

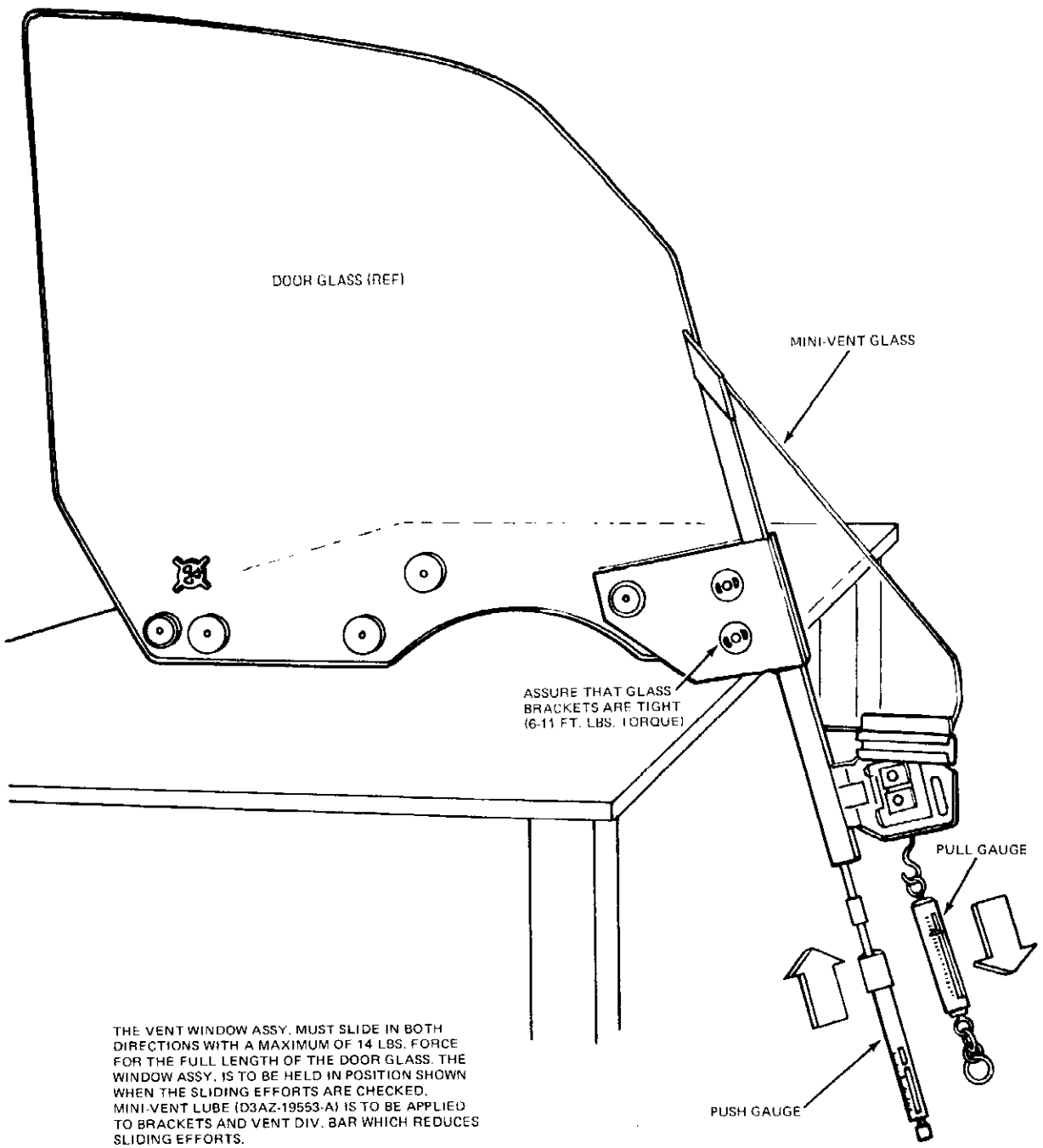


1. SEE ILLUSTRATION NO. 1 FOR ASSEMBLY OF DIV. BAR BRKTS., BUSHINGS, & SPACERS & VENT.
2. HOLD VENT GLASS TO DOOR GLASS AS SHOWN AND INSERT SHIM.
3. TIGHTEN BRACKET SCREWS TO 6-11 FT. LBS. TORQUE.
4. SLIDE VENT GLASS DOWN & REMOVE SHIM.
5. SLIDE VENT GLASS UP & DOWN TO CHECK FOR BINDS.
6. LUBRICATE DIV. BAR AND BRACKETS WITH MINI-VENT LUBE (D3AZ-19553-A).

N2521-2B

FIG. 15 Pre-Assembling Door and Mini-Vent Glass

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N2522-2B

FIG. 16 Checking Sliding Efforts—Mini-Vent

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VENT WINDOW GUIDE

Removal

1. Remove the vent glass and door glass from the door as an assembly.
2. Using a punch and 1/4 inch drill, remove the rivet attaching the guide to the door panel.
3. Remove the guide adjusting screw located on the hinge face of the door.
4. Remove the guide.

Installation

1. Position the vent window guide in the door and attach to the inner panel using a 1/4-20 x 1/2 inch screw and washer assembly and a matching nut and washer.
2. Install the vent guide adjusting screw into the hinge face of the door. Do not tighten this screw until the glass installation is complete and the entire glass system is cycled to the down position.
3. Install the vent and door glass assembly and adjust the system.

DOOR WINDOW RUN AND/OR GUIDE

Removal

1. Remove the door trim panel and watershield.
2. Remove the (3) glass-to-glass bracket retaining rivets.
3. Support the glass and remove the run upper and lower attaching screws.
4. Disengage the glass from the glass bracket and remove the run, glass bracket and guide from the door as an assembly.
5. Remove the run from the guides, and the guide from the glass bracket.

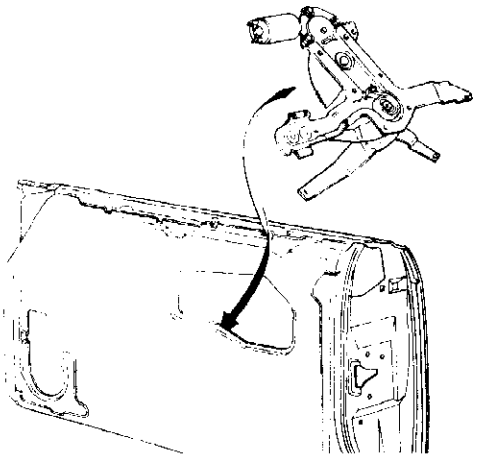
Installation

1. Assemble the glass bracket,guide and glass run.
2. Position the glass run in the door and install the two attaching screws after feeding the regulator roller into the glass bracket C-channel.
3. Position the glass-to-glass bracket and assemble with (3) 1/4-20 x 1 inch bolts and matching nuts and washers. The regulator arm can be moved to gain access to the attaching points. Tighten the nuts to Specification.
4. Adjust the run and guide as outlined in the Adjustment Section of this Part.
5. Install the watershield and the door trim panel.

DRIVE AND/OR MOTOR

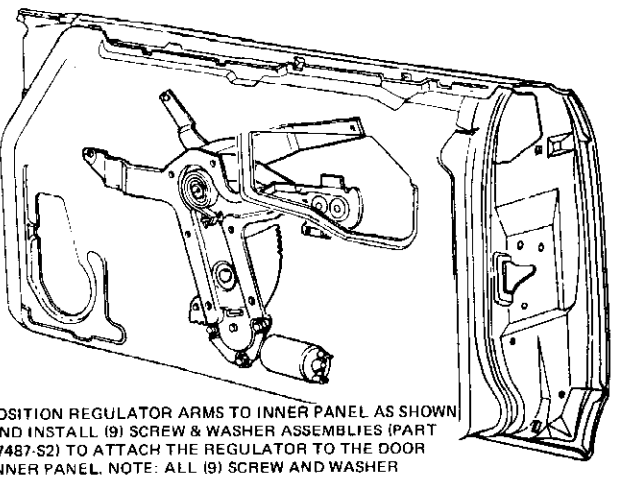
Removal

1. Remove the door trim panel and watershield.
2. Drill a 3/4 inch diameter hole at the dimple located near the bottom edge of the door opposite the window motor drive. **The hole saw pilot should be as short as possible, about 1/4 inch beyond the saw.**



POSITION THE REGULATOR ARMS AS SHOWN AND INSERT THE REGULATOR THROUGH THE ACCESS HOLE IN THE DOOR INNER PANEL UPSIDE DOWN AND GRADUALLY TURN TO UPRIGHT POSITION DURING INSTALLATION. N2523-1A

FIG. 17 Inserting Window Regulator Into Door—Lincoln Continental



POSITION REGULATOR ARMS TO INNER PANEL AS SHOWN AND INSTALL (9) SCREW & WASHER ASSEMBLIES (PART 57487-S2) TO ATTACH THE REGULATOR TO THE DOOR INNER PANEL. NOTE: ALL (9) SCREW AND WASHER ASSEMBLIES MUST BE INSTALLED WITH THE HEAD OF THE SCREW ON THE REGULATOR AND MOTOR SUPPORT PANEL SIDE OF THE DOOR INNER PANEL. N2524-1A

FIG. 18 Installing Window Regulator—Lincoln Continental

3. Disconnect the motor wires at the connector.
4. Working through the two existing holes and the drilled hole, remove the three (3) motor and drive-to-regulator attaching screws. Separate the motor and drive from the regulator and remove the motor and drive from the door.

Installation

1. Position the motor and drive in the door and to the regulator. Install the three attaching screws just snug, not tight.
2. Connect the motor wires at the connector and cylce the glass to be sure of gear engagement. When the gears are engaged, tighten the three motor and drive attaching screws.
3. Install the watershield and the door trim panel.

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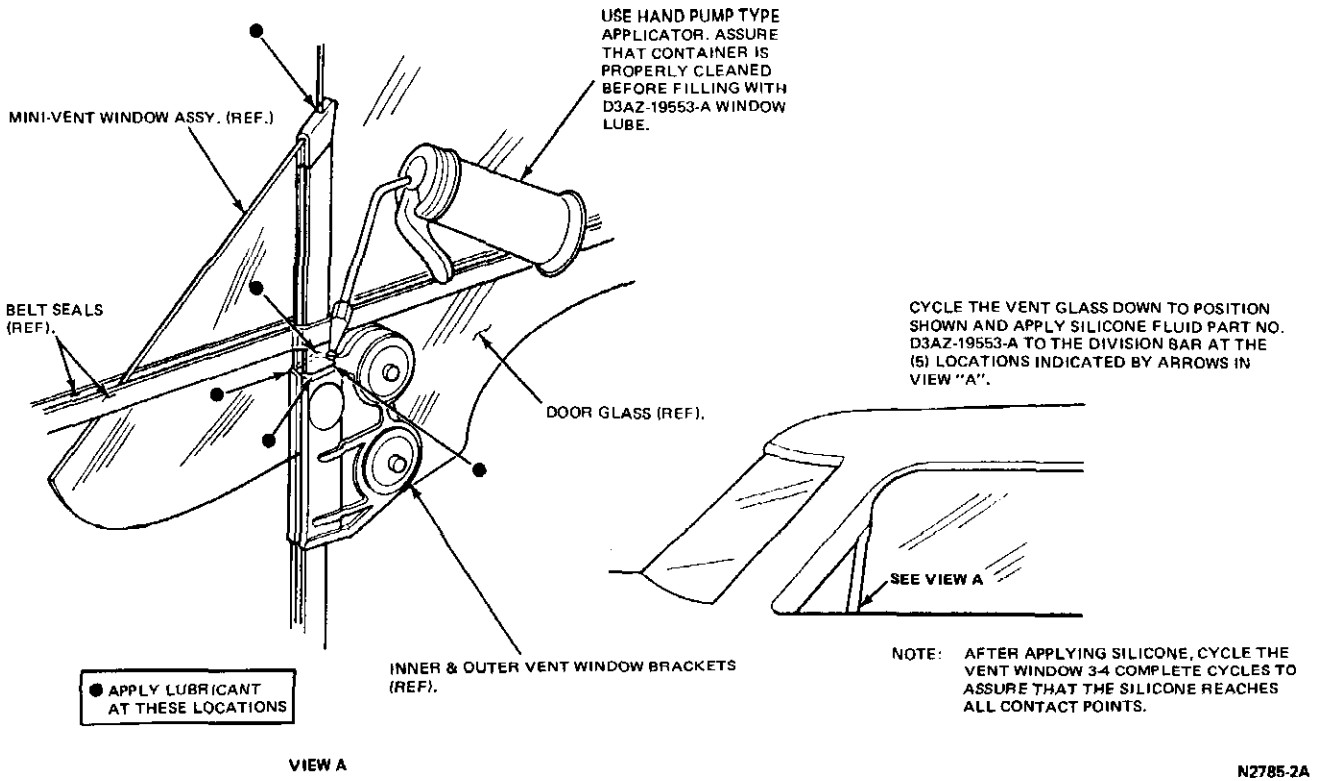


FIG. 19 Mini-Vent Window Lubrication

SPECIFICATIONS

Description	Torque	Description	Torque
Glass Stop Attaching Screw ①	6-11 ft-lb	Motor Bracket-to-Motor	13-32 in-lb
Run Attaching Screws	6-11 ft-lb	Motor Bracket and/or Regulator-to-Inner Panel ①	6-11 ft-lb
Stabilizer Attaching Screws	6-11 ft-lb	Guide-to-Glass Bracket	6-11 ft-lb
Regulator Arm Roller Attachment	6-11 ft-lb	Glass-to-Glass Bracket ①	6-11 ft-lb
Upper Stop Bracket	6-11 ft-lb		

① Riveted in Production.

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DETROIT IRON

Single Tubular Run Rear Door Window Mechanism

PART 42-24

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Glass	24-2
Guides	24-7
Regulator	24-2
REMOVAL AND INSTALLATION (Cont'd.)	
Run	24-7
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Window Motor	24-6
SPECIFICATIONS	24-7

CR2026-2B

ADJUSTMENTS

LTD II, COUGAR, FORD, MERCURY AND LINCOLN CONTINENTAL

Separate adjustment steps are given for each adjustment so that a partial glass adjustment can be performed. If a complete glass adjustment is required, follow the adjustments in the order given. All window mechanism adjustments must be performed with the door trim panel and watershield removed. After the adjustment(s) are completed, install the watershield and trim panel.

Glass Position—Fore and Aft

It is necessary to reposition the glass in the opening if the glass has been removed or if extreme door hinge adjustments are performed. To reposition the glass, loosen the run upper attaching screw (Item A, Fig. 1), and reposition the glass. Tighten the screw after glass is moved to desired position.

Stabilizer Adjustment

The stabilizers are used to support the glass at the belt line. The trim panel must be removed to adjust the stabilizers. Then, with the glass in the UP position, push the front stabilizer firmly against the glass surface and tighten the attaching screw (Item B, Fig. 1). Repeat the procedure for the rear stabilizer.

Glass In-Out

The in-out adjustment is used to obtain a good seal with the weatherstrip at the top edge of the glass. This adjustment is made by repositioning the lower guide with respect to the glass bracket. To adjust the in-out of the glass, loosen the two guide lower attaching screws (Item C, Fig. 1), and move the top edge of the glass inward or outward as required to obtain a good seal with the weatherstrip. Then, tighten the guide attaching screws to 6-11 ft-lbs torque.

Upper Stop Adjustment

The upper stop adjustment is used to limit the up travel of the glass to maintain a constant glass height when the glass is raised to the full closed position. The door trim panel must be removed to adjust the up stops. To adjust the stops, raise the window to the UP position. Check to be sure that there is no interference when the door is opened. Then, position the up stop brackets down against the glass stops, and tighten the stop bracket attaching screw (Item D, Fig. 1). Use this *procedure for both the front and rear upper stops.*

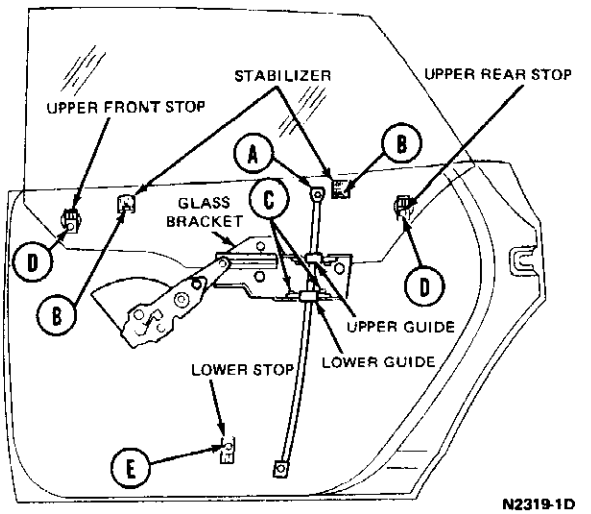


FIG. 1 Single Tubular Run Rear Door Window Mechanism Adjustment

Lower Stop Adjustment

The lower stop is used to control the depth the glass can be lowered into the door. To adjust the lower stop, remove the door trim panel. Loosen the lower stop retaining screw (Item E, Fig. 1), and lower the glass until the top edge is flush to 1/4 inch above the outer panel. Then, lift the stop against the glass bracket and tighten the retaining screw.

GRANADA, MONARCH AND VERSAILLES

1. Secure upper and lower division bar attachment after it is positioned as far rearward as possible (Fig. 2).
2. Run glass into frame to the full **UP** position.

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3. Secure nut and washer assembly at top of run assembly. Torque to 6-11 ft-lbs.
4. Secure nut and washer assembly at bottom of run assembly. Torque to 6-11 ft-lbs.
5. Run glass down and up to check for binding.
6. If binding occurs, loosen bottom attachment of tube, run glass to 1 inch from **UP** position. Adjust bottom attachment inboard or outboard (in opposite direction of binds) to remove binds. Secure all attachments.

REMOVAL AND INSTALLATION

GLASS—EXCEPT FAIRMONT AND ZEPHYR

Removal

1. Remove the door trim panel and watershield.
2. Remove the upstops from the door inner panel.
3. Support the glass and remove the glass-to-glass bracket attaching rivets. Remove the center pin from the rivets with a drift punch. Drill the head from each rivet with a 1/4 inch drill. Remove the rivets and glass-to-glass bracket. (See Figs. 2, 3, 4 and 5.)
4. Loosen the front and rear stabilizer attaching screws, and move the stabilizers away from the glass. (Figs. 3, 4 and 5.)
5. Remove the glass support and remove the glass from the door.

Installation

1. Position the glass in the door, and position the glass bracket to the glass. Install 1/4-20x1 inch hex head bolts and 1/4-20 hex nuts to attach the glass bracket to the glass. Tighten the bolts and nuts to specification. (See specifications at end of this Part.)
2. Install the upper front and rear stops on the inner panel with attaching bolts with 1/4-20x1 inch hex head bolts and 1/4-20 hex nuts. Tighten the bolts and nuts to specification.
3. Adjust the glass to fit the opening and adjust the stabilizers as outlined in the Adjustment Section.
4. Install the watershield and trim panel on the door.

GLASS—FAIRMONT AND ZEPHYR

Removal

1. Remove the door trim panel and watershield.
2. *Remove the glass to glass bracket attaching rivets.* Remove the center pin from the rivets with a drift punch. Drill the head from each rivet with a 1/4" drill. Lower glass 5 to 6" and let it rest in door well.
3. Remove the retainer and division bar glass run attaching screw and washer assembly.
4. Remove the screw and washer assembly at the top of the division bar at door frame. Tilt the division bar and main glass forward and remove the *weatherstrip from the top of the door frame.*
5. Remove the stationary vent glass and weatherstrip from the door frame.
6. Position the retainer and division bar and main glass in an upright position. Pull the main glass and division bar above and outside the door frame. Swing the two assemblies (glass and division bar) 90° from the door frame and work the glass and division bar upward and out of the door channel between the belt moldings.

Installation

The Rear Door Glass, Rear Door Window Glass Channel, Division Bar Glass Run, and Retainer and Division Bar Assembly are pre-assembled prior to installing into the vehicle. Pre-assemble as follows:

1. *Install glass channel to the glass using glass* everseal tape (.065" thick x 3/4" wide x 17-3/4" long). Be sure to align the notches in the glass with the cutouts within the glass channel. Clear the tape from the channel cutouts for installing glass guides. (Step 2).
2. Install the nylon front guide and lower guide into the glass channel slots and snap the mylar flocked glass run over the glass channel.
3. *Place the Retainer and Division Bar Assembly* over the nylon guides and slide over the glass channel.
4. Holding the rear door glass and retainer and division bar at 90° from the door, insert the retainer and division bar between the door belt weatherstrip, swing glass inboard to the belt and install loose in door channel.
   NOTE: Lubricate the belt weatherstrip with silicone or soapy solution for easier installation.
5. Install stationary vent glass and weatherstrip firmly into rear of door frame.
6. Install Run Assembly into door frame (front and top of door).
7. Set the main glass and retainer and division bar into position and install top screw and washer assembly. Assure that sealer at screw head covers holes for tight seal.
8. Install retainer and division bar attaching screw.
9. Install (2) glass to glass bracket rivets or use 1/4" x 20 x 1" Hex head bolts and 1/4" x 20 nuts.
10. Install door watershield and trim panel.

WINDOW REGULATOR—EXCEPT FAIRMONT AND ZEPHYR

Removal

1. Remove the door trim panel and watershield and *support the glass in the UP position.*
2. If equipped with electric windows (except Ford, Mercury, Thunderbird, Lincoln Continental and Continental Mark V), remove the center pin from the motor bracket to inner panel attaching rivet with a drift punch. Then drill the head from the rivet with a 1/4 inch drill and remove the rivet. Disconnect the motor wires at the connector.

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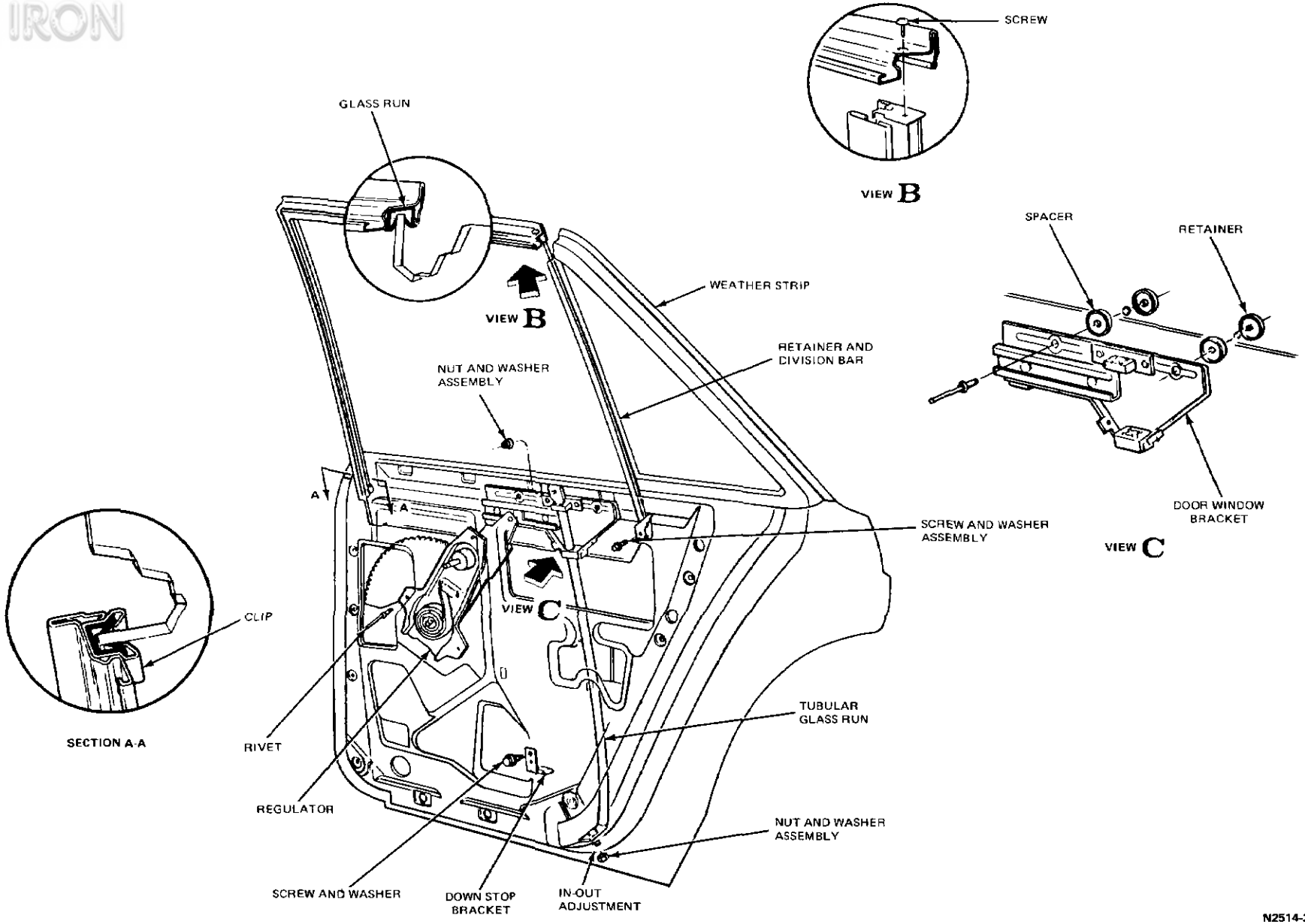


FIG. 2 Adjustment Points—Granada and Monarch Rear Door

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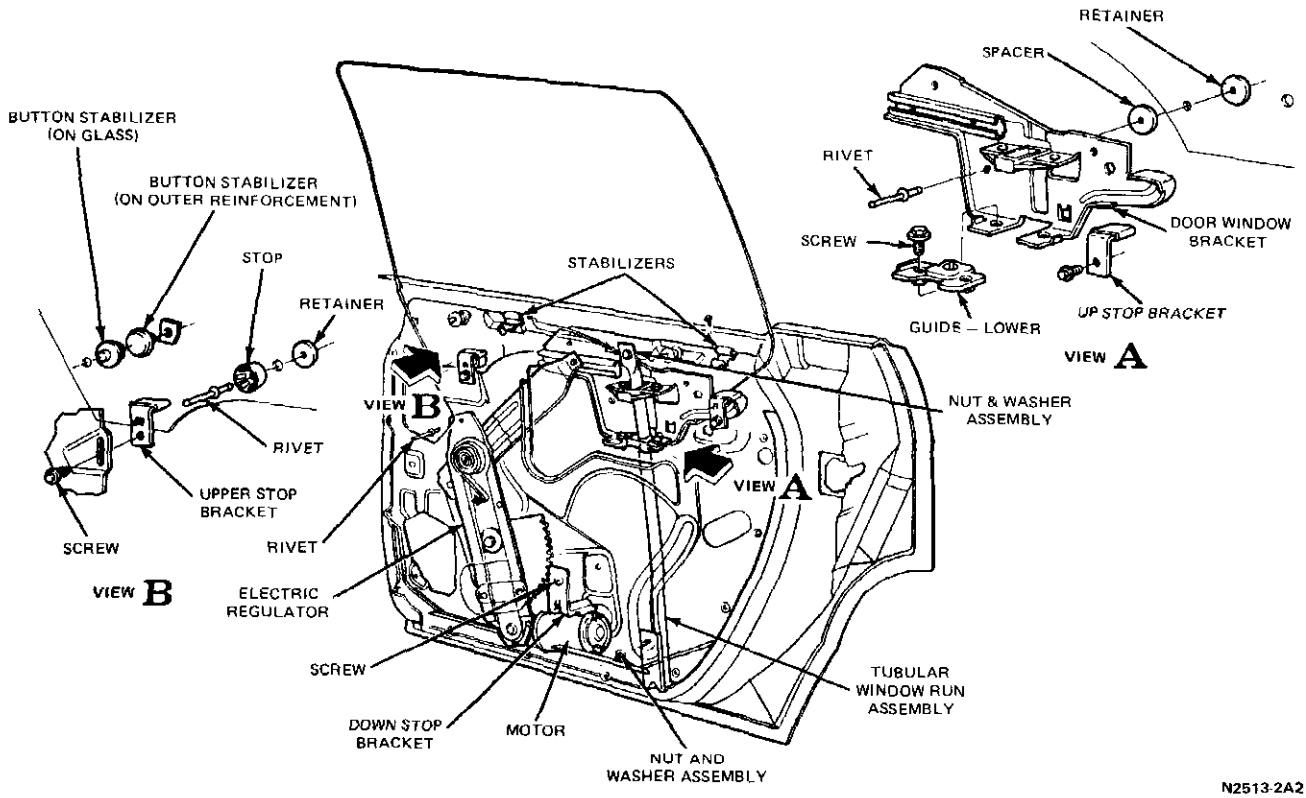


FIG. 3 Rear Door Window Mechanism—Lincoln Continental

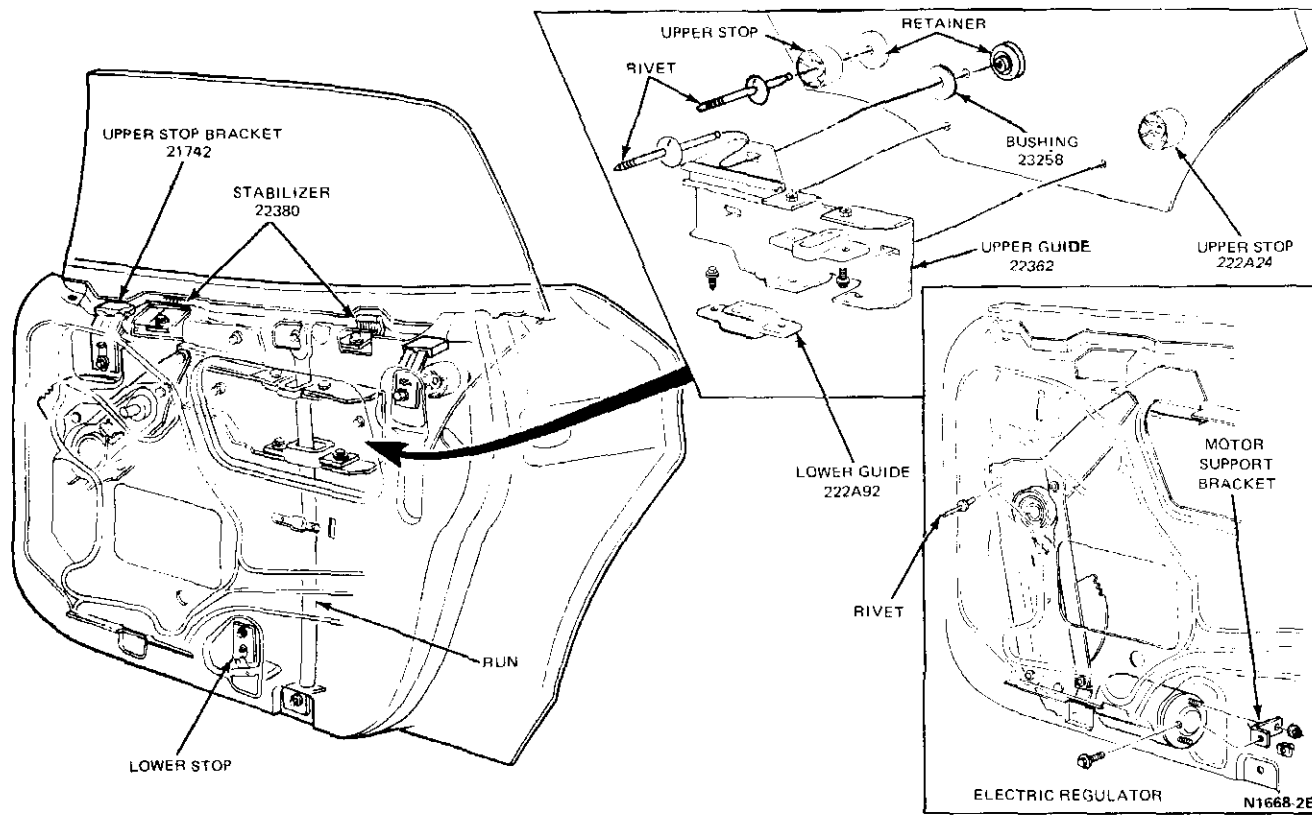


FIG. 4 Rear Door Window Mechanism—LTD II and Cougar

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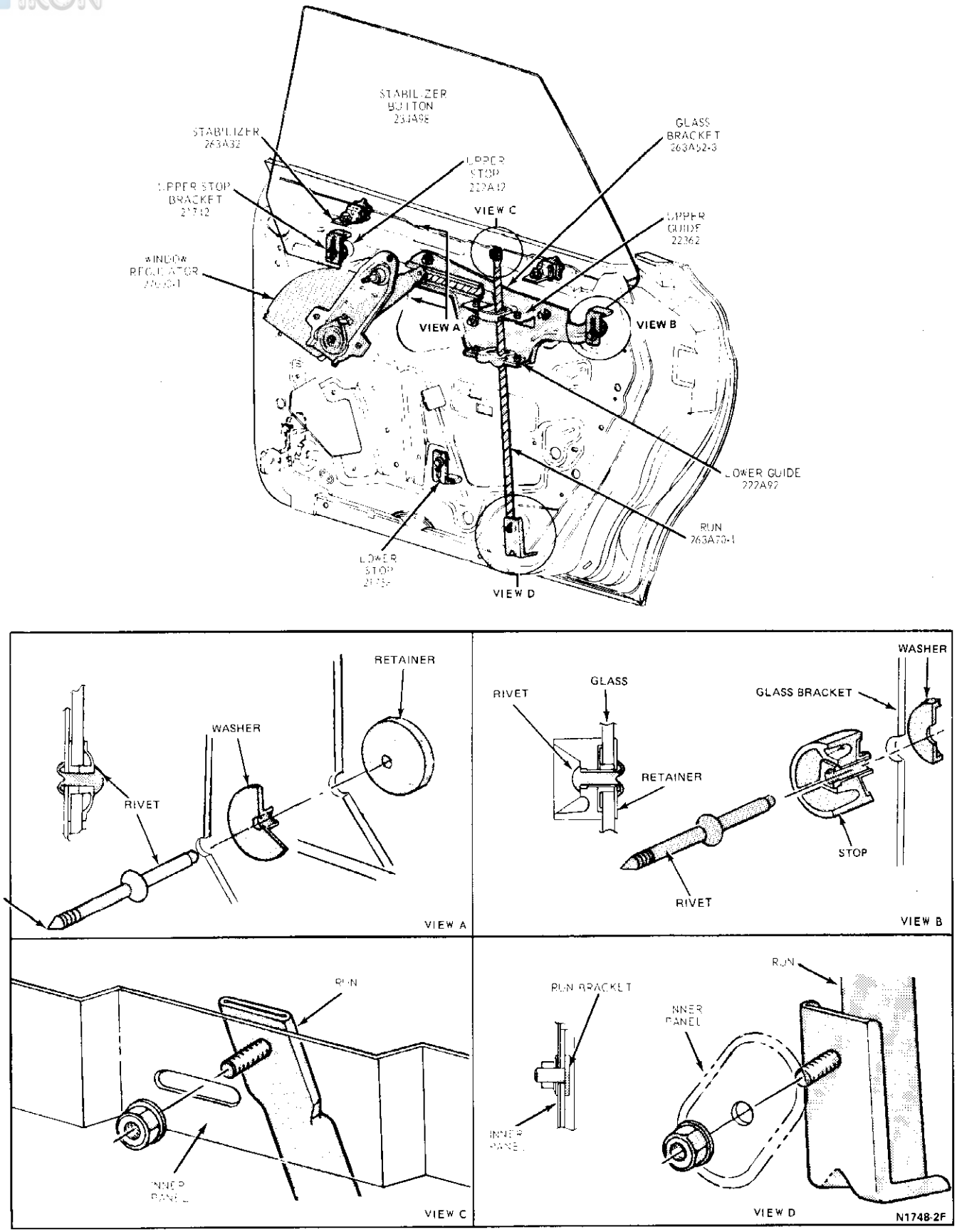


FIG. 5 Rear Door Window Mechanism—Ford and Mercury

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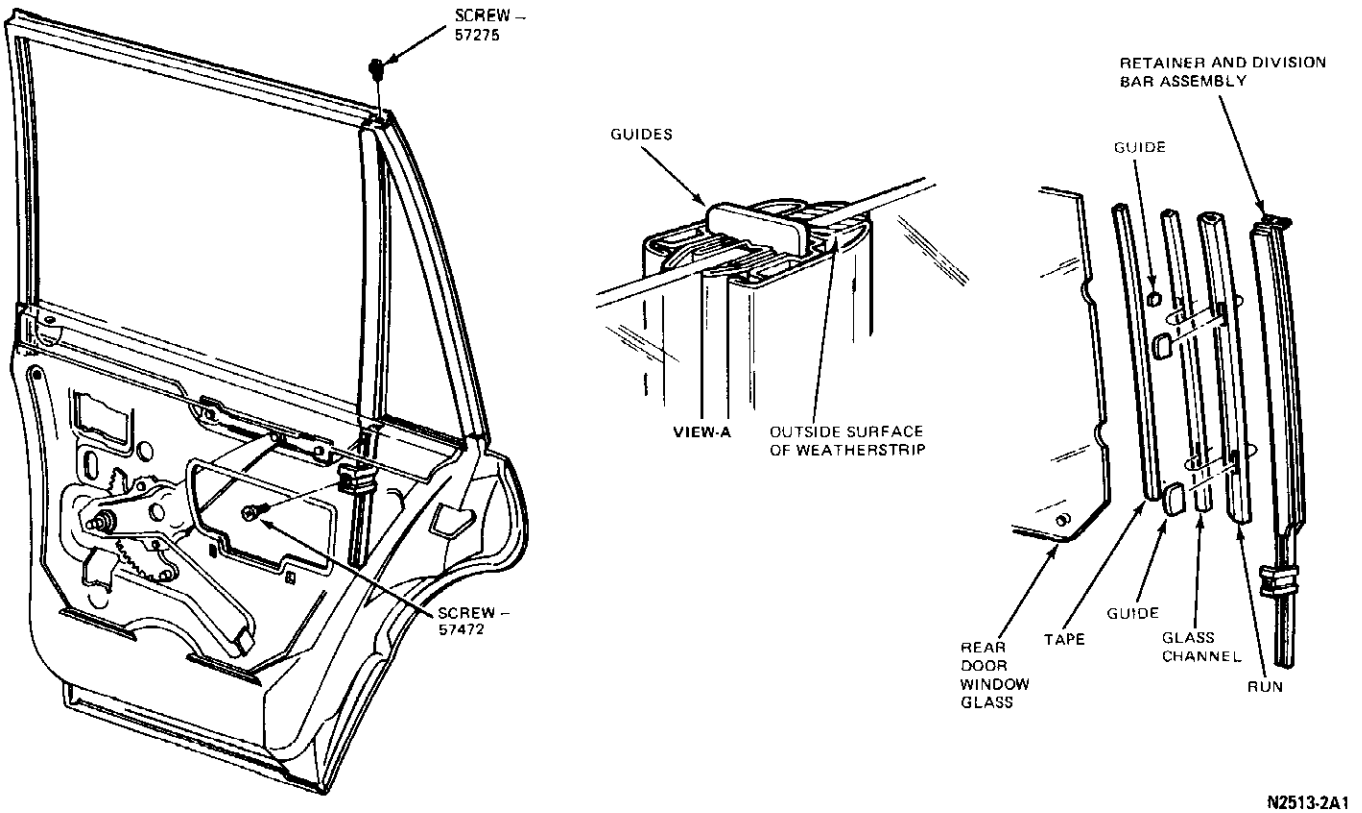


FIG. 6 Rear Door Window Mechanism—Fairmont and Zephyr

3. Remove the center pin from the regulator attaching rivets with a drift punch. Then drill the head from the regulator attaching rivets with a 1/4 inch drill.
4. Disengage the regulator arm from the glass bracket, and remove the regulator from the door.
5. If equipped with power windows, mount the regulator assembly in a vise. Drill a 5/16 inch hole through the regulator sector gear and the regulator plate. Install a 1/4 inch bolt and nut in the hole to prevent the sector gear from moving when the motor and drive assembly is removed. Remove the motor and drive from the regulator. Install the motor and drive on a new regulator.

Installation

1. Lubricate the window mechanism as outlined in Part 42-01.
2. Install nut and retainer assemblies on the regulator mounting plate and motor support bracket at the rivet attaching holes.
3. Position the window regulator into the door and insert the regulator arm roller into the glass bracket channel.
4. Position the regulator to the inner panel, and install 1/4-20x1/2 inch screw and washer assemblies to attach the regulator to the inner panel. Tighten the screws securely.
5. If equipped with electric windows, install a 1/4-20x1/2 inch screw and washer assembly to attach the motor bracket to the inner panel (except Ford, Mercury, Thunderbird, Lincoln Continental and Continental Mark V). Connect the motor wires at the connector.
6. Check the operation of the window mechanism. Then, install the watershield and trim panel on the door.

WINDOW REGULATOR—FAIRMONT AND ZEPHYR

Removal

1. Remove rear door trim panel and water shield.
2. Remove (3) attaching rivets. Remove the center pin from the rivets with a drift punch. Drill out the head of the rivet using 1/4" drill. Be carefull not to route or enlarge sheet metal holes during drilling.
3. Remove regulator arm roller from the glass bracket channel and remove the regulator from the door.

Installation

1. Lubricate the window mechanism as outlined in Part 42-01.
2. Install regulator into access hole in the inner panel.
3. Position the regulator arm roller into the glass bracket channel.
4. Install (3) rivets attaching the regulator to door inner panel (1/4"-20 x 1/2" bolt and 1/4"-20 nut and washer assemblies may be used as alternate).

WINDOW MOTOR AND/OR DRIVE

Removal

1. Remove the trim panel and watershield.
2. Disconnect the motor wires at the multiple connector.
3. All models except Ford, Mercury, Thunderbird, Lincoln Continental and Continental Mark V have

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holes punched in the door panel for motor and drive removal. On models without access holes, use the dimples located on the inner door panel to drill three 3/4 inch holes in the door for access to the motor and drive attaching screws. The holes should be drilled with the glass in the **UP** position. The hole saw pilot drill should be as short as possible, about 1/4 inch beyond the saw.

4. Working through the 3/4 inch holes, remove the three motor and drive-to-regulator attaching screws. Remove the motor and drive from the door.

Installation

1. Position the motor and drive to the regulator and install the three screws **just snug—not tight.**
2. Connect the motor wires at the connector and cycle the glass to assure gear engagement. After the gears are engaged, tighten the three motor and drive attaching screws.
3. Check the window operation and install body tape over the drilled hole (Ford, Mercury, Thunderbird, Lincoln Continental and Continental Mark V). Then, install the watershield and trim panel.

RUN AND/OR GUIDES

Removal

1. Remove the trim panel and watershield from the door.
2. Support the glass and remove four screws attaching the upper and lower guides to the glass bracket (Figs. 2, 3, 4 and 5).
3. Remove the run upper and lower attaching screws, and remove the run and guides from the door.
4. Remove the guides from the run (Figs. 2, 3, 4 and 5).

Installation

1. Assemble the guides on the run making sure they are in the correct order (Figs. 2, 3, 4 and 5).
2. Position the run in the door and the guides to the glass bracket.
3. Install the run upper and lower attaching screws, and the guide attaching screws.
4. Adjust the run and guides as outlined in the Adjustment Section.
5. Install the watershield and door trim panel.

SPECIFICATIONS

SINGLE TUBULAR RUN REAR DOOR WINDOW MECHANISM TORQUE SPECIFICATIONS

Description	Torque
Glass Stop Attaching Screw (1)	6-11 ft-lb
Run Attaching Screws	6-11 ft-lb
Stabilizer Attaching Screws	6-11 ft-lb
Upper Stop Bracket	6-11 ft-lb
Motor Bracket-to-Motor	13-32 in-lb
Motor Bracket and/or Regulator-to-Inner Panel (1)	6-11 ft-lb
Guide-to-Glass Bracket	6-11 ft-lb
Glass-to-Glass Bracket (1)	6-11 ft-lb

(1) Rivets are used in production.

CN2445-1B

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Pivot Type Quarter Window

PART 42-33

SUBJECT	PAGE
REMOVAL AND INSTALLATION	
Glass	33-1
Latch	33-2
REMOVAL AND INSTALLATION (Cont'd.)	
Quarter Window Assembly	33-2

CR2027-2B

REMOVAL AND INSTALLATION

Refer to Part 43-01 for fixed Quarter Windows.

GLASS

PINTO AND BOBCAT (EXCEPT WAGON)

Removal

1. Remove the latch trim cover (Fig. 1).
2. Remove two screws attaching the latch to the roof side.
3. With an assistant, press on each side of the hinge, and pull the hinge from the body. Repeat this procedure for the other hinge.
4. Push the hinge pin from each hinge with a small diameter rod inserted through the hole in the bottom of the hinge. Then, remove the hinges from the glass frame.

Installation

1. Install the latch bolt and nut on the glass.
2. Position latch to the latch bolt and install the pin.

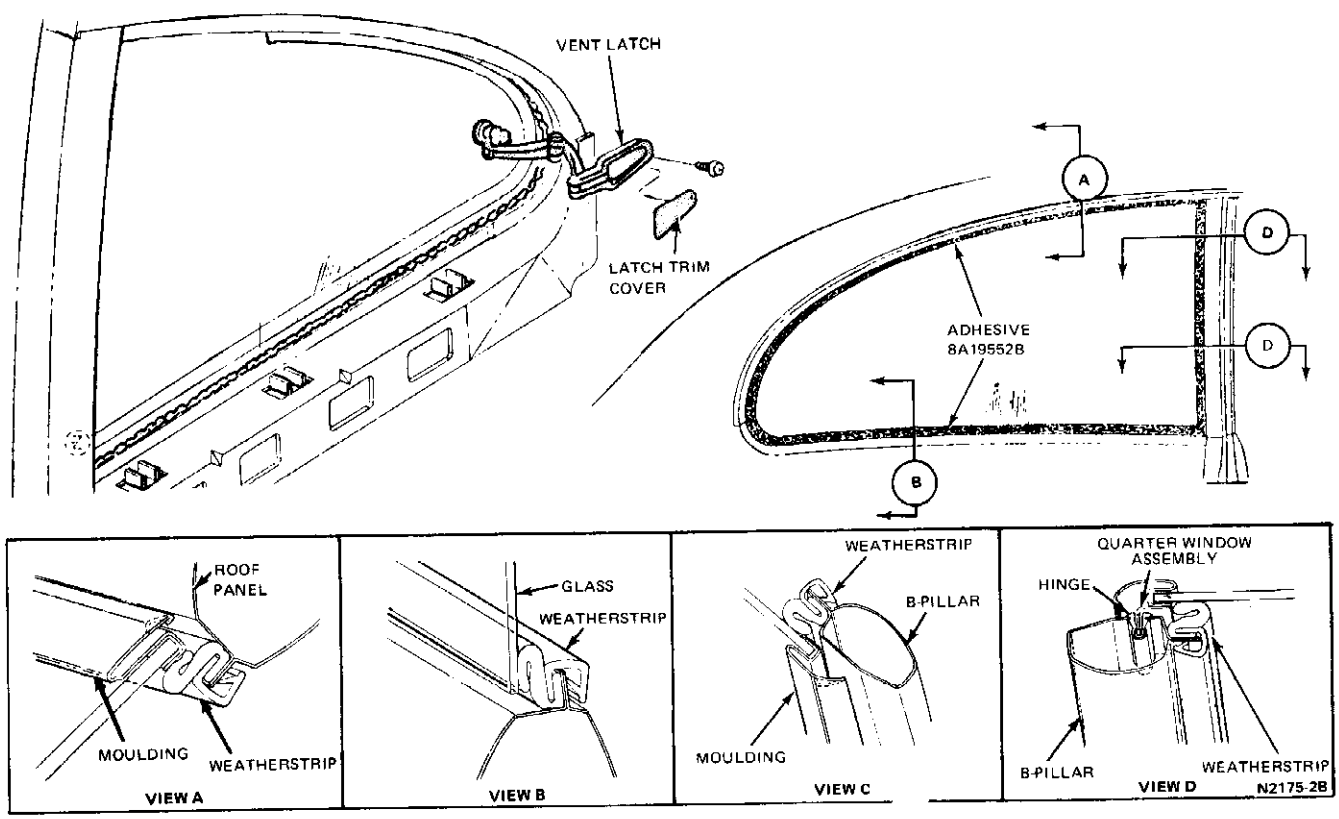


FIG. 1 Quarter Vent Window—Pinto and Bobcat (Except Wagon)

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3. Position the hinges to the glass and install the hinge pins. The large hole in the hinge must be on top when installed.
4. Position the glass and hinges to the body. Press the hinges firmly into place.
5. Position the latch to the roof side rail and install the two attaching screws.
6. Install the latch trim cover.

PINTO AND BOBCAT WAGON

Removal

1. Mark the position of the latch on the body. Then, remove three screws attaching the latch to the body (Fig. 2).
2. With an assistant, depress each side of the hinge, and pull the hinge from the body. Repeat this procedure for the other hinge.
3. Push the hinge pin from each hinge with a small diameter rod inserted through the hole in the bottom of the hinge. Then, remove the hinges from the glass frame.
4. Remove the latch from the glass.

Installation

1. Install the latch on the glass.
2. Position the hinges to the glass and install the hinge pins. The large hole in the hinge must be on the top when installed.
3. Position the hinges to the body and press them firmly into place.
4. Position the latch to the body in the exact same location as it was before being removed. Failure to properly position the latch could result in glass failure.
5. Install the three latch attaching screws.

LATCH

1. Remove the latch trim cover (Fig. 1).
2. Remove two screws attaching the latch to the roof side.
3. Remove the pin from the latch retainer and latch at the glass. Then, remove the latch from the retainer.
4. Position the latch to the retainer and install the pin.
5. Position the latch to the roof side, and install the two attaching screws.
6. Install the latch trim cover.

QUARTER WINDOW ASSEMBLY

Mustang II

The Mustang II 3-door model quarter window is replaced as a window assembly (Fig. 3).

Removal

1. Remove the window upper retaining screws (3).

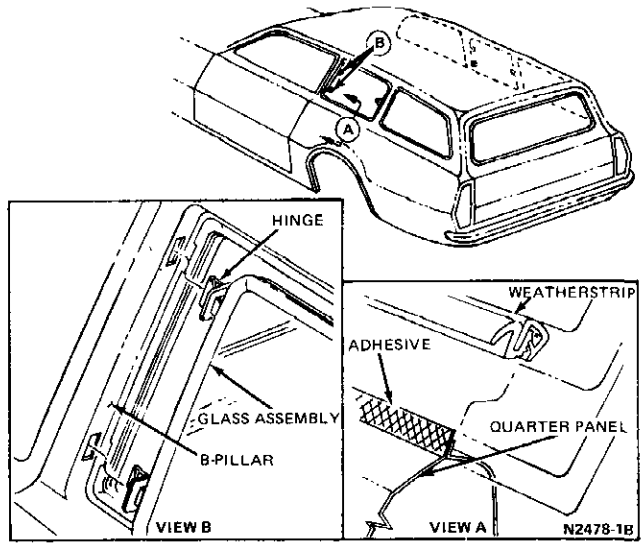


FIG. 2 Quarter Window—Pinto and Bobcat Station Wagon

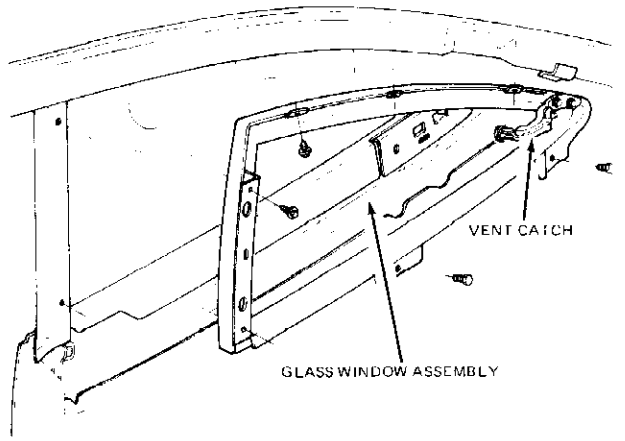


FIG. 3 Quarter Window—Mustang II 3-Door Model

2. Remove the window front retaining screws (3).
3. Remove the window lower retaining bolts (2).
4. Remove the quarter window assembly.

Installation

1. Position the quarter window assembly and install the window lower retaining screws (2) hand tight.
2. Install the window front retaining screws (3).
3. Install the window upper retaining screws (3).
4. Position the quarter window, making certain that it is properly seated.
5. Tighten the screws and torque the window lower retaining bolts (2) to 6-11 ft-lbs.

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Stationary Quarter Window

PART 42-38

SUBJECT	PAGE	SUBJECT	PAGE
ADJUSTMENTS	38-1	REMOVAL AND INSTALLATION	38-3

CR2030-2B

ADJUSTMENTS

Thunderbird, LTD II and Cougar

Minor inboard/outboard adjustment of the stationary quarter window-to-door glass can be done by removing the pressure relief valve from the lock pillar, to gain access to the quarter window glass bracket retaining screw. Loosening the glass bracket retaining screw allows inboard/outboard movement of the front edge of the quarter glass, so that a proper seal at the door glass is obtained (Fig. 1).

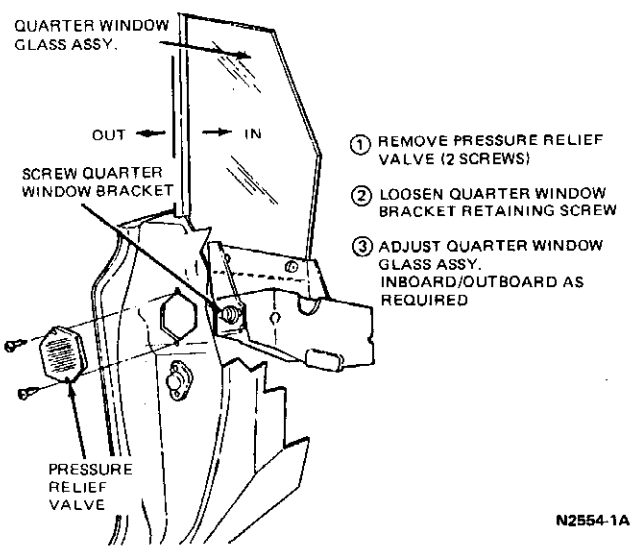


FIG. 1 Stationary Quarter Window Glass Adjustment Procedure—Thunderbird, LTD II and Cougar

GLASS IN-OUT ADJUSTMENT

To adjust, loosen the two screws attaching the guide assembly to the quarter inner panel. Move the glass inboard or outboard as necessary, to align with the door glass at the belt. Then, tighten the guide attaching screws.

GLASS FORE-AFT TILT ADJUSTMENT

To adjust, loosen the quarter window guide lower bracket-to-inner panel attaching screw. Then, tilt the glass as required to obtain a parallel fit between the quarter glass and the door glass. Tighten the lower bracket attaching screw.

GLASS IN-OUT TILT ADJUSTMENT

To adjust the in-out tilt of the top of the glass, loosen the guide-to-lower bracket attaching screw and move the lower end of the guide inboard or outboard as necessary, to align the top edge of the quarter glass with the door glass. Then, tighten the guide-to-lower bracket attaching screw.

GLASS UP-DOWN ADJUSTMENT

Loosen the front and rear up-stop screws and hex flanged nut and raise the glass until a good seal is obtained between the quarter glass, door glass and the roof rail weatherstrip. Tighten the hex flanged nut and then, position the front and rear up-stops firmly against the glass bracket and tighten the attaching screws.

GLASS IN-OUT AND FORE-AFT ADJUSTMENTS

1. To adjust, loosen the two screw and washers attaching the bracket to the inner panel at the belt line.
2. Loosen the screw and washer attaching the bottom of the bracket to the support assembly.
3. Make the necessary fore-aft and in-out adjustments assuring that the door and quarter glass is at a parallel fit with approximately 3/16" to 1/4" margin.
4. Tighten the three screw and washers to 6-11 ft-lbs torque.

GLASS FORE-AFT TILT ADJUSTMENT

1. To adjust, loosen the three screw and washers attaching the bracket to the glass.
2. Make the necessary fore-aft tilt adjustment, assuring that the door and quarter glass is at a parallel fit with approximately a 3/16" to 1/4" margin.
3. Tighten the three screw and washers to 6-11 ft-lbs torque.

GLASS UP-DOWN ADJUSTMENT

1. To adjust, loosen the three nuts attaching the glass to the bracket.

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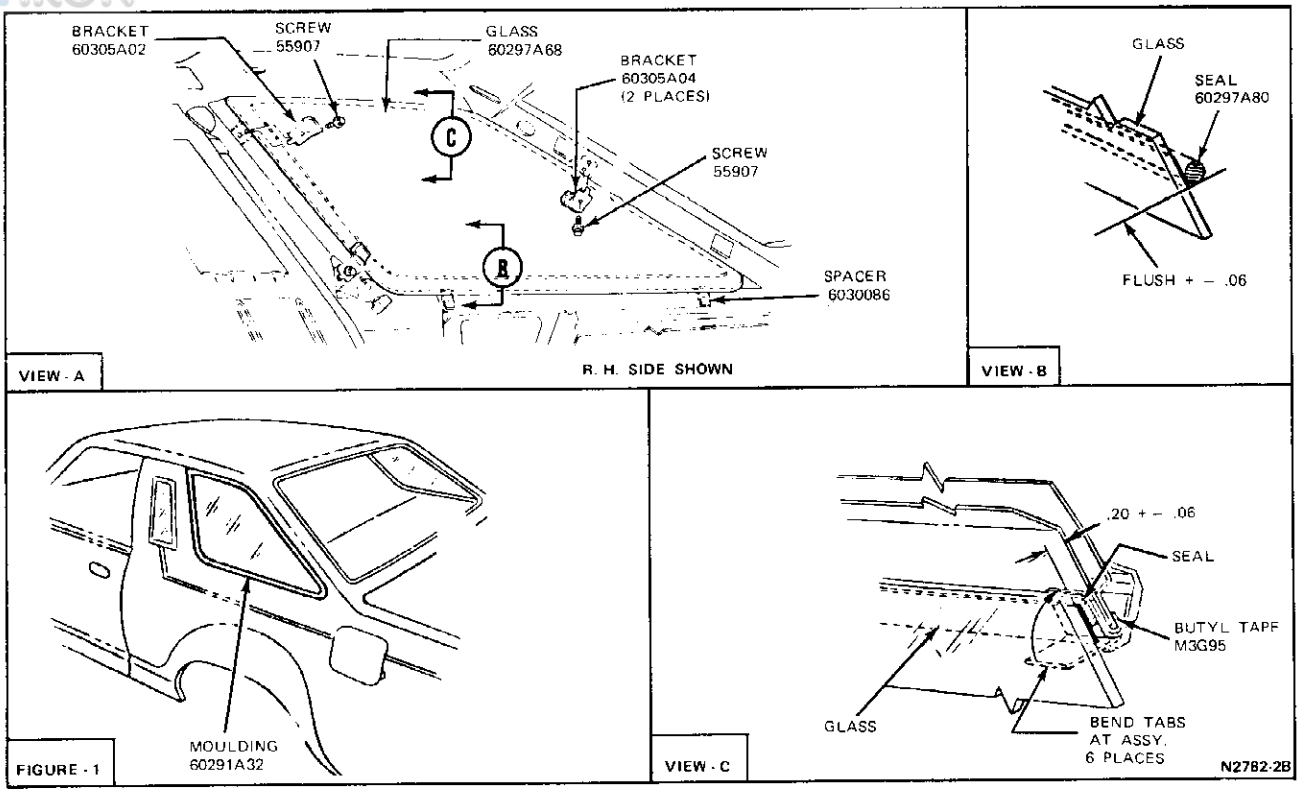


FIG. 2 Stationary Quarter Window Installation—Thunderbird

2. Raise or lower the quarter glass to obtain a proper seal between the glass and the roof rail weatherstrip, by adjusting the nut securing the glass retainer-to-tab on the quarter glass bracket.
3. Tighten the three nuts to 6-11 ft-lbs torque.

Continental Mark V

While the following adjustments can be made separately to correct specific conditions, complete adjustment is performed in the following sequence. All adjustments must be performed after the door glass is properly adjusted and with the trim panel, watershield and sound insulator removed.

GLASS UP-DOWN AND FORE-AFT TILT ADJUSTMENTS

1. Loosen the two screw and washer assemblies attaching the quarter window glass bracket upper support assembly to the quarter inner panel (Fig. 2).
2. Loosen the one screw and washer assembly attaching the quarter window glass bracket lower support assembly to the quarter inner panel.
3. Manually, raise or lower the quarter window to obtain a seal condition into the pocket of the roof rail weatherstrip.
4. Make sure that the door and quarter glass is at a parallel fit with approximately 3/16" to 1/4" margin.
5. Tighten the three screw and washer assemblies to 6-11 ft-lbs torque.

GLASS FORE-AFT AND IN-OUT TILT ADJUSTMENTS

1. Loosen the two screw and washer assemblies attaching the quarter window glass bracket upper support assembly to the quarter inner panel (Fig. 2).
2. Loosen the one screw and washer assembly attaching the quarter window glass bracket assembly to the quarter window glass bracket lower support assembly.
3. Make the necessary fore-aft and in-out tilt adjustments assuring that the door and quarter glass is at a parallel fit with approximately a 3/16" to 1/4" margin.
4. Tighten the three attaching screw and washer assemblies to 6-11 ft-lbs torque.

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REMOVAL AND INSTALLATION

QUARTER WINDOW ASSEMBLY

Mercury

Removal

1. Remove the rear seat cushion, quarter arm rest, roof side inner rear moulding, quarter trim panel and watershield.
2. Remove the two screw and washers attaching the bracket to the inner panel at the belt line.
3. Remove the three nut and washers attaching the bracket to the glass.
4. Using caution so the quarter glass and bracket does not fall, remove the remaining screw and washer attaching the support assembly to the quarter inner panel.
5. Separate the glass from the bracket and remove the glass between the inner and outer quarter panels at the belt line.
6. Remove the bracket and support assembly through the access hole in the inner panel.
7. Then, remove the weatherstrip and glass-to-bracket attachments from the glass.

Installation

1. Install the mounting tape, retainer and weatherstrip on the front edge of the glass.
2. Install one bolt, washer, bushing and teenut into each of the three holes in the glass and tighten 6-11 ft-lbs torque.
3. Install one spring nut to the support assembly.
4. Install two spring nuts at the two holes in the top flange of the bracket.
5. Attach the support assembly to the bracket with one screw and washer.
6. Then, install the bracket and support assembly through the access hole in the quarter inner panel and assemble the lower support attachment to the inner panel with one screw and washer (loosely).
7. Install the window assembly between the inner and outer quarter panels (at the belt line) and insert the three studs on the window assembly into the bracket slots.
8. Insert the threaded end of the retainer through the hole in the tab on the glass bracket and engage the hole in the retainer on to the lower stud of the three hole pattern of the glass.
9. Assemble the retainer loosely, with the two nut and washers.
10. Assemble the upper two attachments of the bracket to the inner panel (at the belt line) with two screw and washers (loosely).
11. Refer to the Adjustment Procedures and adjust the window as required.
12. Install the water shield, quarter trim panel, roof side inner moulding, arm rest and rear seat cushion assembly.

Continental Mark V (Fig. 3)

Removal

1. Remove the rear seat cushion assembly, quarter arm rest, quarter trim panel (upper and lower), watershield, sound insulator, roof side inner mouldings (front and rear), shoulder strap (at roof rail) and the roof side rear trim panel.
2. Remove the four screws attaching the quarter lock pillar-to-window frame seal assembly to the quarter lock pillar.
3. Remove the one screw attaching the bottom end of the quarter glass at belt inside weatherstrip assembly to the quarter panel assembly.
4. Remove the seven tapping screws attaching the rear roof quarter window housing and the glass at belt inside weatherstrip assembly.
5. Remove the two screw and washer assemblies attaching the quarter window glass bracket assembly to the quarter window glass bracket upper support assembly.
6. Remove one screw and washer assembly attaching the quarter window glass bracket assembly to the quarter window glass bracket lower support assembly and carefully lower the window assembly to rest at the bottom of the quarter panel.
7. Remove the five screws attaching the quarter window outside moulding assembly to the quarter panel.
8. Remove the window bracket assembly through the opening between the inner and outer quarter panel at the belt line.

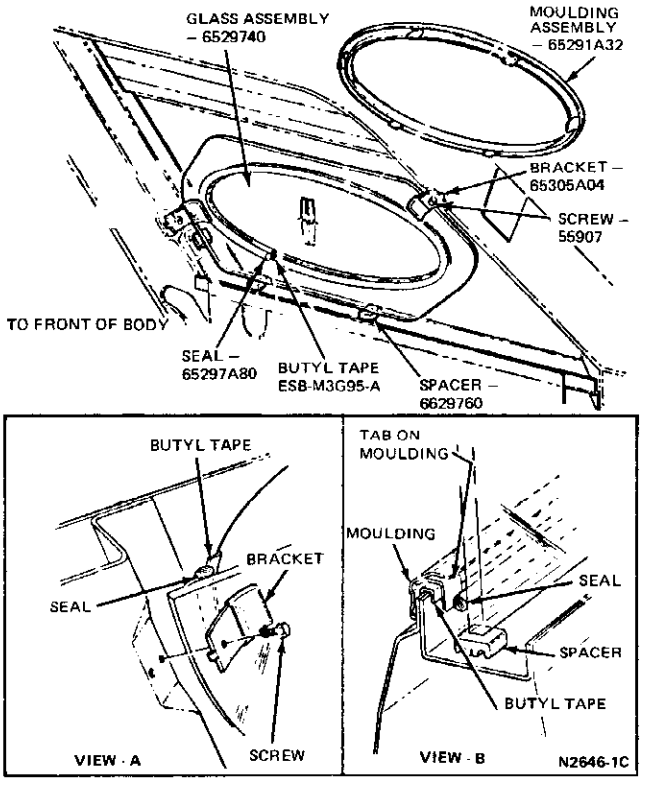


FIG. 3 Quarter Window Housing and Moulding Assembly Installation—Continental Mark V

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9. Remove the one screw and washer assembly attaching the quarter window glass bracket assembly to the bracket assembly retainer.
10. With the window assembly on a work bench, use a drift punch and remove the center pin from the two rivets attaching the glass to the bracket assembly. Then, remove the rivets by drilling them out with a 1/4" drill.

Installation

1. Assemble and attach the quarter window glass to the bracket assembly with one spacer, one retainer assembly, one 1/4"-20 x 1" hex head bolt and 1/4"-20 nut and washer assembly. Tighten to 6-11 ft-lbs torque.
2. Assemble the quarter window glass bracket assembly to the bracket assembly retainer with one screw and washer assembly and tighten to 6-11 ft-lbs torque.
3. Insert the quarter window assembly into the opening between the inner and outer quarter panel assembly and carefully lower it to rest at the bottom of the quarter panel.
4. Attach the quarter window outside moulding assembly to the quarter panel with five screws.
5. Raise the window to the installed position and loosely assemble the lower attachment of the quarter window glass bracket assembly to the quarter window glass bracket lower support assembly with one screw and washer assembly.
6. Loosely assemble the two upper attachments of the quarter window glass bracket assembly to the quarter glass bracket upper support assembly with two screw and washer assemblies.
7. Refer to the Adjustment Procedures (this Part) and adjust the window as required.
8. Install the rear roof quarter window housing and the quarter window glass at belt inside weatherstrip assembly (attached to housing) with seven tapping screws.
9. Install the quarter lock pillar-to-window frame seal assembly to the quarter lock pillar with four screws.
10. Install the watershield, sound insulator, roof side rear trim panel, shoulder strap (at roof rail), quarter trim panel (upper and lower), roof side inner mouldings (front and rear), quarter arm rest and rear seat cushion assembly.

Other Models

See Figs. 4 through 7 for installation on other models.

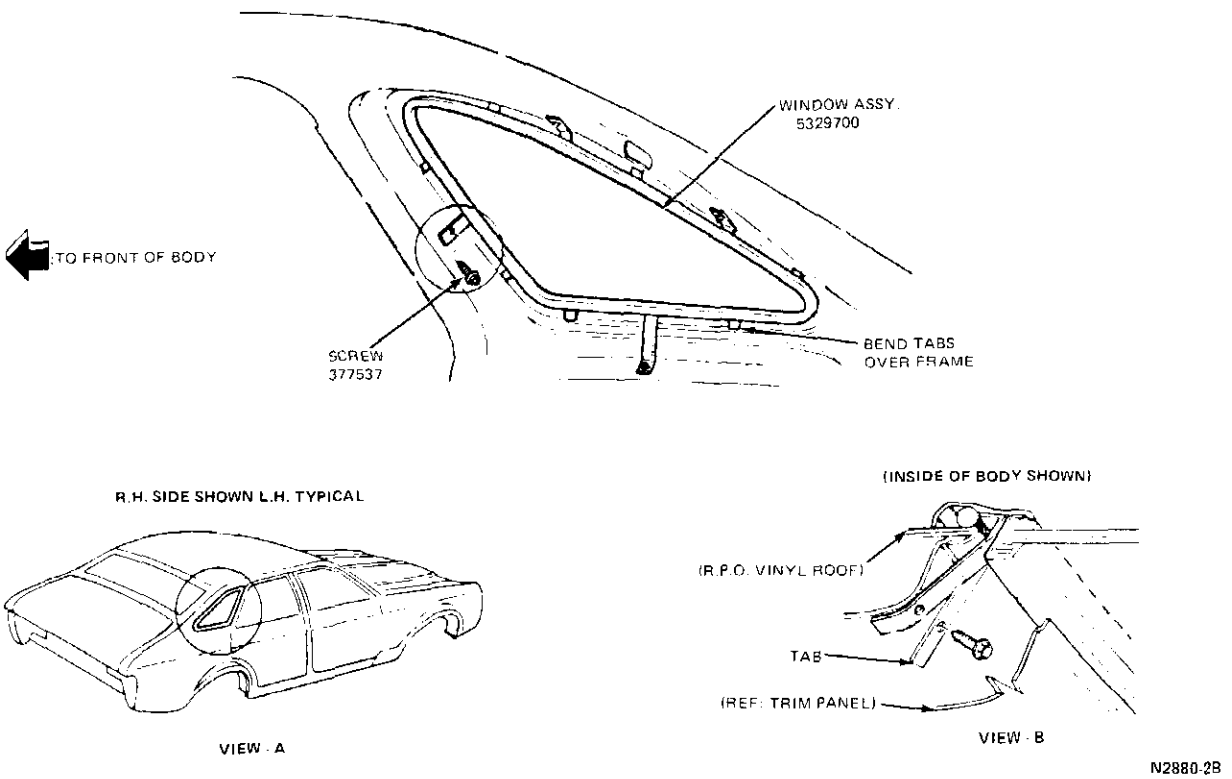


FIG. 4 Quarter Window (RPO)—LTD II and Cougar

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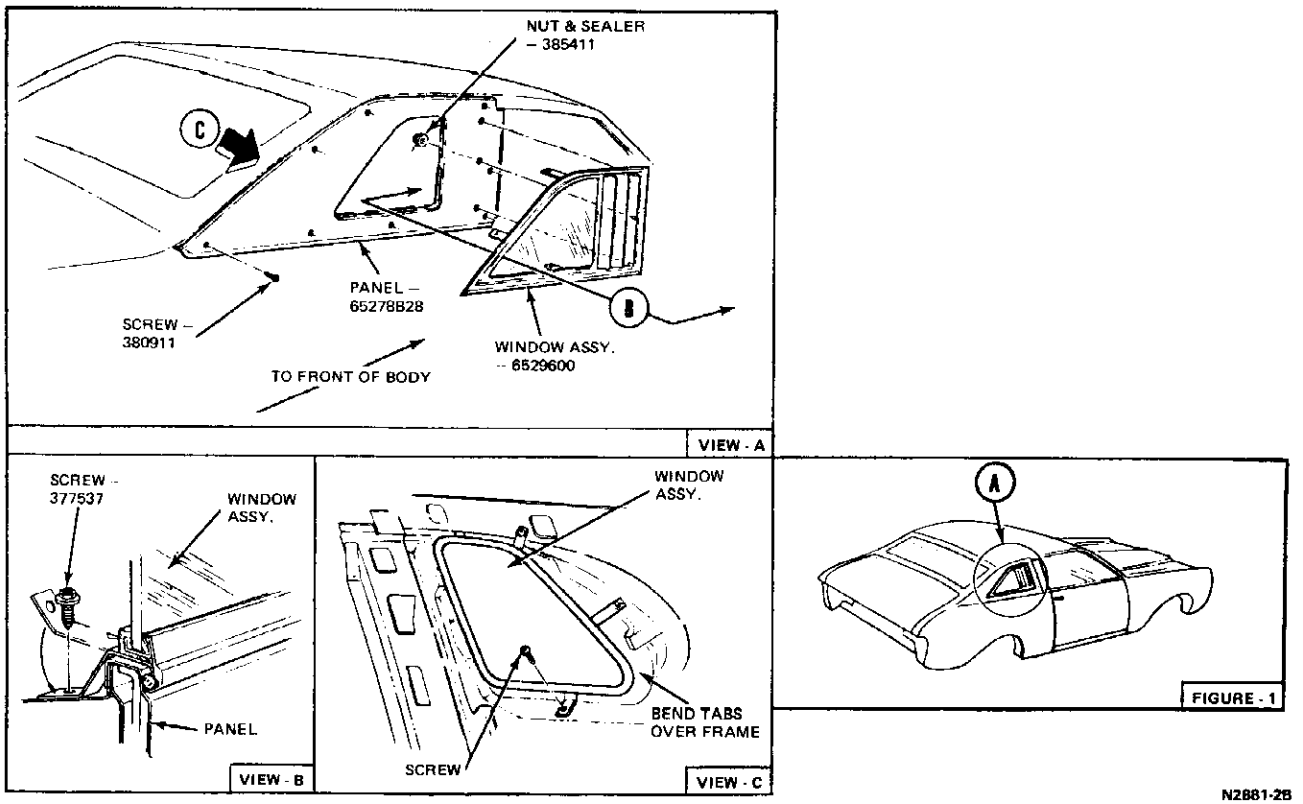


FIG. 5 Quarter Window—Cougar XR7

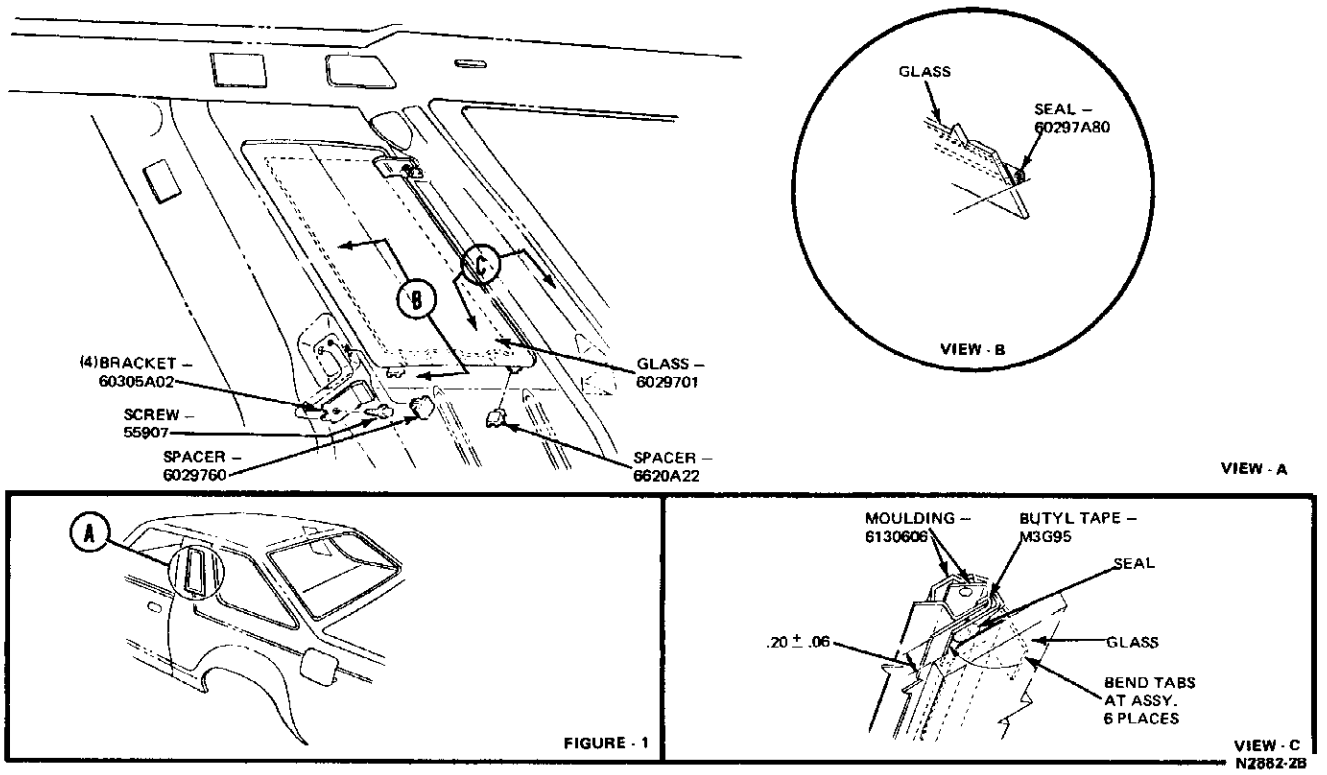


FIG. 6 Opera Window—Thunderbird

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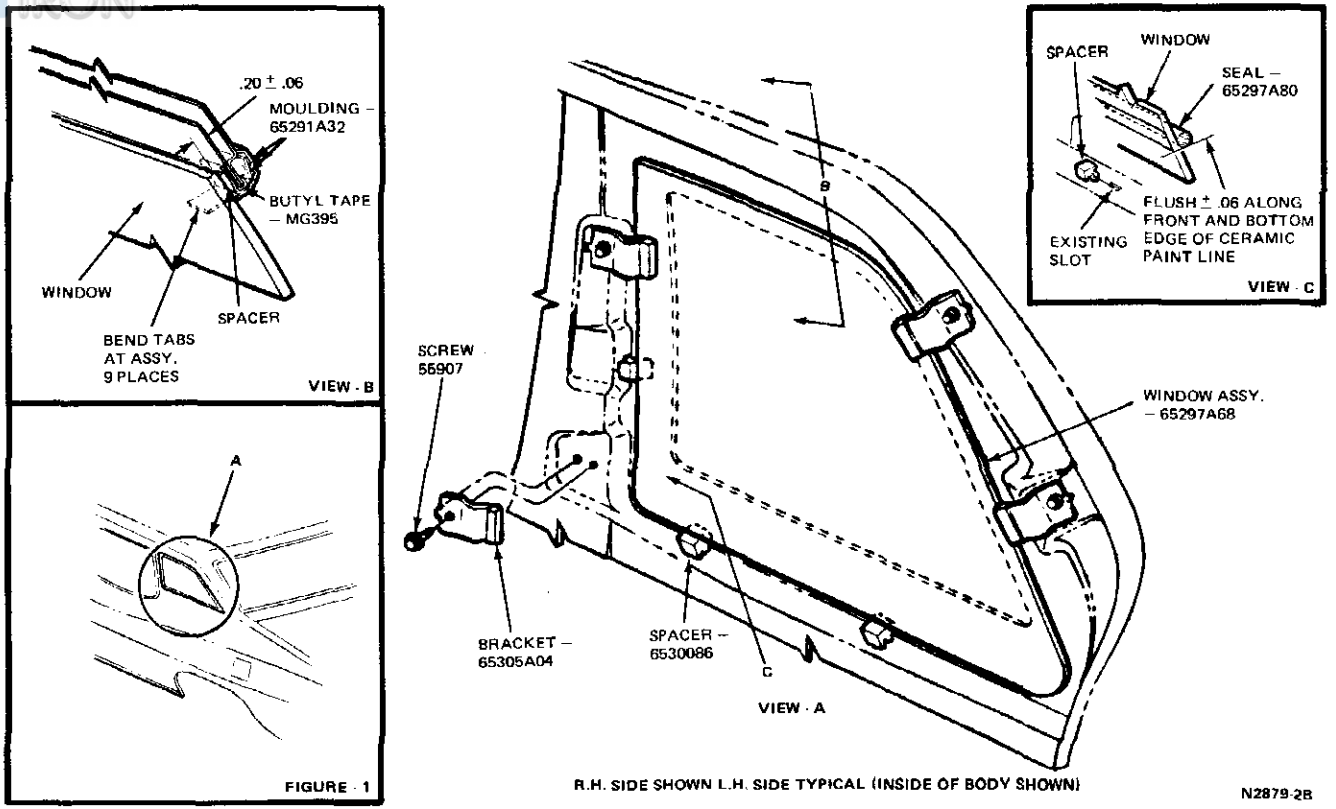


FIG. 7 Quarter Window—LTD II and Cougar 2-Dr.

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Tailgate Window Glass and Mechanism -- Dual Action Gate

PART 42-41

SUBJECT	PAGE
ADJUSTMENTS	41-1
REMOVAL AND INSTALLATION	
Glass	41-2
REMOVAL AND INSTALLATION (Cont'd.)	
Motor and/or Drive	41-3
Regulator	41-2
Run	41-2

CR2031-2B

ADJUSTMENTS

TAILGATE WINDOW ADJUSTMENT

FORD AND MERCURY

Separate adjustment steps are given for each adjustment so that a partial glass adjustment can be performed. If a complete glass adjustment is required, follow the adjustments in the order given. All window mechanism adjustments except the in-out tilt of the top edge of the glass must be performed with the trim panel removed. The in-out tilt adjustment can be performed without removing the trim panel. After the adjustment(s) are completed, operate the window up and down to see if the mechanism is free of binds which cause hard operating efforts for manual windows or sluggish operation for electric windows. If binding is found to exist, repeat the adjustment(s). Install the tailgate trim panel (if removed) after the adjustments are completed.

Glass Position—Full-Up

The tailgate glass should be properly positioned within the glass opening to assure a good seal around the glass with the weatherstrip. The top edge of the glass should also be parallel to the top of the glass opening when the glass is closed. To adjust, loosen each upper stop bracket attaching screw (Item A, Fig. 1), and again check the glass fit. If the glass fit is not as specified, loosen the four window regulator attaching bolts (Item B, Fig. 1). Move the glass until the top edge of the glass is parallel to the glass opening, and tighten the regulator attaching bolts. After the glass has been positioned in the opening, move the upper stop brackets down firmly against the stops and tighten the attaching screws.

Glass Position—Side-to-Side

The tailgate glass can be positioned from side-to-side to obtain a good seal overlap with the side weatherstrips. To adjust, loosen the two lower right guide-to-glass attaching screws (Item C, Fig. 1). Then, move the glass from side-to-side as necessary to obtain a good glass overlap with the weatherstrip on each side of the glass. Tighten the guide attaching screws after the glass has been moved to the desired position.

Glass Tilt—In and Out

The top edge of the tailgate glass can be tilted in or out to obtain a good seal against the weatherstrip. To adjust, loosen the glass run lower attaching screws (Item D, Fig. 1). Then, move the run lower ends forward or rearward as necessary to move the glass top edge against the weatherstrip to obtain a good seal. Tighten the run lower attaching screws after a good seal is obtained.

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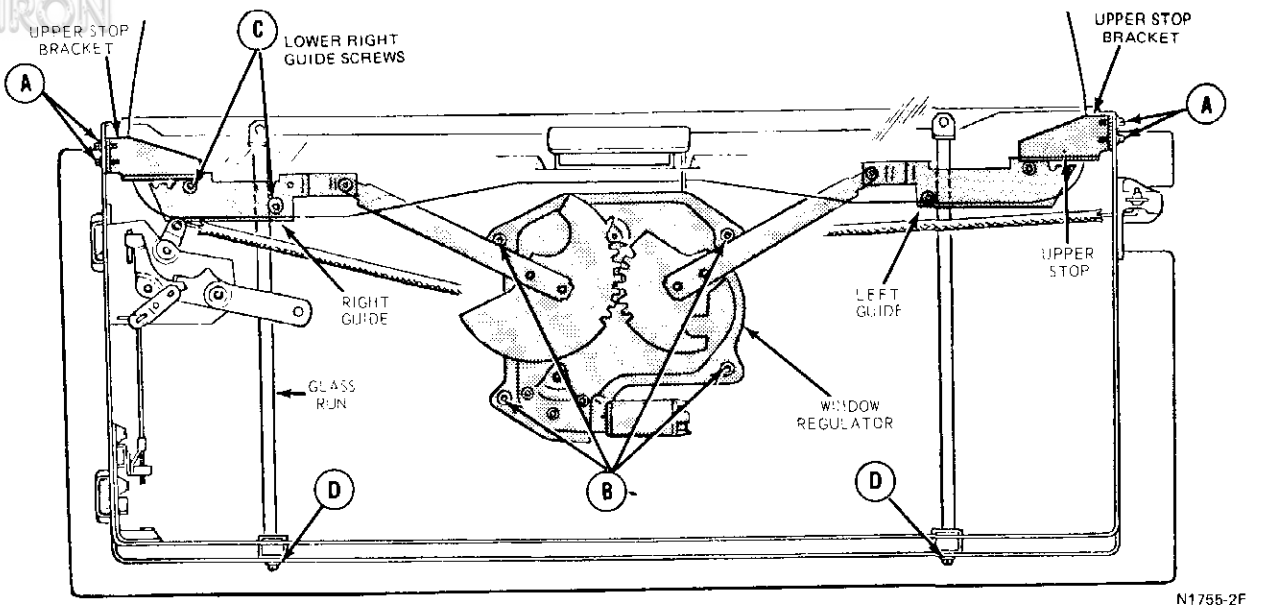


FIG. 1 Tailgate Window Mechanism Adjustment—Ford and Mercury

REMOVAL AND INSTALLATION

TAILGATE GLASS

FORD AND MERCURY

Removal

1. Remove the tailgate inside cover and watershield.
2. Remove the tailgate inner panel lower access cover.
3. Lower the tailgate to the DOWN position, and raise the glass until the glass brackets are accessible.
4. Remove the center pin from the glass-to-glass bracket rivets with a drift punch. Then, drill the heads from the rivets with a 1/4 inch drill, and remove the rivets.
5. Disconnect the wires from the rear window defroster terminals, if so equipped.
6. Slide the glass from the tailgate.

Installation

1. Position the glass into the tailgate and to the glass brackets. Be sure the spacers are placed between the glass and the glass bracket (Fig. 2).
2. Install 1/4-20 x 1 inch hex head bolts and 1/4-20 hex head nuts to attach the glass bracket to the glass. Tighten the bolts and nuts to specification.
3. Adjust the glass as outlined in ADJUSTMENTS in this part.
4. Connect the wires to the rear window defroster terminals, if so equipped.
5. Install the tailgate inner panel lower access cover, and the watershield and tailgate inside cover.

REGULATOR

FORD AND MERCURY

Removal

1. Remove the tailgate glass.
2. Remove the glass brackets from the regulator arm rollers.
3. Disconnect the motor wires at the connector.
4. Remove four regulator attaching screws and remove the regulator from the tailgate (Fig. 2).
5. Drill a 5/16 inch hole through the regulator sector gear and regulator plate. Install a 1/4 inch bolt and nut through the hole to prevent the sector gear from moving when the motor and drive assembly is removed from the regulator. Remove the motor assembly from the regulator.

Installation

1. Position the regulator in the tailgate and install the attaching screws.
2. Connect the regulator motor wires at the connector.
3. Install the tailgate glass.

GLASS RUN

FORD AND MERCURY

Removal

1. Remove the tailgate inside cover and watershield.
2. Remove the glass from the tailgate as outlined in this part.
3. Remove the outside belt moulding and weatherstrip from the tailgate.
4. Remove the run upper and lower attaching screws and remove the run and glass bracket from the tailgate (Fig. 2).
5. Remove the glass bracket and guides from the run.
6. To remove the guides, remove two screws attaching each guide to the glass bracket.

Installation

1. Install the guides on the glass bracket if they were removed. Be sure to note that the lower right guide is different from the other guides (Fig. 2).
2. Install the glass bracket and guides on the run, and install the run in the door.

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3. Install the weatherstrip and outside belt moulding.
4. Install the tailgate glass as outlined in this part.
5. Install the tailgate watershield and inside cover.

WINDOW MOTOR AND/OR DRIVE

Removal

1. Remove the tailgate inner panel and watershield.
2. Disconnect the motor wires at the connector.
3. Working through the access hole(s), remove the three motor and drive-to-regulator attaching screws. Remove the motor and drive from the tailgate.

Installation

1. Position the motor and drive to the window regulator, and install the three screws **just snug—not tight.**
2. Connect the motor wires at the connector and cycle the glass to assure gear engagement. After the gears are engaged, tighten the three motor and drive attaching screws.
3. Check the window operation. Then, install the watershield and tailgate inner panel.

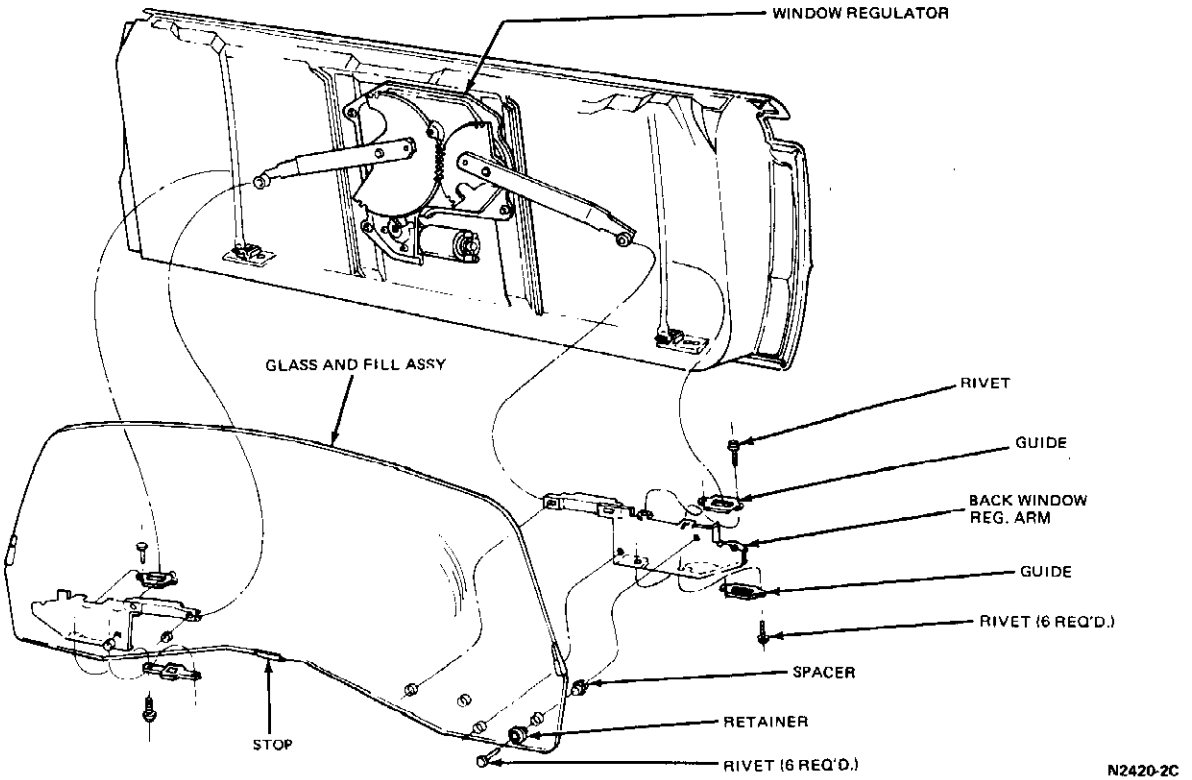


FIG. 2 Tailgate Window Mechanism—Ford and Mercury

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DETROIT IRON

STATIONARY WINDOW GLASS

GROUP 43

PART TITLE	PART NO.	PART TITLE	PART NO.
Stationary Glass – Butyl Type Seal	43-11	Stationary Glass – Weatherstrip Type Seal	43-01

CR2004-2B

Stationary Glass -- Weatherstrip Type Seal

PART 43-01

SUBJECT	PAGE	SUBJECT	PAGE
REMOVAL AND INSTALLATION		REMOVAL AND INSTALLATION (Cont'd.)	
Back Window Mouldings	01-1	Quarter Window Mouldings	01-1
Back Window – Weatherstrip Type Seal	01-1	Stationary Quarter Window Glass	01-2
Opera Window	01-2	Windshield Mouldings	01-1

CR2032-2B

REMOVAL AND INSTALLATION

Before removing the exterior mouldings, it should be determined by the types of retainer used whether a respective door, quarter or luggage compartment trim panel must first be removed to provide access.

If a weld stud is distorted or broken off, it can be replaced with a screw (379560-S101) or pop rivet as shown in Fig. 23.

WINDSHIELD MOULDINGS

The windshield mouldings for the Fairmont, Zephyr, Pinto and Bobcat are shown in Figs. 1 and 2. The mouldings are retained with retainers set in the glass opening.

BACK WINDOW MOULDINGS

The back window mouldings are shown in Figs. 3 through 11. The mouldings are retained with retainers set in the glass opening.

QUARTER WINDOW MOULDINGS

The stationary quarter window mouldings on the Pinto and Bobcat are retained within the weatherstrip (Fig. 12). Refer to Quarter Window and Glass Removal and Installation procedures (this Section).

The mouldings for Mustang II are shown in Figs. 15 and 16. Granada, Monarch and Versailles are shown in Figs. 17 and 18. LTD II and Cougar mouldings are shown in Figs. 19 and 20.

BACK WINDOW-WEATHERSTRIP TYPE SEAL

Removal

1. Remove the window outside mouldings (Figs. 3 through 11).
2. Remove the window interior garnish mouldings, (if so equipped).
3. With an assistant, push the glass and weatherstrip from the window opening.
4. Clean all sealer from the glass and/or weatherstrip if either is to be reused.
5. Clean all tape seal from the glass opening flange.

Installation—All Models Except Pinto and Bobcat 3-Door and Station Wagon

1. Check all moulding retainers. Replace or repair damaged retainers to insure moulding retention. Replace any missing or damaged weld studs with a screw.
2. Apply tape seal to the pinch weld flange of body opening.
3. Position the weatherstrip on the glass.
4. Insert a draw cord in the pinch weld opening of the weatherstrip all around the weatherstrip (Fig. 13), and overlap the cord about 18 inches at the lower center of the glass. Tape the ends of the cord to the inside of the glass.
5. Position the window glass to the body window opening.
6. With an assistant applying hand pressure from the outside, pull the draw cord to pull the lip of the weatherstrip over the window opening flange. Draw the weatherstrip lip over the lower flange, each side flange and then over the upper flange.

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7. Install the window outside mouldings.
8. Install the window interior garnish mouldings.
9. Test for water leaks. Apply sealer in the glass groove of the weatherstrip, if necessary.

Pinto and Bobcat 3-Door and Station Wagon

1. Remove the moulding and clean the weatherstrip area. Then, using a hand tool (screwdriver, chisel, etc.), insert an approximately 1/8 inch diameter drawcord into the moulding cavity of the weatherstrip. Start the cord at the lower center edge of the weatherstrip and continue pushing the cord around the entire perimeter (Fig 9). Leave a minimum of 10 inches of cord trailing at each end after completion.
2. Apply a soap solution around the entire moulding retaining lip on the weatherstrip.
3. Assemble the right and left hand sections of the mouldings to the weatherstrip by progressively positioning the retaining lip of the moulding under the raised weatherstrip retaining lip. Adjust the moulding as required to assure full engagement of the retaining lip.
4. Starting at the bottom of the glass, pull the drawcord outboard over the top of the moulding. Then, apply hand pressure to the moulding as the cord is being slowly pulled from the weatherstrip.
5. Visually check for full engagement of the moulding to the weatherstrip and repair any loose areas with a hand tool.
6. Remove all excess soap solution from the weatherstrip assembly.

STATIONARY QUARTER WINDOW GLASS

Pinto and Bobcat

Removal

1. Pry the weatherstrip inboard lip from the forward edge of the glass; then push the glass and weatherstrip from the glass opening.
2. Remove the upper moulding from the weatherstrip and remove the weatherstrip from the glass.

Installation

1. Clean any sealer or broken glass from the weatherstrip.
2. Apply PVC tape to the glass opening flange. Then, install the weatherstrip on the glass and install the moulding in the weatherstrip groove. (Fig. 12).
3. Insert a draw cord in the pinch weld opening of the weatherstrip all around the weatherstrip and overlap the cord about 18 inches at the lower center of the glass. Tape the ends of the cord to the glass.
4. Position the quarter glass to the body opening, then apply hand pressure from the outside and pull the draw cord to pull the weatherstrip over the body opening flange.

Mustang II, Granada and Monarch

1. Remove the interior garnish mouldings (Group 45).
2. Remove the screws attaching the quarter window assembly to the rear quarter (Figs. 14, 15 and 16), and remove the assembly from the opening.
3. Position the glass to the opening, and install the attaching screws.
4. Install the interior garnish mouldings (Group 45).

Continental Mark V, Thunderbird, LTD II and Cougar

Removal

1. Remove the inside garnish moulding and quarter trim panel (Group 45).
2. Remove two bolts attaching the glass bracket extension (Fig. 17) to the quarter inner panel.
3. Loosen the glass bracket-to-extension bolts, and remove the glass, bracket and extension from the vehicle.
4. Place the glass on a bench and remove the extension from the glass bracket.
5. Remove the center pin from the glass bracket-to-glass rivets with a drift punch. Then, drill the head from the rivets with a 1/4-inch drill, and remove the rivets.
6. Separate the glass bracket, spacers and retainers from the glass.
7. Remove the front weatherstrip and retainer from the glass.

Installation

1. Install the front weatherstrip and retainer on the glass using butyl. Use 1 3/4 inch wide tape, approximately 0.06 inch thick.
2. Position the retainers and spacers to the glass and snap them together (Fig. 17).
3. Position the glass bracket to the glass and install 1/4-20 x 1 inch hex head bolts and 1/4-20 hex nuts to attach the bracket to the glass. Tighten the nuts to 6-11 ft-lb. torque.
4. Position the extension to the glass bracket and install the attaching bolts finger tight.
5. Position the glass and bracket assembly in the quarter and install two bolts to attach the assembly to the inner panel. Tighten the bolts to 3-7 ft-lb. torque.
6. Position the glass snugly against the weatherstrip to obtain a good seal between the glass and weatherstrip. Then, tighten the glass bracket-to-extension attaching bolts to 3-7 ft-lb. torque.
7. Install the quarter trim panel and interior garnish moulding.

OPERA WINDOW

Removal

1. From inside the vehicle, remove the interior garnish mouldings to gain access to the quarter pillar trim panels.
2. Remove the rear seat cushion and back assembly (Group 41).
3. Remove the quarter lower and upper trim panel to gain access to the opera window attaching screws (Fig. 16).
4. Remove the screws and opera window assembly.
5. For installation, reverse procedure, using butyl tape. See Fig. 18.

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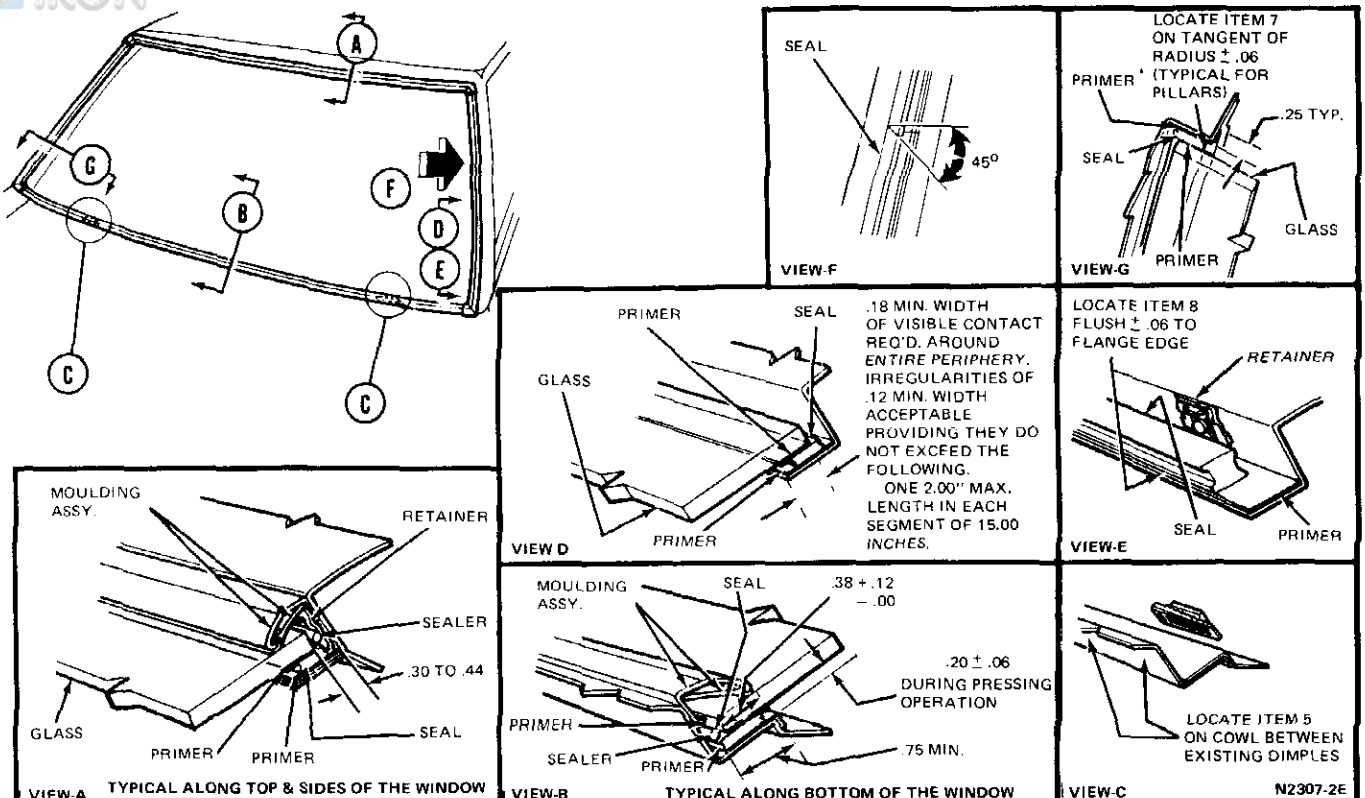
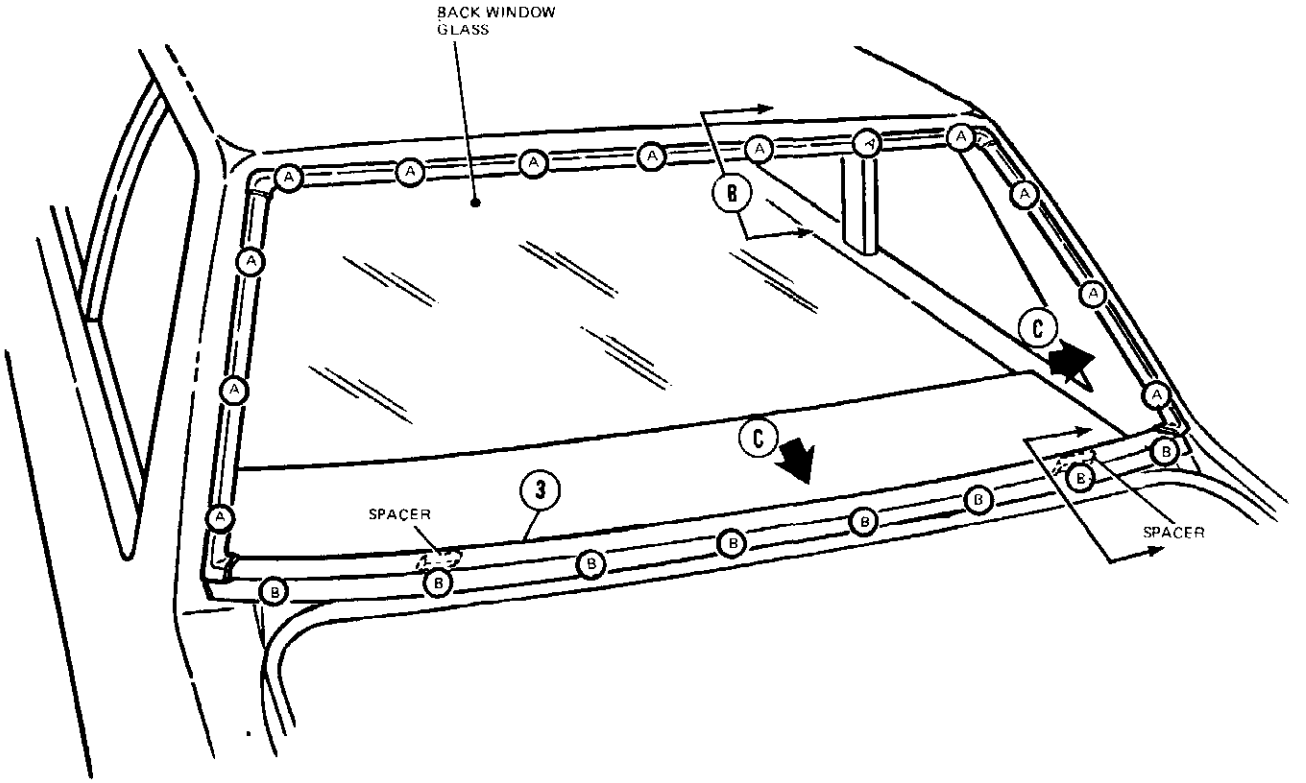
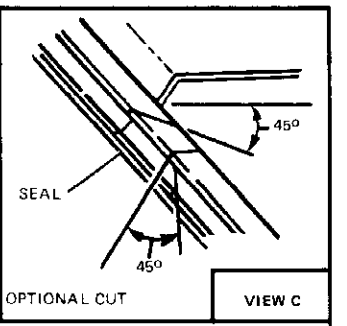
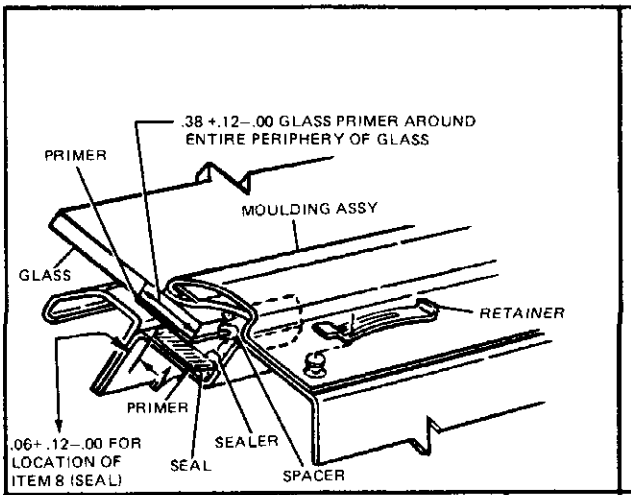


FIG. 1 Windshield and Exterior Moulding Installation—Fairmont and Zephyr

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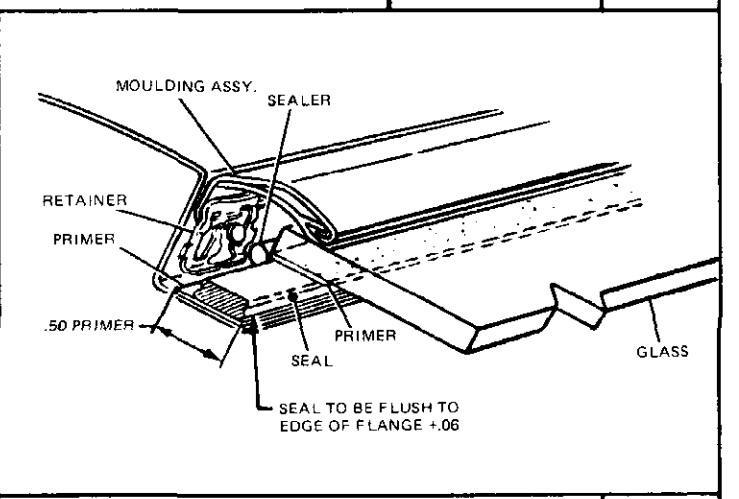


FIG. 2 Windshield and Exterior Moulding Installation—Pinto and Bobcat

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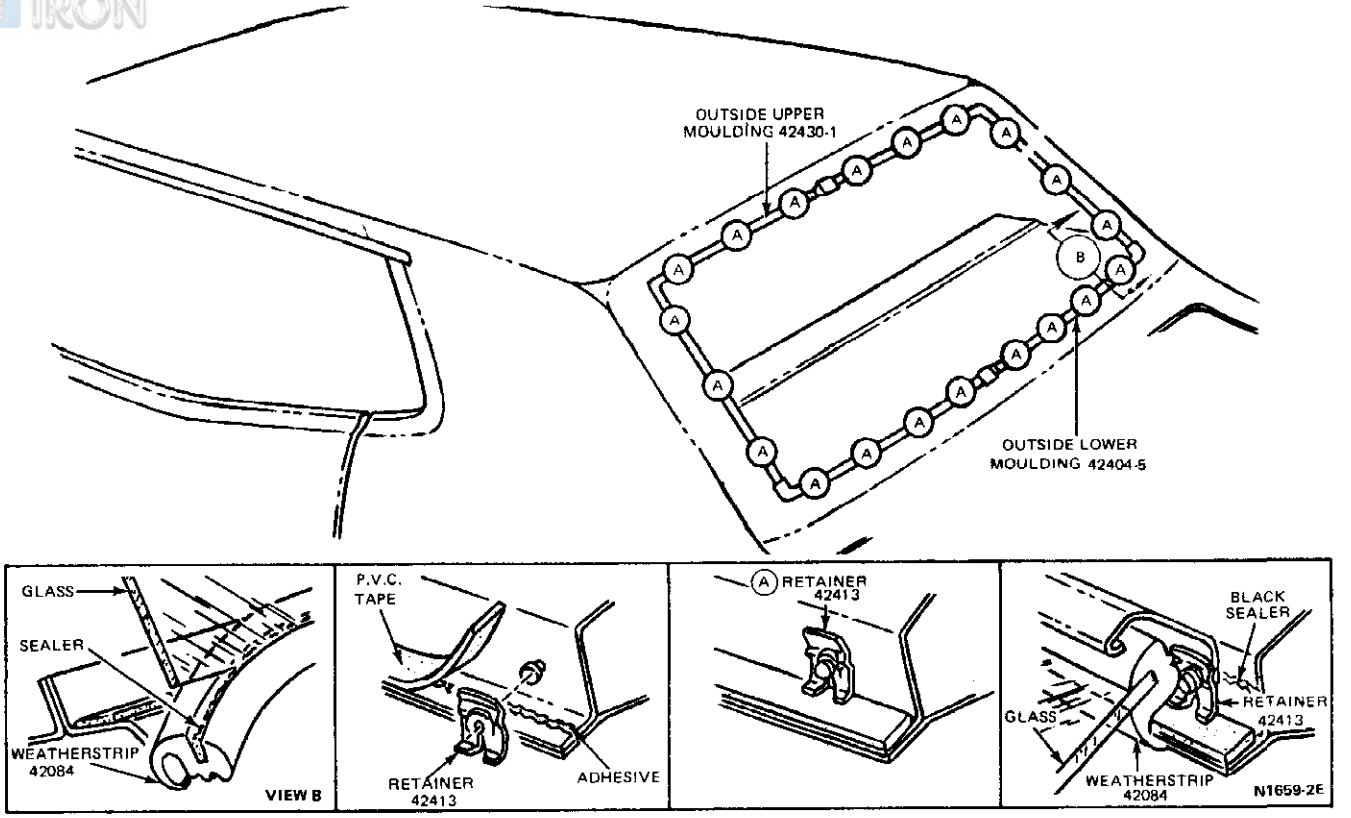


FIG. 3 Back Window and Exterior Mouldings—LTD II and Cougar XR-7

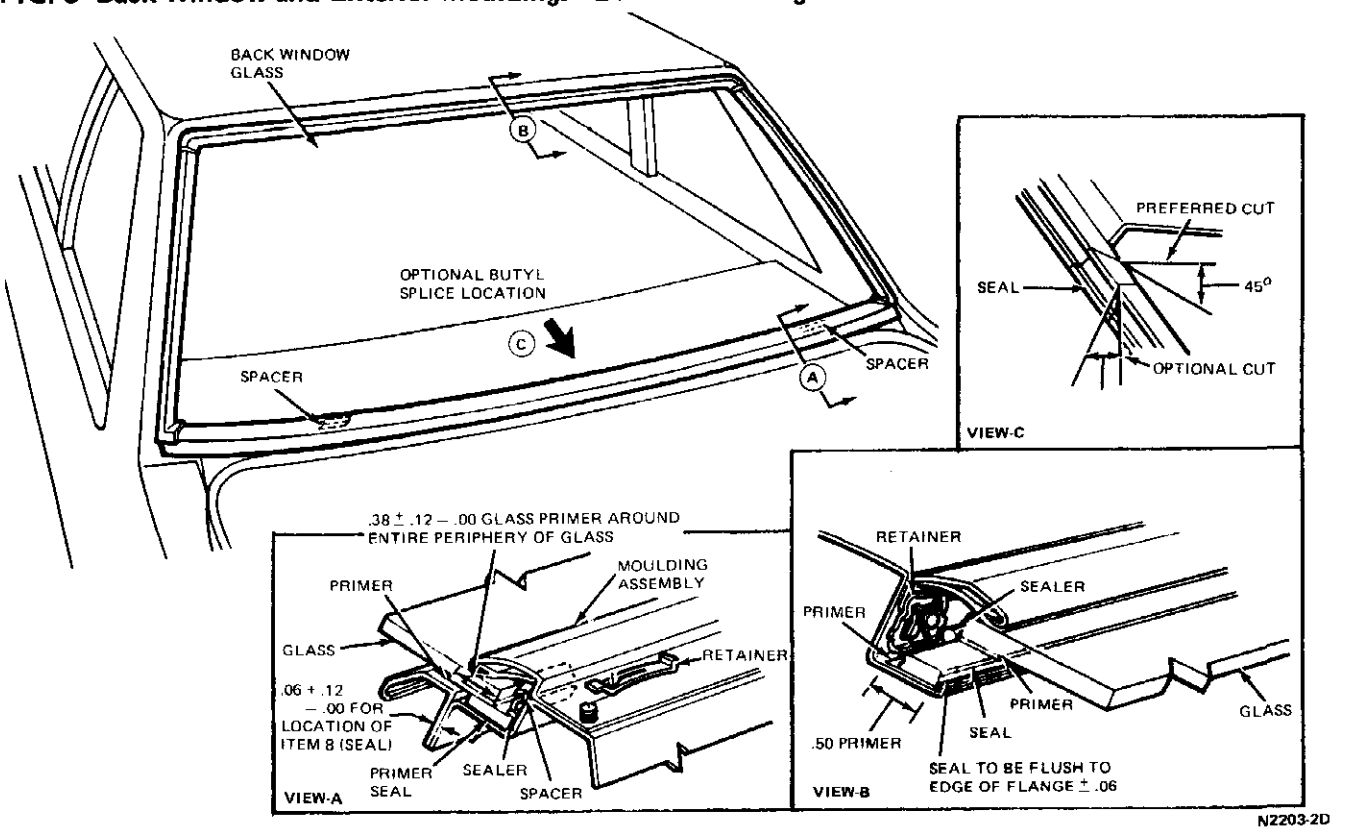


FIG. 4 Back Window and Exterior Mouldings—Fairmont and Zephyr 2-Door Shown—Typical 4-Door

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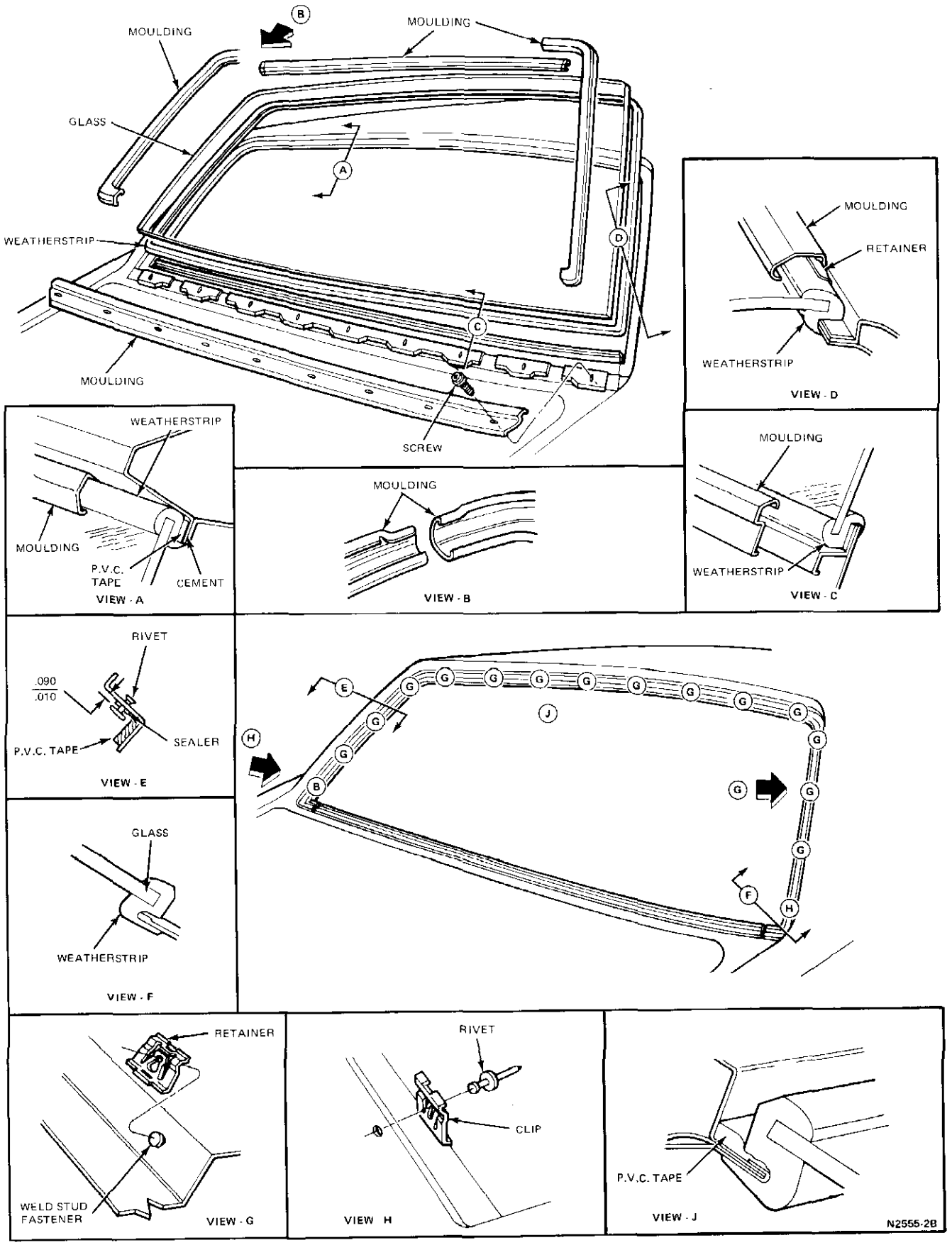


FIG. 5 Back Window and Exterior Moulding—Granada and Monarch 2-Door Shown—Typical 4-Door

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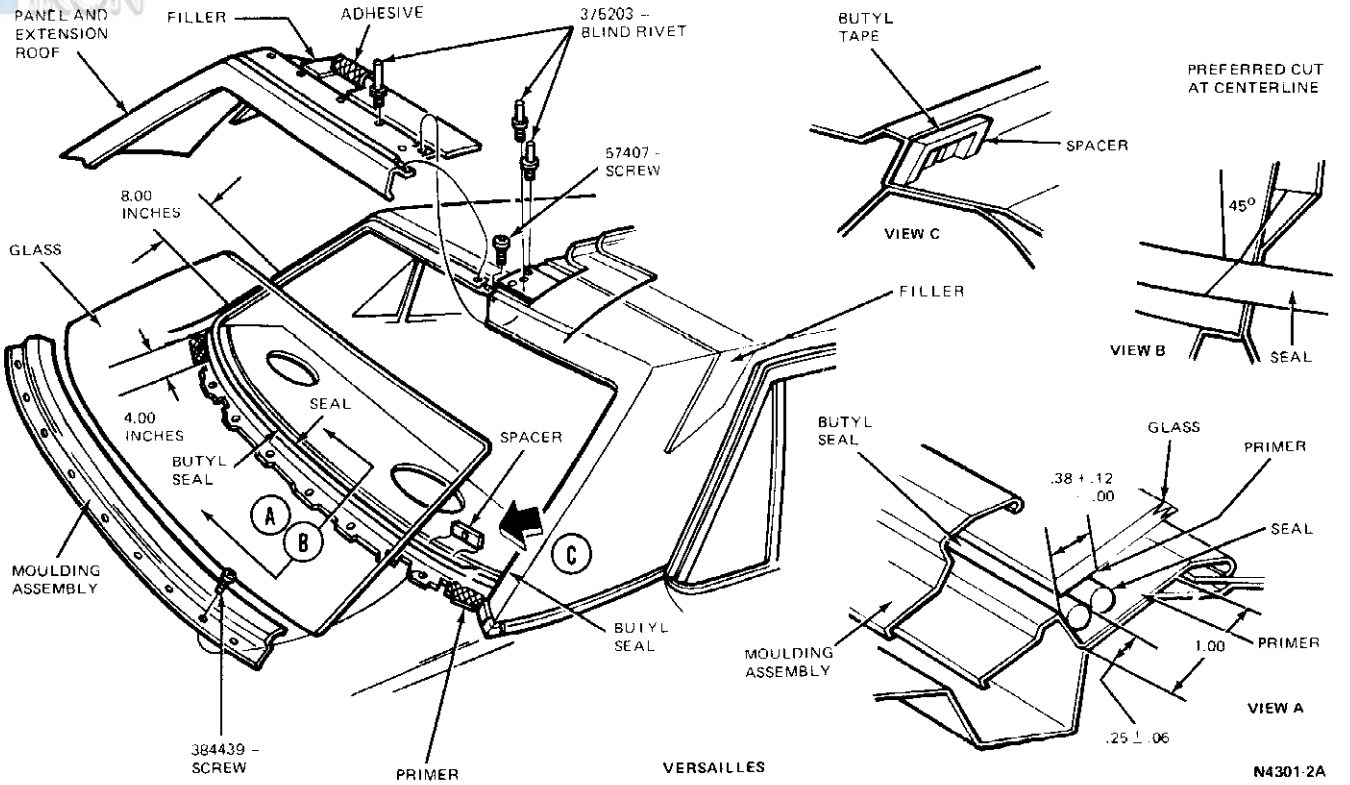


FIG. 6 Back Window and Exterior Moulding—Versailles

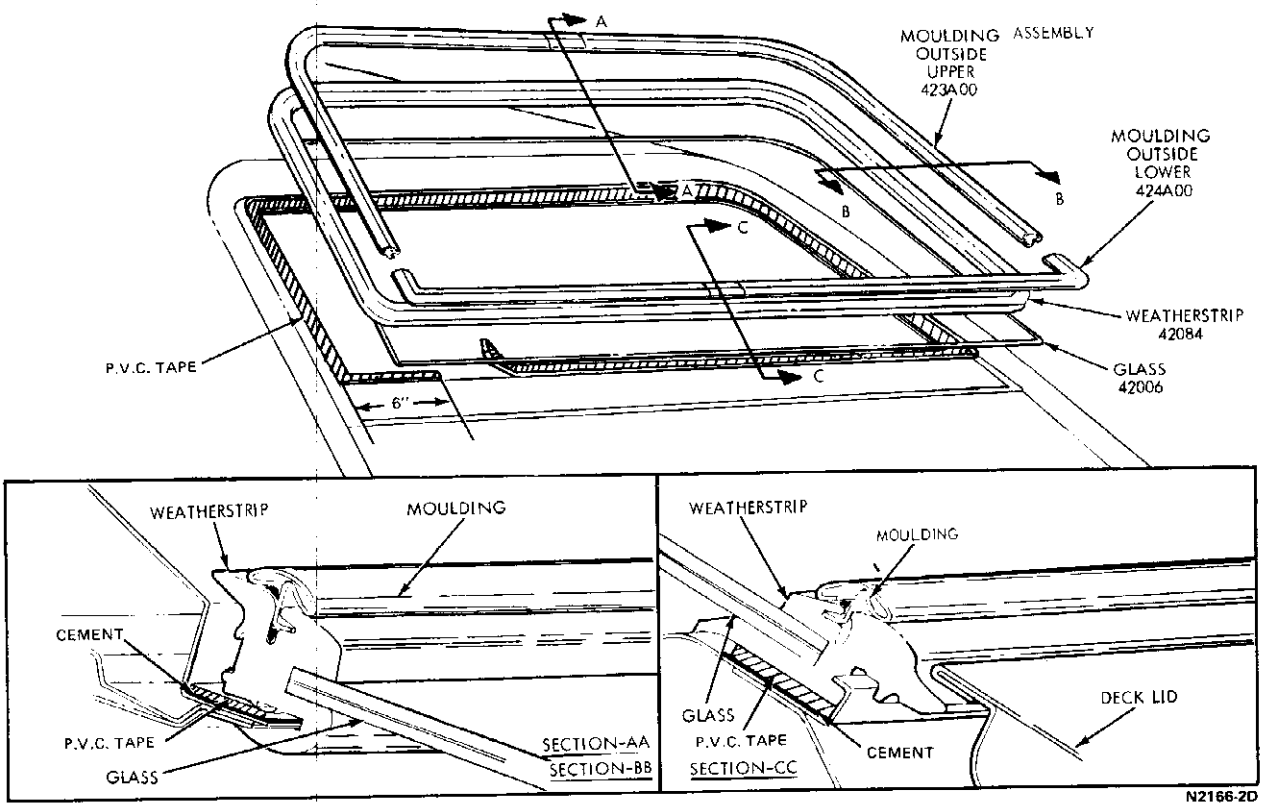


FIG. 7 Back Window and Exterior Mouldings—Pinto and Bobcat 2-Door

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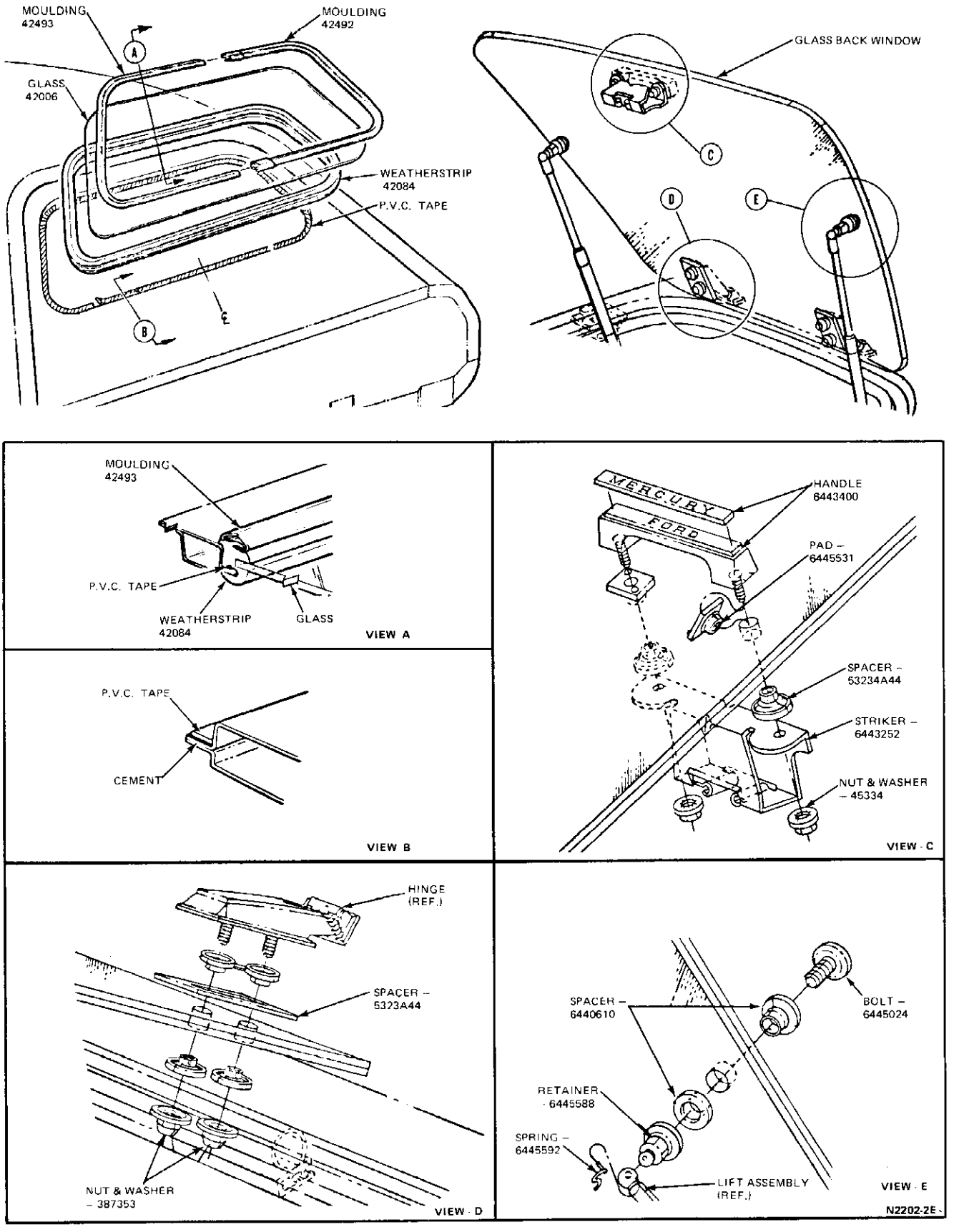


FIG. 8 Back Window and Exterior Mouldings—Pinto and Bobcat 3-Door

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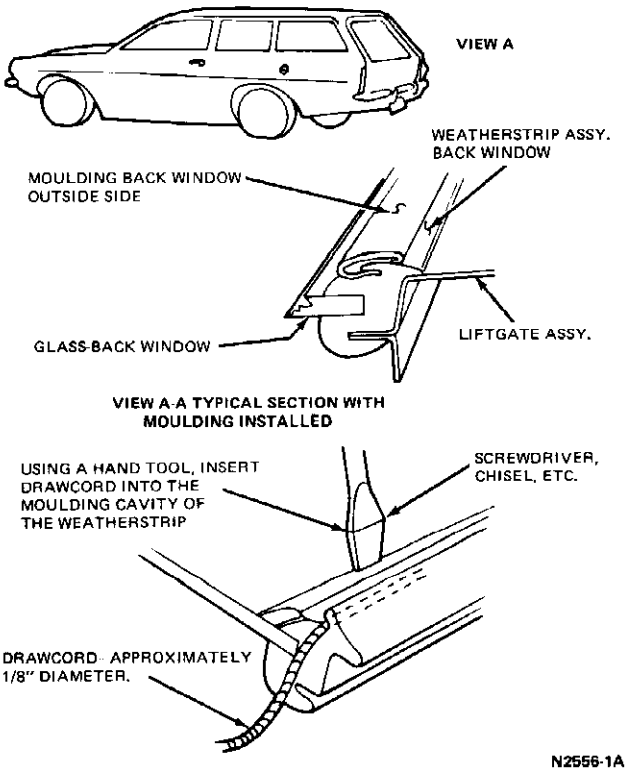


FIG. 9 Back Window Outside Moulding Installation—Pinto and Bobcat—3-Door and Station Wagon

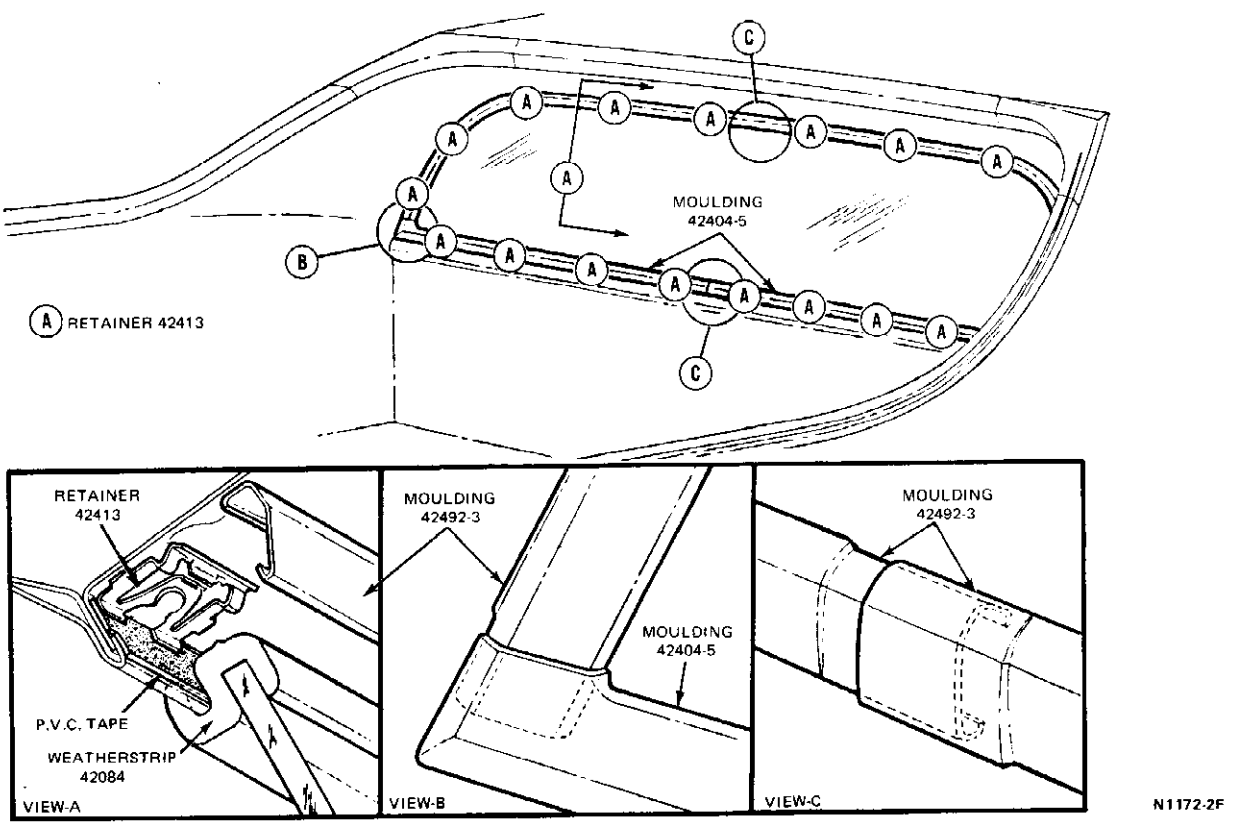


FIG. 10 Back Window and Exterior Mouldings—LTD II Ranchero

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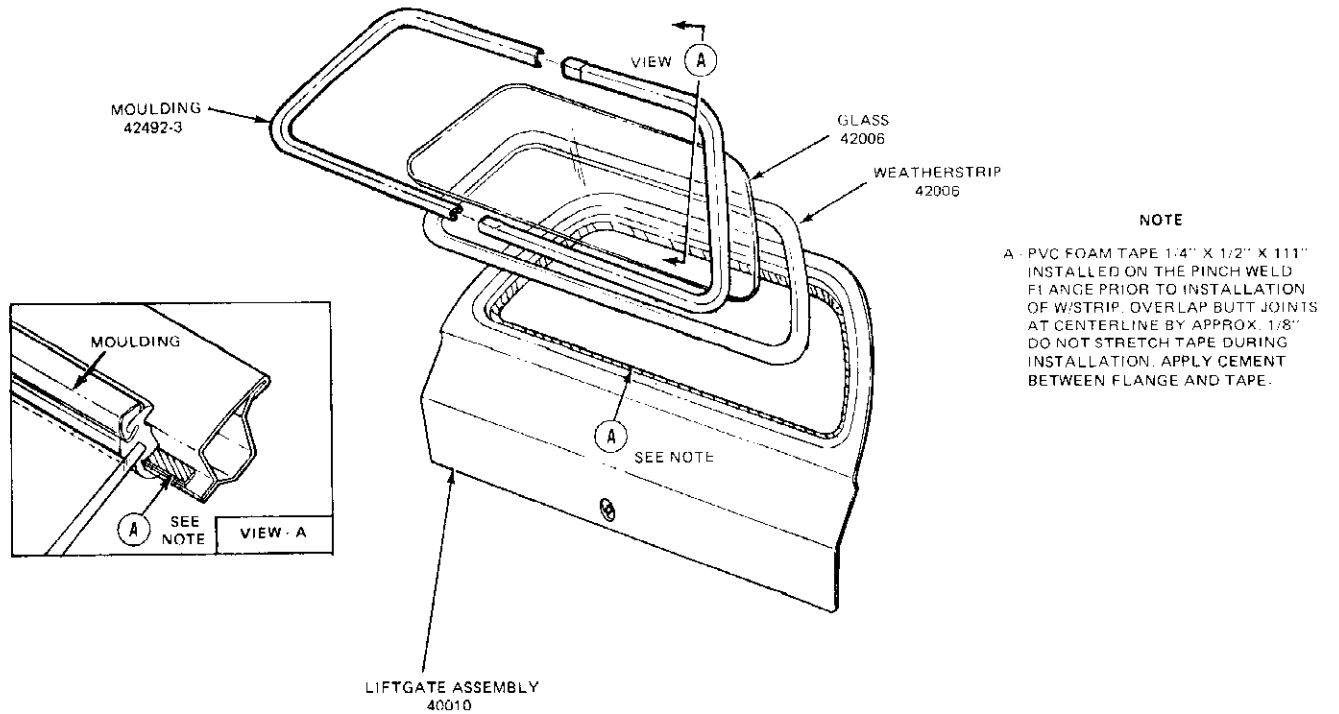


FIG. 11 Back Window and Exterior Mouldings—Pinto and Bobcat Station Wagon

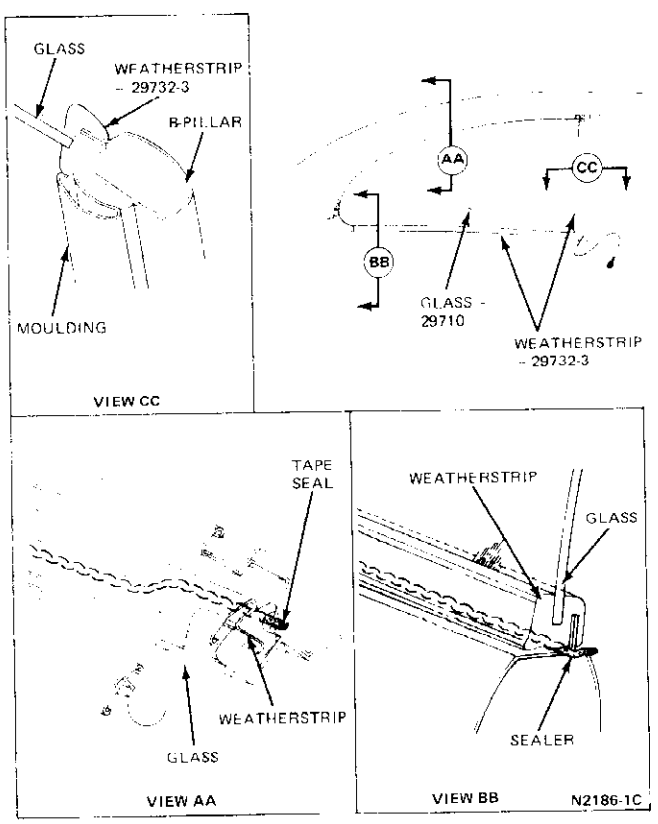


FIG. 12 Quarter Window and Mouldings Pinto and Bobcat

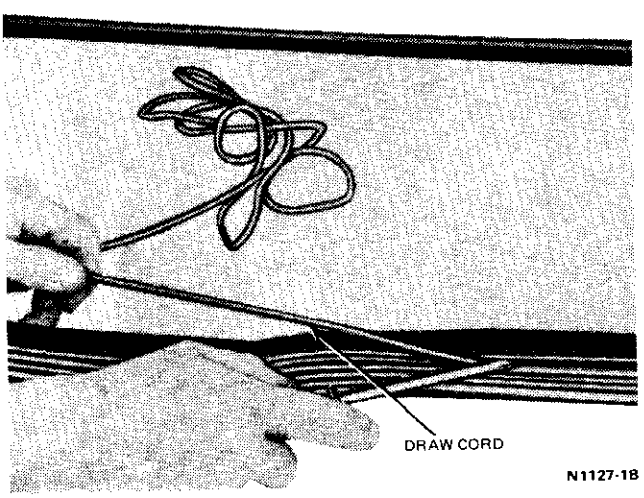


FIG. 13 Draw Cord Installation—Typical

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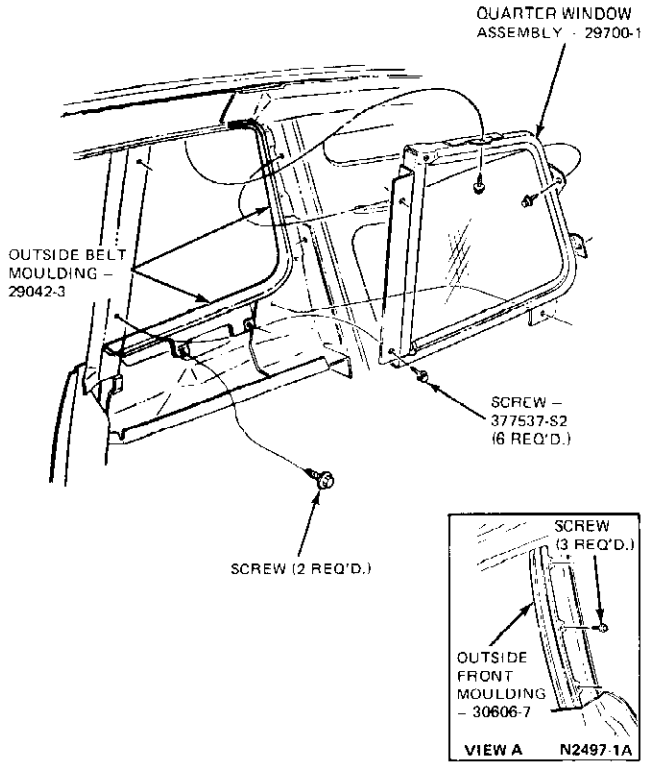


FIG. 14 Quarter Window Installation—Mustang II 2-Door

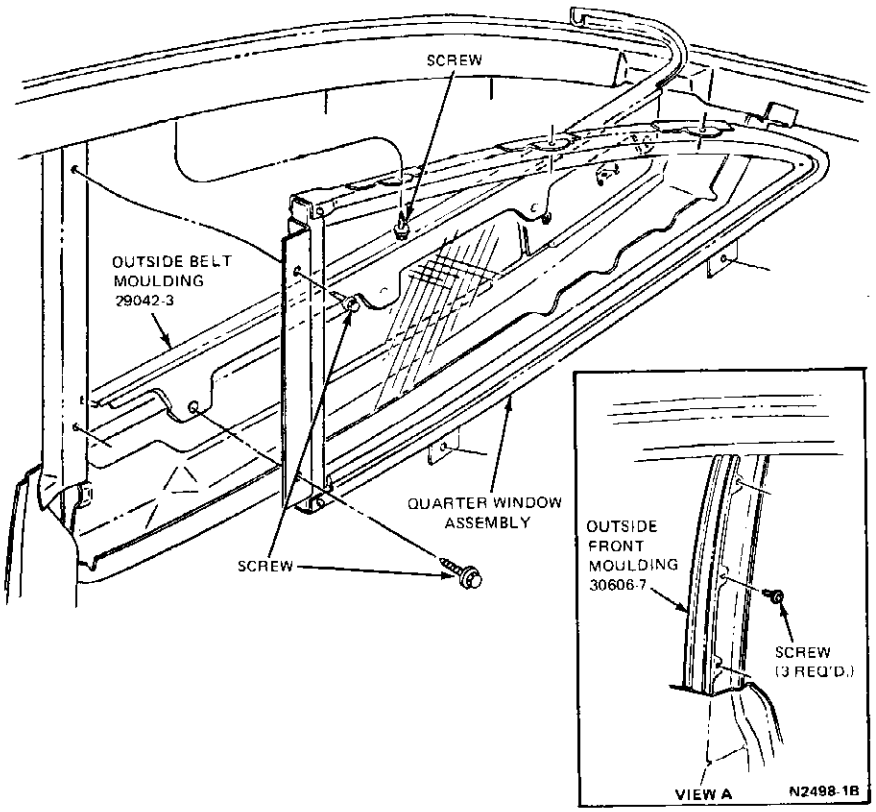


FIG. 15 Quarter Window Installation—Mustang II 3-Door

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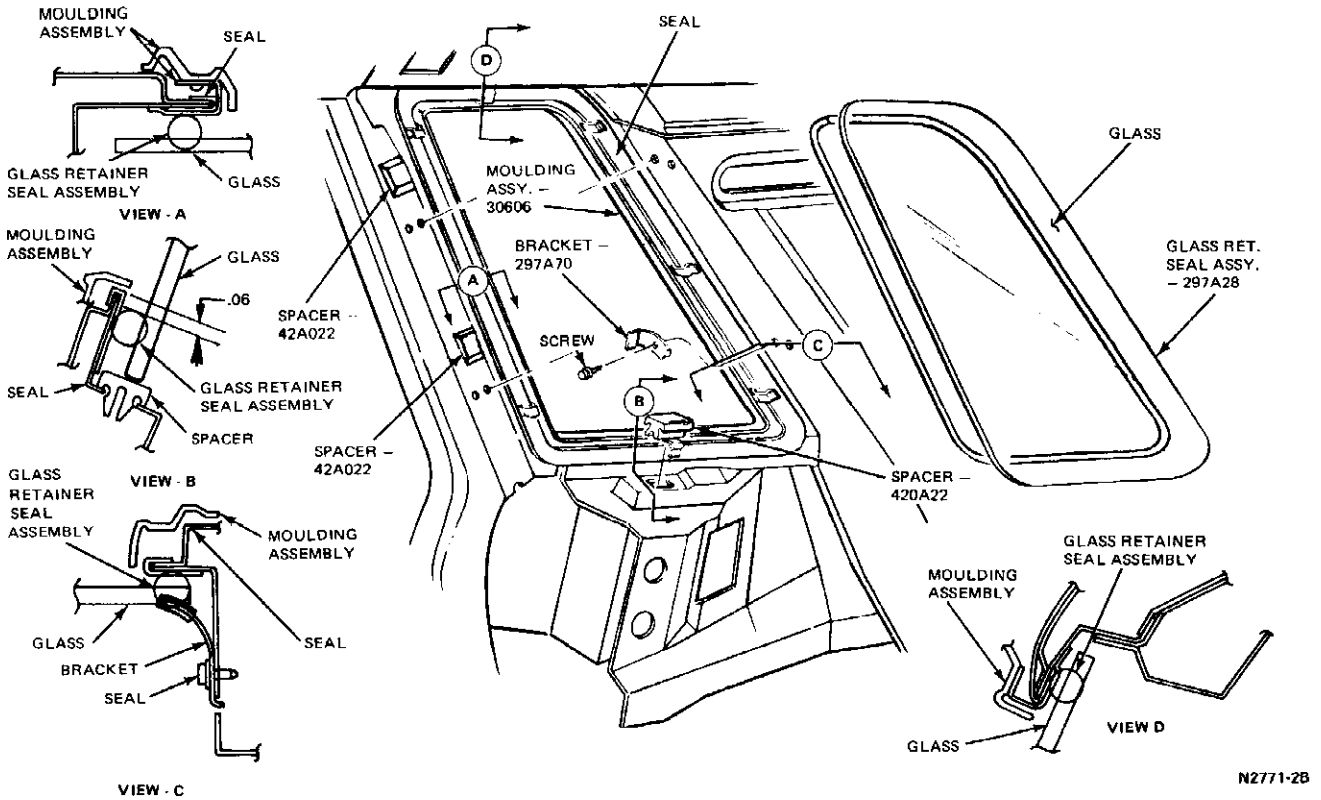


FIG. 16 Stationary Quarter Window—Granada and Monarch 2-Door

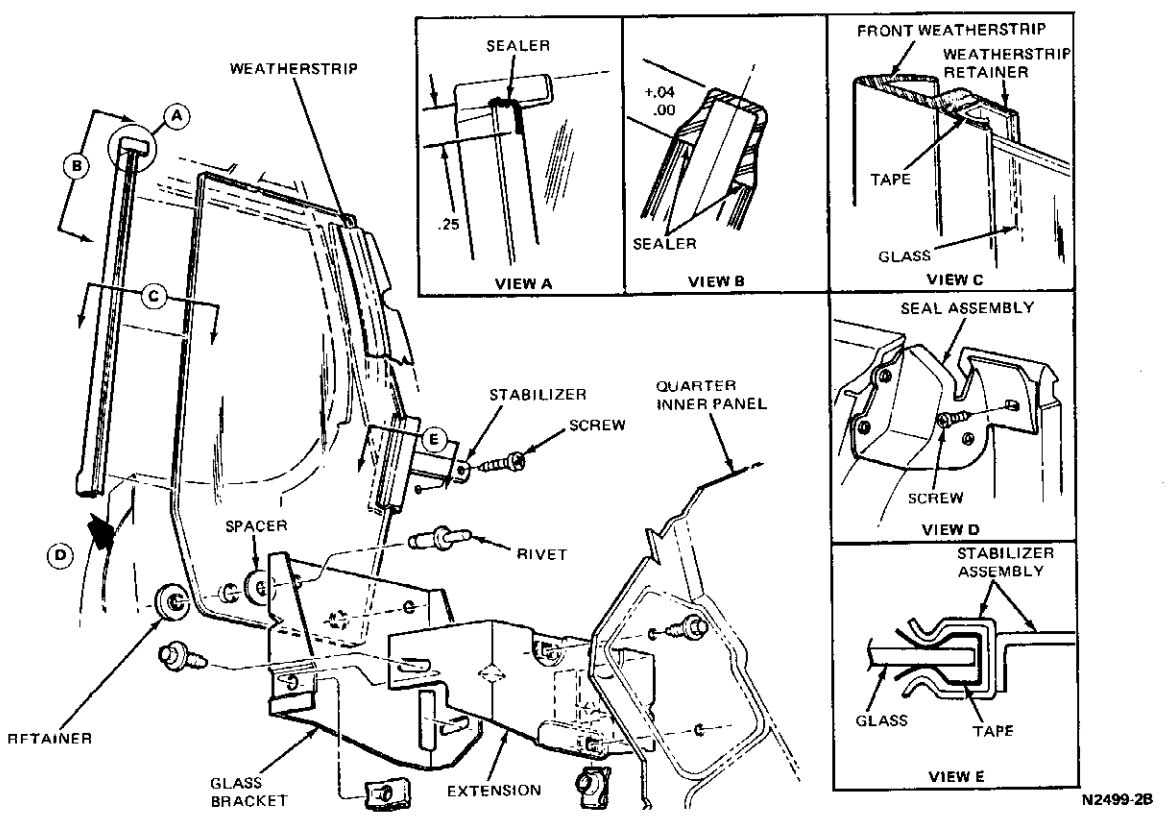


FIG. 17 Stationary Quarter Window—LTD II and Cougar

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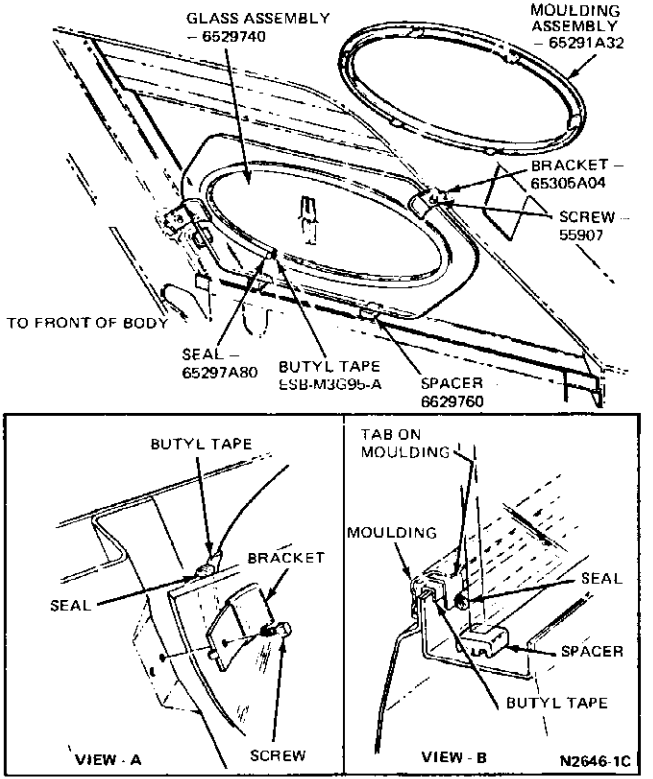


FIG. 18 Opera Window Installation—Continental Mark V—Thunderbird, LTD II, Cougar and Lincoln Continental Similar

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Stationary Glass -- Butyl Type Seals

PART 43-11

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REMOVAL AND INSTALLATION	
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Back Window Mouldings	11-6
REMOVAL AND INSTALLATION (Cont'd.)	
Quarter Window Mouldings	11-6
Windshield Mouldings	11-1

CR2033-2B

REMOVAL AND INSTALLATION

Before removing the exterior mouldings, it should be determined by the type of retainer used whether a respective door, quarter or luggage compartment trim panel must first be removed to provide access.

If a weld stud is distorted or broken off, it should be replaced with a screw (379560-S101). Also, refer to Fig. 23 in Part 43-01.

WINDSHIELD MOULDINGS

The windshield mouldings for the various models are shown in Figs. 1 through 6. If the mouldings are retained with retainers set in the glass opening, the moulding should be released from the retainers with the tool shown in Fig. 1, Part 43-01.

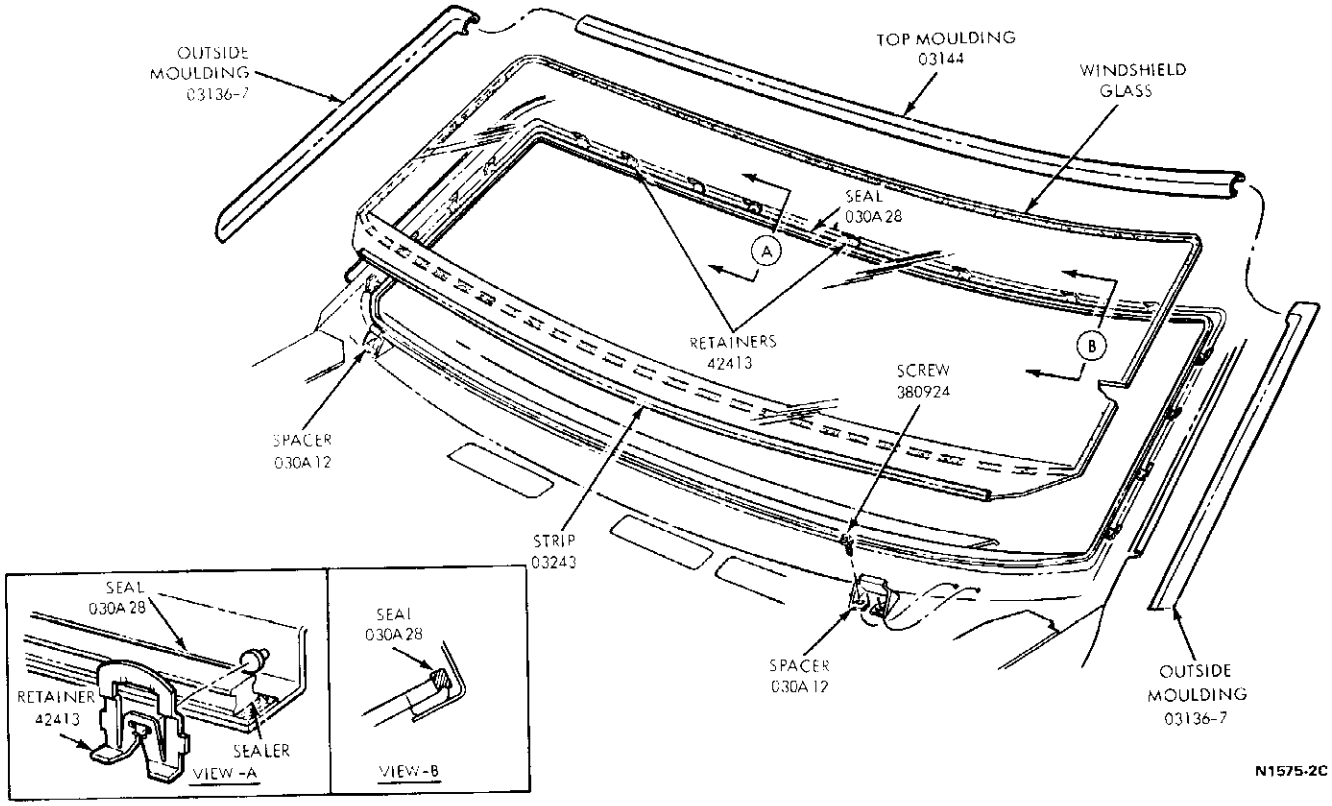


FIG. 1 Windshield and Exterior Moulding Installation Ford and Mercury—Typical

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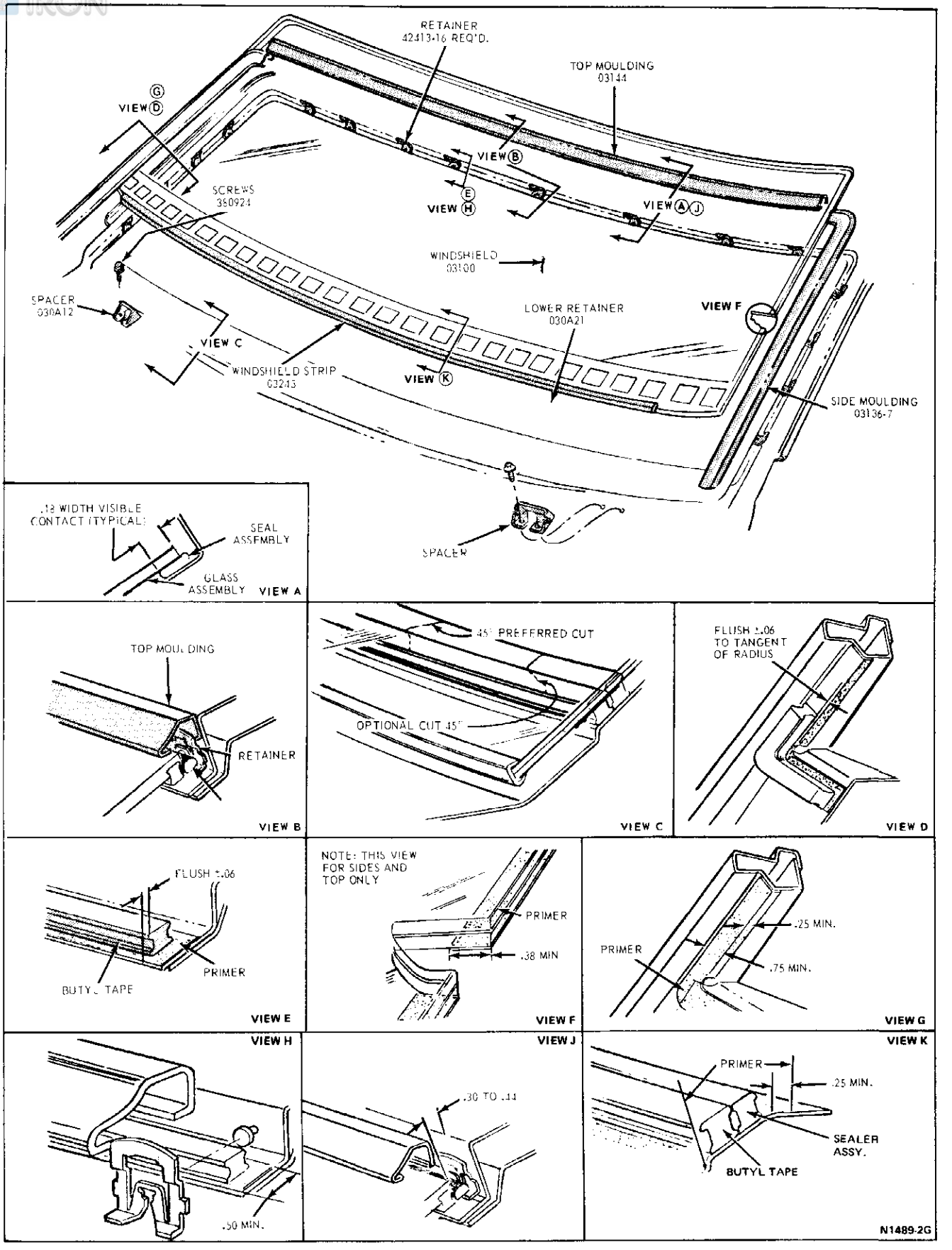
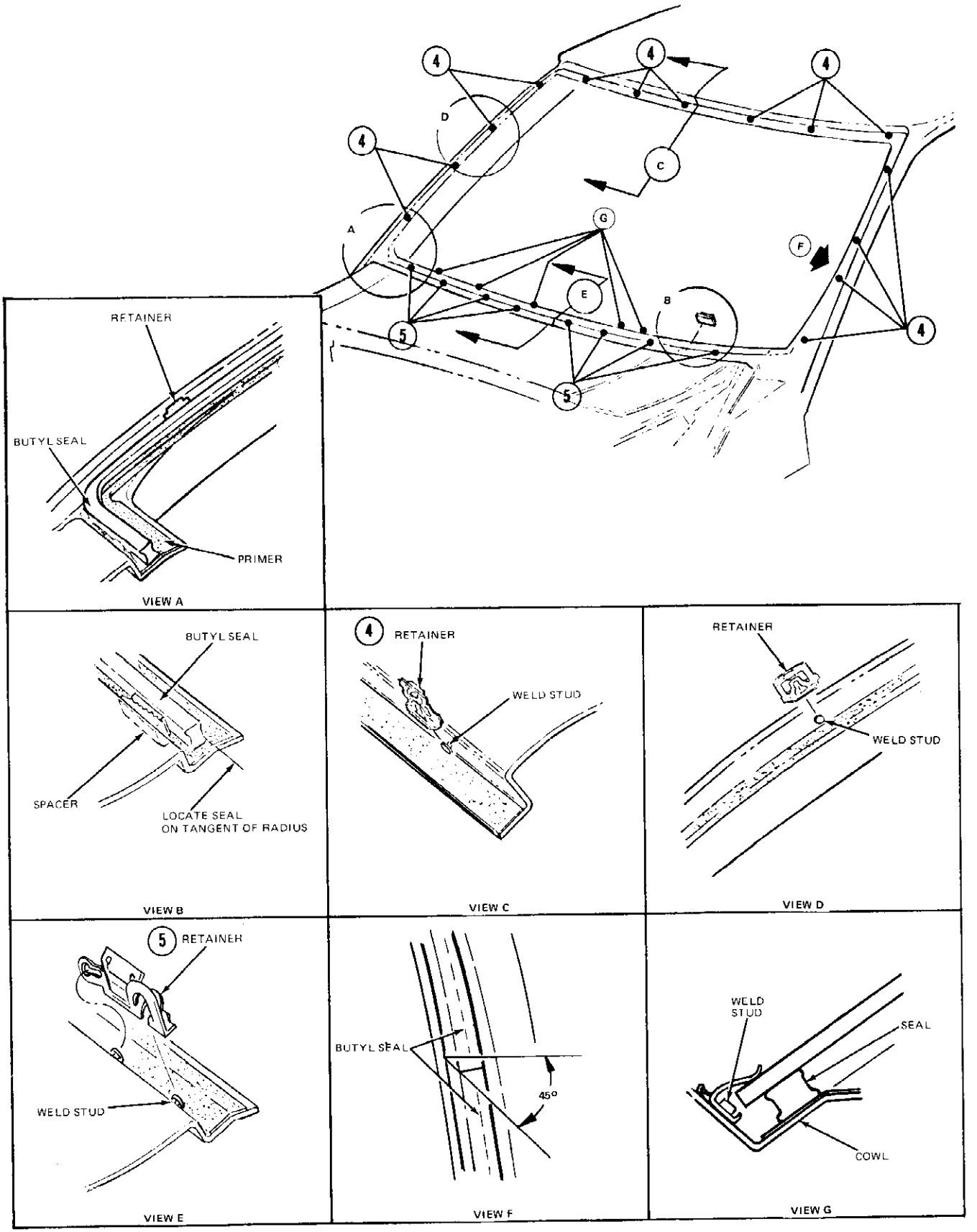


FIG. 2 Windshield and Exterior Moulding Installation—LTD II, Cougar and Thunderbird

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FIG. 3 Windshield and Exterior Moulding Installation—Mustang II Shown, Fairmont and Zephyr Similar

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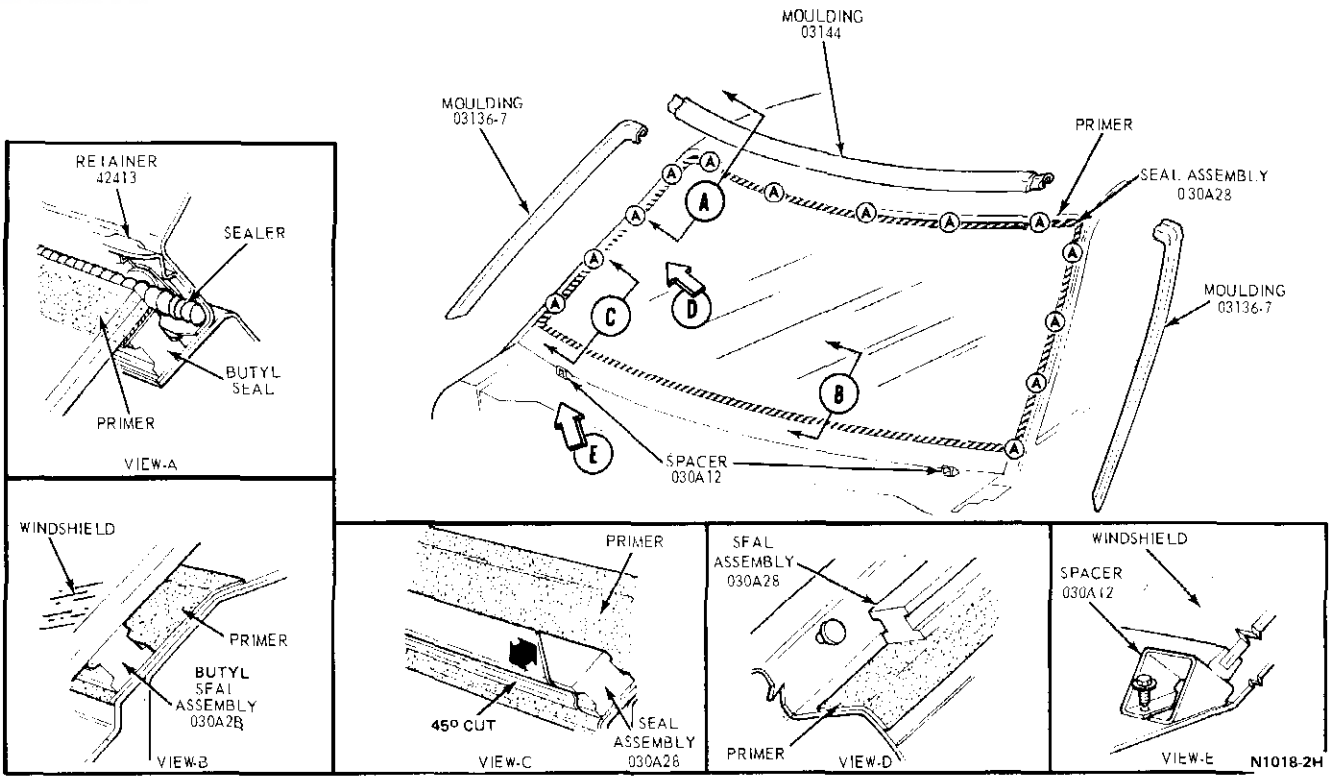


FIG. 4 Windshield and Exterior Moulding Installation—Thunderbird and Continental Mark V

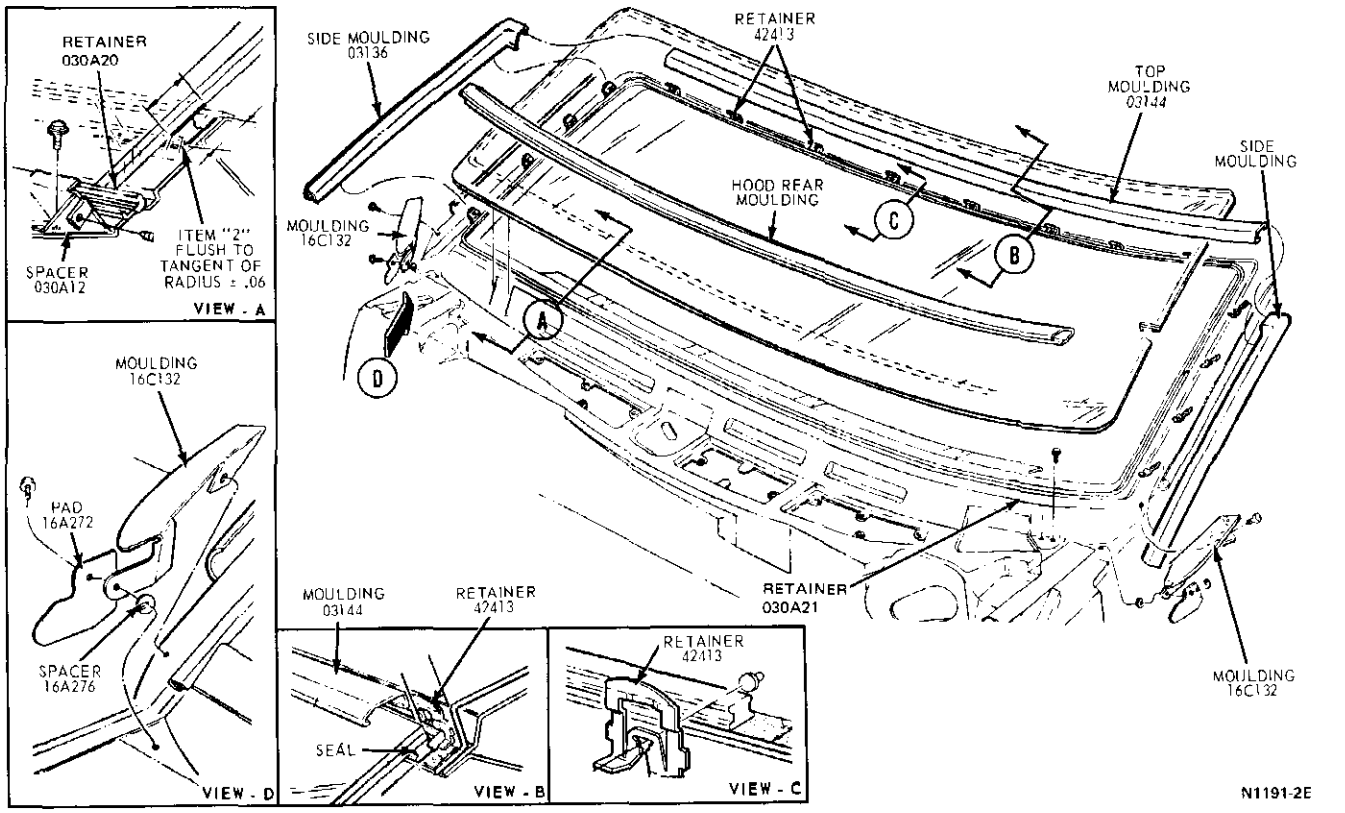


FIG. 5 Windshield and Exterior Moulding Installation—Lincoln Continental

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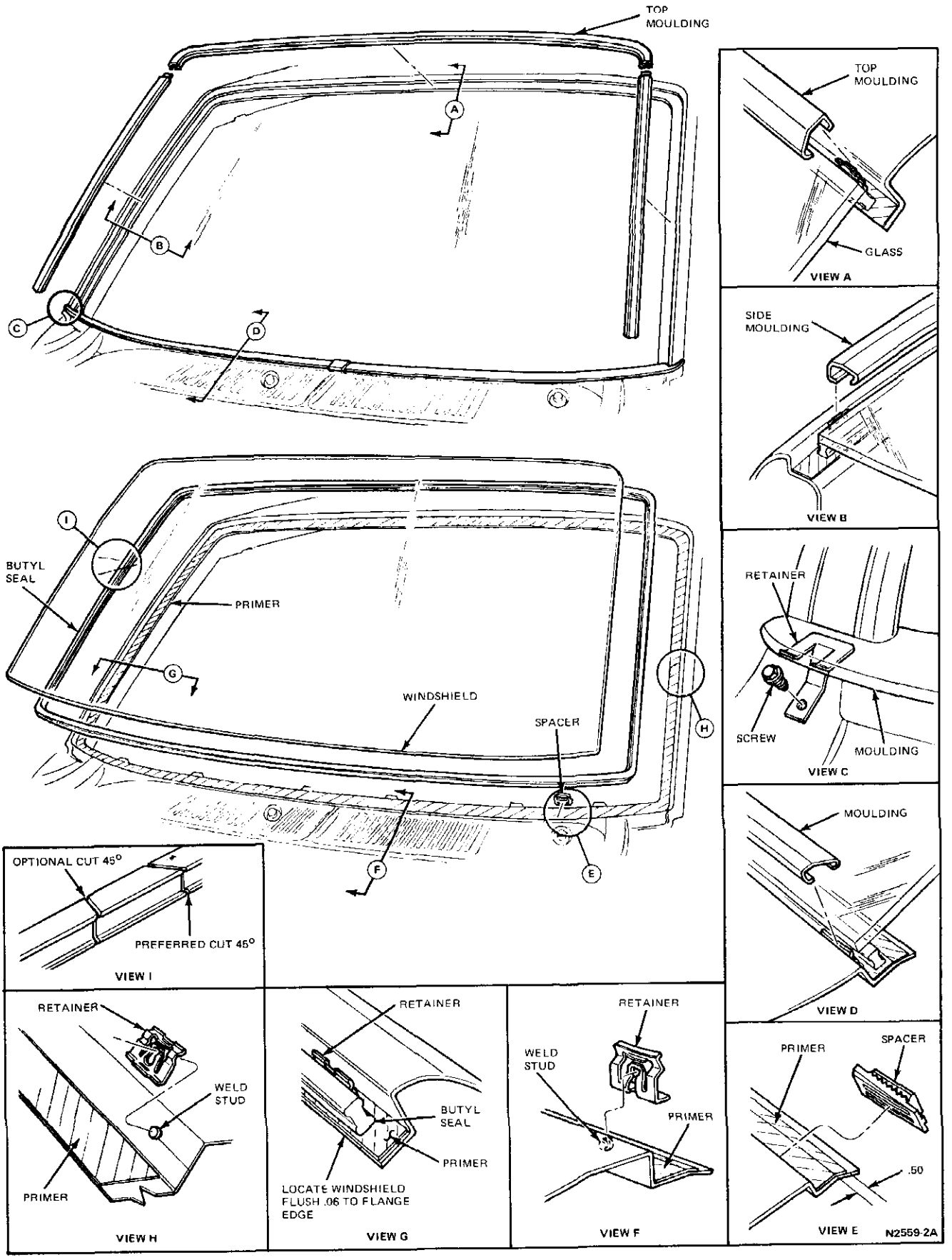


FIG. 6 Windshield and Exterior Moulding Installation—Granada, Monarch and Versailles

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BACK WINDOW MOULDINGS (EXCEPT FRENCHED)

The back window mouldings are shown in Figs. 7 through 17. If the mouldings are retained with retainers set in the glass opening, the moulding should be released with the tool shown in Fig. 1, Part 43-01.

FRENCHED BACK WINDOW MOULDINGS

The Special Order "frenched" back window option with the half padded vinyl roof cover, extends over and tucks under the back window mouldings. A "frenched" back window appears to be recessed down into the roof cover, with no back window mouldings visible.

Removal

1. Using a sharp knife or razor blade, remove the bead of silastic rubber adhesive from between the roof cover and the back window glass.

   NOTE: When cutting the seal, hold the knife blade cutting edge against the glass to avoid the possibility of cutting the roof cover (Figs. 8 and 9).
2. Using a hooked tool fabricated from a discarded Bowden control wire or equivalent, carefully pull the roof cover out from between the glass and the covered back window moulding.

   NOTE: For added clearance, pry up the covered moulding with a wood wedge or a putty knife blade. Do not use heat to soften the vinyl.
3. Carefully peel the roof cover back at least one inch from the moulding. This is a critical phase of the repair as the vinyl cover and the padding can be seriously damaged unless the cover and the padding is carefully cut away from the moulding and the roof panel. Usually the padding will stick to the cover as it is pulled up and back from the moulding. A blunted putty knife can be used to push the pad away or a sharp knife can be used to cut the pad away from the moulding and roof panel.
4. Secure the peeled back cover and padding with tape as shown in Figs. 8 and 9, to about one inch beyond the mouldings around the entire back window.

   NOTE: The cover and pad are shown peeled back more than necessary for illustration purposes.
5. Remove the back window mouldings using tool shown in Part 43-01, Fig. 1.

Installation

1. Install the back window mouldings.
2. Using Vinyl Top Adhesive (D4AZ-19C525-A) (or equivalent) with the instructions shown in part 46-20, install the peeled back portion of the roof cover. The vinyl roof cover wrinkles can be carefully pulled out and the material pushed back into position under the mouldings using the reworked putty knife and the wedge.

   NOTE: Do not use heat in an attempt to eliminate wrinkles.
3. Reseal the glass-to-roof cover gap with a thin bead of Dow Corning Clear Silastic Adhesive or equivalent. This adhesive can be tooled before it starts to "skin over" so that it will not show under normal inspection.

QUARTER WINDOW MOULDINGS

FORD AND MERCURY STATION WAGON ONLY—FOR ALL OTHER MODELS, REFER TO PART 43-01.

The quarter window mouldings (Figs. 13 and 14), are retained with retainers set in the glass opening and should be released with the tool shown in Fig. 1, Part 43-01.

GLASS BUTYL TYPE SEAL

There are two procedures applicable to the installation of glass with butyl type seal.

Procedure No. 1 should be used with butyl kit (03863) packaged with 5/16" diameter butyl (round type). DO NOT use this kit if adhesion of existing butyl-to-pinch weld flange is unreliable, as indicated by a surface which is not smooth and free of excessive skips, bumps and contamination.

Procedure No. 2 should be used with butyl kit (03863) packaged with "I" beam type butyl, where complete replacement of existing butyl is necessary.

Removal (Procedure No. 1)

Engine must be off on vehicles equipped with high voltage output type heated glass.

1. Remove the windshield wiper arms and blades if the windshield is being replaced (Figs. 1 through 6).
2. Remove the window mouldings (Figs. 7 through 15).
3. On the heated back window, it will be necessary to disconnect the window wires at the connectors on both sides of the window before proceeding with the glass removal.
4. With an electric knife Tool No. T70B-42006-A or equivalent (Figs. 16, 17 and 19), insert the blade under the edge of the glass. Cut the butyl seal as close to the inside surface of the glass as possible. To cut the butyl at the lower corners of the glass, move the handle of the tool as close to the corner as possible. Then, rotate the blade downward to cut the corner butyl seal and remove the glass from the vehicle using the glass holding tool.

Installation

1. Temporarily position the replacement glass in the windshield opening using spacers to prevent glass-to-metal contact. Adjust glass side to side to the best glass-to-"A" pillar weld flange overlap position and adjust lower spacers, if necessary, for proper positioning at the top. A minimum of 3/16" butyl tape-to-glass contact is required around the periphery to assure proper retention and adequate seal. Mark this location with a crayon on the outside surface of the glass and a corresponding point of the glass opening. Remove the glass and clean the inside surface and edge thoroughly.
2. Starting at the side of the glass opposite the original butyl splice, place the 5/16" diameter butyl furnished in the kit on top of and in a position that assures the 3/16" minimum contact with the glass on the existing butyl remaining on the pinch flange. NOTE: Do not allow the new butyl to overhang the edge of the existing butyl and do not stretch the butyl or bridge the corners of the window opening.

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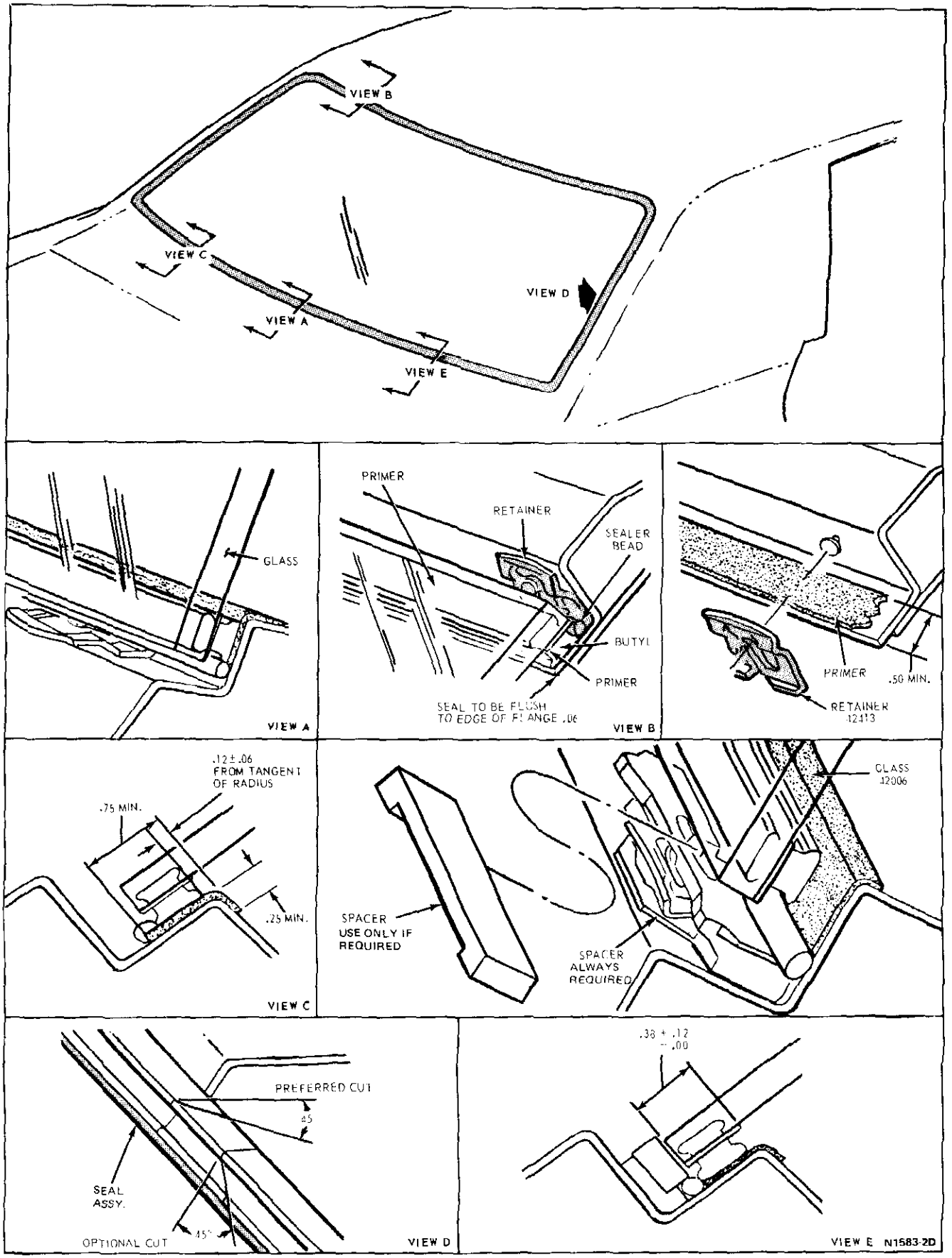


FIG. 7 Back Window and Exterior Moulding Installation—Ford and Mercury Except Station Wagon—Typical

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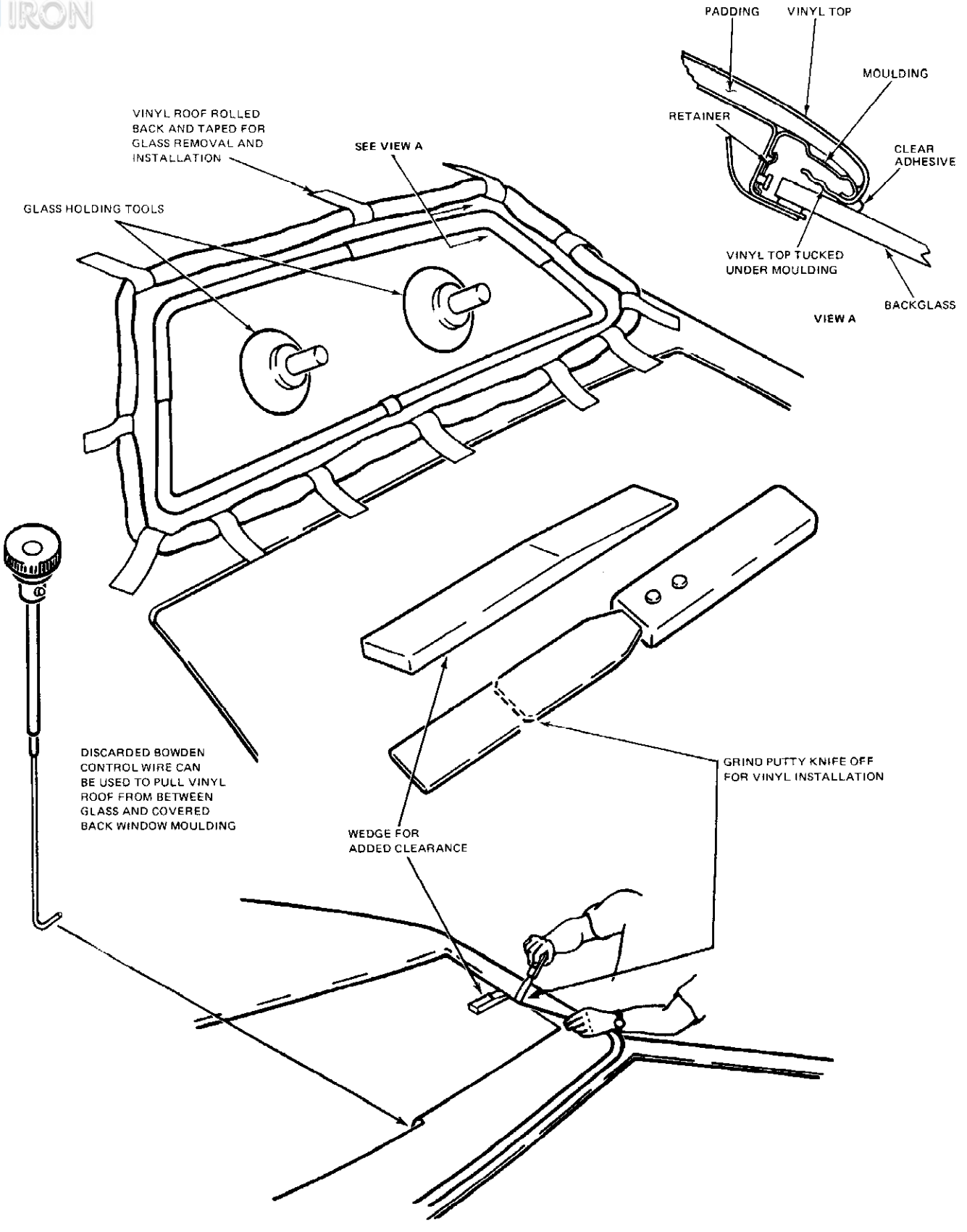


FIG. 8 Frenched Back Window Moulding Installation—Mark V and Lincoln

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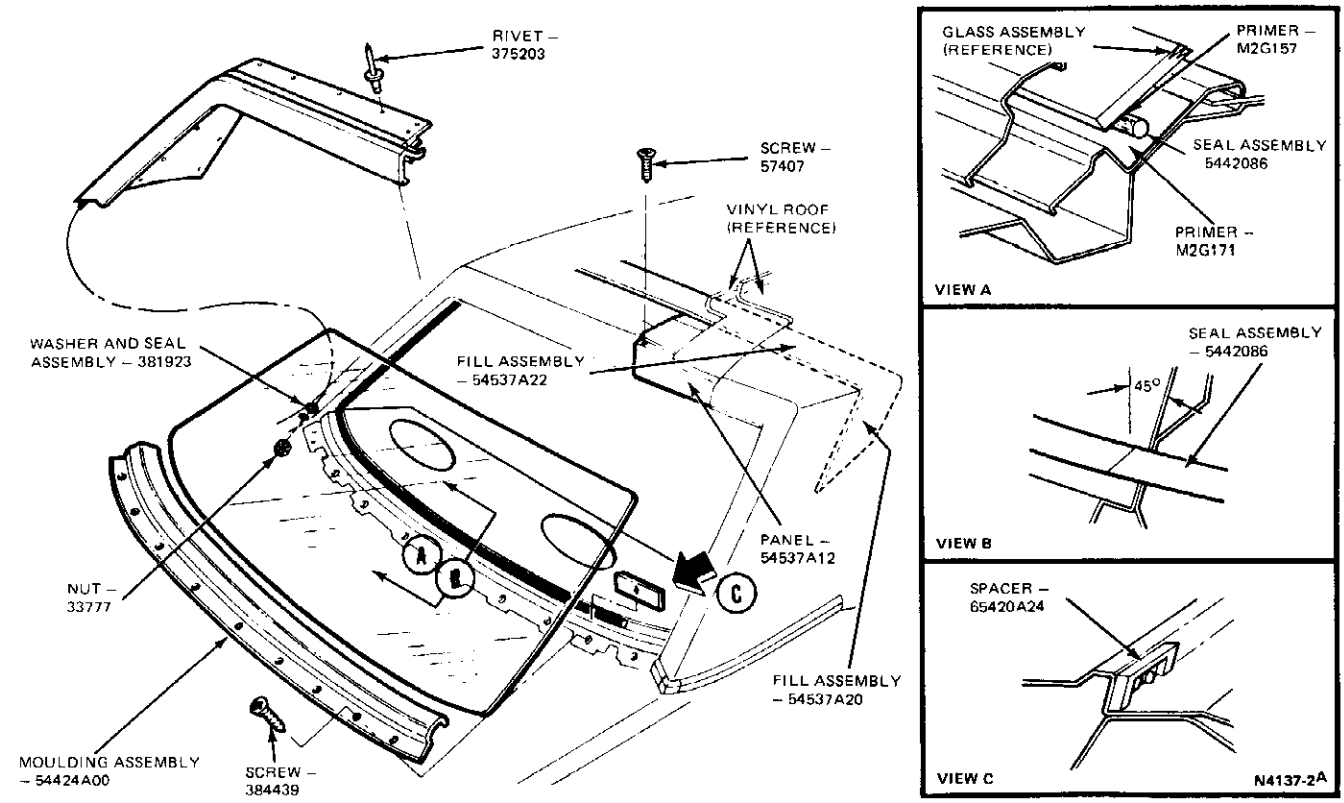


FIG. 9 Frenched Back Window Installation—Versailles

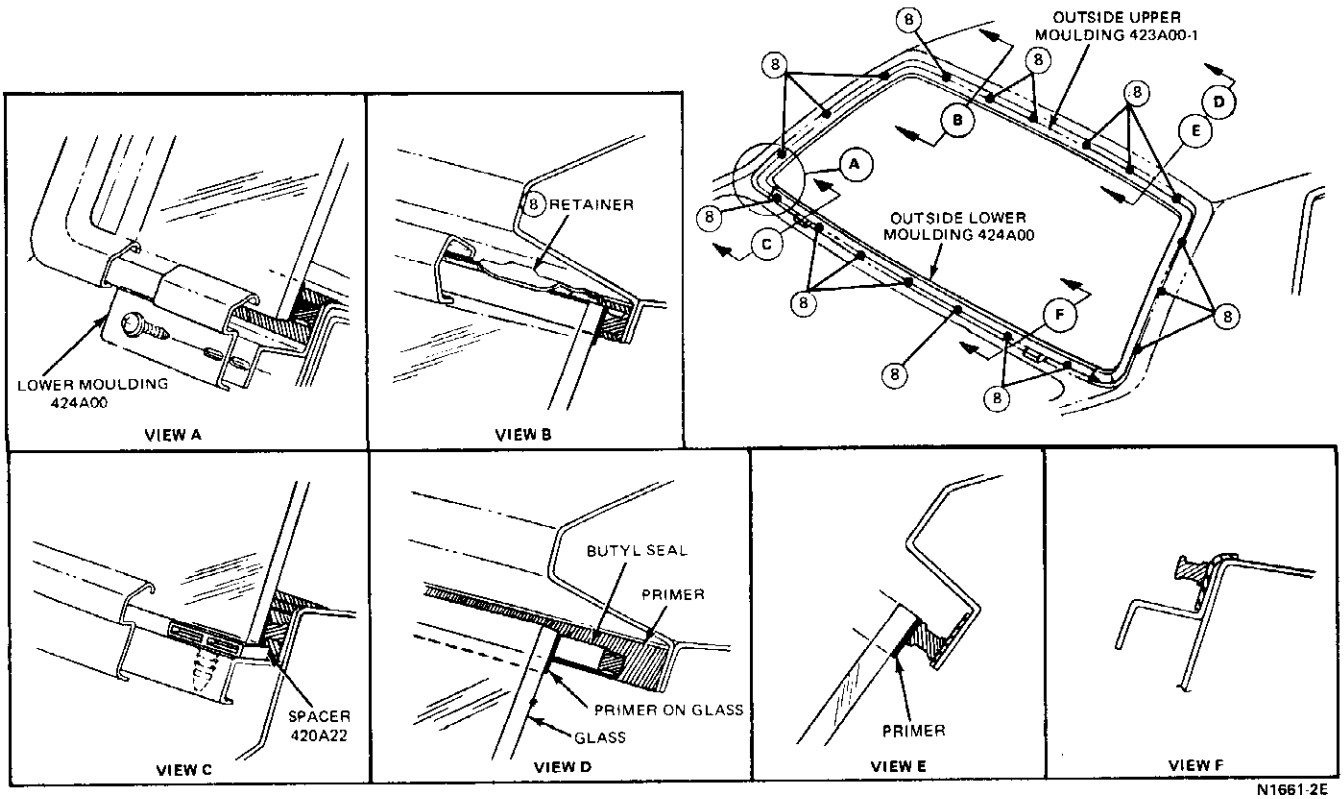


FIG. 10 Back Window Exterior Mouldings—Mustang II 2-Door

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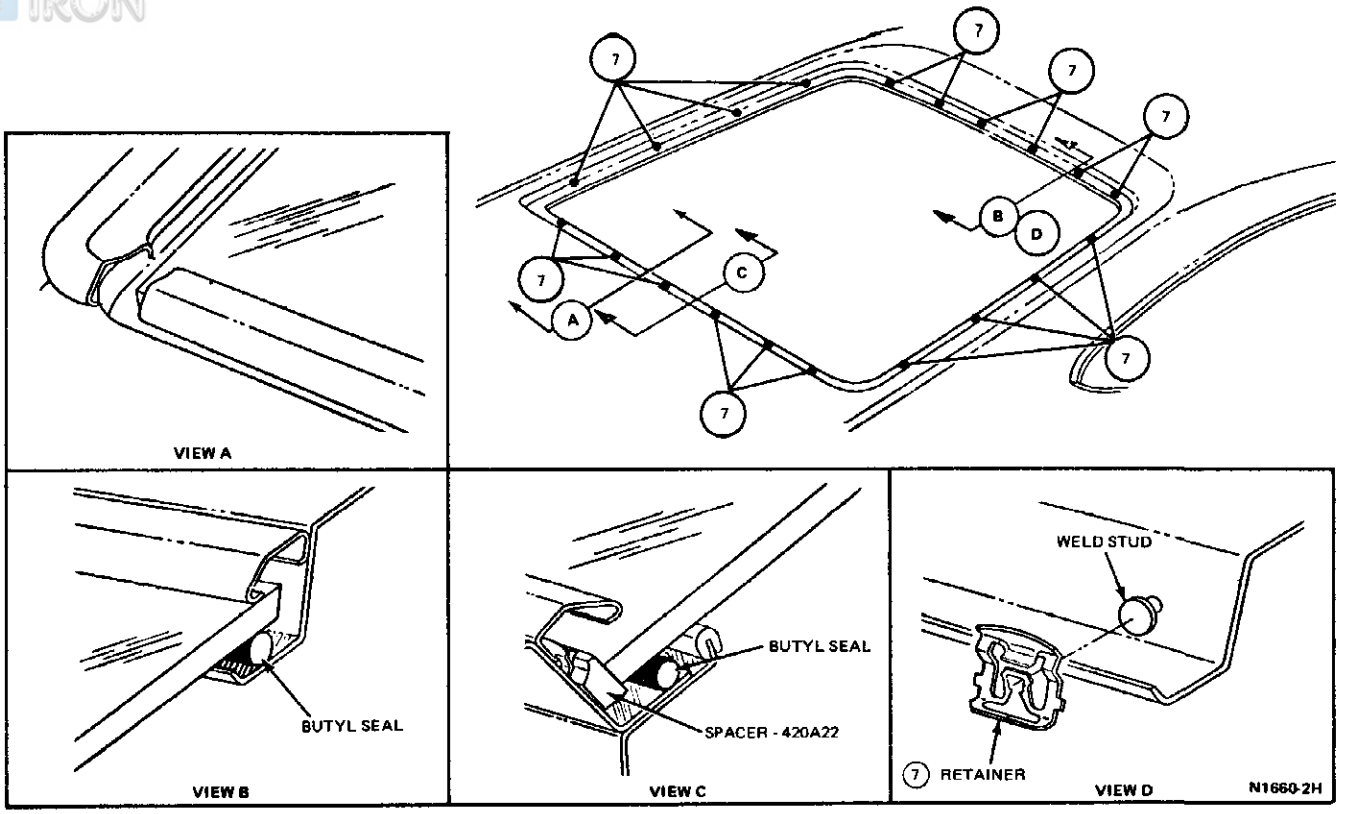


FIG. 11 Back Window Exterior Mouldings—Mustang II 3-Door

3. Carefully splice the two loose ends of the new butyl.
4. Apply the primer (furnished in the kit) around the perimeter of the cleaned inside surface and the edge of the glass in the area that will contact the butyl seal (Fig. 18). Allow the primer to dry one minute before installing the glass.
5. Place the glass in the opening, aligning the crayon marks.
6. Firmly press the glass against the butyl with hand pressure or weights. Recheck to assure that the 3/16" contact between glass and butyl is achieved. A dull spot indicates an area where the butyl is not contacting the glass surface. Additional pressure will seal such areas.
7. From outside the vehicle, apply C9AZ-19554-B Auto Glass Liquid Sealer (or equivalent) around the entire edge of the glass.
8. Remove any excess primer from the inside surface of the glass with a razor blade and wipe the glass with a clean cloth dampened in naphtha.
9. When the liquid sealer has "skinned-over" (approximately ten minutes), water test the installation. If necessary, repair any leaks with additional liquid sealer.
10. Install the mouldings and wiper arms and blades.
11. On the heated back window, it will be necessary to apply a piece of tape to the pinch weld flange under the wires. Then, connect the wires and install the garnish and exterior mouldings.
12. When cleaning the heated back window, use only liquid window cleaning solvent. Do not use steel wool or abrasive powders, as damage to the grid wires will result.
13. Clean the glass and surrounding area.

Removal (Procedure No. 2)

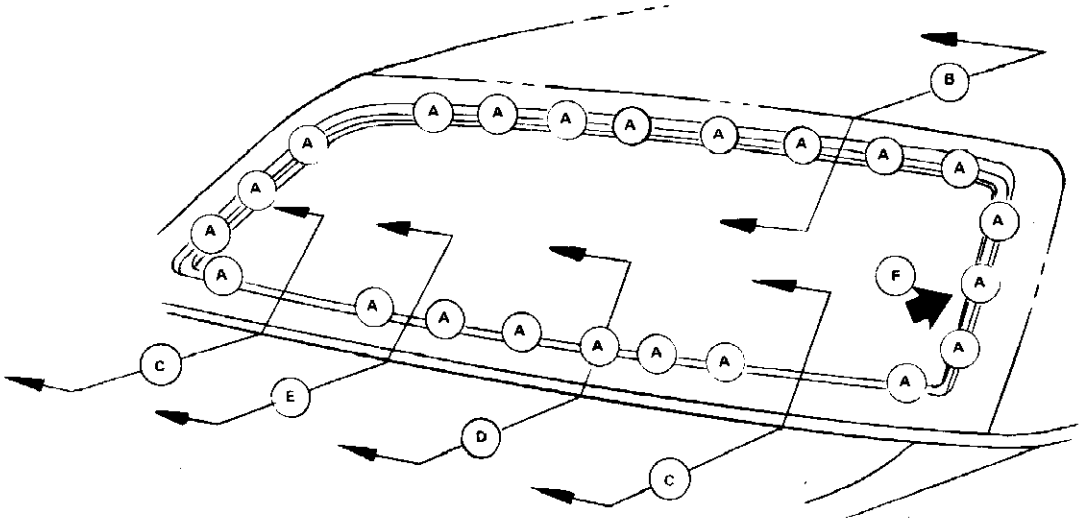
Engine must be off on vehicles equipped with high voltage output type heated glass.

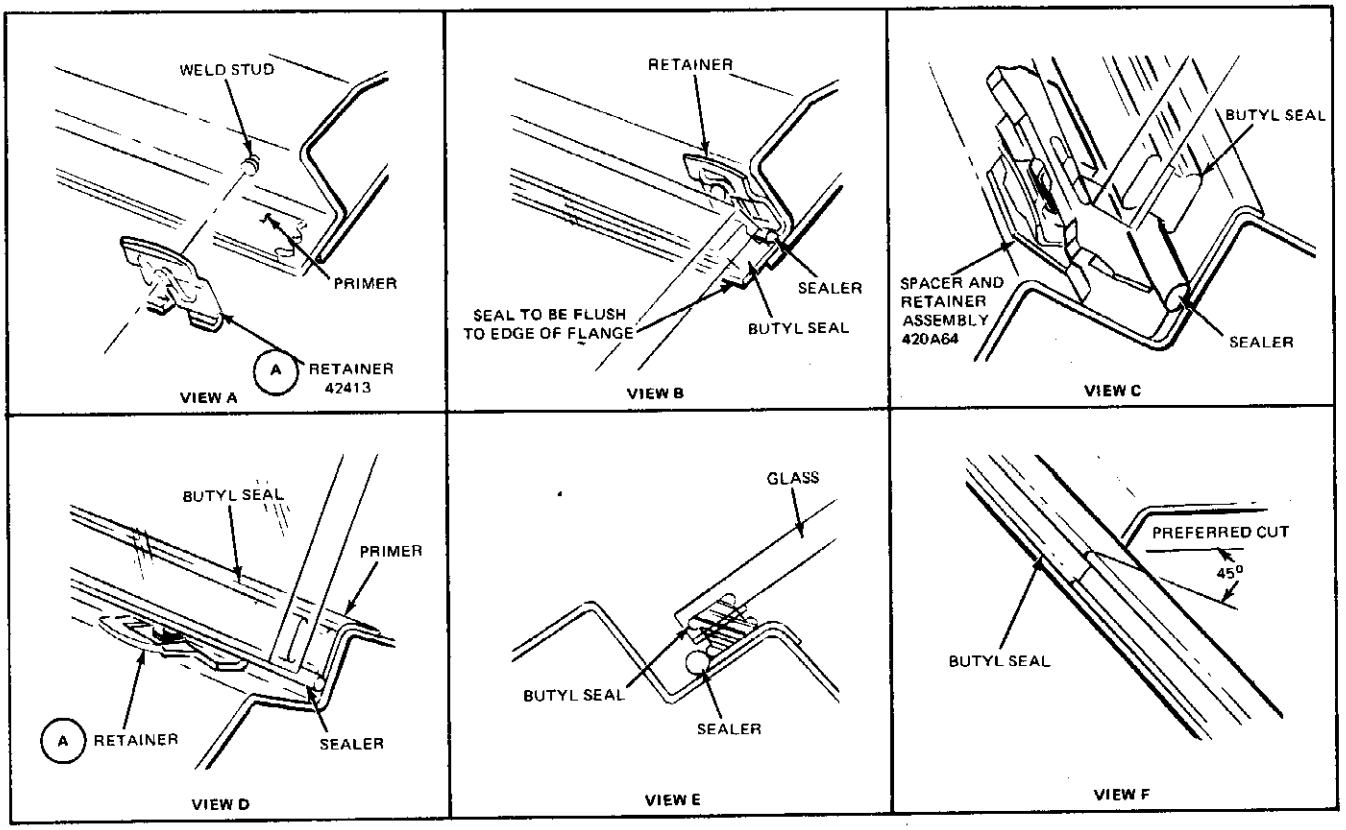
1. Remove the windshield wiper arms and blades if the windshield is being replaced.
2. Remove the window mouldings.
3. On the heated back window it will be necessary to disconnect the window wires at the connectors on both sides of the window before proceeding with the glass removal.
4. With a electric knife (special Tool T70B-42006-A or equivalent), insert the blade under the edge of the glass. Cut the butyl seal as close to the inside surface of the glass as possible. To cut the butyl at the lower corners of the windshield, move the handle of the tool as close to the corner as possible. Then, rotate the blade downward to cut the corner butyl seal and remove glass from the vehicle using the glass holding tool (Figs. 16, 17 and 19).

Installation

1. Clean all remaining butyl from the pinch weld flange and wipe the sheet metal with naphtha or equivalent solvent to provide a clean surface for the replacement butyl.
2. Inspect flange carefully for sheet metal deficiencies, and the sealing surface of the pinch weld flange for chipped or missing paint and repair as necessary.
3. Temporarily position the replacement glass in the windshield opening using spacers to prevent glass-to-metal contact. Adjust glass side to side to the

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N1573-2F

FIG. 12 Back Window Exterior Mouldings—Continental Mark V

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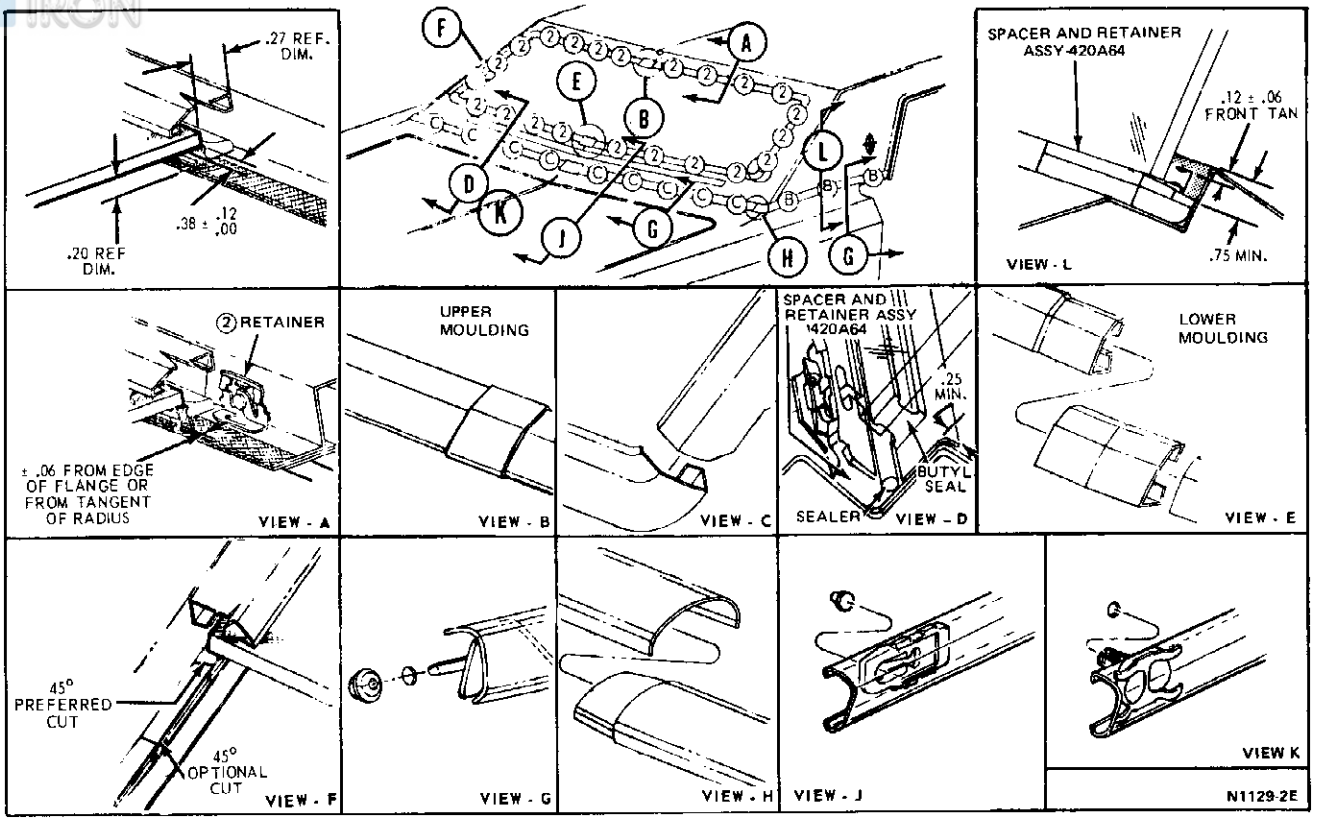


FIG. 13 Back Window Exterior Mouldings—Lincoln Continental 2-Door Shown—Typical 4-Door

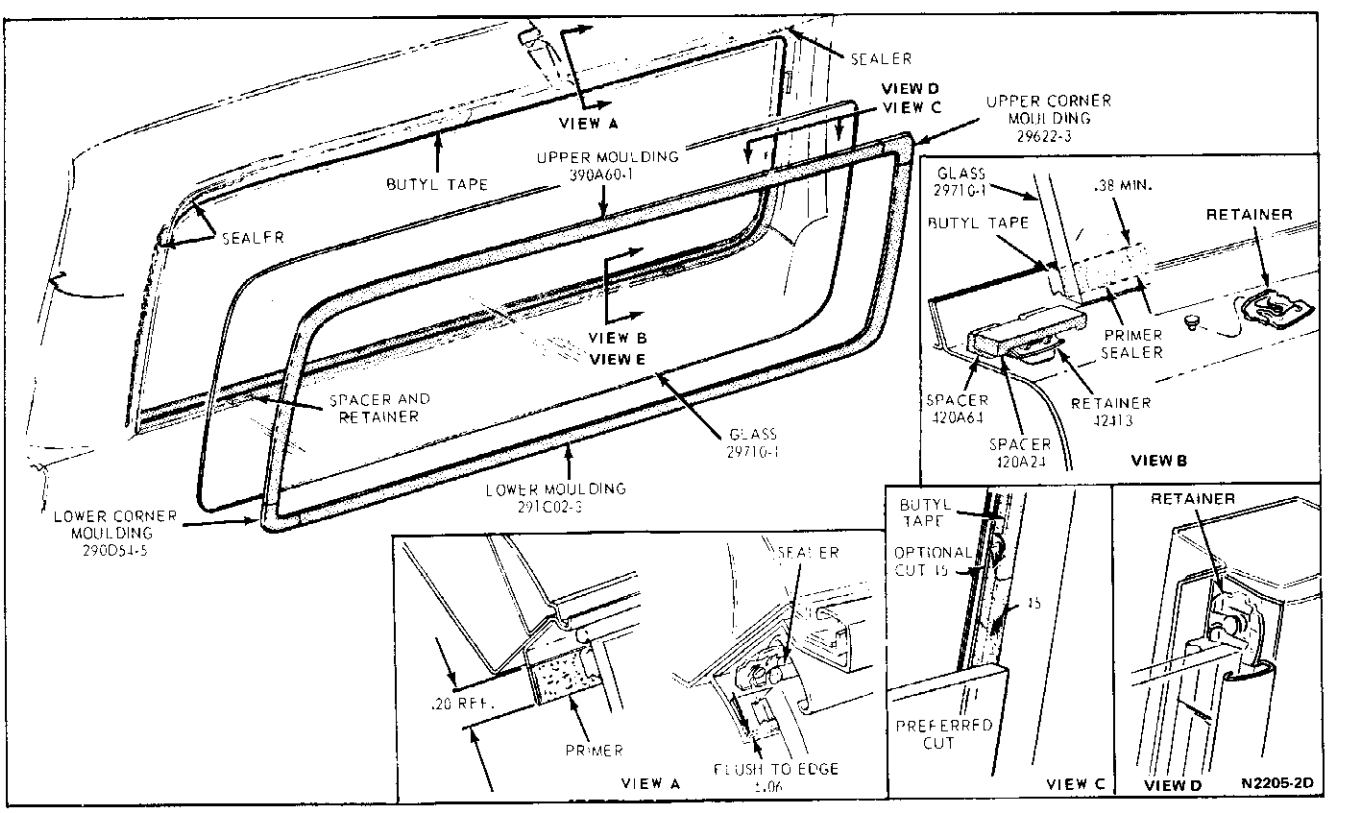


FIG. 14 Quarter Window Moulding Installation—Ford and Mercury Station Wagon—Fairmont and Zephyr Similar

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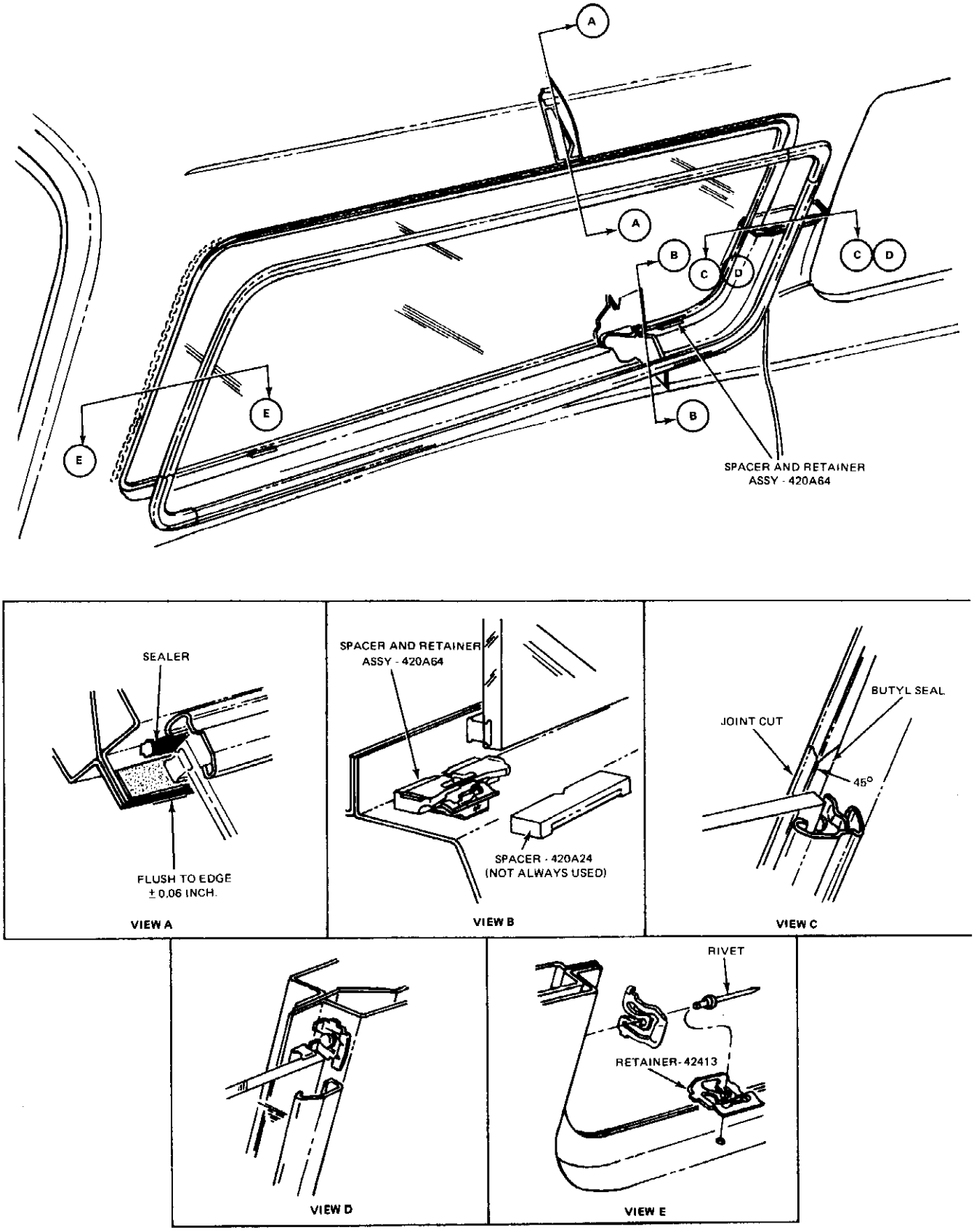


FIG. 15 Quarter Window and Moulding Installation—LTD II Station Wagon

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FIG. 16 Removing Butyl Type Seal

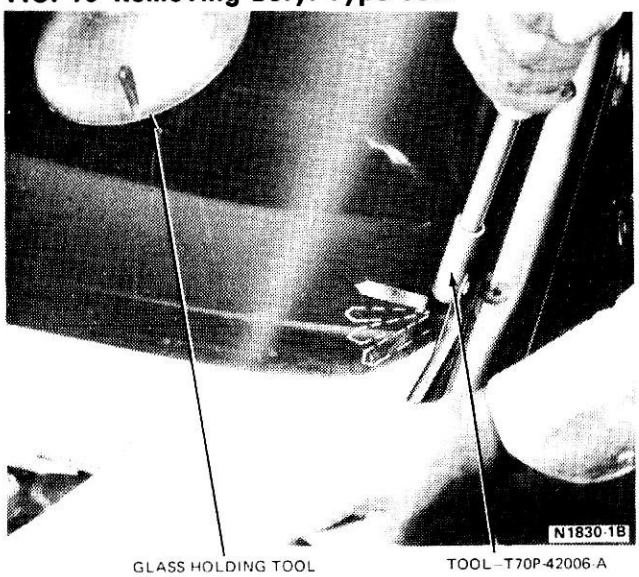


FIG. 17 Cutting Corner Seal

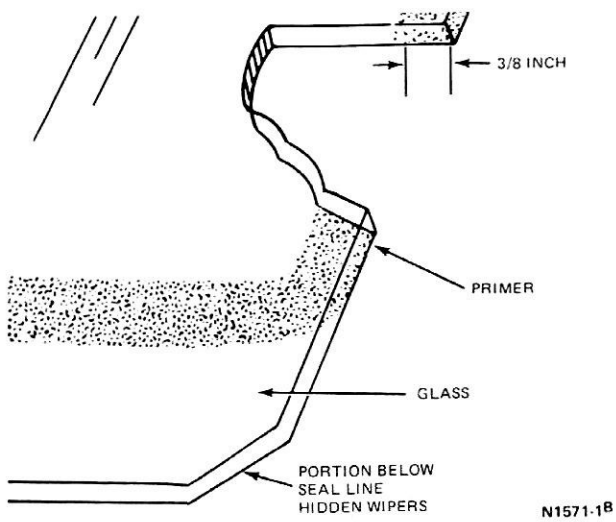


FIG. 18 Primer Installation

best glass-to-"A" pillar weld flange overlap position and adjust lower spacers, if necessary, for proper positioning at the top. A minimum of 3/16" butyl tape-to-glass contact is required around the periphery to assure proper retention and adequate seal. Mark this location with a crayon on the outside surface of the glass and a corresponding point of the glass opening. Remove the glass and clean the inside surface and edge thoroughly.

4. Starting at the midpoint on one "A" pillar, place the butyl tape flush to 1/16" inboard of the pinch weld flange edge around the periphery of the opening and along the raised area of the cowl top panel provided for the seal. NOTE: Do not allow the butyl to bridge corners of the window opening and do not stretch the butyl.
5. Cut the butyl at the required length on a 45 degree angle and carefully splice the two loose ends.
6. Apply the primer (furnished in the kit) around the perimeter of the cleaned inside surface and the edge of the glass in the area that will contact the butyl seal (Fig. 18).
7. Allow the primer to dry one minute before installing the glass.
8. Place the glass in the opening, aligning the crayon marks.
9. Firmly press the glass against the butyl with hand pressure or weights. Recheck to assure that 3/16 inch contact between glass and butyl is achieved. A dull spot indicates an area where the butyl is not contacting the glass surface. Additional pressure will seal such areas.
10. From outside the vehicle, apply C9AZ-19554-B Auto Glass Liquid Sealer (or equivalent) around the entire edge of the glass.
11. Remove any excess primer from the inside surface of the glass with a razor blade and wipe the glass with a clean cloth dampened in naphtha.
12. When the liquid butyl has "skinned over" (approximately ten minutes), water test the installation. If necessary, repair any leaks with additional liquid sealer.
13. Install the mouldings and wiper arms and blades.
14. On the heated back window, it will be necessary to apply a piece of tape to the pinch weld flange under the wires. Then, connect the wires and install the garnish and exterior moldings.
15. When cleaning the heated back window, use only liquid window cleaning solvent. Do not use steel wool or abrasive powders, as damage to the grid wires will result.
16. Clean the glass and surrounding area.

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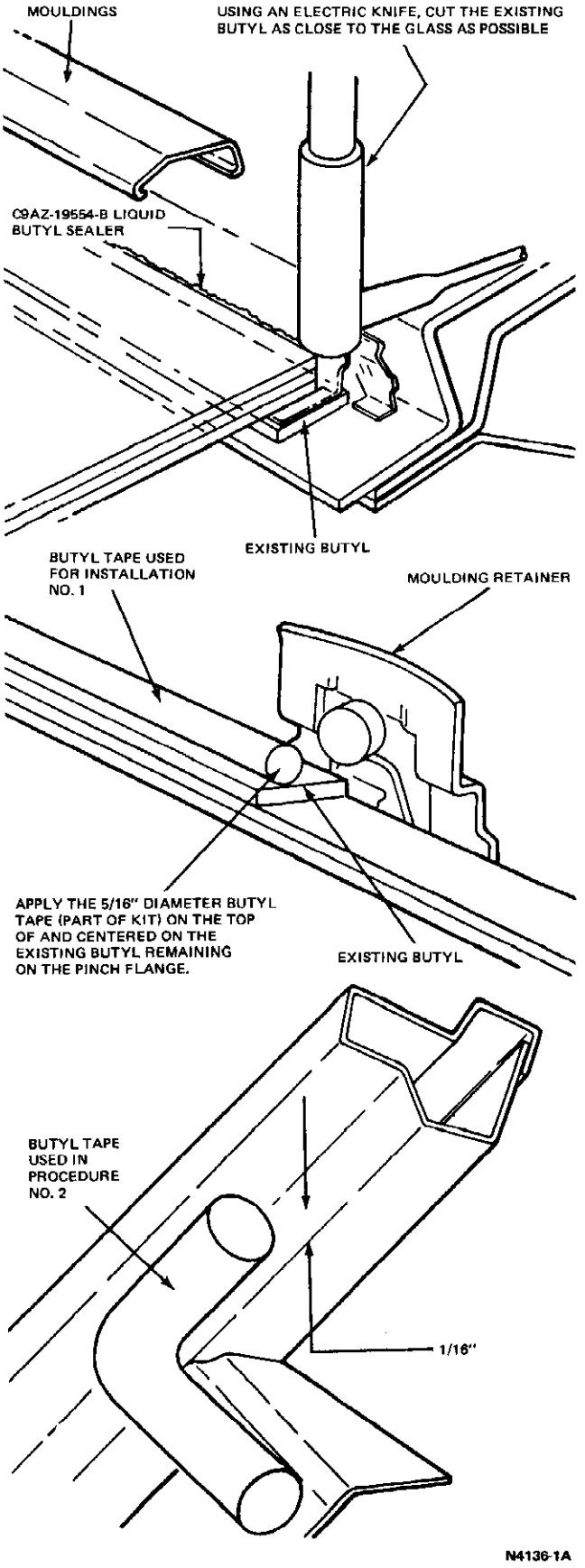


FIG. 19 Butyl Type Seal Installation

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DETROIT IRON

DOORS,HOOD,LUGGAGE COMPARTMENT DOOR AND TAILGATE

GROUP 44

PART TITLE	PART NO.
Door, Hinge, Weatherstrip, Latch and Lock	44-06
Door, Hood, Luggage Compartment Door and Tailgate – General Service	44-01
Hood, Hinge and Latch	44-21
Luggage Compartment Door, Hinge, Latch, Lock and Weatherstrip	44-41
Power Door Locks	44-16
Tailgate, Hinge, Latch and Lock – Dual Action Gate	44-76
Tailgate, Hinge, Latch and Lock – Single Action Gate	44-61

CR2005-2B

General Service

PART 44-01

GENERAL INFORMATION

DOOR AND ROOFRAIL WEATHERSTRIP LUBRICANT

Silicone Lubricant COAZ-19553-A (Jelly) and COAZ-19533-C (Spray) (or Equivalent)

This lubricant is to be used on the door and window weatherstrips. It is recommended that silicon lubricant be applied to the weatherstrips at every regular lubrication period and/or, whenever necessary. Its use makes the doors easier to close, avoids weatherstrip squeaks, retards excess weatherstrip wear from chafing between the door glass upper frame and the weatherstrip. Also, it helps to retain door window alignment by reducing friction between the glass frame and the rubber weatherstrip.

DOOR, HOOD, LUGGAGE COMPARTMENT LATCHES AND TAILGATE HINGES-LUBRICANT

Polyethylene Grease C4AZ-19584-B (or Equivalent)

The lubricant is used to lubricate door hood, luggage compartment,and tailgate hinges and latches. Apply an even coat to all movable hinge surfaces when a binding condition occurs. The hood latch and auxiliary latch should be checked every six months.

CYLINDER LOCK LUBRICANT

Lock Lubricant B4A19587-A (or Equivalent)

This lubricant is used to eliminate sticking or binding of all key lock cylinders.

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DETROIT IRON

Door, Hinge, Weatherstrip, Latch and Lock

PART 44-06

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Door Latch Striker	06-2
REMOVAL AND INSTALLATION	
Door Hinge	06-3
Door Latch Remote Control — Front or Rear	06-7
Door Lock Cylinder	06-11

SUBJECT	PAGE
REMOVAL AND INSTALLATION (Cont'd.)	
Door Outside Handle	06-14
Doors	06-3
Front and Rear Door Weatherstrip	06-2
Front Door Latch	06-3
Rear Door Latch	06-10
Rear Door Latch Bellcrank	06-11
Roof Side Rail and Door Weatherstrips	06-2

CR2035-2B

ADJUSTMENTS

DOOR ALIGNMENT

The door hinges provide sufficient adjustment to correct most door misalignment conditions. The holes of the hinge and/or the hinge attaching points are enlarged or elongated to provide for hinge and door alignment (Figs. 1 and 2).

The lubrication points on the door hinges are shown in Figs. 1 and 2. **Do not cover up a poor door alignment with a latch striker adjustment.**

SIDE DOORS

1. See Figs. 1 and 2, to determine which hinge bolts must be loosened to move the door in the desired direction.
2. Loosen the hinge bolts just enough to permit movement of the door with a padded pry bar.
3. Move the door the distance estimated to be necessary. Tighten the hinge bolts and check the

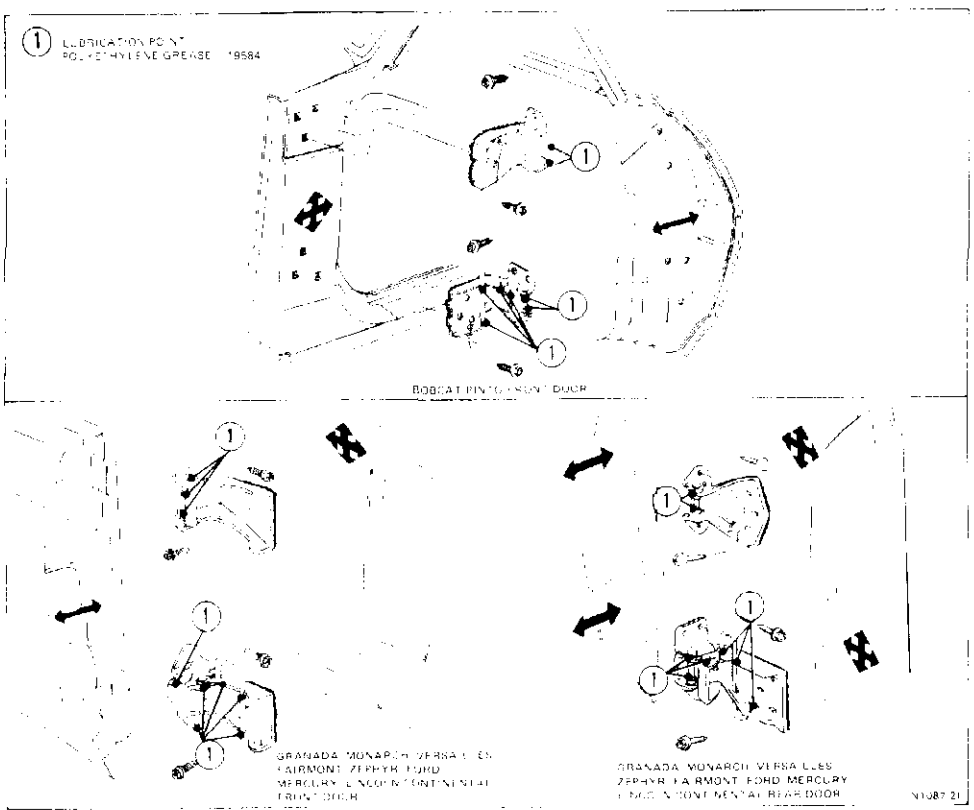


FIG. 1 Side Door Hinge Adjustments—All Models Except LTD II, Cougar, Thunderbird, Continental Mark V and Mustang II

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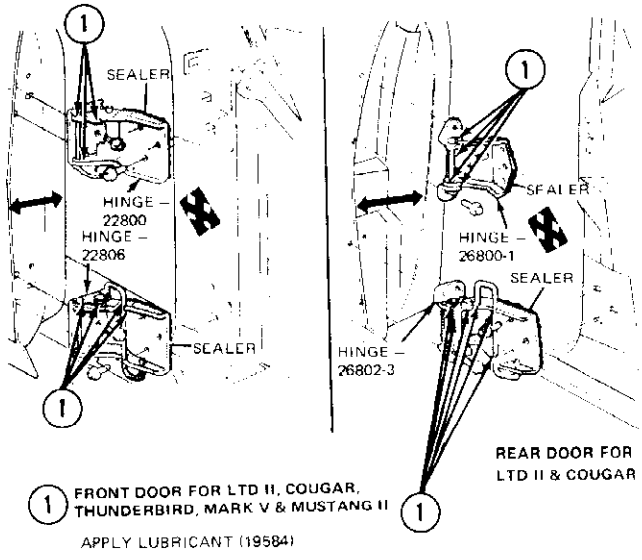


FIG. 2 Side Door Hinge Adjustments—LTD II, Cougar, Thunderbird and Continental Mark V

door fit, to be sure there is no bind or interference with the adjacent panel.

4. Repeat the operation until the desired fit is obtained, and check the striker plate alignment for proper door closing.

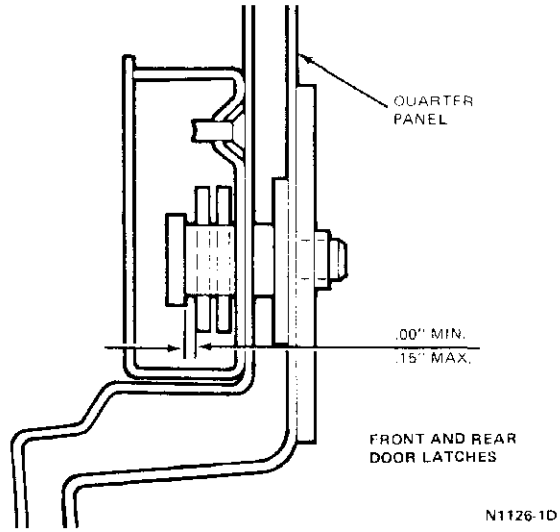


FIG. 3 Door Latch Striker Adjustment—Fairmont and Zephyr Shown

5. On all hardtop models, the door and quarter glass must be checked to assure proper alignment to the roof rail and vertical weatherstrips. See Group 42.

DOOR LATCH STRIKER

The striker pin can be adjusted laterally and vertically as well as fore and aft. The latch striker should not be adjusted to correct door sag.

The latch striker should be shimmed to get the clearance shown in Fig. 3 between the striker and the latch. To check this clearance, clean the latch jaws and the striker area. Apply a thin layer of dark grease to the striker. As the door is closed and opened, a measureable pattern will result on the latch striker.

Move the striker assembly in or out to provide a flush fit at the door and pillar or quarter panel. Use Tool T70P-2100-A to loosen and tighten the latch striker.

REMOVAL AND INSTALLATION

ROOF SIDE RAIL AND DOOR WEATHERSTRIPS

The roof side rail and door weatherstrip installations are shown in Figs. 6 through 15. Apply adhesive (Part Number 19552) or equivalent, where required to retain the weatherstrip to the door or retainer.

FRONT AND REAR DOOR WEATHERSTRIP

ALL MODELS EXCEPT PINTO, BOBCAT AND LINCOLN CONTINENTAL

Removal

1. Remove the door weatherstrip front and rear molded details attaching screws (Fig. 4).
2. Pry the door trim panel up and pull the molded belt detail flap out from under the door trim panel, tearing it away from the retaining pin. Do this at both the front and rear sections and remove the weatherstrip from the door.

Installation

1. Prior to installation of the replacement weatherstrip, remove the retaining pins from the molded detail flaps of the new weatherstrip assembly (Fig. 5).
2. Slide the "flap" of both front and rear molded belt details of the new weatherstrip assembly under the door trim panel. Proceed to complete weatherstip installation, using adhesive where required (Part No. 19552) (or equivalent). Fully insert all weatherstrip retaining pins.

PINTO AND BOBCAT

Removal

1. Pull weatherstrip away from door panel by breaking loose from adhesive.
2. Clean off all the old adhesive.

Installation

1. Apply adhesive to door panel.

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DETROIT IRON

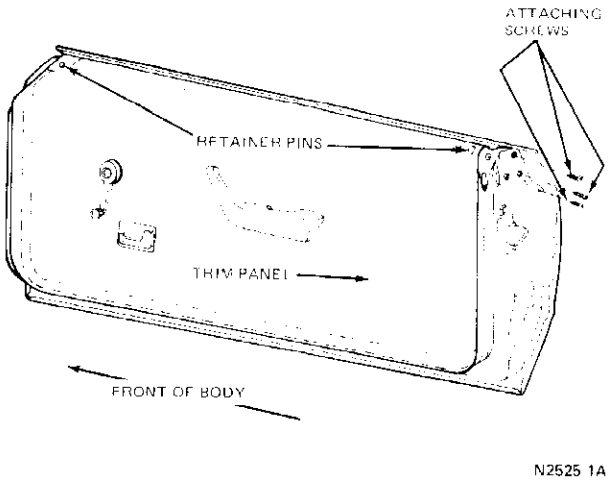


FIG. 4 Removing Door Weatherstrip—Trim Panel in Place (Typical)

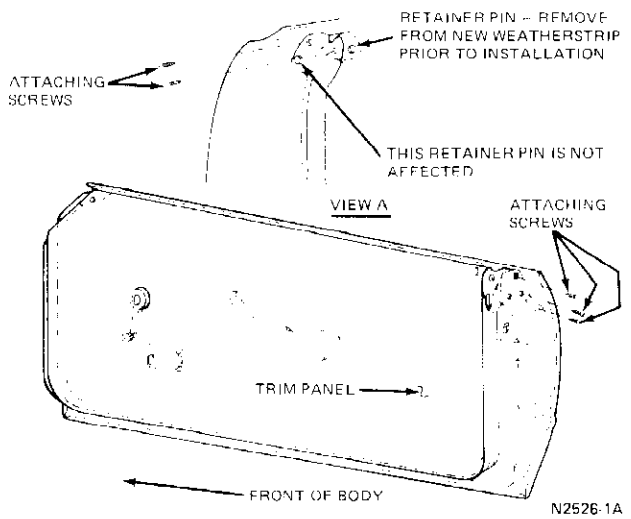


FIG. 5 Installing Door Weatherstrip—Trim Panel in Place (Typical)

2. Position new weatherstrip and press against door until secure. Fully insert all weatherstrip retaining pins.

LINCOLN CONTINENTAL

Removal

1. Remove the retaining screws (8 front-door, 7 rear-door) and remove the weatherstrip.

Installation

1. Position the weatherstrip to the door flange.
2. Install the retaining screws.

DOORS

Removal

1. Remove the trim panel, the watershield, and all usable outside mouldings and clips (if the door is to be replaced).
2. Remove the wiring harness, actuator and radio speaker from the door (if so equipped).
3. Remove all usable window and door latch components from the door (if the door is to be replaced).
4. Support the door.
5. Remove the hinge attaching bolts from the door and remove the door.
6. Remove the weatherstrip from the door.

Installation

1. Drill holes as necessary for attaching the outside moulding. Install the door weatherstrips in proper position.
2. Position the door to the hinges and partially tighten the bolts. Then, align the door and tighten the bolts securely.
3. Install the wiring harness, actuator and radio speaker in the door, if so equipped.
4. Install the latch mechanism, the window mechanism, glass, and the glass weatherstripping. Adjust the window mechanism as outlined in Group 42 and striker adjustment in this Section.
5. Install the exterior trim, garnish mouldings, watershield, and interior trim.

DOOR HINGE

ALL MODELS

1. Support the door.
2. Mark the location of the hinge on the door and body.
3. Remove the hinge-to-body attaching bolts.
4. Remove the hinge-to-door attaching bolts and remove the hinge.
5. Position the hinge to the door and body, and install the attaching bolts.
6. Adjust the door and hinges and remove the support.

FRONT DOOR LATCH

Removal

1. Remove the trim panel and watershield from the door.
2. Ford, Mercury (4-door sedan and wagon) and Fairmont, Zephyr, Pinto and Bobcat; mark the location of the rear run lower retaining bolt. Then, remove the bolt.
3. Check all rod connections against the appropriate illustration (Figs. 16 thru 24). Correct any misconnected or loose connections and check operation before replacing parts.
4. Disconnect the rods from the latch. The remote link and the latch to lock cylinder rod cannot be removed because of the rod's end configuration.
5. Remove the lock cylinder rod from the lock cylinder lever.
6. Remove the remote control as outlined in the next section.
7. Remove the latch assembly attaching screws; disconnect the door indicator switch wire (if so equipped) and remove the latch from the door.

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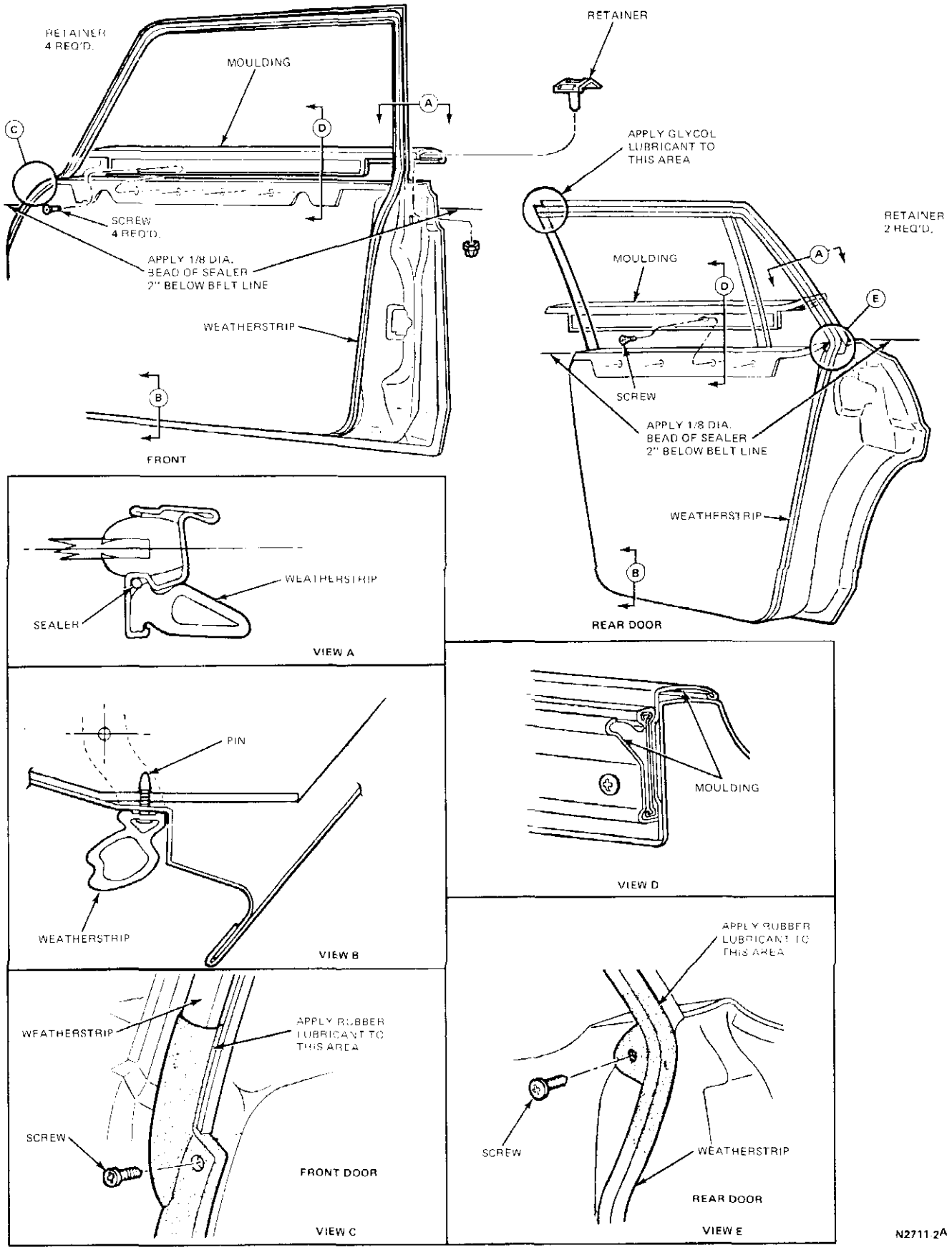


FIG. 6 Retainer and Weatherstrip Installation—Granada and Monarch—4-Door Shown—2-Door Similar

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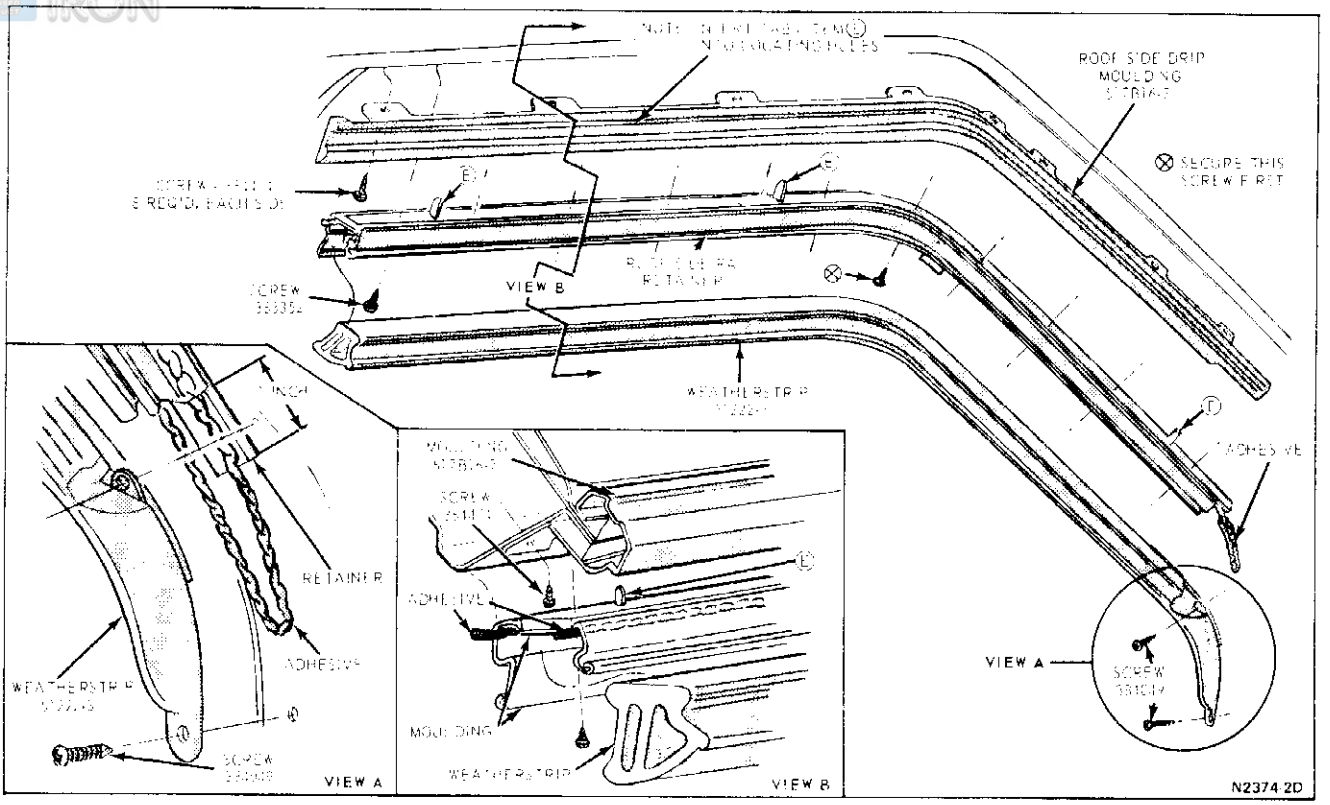


FIG. 7 Roof Rail Weatherstrip Installation—Continental Mark V

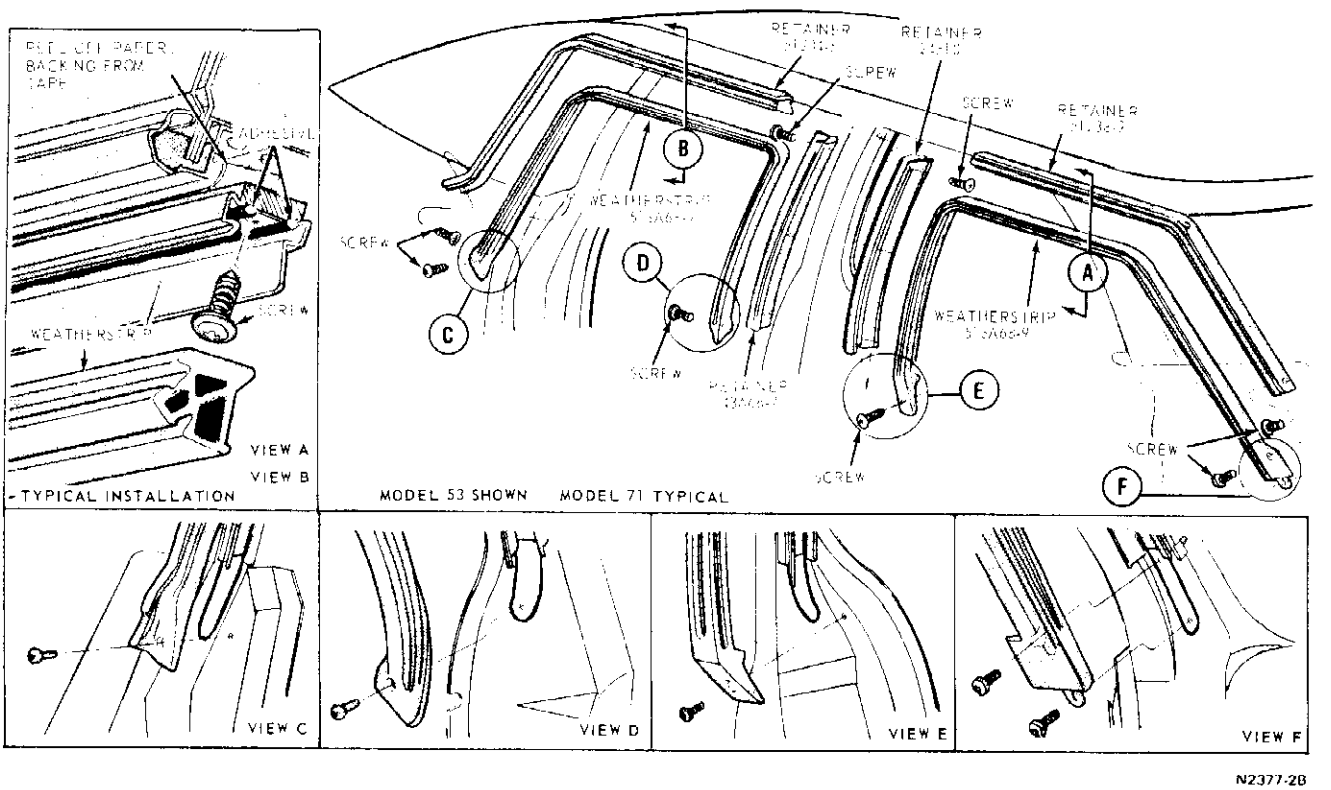


FIG. 8 Retainer and Weatherstrip Installation—LTD II and Cougar 4 Door

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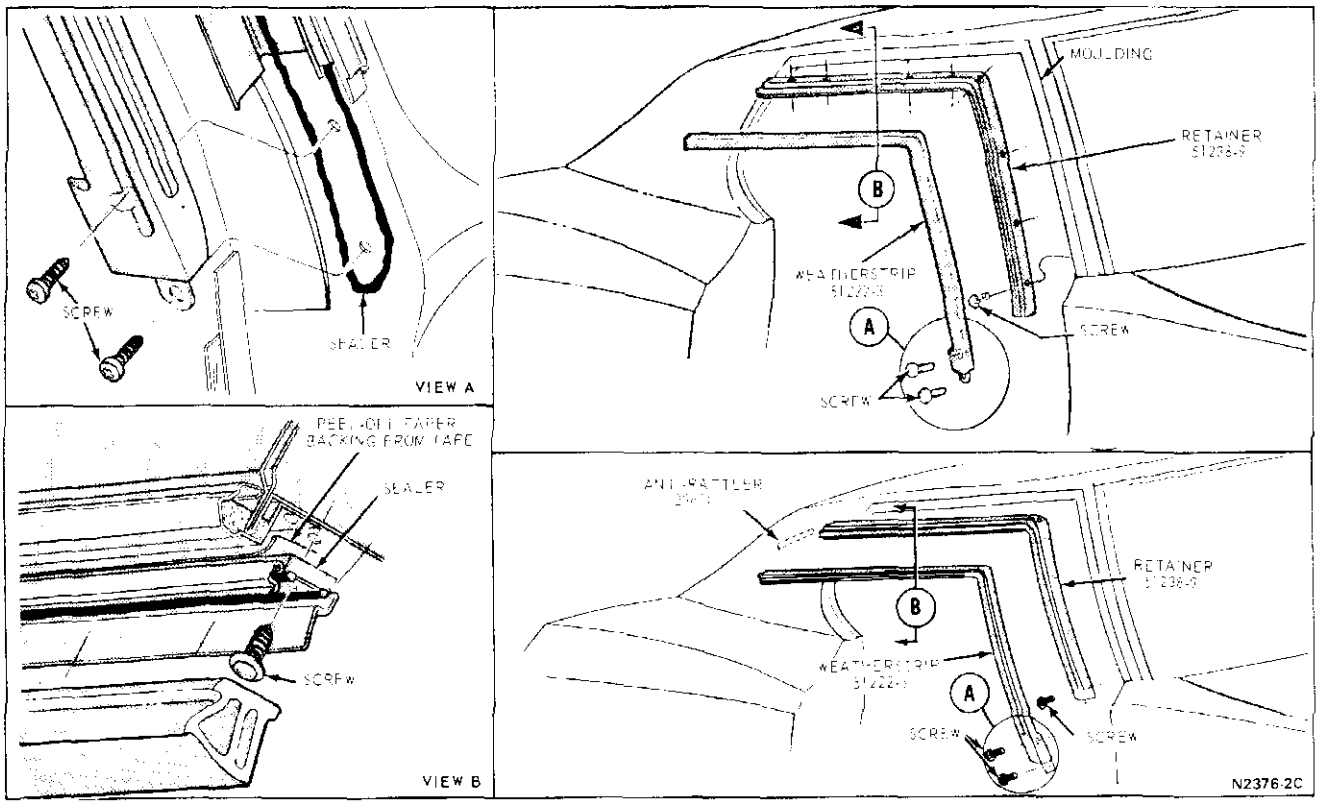


FIG. 9 Roof Rail Weatherstrip Installation—LTD II, Cougar and Thunderbird—Two Door

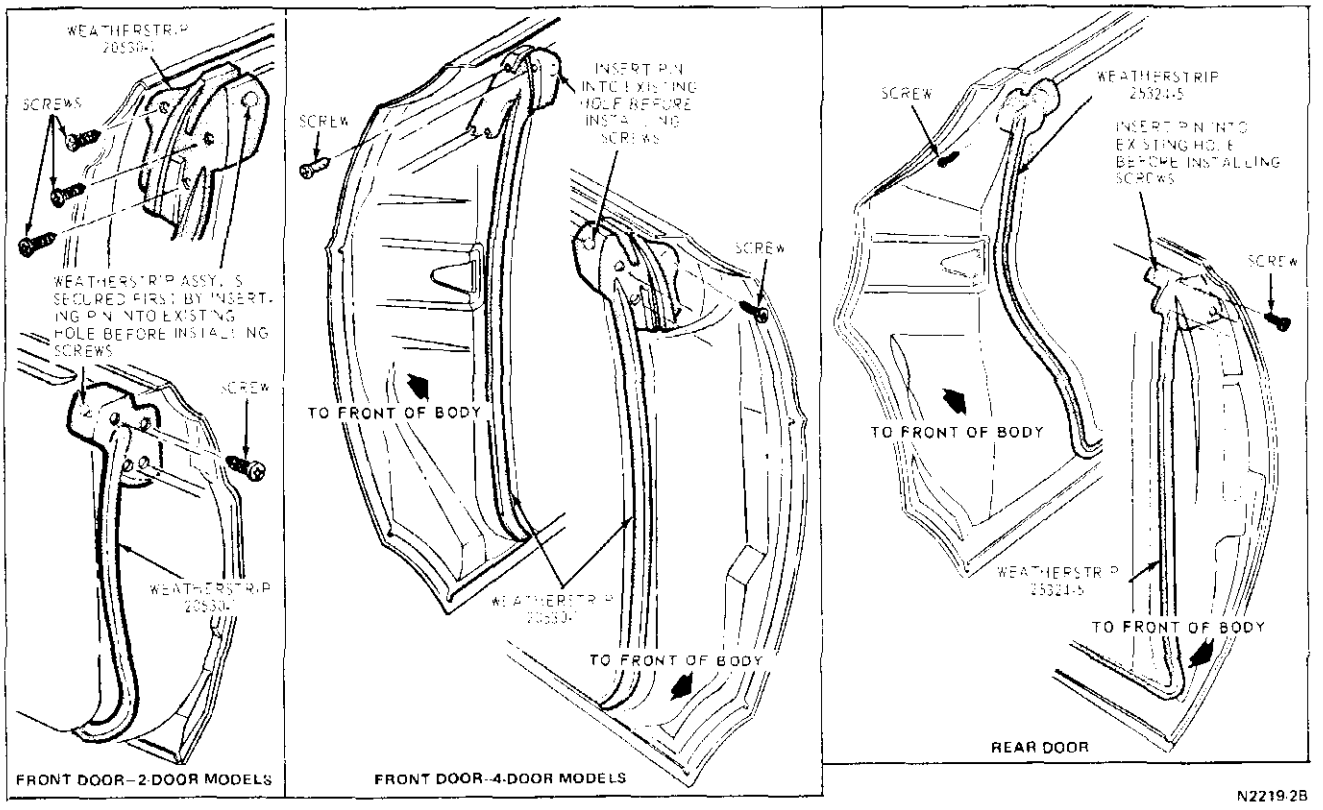


FIG. 10 Front and Rear Door Weatherstrips—LTD II, Thunderbird and Cougar

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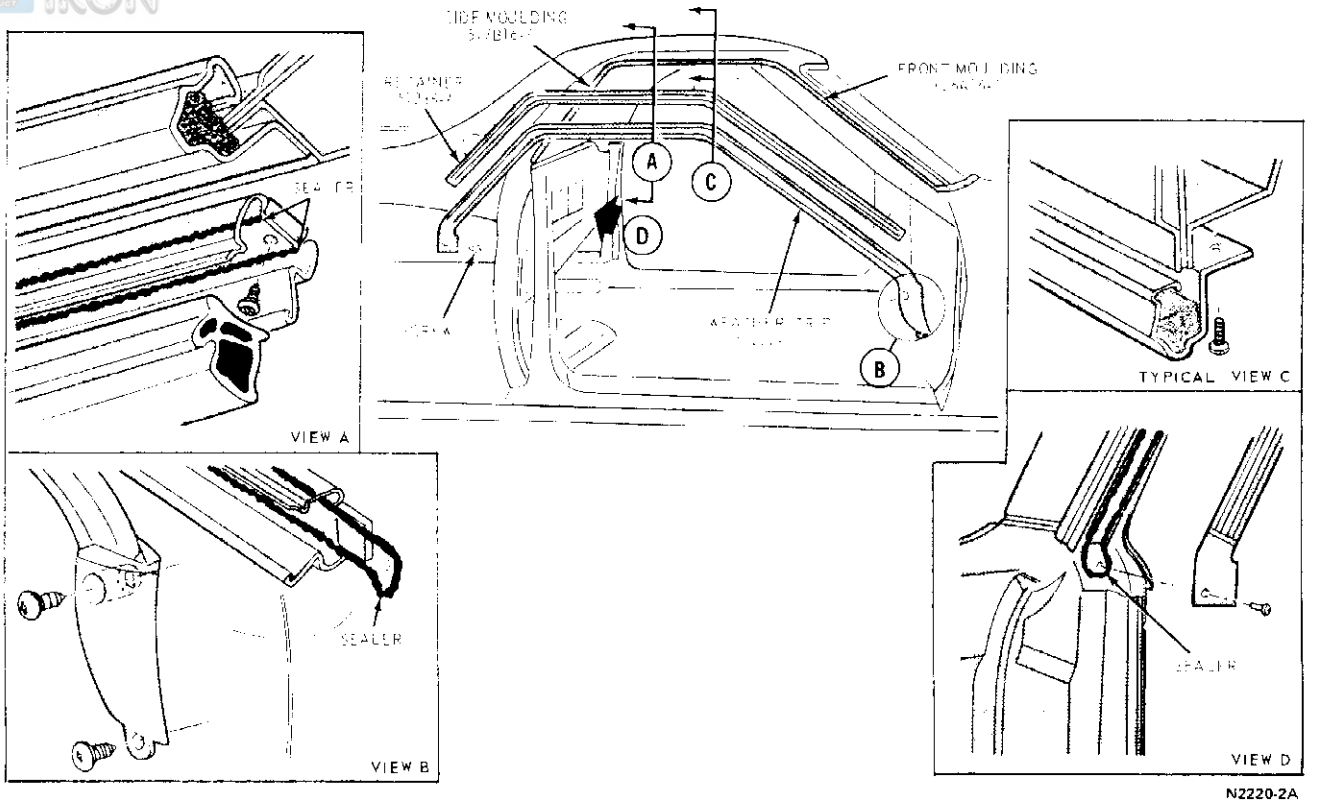


FIG. 11 Roof Side Rail Weatherstrip Installation—Ranchero

8. Remove the remote link, the latch to lock cylinder rods, and the door indicator switch from the latch where applicable.

Installation

1. Position the door indicator switch to the latch and install the attaching screw. Adjust the switch.
2. Install new rod retaining clips and grommets in the *new latch assembly, using the removed latch as a* guide.
3. Install the remote link and the latch to lock cylinder rod.
4. Position the latch in the door and connect the wire to the door indicator switch. Then, install the latch attaching screws.
5. Reinstall the door latch remote control as outlined in the next section.
6. Connect the latch to lock cylinder rod to the lock cylinder lever.
7. Connect the rods to the latch that were disconnected for removal and check the latch operation.
8. Install the rear run lower attaching bolt (if removed). Locate the bolt in the original position and tighten the bolt.
9. Install the watershield and trim panel on the door.

DOOR LATCH REMOTE CONTROL—FRONT OR REAR

ALL MODELS EXCEPT MUSTANG II, PINTO AND BOBCAT

Removal

1. Remove the door trim panel and watershield.
2. Remove the attaching screw or poprivets (see *appropriate Figs. 16 thru 23) and disengage the* attaching tab.
3. Rotate the remote control clockwise on the right-hand door and counterclockwise on the left-hand door, while moving it forward to disconnect the remote control from the remote control rod and the door.

Installation

1. Install a new rod end bushing to the remote control if the remote control is to be replaced.
2. Position the remote control to the door inner panel with the remote control rod started into the remote control bushing. Rotate the remote control a quarter turn onto the remote rod (counterclockwise on the right-hand and clockwise on the left-hand door).
3. Engage the tab on the remote control into the slot on the inner panel and install the attaching screw or poprivets.

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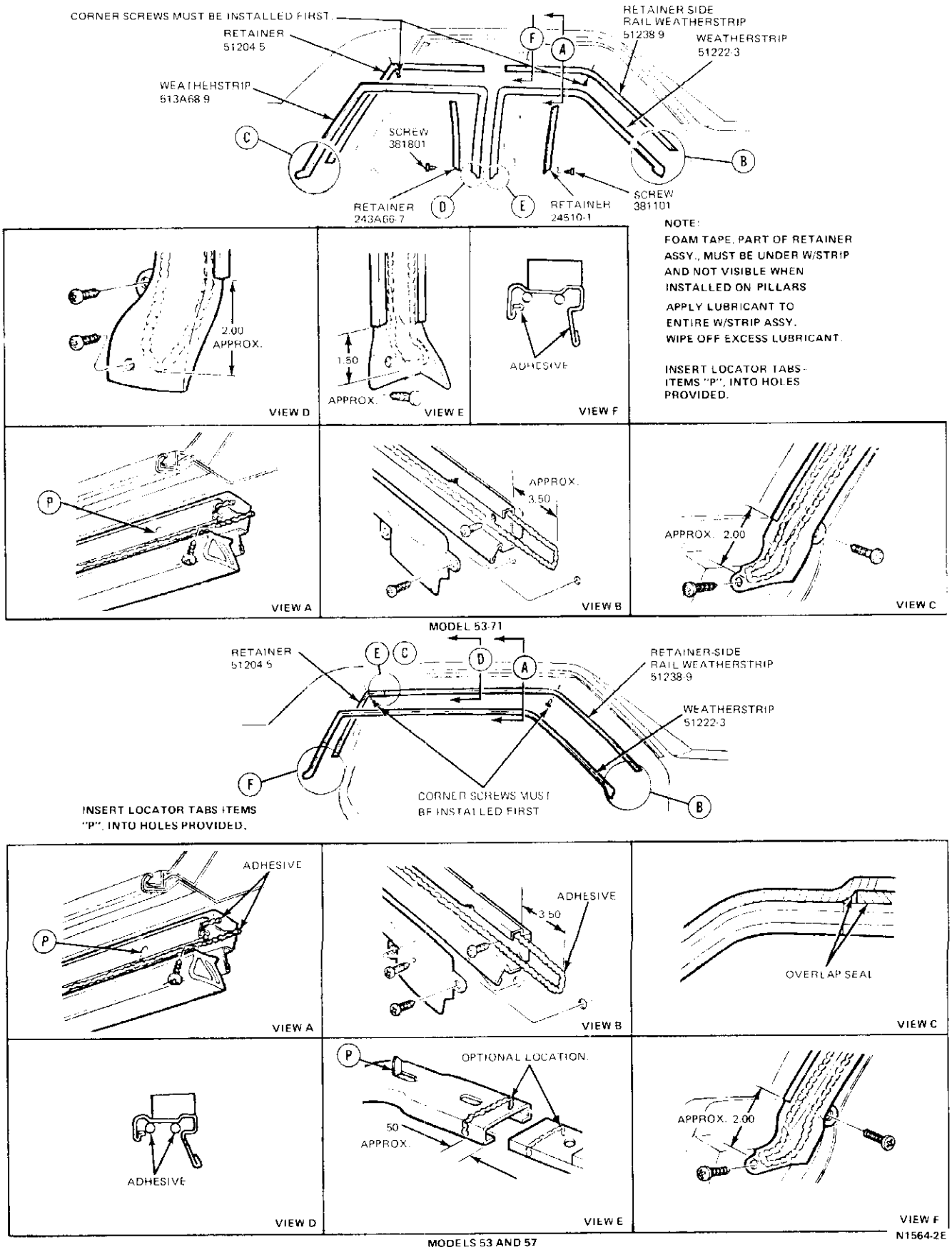


FIG. 12 Roof Rail Weatherstrip Installation—Ford and Mercury

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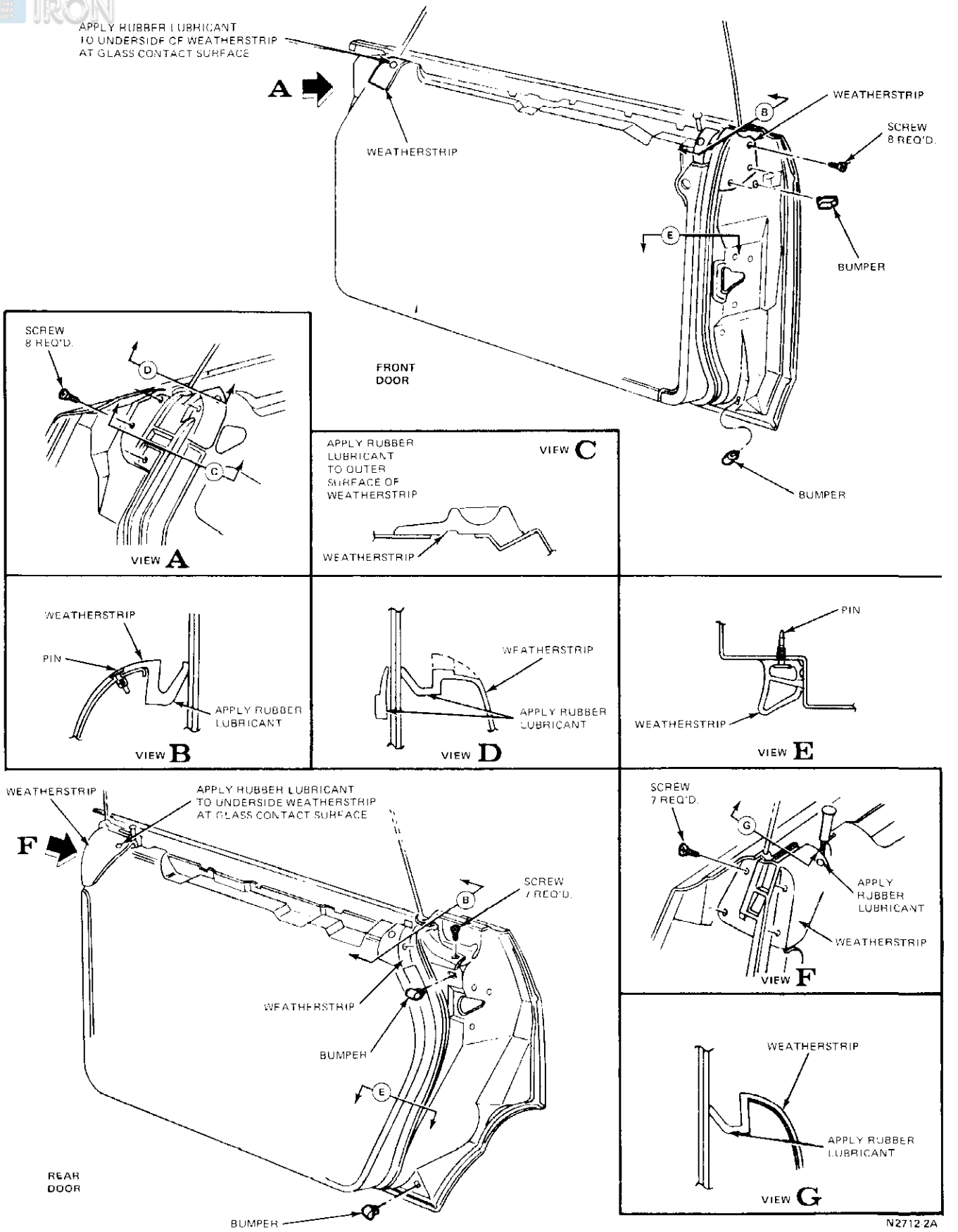


FIG. 13 Door Weatherstrip Installation—Lincoln Continental-4-Door Shown, 2-Door Similar

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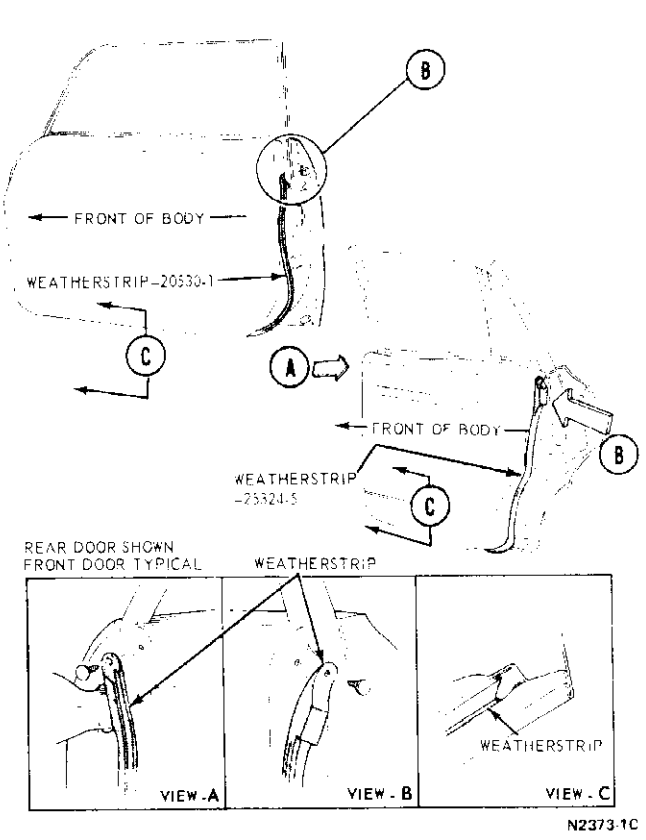
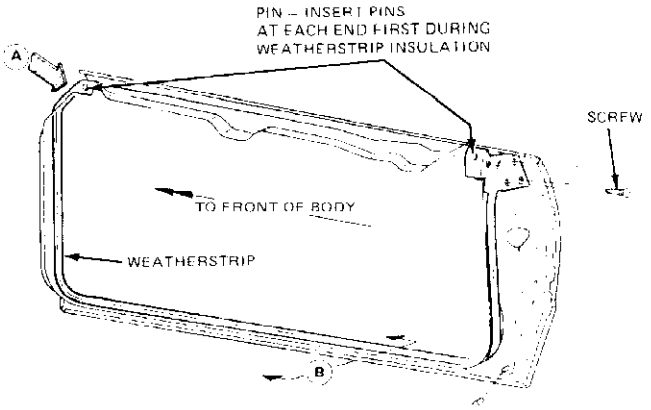


FIG. 14 Door Weatherstrips—Pinto and Bobcat



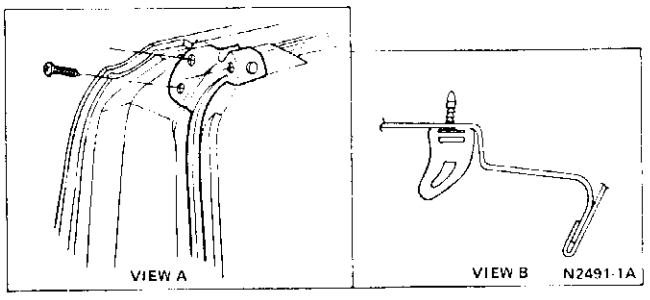


FIG. 15 Door Weatherstrips—Mustang II

4. Check the remote control and latch operation.
5. Install the watershield and door trim panel.

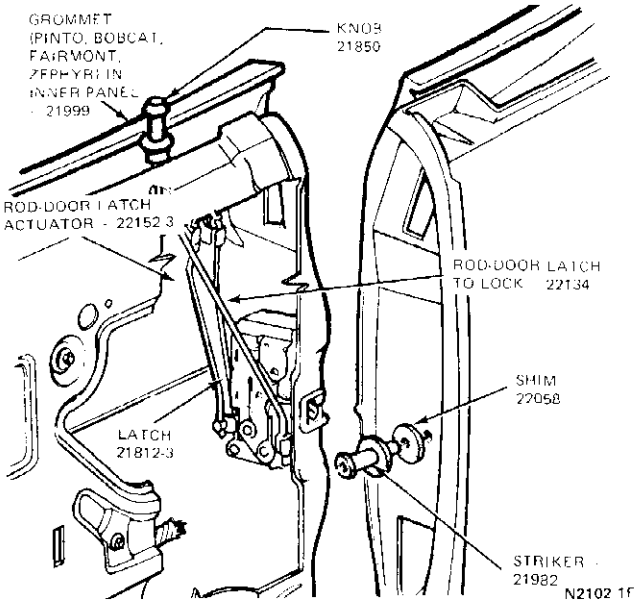


FIG. 16 Door Latch and Striker Installation—Pinto, Bobcat, Fairmont and Zephyr

Fairmont, Zephyr, Pinto, Bobcat and Mustang II

Removal

1. Remove the door trim panel and watershield.
2. Disconnect the retainer from the link at the remote control (Fairmont and Zephyr).
3. Remove the three screws or nuts attaching the remote control to the door inner panel and remove the remote control. The Mustang II, Pinto and Bobcat remote control must be rotated off the remote rod to remove, similar to other vehicles.

Installation

1. Install a new bushing or retainer into the new remote control, if the remote control is to be replaced.
2. Rotate the remote arm onto the link to engage the two parts for Mustang II, Pinto and Bobcat only.
3. Position the remote control to the door inner panel and install the three attaching screws or nuts (Fig. 18).
4. Connect the link to the remote control and secure with the retainer (Fairmont and Zephyr).
5. Check the remote control and latch operation.
6. Install the watershield and door trim panel.

REAR DOOR LATCH

Removal

1. Remove the trim panel and watershield from the door.
2. Disconnect the door latch actuating rod from the latch assembly—all car lines.
3. Remove the rear door latch bellcrank as outlined for all car lines.
4. Remove the door latch remote control as outlined previously for all car lines.
5. Remove the three latch assembly attaching screws, disconnect the wire from the door indicator switch (if so equipped), and remove the latch assembly from the door.

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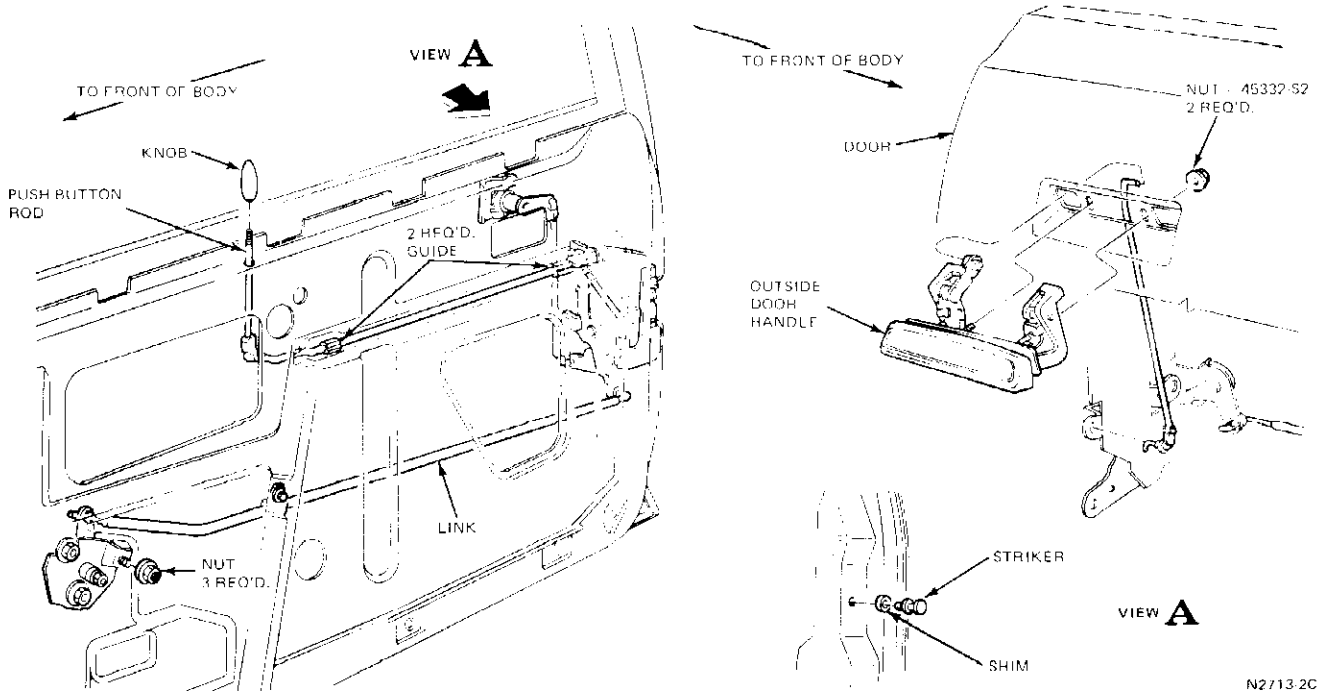


FIG. 17 Front Door Latch Mechanism—Granada, Monarch and Versailles—2-Door Shown

6. Remove the door indicator switch from the latch assembly (if so equipped), and remove the two link assemblies from the latch on all car lines.

Installation

1. Install new clips and grommets in the new latch assembly, using the removed latch as a guide.
2. Install the door indicator switch on the latch assembly and adjust as outlined under adjustments.
3. Install the two link assemblies into the lower lever grommets as shown in Fig. 21.
4. Place the latch assembly to the door and connect the wire to the door indicator switch.
5. Position the latch assembly to the door and install the three attaching screws (Fig. 21).
6. Connect the door latch actuating rod to the latch assembly.
7. Reinstall the door latch bellcrank and remote control as outlined under each respective heading.
8. Check the operation of the latch assembly.
9. Install the watershield and trim panel on the door.

REAR DOOR LATCH BELLCRANK

Removal

1. Remove the lock control knob from the push button rod.
2. Remove the trim panel and watershield from the door.
3. Remove the screw or pop rivet attaching the bellcrank to the door inner panel. Disconnect the bellcrank from the lock control link by unclipping the retainer or rotating it off the double 90 degree bend on the other car lines (Fig. 21).
4. Remove the push button rod from the bellcrank.

Installation

1. Install new rod retaining clips or bushings in the new bellcrank if the bellcrank is to be replaced.
2. Assemble the push button rod to the bellcrank.
3. Assemble the bellcrank to the lock control link by clipping the retainer or rotating the bellcrank onto the link on other car lines.
4. Position the bellcrank to the door inner panel with the push button rod inserted through the hole at the belt line. Then, install the bellcrank attaching screw or pop rivet.
5. Check the operation of the bellcrank and associated linkage.
6. Install the watershield and trim panel on the door.

DOOR LOCK CYLINDER

When a lock cylinder is replaced, both door lock cylinders and ignition lock cylinder should be replaced in a set. This will avoid carrying an extra key which will fit only one lock.

1. Remove trim panel and position the watershield away from the access holes.
2. Disconnect the lock control-to-door lock cylinder rod at the lock cylinder arm (Figs. 16 through 23).
3. Remove the door lock cylinder retainer and remove the lock cylinder from the door.

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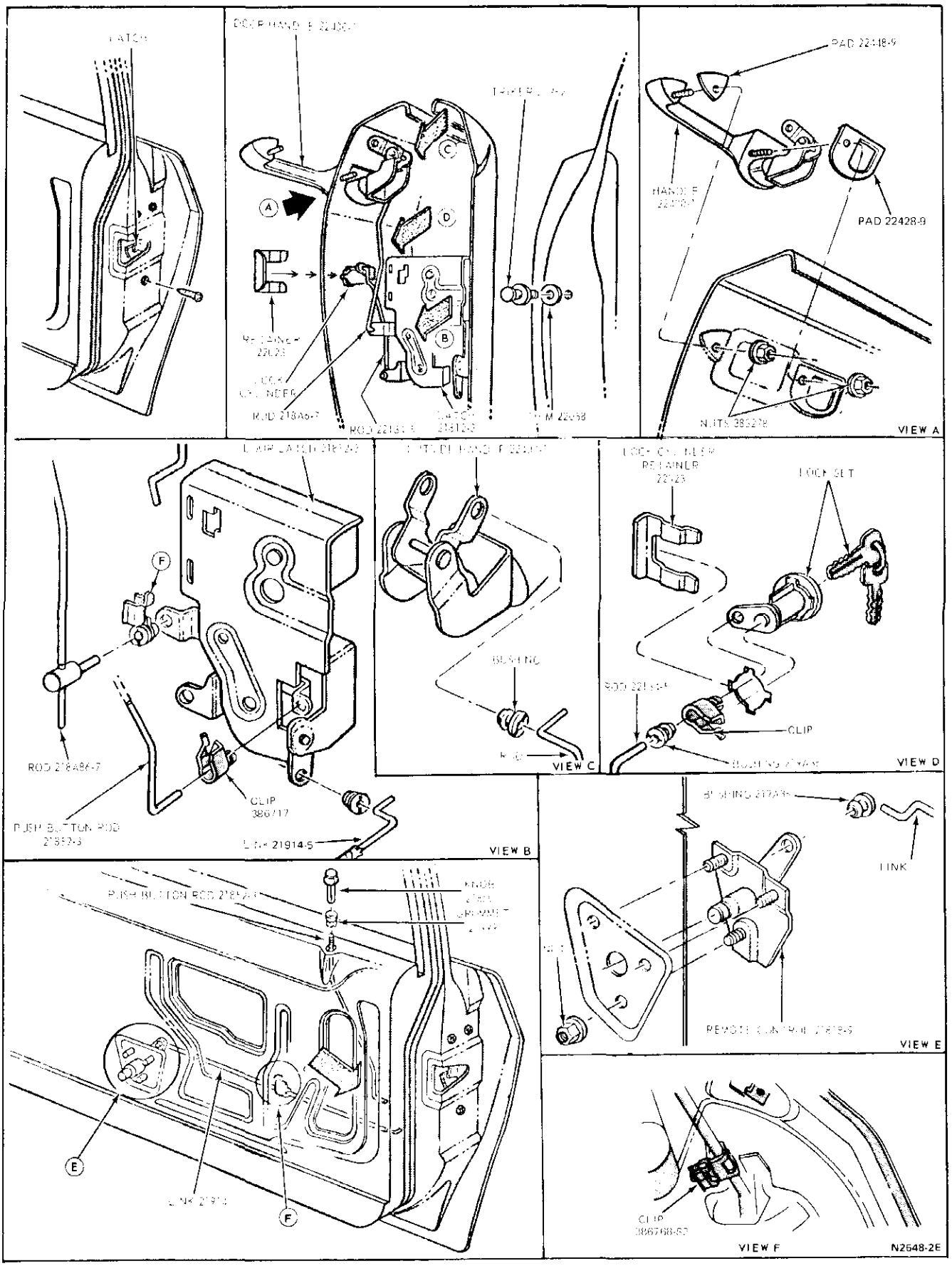


FIG. 18 Door Latch and Striker Installation—Pinto and Bobcat

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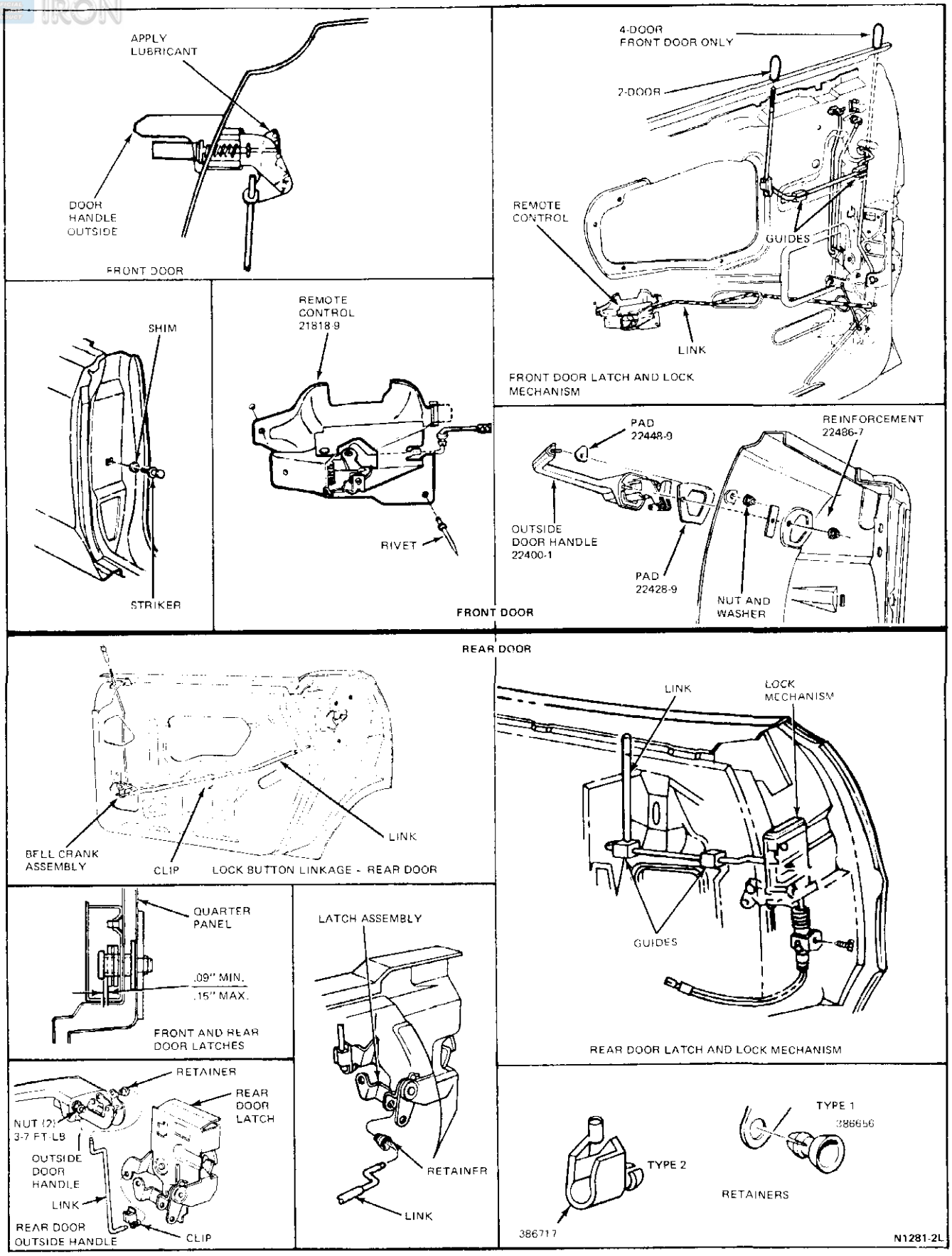


FIG. 19 Door Handle and Latch Installation—Lincoln Continental

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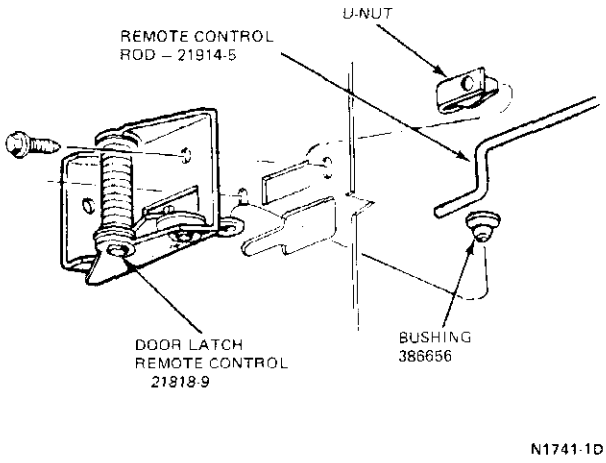


FIG. 20 Door Latch Remote Control—Typical

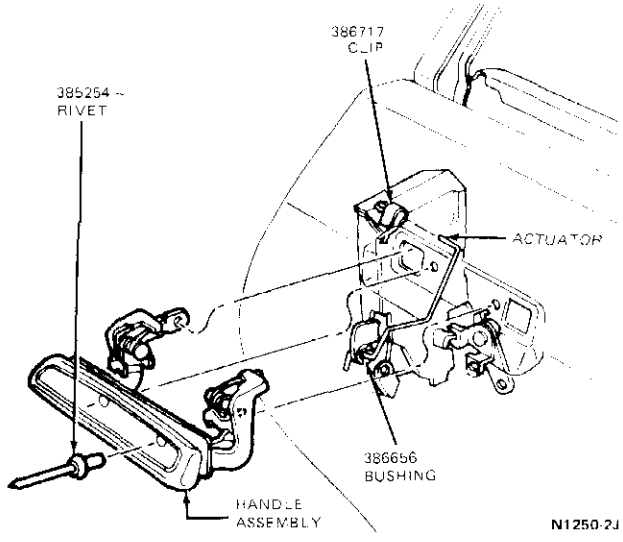


FIG. 21 Rear Door Outside Handle and Latch *Mechanism—Typical*

4. Transfer the lock cylinder arm to the new lock cylinder and replace the rod retainer if it shows any wear or warpage.
5. Position the lock cylinder in the door and install the lock cylinder retainer.
6. Connect the lock control-to-door lock cylinder rod at the lock cylinder and secure the retainer.
7. Carefully position the watershield to the inner panel and install the trim panel.

DOOR OUTSIDE HANDLE

LINCOLN CONTINENTAL, FAIRMONT, ZEPHYR, PINTO AND BOBCAT

Removal

1. Remove the trim panel and water shield from the door.
2. Disconnect the latch actuating rod from the handle link connector.

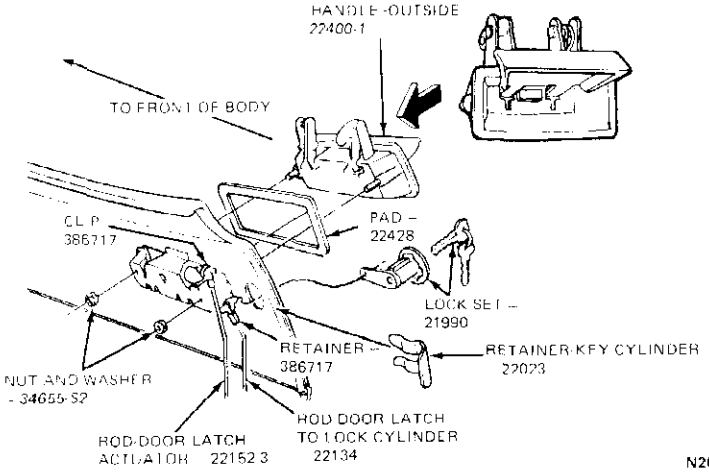


FIG. 22 Door Handle and Lock Cylinder Installation—Continental Mark V

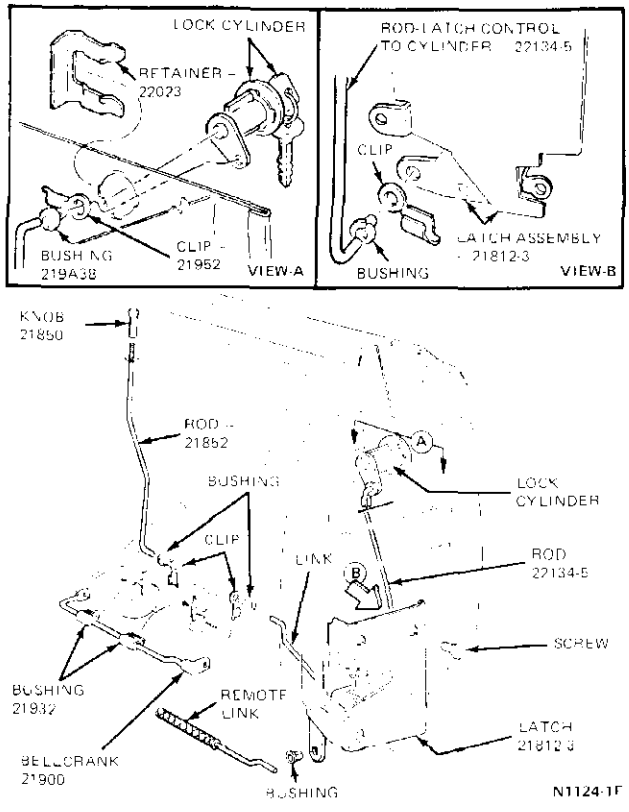


FIG. 23 Door Latch Installation—Typical

3. Prep the area surrounding the door handle opening with protective cover to preclude paint damage.
4. Using a 1/2"x4" piece of wood dowel stock, or similar material, prop the door handle open to gain access to the 2 blind rivets retaining the handle.
5. Using a drift punch or similar tool, knock out the center pin or mandrel of each rivet. Then use a 1/4" drill and drill out the remainder of the rivet from the door sheet metal. (Use care in drilling so that sheet metal holes are not enlarged.)

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6. Remove the prop and door handle from the door.

Installation

1. Prep area surrounding the door handle opening with protective covering to preclude paint damage.
2. Remove the door trim panel and water shield.
3. Position the door handle into the door opening and pull the handle lever open and insert a 1/2"x4" piece of wood dowel stock or similar material between the open handle and door sheet metal. Assure that the handle base is flush to the door sheet metal and aligned to the retaining holes.
4. Install 2 1/4"x1/2" Blind Oval Head Rivets (388047-S100) and remove prop.

   NOTE: DO NOT SUBSTUTUTE RIVETS USE 388047-S100 RIVETS ONLY.

Hand tools capable of setting 1/4" blind rivets are available from:

Townsend-Textron	1/4" Rivet Hand
2515 Pilot Knob Road	Tool No. 4022
St. Paul, MN 55165	
Telephone: (612) 452-1771	
OR	
USM Corporation	Hand Pop-Riveter
Pop-Rivet Division	No. PRG-450 With
510 River Road	PR Nose Piece
Shelton, CN 06484	No. 826
Telephone: (203) 735-9341	
OR	
An equivalent supplier.	

5. Install latch actuating rod and check for proper operation.
6. Install door watershield and trim panel.

ALL EXCEPT LINCOLN CONTINENTAL, PINTO AND BOBCAT

Removal

1. Remove the door trim panel and watershield.
2. Disconnect the door latch actuator rod from the latch (Figs. 21 and 22).
3. Remove two rivets retaining the handle to the door. Remove the handle and rod from the door.

Installation

1. Transfer the actuator rod to the new handle using a new bushing, if the handle is to be replaced.
2. Insert the handle and rod into the door and install the two rivets.
3. Connect the door latch actuator rod to the door latch (Fig. 21).
4. Check the operation of the door outside handle and the door latch.
5. Install the watershield and door trim panel.

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Power Door Locks

PART 44-16

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Tailgate Lock Actuator	16-2

CR2036-2B

DESCRIPTION AND OPERATION

The power door lock control system uses electric switches controlled by the front door lock push buttons (LTD II, Cougar, Granada and Monarch), and rocker type switches located in the arm rests on Ford, Mercury, Lincoln Continental, Continental Mark V, Thunderbird and Cougar XR-7, Versailles and Granada. Relays on push-button switches on LTD II, Granada and Cougar direct the current to the door lock motors to lock or unlock the doors.

To lock the doors on the LTD II, Cougar, Granada and Monarch, **push down** firmly on either front door lock push buttons and close the door(s). To unlock the doors from inside the vehicle lift the push buttons upward beyond the normal travel. On the Ford, Mercury, Cougar XR-7, Thunderbird, Lincoln Continental, Continental Mark V, Versailles and Granada, the rocker-type switches are located in the arm rests. Push the door lock switch to **lock** or **unlocked** as desired.

The key will not lock or unlock all doors from outside the vehicle. The key inserted into the door lock can only be used to lock or unlock each individual door.

TESTING

MOTOR

Apply 12 volts to one terminal of the motor's (actuator) connector and ground the other terminal (Fig. 1). The motor (actuator) gear should finish its travel in less than one (1) second.

Using an ammeter; the motor current draw (stall test), should not exceed 6 amps. Reverse the power and ground leads to the connector and re-test.

SWITCH

LTD II, Granada, Monarch and Cougar

Using a self-powered test light, there should be **no continuity** between any terminals with the switch in its normal position.

Continuity should exist between terminals A and B with the switch held in one position and between terminals B and C with the switch held in the other position (Fig. 1).

Ford, Mercury, Lincoln Continental, Thunderbird, Versailles, Granada, Cougar XR-7 and Continental Mark V.

Procedures for testing the power door lock switch is the same as for the single power window switch. Refer to Group 42.

RELAY

LTD II, Cougar, Granada and Monarch

Remove both connectors to perform the relay tests. The relay is located on the brake pedal support.

Verify that terminal 1 on the relay is grounded. If terminal 1 on the relay is not grounded, check the relay case to ground bolts for tightness. If the relay case to ground bolts are tight, replace the relay. If not, tighten and re-test.

Apply power to terminals 2 and 4 on each relay, and connect a 12 volt test light between terminals 1 and 2, and ground **(no longer than two minutes).** The test light should light. If the operative test light does not light, replace the relay.

Refer to the Wiring and Vacuum Diagrams manual, Form 365-229, for electrical schematic wiring diagrams and the locations of the wiring harnesses.

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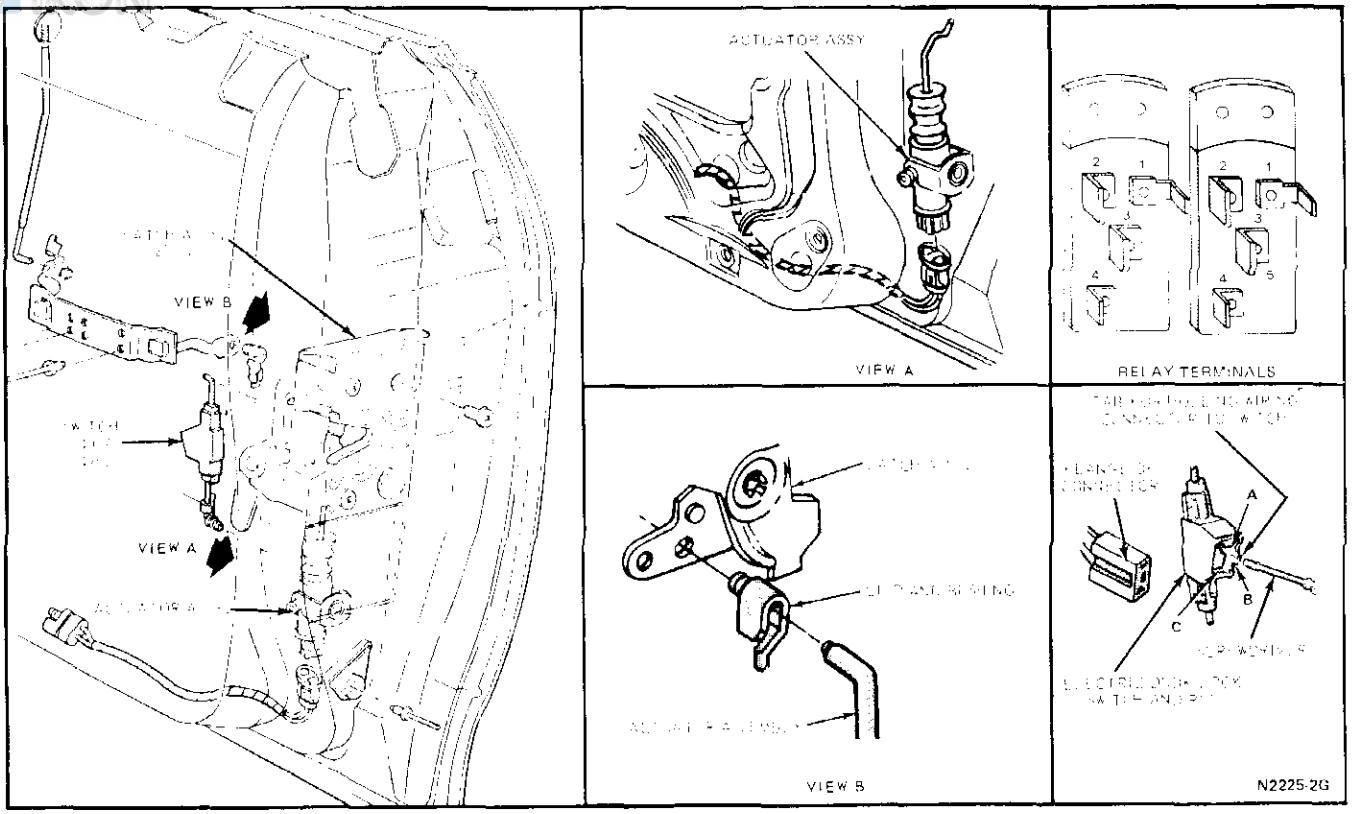


FIG. 1 Power Door Lock Actuator, Switch and Relay—LTD II, Granada, Monarch and Cougar

Ford, Mercury, Lincoln Continental, Thunderbird, Versailles, Granada, Cougar XR-7 and Continental Mark V

There is no relay test for the two-door models. Power is supplied directly to the door lock motor through the switch located in the arm rest.

REMOVAL AND INSTALLATION

ELECTRIC DOOR LOCK ACTUATOR MOTOR

To remove the door lock actuator motor (Fig. 1), remove the door trim panel and watershield. Then, disconnect the actuator motor link from the door latch. Remove the screws or pop rivets attaching the actuator motor to the door and disconnect the wiring at the connector. Remove the actuator motor.

To install the door lock actuator motor, connect the wiring at the connectors and install the door lock actuator motor in the door with screws and/or pop rivets. Connect the actuator motor link to the door latch. Then, install the watershield and door trim panel.

DOOR LOCK CONTROL SWITCH

LTD II, Cougar, Granada and Monarch

The power door switch is an integral part of the door lock push button rod. To replace the switch, remove the door trim panel and watershield (Group 45). The switch must be detached from the door latch and/or bellcrank before disconnecting or connecting the wiring connector. (See Fig. 1.)

Disengage the push button rod from the latch. To disengage the wiring connector from the switch, apply pressure under the tab with a small screwdriver (Fig. 1). Then, pry the locking tab up from the flange of the connector and pull them apart.

To reassemble the wiring connector to the switch, press firmly together until the tab locks behind the flange. Install the switch to the door latch and/or bellcrank. **Inspect the switch installation to ensure that no binds to sheet metal or tight wires exist.**

Install the watershield and trim panel to the door.

Ford, Mercury, Lincoln Continental, Versailles, Granada, Thunderbird, Cougar XR-7 and Continental Mark V

To remove the control switch, remove the control panel from the arm rest. Release the connector attaching nuts and remove the switch from the control panel. See Part 42-01.

TAILGATE LOCK ACTUATOR

Ford and Mercury—Station Wagons

Remove the tailgate trim panel and watershield. Then, remove the two screws or rivets retaining the lock actuator to the tailgate inner panel (Fig. 2). Disconnect the lock actuator rod from the latch, disconnect the wiring connector and remove the actuator.

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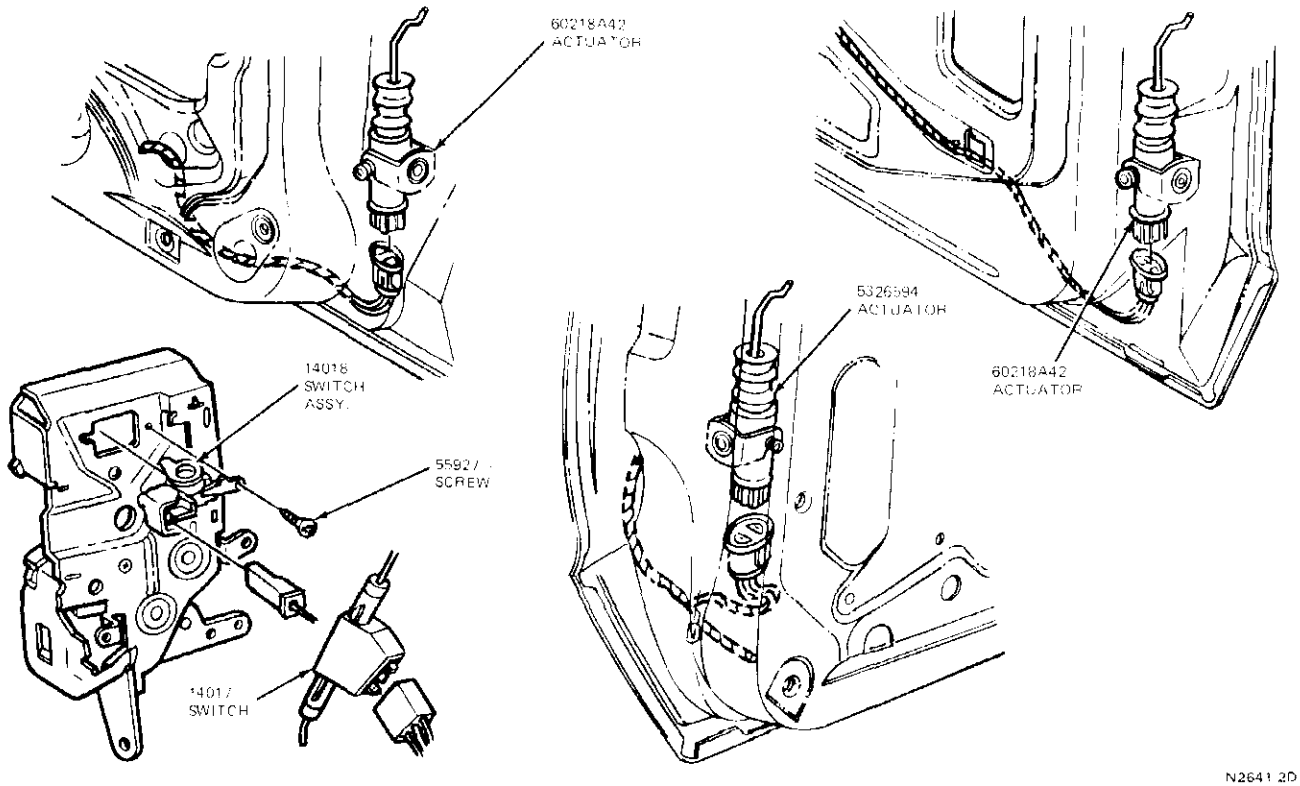


FIG. 2 Tailgate Actuator Motor Assembly—Typical

To install the tailgate lock actuator, connect the wiring connector to the actuator and then lock actuator rod to the latch. Assemble it to the tailgate inner panel and install watershield and trim panel.

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DETROIT IRON

Hood, Hinge and Latch

PART 44-21

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Hood Support Rod	21-7
Hood Latch Control Cable	21-6

CR2037-2B

ADJUSTMENTS

HOOD ALIGNMENT

Ford, Mercury, Cougar, LTD II and Thunderbird

The hood can be adjusted fore and aft and side to side by loosening the hood-to-hinge attaching screws, and repositioning the hood. To raise or lower the hood, loosen the hinge-to-fender reinforcement attaching screws, and raise or lower the hinge as necessary (Figs. 1 and 2). To ensure that the rear corners of the hood are pulled down snugly against the rear hood bumpers, it may be necessary to rotate the hinge around the three attaching bolts.

Fairmont and Zephyr

The hood is provided with fore and aft, vertical, and side-to-side adjustments (Fig. 3). These directions refer to the position of the hood when it is fully lowered. The elongated bolt slots in the hinge and hood provide the side-to-side and fore and aft adjustments. The elongated slots at the fender apron provide for up and down adjustments.

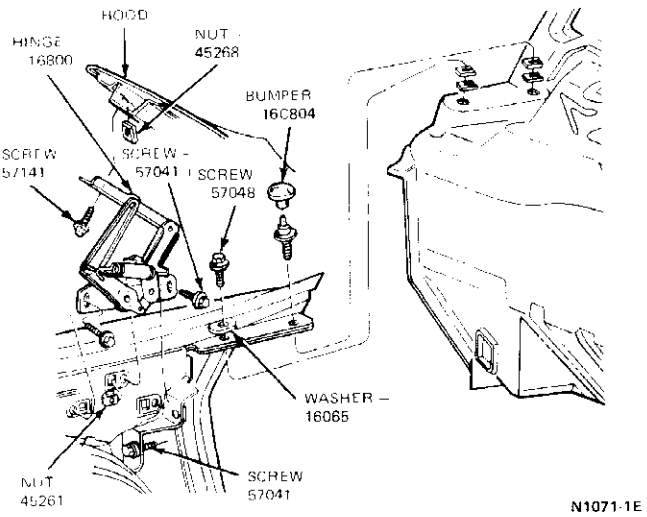


FIG. 2 Hood Hinge Installation—LTD II, Thunderbird and Cougar

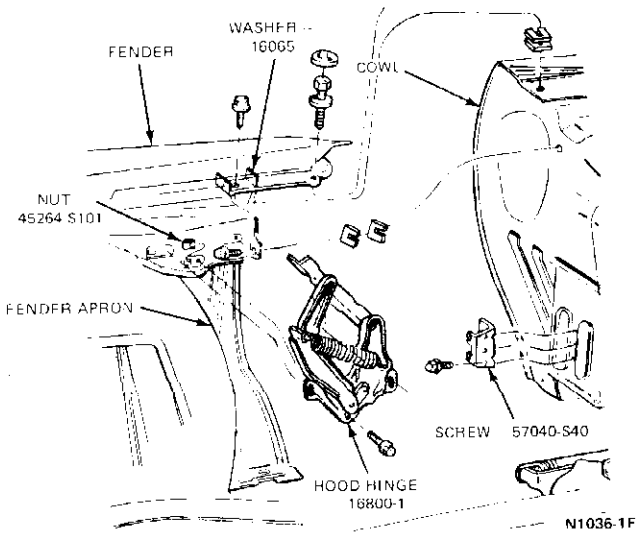


FIG. 1 Hood Hinge Installation—Ford and Mercury

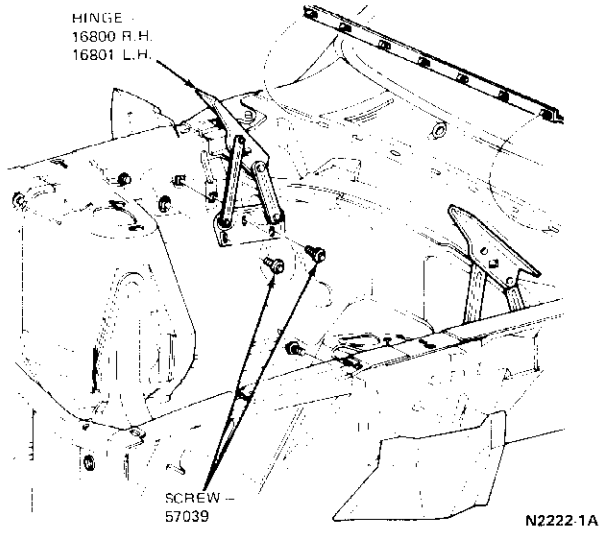


FIG. 3 Hood Hinge Installation—Fairmont and Zephyr

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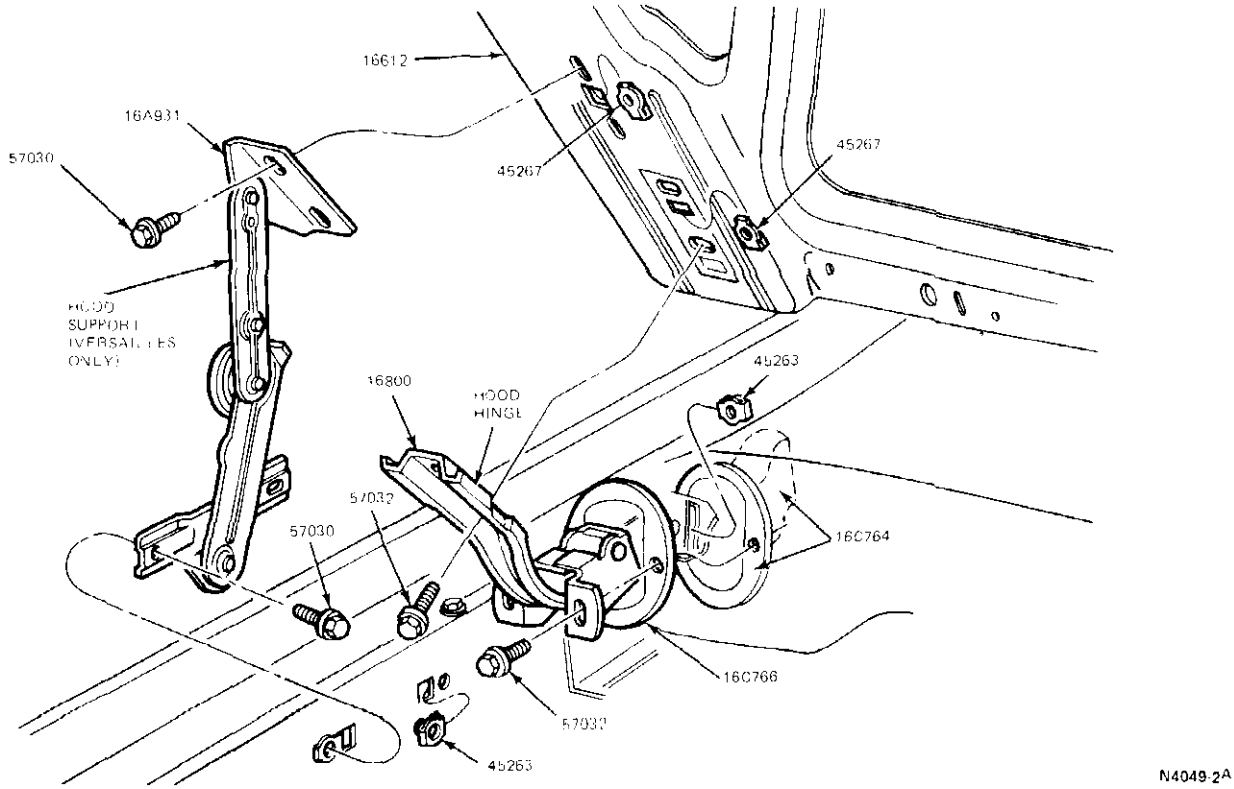


FIG. 4 Hood Hinge Installation and Adjustment—Pinto, Bobcat, Mustang II, Granada, Monarch and Versailles

Hood bumpers, located on the top left and the top right surface of the radiator support, can be adjusted up and down to provide a level surface alignment of the hood panel with the front fenders. To insure that the rear corners of the hood are pulled down snugly against the rear hood bumpers, it may be necessary to rotate the hinge around the three attaching bolts. Adjust the bumpers on each side of the radiator support to eliminate any looseness of the hood when latched.

Pinto, Bobcat, Mustang II, Granada, Monarch and Versailles

The hood can be adjusted fore and aft and from side-to-side by loosening the two hood-to-hinge attaching bolts at both hinges (Fig. 4). Then, reposition the hood as required and tighten the hood-to-hinge attaching bolts.

To raise or lower the rear of the hood, loosen the hinge to body attaching bolts. Raise or lower the hinge as necessary to obtain a flush condition of the top of the hood with the surrounding panels. Then, tighten the hinge-to-body attaching bolts.

Lincoln Continental and Continental Mark V

The hood can be adjusted fore and aft and side-to-side by loosening the hood-to-hinge attaching bolts and repositioning the hood. To raise or lower the hood, loosen the hinge-to-fender reinforcement attaching bolts and raise or lower the hinge as necessary. Then, tighten the attaching bolts (Figs. 5 and 6).

To ensure that the rear corners of the hood are pulled down snugly against the rear hood bumpers, it may be necessary to rotate the hinge around the three attaching bolts.

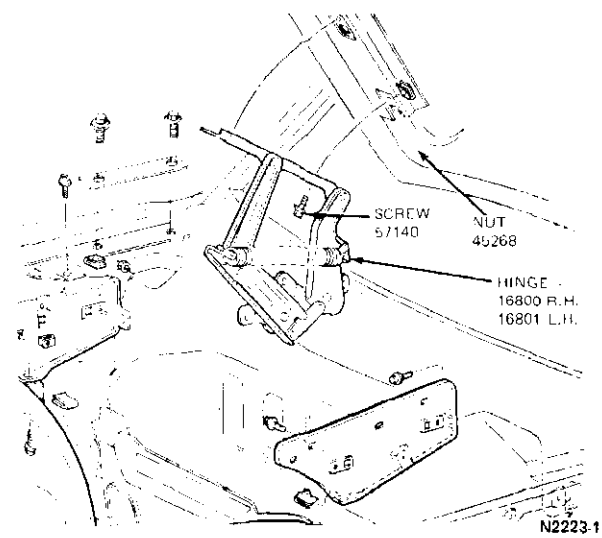


FIG. 5 Hood Hinge Installation—Lincoln Continental

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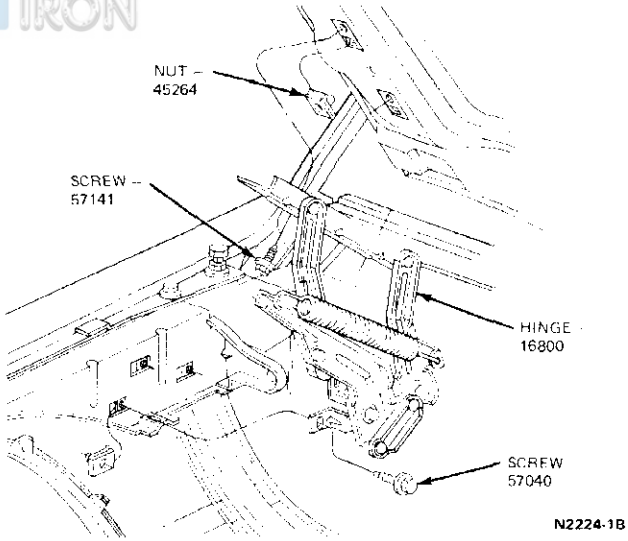


FIG. 6 Hood Hinge Installation—Continental Mark V

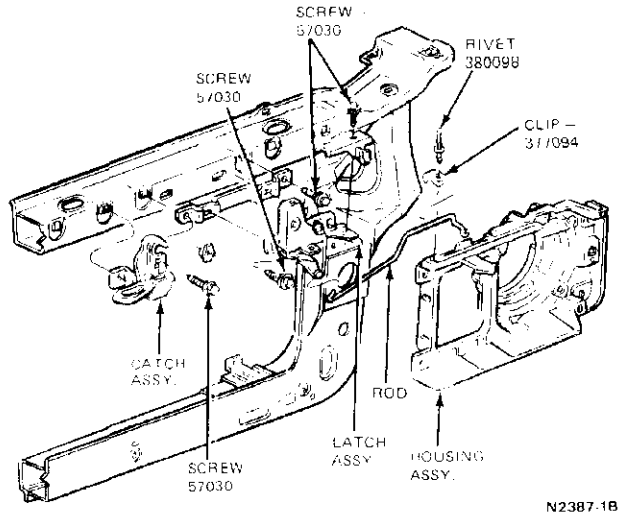


FIG. 7 Hood Latch—Fairmont

HOOD LATCH ADJUSTMENT

Before adjusting the hood latch mechanism, make certain that the hood is properly aligned. The hood latch can be moved from side-to-side to align it with the opening in the hood inner panel and up-and-down to obtain a flush fit with the front fenders.

1. Loosen the hood latch attaching bolts until they are just loose enough to move the latch (Figs. 7 through 13).
2. Move the latch from side-to-side to align it with the opening in the hood inner panel.
3. Loosen the lock nuts on the two hood bumpers and lower the bumpers.
4. Move the hood latch up or down as required to obtain a flush fit between the top of the hood and fenders when an upward pressure is applied to the front of the hood. Then, tighten the hood latch attaching screws.
5. Raise the two hood bumpers to eliminate any looseness at the front of the hood when closed. Then, tighten the hood bumper lock nuts.
6. Open and close the hood several times to check the operation.

AUXILIARY HOOD CATCH

To check the engagement of the auxiliary hood catch, release the hood latch to the pop open position and pull up on the hood assembly. The catch should prevent the hood from opening.

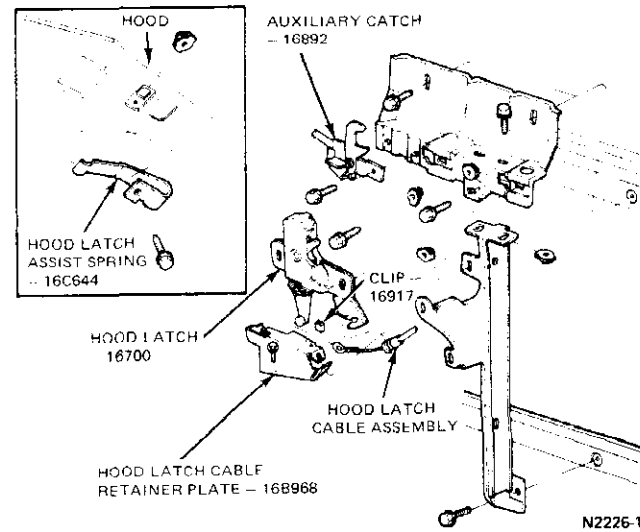


FIG. 8 Hood Latch Installation—Pinto, Bobcat, Mustang II and Zephyr

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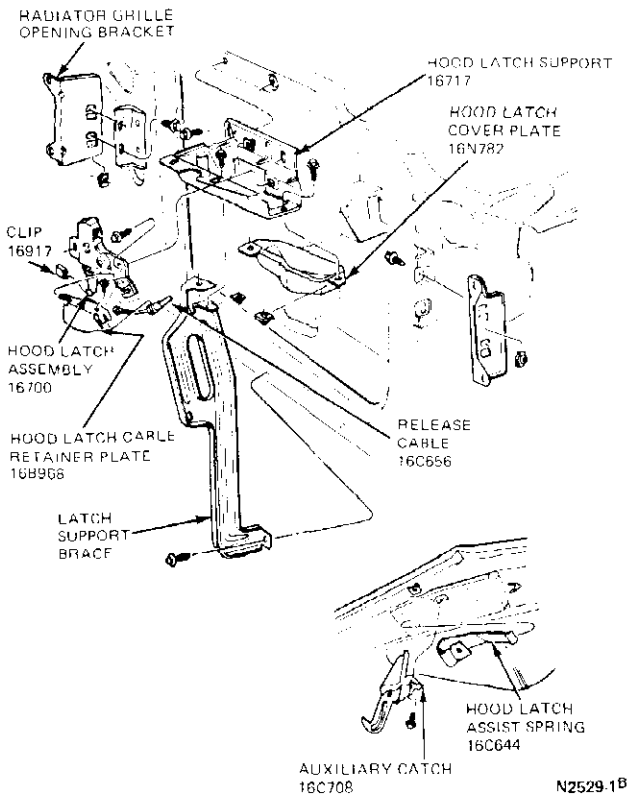


FIG. 9 Hood Latch, Auxiliary Catch and Cable Installation—Granada, Monarch and Versailles

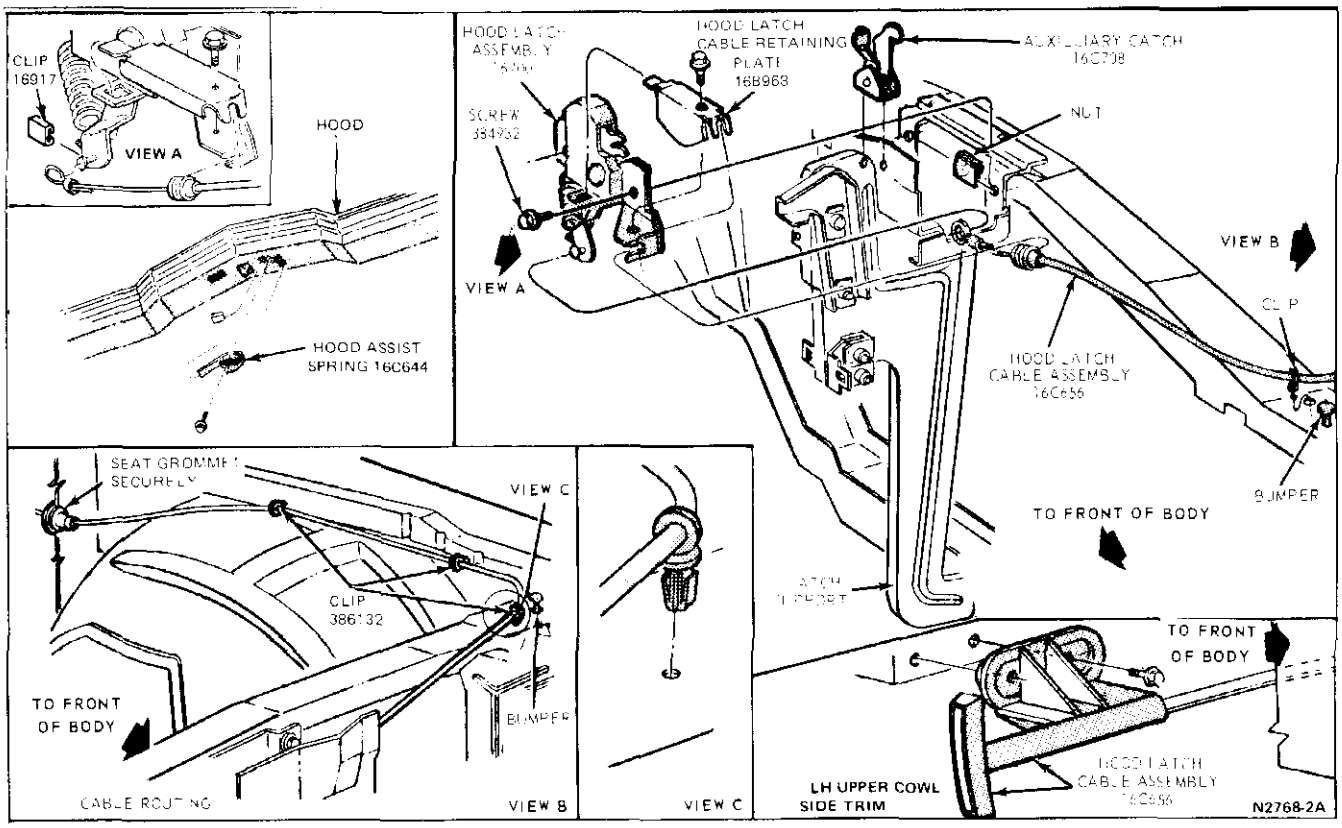


FIG. 10 Hood Latch, Auxiliary Catch and Cable Installation—LTD II, Thunderbird and Cougar

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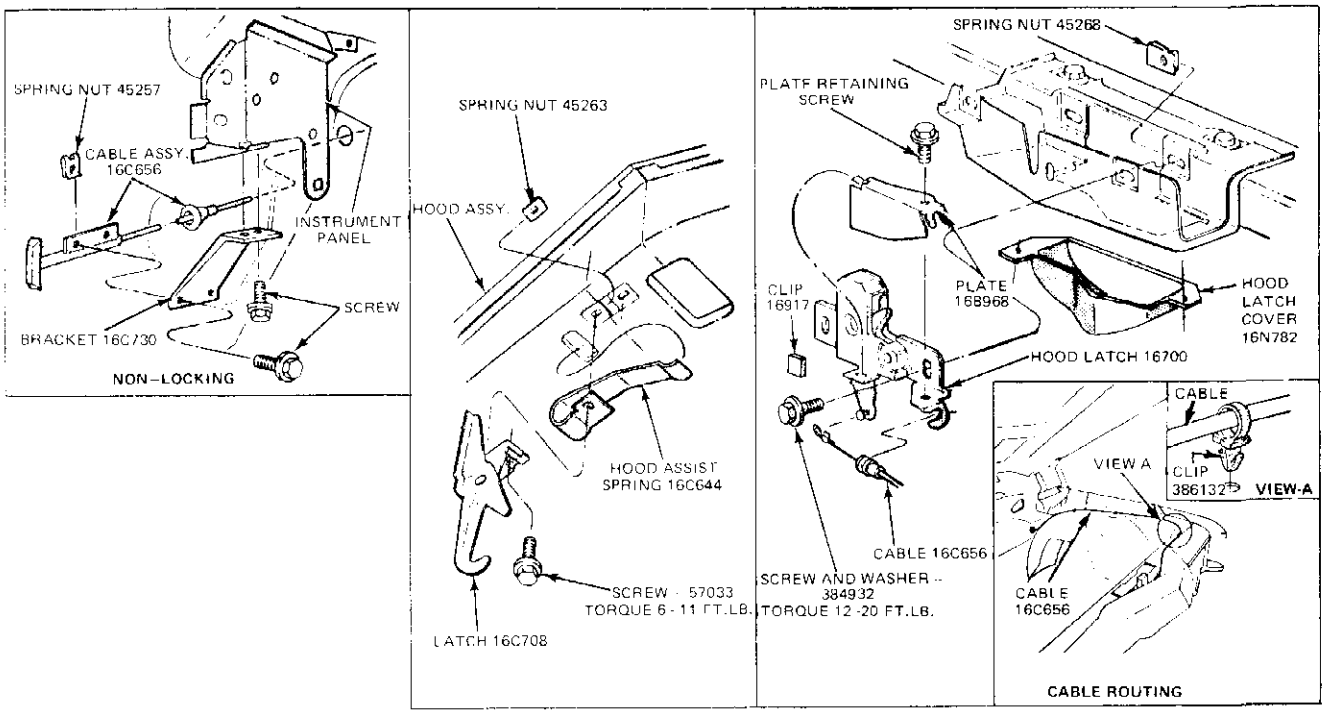


FIG. 11 Hood Latch, Auxiliary Catch and Cable Installation—Ford and Mercury

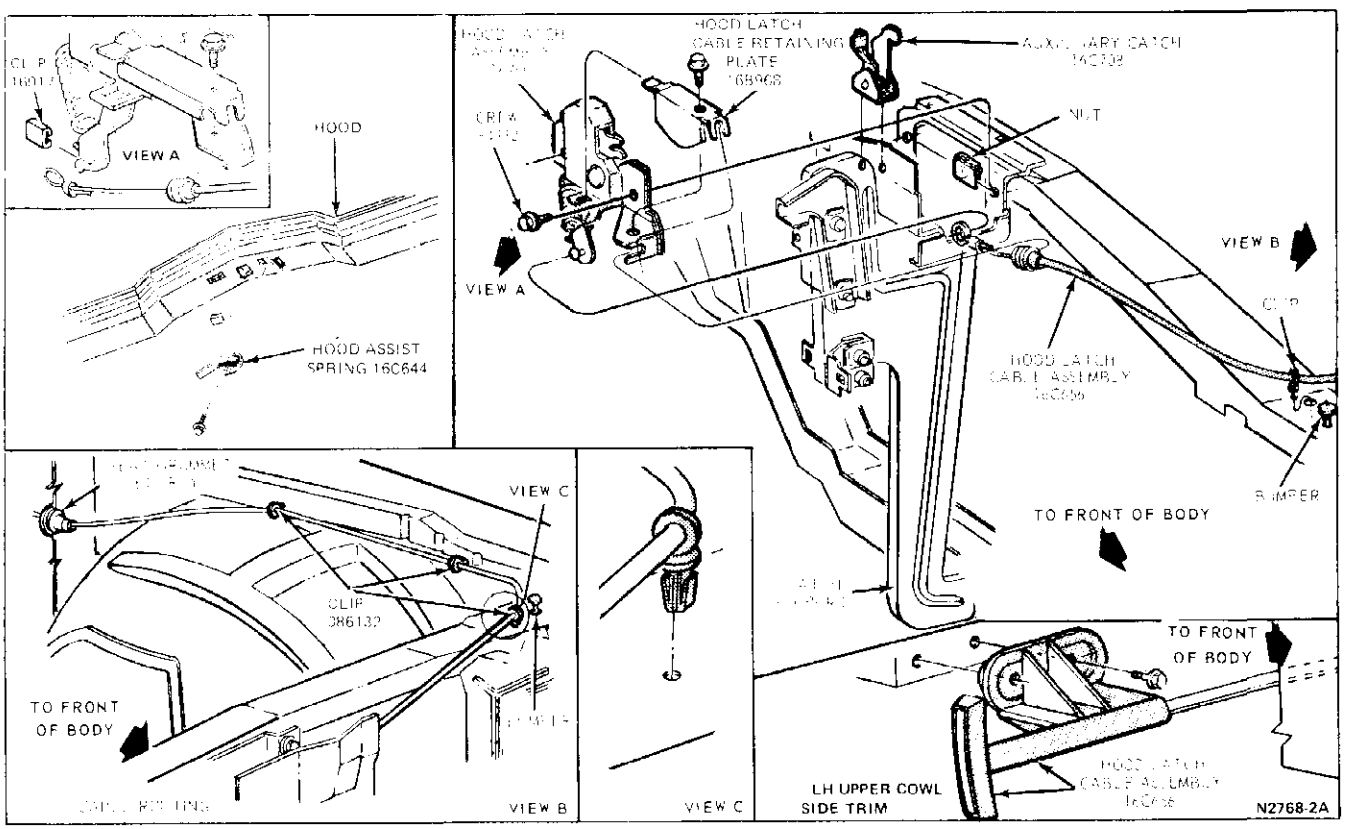


FIG. 12 Hood Latch, Auxiliary Catch and Cable Installation—Continental Mark V

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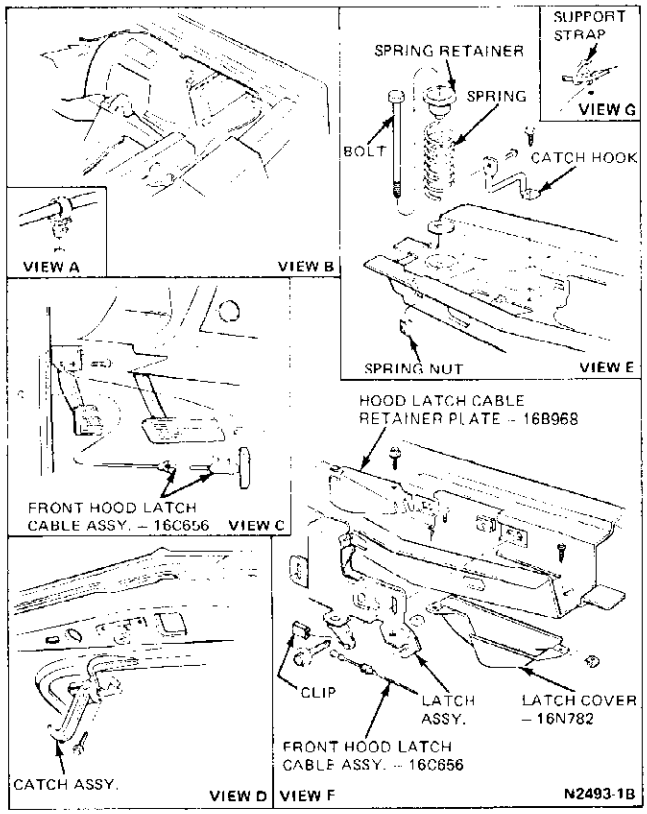


FIG. 13 Hood Latch, Auxiliary Catch and Cable Installation—Lincoln Continental

REMOVAL AND INSTALLATION

HOOD LATCH CONTROL CABLE

Removal

1. From inside the vehicle, open the hood.
2. Remove the hood latch cable retainer plate (one screw), and the cable clip (Figs. 10 through 15).
3. Disengage the cable and ferrule away from the hood latch assembly.
4. Remove the cable retaining clips.
5. From inside the vehicle, remove the cable mounting bracket attaching screws and carefully pull the hood latch cable assembly through the retaining wall.

Installation

1. Position the cable assembly through the retaining wall, seat the grommet securely, and install the cable mounting bracket attaching screws.
2. Route the cable as shown in Figs. 10 through 15, and retain in position with new clips.
3. Install the cable and ferrule to the hood latch assembly.
4. Install the cable clip and the hood latch cable retainer plate (one screw).
5. Check the hood latch cable release operation before closing the hood.

HOOD

Removal

1. Open the hood and support the hood in the open position. Mark the hood hinge locations on the hood. For Versailles, mark location of hood supports.
2. Protect the body with covers to prevent damage to the paint.
3. Remove the two bolts attaching each hinge to the hood, taking care not to let the hood slip when the bolts are removed. On Versailles remove two bolts attaching hood support to hood on each side.
4. Remove the hood from the vehicle.

Installation

1. Position the hood to the hood hinges and install the attaching bolts. Remove the body covers. On Versailles install bolts attaching hood supports to hood.
2. Adjust the hood for an even fit between the fenders and for a flush fit with the front of the fenders.
3. Adjust the hood for a flush fit with the top of the cowl and fenders.
4. Adjust the hood latch, if necessary.

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HOOD HINGE

Removal

1. Open the hood and cover the fenders and cowl top panel.
2. Prop the hood in the open position and remove two hood hinge-to-hood attaching screws.
3. Remove the hinge-to-fender reinforcement or cowl reinforcement attaching screws and remove the hinge.

Installation

1. Position the hinge to the fender reinforcement or cowl reinforcement and install the three attaching screws snug.
2. Position the hinge to the hood and install the two attaching screws.
3. Adjust the hood.

HOOD SUPPORT ROD

Mustang II, Fairmont, Zephyr, Pinto, Bobcat, Granada and Monarch

Removal

1. Open the hood and temporarily support the hood in the open position with something other than the support rod.
2. Remove the support from its stowed position on top of the radiator support.
3. Unsnap the hood support rod retainer from the support rod and pull the rod out of the hole in the retainer (Fig. 15).
4. Remove retainer from hole in the fender apron.

Installation

1. Install a new retainer in hole in fender apron, push until it snaps into position.
2. Insert the end of the support rod into the retainer hole, rotate retainer and snap the locking finger over the support rod (Fig. 15).
3. Place the support rod in its stowed position, remove the temporary hood support and close the hood.

HOOD LATCH

Removal

1. Open the hood and remove the hood latch cable retainer plate or release rod and cable clip (Figs. 10 through 15).
2. Disengage the cable and ferrule or release rod away from the hood latch assembly.
3. Remove the latch attaching screws and remove the latch assembly.

Installation

1. Position the latch assembly to the vehicle and install the two attaching screws.
2. Position the hood latch control cable and ferrule or release rod to the latch assembly and install the cable clip.
3. Install the hood latch retainer plate or release rod.
4. Adjust the latch assembly.

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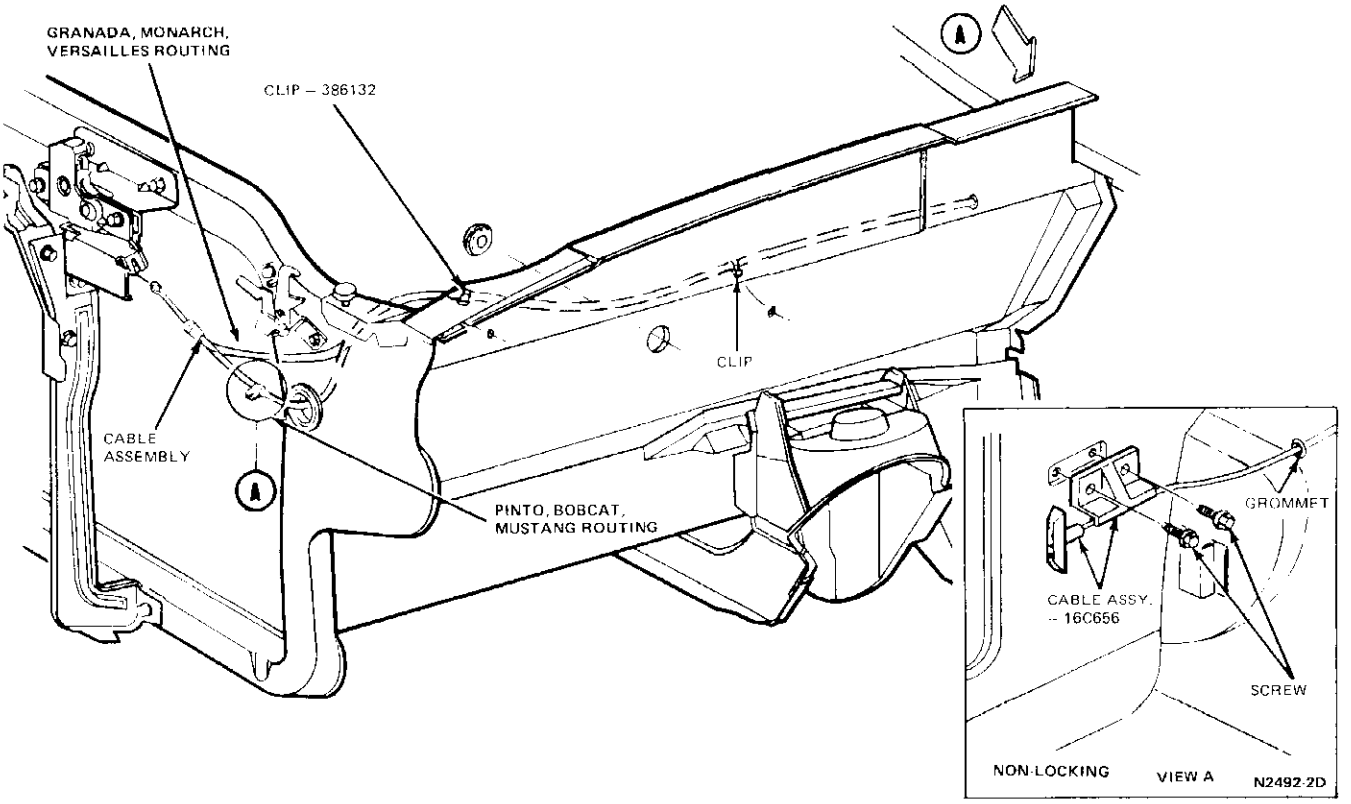


FIG. 14 Hood Latch Cable Installation

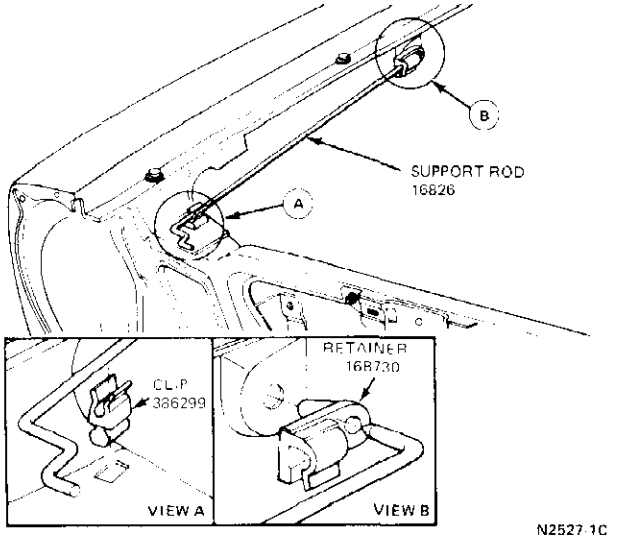


FIG. 15 Hood Support Rod-Mustang II—Others Similar

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DETROIT IRON

Luggage Compartment Door, Hinge, Latch, Lock and Weatherstrip

PART 44-41

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Luggage Compartment Door	41-2
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CR2038-2B

DESCRIPTION

ELECTRIC LUGGAGE COMPARTMENT RELEASE

Ford, Mercury, Lincoln Continental, Thunderbird and Continental Mark V

A switch mounted in the glove box actuates a solenoid which is an integral part of the luggage compartment latch assembly (Fig. 1).

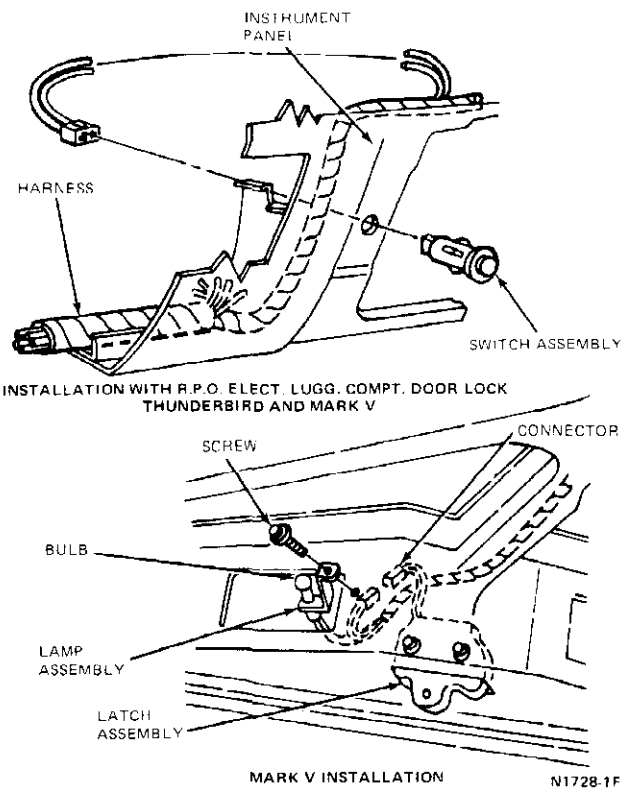


FIG. 1 Luggage Compartment Electric Lock

GENERAL INFORMATION

LUBRICANT

Apply lubricant (Part 19584 or equivalent) to all areas shown in Fig. 2 when required.

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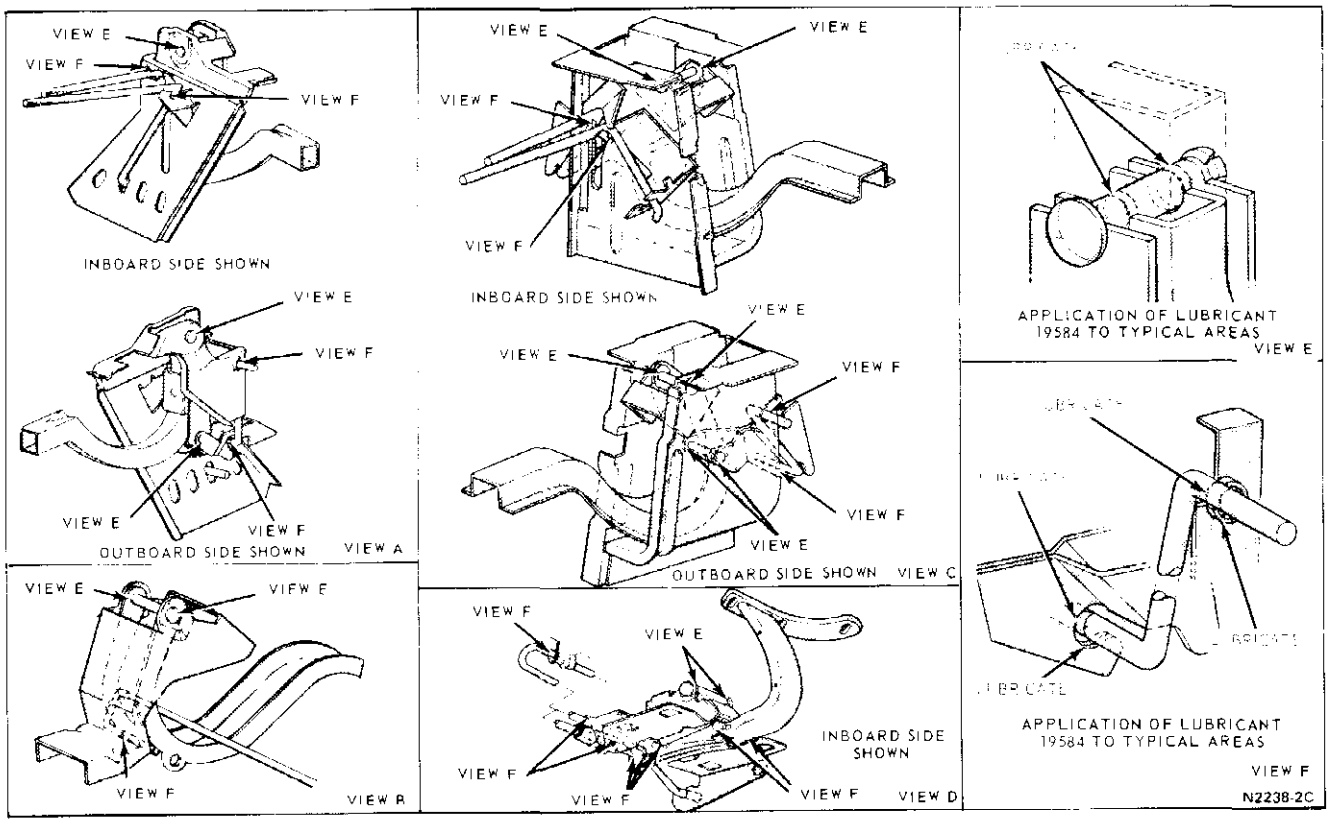


FIG. 2 Hinge Lubrication Areas—Typical

ADJUSTMENTS

LUGGAGE COMPARTMENT DOOR

The luggage compartment door, (third door and/or deck lid), can be shifted fore and aft on all models and from side to side on Pinto and Bobcat by loosening the hinge to door attaching screws. The up and down adjustment is made by loosening the hinge-to-door attaching screws and raising or lowering the door and/or adding or removing shims (Fig. 3 through 6).

The luggage compartment door should be adjusted for an even and parallel fit with the door opening. The door should also be adjusted up and down for a flush fit with the surrounding panels. Care should be taken not to distort or mar the luggage compartment door or surrounding body panels.

FAIRMONT/ZEPHYR LIFTGATE (WAGON)

The station wagon liftgate can be adjusted up and down and side to side by loosening the hinge to header roof panel attaching nut and washer assembly. (Fig. 7). The liftgate can be adjusted in and out by shimming the hinge at the header roof panel. (Fig. 7). The liftgate door should be adjusted for an even and parallel fit with the door opening and surrounding panels.

PINTO AND BOBCAT STATION WAGON ONLY

If the liftgate door ajar warning switch is replaced, all adjustments to the liftgate and latch must be made **before** installing the switch.

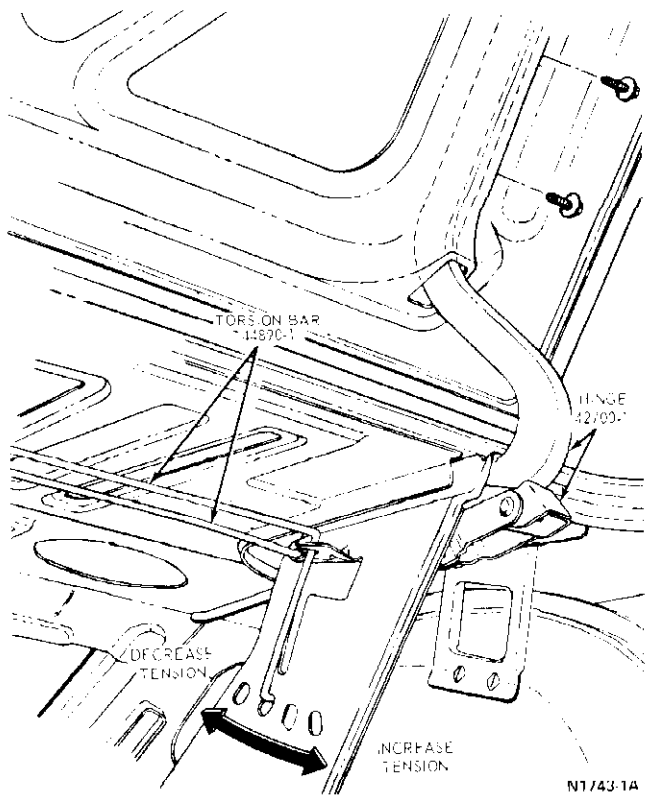


FIG. 3 Luggage Compartment Door Hinge and Torsion Bar—Ford and Mercury

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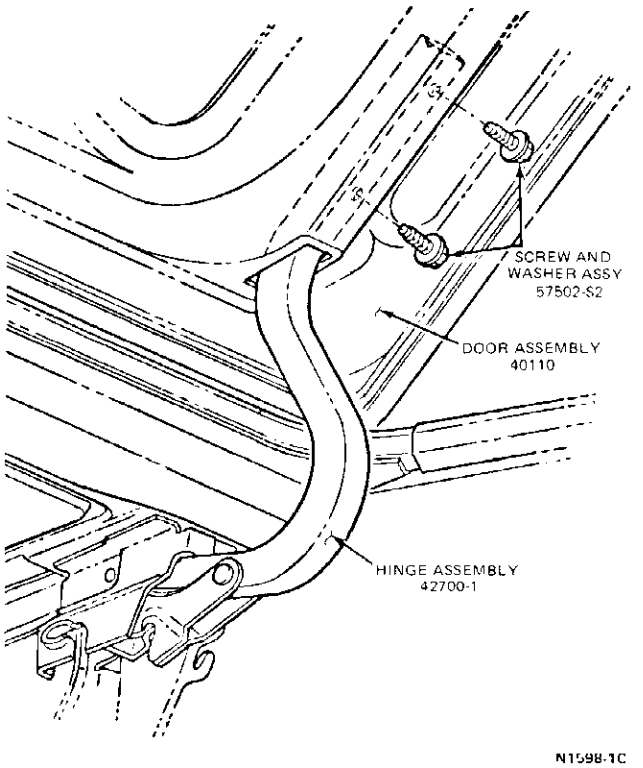


FIG. 4 Luggage Compartment Door Hinge—LTD II, Cougar and Thunderbird

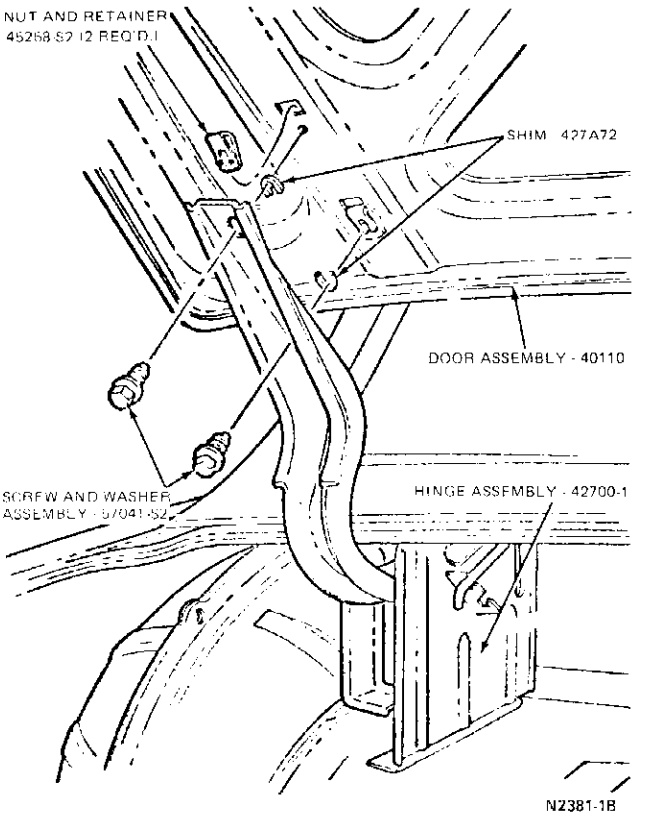


FIG. 5 Luggage Compartment Door Hinge — Lincoln Continental

DOOR HINGE TORSION BAR

ALL EXCEPT PINTO AND BOBCAT 3-DOOR AND WAGON, MUSTANG II 3-DOOR AND FAIRMONT AND ZEPHYR WAGON

1. Open the luggage compartment door and note the pop-up distance of the door. The door should have adequate finger clearance.
2. If the door does not have adequate finger clearance, the torsion bar tension should be increased. See appropriate Figs. 3 through 13.
3. If the door pops open with more force than is desired, the torsion bar tension can be decreased. Use care when adjusting the torsion bar as it is under tension and could spring out of control if not handled properly.
4. Support the door in the full open position before adjusting the torsion bar.
5. To adjust a torsion bar, use a suitable tool designed to safely perform the adjustment. Then, move the torsion bar end to another position (notch) to increase or decrease the tension.
6. Adjust one torsion bar and check the adjustment before adjusting the other torsion bar.
7. After torsion bar adjustment, the difference of the position of the torsion bar ends, between the right and left side, must not be more than one slot.

Pinto, Bobcat and Mustang II 3-Door

To adjust the hinge, pull down the weatherstrip across the entire top edge of the door opening.

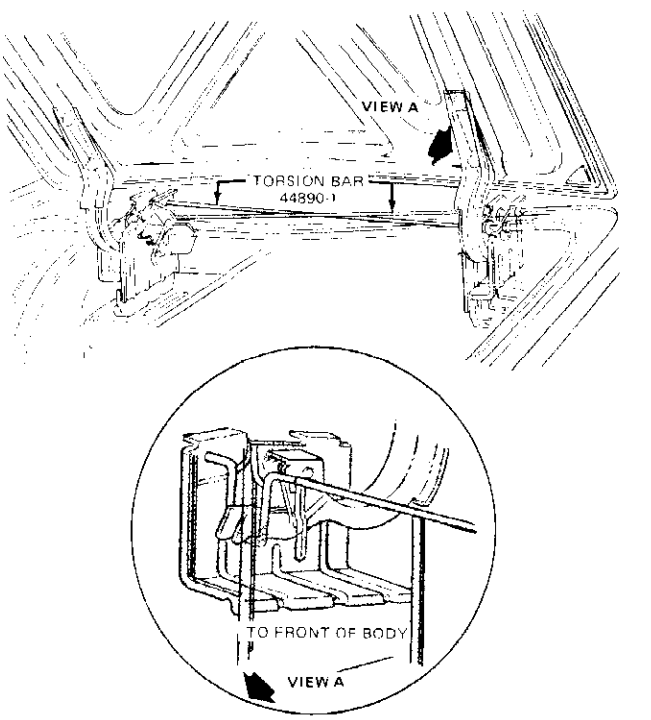


FIG. 6 Luggage Compartment Door Hinge and Torsion Bar—Lincoln Continental

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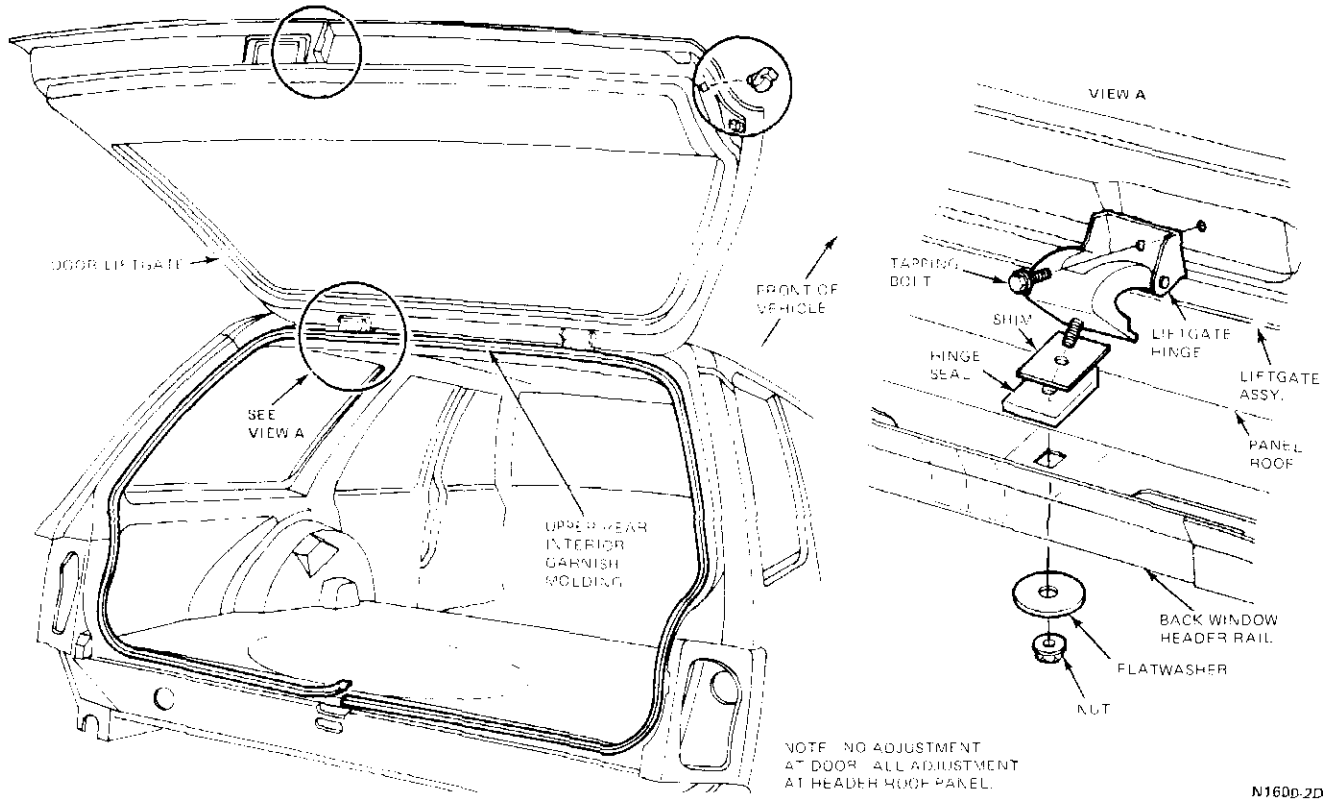


FIG. 7 Torsion Bar Adjustment—Typical Fairmont and Zephyr

Carefully loosen and pull down the headlining to expose the access holes to the hinge nuts (Figs. 11 and 12). Adjust the hinges as necessary. Apply trim cement to the sheet metal flange, install headlining and smooth out any wrinkles. Apply rubber cement to the upper surface of the flange and reinstall the weatherstrip.

FAIRMONT/ZEPHYR LIFTGATE HINGE ADJUSTMENT

To adjust a hinge, or hinges remove the upper rear interior center garnish moulding. Carefully move the headliner slightly out of position to gain access to the hinge to header roof panel attaching nut and washer assembly (Fig. 7). Adjust the hinge as necessary. Install headliner back into position and install garnish moulding.

PINTO AND BOBCAT STATION WAGON

Open the luggage compartment and support the door in the open position. Remove the liftgate hinge cover panel (ten screws). Using vise grips, remove the torsion bar (Fig. 13).

LUGGAGE COMPARTMENT DOOR LATCH

Door Mounted Latch Adjustment

The striker plate can be adjusted up and down and the latch can be adjusted from side-to-side. Before adjusting the deck lid latch make sure that the deck lid is properly aligned. To adjust the latch, loosen the attaching screws, move the latch as required to enter the striker without deflecting the deck lid sideways, and tighten the attaching screws. Move the striker plate up or down as necessary to provide proper deck lid seal between the deck lid and the lower back panel.

Pinto and Bobcat Station Wagon Liftgate

A two-position (secondary and primary) door latch system is incorporated into the liftgate of Pinto and Bobcat Station Wagon models. This latch cycle consists of a first or secondary position which latches the liftgate but is not intended to seal the door to the liftgate weatherstrip. The second or primary latch position is designed to hold the door firmly into the weatherstrip section to preclude water leaks and/or wind noise. To assure that the **primary** latch has been activated when the liftgate is fully closed, adjust the liftgate latch striker plate as required to establish a firm door-to-weatherstrip seal in that position.

Back Panel Mounted Latch Adjustment

The luggage compartment door latch can be moved up and down in elongated holes to obtain a snug fit between the door and the weatherstrip. The latch striker can be shifted from side to side to obtain alignment with the striker.

The latch can be adjusted by loosening the attaching screws just enough to move the latch. Then, reposition the latch up or down, as required, to obtain a water tight fit between the luggage compartment door and the weatherstrip, and tighten the attaching screws. After the latch is adjusted, reposition the latch striker for proper engagement and alignment with the latch.

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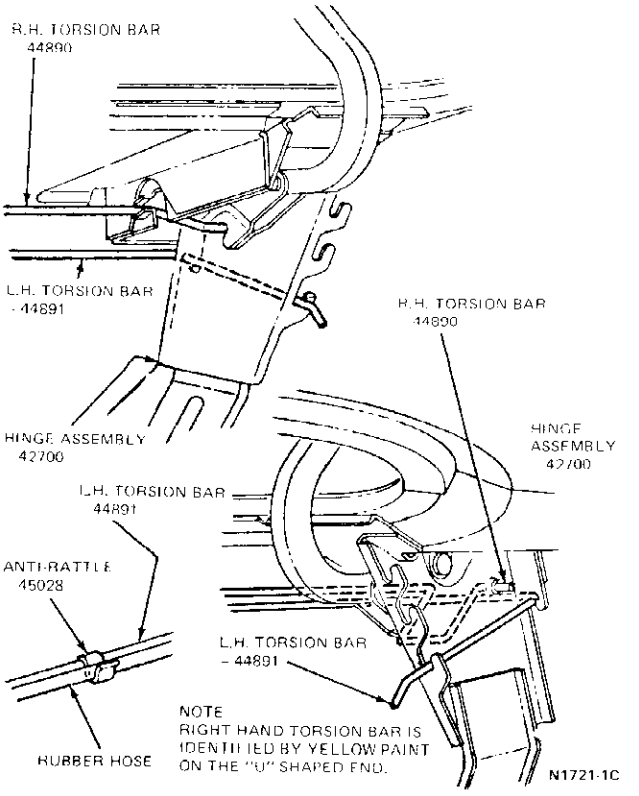


FIG. 8 Torsion Bar Adjustment—LTD II, Thunderbird and Cougar Shown—Continental Mark V and Lincoln Similar

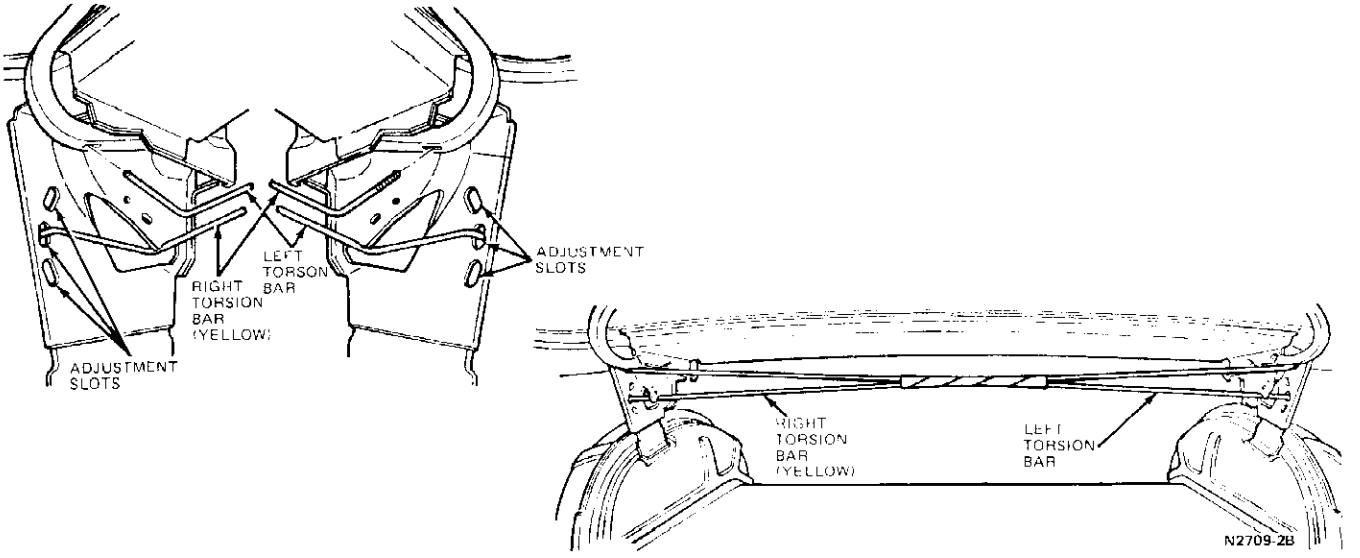


FIG. 9 Torsion Bar Adjustment—Granada, Monarch and Versailles

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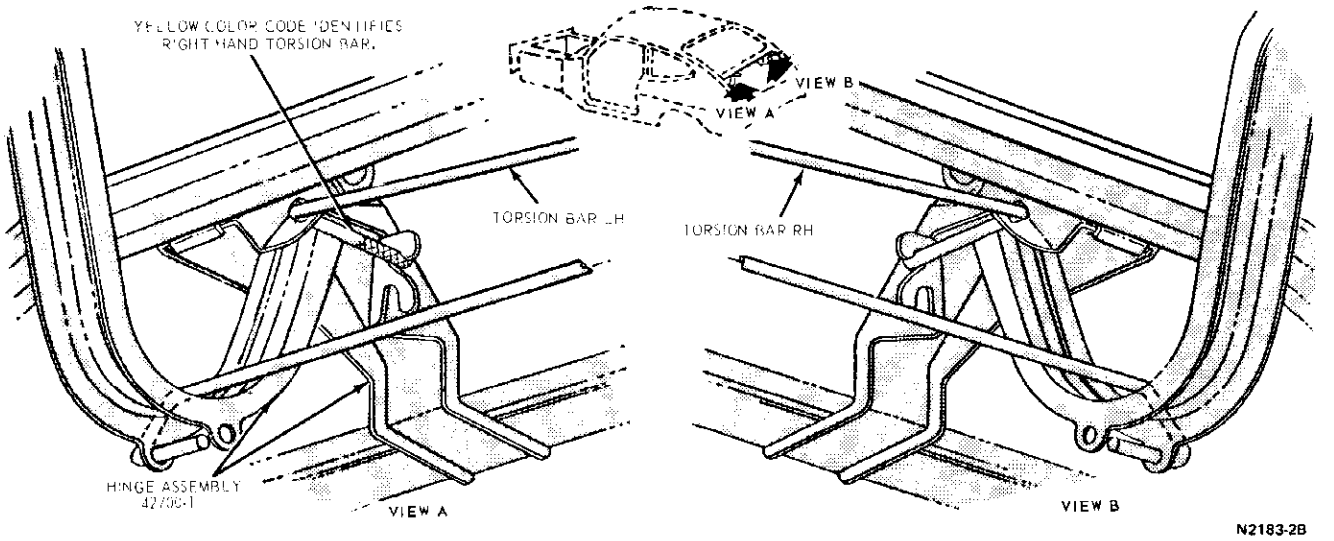


FIG. 10 Torsion Bar Adjustment—Pinto and Bobcat 2-Door

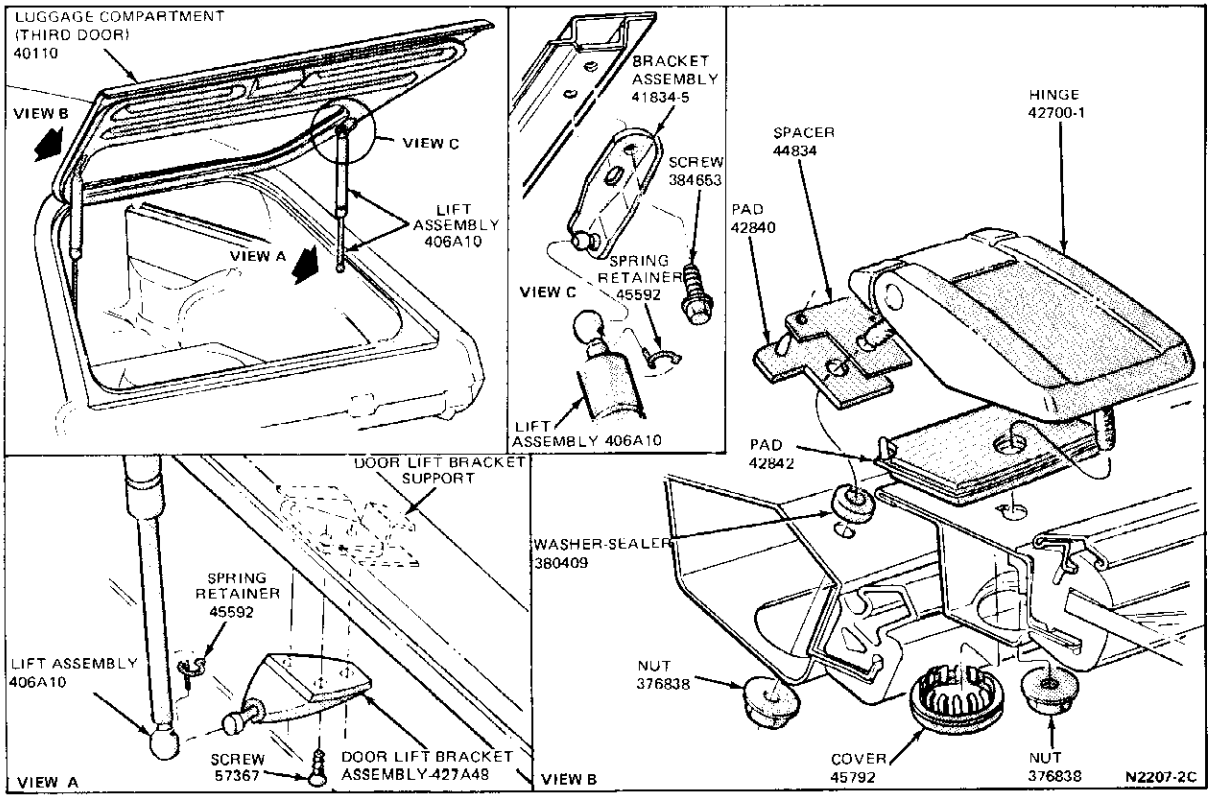


FIG. 11 Luggage Compartment Door, Hinge and Lift Assembly-Pinto and Bobcat 3-Door

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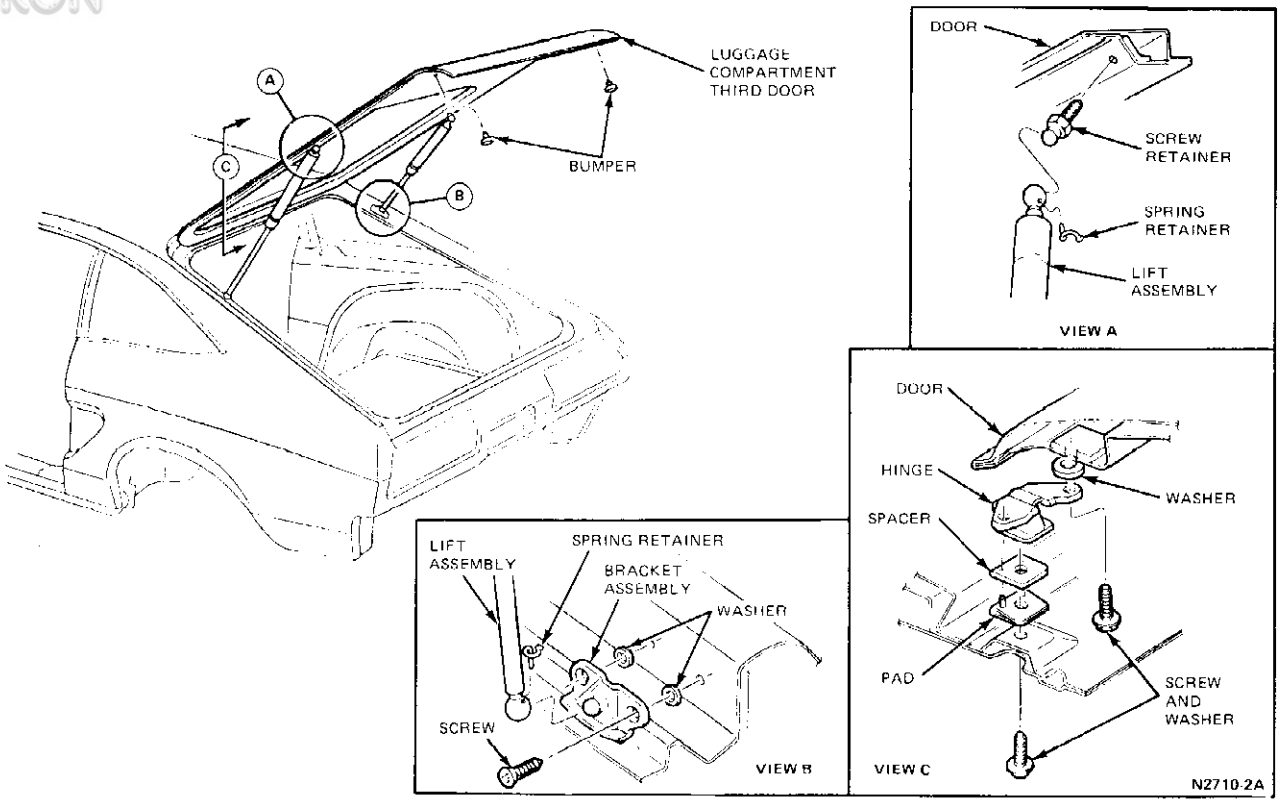


FIG. 12 Luggage Compartment Door, Hinge and Lift Assembly—Mustang II 3-Door

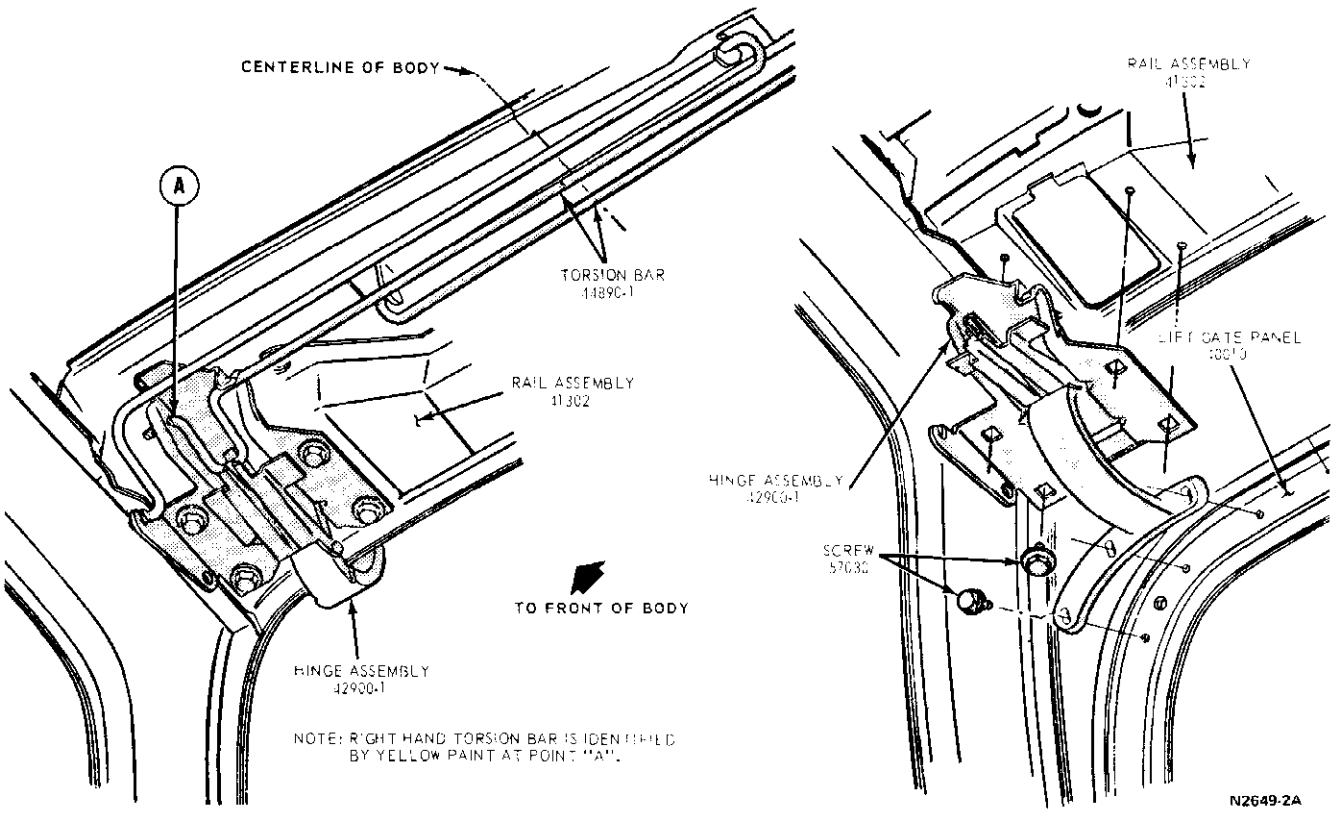


FIG. 13 Hinge and Torsion Bar Installation-Pinto and Bobcat—Station Wagon

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REMOVAL AND INSTALLATION

LUGGAGE COMPARTMENT DOOR WEATHERSTRIP

Removal

1. Remove the weatherstrip from the door opening.
2. Remove all old cement and rubber from the weatherstrip mounting surface (Fig. 14).

Installation

1. Apply a 1/4 inch bead of rubber cement 19552 (or equivalent) in the bottom of the weatherstrip trough except in the drainage depressions. (See Fig. 14 Note.)
2. Position the new weatherstrip in the trough as shown in Fig. 14. Cut the new weatherstrip approximately 1 to 2 inches longer than required and butt together without adhesive.
3. Apply a 3/32 inch bead of rubber cement 19552 or equivalent under the outboard lip of the weatherstrip between points shown in Fig. 14.

LUGGAGE COMPARTMENT LIFT ASSEMBLY—PINTO, BOBCAT AND MUSTANG II—3-DOOR

Refer to Figs. 11 and 12 for Removal and Installation procedures (Luggage Compartment Lift Assembly).

LIFTGATE ASSEMBLY—FAIRMONT/ZEPHR (WAGON)

Refer to Figs. 7 and 8 for removal and installation procedures.

Removal

1. Open liftgate.
2. Remove the upper rear interior center garnish moulding.
3. Support door in open position and remove gas cylinder assist rods.
4. Close liftgate and lock.
5. From inside of vehicle remove the hinge to header roof panel attaching nut and washer assemblies.
6. Unlock liftgate and remove door from body opening.

Installation

1. Reverse above steps.

LUGGAGE COMPARTMENT LATCH AND LOCK

1. Open the luggage compartment door.
2. Remove the lock cylinder retainer screw and/or rivet. Remove the retainer, and remove the lock cylinder (Figs. 15 through 24).
3. Remove the latch attaching screws. Disconnect the electric latch wire (if so equipped), and remove the latch.
4. Connect the electric latch wire (if so equipped). Position the latch to the luggage compartment door, and install the attaching screws snug.
5. Adjust the latch as outlined under Adjustments.
6. In case of lock malfunction, the liftgate screws may be loosened by using a 7/16" open end wrench

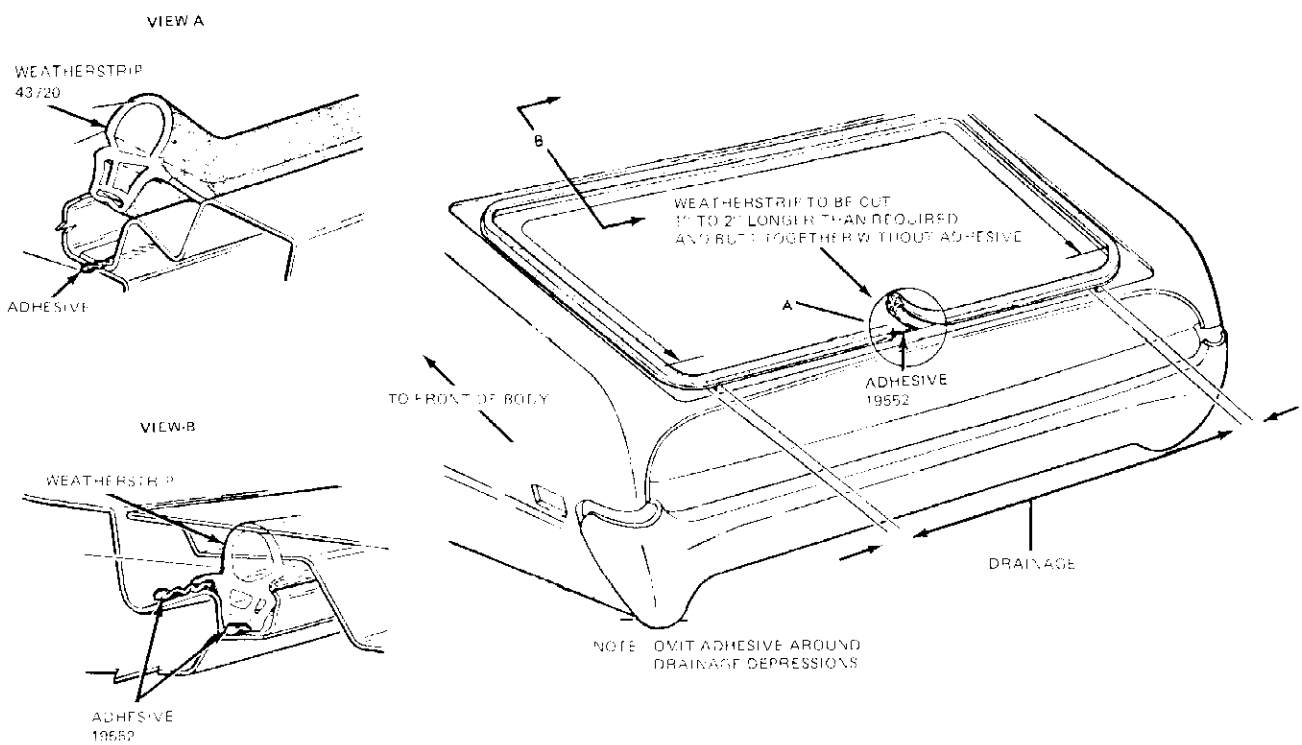


FIG. 14 Luggage Compartment Weatherstrip Installation-Typical All Models

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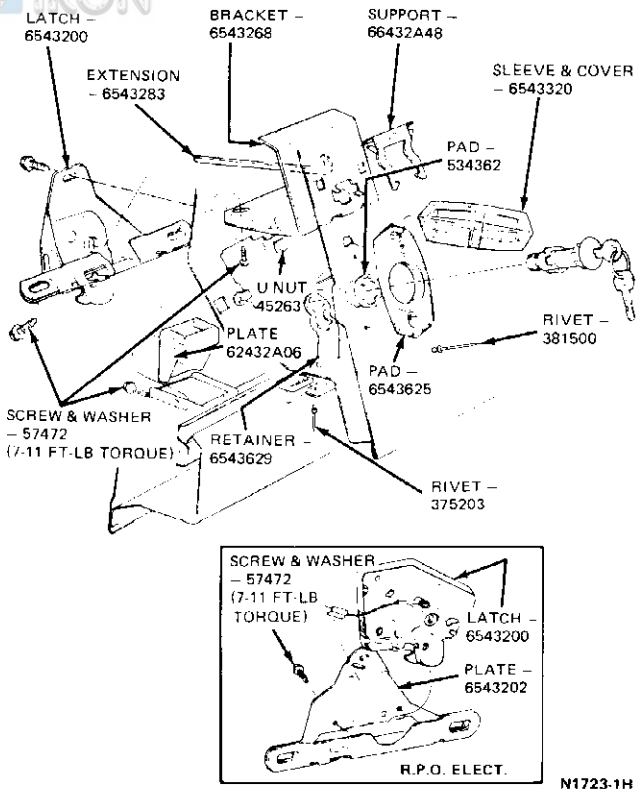


FIG. 15 Luggage Compartment Latch and Lock Continental Mark V

between the door panel and load floor (see Fig. 22, at point A).

LIFTGATE HINGE (FAIRMONT/ZEPHYR)

Removal

1. Disconnect the lift assemblies from the door. Open liftgate assembly.
2. Remove the upper rear interior center garnish moulding.
3. Support door in open position and disconnect.
4. Carefully move the headliner slightly out of position to gain access to the hinge to header panel attaching nut and washer assembly and remove attaching nut.
5. Remove the hinge to liftgate attaching bolt and remove complete hinge assembly.

Installation

1. Install hinge to liftgate door and tighten attaching bolt.
2. Install hinge to roof header panel and tighten attaching nut.
3. Adjust hinge as outlined in adjustment procedures (Fig. 7).
4. Install headliner and garnish moulding.

GLOVE COMPARTMENT LOCK AND KNOB

All Models Except Pinto, Bobcat, Fairmont and Zephyr

Removal and Installation

1. Fabricate a tool from a discarded Bowden cable or equivalent wire stock, by forming a 1/4 inch hook (Fig. 25) if Tool T71P-19703-C (or equivalent) is not readily available.
2. Unlock the glove compartment door.

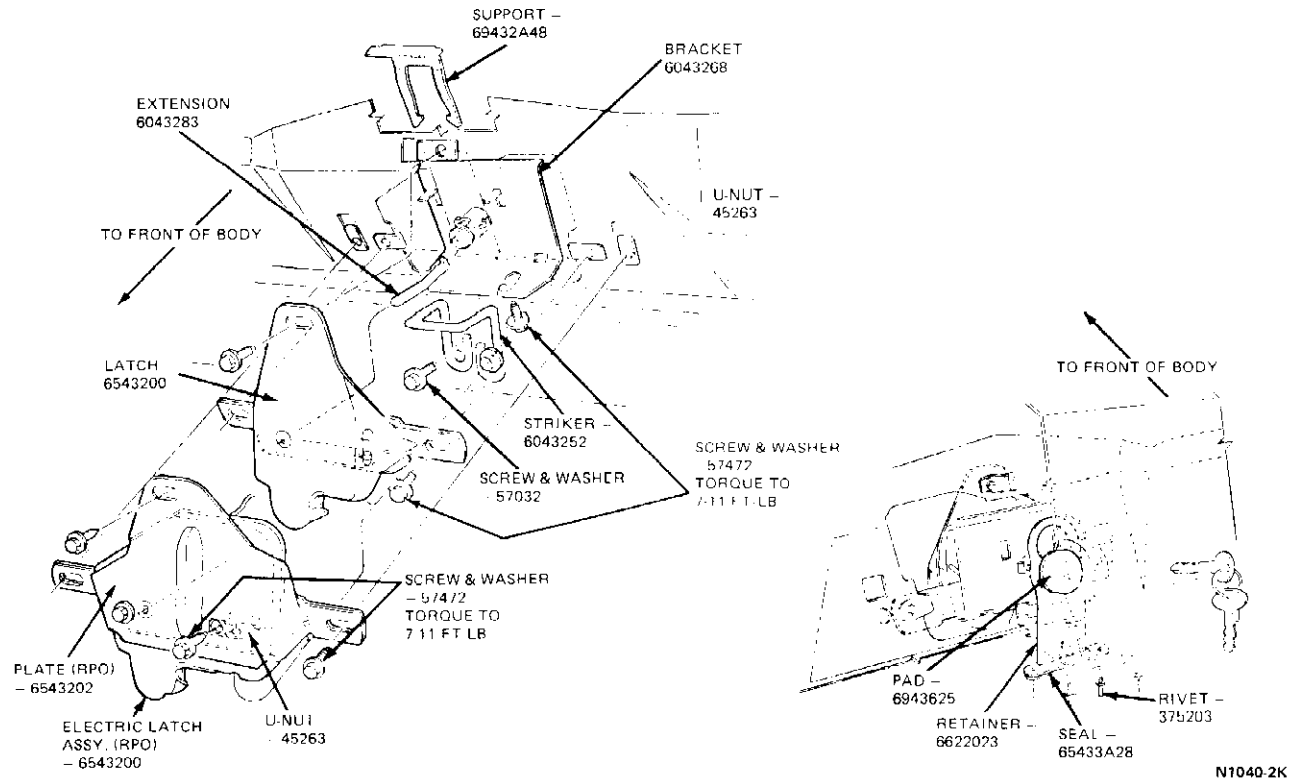


FIG. 16 Luggage Compartment Latch and Lock-Thunderbird, LTD II and Cougar

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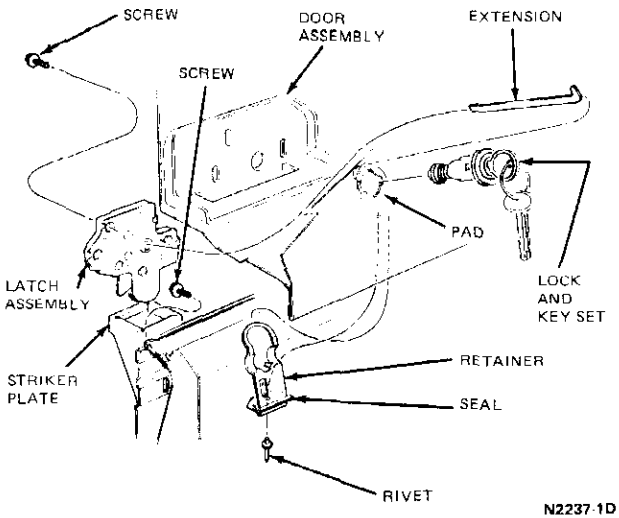


FIG. 17 Luggage Compartment Latch and Lock—Mercury

3. Insert the fabricated tool and/or Tool T71P-19703-C (or equivalent) through the key slot with the hook turned towards the center of the car.
4. Feel and engage the spring clip retainer with the tool and then pull the glove compartment knob from the lock assembly.
5. Remove the lock assembly screws and remove the lock assembly.
6. Install the new lock assembly and retaining screws (snug).
7. Push the knob on the lock assembly.
8. Adjust the lock assembly as required and tighten the retaining screws.

LIFTGAGE GAS CYLINDER ASSIST ROD

Removal

1. Open liftgate and support it.

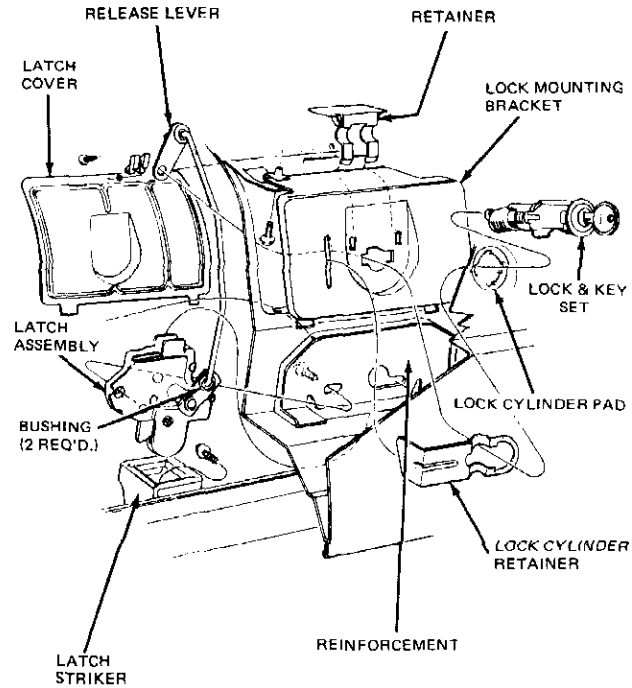


FIG. 18 Luggage Compartment Latch and Lock—Ford

2. Using small screwdriver, push locking wedge out of ball socket of lift assembly. Do the same to other end of rod.
3. Remove gas cylinder assist rod.

Installation

1. *Install one end of lift assembly onto the ball socket.* Push locking wedge to lock ball socket. Do same to other end. See Fig. 26.
2. Close liftgate. Check operation,

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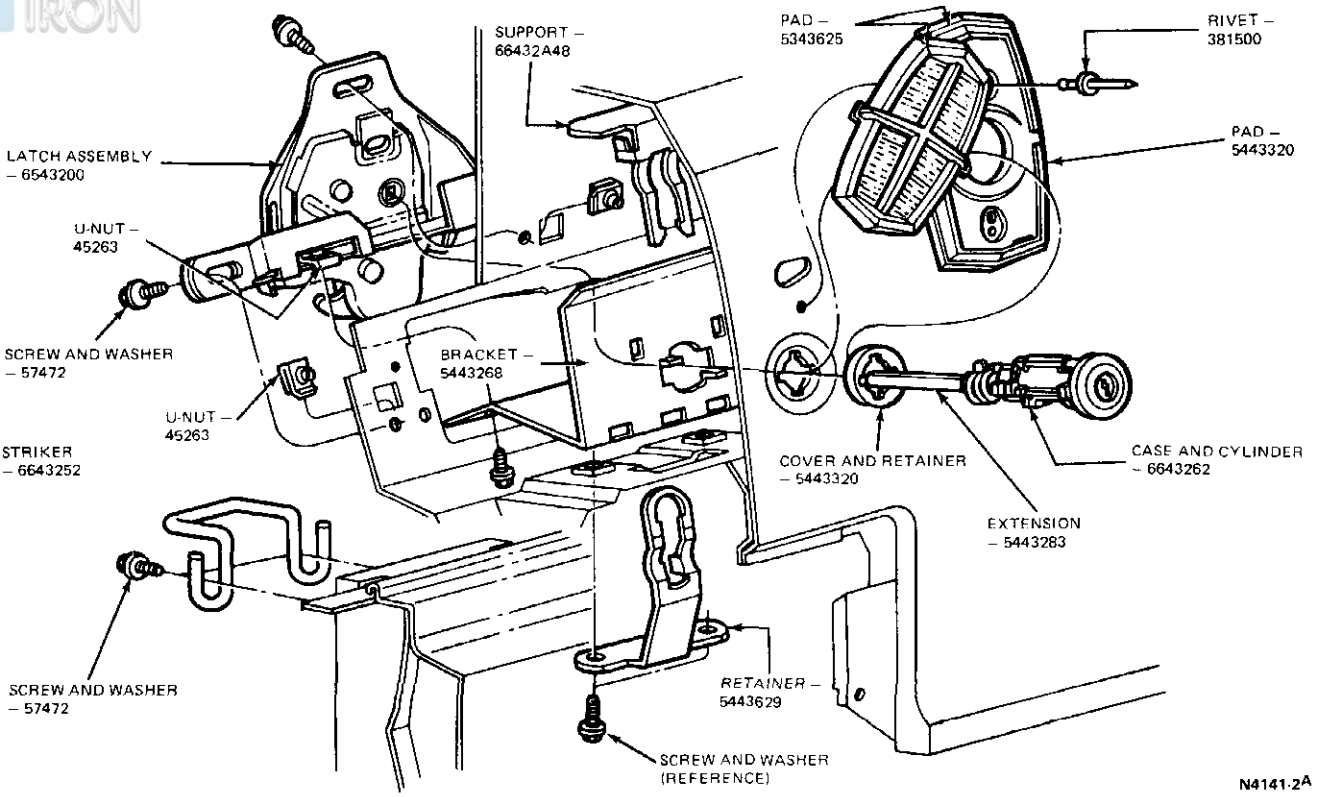


FIG. 19 Luggage Compartment Latch and Lock—Granada, Monarch and Versailles

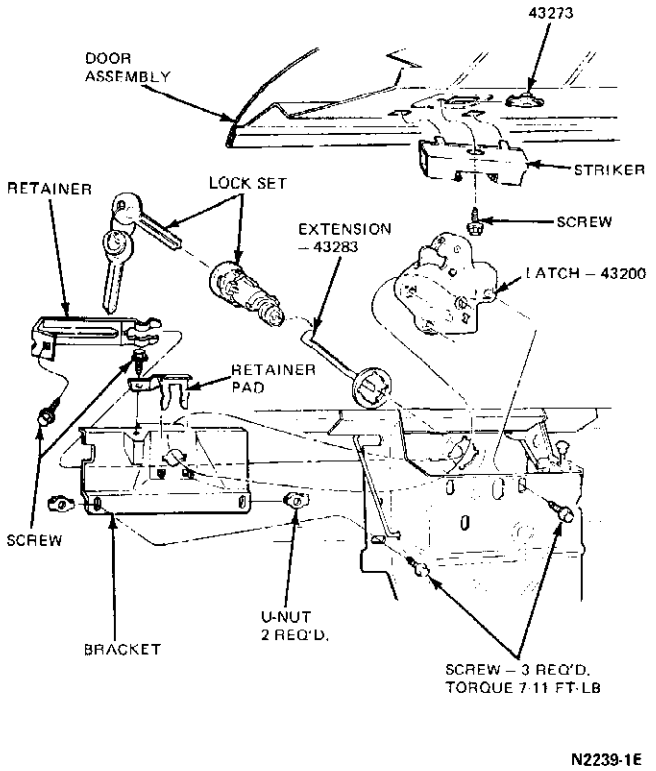


FIG. 20 Luggage Compartment Latch and Lock—Mustang II

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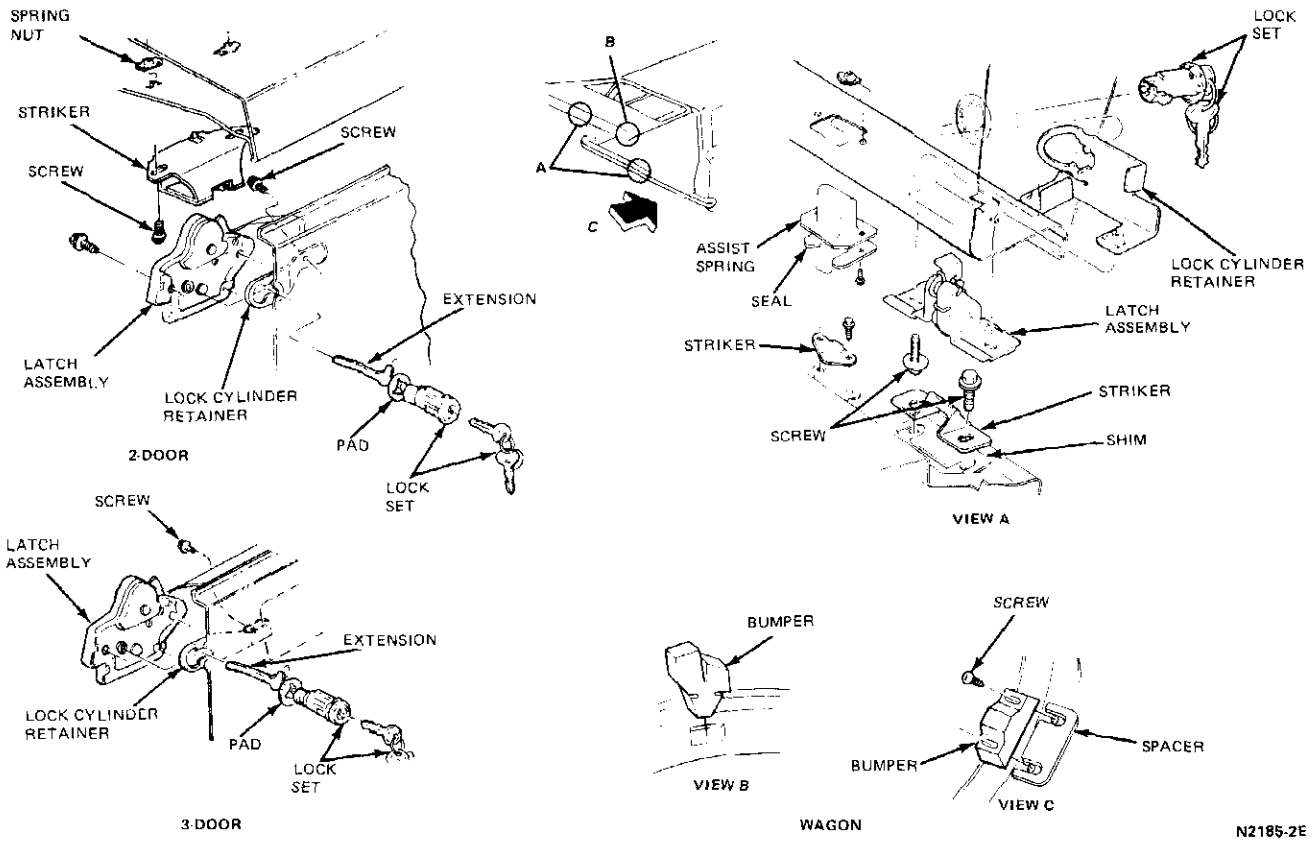


FIG. 21 Luggage Compartment Latch and Lock—Pinto and Bobcat

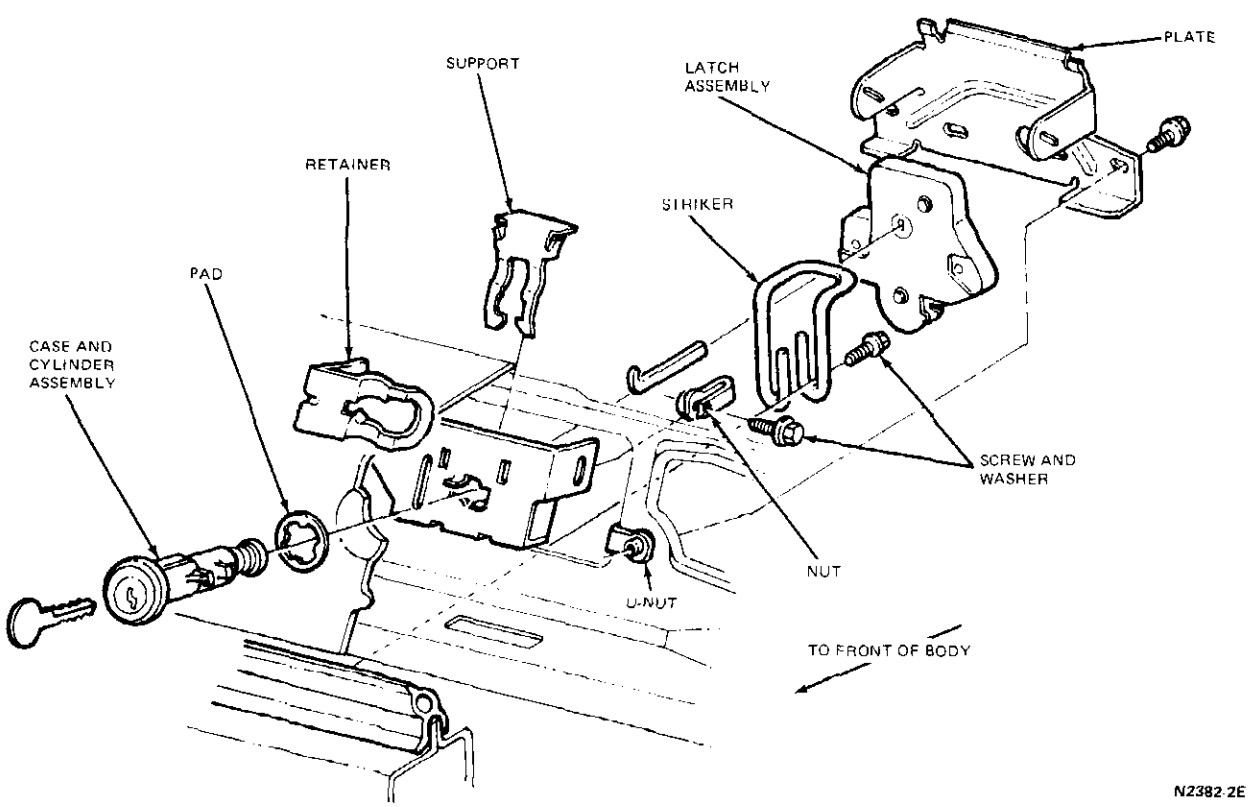


FIG. 22 Luggage Compartment Latch and Lock—Fairmont and Zephyr

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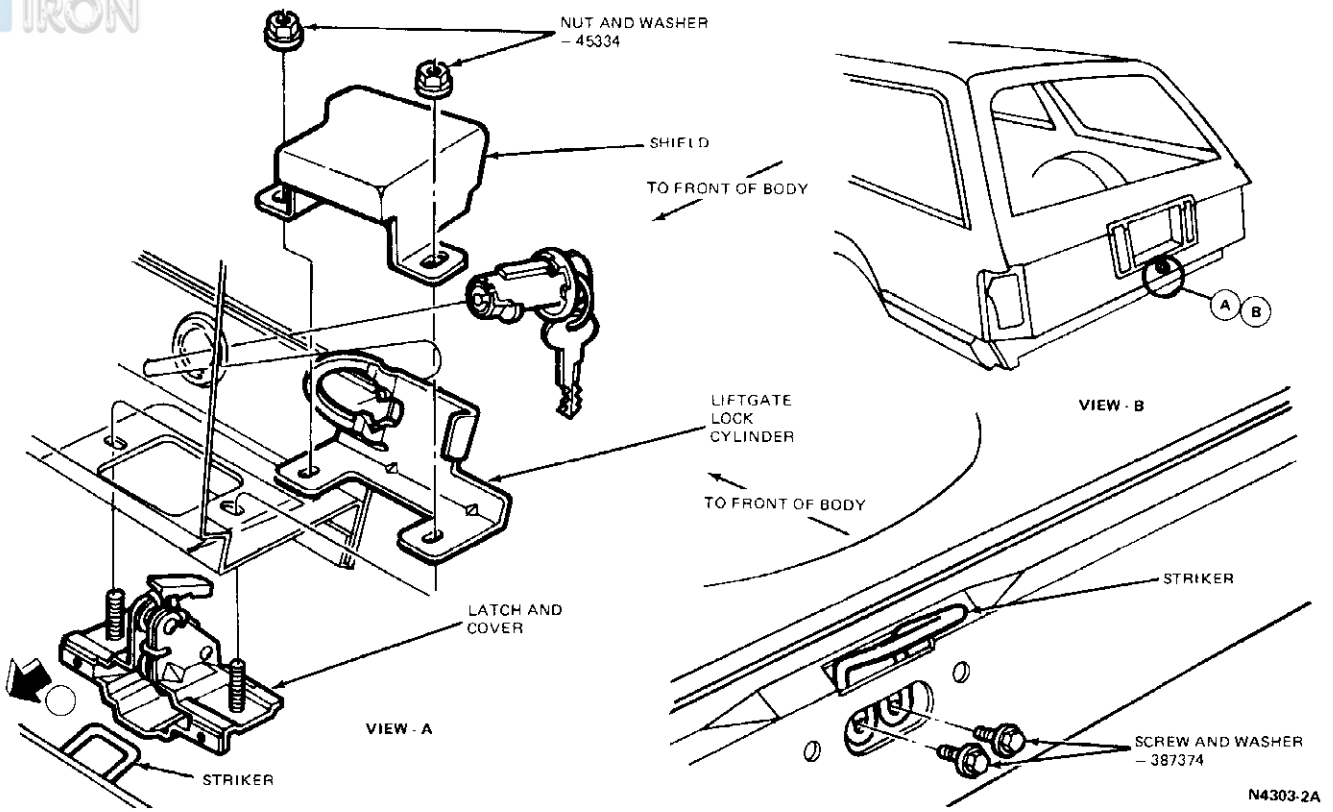


FIG. 23 Luggage Compartment Latch and Lock—Fairmont and Zephyr Station Wagon

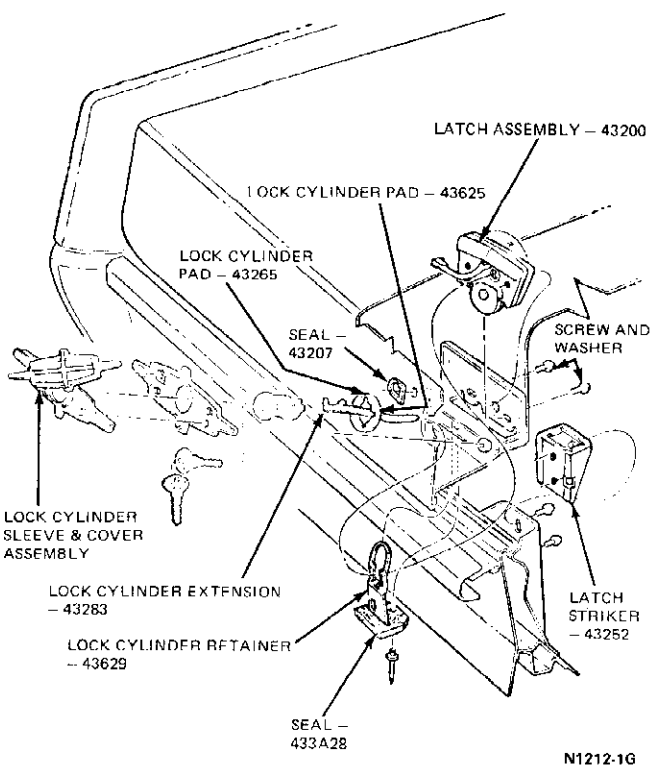


FIG. 24 Luggage Compartment Latch and Lock—Lincoln Continental

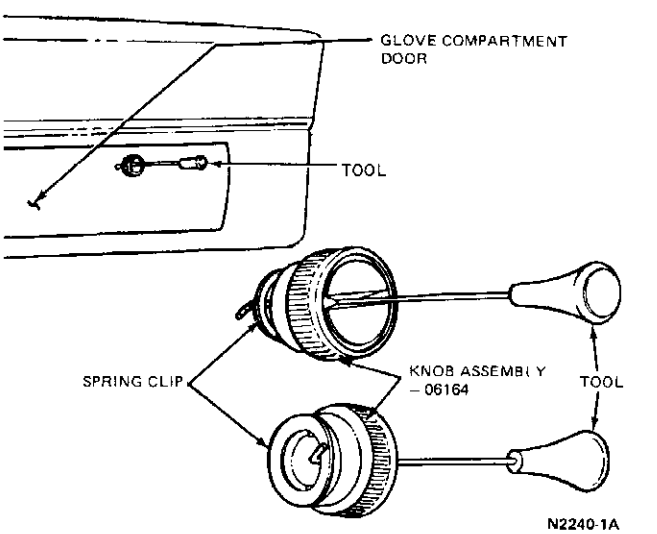


FIG. 25 Glove Compartment Lock Knob Removal

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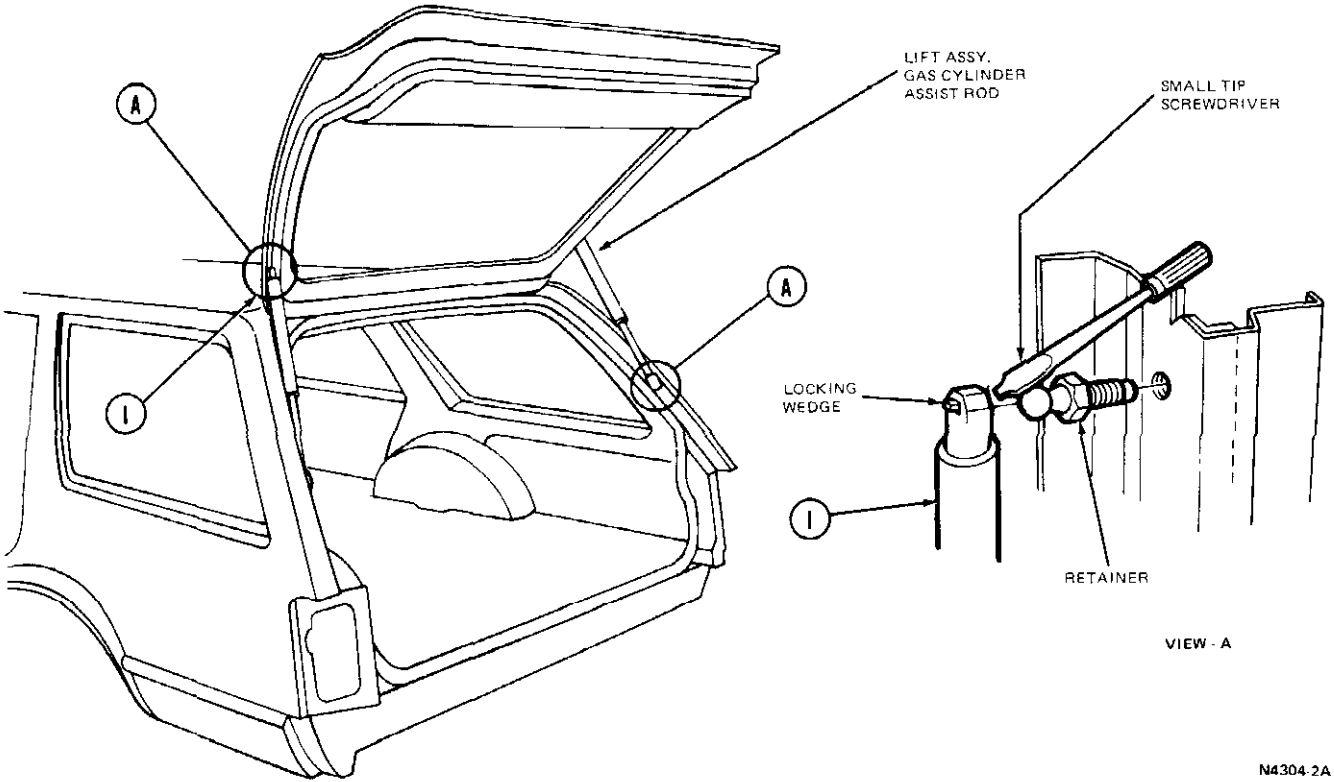


FIG. 26 Gas Cylinder Assist Rod—Fairmont and Zephyr Station Wagon

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DETROIT IRON

Tailgate Hinge, Latch and Lock -- Single Action Gate

PART 44-61

LTD II Ranchero Only

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REMOVAL AND INSTALLATION	
Hinge – Left Side	61-1
Hinge – Right Side	61-1
Latch	61-1

CR2039-2B

ADJUSTMENTS

TAILGATE HINGE

(Ranchero Only)

The tailgate can be adjusted fore and aft and up or down at the hinge-to-body mounting bolts.

To adjust the tailgate from side to side in the tailgate opening, remove the trim panel, loosen the hinge-to-tailgate bolts and shift the tailgate, as required.

REMOVAL AND INSTALLATION

TAILGATE HINGE—RIGHT SIDE

Removal

1. Open the tailgate and mark the hinge location on the tailgate and body.
2. Remove the tailgate trim panel, watershield and access cover.
3. Support the tailgate with a suitable prop.
4. Remove three hinge-to-body attaching bolts (Fig. 1).
5. Remove three hinge-to-tailgate retaining nuts and remove the hinge.

Installation

1. Position the hinge to the tailgate and body and install the three hinge-to-tailgate retaining nuts.
2. Install the three hinge-to-body attaching bolts.
3. Align the tailgate and tighten the hinge retaining nuts and attaching bolts.
4. Install the access cover, watershield and trim panel on the tailgate.

TAILGATE HINGE—LEFT SIDE

Removal

1. Open the tailgate and mark the hinge location on the tailgate and body.
2. Remove the tailgate trim panel, watershield and access cover.
3. Retain the torsion bar in the tension position with a deep socket and an extension.
4. Remove the torsion bar retainer bracket attaching screws. Then, release the torsion bar tension and remove the bracket and retainer (Fig. 1).
5. Support the tailgate with a suitable prop.
6. Remove three hinge-to-body attaching bolts and disconnect one end of the cable assembly (Fig. 1).
7. Remove three hinge-to-tailgate retaining nuts and remove the hinge.

Installation

1. Position the hinge to the tailgate and install the three hinge-to-tailgate retaining nuts.
2. Install the three hinge-to-body attaching bolts and the end of the cable assembly.
3. Align the tailgate and tighten the hinge retaining nuts and attaching bolts.
4. Apply tension to the torsion bar and install the torsion bar bracket and retainer.
5. Install the access cover, watershield, and trim panel on the tailgate.

TAILGATE LATCH

Removal

1. Open the tailgate and remove the tailgate trim panel.
2. Disconnect the latch release link from the latch (Fig. 1).
3. Remove three latch attaching screws and remove the latch.

Installation

1. Position the latch in the tailgate and install the three attaching screws.
2. Connect the latch release link to the latch and snap the link retainer onto the link.
3. Install the tailgate trim panel.

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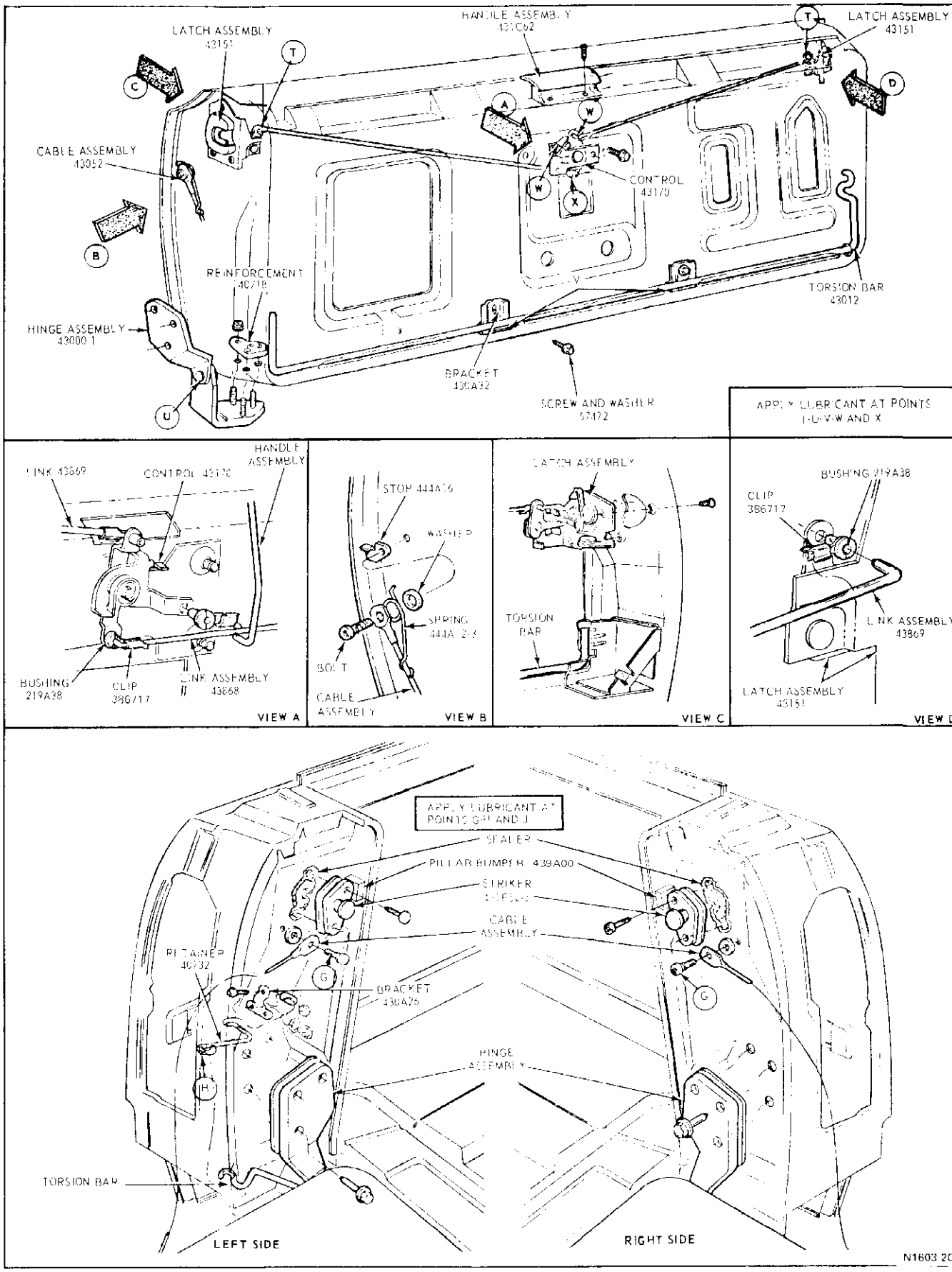


FIG. 1 Tailgate Latch Mechanism—Single-Action Gate

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DETROIT IRON

Tailgate, Hinge, Latch, Lock and Weatherstrip -- Dual Action Gate

PART 44-76

Ford and Mercury Only

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ADJUSTMENTS	
Tailgate Striker	76-2
Upper Hinge and Latch Release Link Adjustment	76-2
Upper Latch-To-Lower Latch Link Adjustment	76-1
REMOVAL AND INSTALLATION	
Lower Hinge	76-2
Tailgate Latch Release Control	76-4

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Tailgate Upper Latch	76-3
Tailgate Window Limit Switch	76-3
Tailgate Window Switch	76-4
Torsion Bar	76-2
Upper Hinge	76-2
Weatherstrips	76-4

CR2020-2B

ADJUSTMENTS

UPPER LATCH-TO-LOWER LATCH LINK ADJUSTMENT

Ford, Mercury

Place tailgate latches in the closed (latched) position (Fig. 1). Disconnect the upper latch-to-lower latch link from the lower latch. Then, adjust the upper latch-to-lower latch link to engage with the lower latch with no load on the link.

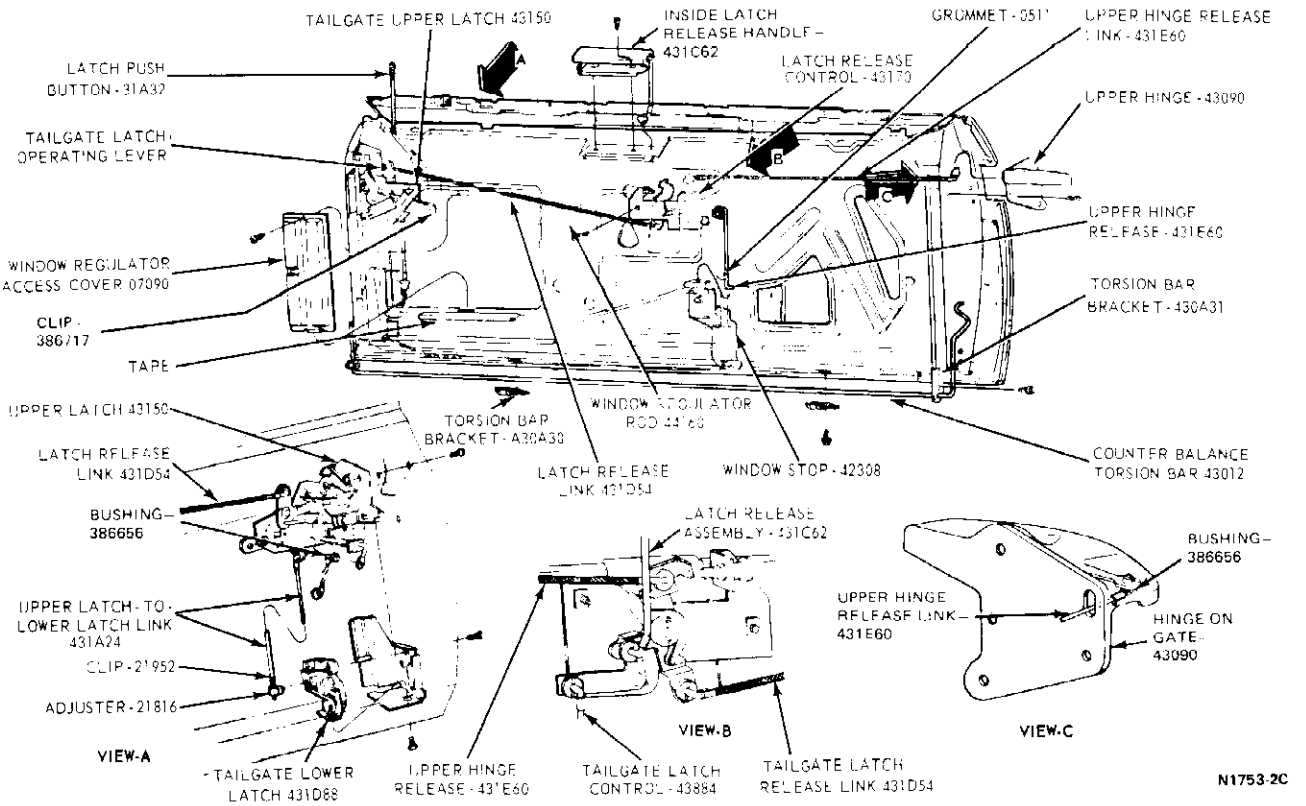


FIG. 1 Tailgate Latch Mechanism—Ford and Mercury

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To check the adjustment, the upper latch must not close when the lower latch is in the OPEN position. The upper and lower latches must open at the same time when the outside handle is operated.

UPPER HINGE AND LATCH RELEASE LINK ADJUSTMENT

Loosen the latch release control attaching screws (Fig. 1), and close the upper latch. Position the latch release handle against the rubber stops. Then, move the latch release control down and rotate the control clockwise (bottom toward the latch) until slack is removed from the links. Then, tighten the latch release control attaching screws.

Adjustment Check

1. The electric window regulator must not operate when the latch release control is in the released position.
2. The inside release handle must not operate when the window is down and the upper latch is locked by either the key or the inside push button.

TAILGATE STRIKER

Fore and aft and up and down adjustment of the strikers is accomplished by means of square holes in the pillar, backed by floating tapping plates. Lateral adjustment is accomplished by adding or removing shims (Fig. 2).

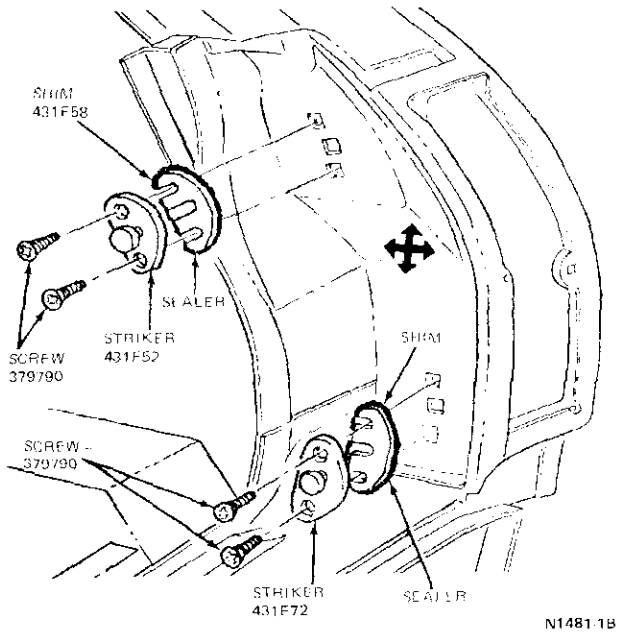


FIG. 2 Tailgate Striker Adjustment—Typical

REMOVAL AND INSTALLATION

LOWER HINGE

Ford, Mercury

Removal

1. Open the tailgate as a drop gate and place a support under the tailgate.
2. Remove the tailgate inside cover and watershield.
3. Remove the wire clip from the hinge.
4. Remove the torsion bar retainer bracket (Fig. 3). **Use caution when working with the torsion bar as the bar is under tension when installed.**
5. Latch the upper tailgate latch by hand (Fig. 1).
6. Move the tailgate glass to the up position. Be sure to support the glass.
7. Mark the location of the hinge and remove four nuts retaining the hinge to the tailgate.
8. Remove four hinge-to-body attaching bolts (Fig. 3), remove the hinge.

Installation

1. Position the hinge to the body and tailgate, and install the retaining nuts and attaching bolts.
2. Position the torsion bar and retainer to the body with a pipe wrench and install the retainer bracket attaching screws.
3. Install the wire clip on the hinge.
4. Adjust the tailgate and tighten the attaching bolts and retaining screws.
5. Install the watershield and tailgate inside cover.

UPPER HINGE ON GATE

Ford, Mercury

Removal

1. Remove three screws attaching the upper hinge to the tailgate (Fig. 1).
2. Rotate the hinge off of the upper hinge release link.
3. Remove the link bushing from the hinge.

Installation

1. Install the link bushing on the hinge.
2. Rotate the hinge onto the upper hinge release link.
3. Position the hinge to the tailgate and install the three attaching screws.

TORSION BAR

Ford and Mercury

Removal

1. Open the tailgate as a door and remove two brackets retaining the torsion bar to the bottom of the tailgate (Fig. 1).
2. Remove the two torsion bar bracket retaining screws from the left end of the tailgate (Fig. 1).
3. Remove the torsion bar from the tailgate, and remove the bracket from the torsion bar.

Installation

1. Position the bracket on the torsion bar.
2. Position the torsion bar to the tailgate. Be sure to engage the torsion bar retainer (Fig. 3).

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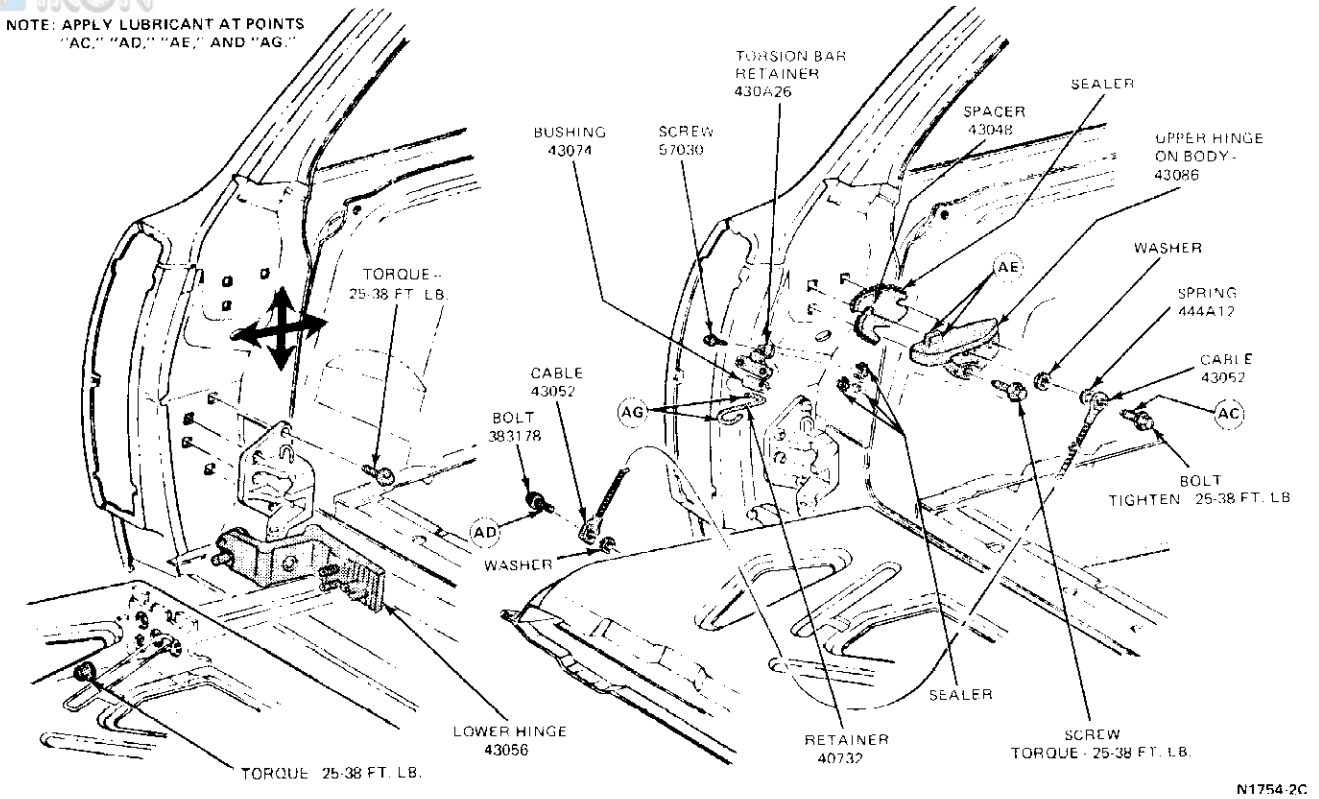


FIG. 3 Tailgate Hinges—Ford and Mercury Shown

3. Install the two bracket retaining screws.
4. Install the two brackets retaining the torsion bar to the bottom of the tailgate.

TAILGATE UPPER LATCH

Ford, Mercury

Removal

1. Remove the tailgate inside cover and watershield.
2. Disconnect the power lock actuator link from the latch, if so equipped.
3. Disconnect the two links with double 90 degree ends from the clips on the other end of the link.
4. Remove the tailgate (Fig. 1) power door lock actuator.
5. Remove three latch attaching screws and remove the latch.
6. Transfer the rods and clips to the new latch. Be careful to put the rods and clips into the same side of the lever.

Installation

1. Position the latch in the tailgate and install the three attaching screws.
2. Install the tailgate power lock actuator.
3. Connect the rods to the connecting components.
4. Install the watershield and inside cover on the tailgate.

TAILGATE LOWER LATCH

Removal

1. Remove the interior trim panel and access cover from the tailgate.
2. Disconnect the latch actuator link from the lower latch (Figs. 1 and 2).
3. Remove three lower latch attaching screws and remove the lower latch from the tailgate.

Installation

1. Install a new retainer clip in the lower latch.
2. Position the lower latch to the tailgate and install the three attaching screws.
3. Adjust and connect the latch actuator link to the lower latch.
4. Adjust the lower latch striker, if necessary.
5. Install the access cover and trim panel on the tailgate.

TAILGATE WINDOW LIMIT SWITCH

Ford, Mercury

Removal

1. Remove the tailgate inside cover and watershield.
2. Remove the wiring connector from the limit switch.
3. Remove the rubber boot from the switch plunger and unscrew the limit switch from the mounting bracket.

Installation

1. Assemble the limit switch to the bracket (mounting) finger tight.
2. Install the rubber boot over the switch plunger and threaded portion of switch shell.
3. Connect wiring connector to switch.
4. Install the watershield and inside cover on the tailgate.

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TAILGATE WINDOW SWITCH

Ford and Mercury

Removal

1. Remove the tailgate inside cover and watershield.
2. Disconnect the tailgate latch rod from the switch (Fig. 4).
3. Remove the lock set retainer (Fig. 4).
4. Disconnect the switch wires and remove the wire clips. Then, remove the switch and wire assembly from the tailgate.

Installation

1. Position the switch and wire assembly in the tailgate. Connect the wires and install the wire clips.
2. Position the switch to the lock cylinder and install a new retainer and clip (Fig. 4).
3. Connect the tailgate latch rod to the switch.
4. Install the watershield and inside cover on the tailgate.

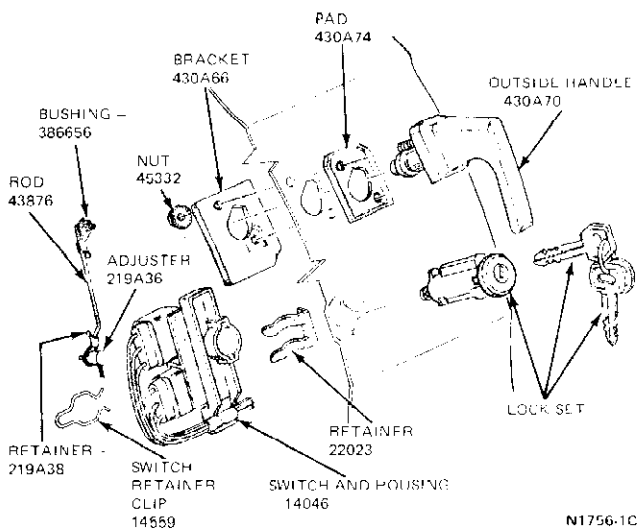


FIG. 4 Tailgate Window Switch—Ford and Mercury

TAILGATE OUTSIDE HANDLE

Ford and Mercury

1. Remove the inside tailgate trim panel.
2. Remove the access hole cover.
3. Disconnect the handle retaining nuts and remove the handle.

Tailgate Lock Cylinder

Removal

1. Remove the tailgate inside trim panel.
2. Remove the access hole cover.
3. Remove the lock cylinder clip and the switch retainer from the lock cylinder (Fig. 4).
4. Remove the lock cylinder from the tailgate.

Installation

1. Insert the lock cylinder into the tailgate and switch and housing assembly (Fig. 4).
2. Install the lock cyl. retainer and the switch retainer clip.
3. Install the tailgate inside access hole cover and trim panel.

TAILGATE LATCH RELEASE CONTROL

Removal

1. Remove the interior trim panel from the tailgate.
2. Raise the glass part way out of the tailgate.
3. Disconnect the rods from the latch release control (Fig. 1).
4. Disconnect the wiring connector from the limit switch.
5. Remove three latch release control attaching screws, and remove the control from the tailgate.
6. Transfer the limit switch to the new control assembly.

Installation

1. Position the latch release control to the tailgate and install the three attaching screws snug.
2. Connect the rods to the latch release control.
3. Connect the wiring connector to the limit switch.
4. Lower the glass and adjust the latch release control and tighten the attaching screws.
5. Install the trim panel on the tailgate.

WEATHERSTRIPS

All weatherstrips should be trimmed to obtain a good butt joint.

The tailgate weatherstrip is shown in Fig. 5. Apply adhesive (19552 or equivalent) where required for weatherstrip retention. On Ford and Mercury models, before removing the weatherstrip, remove any trim panels necessary to assure proper seating of new weatherstrip. Start the weatherstrip installation on the left side of the tailgate opening as shown in Fig. 5.

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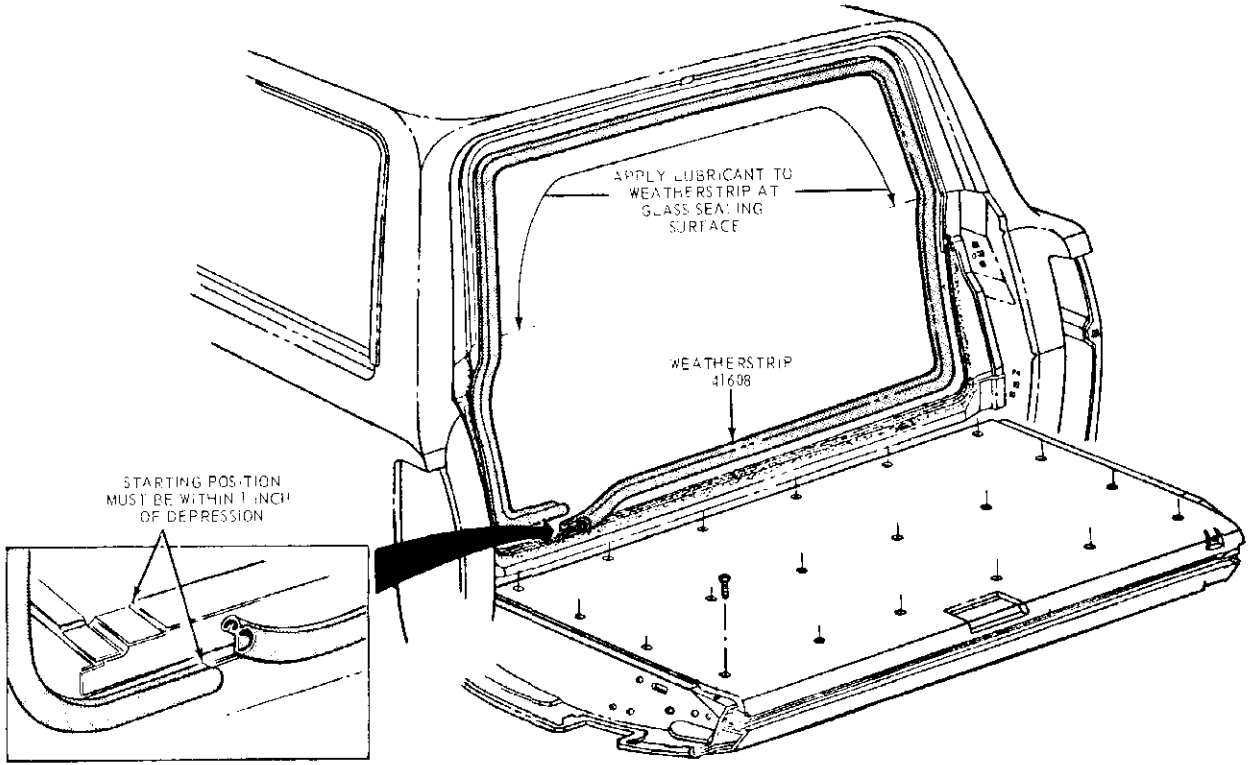


FIG. 5 Tailgate Weatherstrip and Inside Cover Assembly—Ford and Mercury

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INTERIOR TRIM

GROUP 45 (70000)

PART TITLE	PART NO.	PART TITLE	PART NO.
Carpets and Floor Mats	45-26	Instrument Panel Pad	45-61
Door and Quarter Trim Panels	45-03	Interior Mouldings	45-16
Floor Console	45-31	Rear Package Tray	45-21
Headlining	45-41		

CR2006-2B

Interior Trim

PART 45-03

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Center Pillar and Quarter Trim Panels	03-13	Roof Side Trim Panels	03-11
Door Trim Panels	03-1		
Quarter Trim Panel – Two-Door Models	03-1		

CR2042-2B

REMOVAL AND INSTALLATION

DOOR TRIM PANELS

The following door and quarter trim panel removal and installation procedures generally apply to all car lines. **If some of the steps do not apply to the particular vehicle being serviced, proceed to the next step.** See Figs. 1 through 9.

1. Remove the door lock pushbutton control knob and *garnish moulding.*
2. Remove the window regulator handle retaining screw access cover (if so equipped) and remove the screw and regulator handle.
3. Remove the door latch handle retaining screw access cover (if so equipped) and remove the screw(s) from the door latch handle.
4. Remove the screws from the armrest door pull cup area (if so equipped).
5. Remove the retaining screws from the armrest assembly, disconnect switch wiring (if so equipped) and remove the armrest.
6. Remove the mirror remote control bezel nut.
7. Remove the door trim panel retaining screws.
8. With a putty knife or similar tool, pry the trim panel retaining clips from the door inner panel.
9. Disconnect all wiring (if so equipped) and remove the trim panel.
10. If the trim panel and/or the arm rest is to be replaced, transfer the pull handle pop rivets and/or retaining screws and retaining clips to the new assembly. If the watershield has been removed, be sure to position it correctly in place before installing the trim panel. Be sure that the armrest retaining clips are properly positioned on the door inner panel. If they have been dislodged, they must be reinstalled before installing the watershield.
11. Position the trim panel to the door inner panel and connect the wiring (if so equipped) and route the mirror control cable through the hole.
12. Push the trim panel and retaining clips into the inner *door panel holes and install the retaining screws.*
13. Install the remote control mirror bezel nut.
14. Position the armrest to the trim panel, connect the wiring (if so equipped) and install the retaining screws.
15. Install the armrest finish panel (if so equipped).
16. Position the door latch and window regulator handles and install the retaining screw(s).
17. Clean old cement from the handle access covers with naphtha. Use a 1 3/4 x 3/8 inch tape such as 3M No. Y9122 or equivalent and cement the cover(s) back in place.
18. Install the garnish moulding and door lock pushbutton control knob.

QUARTER TRIM PANEL—TWO-DOOR MODELS

FORD, MERCURY, LTD II, COUGAR AND THUNDERBIRD

Removal

Basically, all quarter trim panels, except Ford and Mercury, are retained in the same manner. In view of this, one removal and installation procedure will cover

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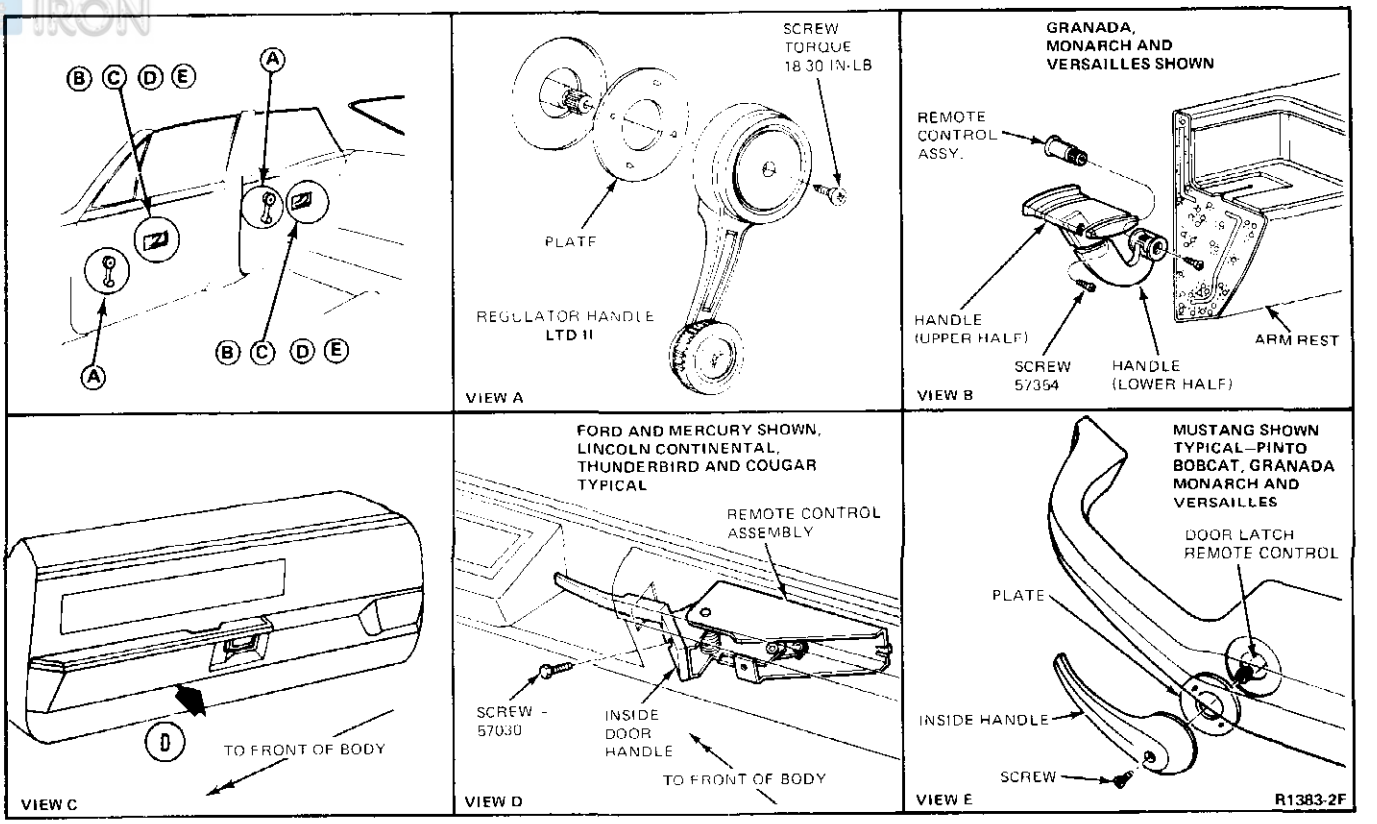


FIG. 1 Typical Door and Window Regulator Handle Installation

all models. The top of the Ford (2-door only) quarter trim panel is retained by four (4) "J" clips which are pop riveted to the roof side trim panel.

1. Remove the rear seat cushion and back assemblies. See Group 41.
2. Remove any screws retaining the trim panel to the inner panel, armrest retaining screws, garnish moulding retaining screws and the door sill step plate rear screw.
3. Then, with a putty knife pry the trim panel retaining clips from the quarter inner panel and remove the panel.

Installation

1. Position the trim panel to the quarter panel. Then, snap the retaining clips in the holes.
2. Install the trim panel attaching screw(s).
3. Install the armrest.
4. Install the rear seat cushion and back assemblies.

GRANADA, MONARCH, VERSAILLES, FAIRMONT, ZEPHYR, MUSTANG II, BOBCAT AND PINTO—EXCEPT STATION WAGON

Removal

1. Open the luggage compartment door and lower the rear seat on 3-Door Models. On 2-Door Models, remove the rear seat cushion and seat back (Group 41).
2. Remove the door sill scuff plate.
3. Remove the seat belt retractors from the door sill (Group 41).
4. Remove the trim panel attaching screws (Figs. 12, 13, 14 and 15).
5. Push the trim panel forward and away from the installed position. Remove the bezel from the rear seat belt opening in the trim panel, and remove the belt from the opening. On Mustang II, unsnap shoulder belt lower bezel and slide belt out through upper bezel opening. Then, remove the trim panel.

Installation

1. Position the trim panel in the vehicle. Insert the rear seat belt through the opening and install the bezel. Slide the shoulder belt into the opening and install the bezels on Mustang II Models.
2. Position the trim panel to the quarter and install the attaching screws.
3. Install the seat belt retractors in the door sill, and install the door sill scuff plate.
4. Install the rear seat back and seat cushion on 2-Door Models.

CONTINENTAL MARK V

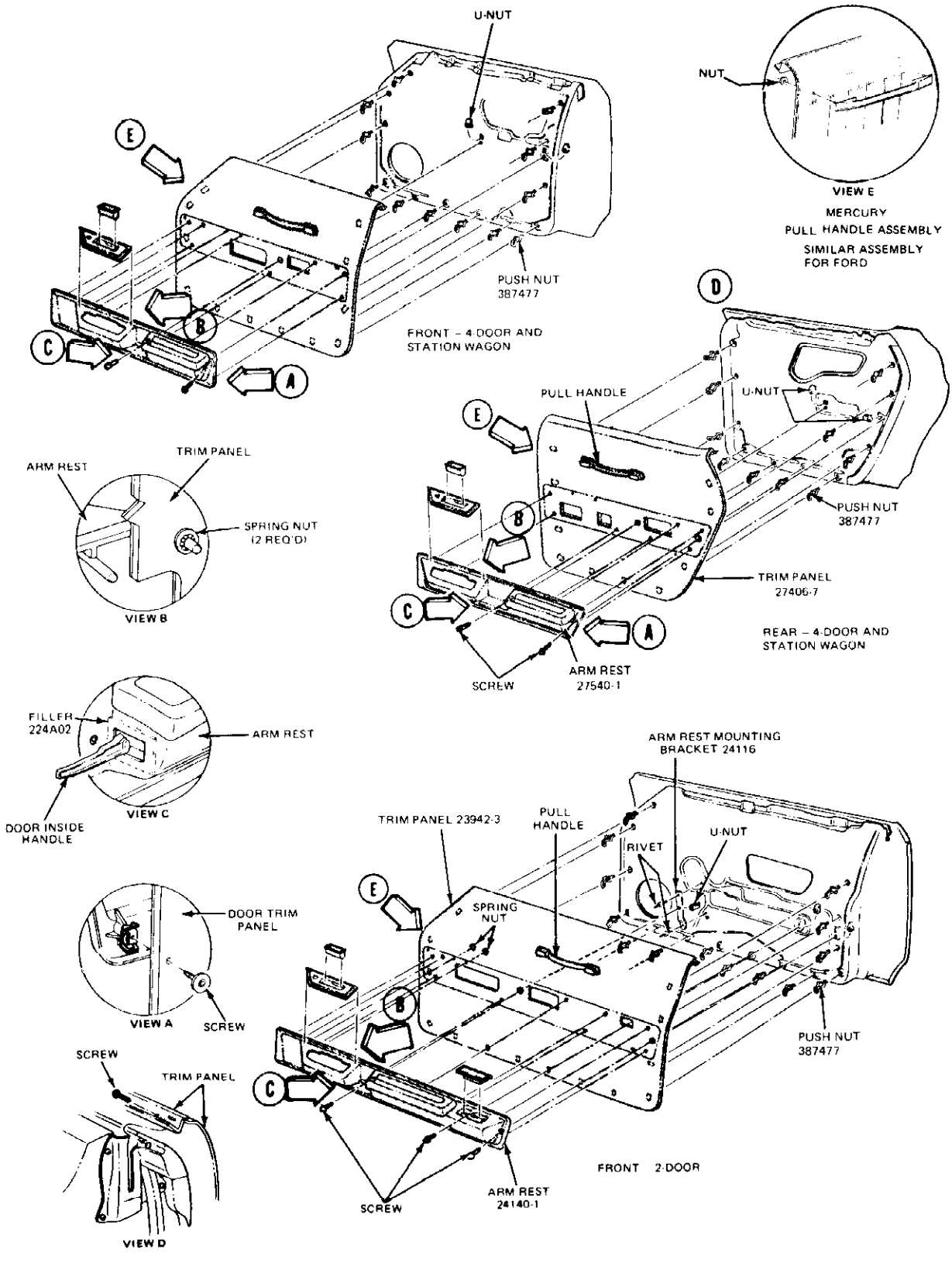
Removal

1. Remove the rear seat cushion and back assembly (Group 41).
2. Pry up on the armrest assembly (Fig. 17) and disengage it from the retaining clips (five).
3. Remove the lower quarter trim panel retaining screws and the retaining screw at the rear of the step plate.
4. Remove the lower quarter trim panel.

Installation

1. Position the quarter trim panel to the quarter panel and connect the power window wires. Then, snap

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FIG. 2 Door Trim Panel Installations—Ford and Mercury

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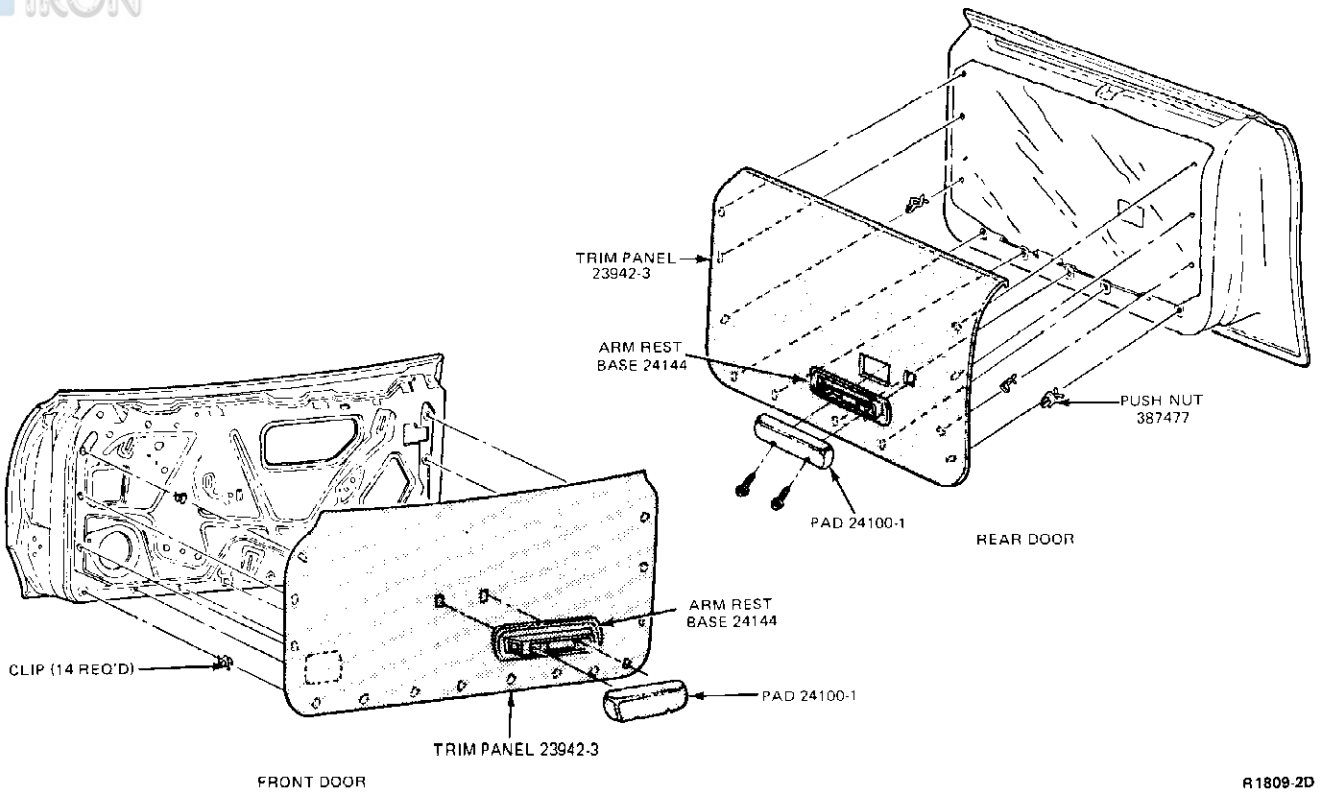


FIG. 3 Door Trim Panel Installation—Thunderbird, LTD II and Cougar

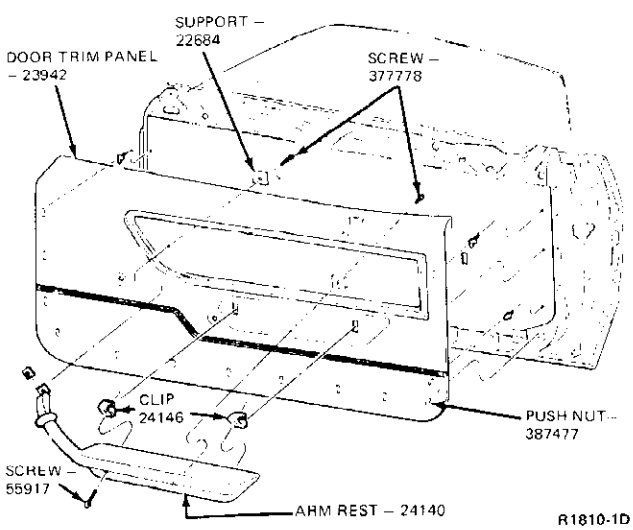


FIG. 4 Door Trim Panel Installation (Luxury Trim)—Mustang II

in the retainers and clips together with the attaching screws.

2. Position the roof side trim panel and retain with clips and screws.
3. Push armrest assembly firmly in place until retained by five retaining clips.
4. Install rear seat cushion and back assembly.

LINCOLN CONTINENTAL

Removal

1. Carefully pry off the armrest finish panel (Fig. 18).
2. Remove the three screws attaching the armrest and remove the armrest.
3. Remove the seat cushion and back assemblies (not shown on illustrations).
4. Remove the necessary interior backlamp garnish mouldings (not shown on illustration).
5. Remove one screw securing the coat hook and remove coat hook.
6. Remove one screw behind the shoulder belt at the roof rail.
7. Pry loose the quarter trim finish panel starting at the rear.

CAUTION: When the finish panel attaching clips have been extracted from the quarter trim panel, be sure to pull the panel directly rearward first and then inboard in order not to break the clips at the front of the panel. The finish panel is not designed to pivot around the front clips.

8. Remove three screws securing the lower quarter trim panel and remove the panel.
9. Remove three screws along the belt line securing the quarter trim panel and pry loose the one clip located at the front of the trim panel. Disconnect the courtesy lamp wiring and then, remove the trim panel.

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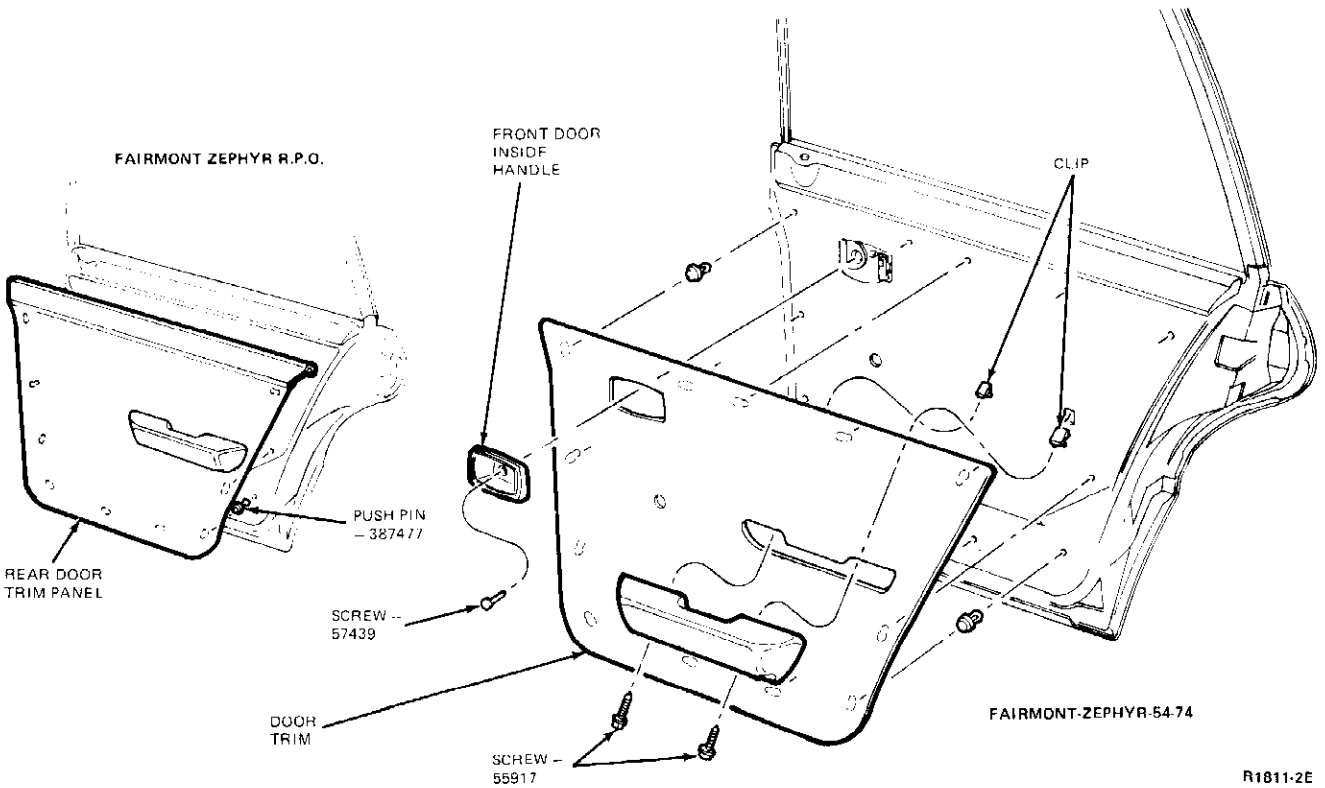


FIG. 5 Door Trim Panel Installation—Fairmont and Zephyr

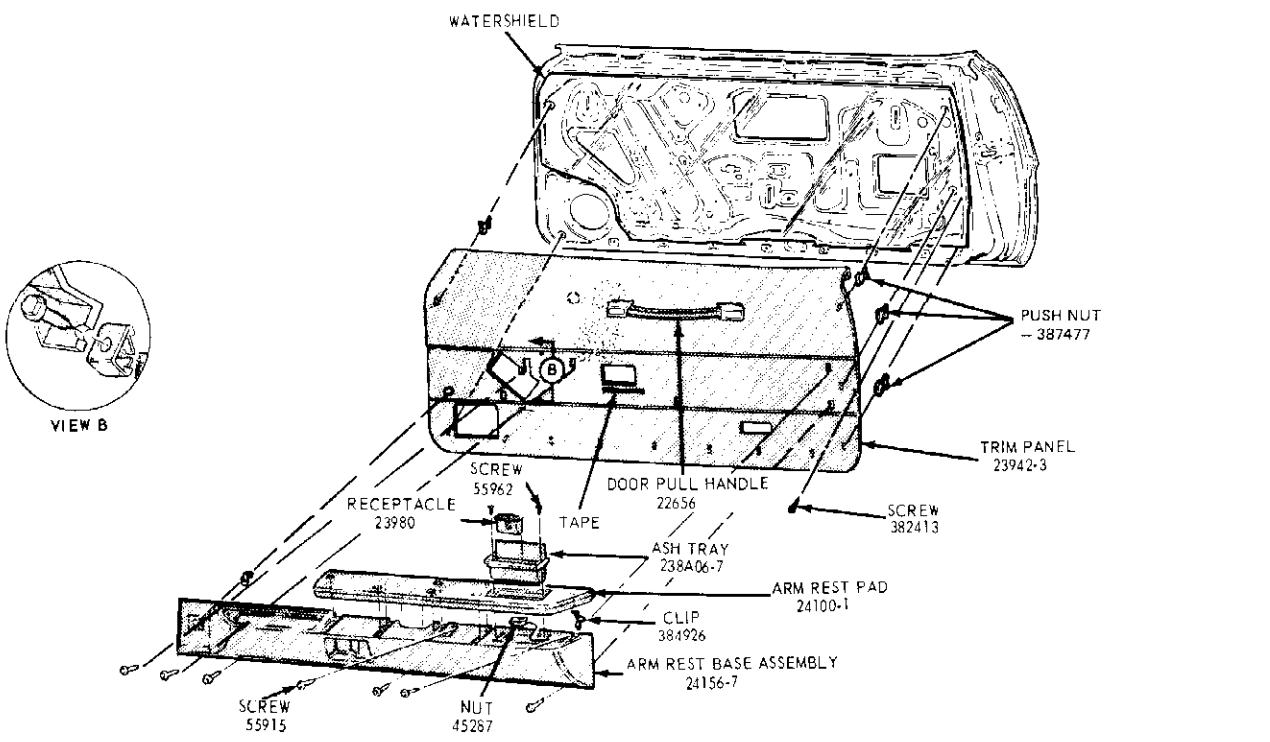


FIG. 6 Door Trim Panel Installation—Continental Mark V

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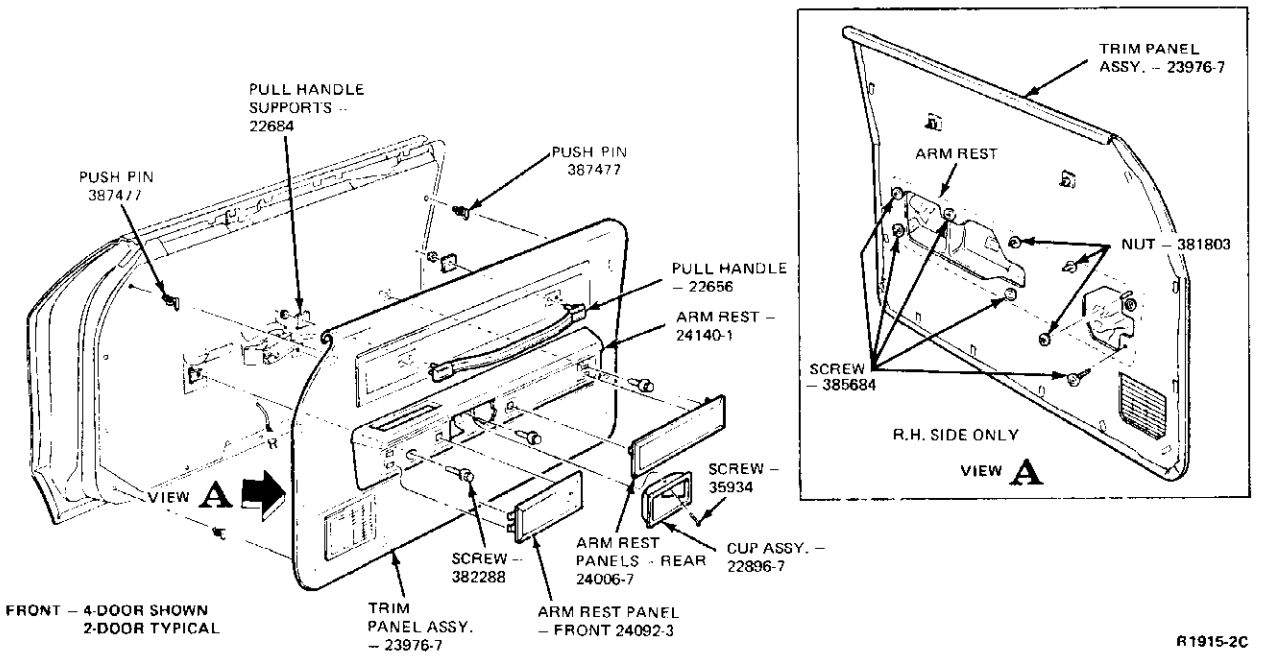


FIG. 7 Door Trim Panel Installation—Lincoln Continental

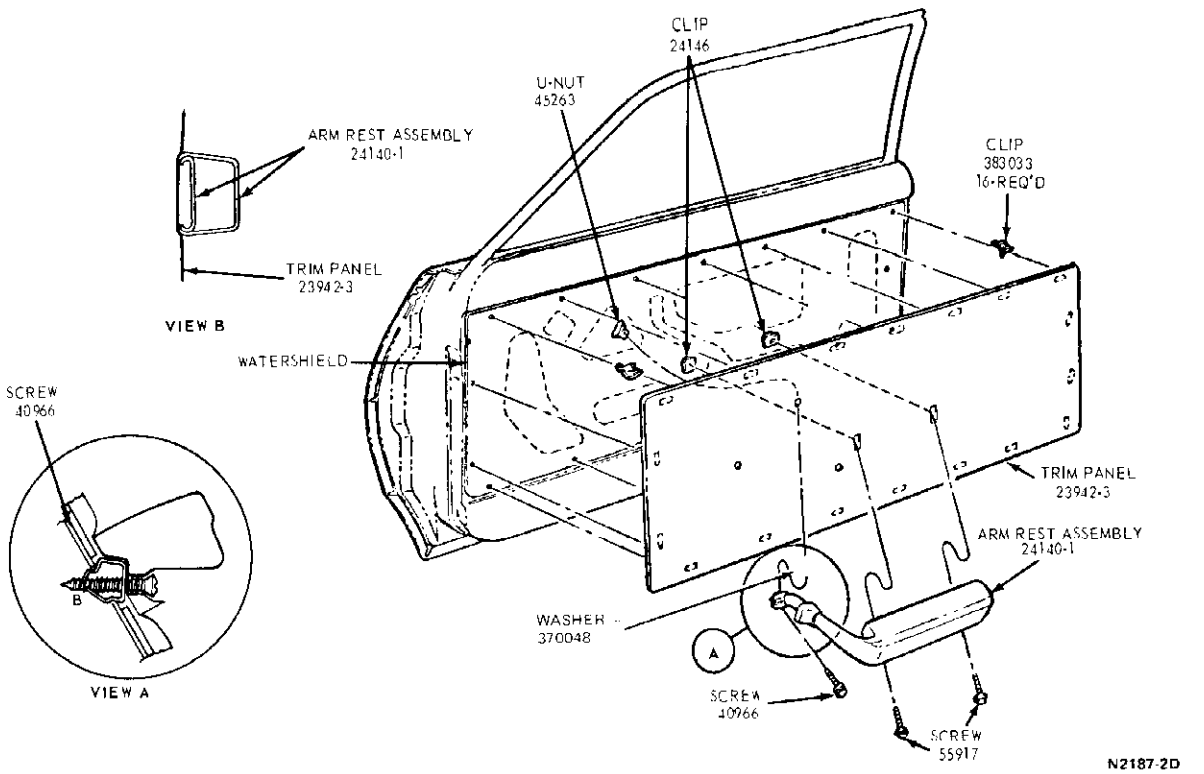


FIG. 8 Door Trim Panel Installation—Pinto and Bobcat

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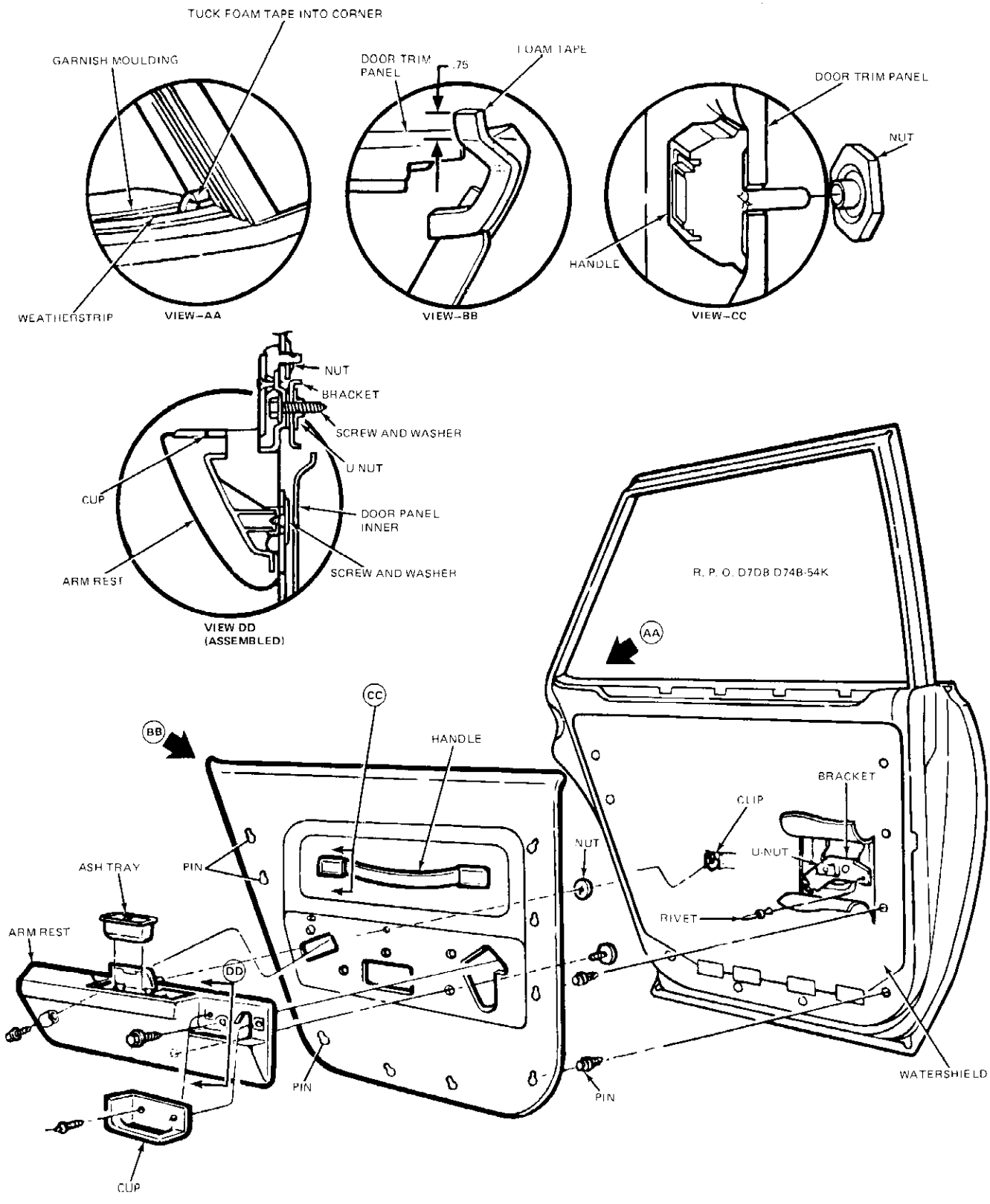


FIG. 9 Door Trim Panel Installation—Granada, Monarch and Versailles

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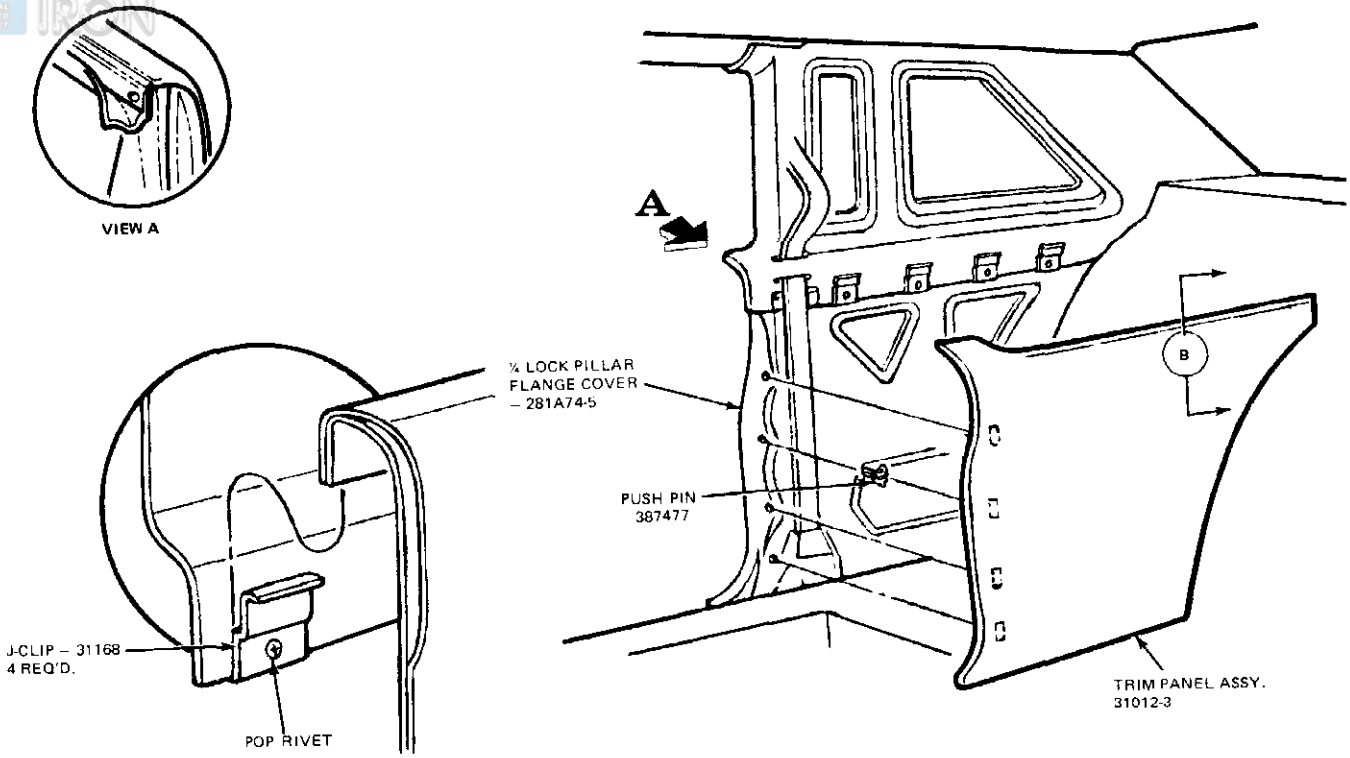


FIG. 10 Quarter Trim Panel Installation—Ford

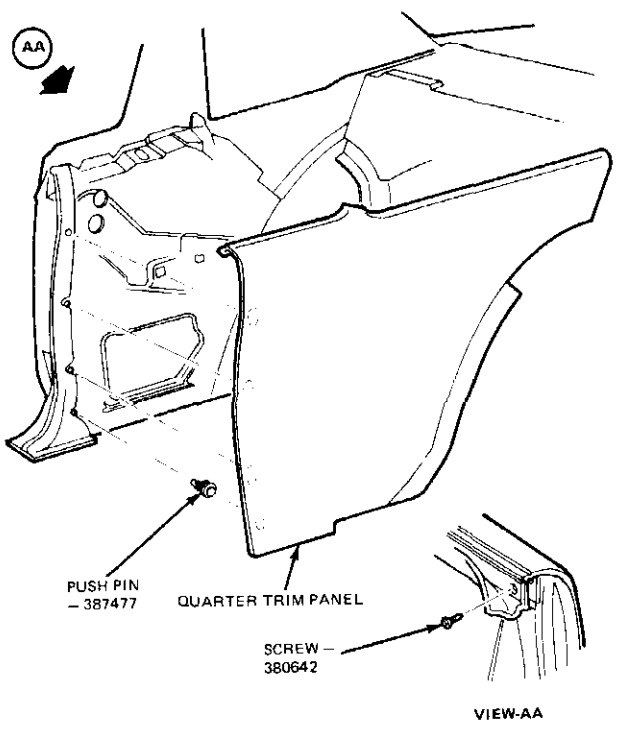


FIG. 11 Quarter Trim Panel Installation—Mercury

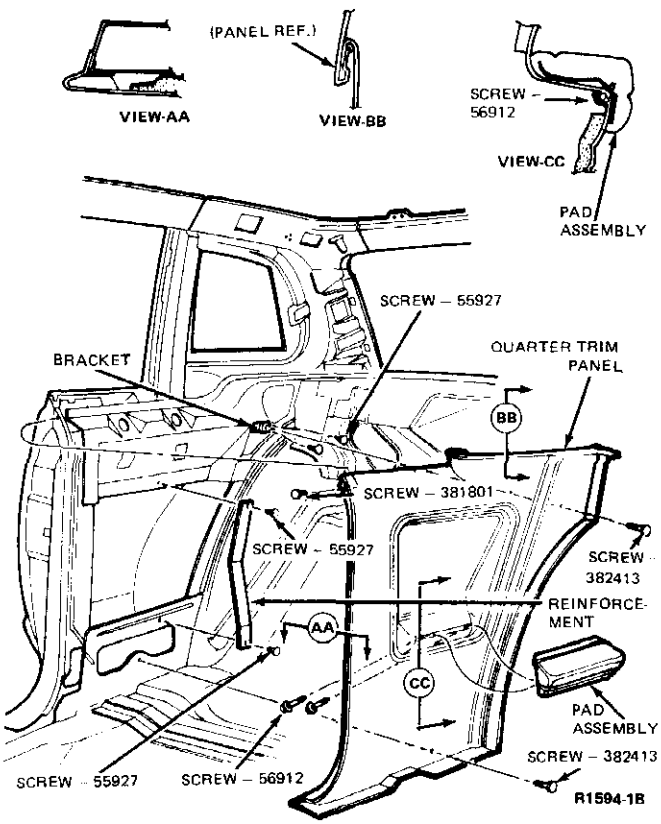


FIG. 12 Quarter Trim Panel Installation—LTD II, Thunderbird and Cougar

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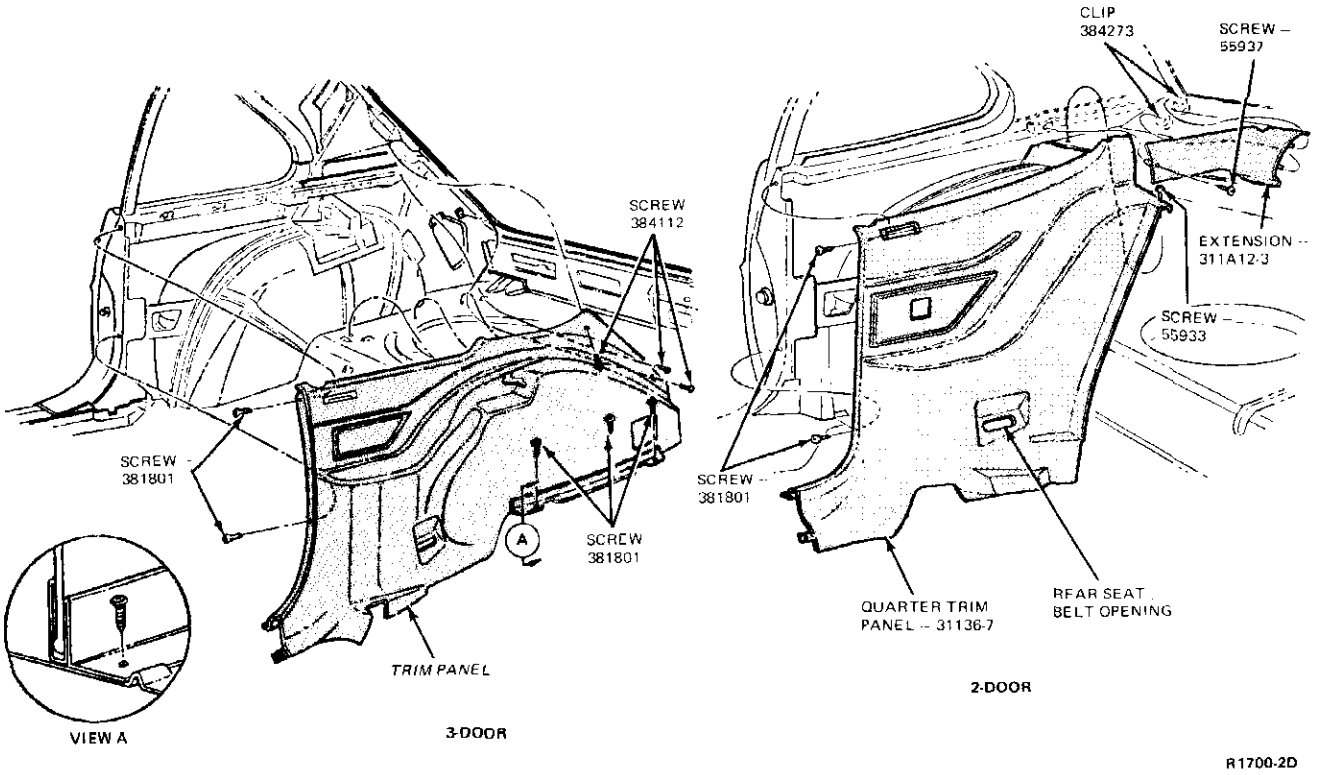


FIG. 13 Quarter Trim Panel Installation—Pinto and Bobcat—Except Station Wagon

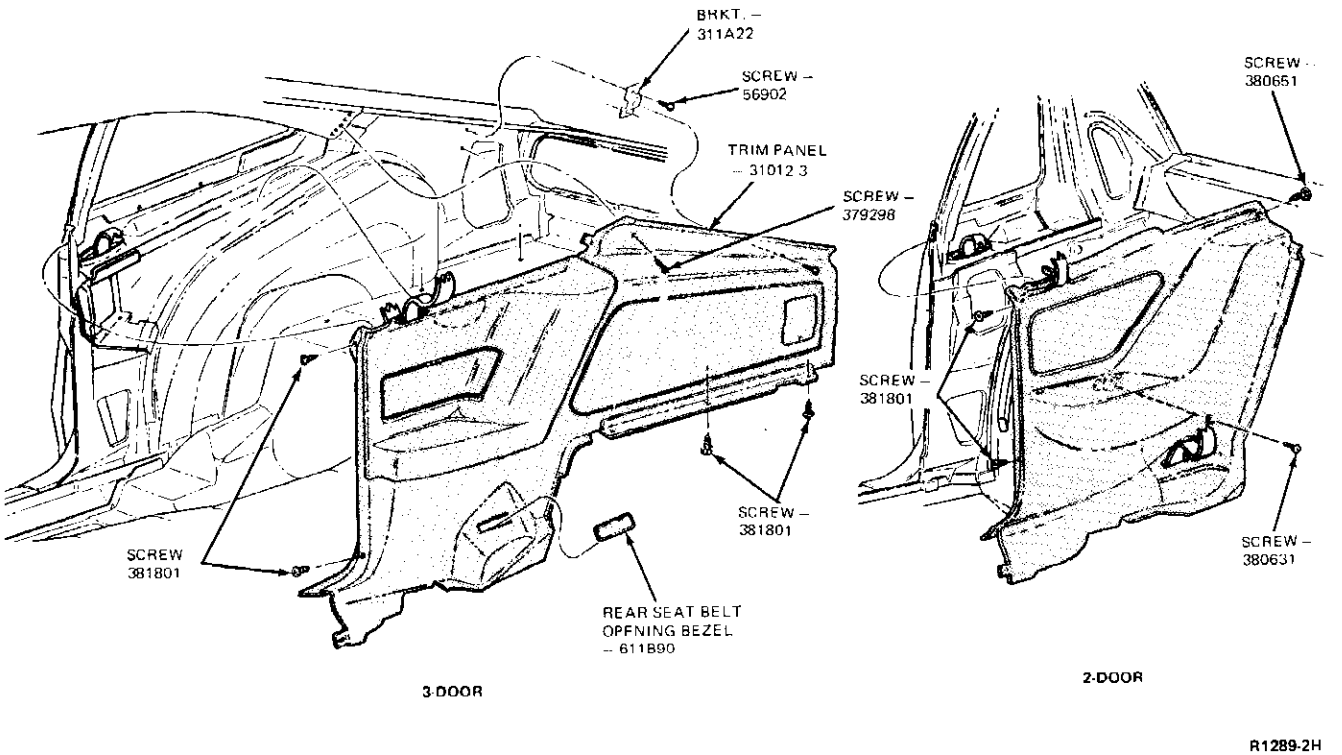


FIG. 14 Quarter Trim Panel Installation—Mustang II

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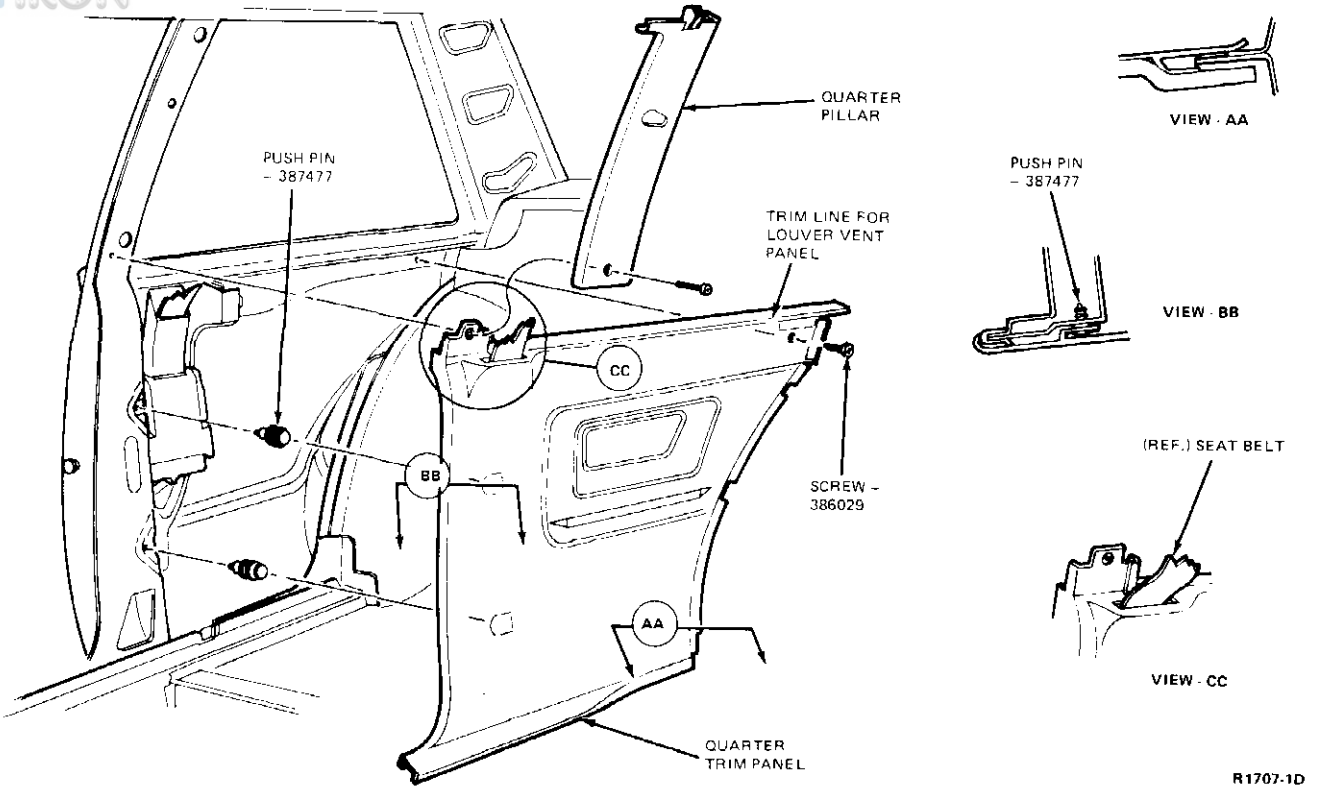


FIG. 15 Quarter Trim Panel Installation—Fairmont and Zephyr

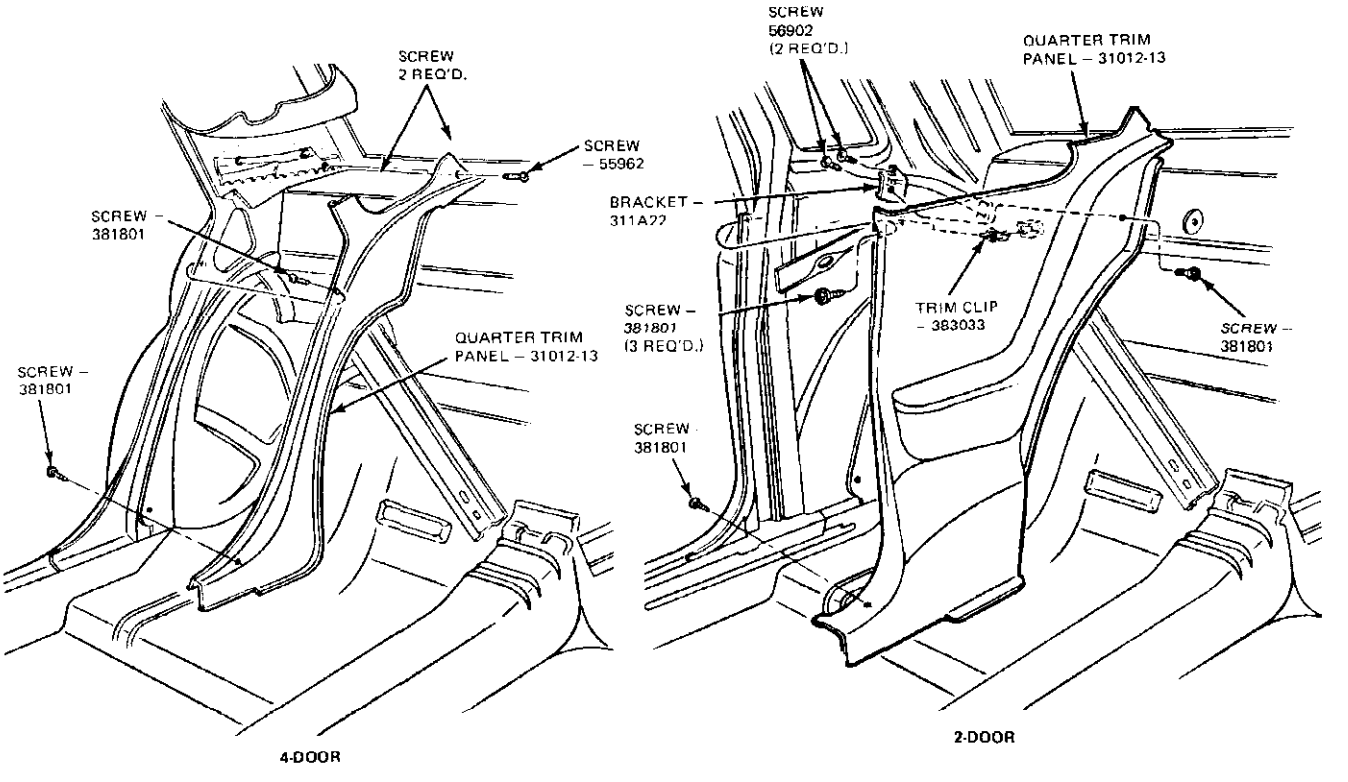


FIG. 16 Quarter Trim Panel Installatiion—Granada, Monarch and Versailles

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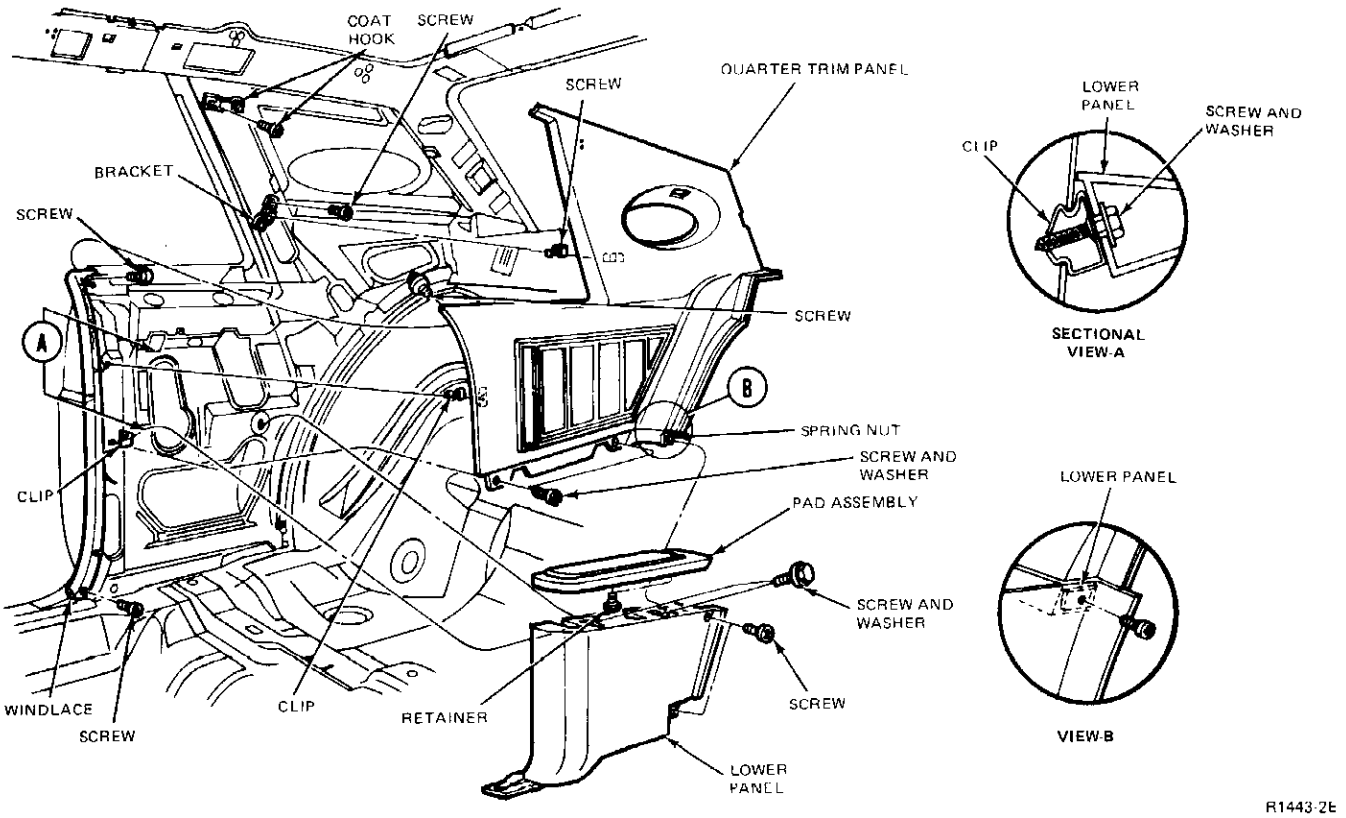


FIG. 17 Quarter Trim Panel and Armrest Installation—Continental Mark V

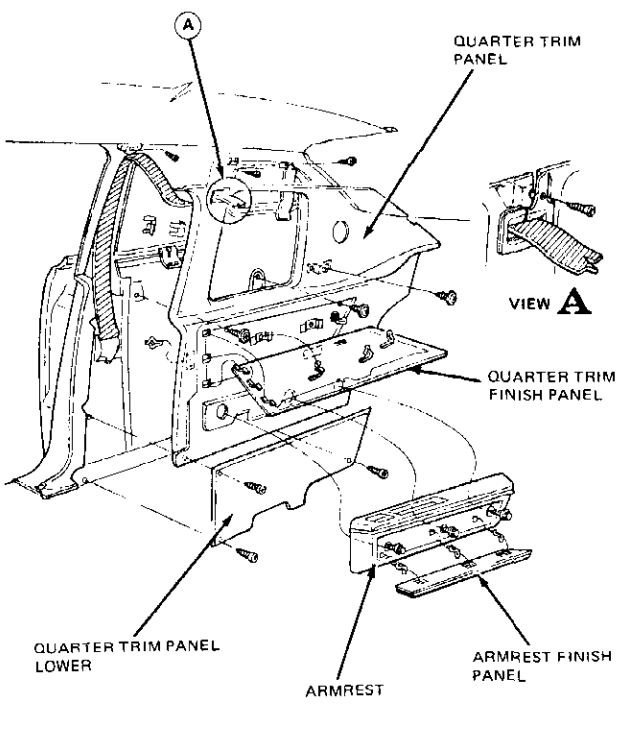


FIG. 18 Quarter Trim Panel Installation—Lincoln Continental 2-Door

NOTE: Take all necessary precautions to protect the quarter trim panel from damage or dirt.

Installation

1. Position the quarter trim panel to the quarter panel and connect the courtesy lamp wiring. Retain with clips and screws.
2. Install coat hook and retain with screw.
3. Install interior backlamp garnish moulding.
4. Install seat cushion and seat back.
5. Install armrest and retain with three screws.
6. Install armrest finish panel.

ROOF SIDE TRIM PANELS

ALL EXCEPT VERSAILLES

Removal

1. Remove rear seat cushion and seat back.
2. Remove quarter trim panel and related parts (moulding, arm rest, trim and retaining screws).
3. **Ford 2-Door only** —Remove screw at seat belt opening and coat hook screw (Fig. 19).
   Continental Mark V only — Remove screw retaining seat belt opening cover (Fig. 19).
   Granada and Monarch 2-Door only —Remove screw at seat belt opening (Fig. 19).
4. Pull roof side trim panel away from body until released by retaining clips.

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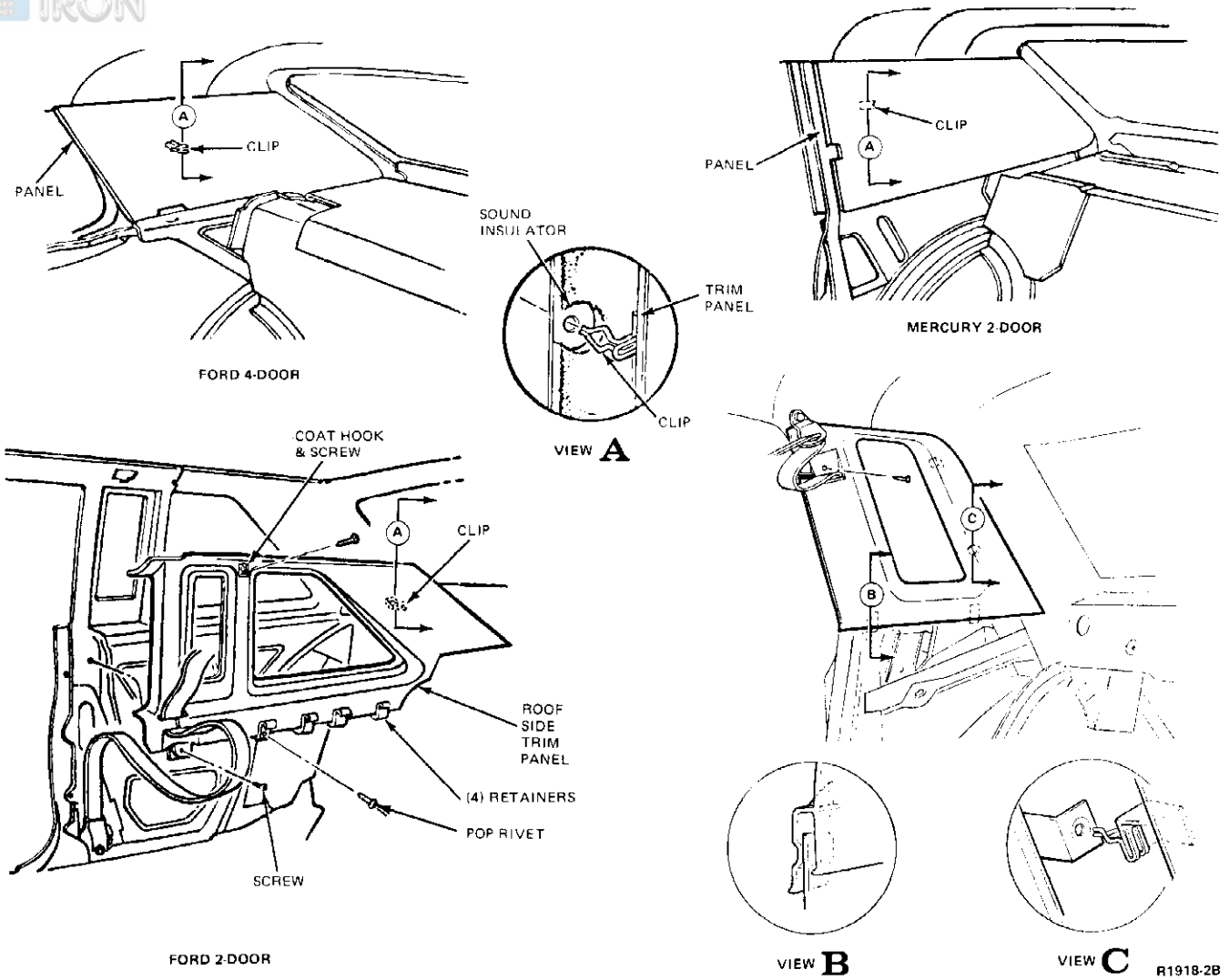


FIG. 19 Roof Side Trim Panels—Typical

5. **Granada and Monarch 2-Door only** — Disconnect seat belt and slip through opening in roof side trim panel. Move trim panel upwards and remove.

   Ford 2-Door only —Slip seat belt through opening in roof side trim panel, then remove panel, after disconnecting courtesy lamp wiring.

Installation

1. **Ford 2-Door only** —Slip seat belt through opening in roof side trim panel. Connect courtesy lamp wiring harness.

   Granada and Monarch 2-Door only —Slip seat belt through opening, then connect seat belt assembly to anchor.
2. Position roof side trim panel and push inward until retained by clips.
3. **Ford 2-Door only** —Install screw at seat belt opening and coat hook.

   Granada and Monarch 2-Door only —Install screw at seat belt opening.
4. Install quarter trim panel and related parts.
5. Install rear seat cushion and seat back.

ROOF SIDE TRIM PANELS

VERSAILLES

Removal

1. Remove rear seat cushion and seat back.
2. Remove the door sill scuff plate retaining screws and remove the scuff plate.
3. Remove the quarter trim panel and lower and center mouldings.
4. Pull the interior backlite upper and side garnish mouldings away from the body until released by retaining clips.
5. Remove the trim panel upper retaining screw (if equipped).
6. Pull the roof side trim panel away from the body until released by the retaining clips.

Installation

1. Position roof side trim panel and push inward until retained by clips.
2. Position the roof side trim panel and install the retaining drive pins.

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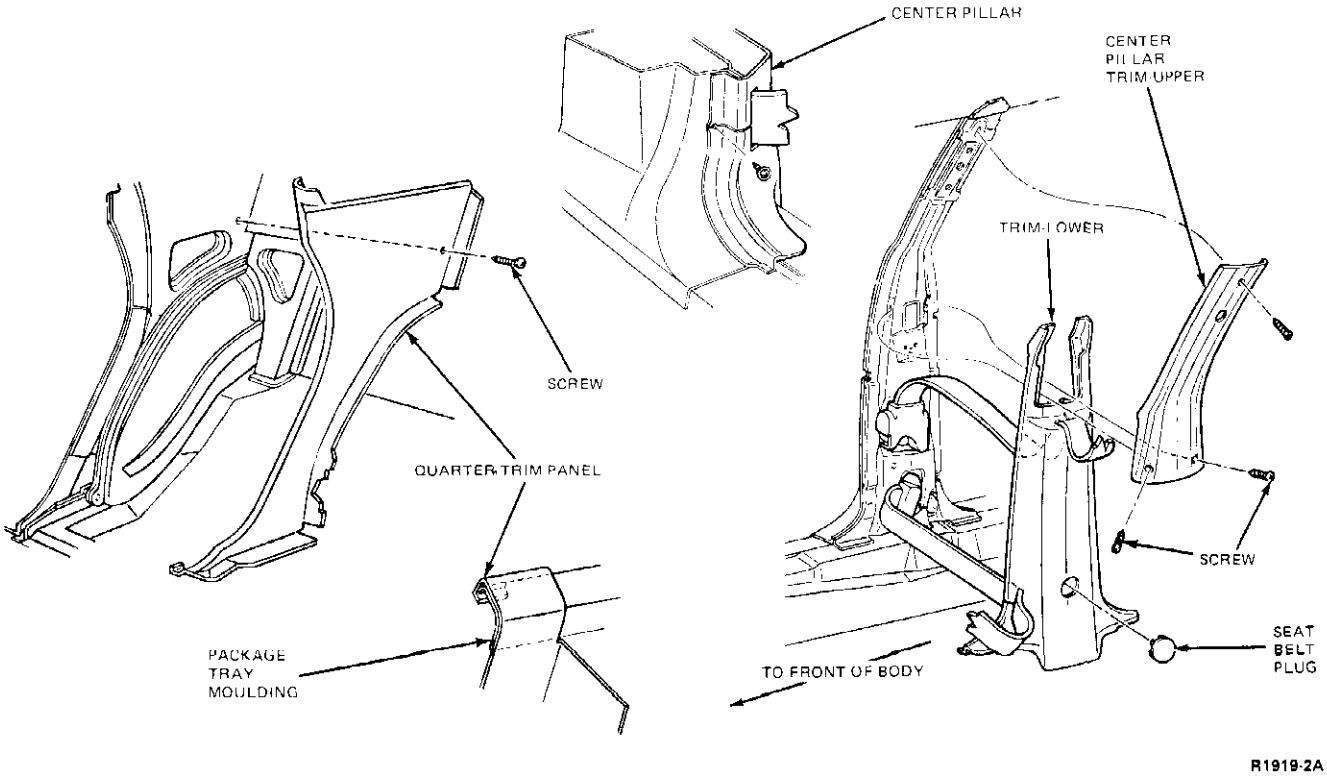


FIG. 20 Typical Center Pillar and Quarter Trim Panel

3. Install the quarter trim panel.
4. Position and install the interior backlite side and upper garnish mouldings.
5. *Install rear seat cushion and seat back.*

CENTER PILLAR AND QUARTER TRIM PANELS—FOUR DOOR MODELS

Before removing the center pillar post trim panel, it may be necessary to remove the shoulder belt upper pivot and the upper garnish moulding (if so equipped). Then, remove the retaining screws, slide the shoulder belt out through the slot, and remove the center pillar trim panel.

Before removing the rear quarter trim panel assembly, remove the rear seat cushion and back assembly (Group 41). Remove the retaining screw(s), unthread the seat belt and bezel from the trim panel, and remove the trim panel (Fig. 20).

QUARTER TRIM PANEL—STATION WAGON

Removal

1. Remove the rear door sill scuff plate.
2. On Pinto and Bobcat, remove the seat belt retractors from the door sill.
3. Fold the rear seat to the cargo (down) position.
4. Remove the quarter window lower moulding, if so equipped.
5. Remove the trim panel attaching screws (Figs. 21 and 22).
6. Remove the trim panel from the installed position. On Pinto and Bobcat, remove the bezel and seat belt from the trim panel.
7. Remove the trim panel from the vehicle.

Installation

1. Position the trim panel in the vehicle and insert the seat belt through the trim panel on Pinto and Bobcat models. Install the seat belt bezel.
2. Install the trim panel attaching screws (Figs. 21 and 22).
3. Install the quarter window mouldings, if so equipped.
4. On Pinto and Bobcat, install the seat belt retractors in the door sill.
5. Install the rear door sill scuff plate.

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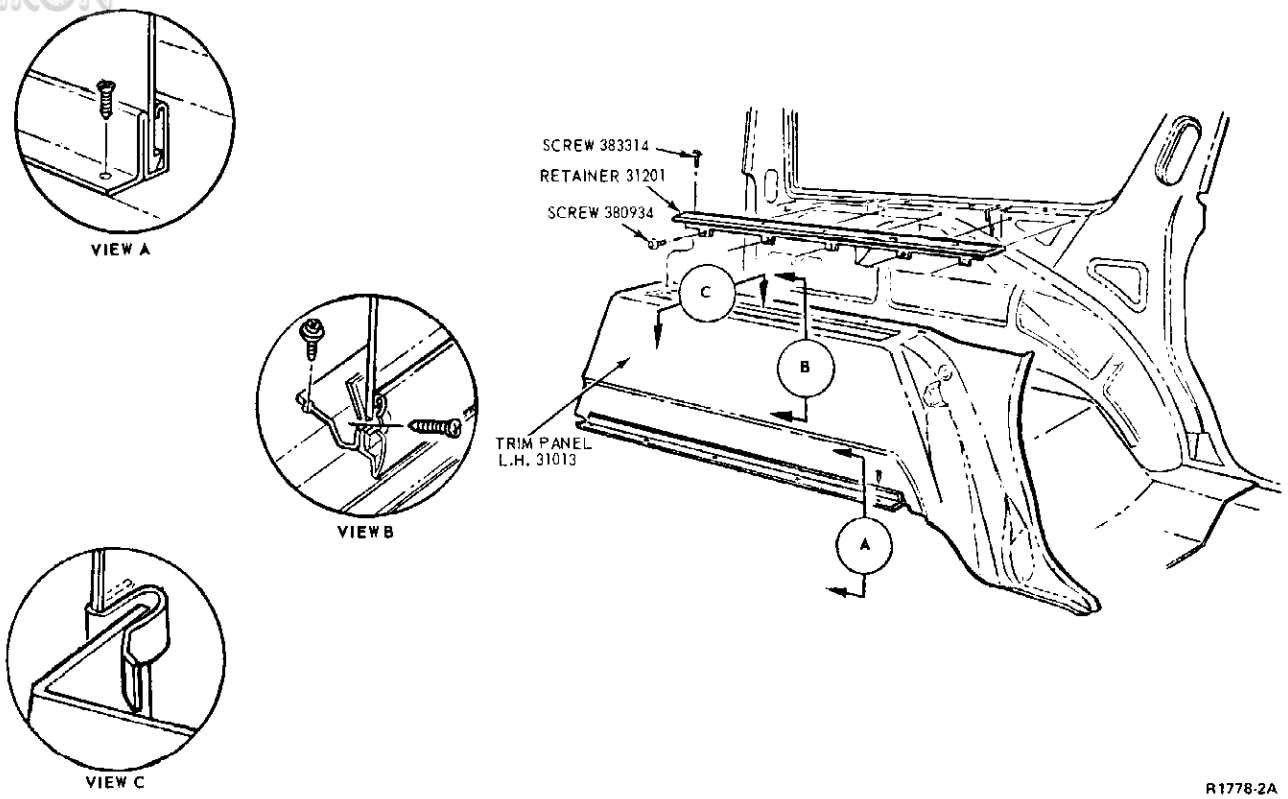


FIG. 21 Typical Station Wagon Quarter Trim Panel

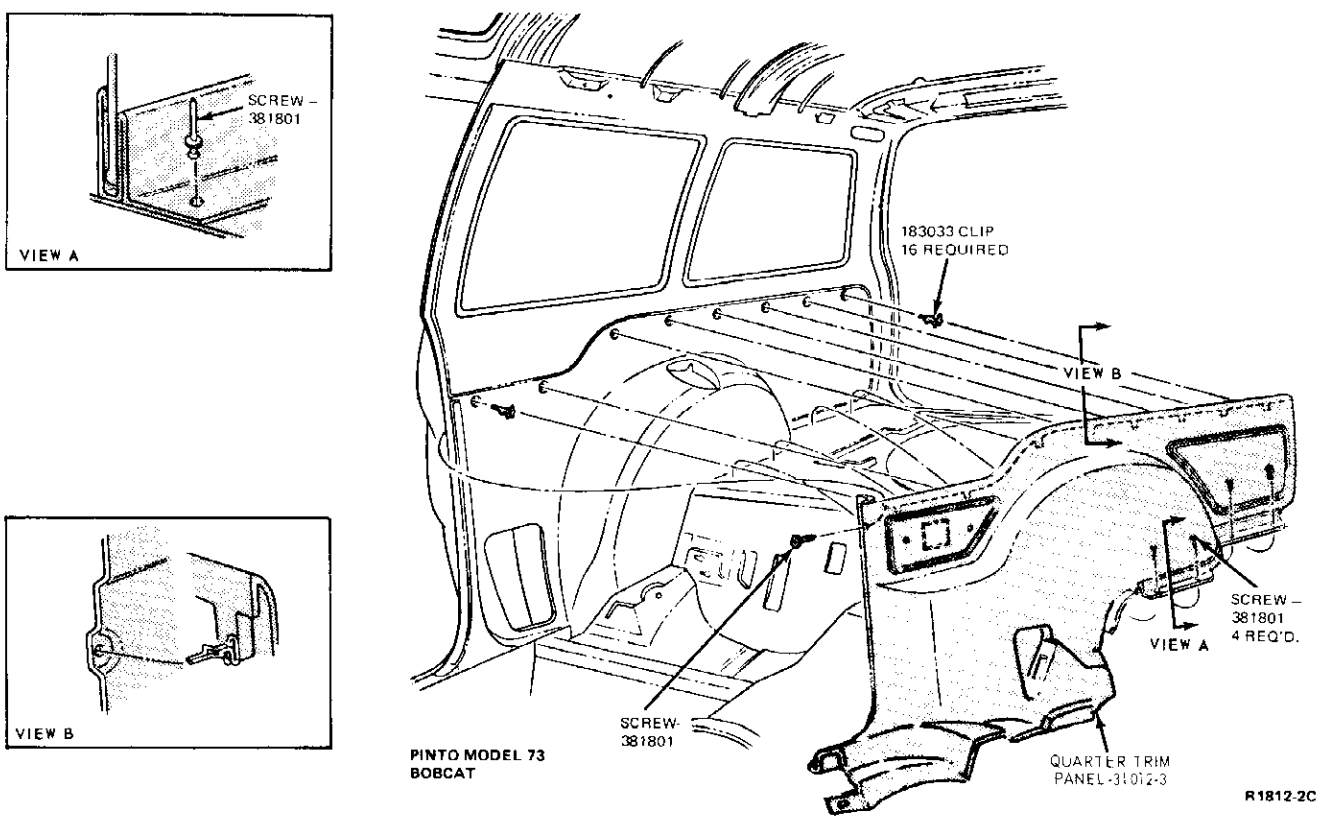


FIG. 22 Quarter Trim Panel Installation—Pinto and Bobcat Station Wagon

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Mouldings

PART 45-16

GENERAL INFORMATION

The installation of interior mouldings are shown in Figs. 1 through 4. In most instances, one moulding overlaps another moulding. If this condition is found, it will be necessary to loosen or remove the overlapping moulding before removal of the desired moulding.

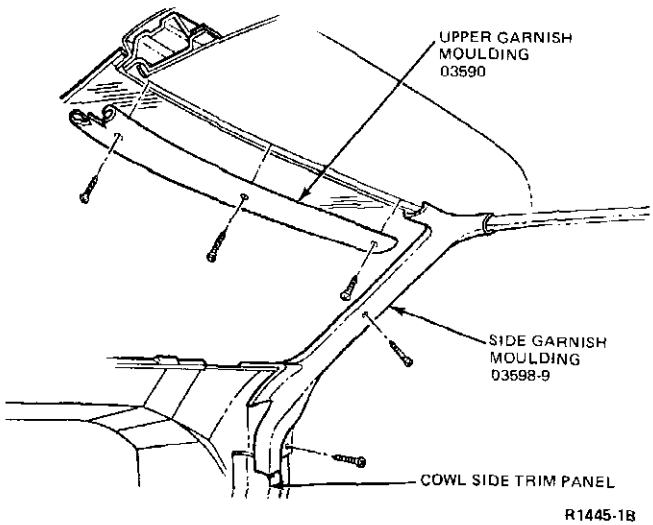


FIG. 1 Typical Windshield Garnish Moulding Installation—Continental Mark V

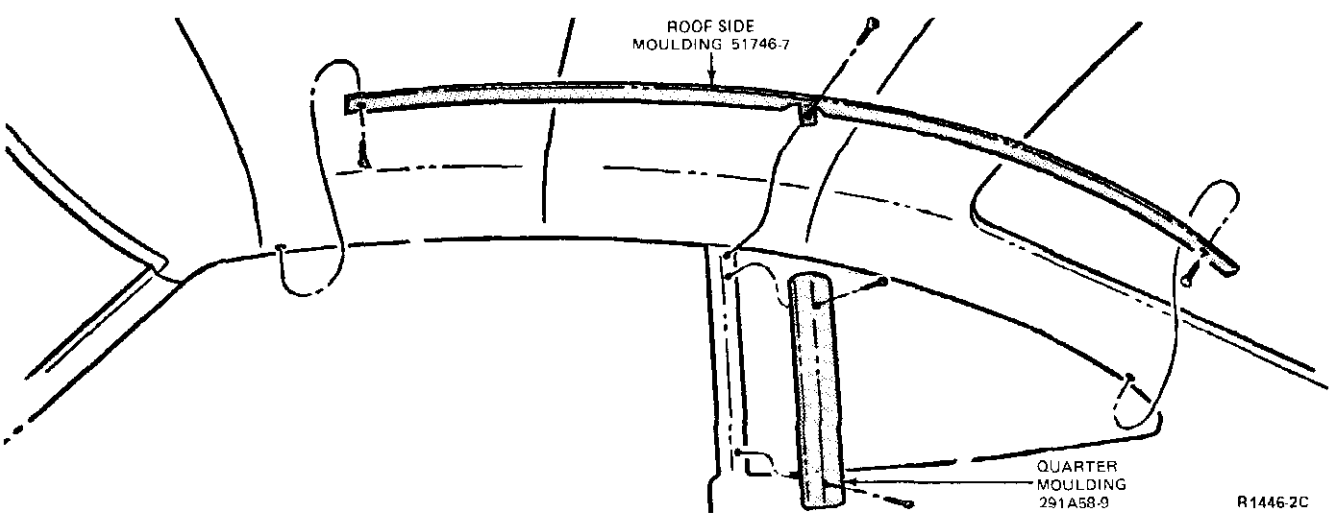


FIG. 2 Typical Roof Side Interior Moulding Installation—Mustang II

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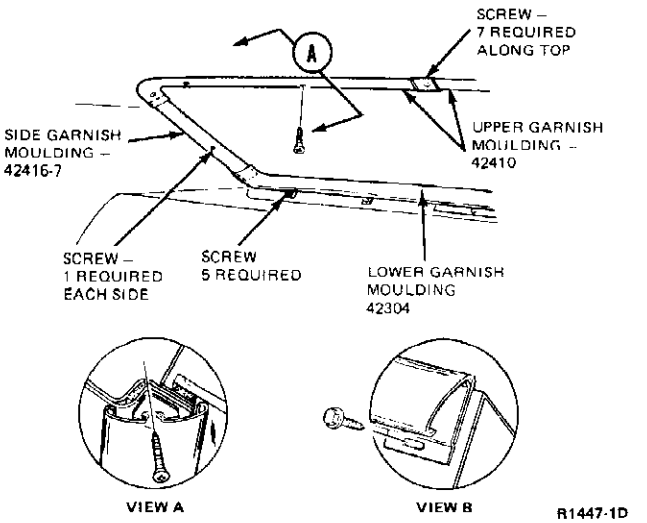


FIG. 3 Typical Back Window Garnish Moulding Installation—Continental Mark V

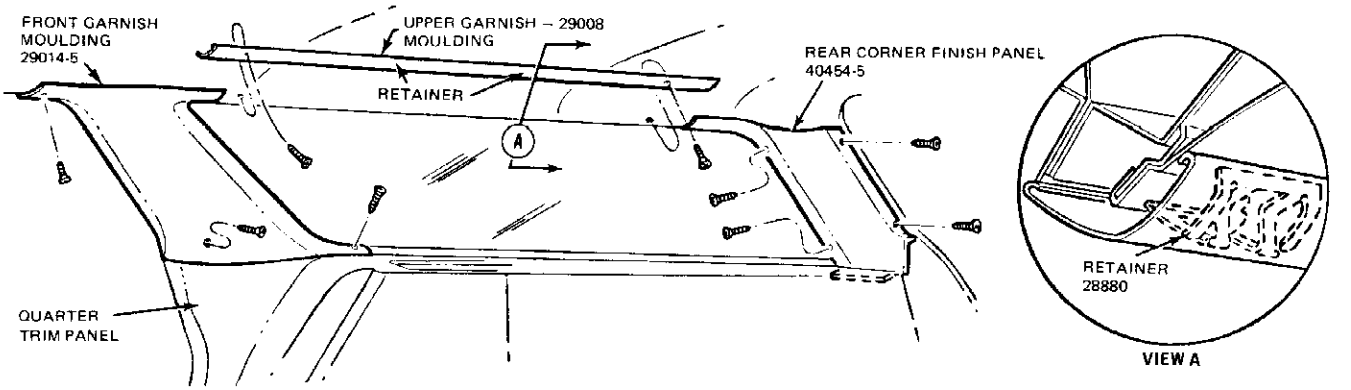


FIG. 4 Typical Quarter Window Mouldings—Model 71—LTD II Shown

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Rear Package Tray

PART 45-21

REMOVAL AND INSTALLATION

PACKAGE TRAY-TRIM PANEL

Removal of the rear seat cushion and rear seat back assembly is necessary on all models for replacement of the package tray trim panel. See Group 41 for rear seat cushion and seat back removal and installation procedures. On some models it will be necessary to remove the quarter trim panel extension assemblies. See Figs. 1 through 6.

1. Remove the back window mouldings and defogger and speaker grille (if so equipped).
2. Remove the trim panel retaining screws.
3. Pull the trim panel forward and slightly upward and remove it from the package tray.
4. If a new trim panel is being replaced, transfer the defogger and radio speaker grille to the new panel if required.
5. Position the trim panel to the package tray and install the retaining screws at the back panel.

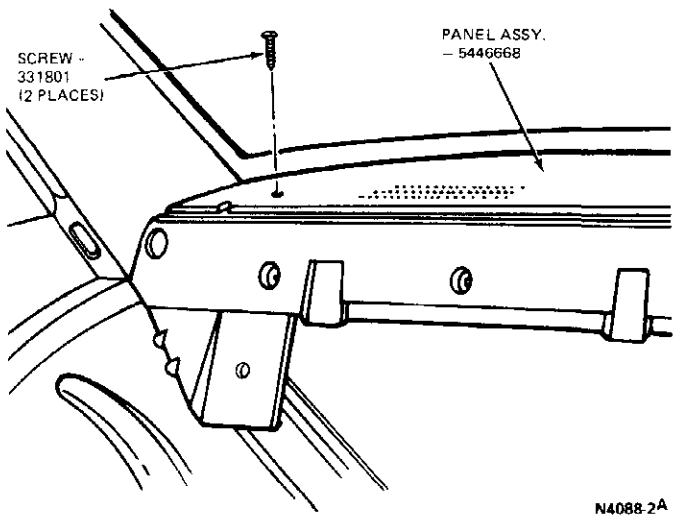


FIG. 1 Package Tray Trim Panel—Versailles

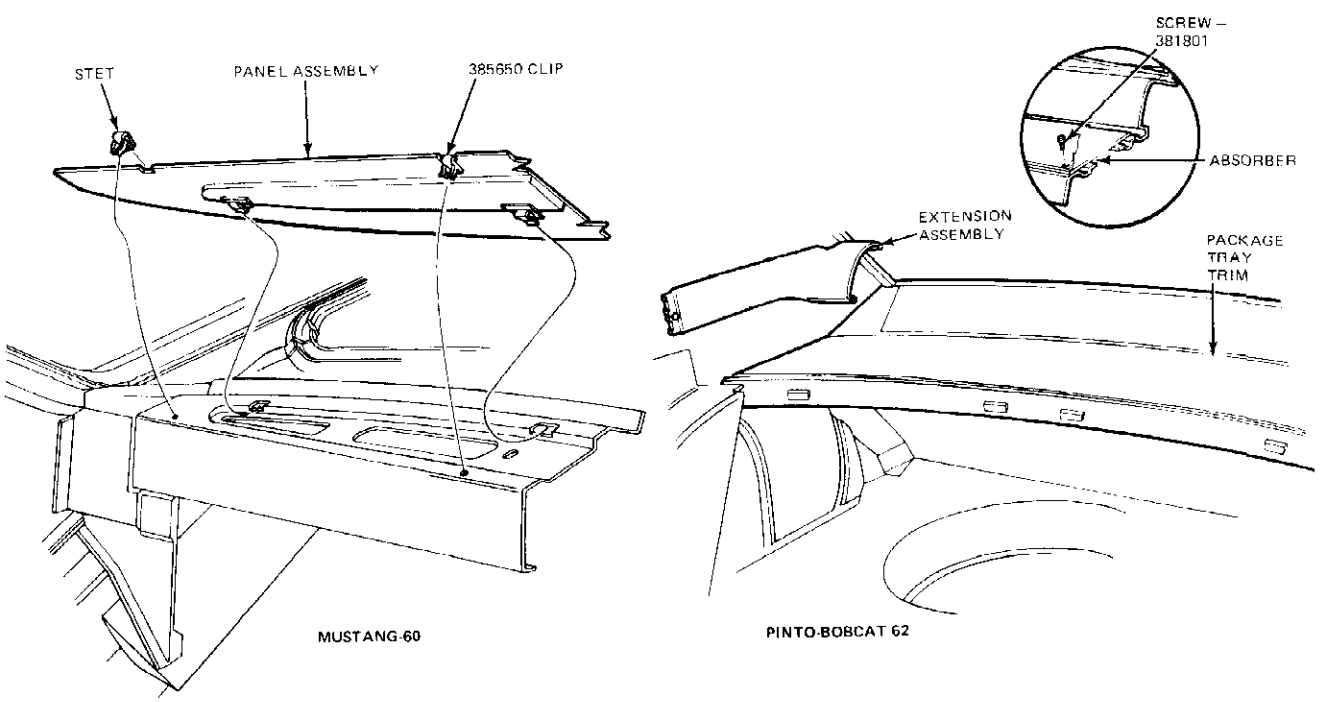


FIG. 2 Package Tray Trim Panel—Pinto, Bobcat, and Mustang II

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6. On units without a backlamp garnish moulding, ensure the three retainer clips mounted on the trim panel engage the hole in the sheet metal package tray. Press downward on the front edge of the trim panel to ensure clip engagement.
7. Install the back window garnish mouldings (if so equipped).
8. Install the quarter trim panel extension assemblies (if so equipped).
9. Install the defogger and radio speaker grille retaining nuts (if so equipped).
10. Install the rear seat back and cushion assembly.

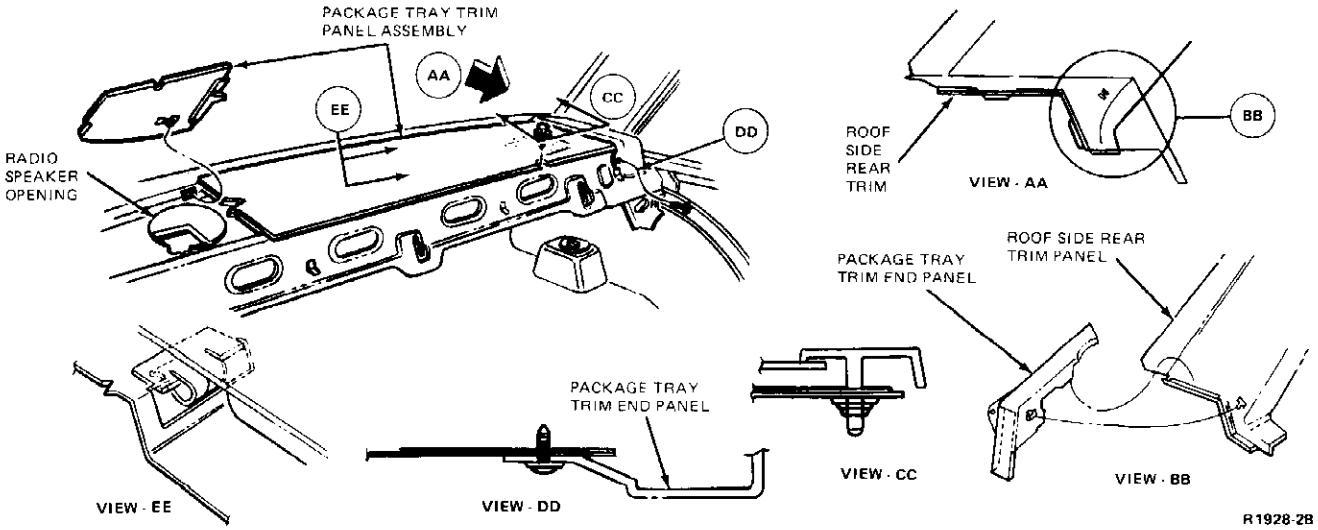


FIG. 3 Package Tray Trim Panel—Fairmont and Zephyr

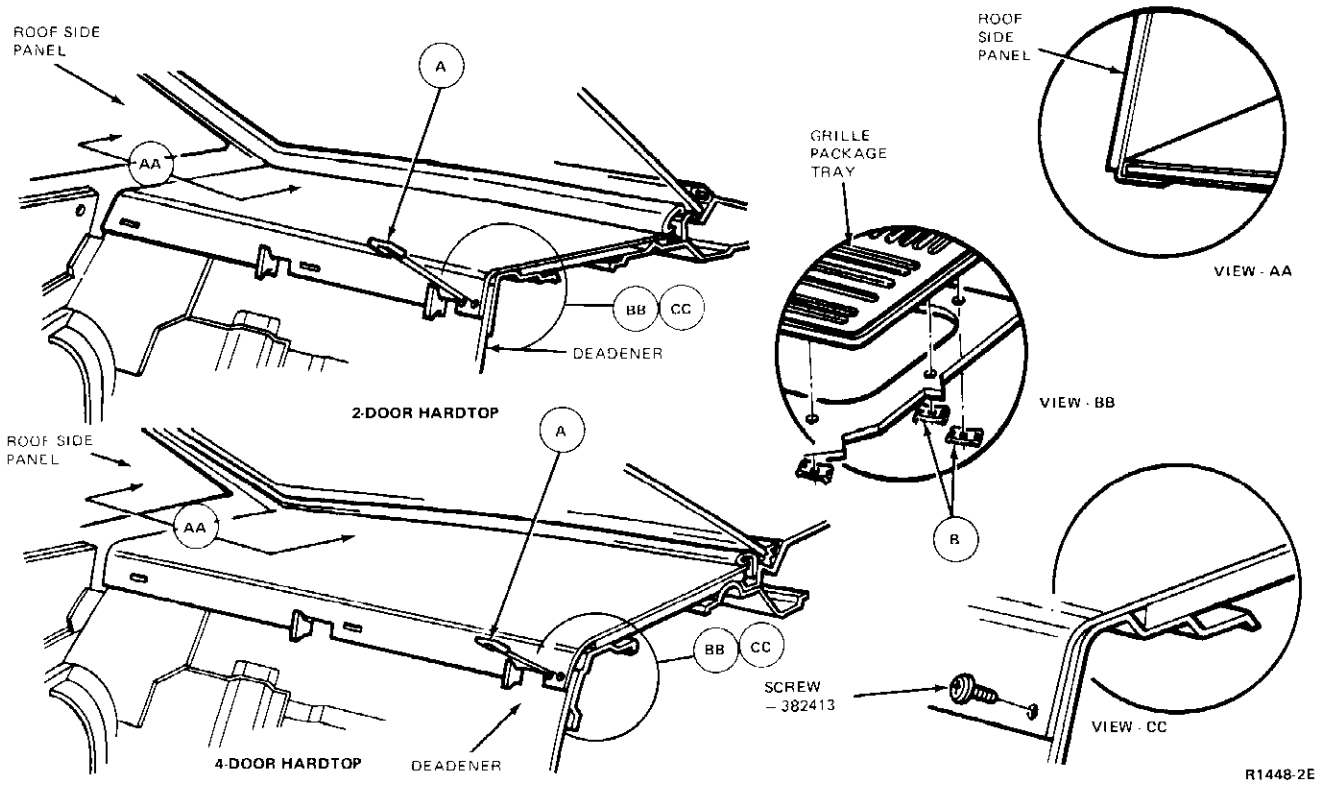


FIG. 4 Package Tray Trim Panel—Ford and Mercury

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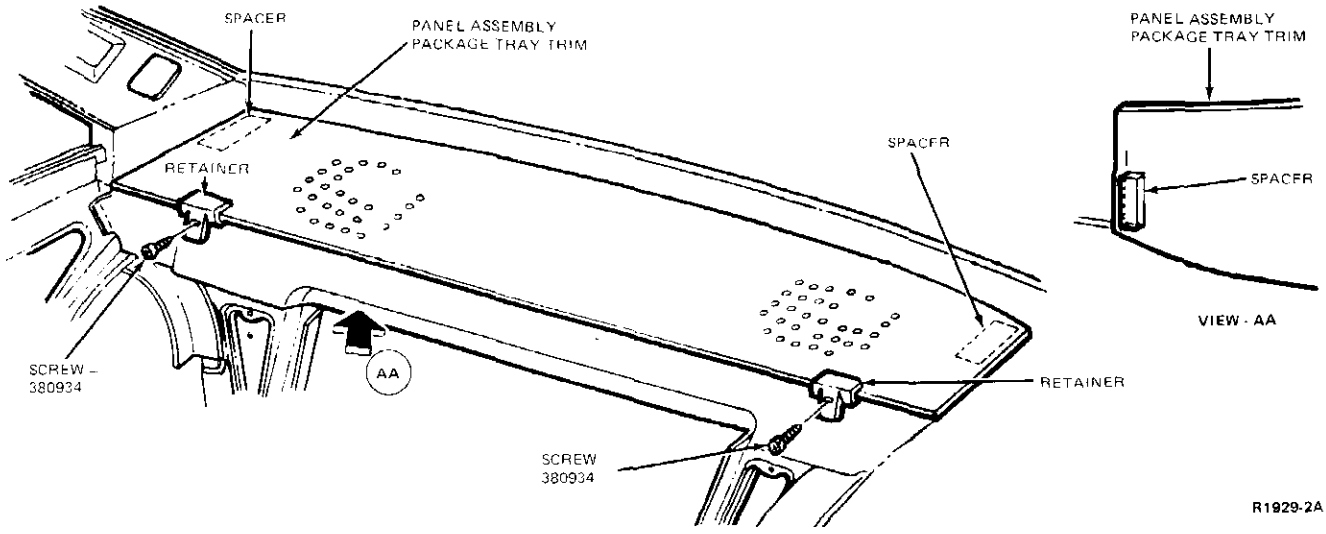


FIG. 5 Package Tray Trim Panel—Lincoln Continental and Continental Mark V

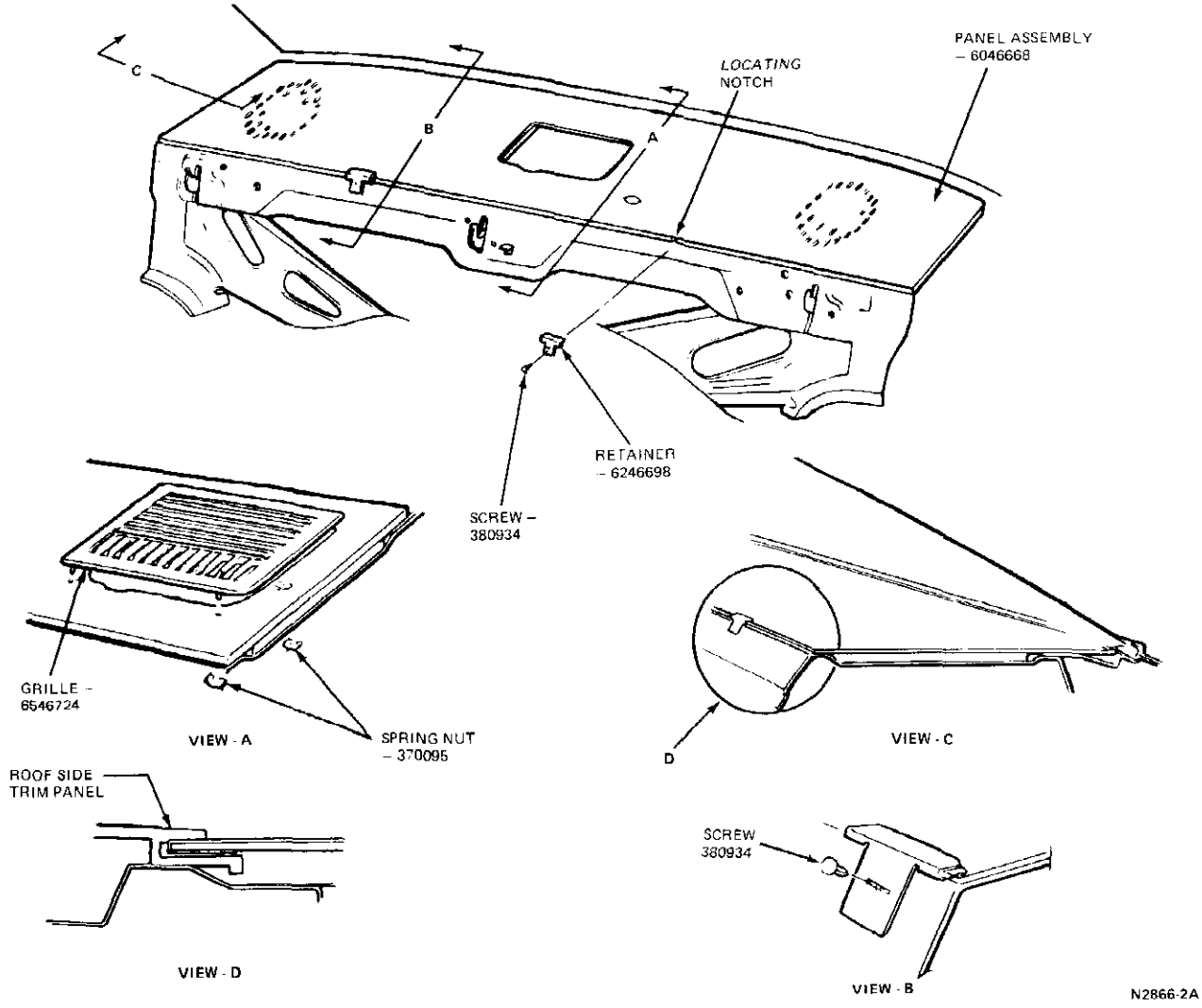


FIG. 6 Package Tray—LTD II, Cougar and Thunderbird

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DETROIT IRON

Carpets and Floor Mats

PART 45-26

REMOVAL AND INSTALLATION

FRONT AND REAR (ONE-PIECE)

On vehicles equipped with a floor-shift transmission, remove the console (see Part 45-31), shift quadrant or shifter bezel. On Pinto, Bobcat and Mustang II models, it is also necessary to remove the parking brake bezels and shakebrace.

Remove the front seat(s) and seat tracks, rear seat cushion, seat belts and outboard retractors, cowl trim panels, "B" pillar trim panels, quarter trim panels and door sill scuff plates. Remove all carpet retaining screws and remove the carpet from the vehicle.

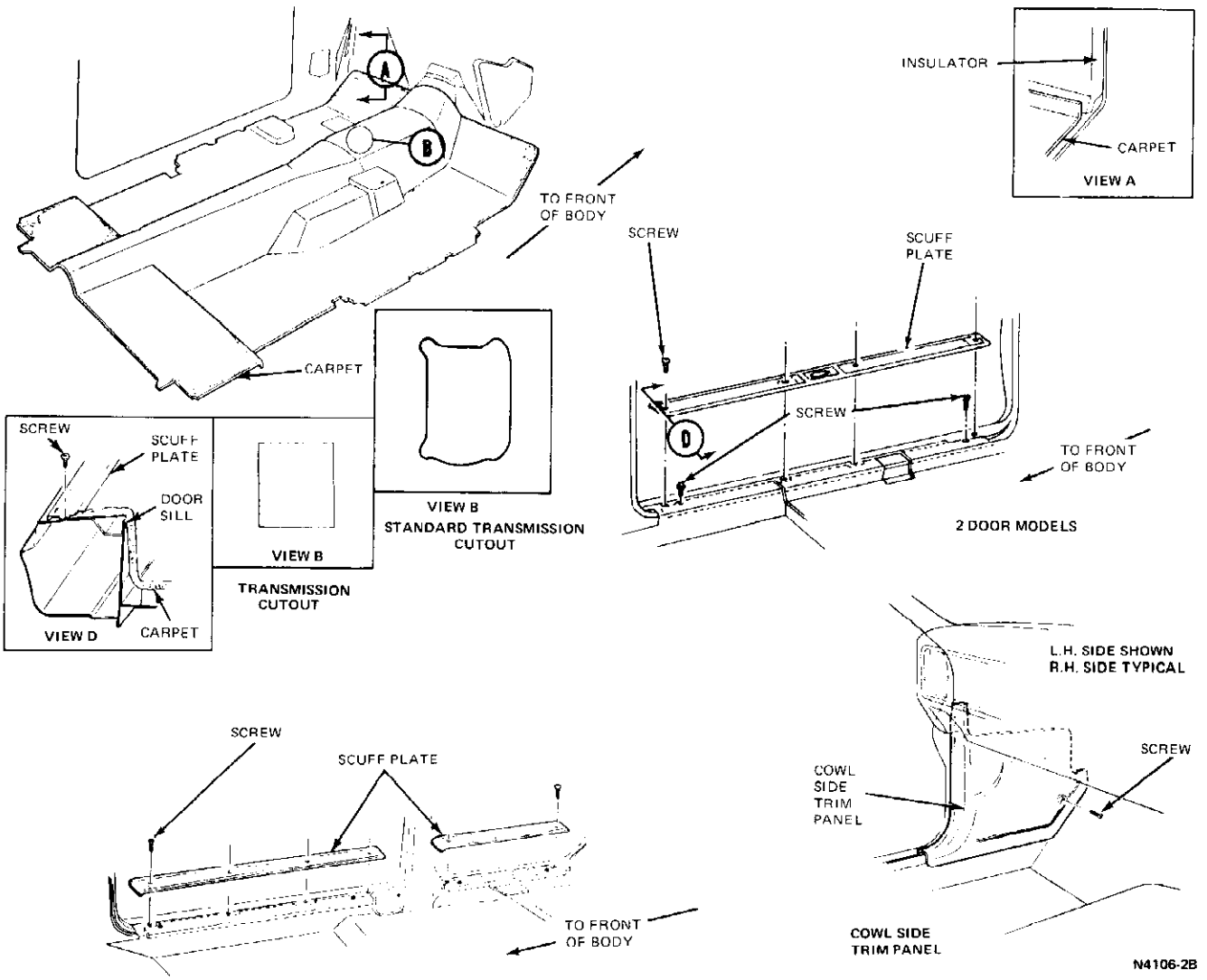


FIG. 1 One-Piece Carpet Installation—Versailles—Other Models Similar

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DETROIT IRON

Floor Console

PART 45-31

REMOVAL AND INSTALLATION

Removal

Open the console glove box door and remove the retaining screws from the bottom of the glove box and the top finish panels (except the gear shift opening panel of Mustang II models Fig. 3). From the console assembly, disconnect all wire connections and remove the console assembly from Cougar XR7, LTD II, Thunderbird, Granada, Monarch, Versailles and Mustang II models (Figs. 1, 3 and 4). On Pinto and Bobcat models (Fig. 2) remove the attaching screws and remove the console. On the Granada, Monarch and Versailles also remove the screws from the forward stowage area (Fig. 4).

Installation

Connect all wires, position the console and install all the retaining screws at the bottom of the glove box (forward stowage area on Granada, Monarch and Versailles) and the top finish panel.

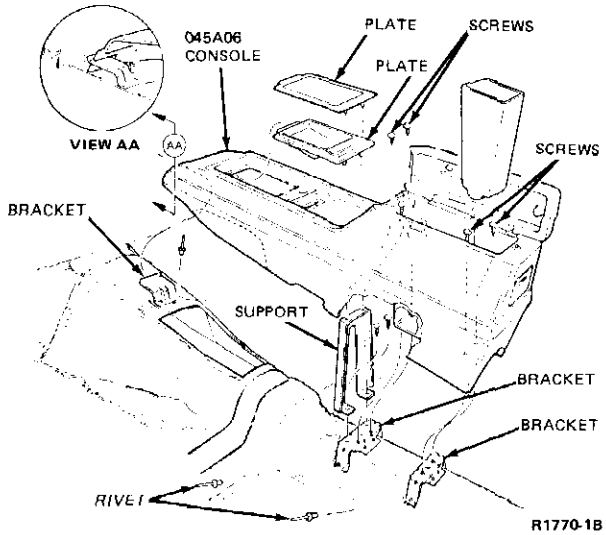


FIG. 1 Floor Console Installation—Cougar XR7, LTD II and Thunderbird

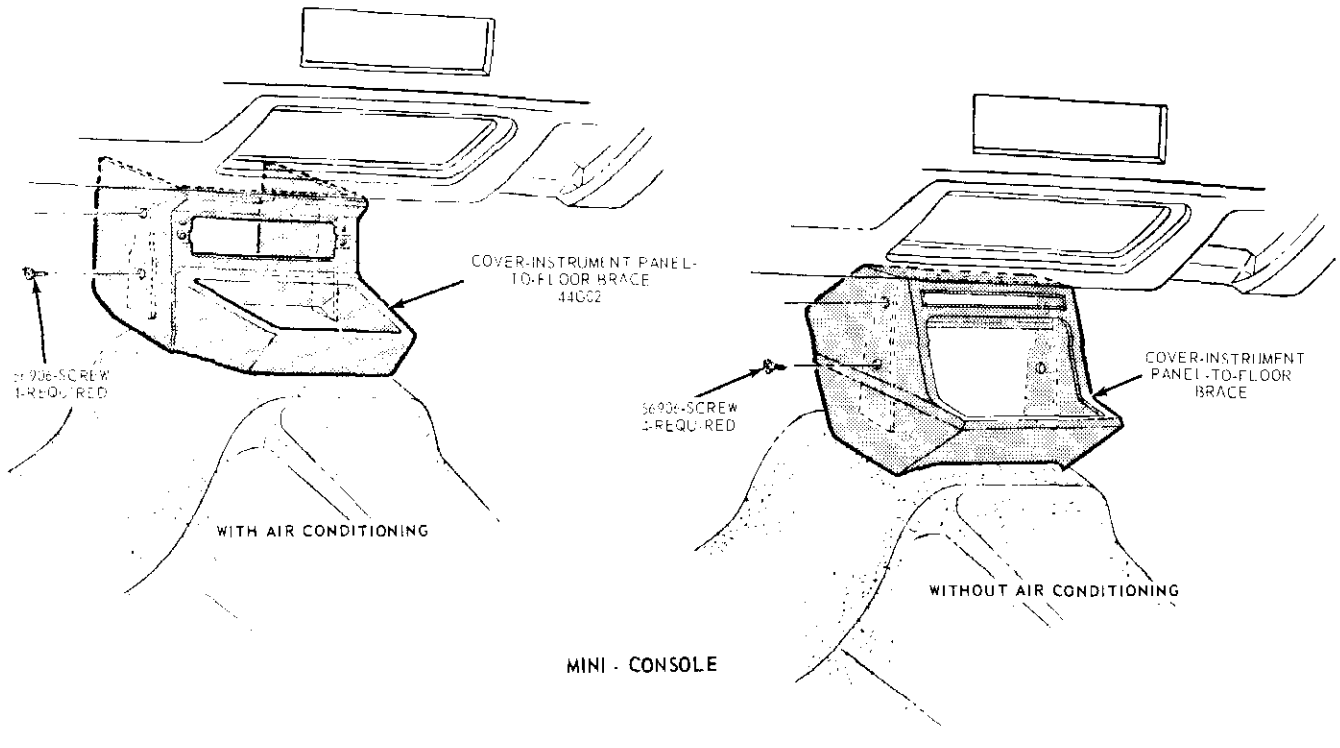


FIG. 2 Floor Console (Mini) Installation—Pinto and Bobcat

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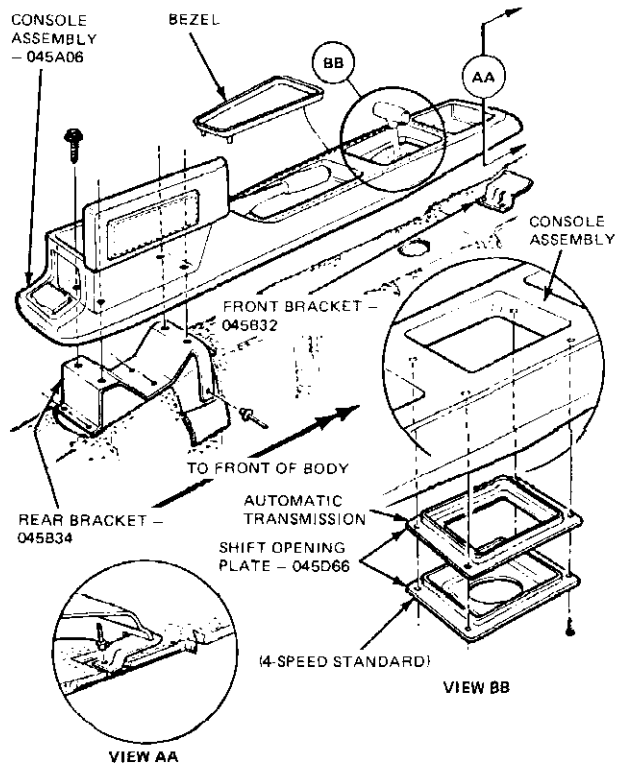


FIG. 3 Floor Console Installation—Mustang II

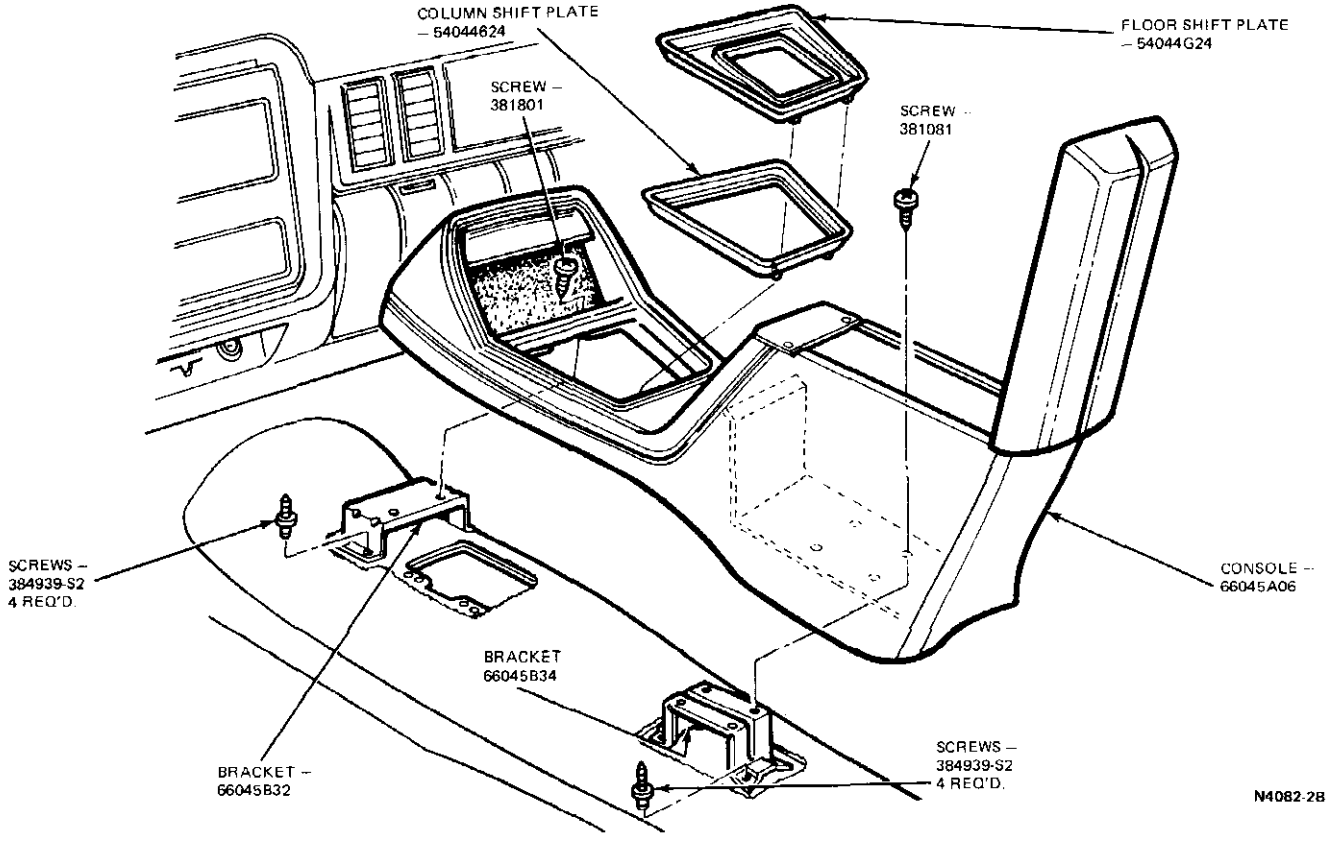


FIG. 4 Floor Console Installation—Granada, Monarch and Versailles

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DETROIT IRON

Headlining

PART 45-41

SUBJECT	PAGE
ADJUSTMENTS	
Sun Visor – Without Lamp	41-1
Sun Visor – With Lamp	41-1
REMOVAL AND INSTALLATION	41-1
GARAGE DOOR OPENER	41-19

CR2047-2B

ADJUSTMENTS

SUN VISOR—WITHOUT LAMP

Occasionally a sun visor will not stay in engagement with the retaining clip at the center of the windshield. This could be caused by the rod at the end of the visor being too far in or out. Outboard edge of rubber tip should be flush with center clip (outer walls). Work the visor in or out for proper engagement. If the rod length is OK, the rubber tip on the end may be worn.

SUN VISOR—WITH LAMP

If the visor will not stay engaged in the retaining clip at the center of the windshield, loosen the visor retaining screw (near the elbow) and shift the visor sideways into proper position.

Tighten the visor retaining screw snug enough to hold the visor in the "up" position, but loose enough to allow the visor to be rotated up and down on the pivot shaft.

REMOVAL AND INSTALLATION

HEADLINING

Sedans and Hardtops—Except Versailles, Fairmont, Zephyr, Thunderbird and Continental Mark V

The following headlining removal and installation procedures generally apply to all models. If some of the steps do not apply to the particular model being serviced, proceed to the next step.

The Pinto and Bobcat require windshield and back window glass removal for headlining installation. See Group 43. Refer to the appropriate Figs. 1 through 29.

Removal

1. Remove the sun visor and bracket assemblies.
2. Remove the windshield upper garnish moulding. Remove the upper screw from the two windshield side garnish mouldings and position the mouldings away from the windshield A pillar.
3. Remove the shoulder belt assemblies, shoulder belt retainers and coat hooks.
4. Remove the roof side and center garnish mouldings. On all 4-door sedans, first remove the center cap from the junction of the front and rear side mouldings at the center pillar. On some 4-doors, there is also a joint cover at the rear quarter. On 2-door hardtops, there is one joint cover at the rear quarter.
5. Remove the rear seat cushion and back assembly (Group 41).
6. Remove the right and left quarter trim panels (Group 45).
7. Remove the roof side rear trim covers (right and left).
8. Remove the back window garnish mouldings and remove the package tray (Group 45).
9. Unhook the headlining from the tabs.
10. Remove the dome lamp and upper rear quarter lamps. Pry off lens and remove the attaching screws.
11. Remove the staples that fasten the headlining to the roof side retainer assemblies (Pinto Station Wagon Only).
12. Pull the headlining loose from all cemented areas.
13. Unhook the right and left retainers from the headlining rear support rod, disengage all support rods from the holes in the left and right roof rails, and remove the headlining from the vehicle.

Installation

1. Unpackage the new headlining and lay it out on a flat surface.
2. Trim the listings (or "pockets") on the new headlining to the approximate length of those on the old one. Remove the support rods from the old headlining and install them in the same relative rod listings of the new headlining.

   Roof headlining support rods are color coded at each end. When ordering new rods, be sure to note the color at each end of the rod.
3. Position the headlining in the vehicle. To maintain the most driver headroom and wrinkle-free headlining, insert the support rods into the **upper**

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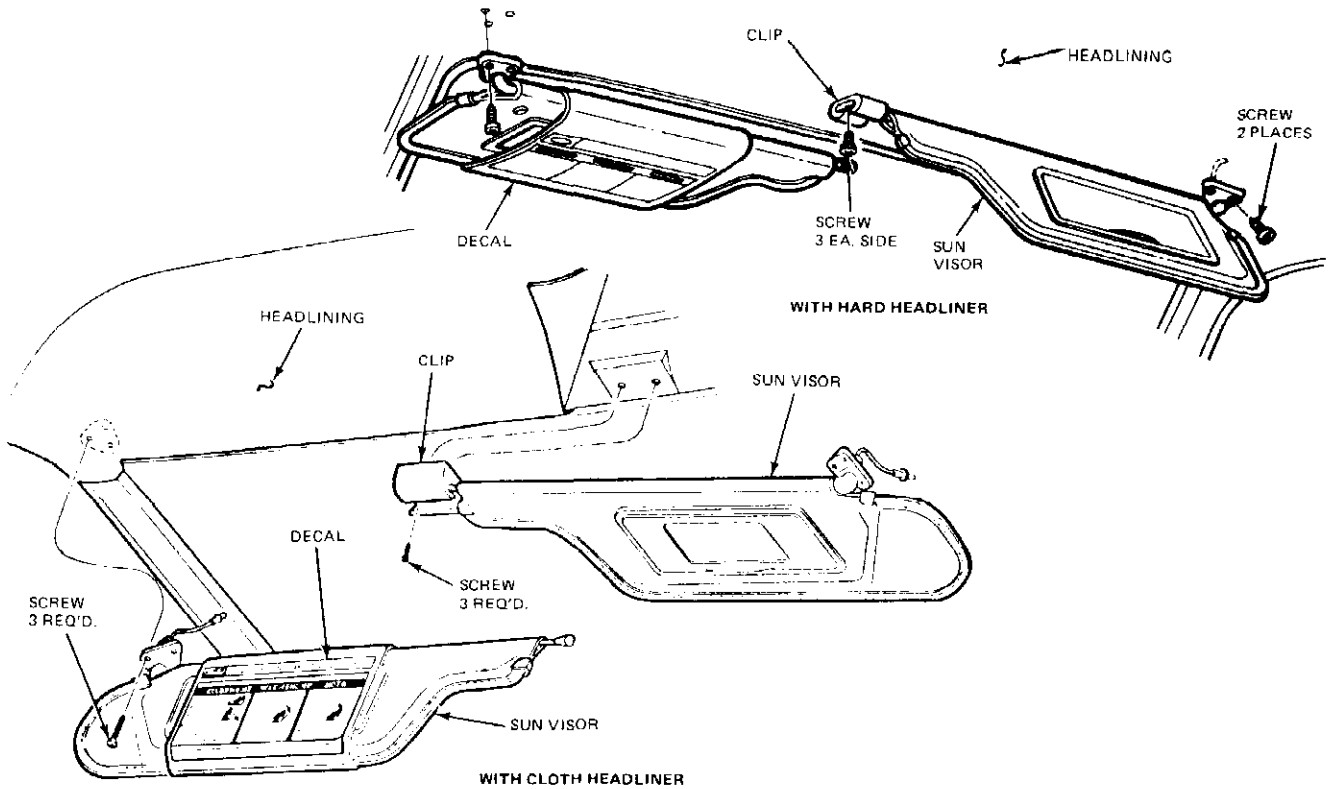


FIG. 1 Sun Visor Installation—Versailles Shown

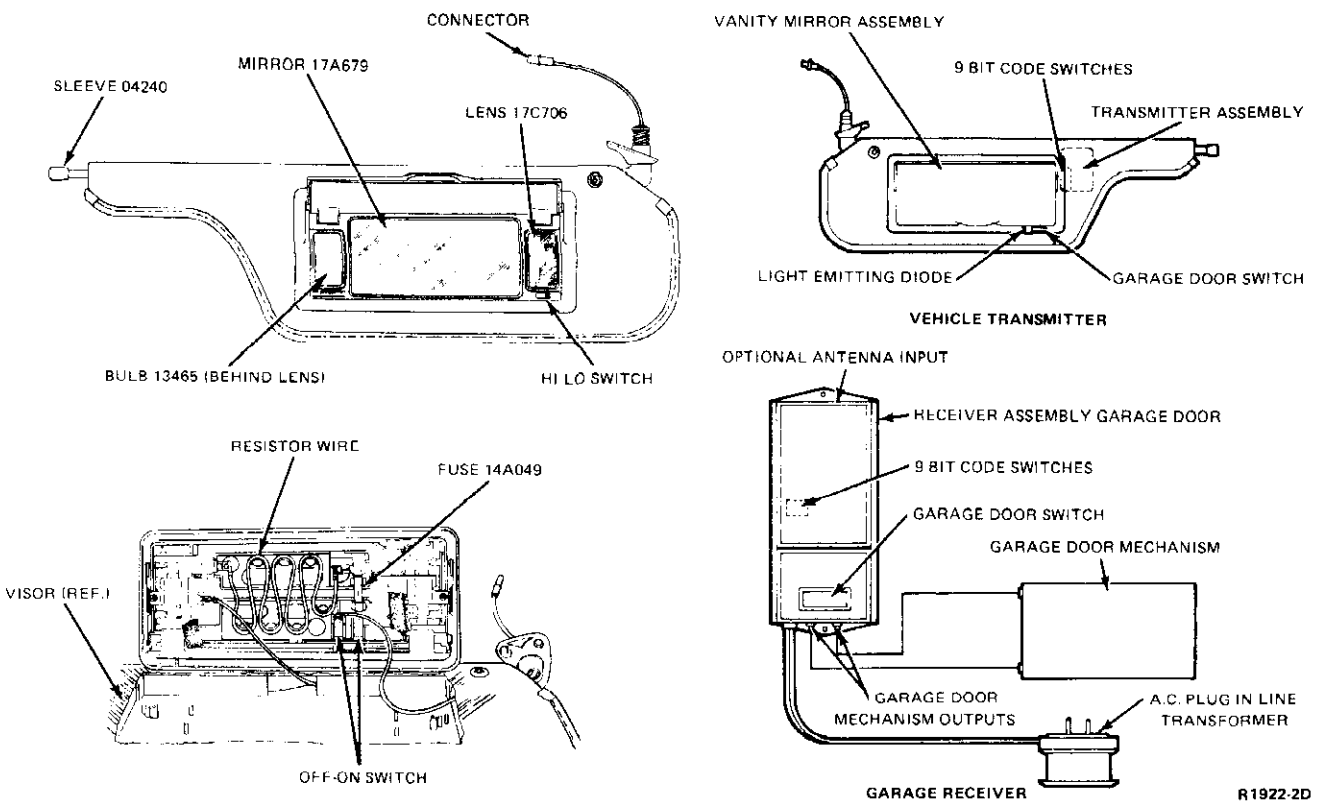


FIG. 2 Lighted Visor Vanity Components—R.H. Shown (L.H. Similar)

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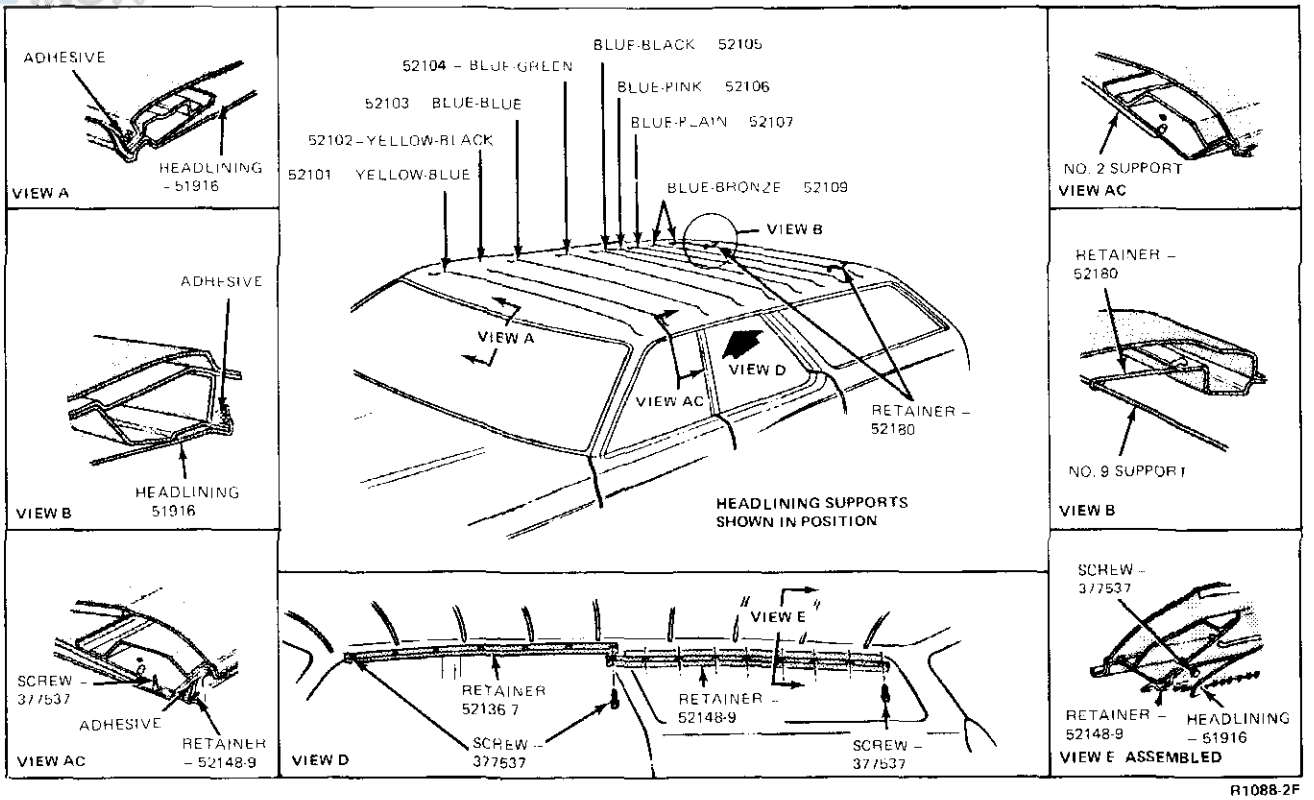


FIG. 3 Station Wagon Headlining Installation—Ford and Mercury

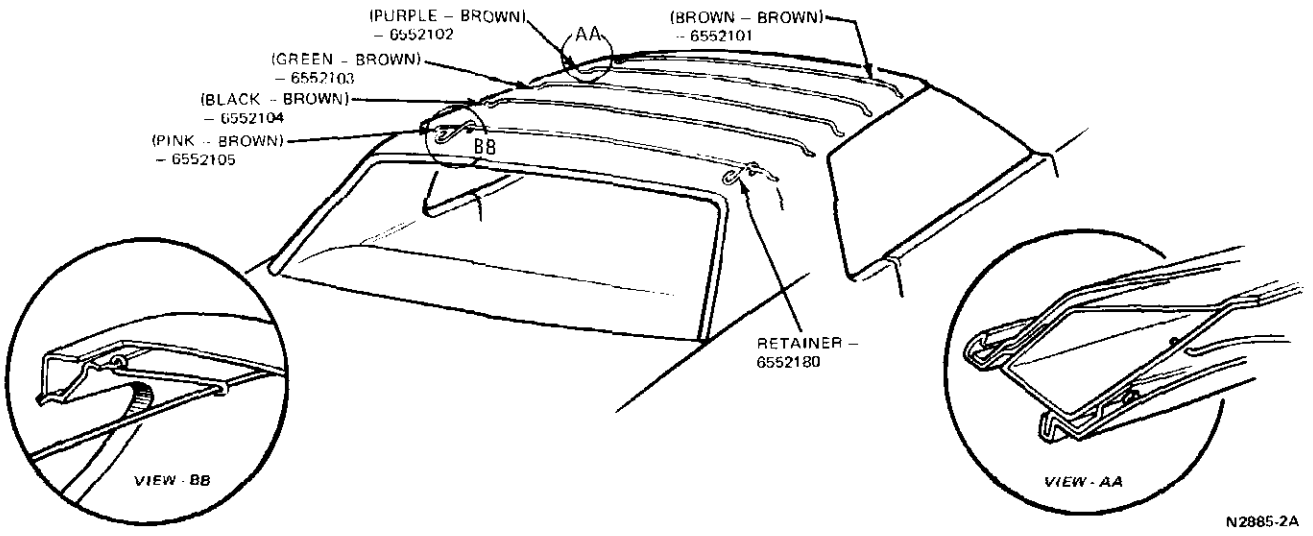


FIG. 4 Headlining Supports—2-Door Models

holes in the highest possible hole in the right hand side without having support rod "snake" across unit.

4. Hook the rear retainers to the rear support rod.
5. Staple the headlining to the retainer assemblies (Pinto Station Wagon Only).
6. Cement the headlining in place and trim the excess material.
7. Install the roof side rear trim covers, the package tray, the rear window garnish mouldings and quarter trim panels and lamps.
8. Cut a hole in the headlining material for the dome lamp and install the lens and bezel.
9. Install all the garnish mouldings shoulder belt assemblies, retainers, coat hooks and sun visors.

Pinto and Bobcat

Removal

1. Remove the right and left windshield wiper arm assemblies.
2. Remove the windshield and mouldings by using the procedures outlined in Group 43.

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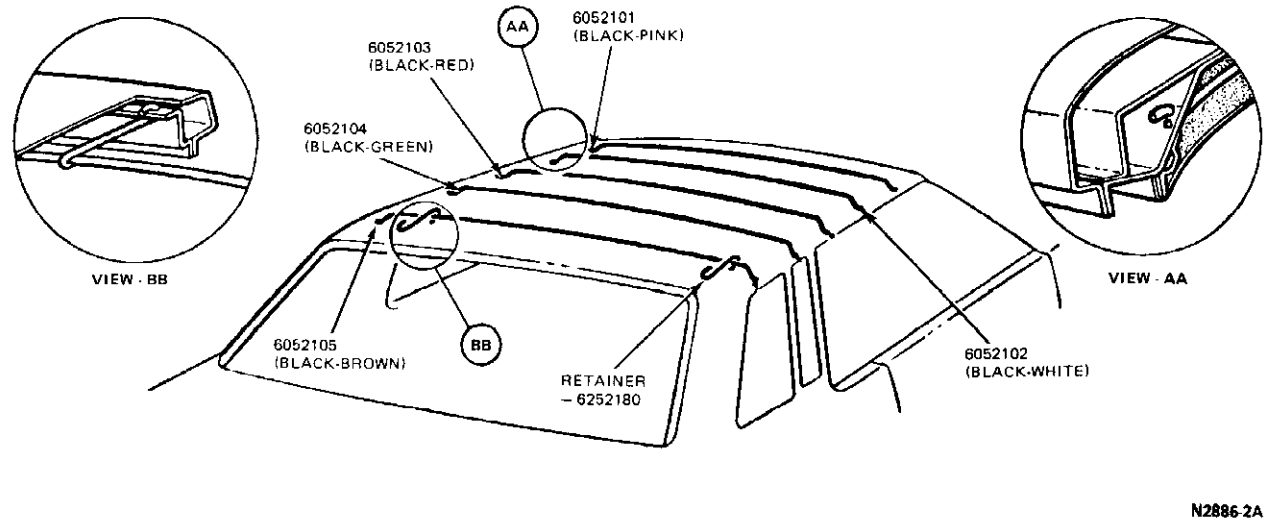


FIG. 5 Headlining Supports—Ford with Opera Windows

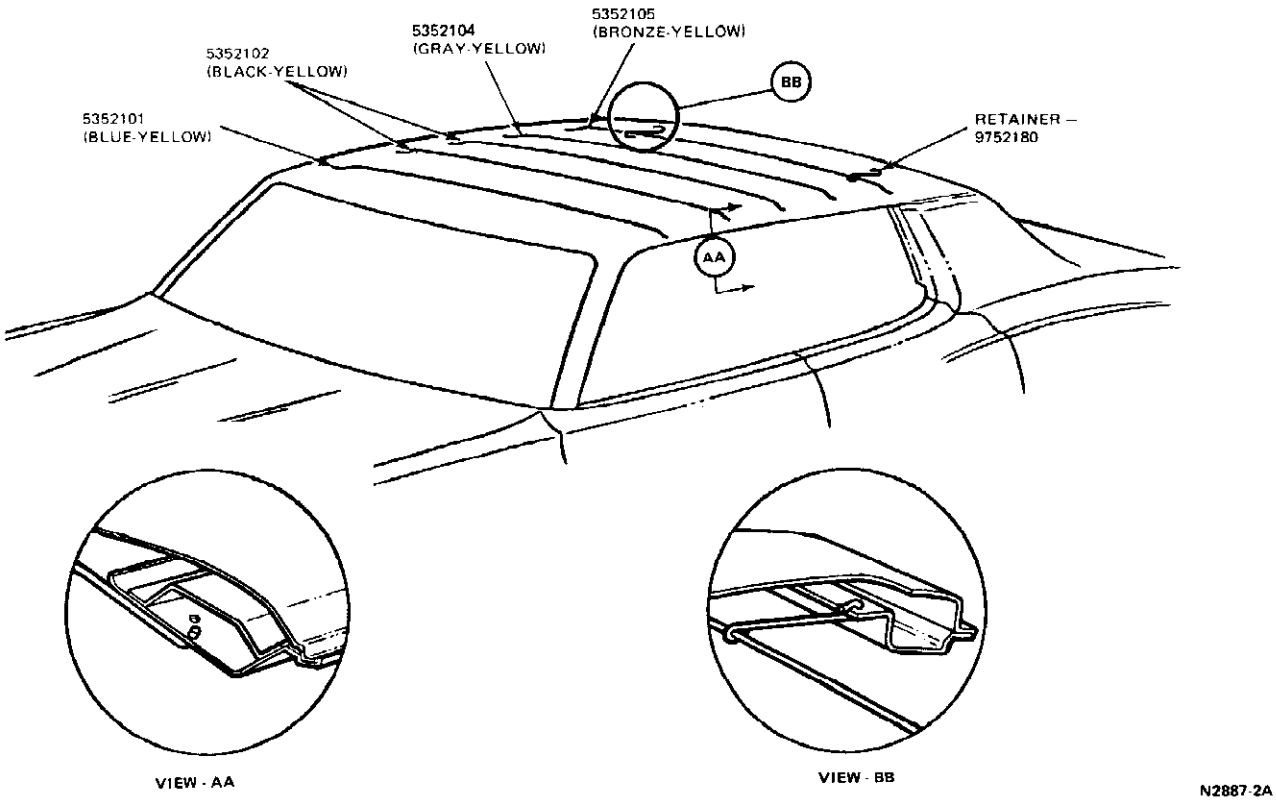


FIG. 6 Headlining Supports—Ford and Mercury 4-Door Models

3. Remove the weatherstrip from the glass opening.
4. Remove the rear window glass from the opening by using the procedures outlined in Group 43.
5. Remove the right and the left shoulder belt fasteners, 1 bolt on each side.
6. Remove the right and left shoulder belt retainer hooks which are fastened with 1 screw on each side. Then, remove the right and left coat hooks which are retained with 1 screw on each side.
7. Remove the rear seat cushion and back assembly (Group 41).
8. Remove the quarter trim panels (Group 45).
9. Open the trunk lid and remove the 2 nuts retaining the right and left upper quarter trim panels.
10. From the interior of the vehicle, remove the one remaining screw on each side and remove the quarter trim mouldings.
11. Remove the right and left sun visors.
12. Remove the head cap mouldings at the top of the A pillar posts, right and left side (pry off carefully).
13. Remove the visor bracket and dome lamp assembly.

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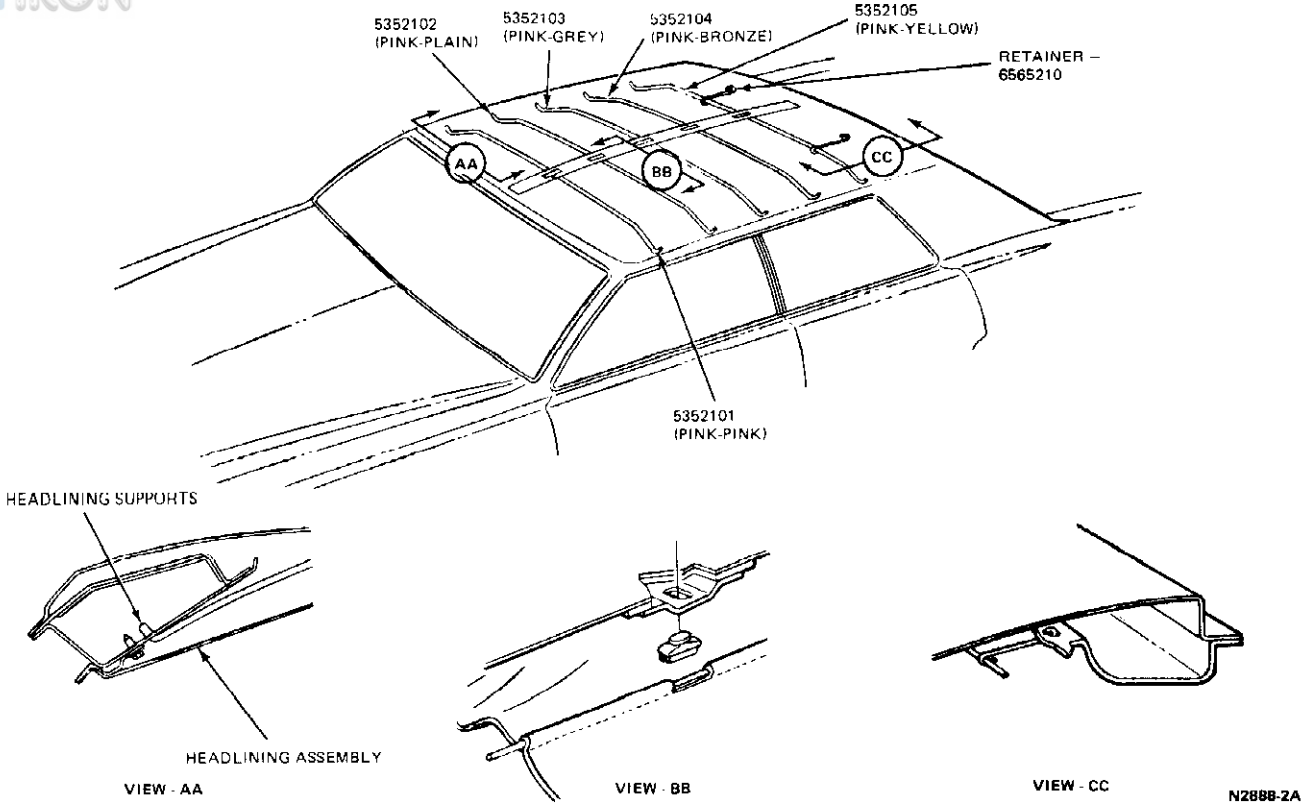


FIG. 7 Headlining Supports—LTD II and Cougar 4-Door Models

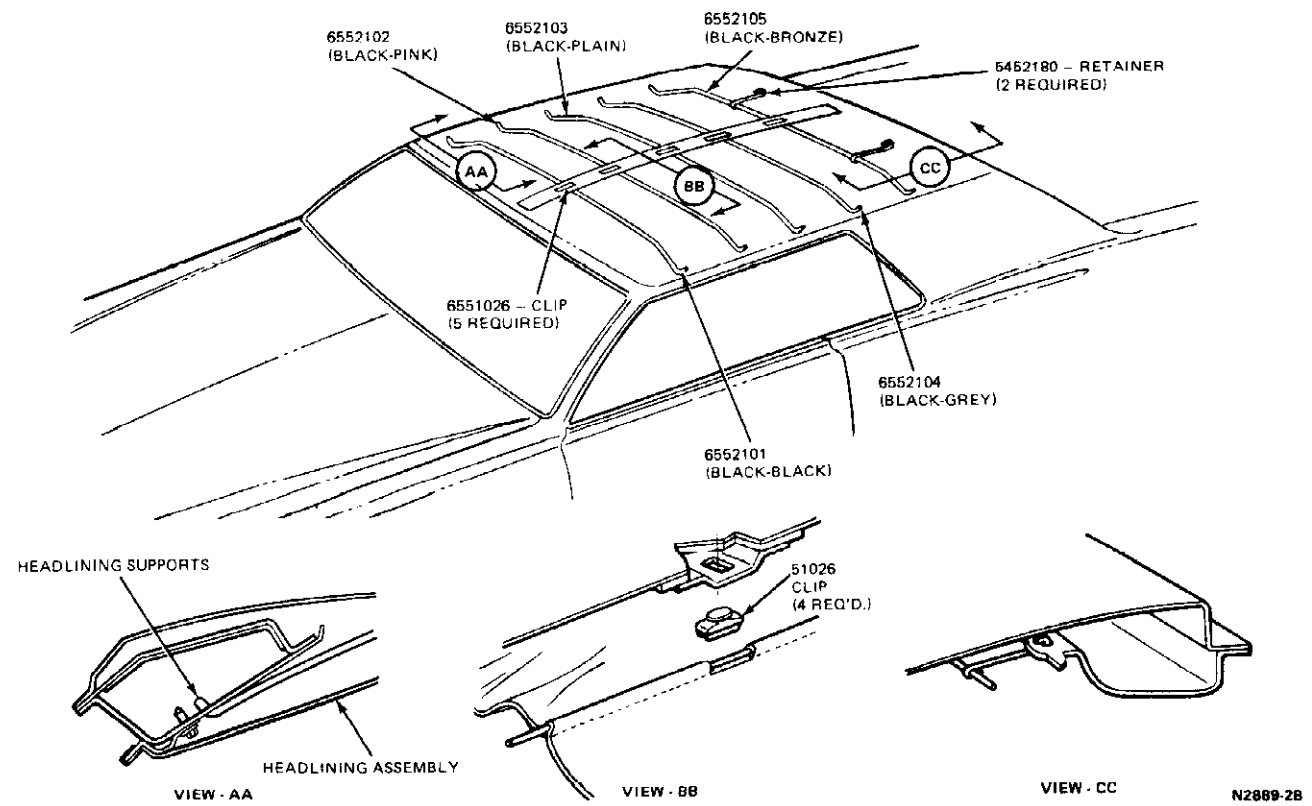


FIG. 8 Headlining Supports—LTD II and Cougar 2 Door Models

14. Remove the right and left B pillar cap mouldings (pry off carefully).

15. Cut headliner parallel to the door opening and pull the right and left strip from the retainer.

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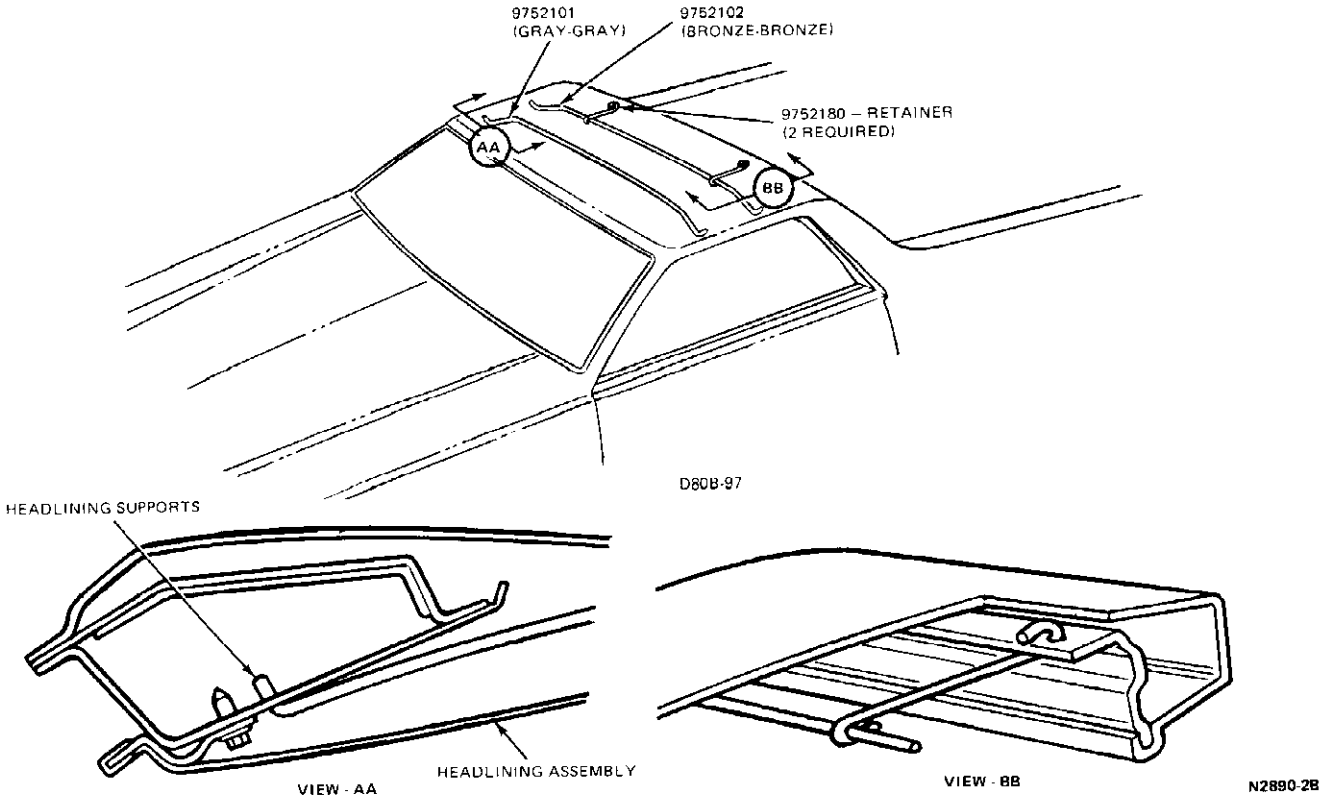


FIG. 9 Headlining Supports—LTD II Ranchero

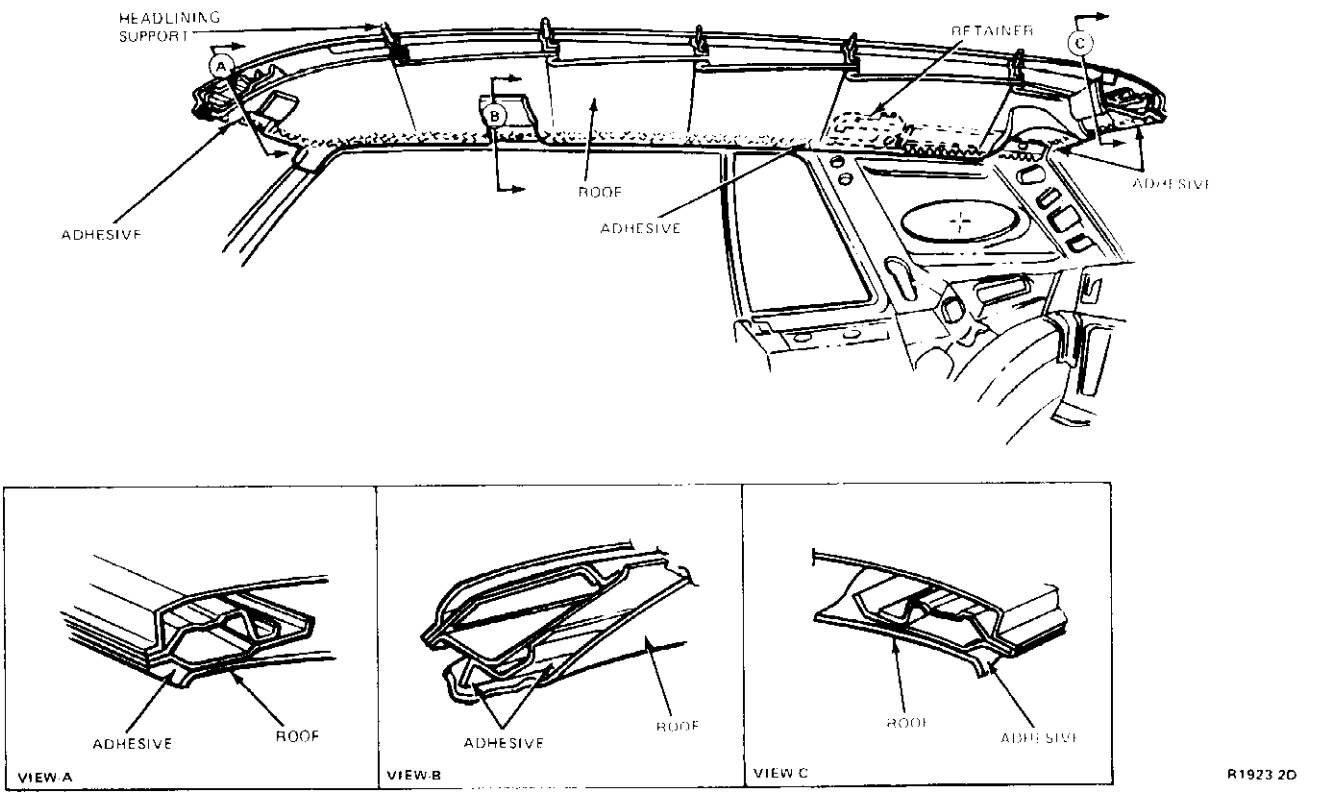


FIG. 10 Headlining Installation—Continental Mark V

16. Loosen the headliner from the retaining tabs at the blind quarter areas and pull the glued areas loose.

17. Disconnect the bows and remove the headliner from the car.

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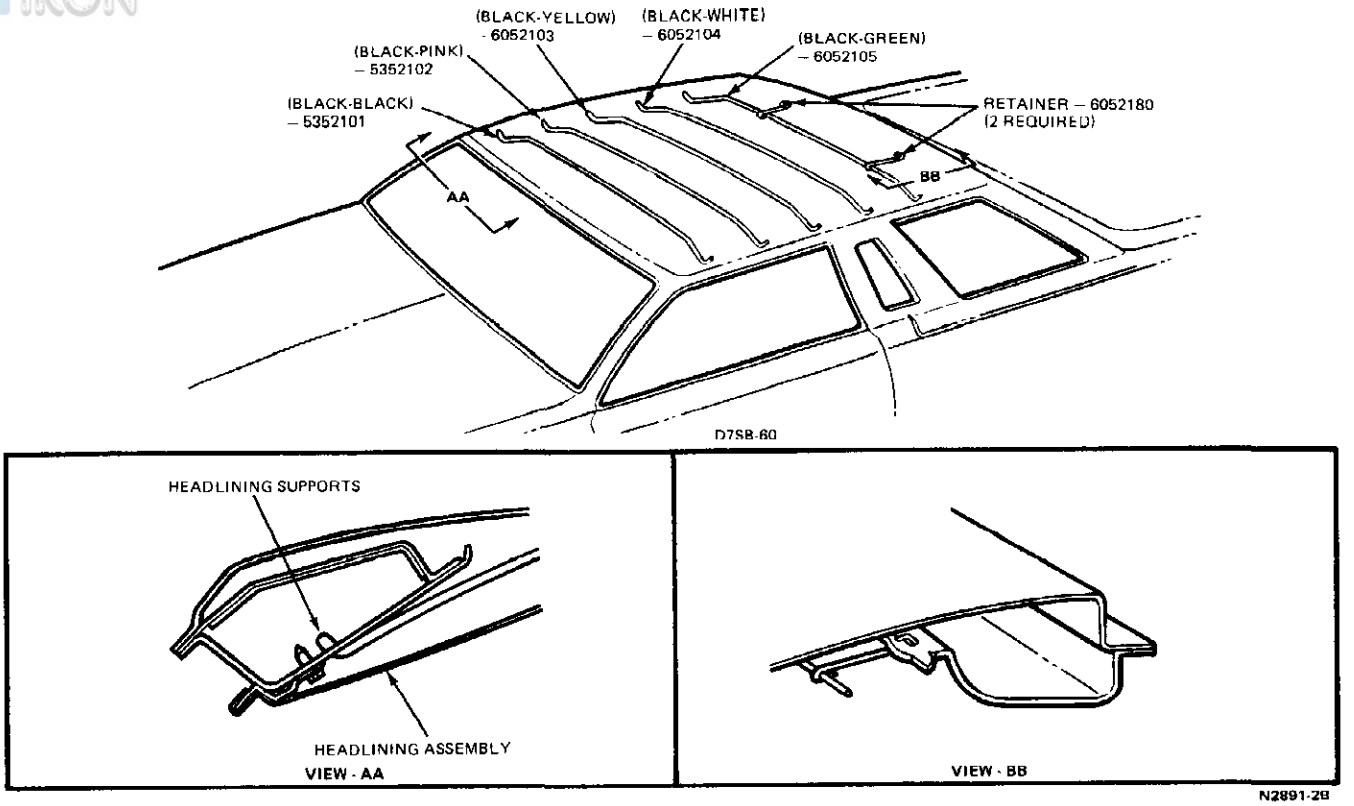


FIG. 11 Headlining Supports—Thunderbird

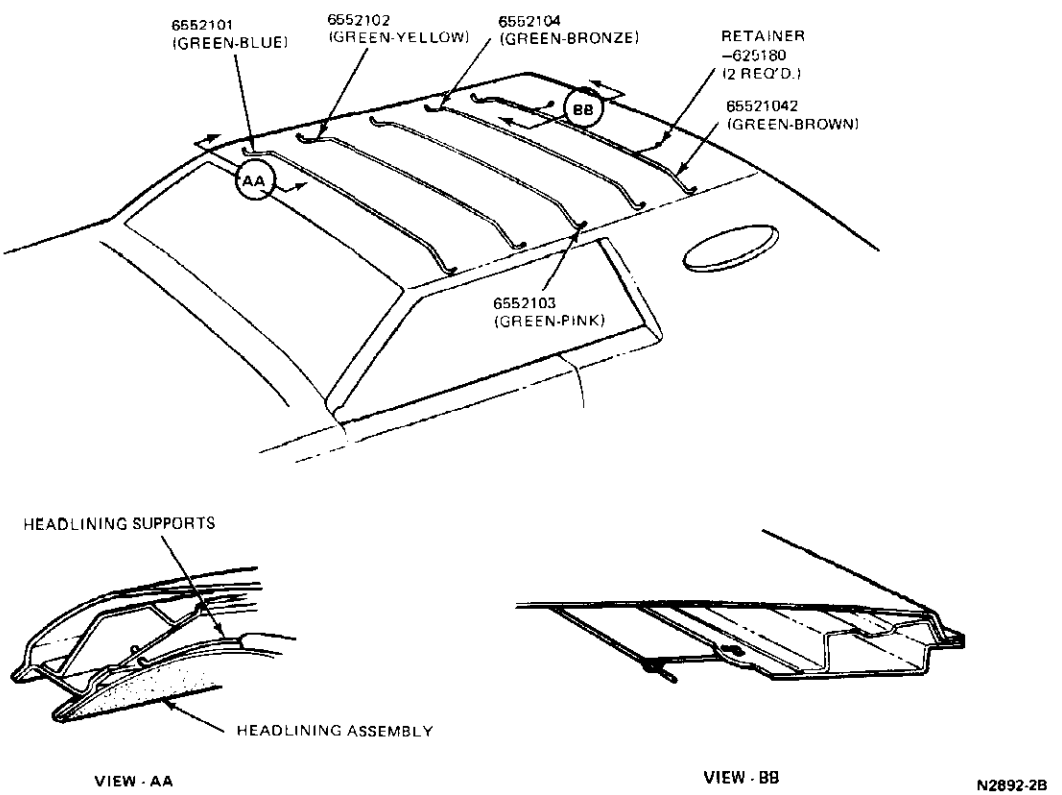


FIG. 12 Headlining Supports—Continental Mark V without Sun Roof

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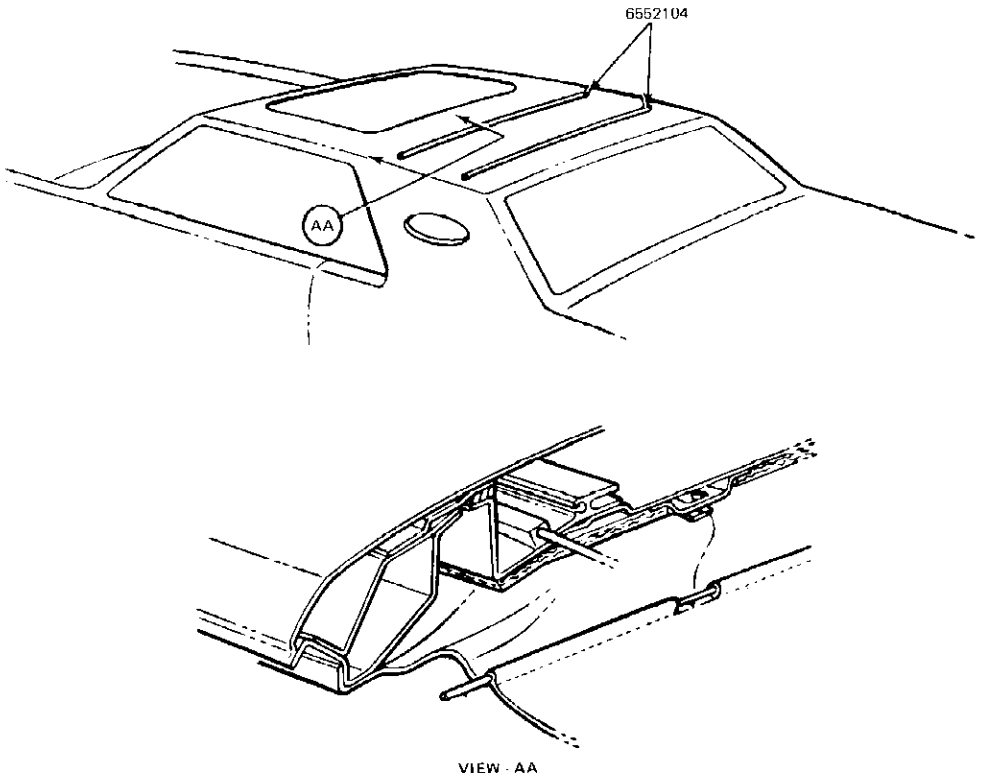
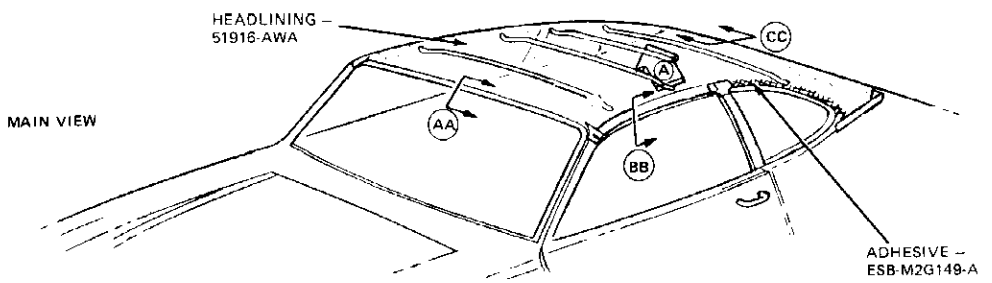


FIG. 13 Headlining Supports—Continental Mark V with Sun Roof



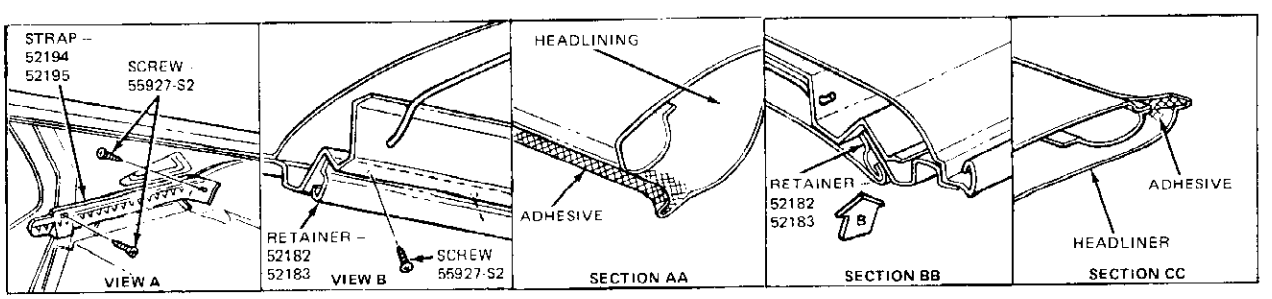


FIG. 14 Headlining Retainers—Pinto and Bobcat 2-Door Sedan Shown—3-Door Typical

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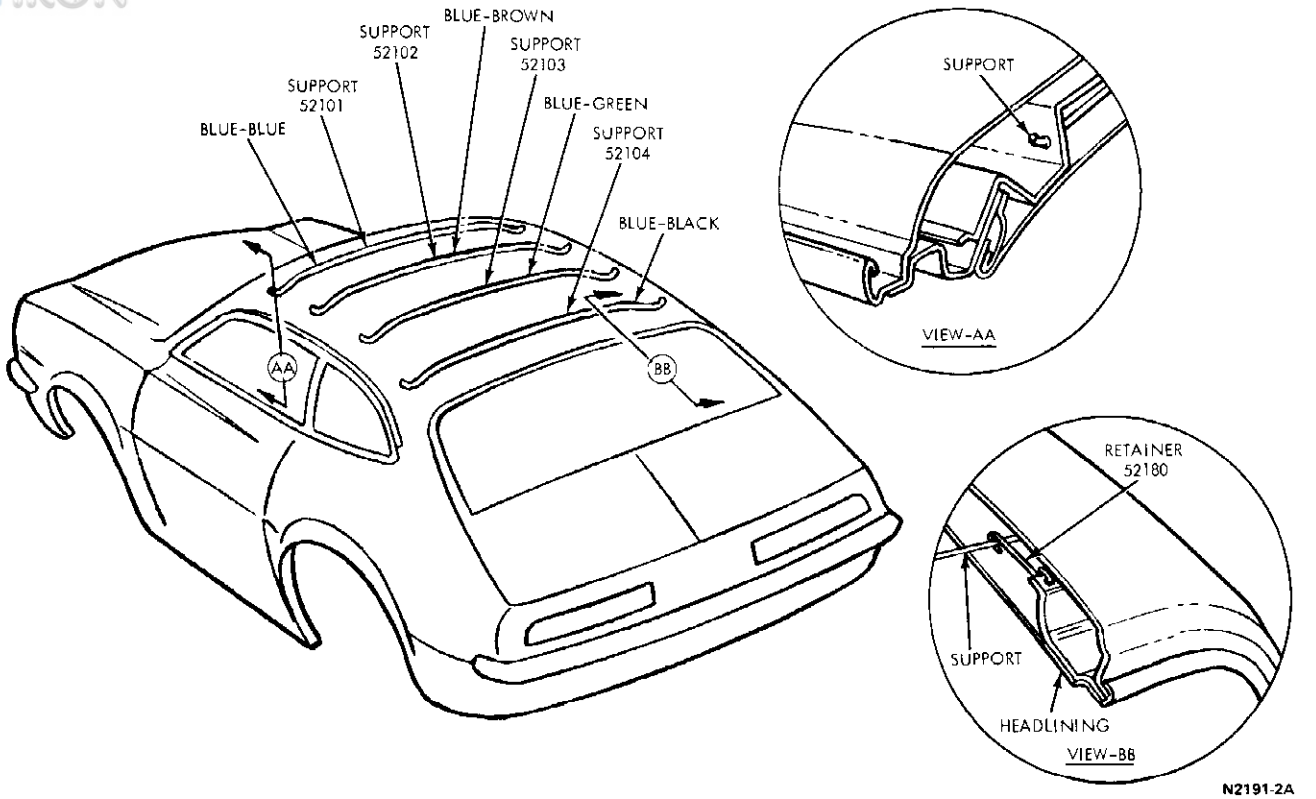


FIG. 15 Headlining Retainers—Pinto and Bobcat 2-Door Shown—3-Door Similar

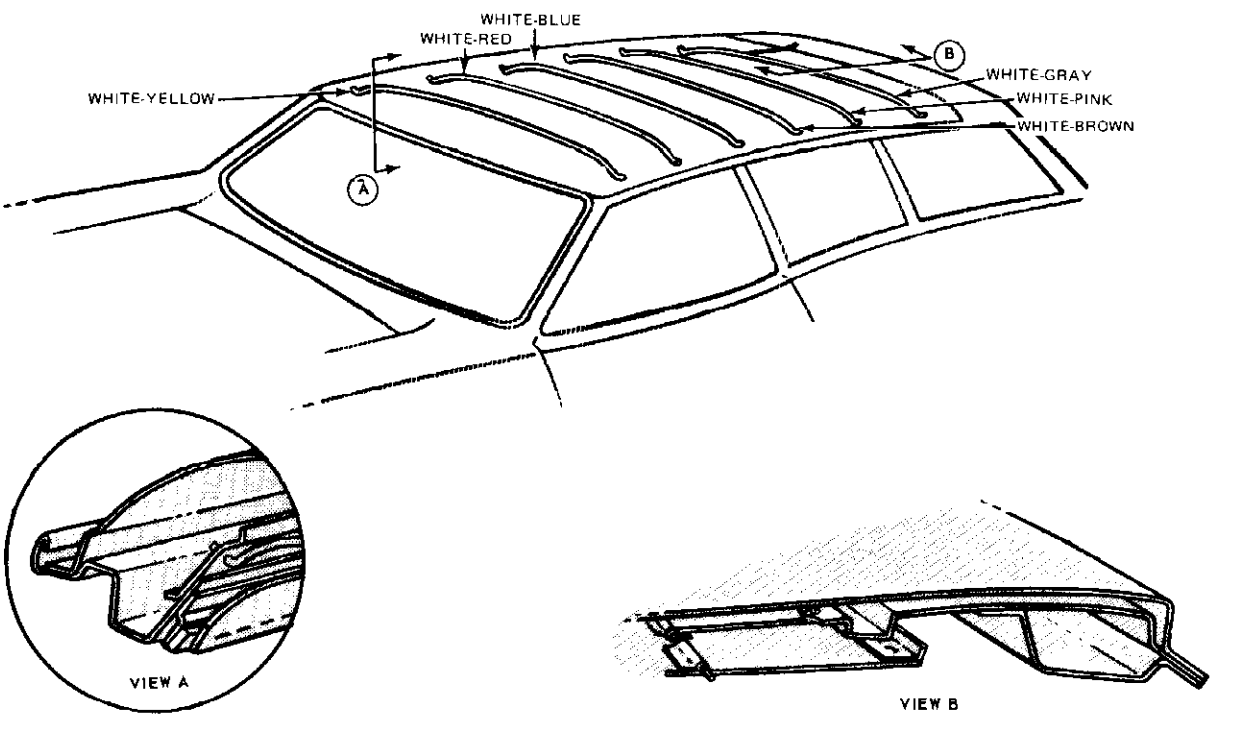


FIG. 16 Headlining Supports—Pinto and Bobcat Station Wagon

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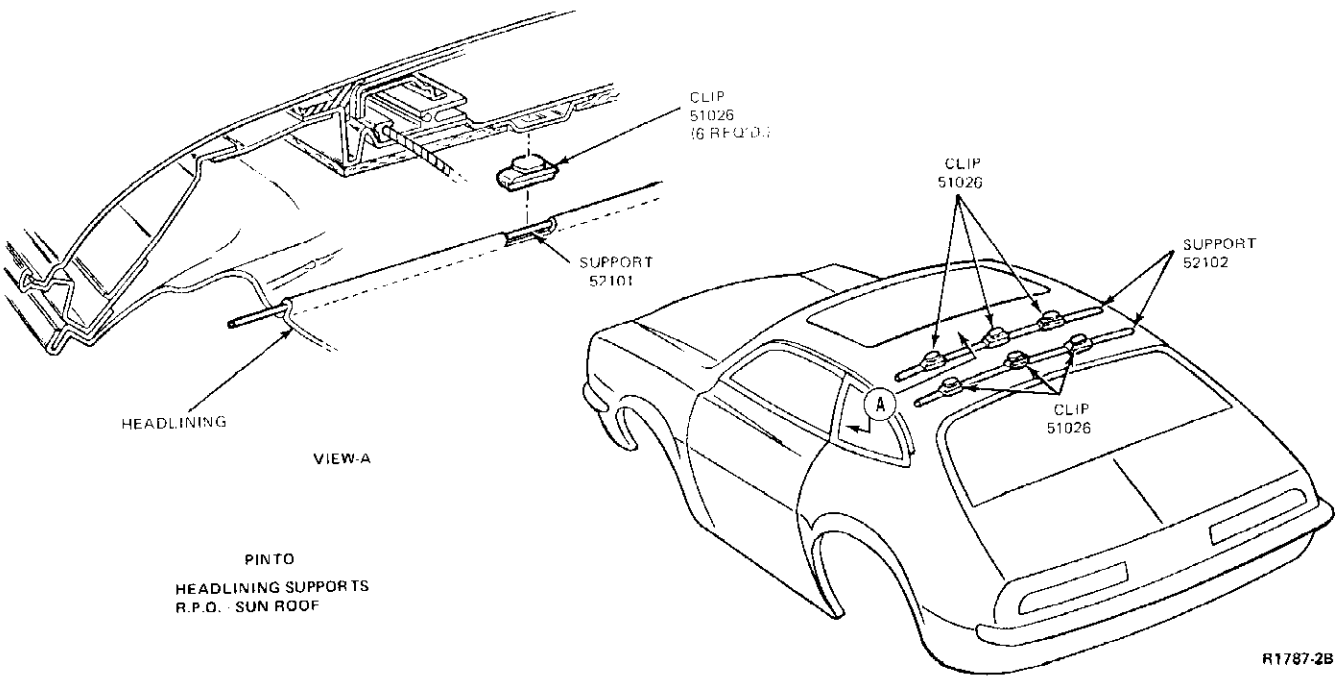


FIG. 17 Headlining Supports—Pinto and Bobcat With Optional Sun Roof

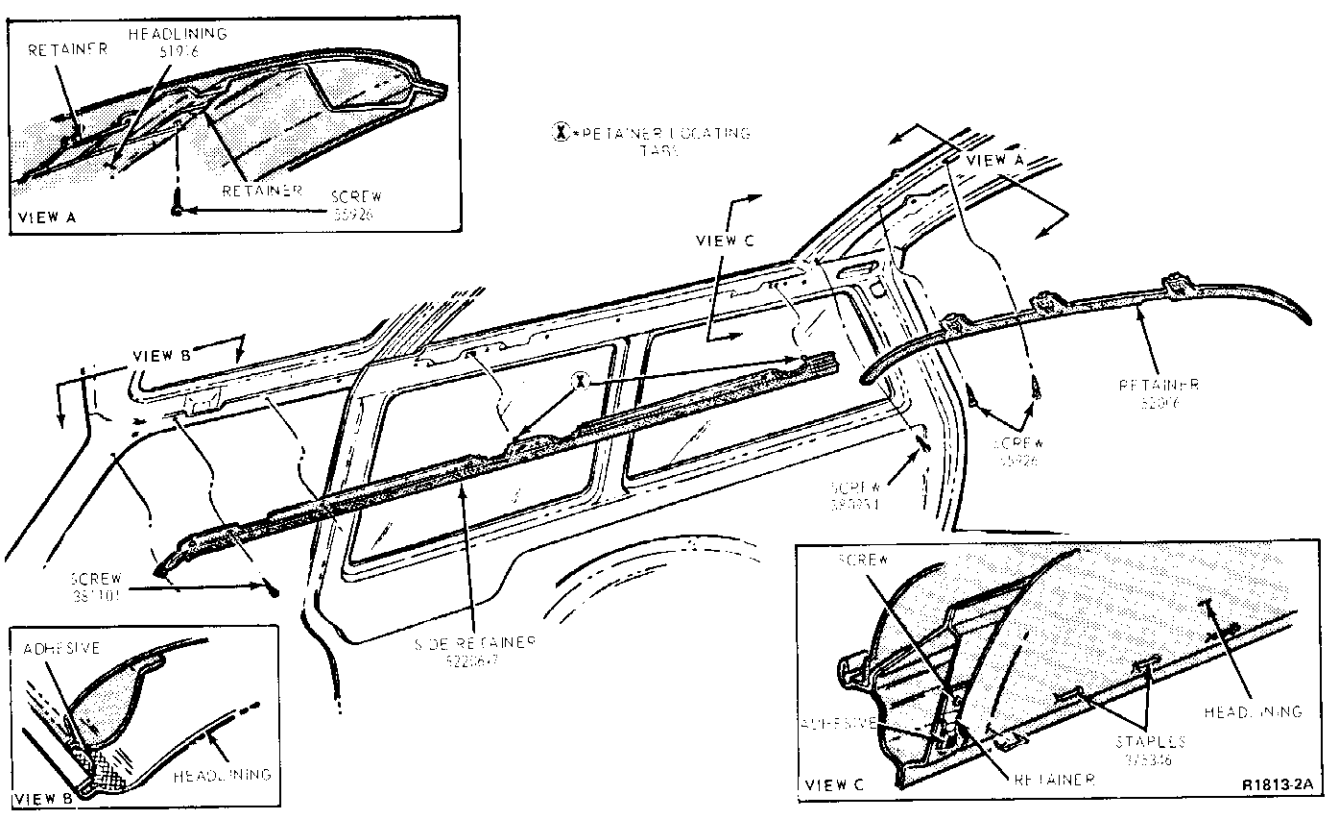


FIG. 18 Headlining Installation—Pinto and Bobcat Station Wagon

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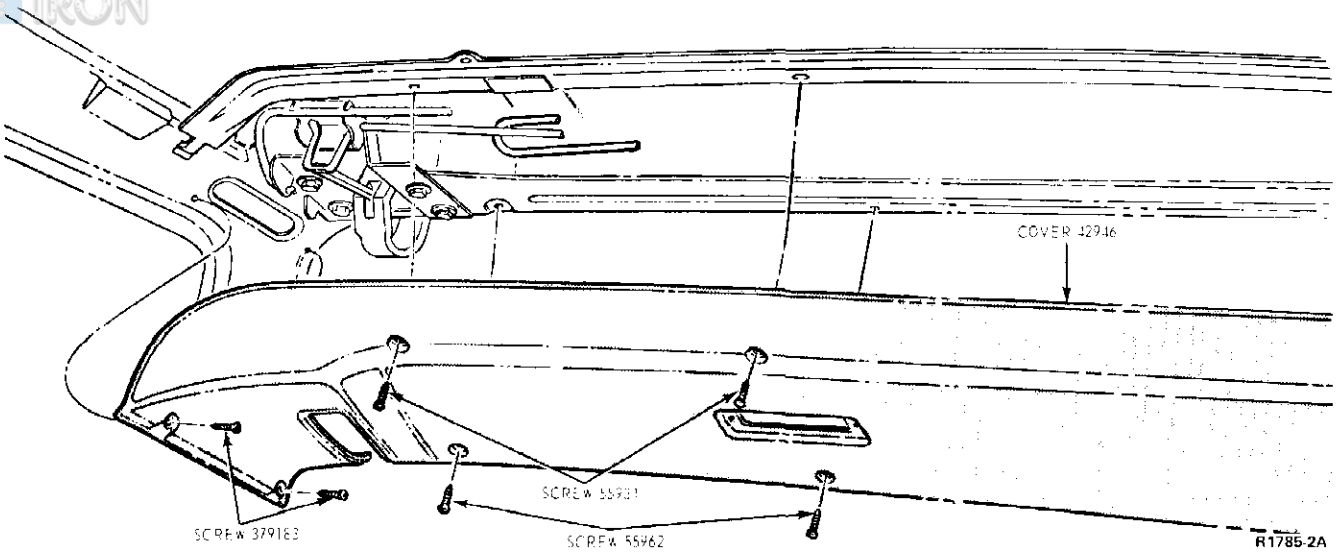


FIG. 19 Liftgate Hinge Cover—Pinto and Bobcat—Station Wagon

Installation

1. Unpackage the new headlining and lay it out on a flat surface. Mark and trim the new headlining using the old one as a pattern.
2. Trim the listings (or "pockets") on the new headlining to the approximate length of those on the old one. Remove the support rods from the old headlining and install them in the same relative rod listings of the new headlining.

   Roof headlining support rods are color coded at each end. When ordering new rods, be sure to note the color at each end of the rod.
3. Position the headliner in the vehicle and connect the bows.
4. Starting at the rear window area, apply trim cement and align the rear bow to the vertical position.
5. Working from the center to the outboard side, stretch and cement headlining to the back window opening flange.
6. Apply cement to the windshield opening flange. Align the bows and pull the headlining forward and cement into position at the windshield opening.
7. Working from front to rear, stretch and cement headlining to the quarter and retainer areas. Insert headlining into roof rail retainer with a putty knife.
8. Fasten the headlining to the retaining tabs at the blind quarters and cement the corner areas. Trim excess material where necessary.
9. Trim all excess material, leaving approximately 1/2 inch to wrap into the glass opening pinchweld areas *(1 1/2-inch Pinto and Bobcat Model 73).*
10. Apply cement and wrap pinchweld areas.
11. Snap on the 2 cap mouldings at the A pillar post area.
12. Snap on the 2 cap mouldings at the B pillar post area.
13. Connect the wire to the dome lamp and install the visor bracket and dome lamp assembly.
14. Install the visor assemblies.
15. Install the package tray mouldings by attaching two nuts from the rear for each moulding and 1 screw on each side from the interior of the vehicle.
16. Position the quarter trim panels, push rearward to secure at the door opening and install the retaining screws.
17. Place the rear seat back assembly into position. Install the 2 retaining bolts and tighten securely.
18. Place the rear seat cushion into position. Install the 2 retaining bolts (if so equipped) and tighten securely.
19. Install the right and left coat hooks.
20. Install the right and left seat and shoulder belt retaining hooks.
21. Install the right and left shoulder belts.
22. Install the back window using the draw cord method described in Group 43.
23. Apply sealer to the outside perimeter of the back window.
24. Install the windshield using the draw cord method described in Group 43.
25. Apply sealer to the outside perimeter of the windshield.
26. Install the windshield mouldings.
27. Install the windshield wiper arms and blades.
28. Clean all excess sealer from the windshield and back window areas.

Station Wagons

Removal

1. Remove the right and left sun visor and bracket assemblies.
2. Remove the windshield upper garnish moulding.
3. Remove the screws retaining the upper ends of the A post mouldings and position the mouldings away from the upper end of the A post.

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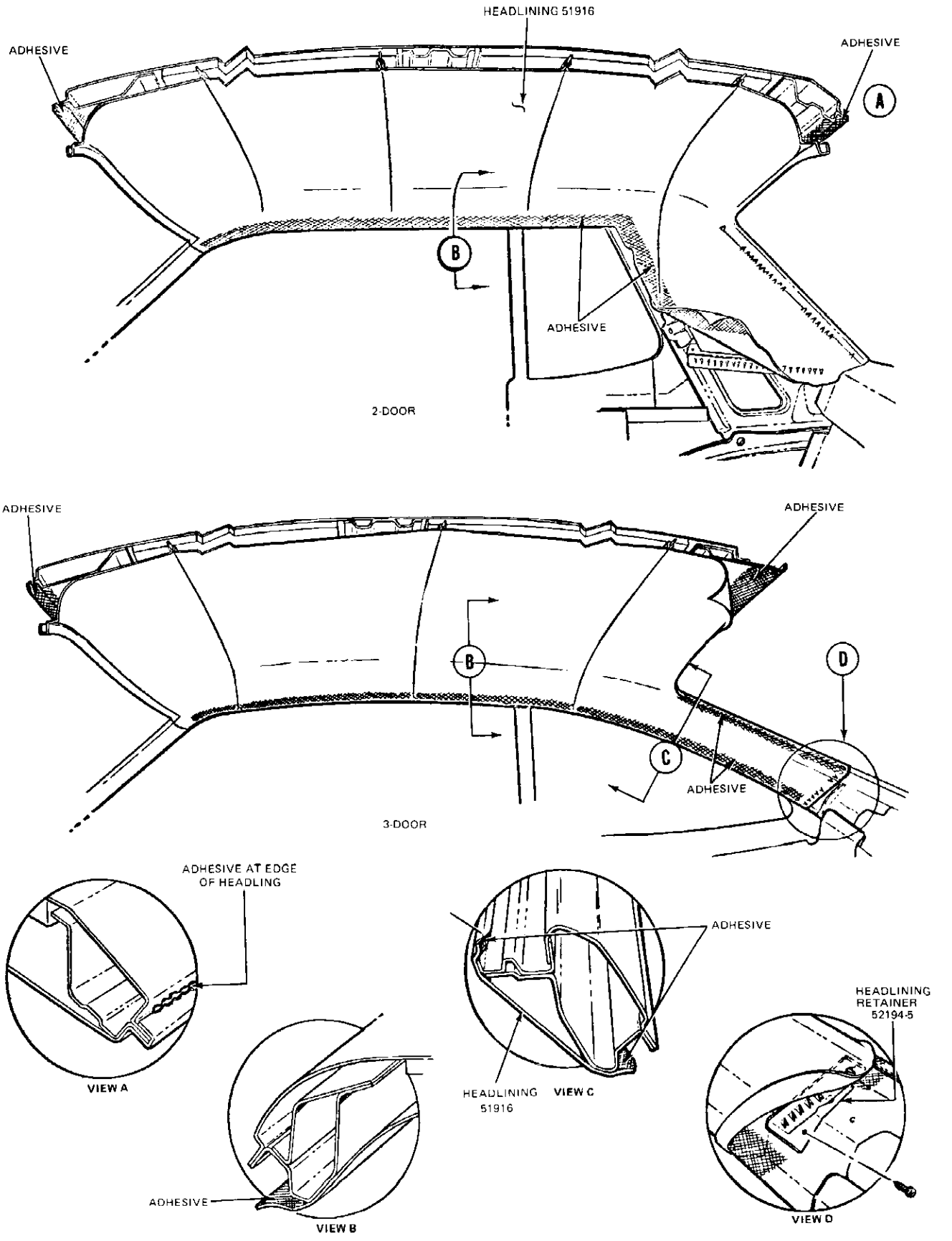


FIG. 20 Headlining Installation—Mustang II

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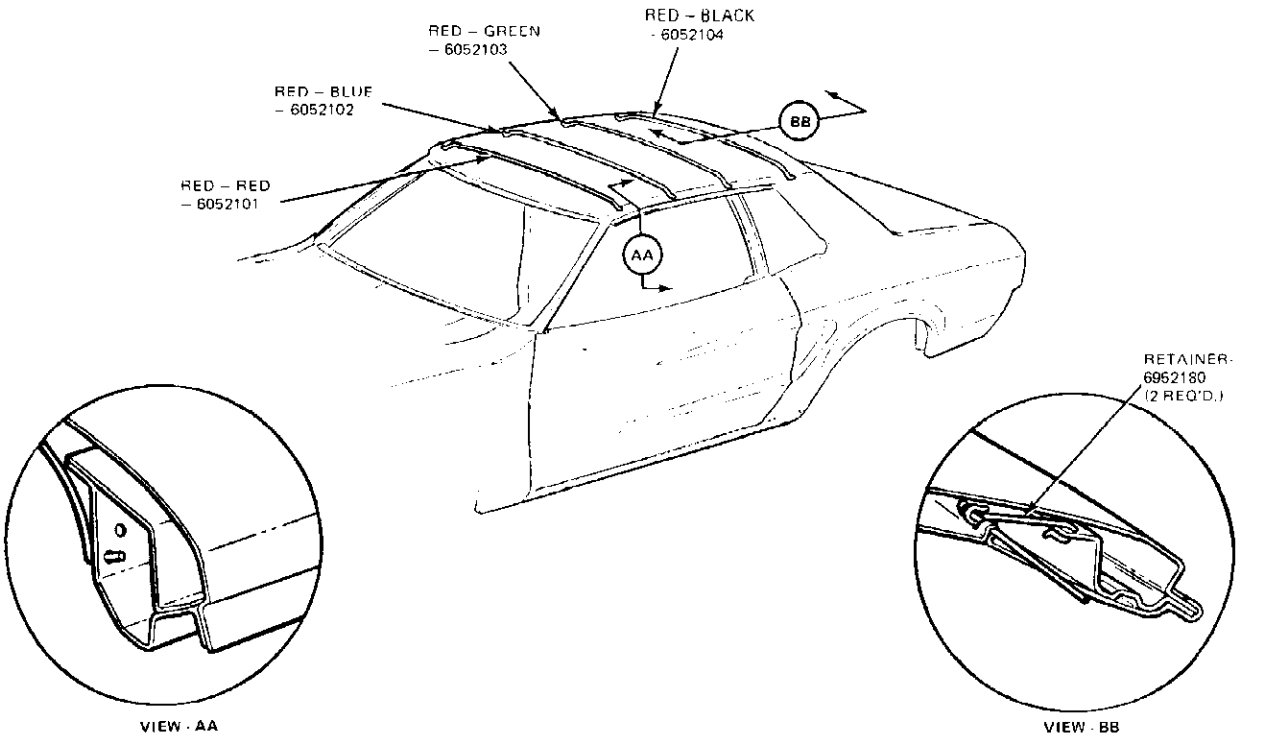


FIG. 21 Headlining Supports—Mustang II—2-Door

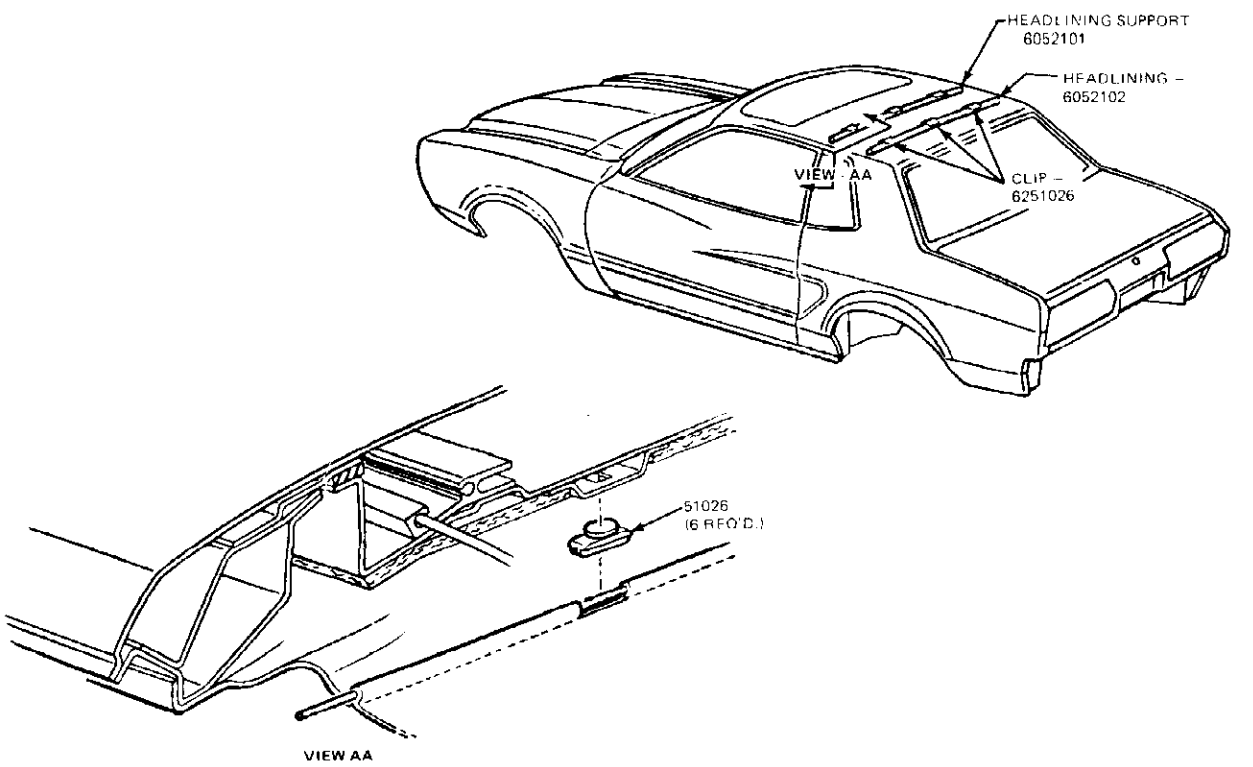


FIG. 22 Headlining Supports—Mustang II with Sun Roof

4. Remove the right and left roof side rear moulding caps (one screw each).

5. Remove the right and left quarter window front garnish mouldings.

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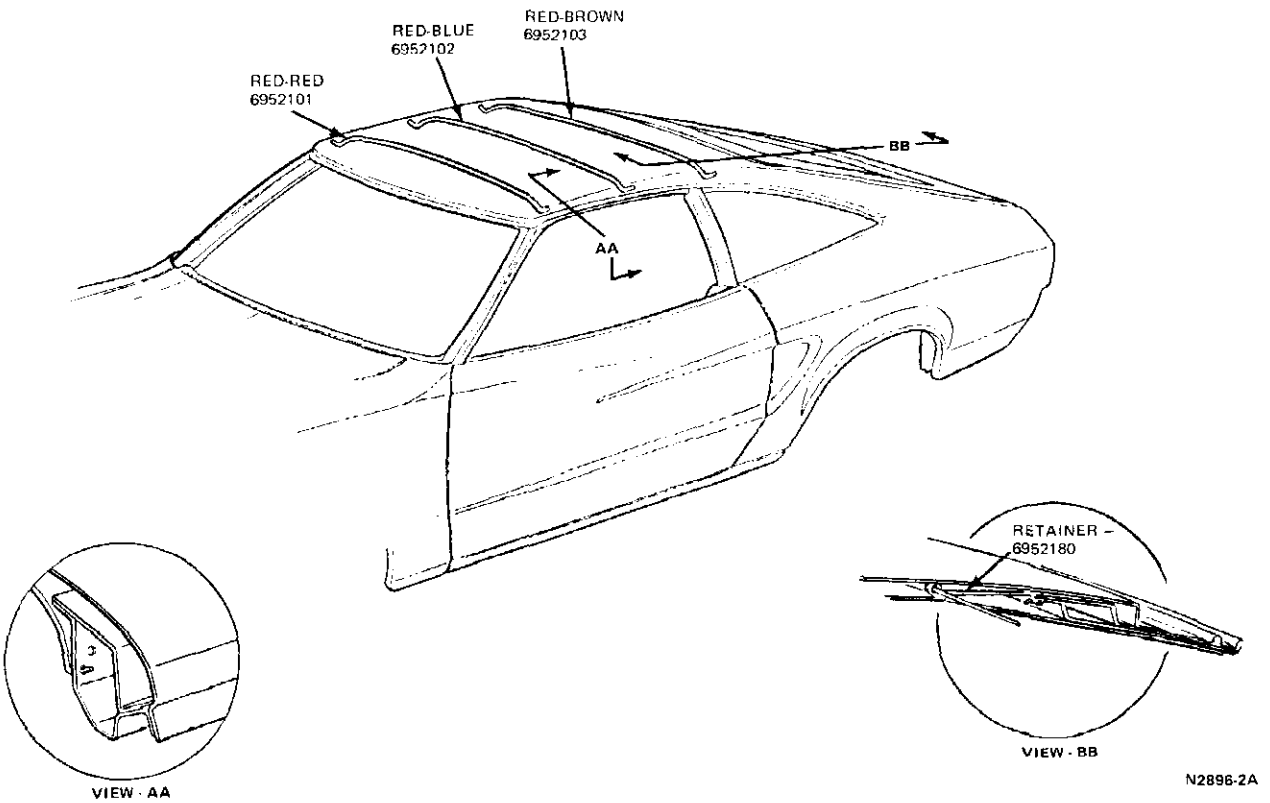


FIG. 23 Headlining Supports—Mustang II 3-Door

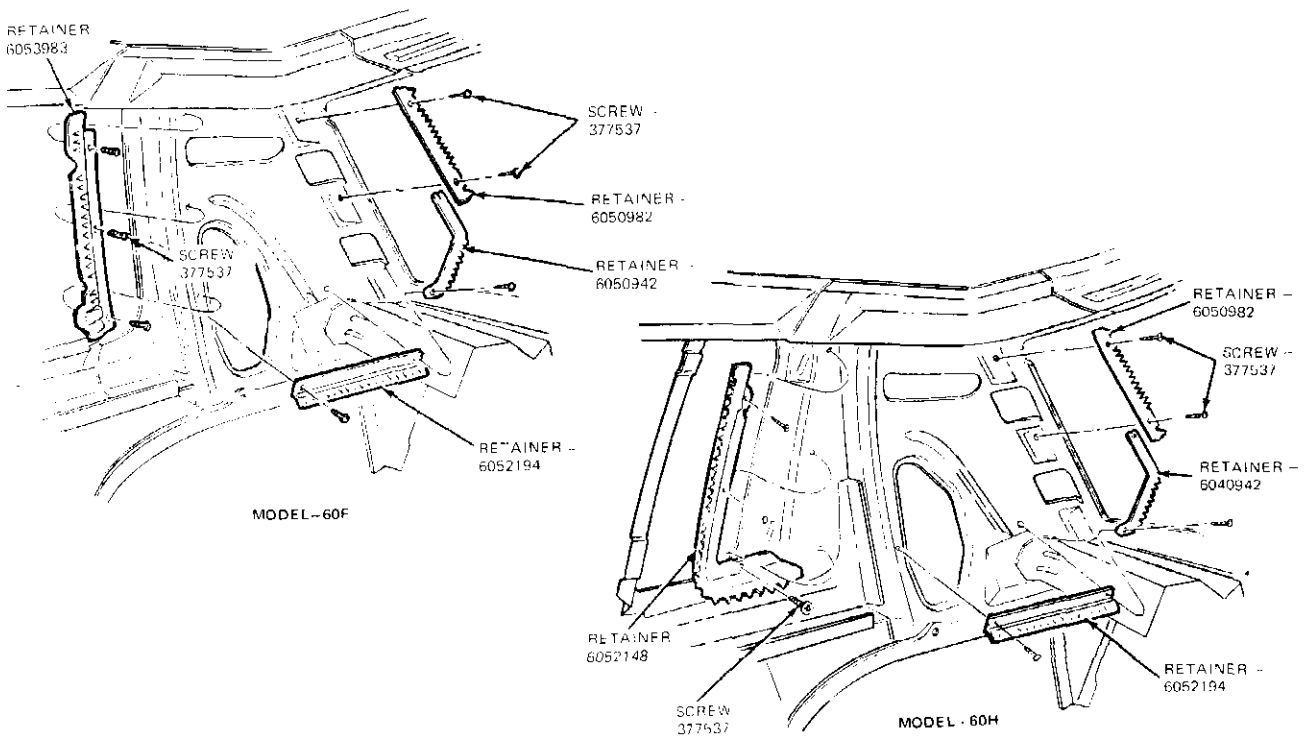


FIG. 24 Headlining Retainers—Mustang II—2-Door

6. Pull off the front and rear (extruded plastic) roof side mouldings at both the left and right sides of the roof.

7. Remove the right and left shoulder belt assemblies (one bolt each).

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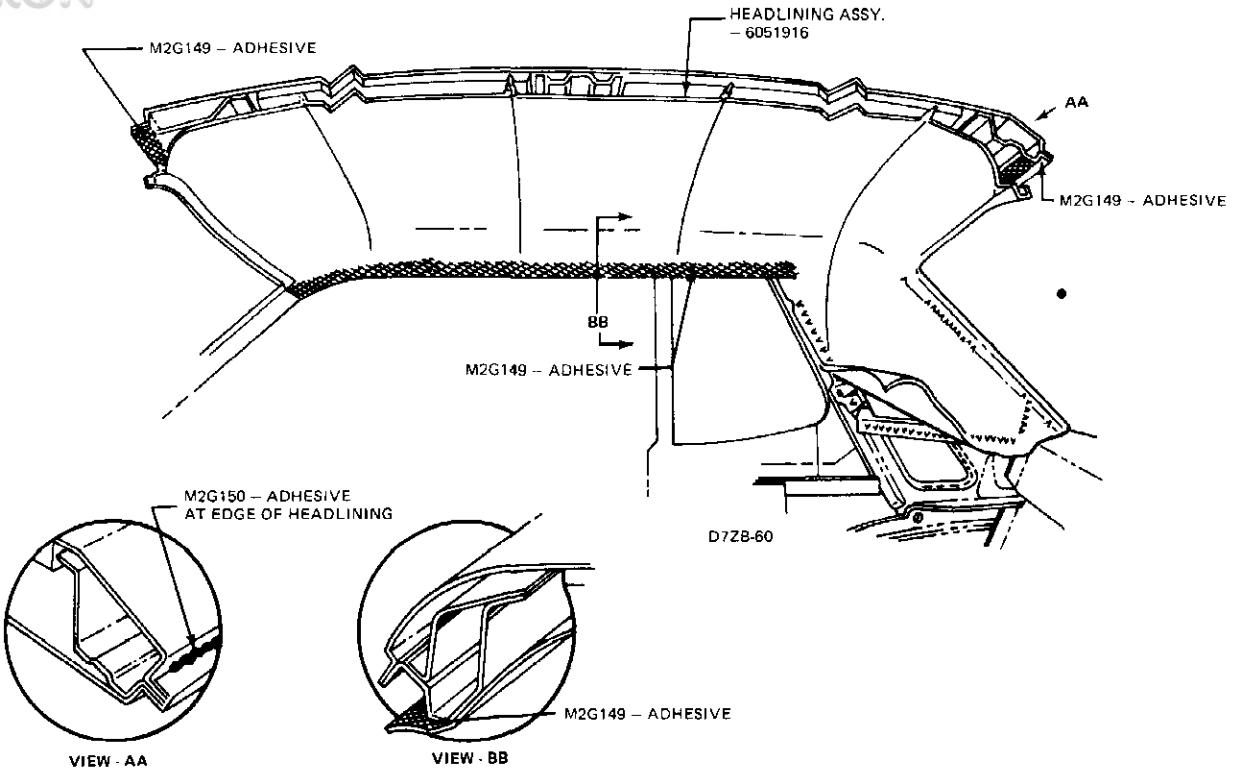


FIG. 25 Roof Headlining—Mustang II

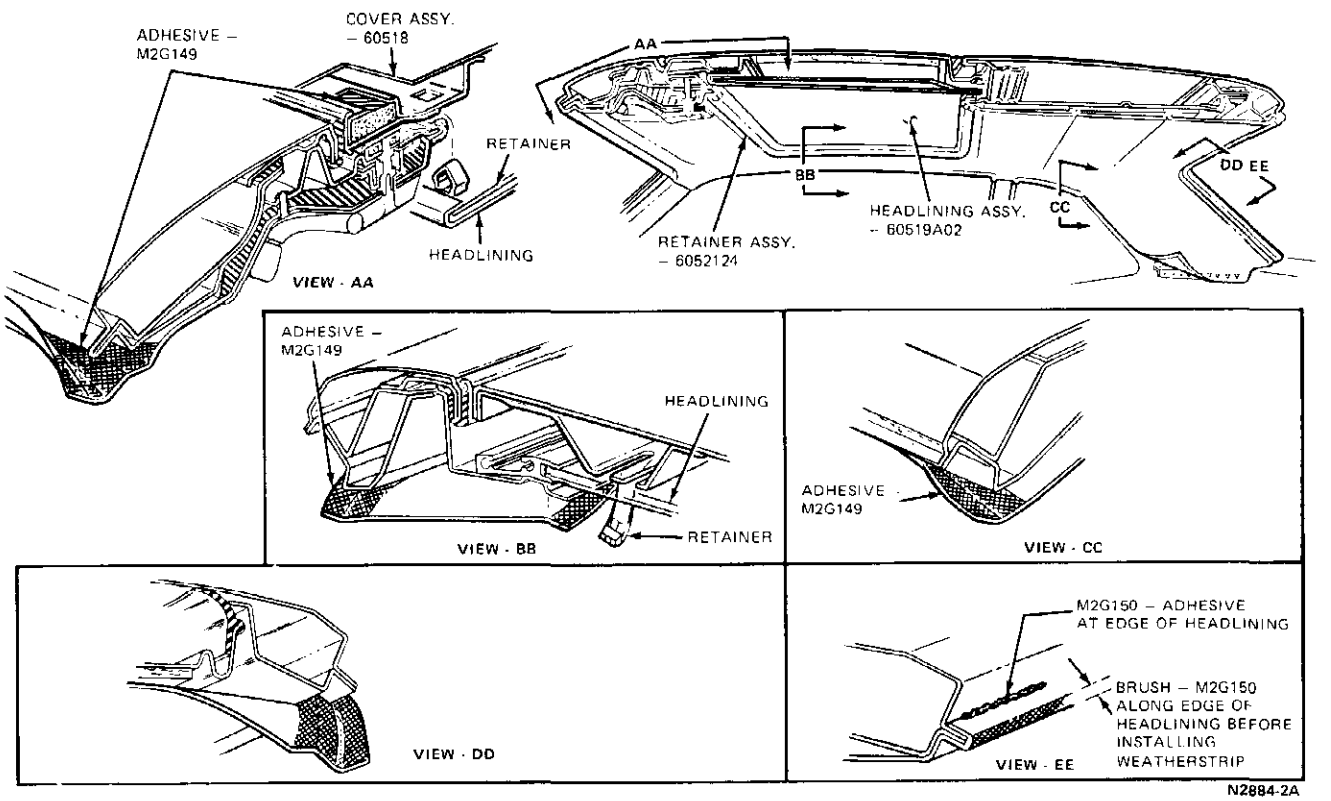
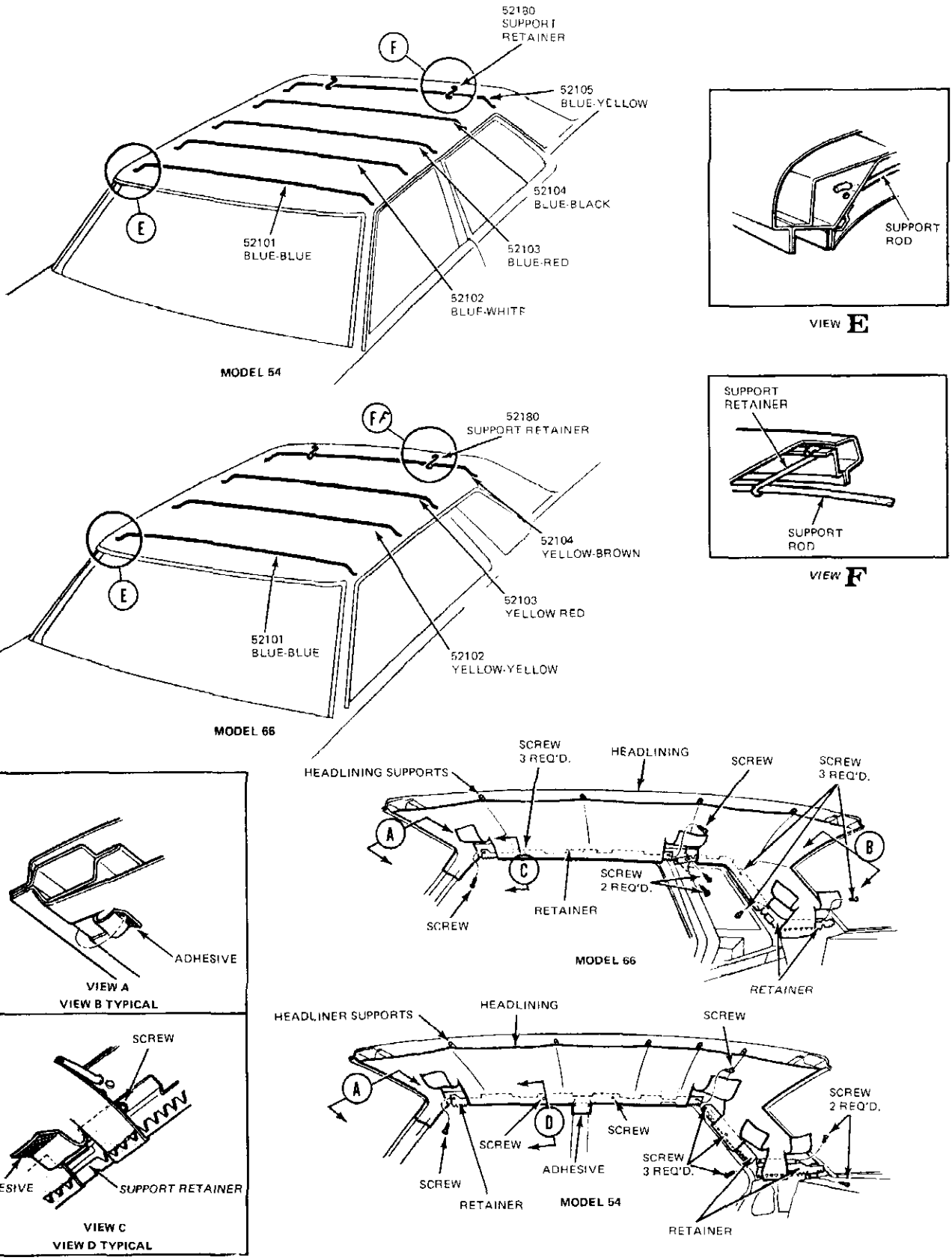


FIG. 26 Roof Headlining—Mustang II with Sun Roof

8. Remove the right and left tacking strips.
9. Remove the front dome lamp bezel and lens.
10. Remove the right and left upper garnish mouldings.
11. Remove the back window upper garnish mouldings.

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R1924-2B

FIG. 27 Headlining Installation—Granada and Monarch

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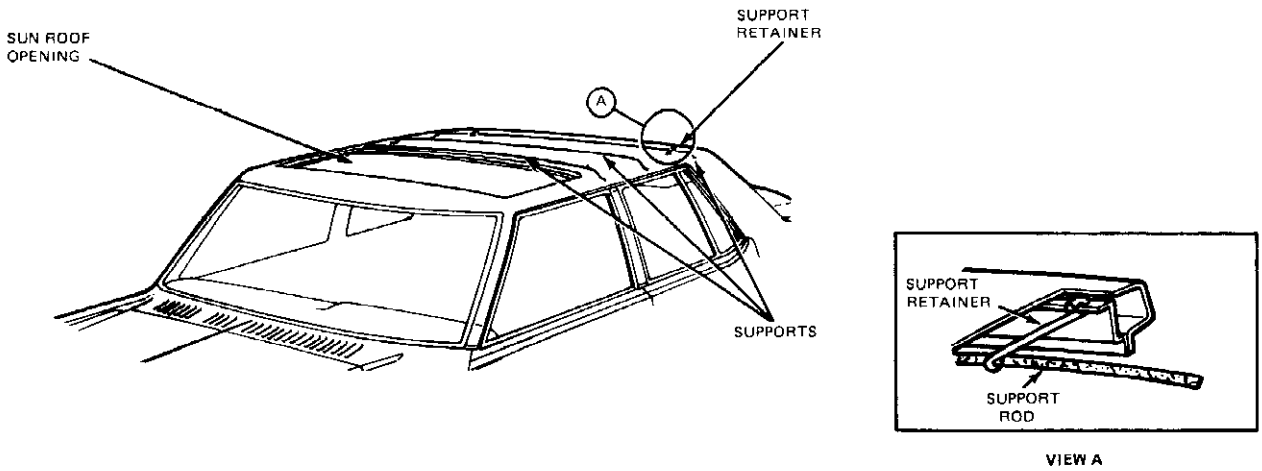


FIG. 28 Headling Installation—Versailles

12. Remove the right and left upper rear corner finish mouldings.
13. Remove the rear dome lamp lens (two screws).
14. Remove the weatherstrip and/or lift gate hinge cover from the flange at the top of the tailgate opening for access to the area to which the headliner is cemented.
15. Remove the staples that fasten the headlining to the retainer assemblies.
16. Unhook the headlining from the tabs.
17. Cut the headlining under the quarter window weatherstrips.
18. Pull the headlining loose from the cemented area over the windshield.
19. Pull the headlining loose at the tailgate flange.
20. Unhook the support rod rear retainers from the rear headlining support rod, disengage all support rods from the holes in the right and left roof rails, and remove the headlining from the vehicle.

Installation

1. Unpackage the new headlining and lay it out on a flat surface.
2. Trim the listings on the new headlining to the approximate length of those on the old one. Remove the support rods from the old headlining and install them in the same relative rod listings of the new headlining.

   Roof headlining support rods are color coded at each end. When ordering new rods, be sure to note the color at each end of the rod. The color codes are indicated in the Car Parts Master Catalogue.
3. Hook the rear retainers to the rear support rod.
4. Secure the headlining to the retainer assemblies above each door opening.
5. Apply cement to the quarter window areas, tuck the material under the weatherstrip, and trim the excess.
6. Hook the headlining to the tabs.
7. Cement the headlining to the area along the flange at the tailgate opening and install the weatherstrip to the rear flange.
8. Cut a hole in the headlining material and install the rear dome lamp lens (two screws).
9. Install the right and left upper rear corner finish mouldings.
10. Install the back window upper garnish moulding.
11. Install the right and left quarter upper garnish mouldings.
12. Cut a hole in the material and install the front dome lamp bezel and lens.
13. Install the right and left shoulder belt assemblies (one bolt each).
14. Install the four extruded plastic roof side mouldings (front and rear on right and left sides).
15. Install the right and left quarter window front garnish mouldings.
16. Install the right and left roof side rear moulding caps.
17. Reposition the upper ends of the A post mouldings and install the retaining screws.
18. Install the windshield upper garnish moulding.

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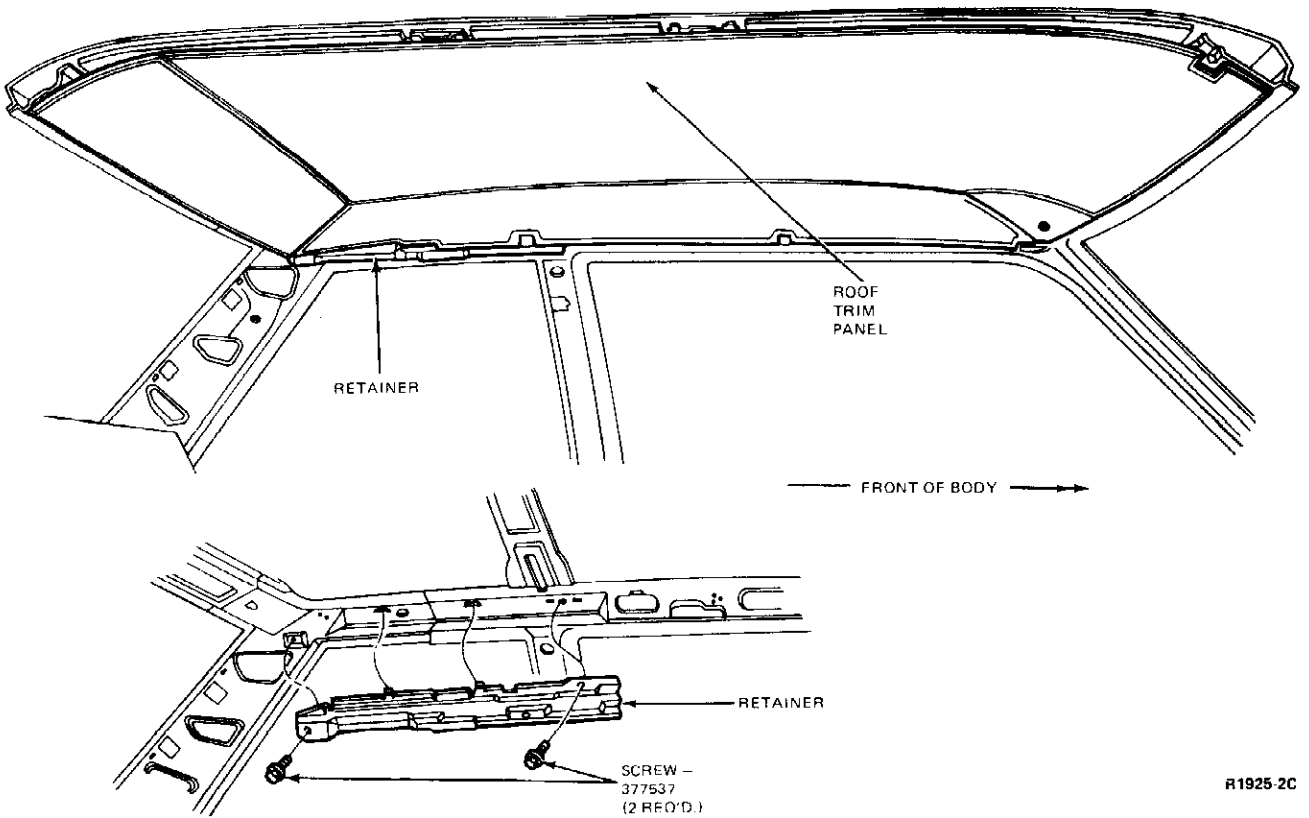


FIG. 29 Headlining Installation—Fairmont and Zephyr

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DETROIT IRON

19. Install the right and left visor and bracket assemblies.

Continental Mark V

Removal

1. Remove the sun visor and bracket assemblies.
2. Remove the windshield upper garnish mouldings. Remove the upper screw from the two windshield side garnish mouldings and position the mouldings away from the windshield A pillars.
3. Remove the shoulder belt assemblies, retainers, coat hooks and side mouldings.
4. Remove the rear seat cushion and back assemblies (Group 41) and remove the package tray and back window garnish mouldings.
5. Remove the rear roof side trim cover retaining screws (unsnap retainers) and disconnect the courtesy lamps.
6. Remove the upper halves of both rear quarter trim panels Group 45.
7. Pull the headlining from the tacking strips (Fig. 5). Pull the headlining away from all cemented areas.
8. Unhook the headlining supports from their retaining clips in the roof side inner rails, and remove the headlining assembly from the vehicle (Fig. 5). **Mark the holes from which the supports are removed so that the same holes are used during installation.**

Installation

1. Unpackage the new headlining and lay it out on a flat surface.
2. Remove the supports from the old headlining and install them in the same relative support listings of the new headlining. **Roof headlining supports are color coded at each end. When ordering new supports, be sure to note the color at each end of the support.**
3. Position the headlining to the roof panel.
4. Apply adhesive to the areas shown in Fig. 5 and staple the headlining to the retainers.
5. Install the upper halves of both rear quarter trim panels.
6. Place the roof side trim covers into position and connect the courtesy lamps. Install the retaining clips.
7. Install the package tray and rear seat cushion and back assemblies.
8. Install the back window garnish mouldings.
9. Install the side mouldings, shoulder belt, retainers and coat hooks.
10. Install the windshield garnish mouldings (upper) and install the sun visors.
11. Install the A pillar post mouldings.

GARAGE DOOR OPENER

DESCRIPTION

The transmitter is an integral part of the driver's side Mirror-Map-Lite unit of the sunvisor and is actuated by depressing the switch marked "GARAGE". When depressed, a red lens L.E.D. will light indicating operation. There are no batteries to wear out or replace as the power is supplied by the vehicle's electrical system.

The system is composed of two units. The first is a radio transmitter located in the sunvisor. The second is a receiver to be located in the garage. The receiver, when it is activated by the signal from the transmitter, will then actuate the existing electric door opener.

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Instrument Panel Pad

PART 45-61

REMOVAL AND INSTALLATION

FORD

1. Remove one screw on each side of the defroster nozzle opening (Fig. 1).
2. *Remove three screws on the ledge above the glove* box door.
3. Remove four screws around the instrument cluster opening and remove the instrument panel pad and upper finish panel assembly.
4. If the pad is to be replaced, remove the six retaining nuts and separate the pad from the upper finish panel (Fig. 1).
5. Position the instrument panel pad and finish panel. Then, install the nine attaching screws.

MERCURY AND LINCOLN CONTINENTAL

1. Remove one screw on each side of the defroster nozzle opening (Fig. 2).
2. Remove four screws going up into the pad (entire length of pad).
3. Remove one screw at each end of pad (inboard side) and remove the instrument panel pad and upper finish panel assembly.
4. If the pad is to be replaced, remove the retaining nuts and separate the pad from the upper finish panel.
5. Position the instrument panel pad and finish panel. Then, install the eight attaching screws.

FAIRMONT AND ZEPHYR

Removal

1. Remove three (3) cluster panel retaining screws. (C)
2. Remove four (4) instrument panel pad retaining screws, (A) in front of panel.
3. Remove two (2) instrument panel pad retaining screws, (B) in top defroster openings, and remove the pad.

Installation

1. To install the Instrument Panel Pad and Cluster Panel, reverse the above procedure, making sure all six (6) Instrument Panel and three (3) Cluster Panel screws are installed.

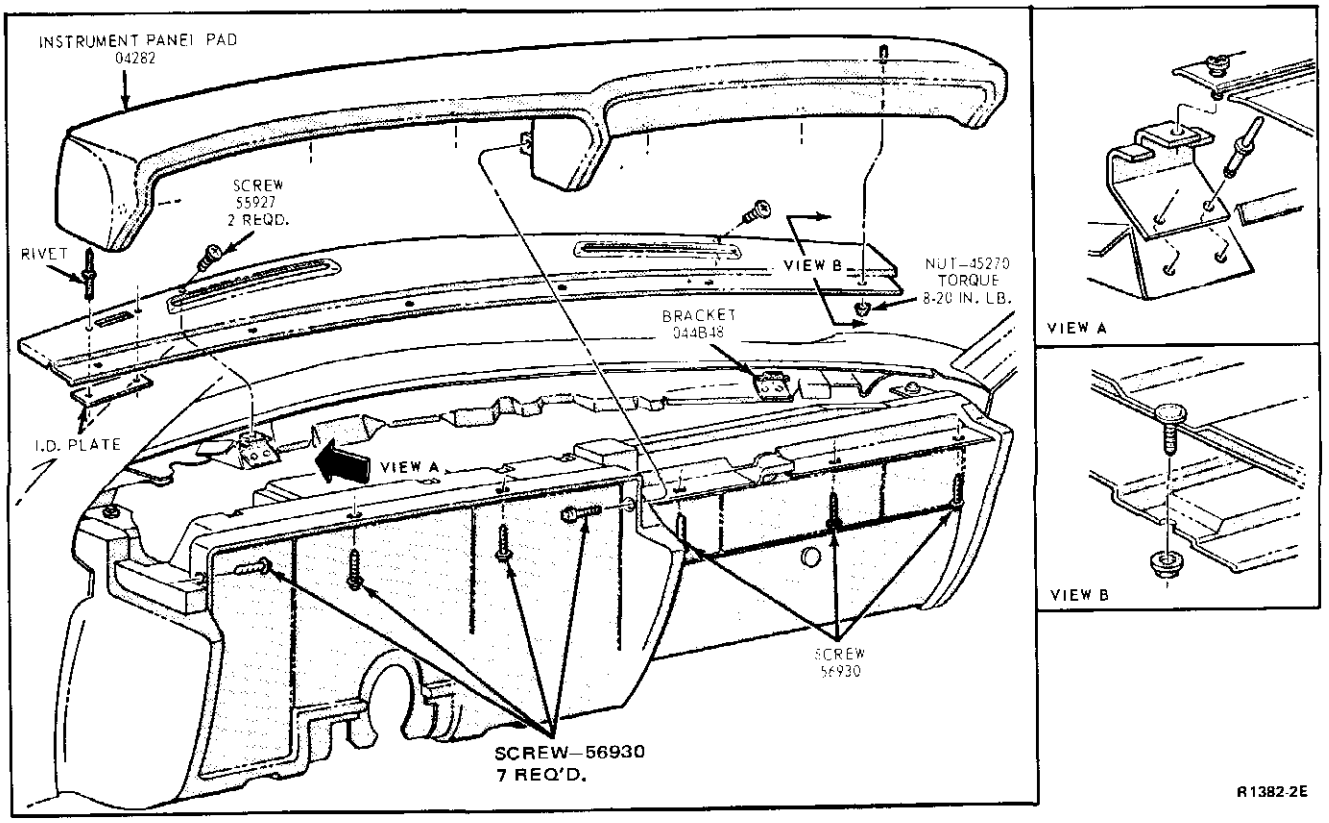


FIG. 1 Instrument Panel Pad—Ford

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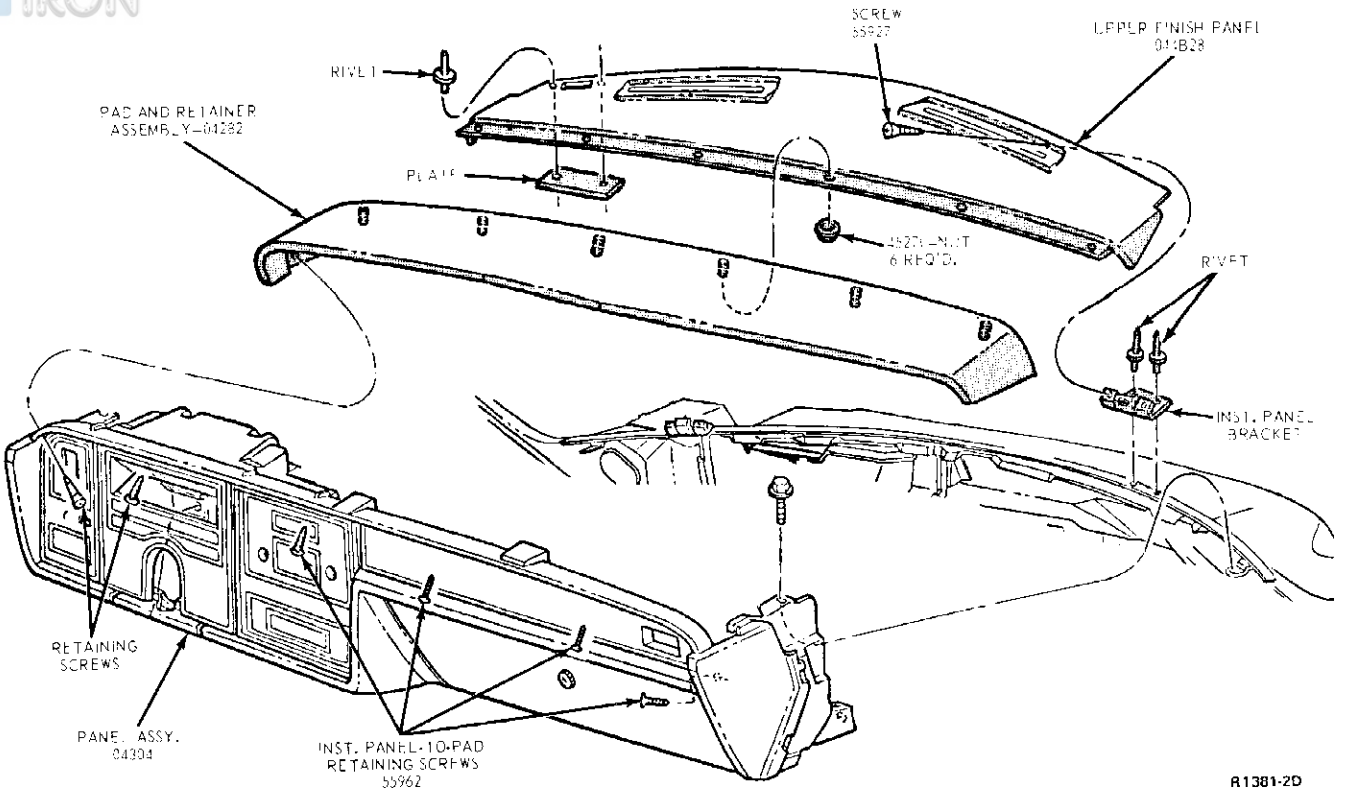


FIG. 2 Instrument Panel Pad—Mercury and Lincoln Continental

THUNDERBIRD, LTD II, RANCHERO AND COUGAR

Removal

1. Remove two screws from around the instrument cluster opening, one screw above steering column, and two screws from above the glove box door.
2. Remove one screw from the top right surface of the instrument panel upper finish panel.
3. Remove the instrument panel pad by pulling rearward and then up to disengage clips from the cowl top flange.
4. If the pad is to be replaced, remove five retaining nuts and separate the pad from the upper finish panel (Fig. 4).

Installation

1. When installing an instrument panel pad and finish panel assembly, replace any spring clips that were distorted or damaged during pad removal.
2. Position the pad and finish panel in the vehicle and engage the S-clips on the finish panel with the cowl top flange.
3. Push the instrument panel pad and finish panel forward and install the five pad retaining screws and one finish panel attaching screw (Fig. 4).

CONTINENTAL MARK V

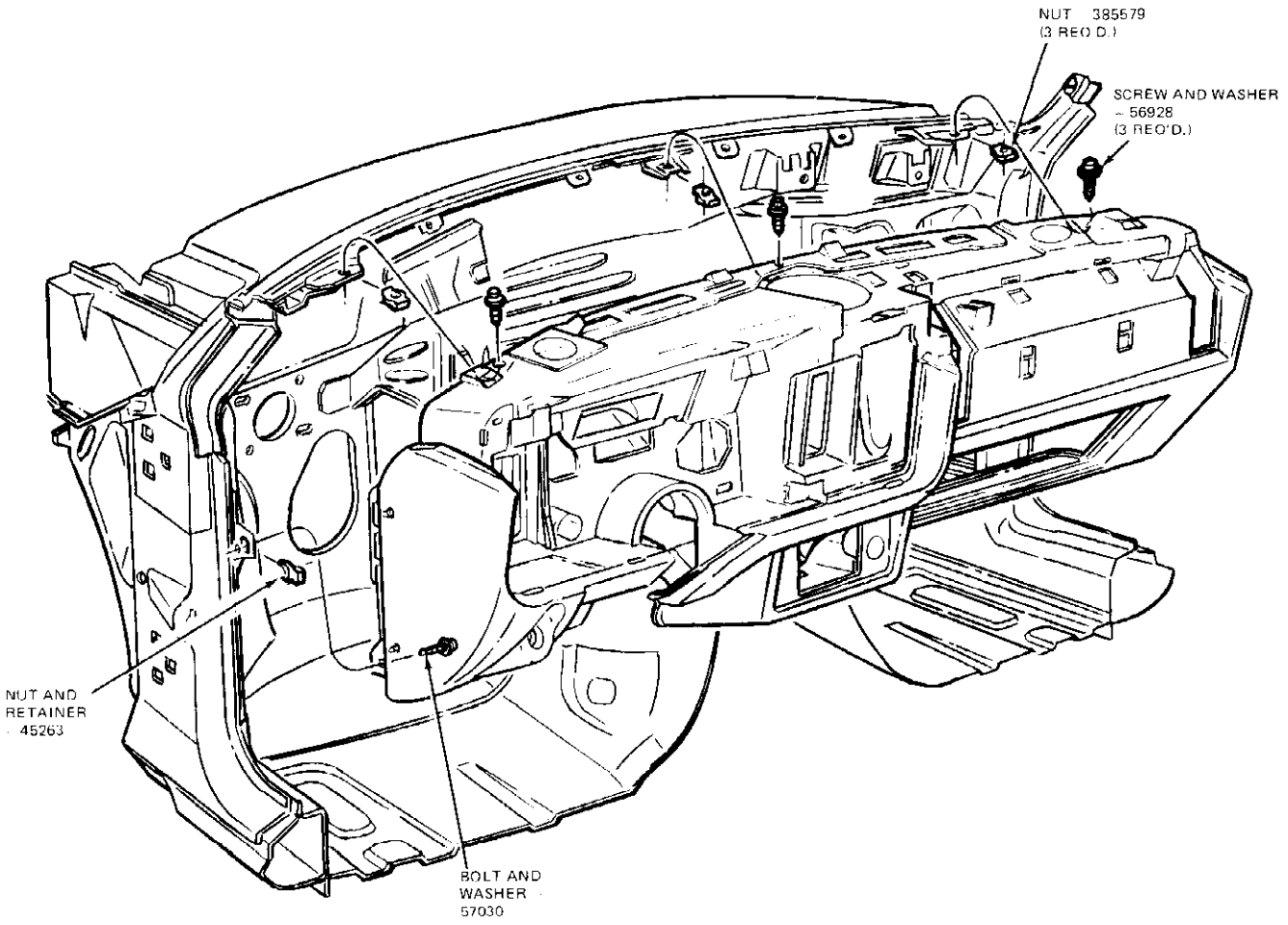
Removal

1. Disconnect the ground cable from the battery.
2. Remove one screw from the left end and three screws from the right end of the instrument panel (Fig. 5).
3. Remove four screws from under the lower right side of the instrument panel pad above the glove compartment opening.
4. Remove retaining screws above the instrument cluster. These screws also retain the access cover over the cluster.
5. Remove the instrument panel cluster finish panel as outlined in Part 33-50.
6. Remove the instrument panel pad and retainer assembly and the upper finish panel from the instrument panel by tilting upward and pulling rearward.
7. If the pad is to be replaced, remove six retaining nuts and separate the pad from the upper finish panel. Remove three screws attaching the right finish panel to the upper flange. Then, tilt down and pull rearward.

Installation

1. When installing an instrument panel pad and retainer assembly and an upper finish panel, replace the spring clips at the three outside positions on the windshield edge of the upper finish panel.
2. Position the instrument panel pad and retainer and upper finish panel in the vehicle. Engage the spring clips on the upper finish panel with the cowl panel upper tabs.
3. Install the instrument panel pad retaining screws.
4. Install the instrument panel cluster opening finish panel as outlined in Part 33-50. Then, connect the

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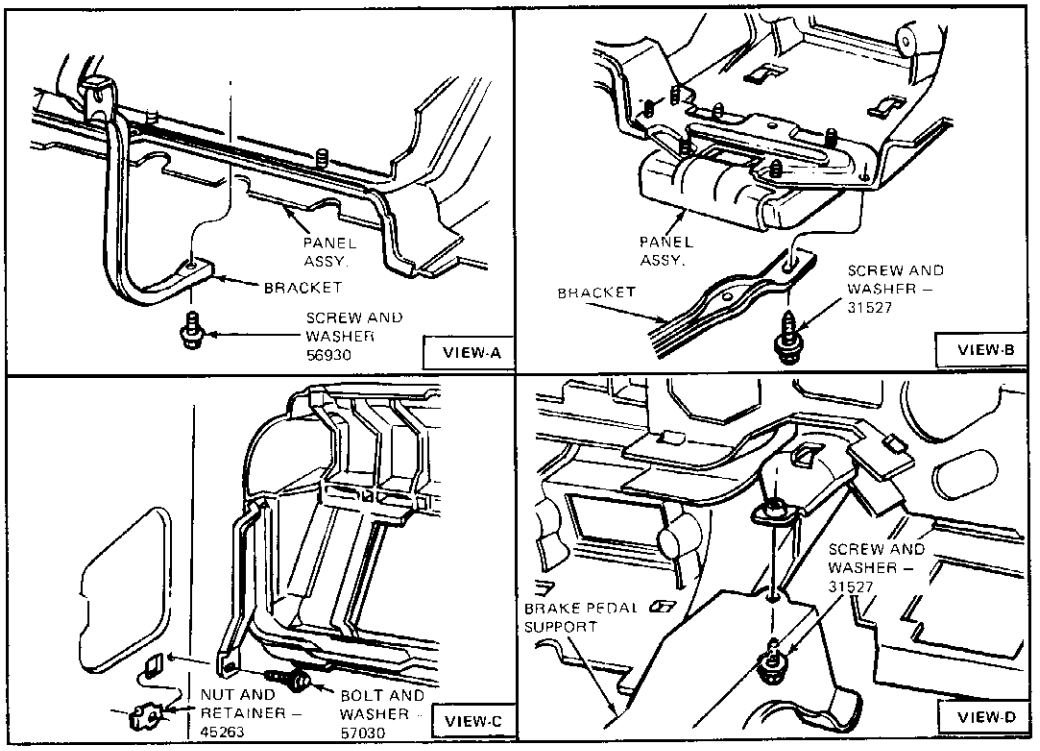


FIG. 3 Instrument Panel Pad—Fairmont and Zephyr

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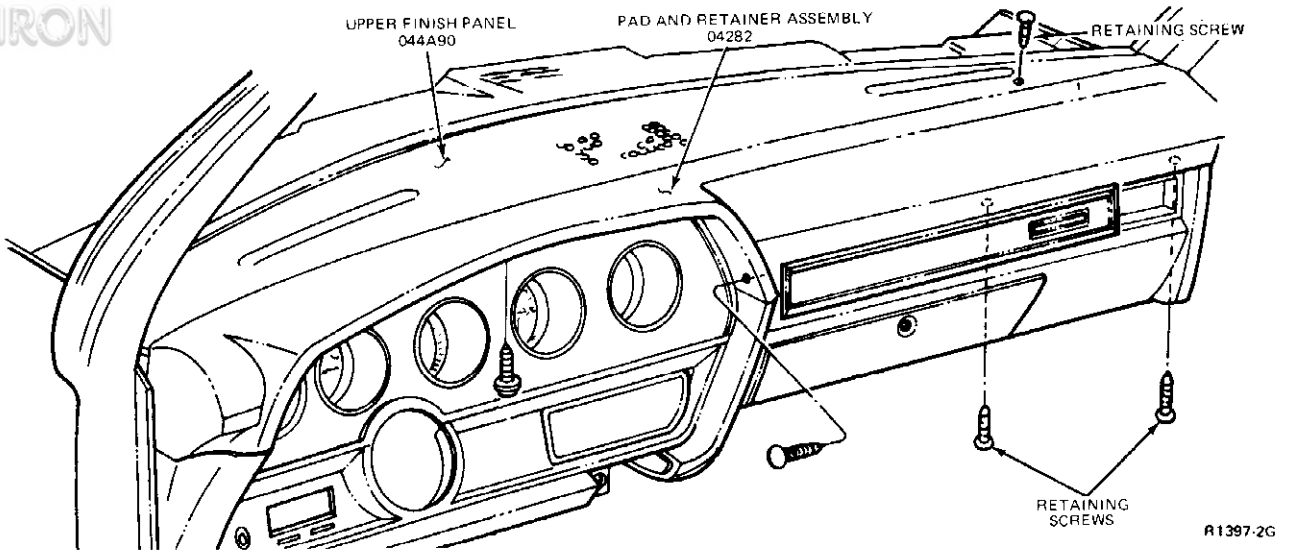


FIG. 4 Instrument Panel Pad—Thunderbird, LTD II, Ranchero and Cougar

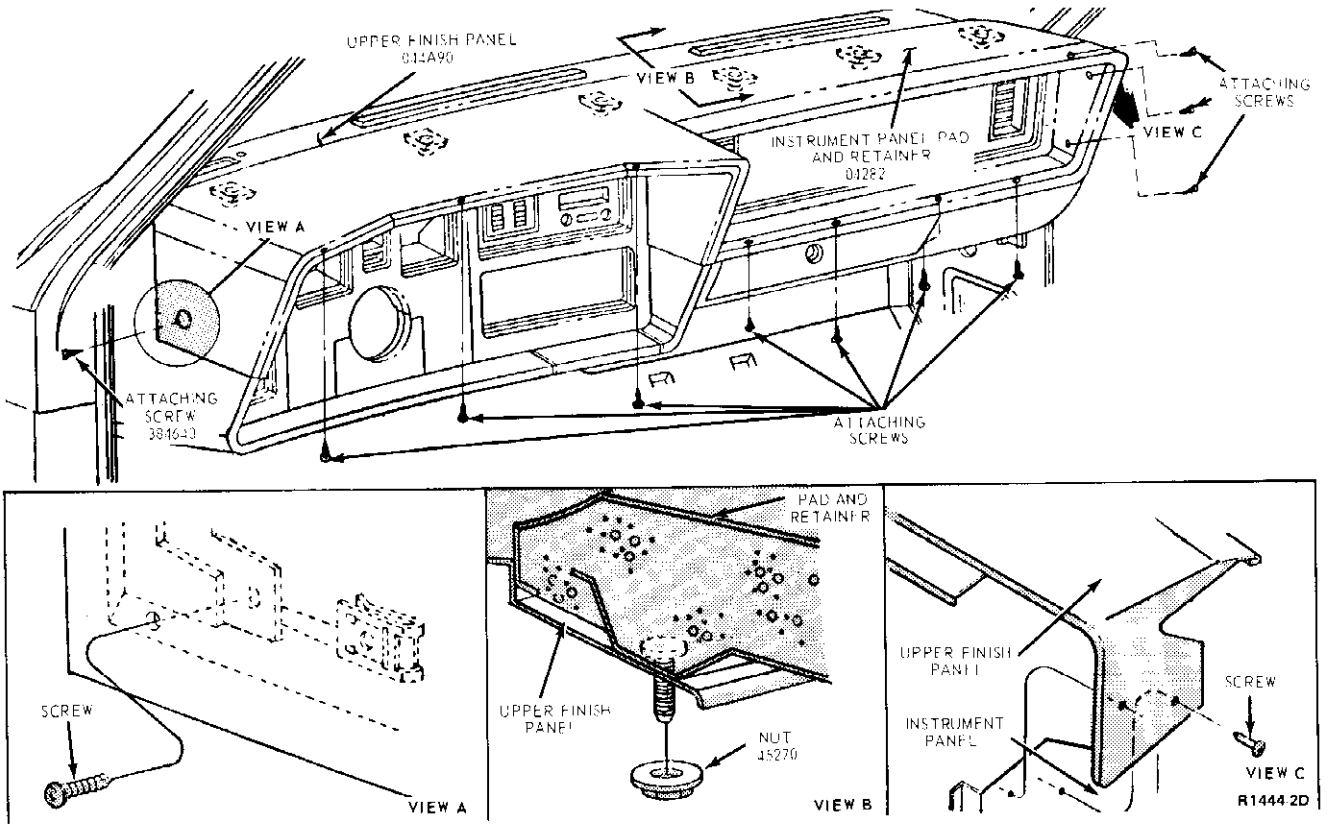


FIG. 5 Instrument Panel Pad—Continental Mark V

ground cable to the battery and check the operation of the instruments and controls.

MONARCH, GRANADA AND VERSAILLES

Removal and Installation

The Granada, Monarch and Versailles instrument panel is shown in Fig. 6. Remove one screw from each defroster opening and six screws from along the lower edge of the pad. Then, pull the pad and upper finish panel rearward and away from the instrument panel.

To install, position the pad and upper finish panel on the instrument panel and attach with eight screws.

Mustang II

The Mustang II instrument panel pad is shown in Fig. 8. Remove one screw from each defroster opening and five screws from along the lower edge of the pad (Fig. 7). Then, pull the pad and finish panel rearward and away from the instrument panel.

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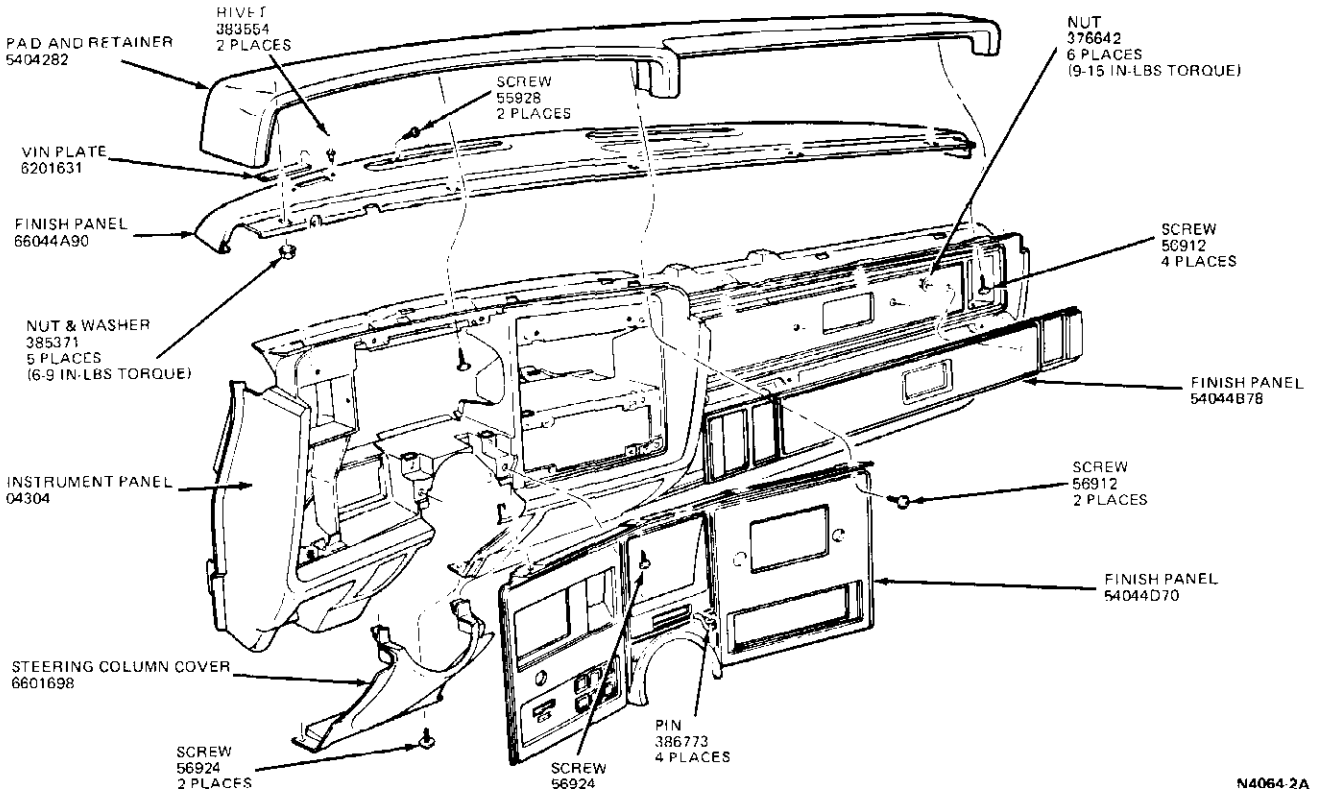


FIG. 6 Instrument Panel Pad—Monarch, Granada and Versailles

To install, position the pad and finish panel to the instrument panel, and install the seven attaching screws (Fig. 7).

PINTO AND BOBCAT

Removal

1. Disconnect the battery negative ground cable.
2. Disconnect the speedometer cable by pressing on the flat surface of the plastic connector (quick connect) and pulling the cable away from the speedometer head.
3. Remove the (2) retaining screws at the top of the cluster and remove the cluster from the instrument panel (Group 33).
4. Remove the (2) screws securing the glove compartment door and remove the door.
5. Remove the right and left air register assemblies (Snap-out).
6. Remove the right and left air register ducts from the plenum (secured with 1 clip on each side).
7. Remove (6) nuts retaining the upper edge of the instrument panel pad. These are reached from under the dash panel area (Fig. 9).
8. Remove 4 screws retaining the front lower edge of the instrument panel pad.
9. Remove the instrument panel pad from the vehicle.

Installation

1. Position the instrument panel pad to the instrument panel.
2. Install the (6) nuts and (4) screws loosely to facilitate alignment of all holes without binding.
3. *Tighten all fasteners securely.*
4. Install the right and left air register ducts to the plenum by sliding into position.
5. Install the right and left air register assemblies and secure with (1) clip on each side.
6. Install the glove compartment door (2 screws) and adjust if necessary.
7. Position the cluster assembly, connect the multiple connector and secure with (2) screws.
8. Connect the speedometer cable by pushing and locking the quick connect.
9. Connect the negative ground cable to the battery.

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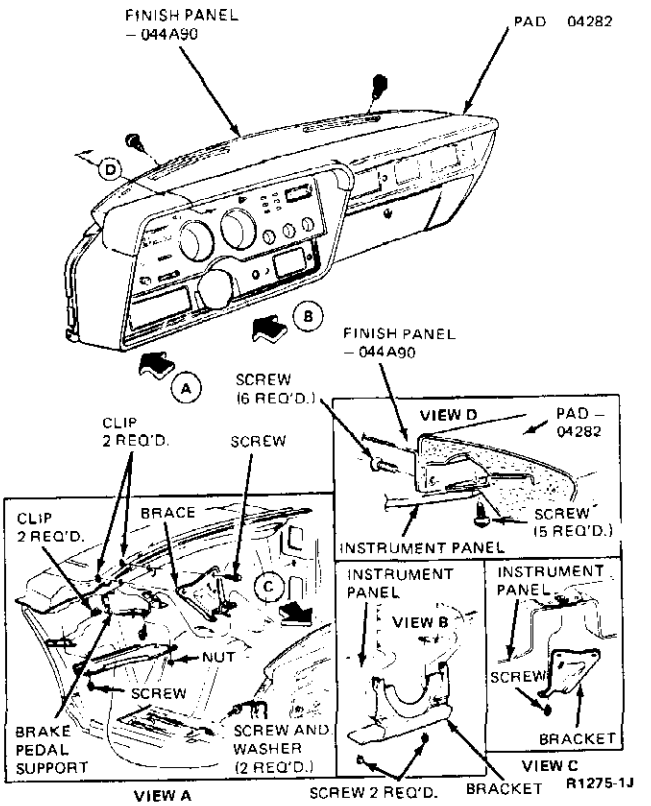


FIG. 7 Mustang II Instrument Panel Pad

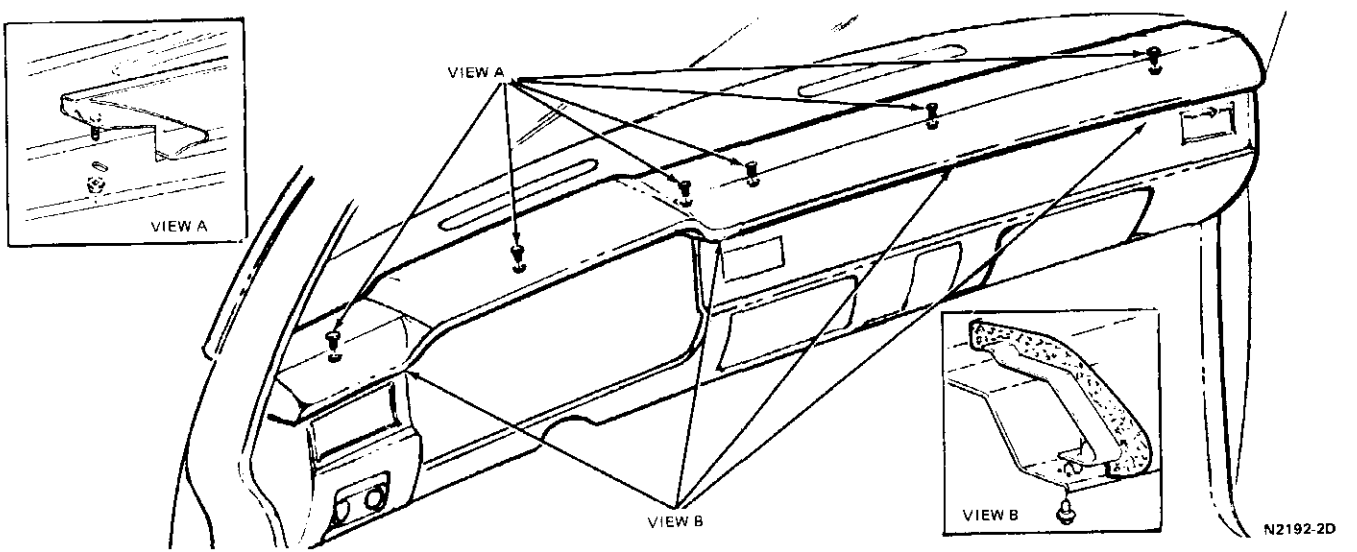


FIG. 8 Instrument Panel Pad—Pinto and Bobcat

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TOPS AND EXTERIOR FINISHES

GROUP 46

PART TITLE	PART NO.	PART TITLE	PART NO.
Top and Exterior Finish General Service	46-01	Removable Sun Roof	46-12
Electric Moon Roof	46-05	Roof Outside Cover	46-20
Manual Sun Roof Panel	46-11	Wood Grain Transfer	46-30

CR2007-2B

Top & Exterior Finish General Service

PART 46-01

CN4140-2A

GENERAL INFORMATION

For detailed information on paint repair, refer to the handbook entitled Spot Repairing Original Enamel finishes with Acrylic lacquer, Form FD-7953-Q.

CLEANING

Paint

The outside finish should be washed frequently. Never wipe the painted surface with a dry cloth. Dusting the finish when it is dry tends to rub the dust and dirt into the baked enamel, and leaves a sandpaper effect on the surface. To keep the finish bright and attractive and eliminate the necessity of using polish, wash the car whenever it has accumulated a moderate amount of dirt and road salt.

Wood Grain Transfers

Never wipe the panels or trim rails with a dry cloth. This method of cleaning tends to rub dust particles into the finished surface and leave fine scratches. Flush off all loose dirt and other elements, and wipe the body panels and rails with a sponge and plenty of cold water. If desired, a mild soap may be used. Rinse thoroughly with clear water and wipe dry.

Glass

The glass should be cleaned with Ford Glass Cleaner (C8AZ-19C507-A) or equivalent, using a clean, soft, lint-free cloth. Follow the directions shown on the container.

CLEAR COAT PAINT REPAIR PROCEDURE

An extremely glossy "wet look" paint finish called Clear Coat is available as an option. In production, two coats of enamel color (base) and two coats of clear enamel are applied. However, due to the toxicity of air dry enamel (which requires polyisocyanate as a drying agent), only acrylic lacquer should be used in making repairs. See Specification Chart for part numbers.

Clear acrylic lacquer is a transparent material which, when sprayed over a metallic or solid color coat, provides a high gloss level. The gloss level is influenced *by the number of lacquer clear coats applied. The repair* color coat and clear coat must be sprayed with extreme care. Unlike conventional exterior paint that can be sanded if a run or a sag occur, the color coat must be free of all imperfections before the clear coat is applied. Any dirt particles, mottling, sand scratches or sags left in the color coat will be magnified when the clear coat is applied.

COMPLETE PANEL REPAIR

1. Prepare surface as normal, with particular care that sand scratches have been removed.
2. **BASE COAT COLOR** —Acrylic lacquer reduced 125 percent with AR60-644-A or equivalent.
3. With 35 psi **AT THE GUN,** spray a minimum of four medium wet coats, allowing 1-2 minutes flash time between these coats. After final coat, allow 15 minutes flash time.
4. ***CLEAR COAT*** *—Using Ford acrylic lacquer AR60-*644-C, or equivalent, apply 2 medium wet coats. This is very important in order to achieve a comparable gloss match with the rest of the finish.
5. Allow 4 hours air dry or 30 minutes at 165°F. Compound by machine with Acrylic Rubbing Compound AR60-3789-A or equivalent.

SPOT REPAIR

1. *Use Complete Panel Repair Procedure and finish* blend area with Ford Final Blend Coat AR60-650-A or equivalent.
2. Apply one mist coat and allow to flash. Follow with medium wet coats overlapping each coat. Air pressure at the gun should be 20 psi. Allow 4 hours air dry time or 30 minutes at 165°F.

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SPECIFICATIONS

Paint Code	Color Name	Ford Part Number
5G	Light Chamois	AR60-5541-C
1T	Silver Poly	AR60-5538-C
1S	Medium Silver Poly	AR60-5537-C
5R	Medium Cordovan Poly	AR60-5534-C
35	Midnight Blue	AR60-5539-C
36	Wedgewood Blue	AR60-5540-C
5L	Midnight Cordovan	AR60-5542-C
9F	White	AR60-5543-C
5K	Medium Chamois Poly	AR60-5536-C
Clear Acrylic	Clear Acrylic Lacquer	AR60-50-C

CN4139-2A

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Electric Moon Roof

PART 46-05

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CR2852-2B

DESCRIPTION AND OPERATION

ELECTRIC OPERATION

The sliding moon roof panel moves on guide rails and is actuated by a reversible electric motor.

When the control switch is moved to open, the sliding roof panel moves from the closed position into a storage space between the headlining and stationary roof panel. This exposes an opening over the front passenger seating area.

When the control is moved to close the panel, the sliding panel travels from the storage position. Near the end of the forward travel, the rear portion of the sliding panel moves upward on two ramps and the rear link rotates to position the panel into the roof opening.

MANUAL OPERATION

To close the sliding panel manually (in case of electrical power failure), remove the drive cover by pulling downward. Then remove the screw which is visible when the cover is removed using the handcrank provided in the glove compartment.

To close the sliding panel, insert the screwdriver end of the crank handle into the auxiliary socket dirve. Turn the crank handle clockwise to close the roof.

After performing these operations, remove the crank handle, install the screw and the drive cover.

REMOVAL AND INSTALLATION

HALO MOULDING

To perform most adjustments or repairs on a moon roof, it is necessary to remove the halo moulding. **NOTE: If the vehicle has been sitting in the cold (less than 70 F), let the vehicle warm up prior to performing repairs. The plastic halo moulding is very brittle when cold and may crack if the moulding is deflected.**

To remove the halo moulding:

1. Cycle shade to most-rearward position.
2. Cycle the sliding panel about halfway open.
3. Remove the screws on the forward surface of the halo moulding (5 screws for Lincoln and Mark V, 3 screws for other models). (See Fig. 1).

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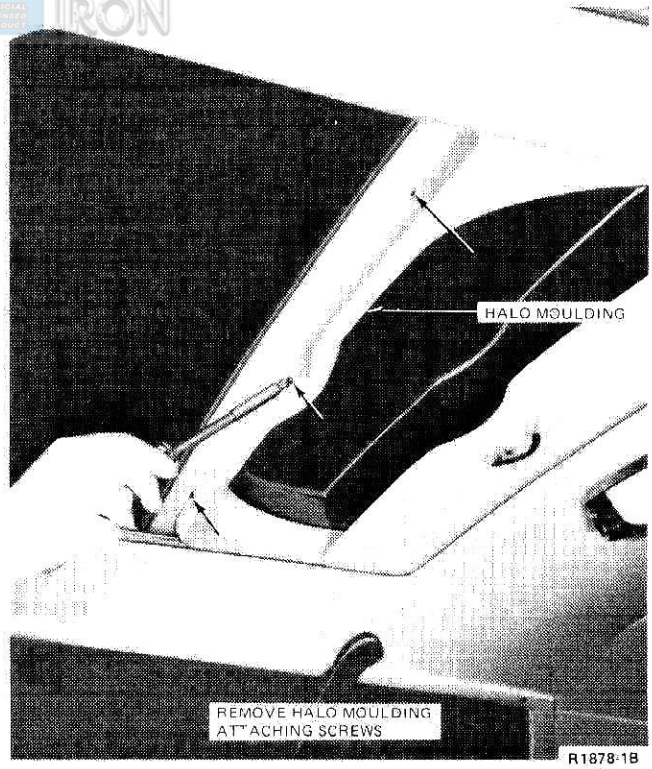


FIG. 1 Halo Moulding Removal

4. For Lincoln and Mark V vehicles, lower the front edge of the halo moulding, cycle the sliding panel to fully closed position. Then turn the halo moulding sideways and down as shown in Fig. 2.

5. For all other car lines, cycle the moon roof to a nearly closed position and pull the forward center of the halo moulding downward so the horizontal tabs at the front of the halo moulding are removed from the track mechanism as shown in Fig. 3.

NOTE: Place a clean rolled-up shop towel in the front horizontal tabs, to prevent the sharp corners from tearing the headliner when the sliding panel is cycled. Cycle the moon roof to the fully closed and raised position. Slide halo moulding forward. Pull the rearward center section so the horizontal track slide surface is removed from the track assembly. Slide the halo moulding forward and remove from the vehicle.

Reverse the procedure for installation.

SUN SHADE REMOVAL

For Lincoln Continental, Continental Mark V, Versailles, Thunderbird and Cougar models the halo moulding must be removed first. With the sliding panel in rearmost position pull the sun shade full forward and then bow the sun shade upward at the center and lift the sun shade out of the tracks (See Fig. 4). For all other models, first remove the halo moulding and sliding panel. Then from outside the vehicle, push the sun shade in the center as shown in Fig. 5. Slide the shade forward and upward out of the vehicle.

Reverse the procedure for installation.

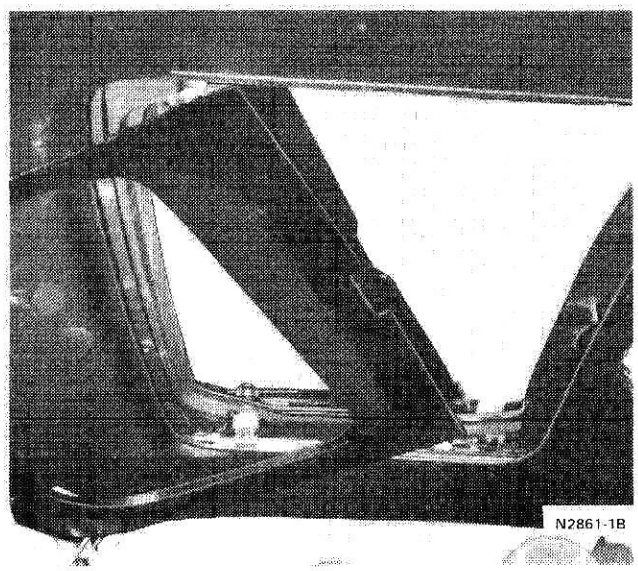


FIG. 2 Halo Moulding Removal

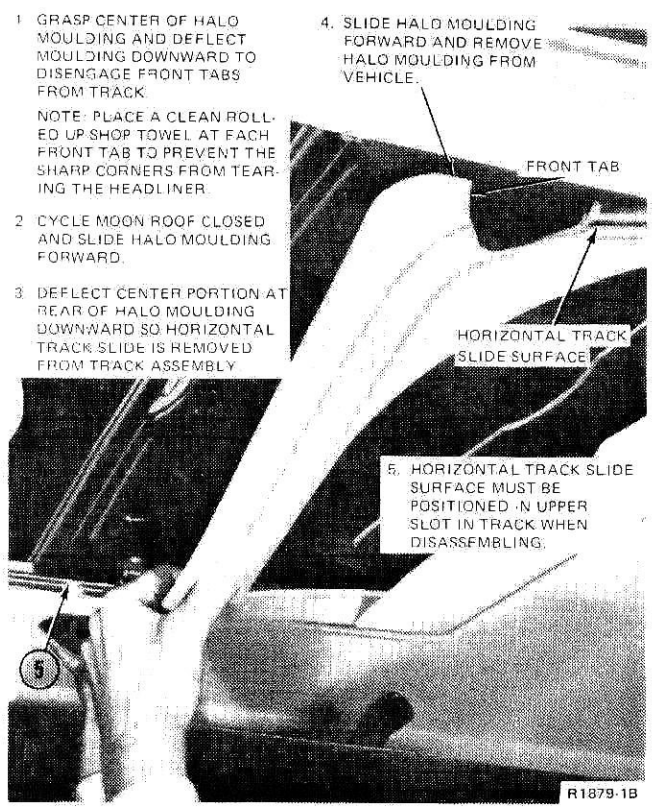


FIG. 3 Halo Moulding Removal

GLASS AND METAL SLIDING PANEL

Refer to the halo moulding or metal trim panel removal procedure and remove the halo moulding. Then:

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1. Detach the sliding panel from both left and right front slide assemblies. (2 screws each side). (See Fig. 6, View A).

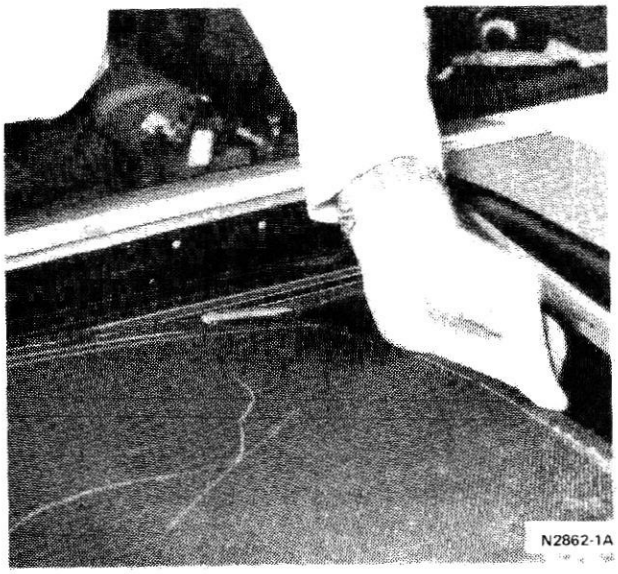


FIG. 4 Sun Shade Removal

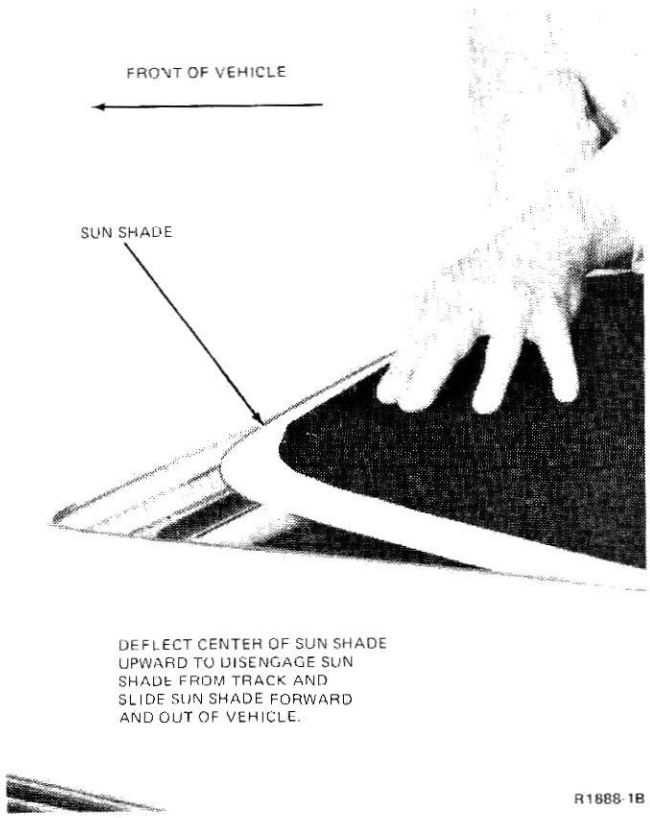


FIG. 5 Sun Shade Removal

Lincoln Continental, Continental Mark V, Versailles, Thunderbird and Cougar

2. Release the rear slide tension springs by rotating them to the inboard position.
3. Detach the sliding panel from the two rear slide assemblies by removing the two retaining screws (2 hex nuts for Thunderbird and Cougar) and remove the mounting bracket to panel retainers from the tabs in the panel. (See Fig. 6, View B).

All Other Models

2. Grasp rear sliding panel retainer pins and slide pins inboard to disengage from the pivot bracket. Rotate pins away from the pivot brackets as shown in Fig. 7.
3. From outside the vehicle, remove the sliding panel.
4. Reverse procedure for installation.

NOTE: If the sliding panel is to be replaced transfer the front guide shoes from the removed panel. The rear weatherstrip assembly on Lincoln Continental, Continental Mark V, Thunderbird, Cougar and Versailles can also be transferred to the new panel. All other models should have a new felt seal (of the appropriate color) installed on the rear sliding panel. Use trim cement to attach the felt seal to the rear of the panel. Install the seal so the thick bulbous section is flush to the top surface of the sliding panel.

CABLE ASSEMBLY

Lincoln Continental, Continental Mark V, Versailles, Thunderbird and Cougar

To remove a cable assembly the halo moulding and sliding panel must first be removed. Remove the front cable cover and the side track retainers. Remove the cable retainer at the drive gear (2 screws) and lift and slide the cable assembly forward out of the track. (See Fig. 8). Reverse the procedure for installation. For initial alignment of new cables, insert them in the tracks, install the side cable retainers and pull the cables as far forward as they will go. (Fig. 9). Then lay the cables into the front track, insert in the teeth of the drive gear and install the cable retainer and the front cable cover.

All Other Car Lines

To remove a cable assembly first remove the halo moulding and sliding panel. Then remove cable drive housing cover plate, remove track extension and corner cover housing. Remove cable retaining clip, and lift cable from drive housing. Slide the cable forward to remove from side track assembly. It may also be necessary to remove the track retaining screws and lift the track so the cable will slide out the front of the track.

Drive Gear

If the motor runs but the sliding panel does not operate, drive clutch slippage should be suspected. To tighten the clutch, remove the drive cover from the headlining and tighten the cap screw with the emergency crank handle.

To remove the drive gear, remove the front cable cover and cable retainer and remove the "C" clip that

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retains the gear to the motor shaft. Slide the drive gear upward and off the motor shaft.

Track

To remove the side track assemblies the front track cover and cable retainer must be removed first. Remove the side track retaining screws, raise the front edge of the track and slide the track forward to disengage the track rail guide pin from the housing (See Figs. 10 and 11).

FELT SEAL (FRONT)

All Models Except Lincoln Continental, Continental Mark V and Versailles

To replace the front felt seal, remove the halo moulding and sliding panel (See Removal and Installation).

Remove the old seal and clean the seal mounting surface with suitable solvent or Spot Remover (Part No. B7A-19521-A). If the felt seal ends were not securely glued at the rear roof opening radius, inspect the area very closely to determine if silicone sealer is evident on the felt seal mounting surface and carefully remove. Do not remove from the corner where the module is mounted to the roof panel. If removed, this can result in water leaks.

Apply masking tape on the roof panel, around the opening as shown in Fig. 12, View B. Apply weatherstrip adhesive Part No. COAZ-19552-A or 3M adhesive Part No. 1099 or equivalent, on the seal mounting surface and the backside of the felt seal.

Remove masking tape from the roof panel. Starting in the rear corner, position the felt seal 3/4 inch to 1 inch behind opening. Carefully position the felt seal into the opening so that it is flush to the roof panel surface. Use extra pressure in the front corner(s) so that the seal will not "pull" or "short cut" at the corners. Trim off excess seal material at the other rear corner, so that 3/4 inch to 1 inch of the seal is positioned rear of the opening.

Install the sliding panel and halo moulding. Then, cycle to assure that the sliding panel functions normally. If the sliding panel appears to bind against the new seal assembly, apply silicone lubricant spray Part No. COAZ-19553-C or equivalent on the new seal to facilitate "break-in".

BODY OPENING WEATHERSTRIP

Lincoln Continental, Continental Mark V and Versailles

It is not necessary to remove the halo moulding or sliding panel to service the front weatherstrip on these vehicles. To replace, drill out the weatherstrip attaching rivets with a 1/8 inch dia. drill and install new weatherstrip with 1/8 inch aluminum blind rivets by aligning rear edge of weatherstrip with the notch in the roof downstanding flange.

REAR SEAL

All Models Except Lincoln Continental, Continental Mark V and Versailles

To replace the rear felt seal, remove the halo moulding and sliding panel. See Removal and Installation.

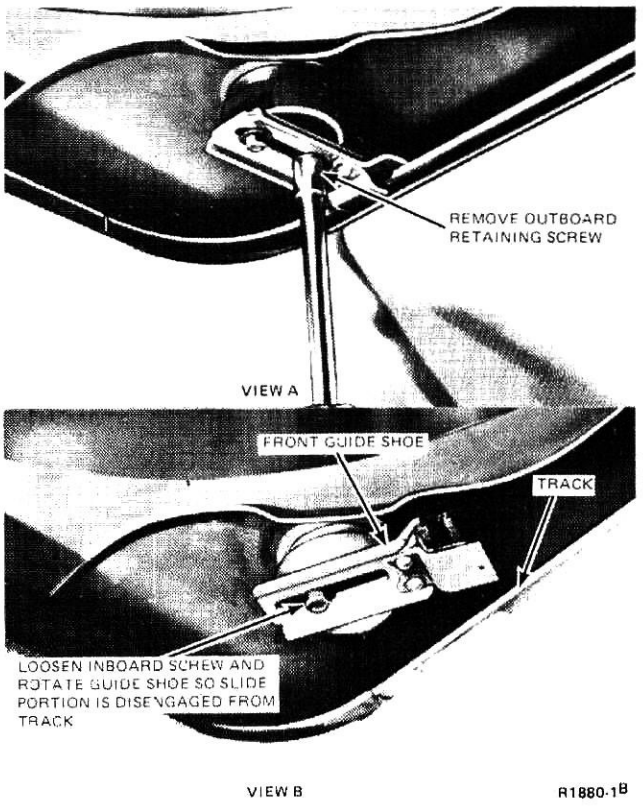


FIG. 6 Sliding Roof Panel Removal

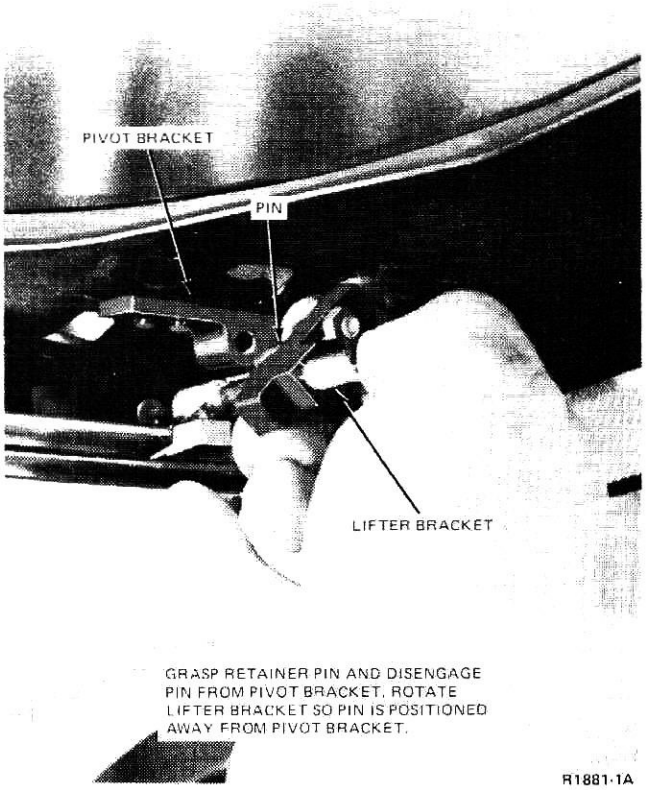


FIG. 7 Sliding Roof Panel Removal

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Place the removed sliding panel on a clean work bench. Remove the old seal from the rear of the sliding panel (Fig. 12, View A). Then, apply weatherstrip adhesive Part No. COAZ-19552-A or 3M adhesive Part No. 1099 or equivalent on the seal mounting surface. Also, apply adhesive to the backside of the felt seal. Remove the masking tape from the sliding panel and install the seal so that the thick bulbous section is flush to the surface of the sliding panel.

Install the sliding panel and halo moulding. Then, cycle to assure that the sliding panel functions normally and does not bind or interfere with the front felt seal.

Lincoln Continental, Continental Mark V and Versailles

The rear seal on these vehicles is an integral part of the rear weatherstrip assembly. It is attached to the sliding panel with 12 screws.

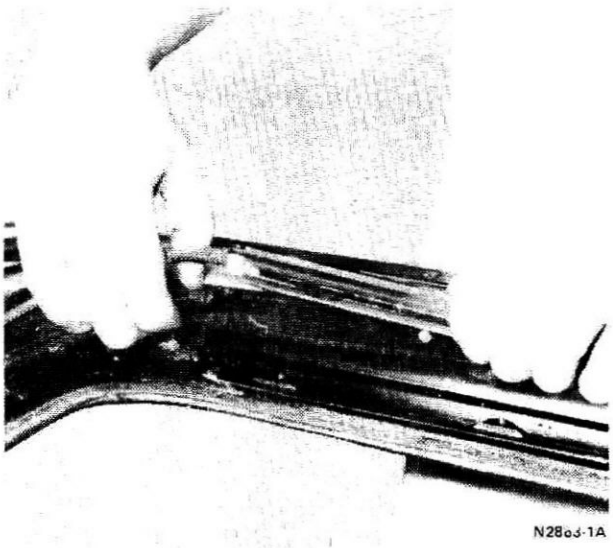


FIG. 8 Cable Removal

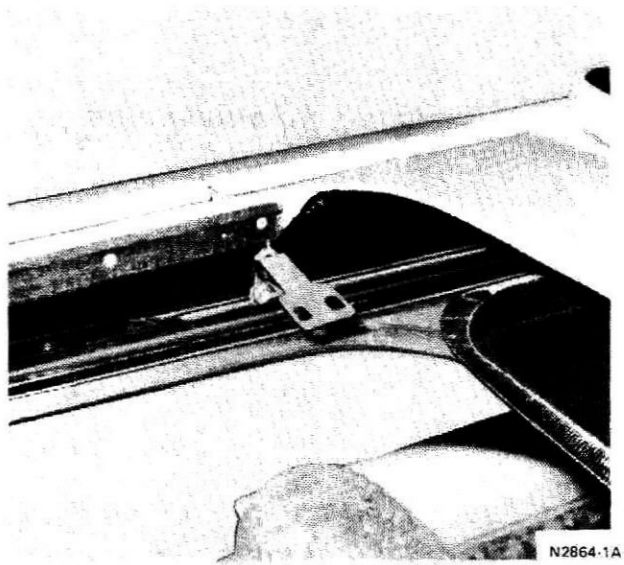


FIG. 9 Initial Cable Alignment

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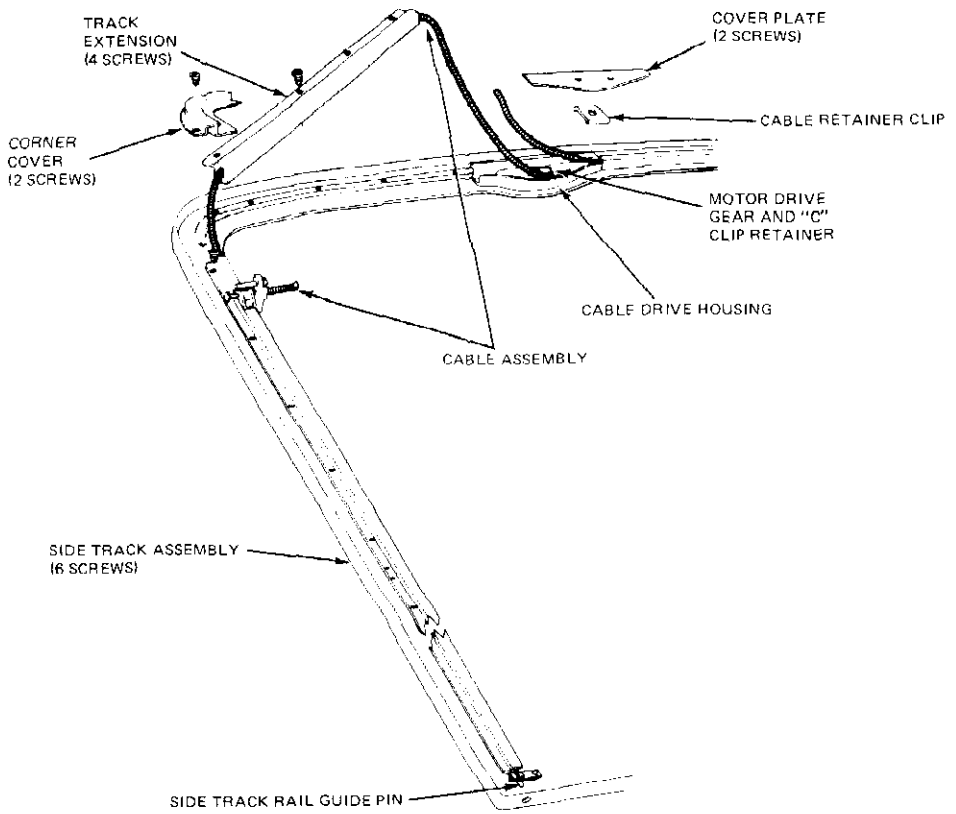


FIG. 10 Cable, Drive Gear and Track Removal—All Except Lincoln Continental, Continental Mark V, Versailles, Thunderbird and Cougar

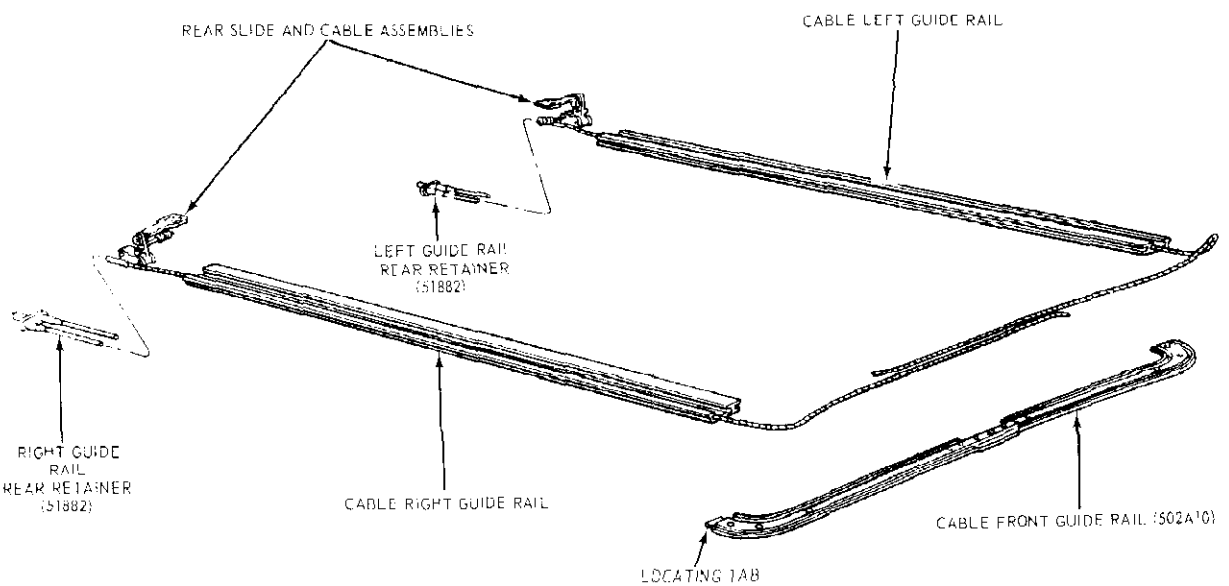


FIG. 11 Cable and Guide Rail System—Lincoln Continental, Continental Mark V, Versailles, Thunderbird and Cougar

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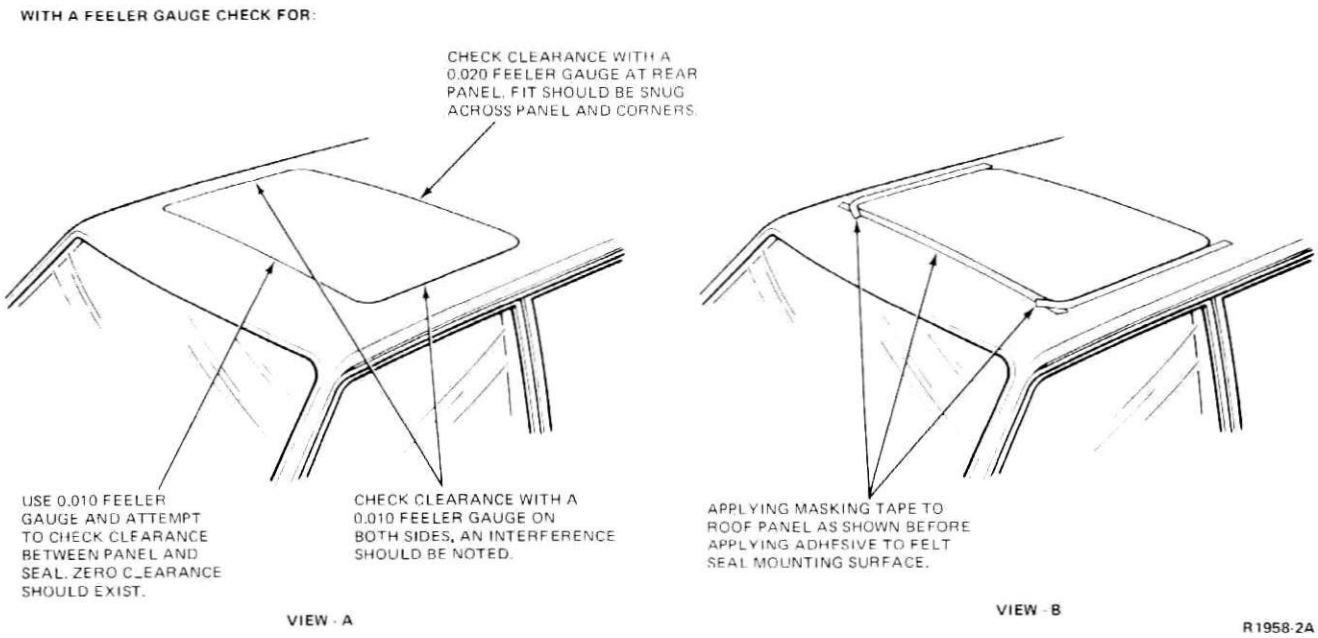


FIG. 12 Panel Checking Procedures

ADJUSTMENTS

ROOF PARALLEL ALIGNMENT

CAUTION: Do not activate the control switch while the cover or cables are removed from the track, as this can cause cable damage.

It is not necessary to remove the halo moulding to perform parallel alignment adjustment on the sliding panel.

1. Open the sliding panel approximately 1/4 inch to 1/2 inch.
2. Sight down the opening to determine the parallel relationship of the forward edge of the sliding panel with the forward edge of the opening in the roof panel and note the variation, see Fig. 8.
3. Open the sliding panel approximately 8 inches to gain access to the cable/drive gear mechanism.
4. Remove the front track cover and cable cover to gain access to the drive gear. (See Fig. 13).
5. Pry metal retaining clip off the cable drive gear mechanism if so equipped.
6. Remove one of the cables from the track as shown in Fig. 10.
7. Slide one side of the sliding panel assembly slightly fore or aft as required to obtain a parallel alignment.
8. Insert the cable into the track. If the unit utilizes a cable clip as shown in Fig. 14 be sure that it is properly oriented, and install the cover.

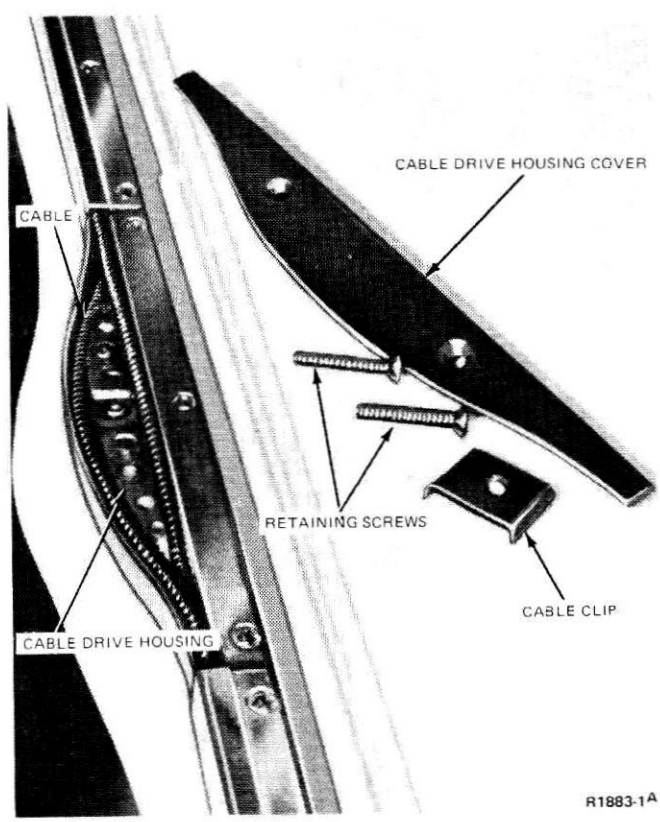


FIG. 13 Cable Cover Removal

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NOTE: The front and rear flanges on the clip are not the same width. The narrow side of the clip must be positioned toward the front of the vehicle, and firmly seated into the notches in the track assembly. If the clip is improperly positioned in the track, the flanges will not go into the grooves in the track and will result in extensive damage to the cables. See Fig. 14, View A.

9. Cycle the sliding panel to approximately 1/4 inch from the closed position and check the parallel relationship.
10. Repeat above procedure, if required, until a parallel relationship is obtained.

SLIDING PANEL FLUSHNESS OR HEIGHT ADJUSTMENT

To obtain a flush fit of the sliding panel to the roof panel, remove halo moulding to gain access to adjusters and refer to Fig. 15 for correct flushness specifications and the procedures outlined below:

1. To raise or lower the rear edge of the sliding panel on all vehicles except Lincoln Continental, Continental Mark V, Versailles, Thunderbird and Cougar, loosen the rear retainer pin attaching nut (Fig. 15). The pin assembly is located in the slotted lifter bracket (See Fig. 16, View A). Position the sliding panel up or down as required to obtain a flush fit to the adjacent roof panel. Re-torque pin retainer nut to 20-23 in-lbs.

To raise or lower the rear edge of the sliding panel on Lincoln Continental, Continental Mark V, Versailles, Thunderbird and Cougar vehicles, loosen the rear slide

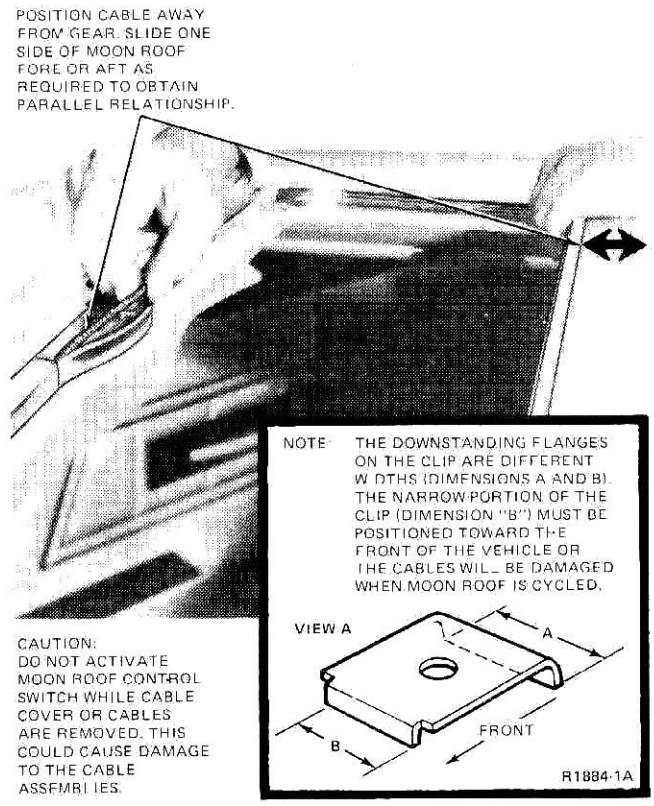


FIG. 14 Cable Clip Position

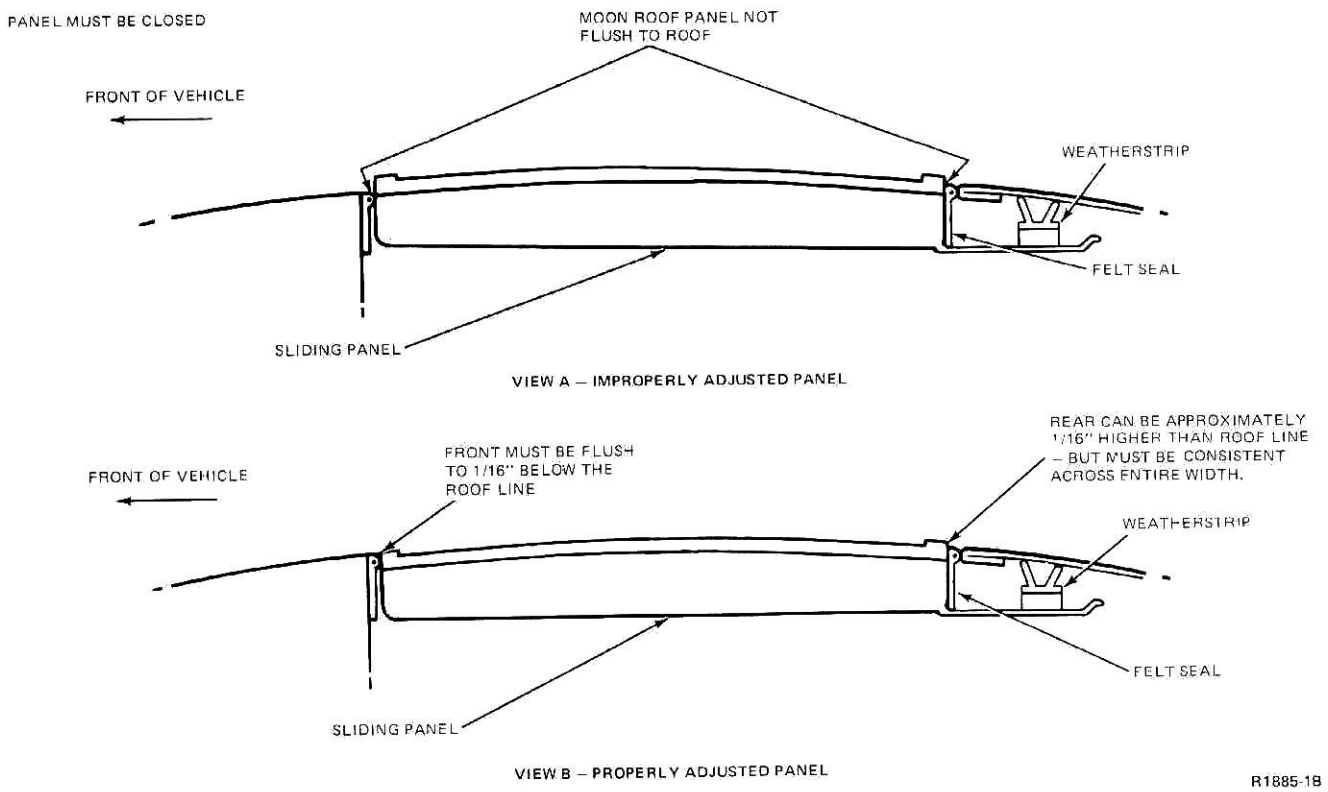


FIG. 15 Correct Sliding Panel Flushness Setting

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adjusting nut (See Fig. 17), raise or lower the panel to achieve correct alignment, and tighten the adjusting nut (24-36 in-lbs).

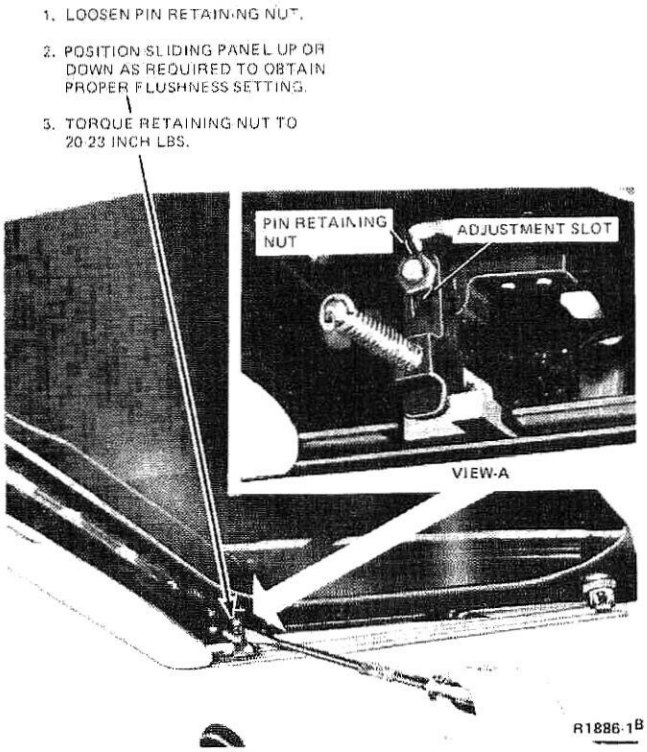


FIG. 16 Rear Sliding Flushness Adjustment

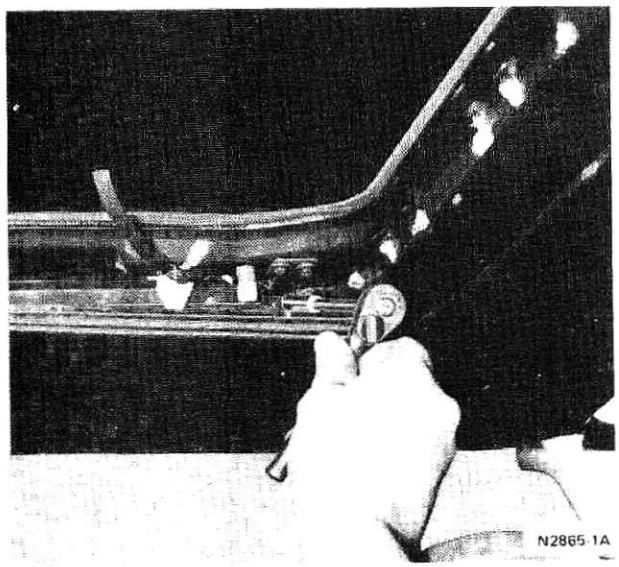


FIG. 17 Rear Roof Panel Adjustment

2. To raise or lower the forward edge of the sliding panel, loosen the forward track shoe retaining screws. Refer to Fig. 18. Rotate the adjuster (clockwise lowers panel, counterclockwise raises panel) as required to obtain a flush fit to adjacent roof panel. Re-torque the track shoe attaching screws to 18-23 in-lbs.

BINDING DURING PANEL MOVEMENT

All Car Lines Except Lincoln Continental, Continental Mark V, Versailles, Thunderbird and Cougar

Sliding panel binding can be caused by unparallel alignment of sliding panel causing the sliding panel to cock in the opening (Fig. 19) or binding of the pivot pins which does not allow the sliding panel to raise at rear corners when cycled to full closed position (Fig. 20).

To diagnose binding:

1. Cycle the roof open about 1/4 inch and sight down the opening to assure that the sliding panel is parallel to the opening. Refer to parallel alignment to correct.
2. The pivot pins, which are attached to the lifter brackets may be too tight in the pivot brackets. This causes the system to function normally through all cycles except the lift cycle. At that point in the cycle, the pivot pins must freely rotate in the pivot bracket. Binding pivot pins can cause the pivot pins to "walk" out of the pivot bracket when the system is cycled numerous times. (Refer to Fig. 19.) If the condition is caused by binding pivot pins, remove the pins from the brackets and ream with a 13/64

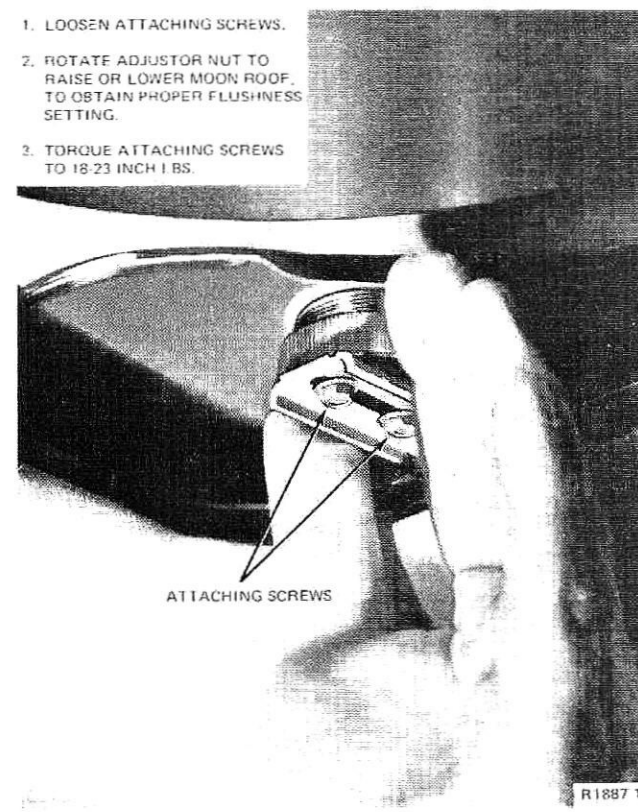


FIG. 18 Front Sliding Panel Flushness Adjustment

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inch drill. Apply silicone lube on the pivot pin and reinstall. Cycle system to assure that the panel is fully raising. Adjust the panel, if required, to obtain a flush fit to the roof panel. (Refer to Fig. 21.)

Lincoln Continental, Continental Mark V, Versailles, Thunderbird and Cougar

Diagnose binding the same as previously described. If the panel fails to raise fully at the rear when closed, make the following adjustments:

Move the sliding panel as far forward as it will go. Check rear lifting links to determine whether or not they have reached full vertical position. If one or both links do not attain vertical position, disengage the cable from the drive gear, manually lift the panel and rotate the links to vertical. Then re-engage the cable and reassemble.

RATCHETING NOISE FROM CABLE AND DRIVE ASSEMBLY

If the cable-drive mechanism emits a ratcheting noise when sliding panel is fully opened or closed, the drive gear may be overriding one of the cables due to insufficient cable to gear engagement.

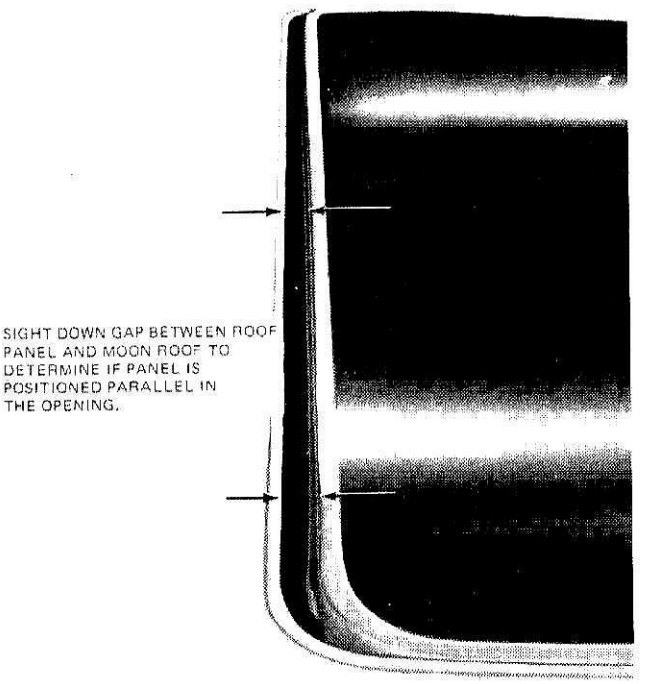


FIG. 19 Sliding Roof Panel Parallel Adjustment

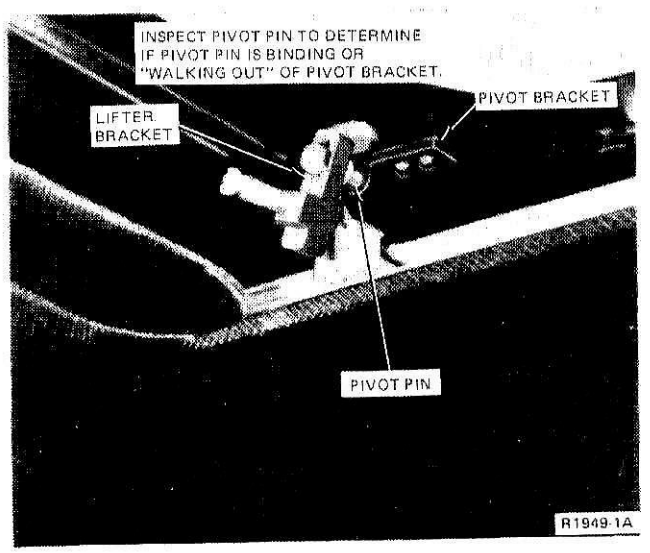


FIG. 20 Inspection for Binding Pivot Pin

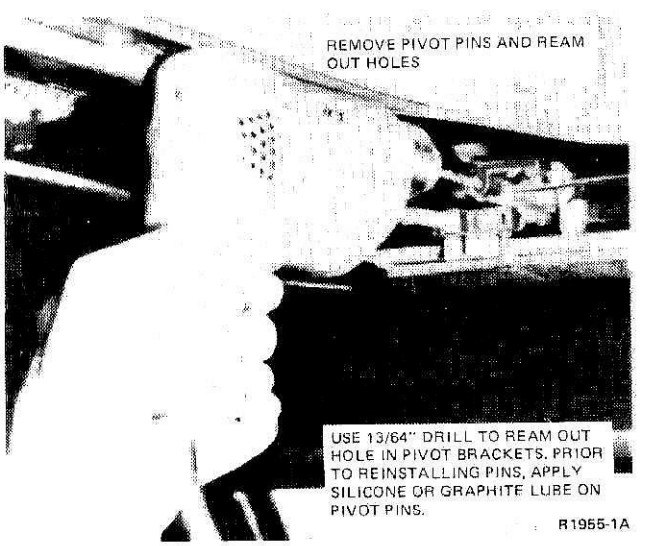


FIG. 21 Reaming Pivot Bracket for Pivot Pin

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Remove the center track cable drive assembly cover plate and cable retainer clip. Examine gear to cable engagement. Pull cables and examine for wear. If the cables do not exhibit excessive wear, reinstall cables and position the retainer clip. Install a .030" shim between the track wall and retainer clip to provide additional gear to cable engagement on the side that exhibits clearance. Refer to Fig. 22.

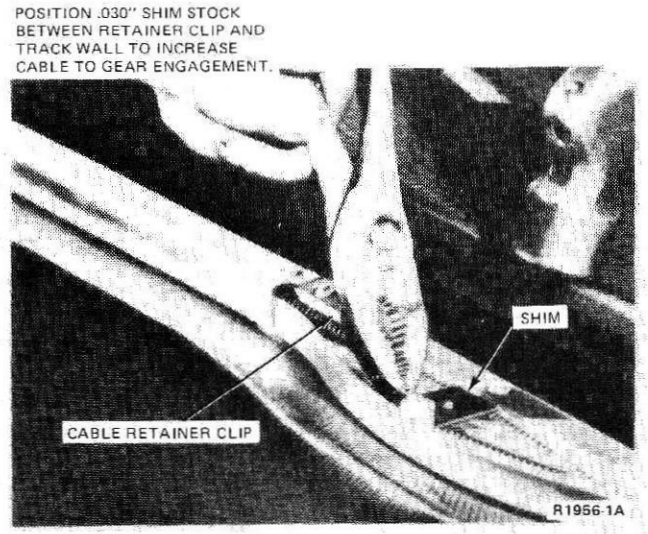


FIG. 22 Increasing Cable-To-Gear Engagement

WATER DRAINAGE SYSTEM AND WATER LEAK CORRECTIONS

DRAIN HOSES

The roof panel module contains the track assemblies, cable and drive mechanisms, and a drain trough that encircles the sliding panel. Attached to the module are four (4) drain hoses. One drain hose is attached at each corner of the module. The two front drain hoses are routed down the windshield pillars and into the cowl sides exiting at rocker panel drain darts—ends of hose are **not** reusable. The two rear drain hoses are routed down the rear pillars over the rear wheel house and into the rear quarters. Refer to Fig. 23.

NOTE: Prior to performing any repairs, first verify that the drainage system is not plugged or restricted. Use a pint size container and pour water into the drain trough. Look at the rear of the vehicle to ensure that the water drains from the rear quarter panels or rocker panels.

If the water flow is restricted, use compressed air to "blow-out" any material in the drain hose system. Test by pouring water slowly into the system again.

After assuring that the drainage system is not restricted, verify that gaps do not exist around the edge of the panel. If a gap exists, the gap must be brought to specification before any further action is taken (Fig. 24).

With the clearances within specification, remove the halo moulding. Close the panel and have an assistant spray water on the sliding panel while you're on the inside visually inspecting the panel area to see if an excessive amount of water is entering the drain trough. A large volume of water indicates that an excessive clearance exists between the sliding panel and the felt seals. See shimming the felt seal, this section.

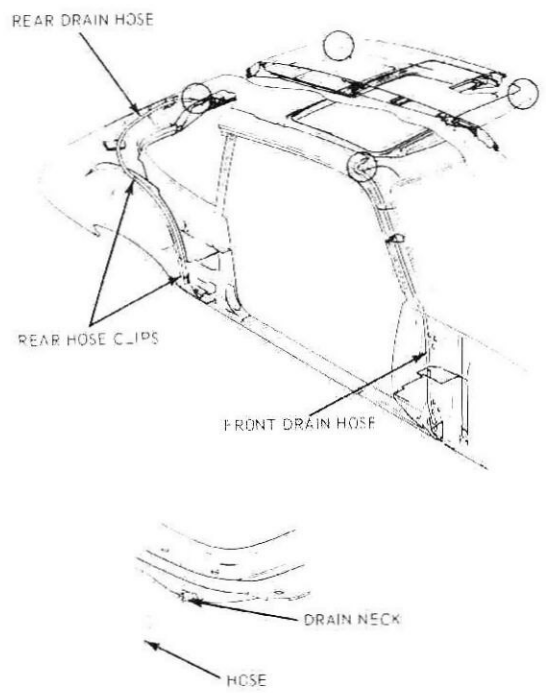


FIG. 23 Water Drainage System

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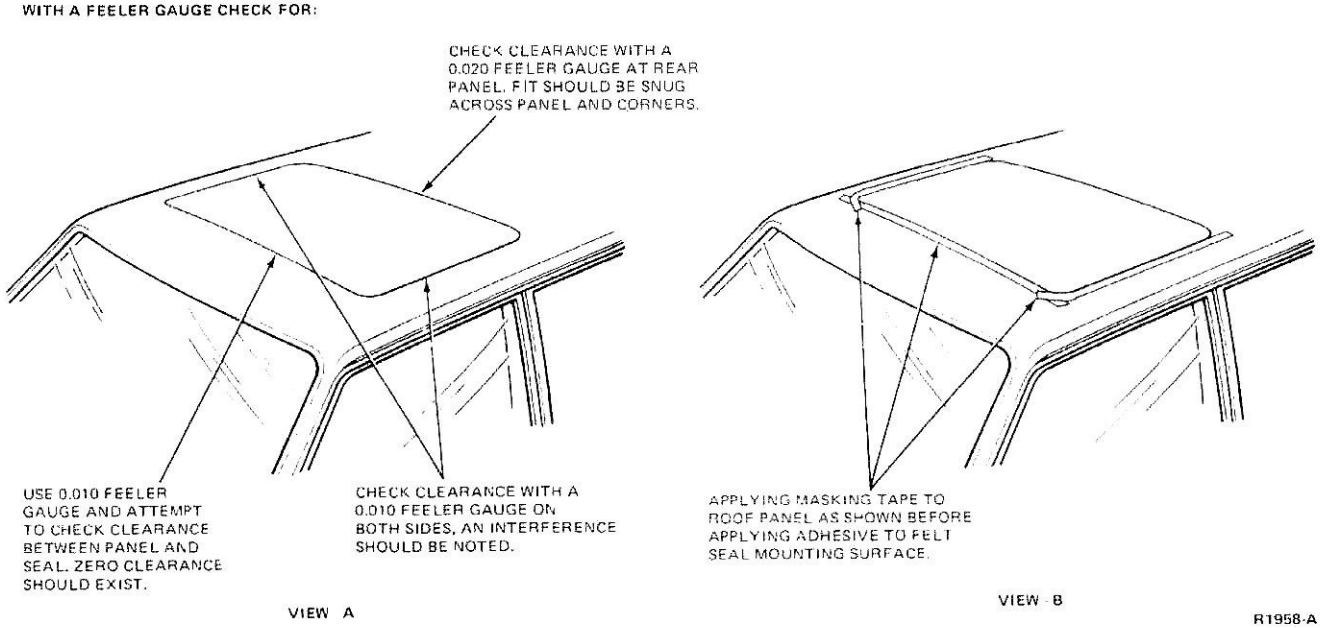


FIG. 24 Panel Checking Procedures

SLIDING PANELS

The sliding panel has a controlled water leak at the roof panel felt seals. Clearances between the felt seal at the front of the panel is "zero". Using a .010" feeler gauge, an interference should be noted at the sides of the panel. .020" clearance maximum should be noted between the rear of the sliding panel felt seal and the roof panel opening. **If these tolerances are not maintained, water will overflow the drain troughs and enter the module, running down into the passenger compartment when the vehicle is stopped abruptly. Refer to Fig. 24, View A.**

SHIMMING THE FELT SEAL

If the vehicle is equipped with a full vinyl roof, remove the felt seal in the "gapped" area, peel up the vinyl roof material and install shim material as required on the sheet metal to fill the void. Re-cement the vinyl over the shim material, and re-attach the felt seal. If the gap is at the rear of the opening, the shim is installed at the front felt seal. Refer to Fig. 25.

If the vehicle is equipped with the 1/2 vinyl roof and the roof panel surrounding the sliding panel is a painted surface, the best material to use for shimming is the felt seal in the appropriate color. Use a pair of tin snips and trim off the bulbous section at the top of the seal and install between the existing seal and the downstanding flange, across the front of the opening (Fig. 26). If the gapping condition exists at the rear corners, it may be necessary to add shim behind the seal, in the corners and at the rear of the sliding panel.

NOTE: PROCURE DOUBLE BACK FOAM TAPE LOCALLY IN VARIOUS THICKNESSES.

A. IF AN EXCESSIVE CLEARANCE IS NOTED, AND THE VEHICLE IS EQUIPPED WITH A VINYL ROOF REMOVE FELT SEAL IN THE AREA TO BE SHIMMED. CAREFULLY PEEL THE VINYL MATERIAL AND INSTALL NECESSARY SHIM ON DOWNSTANDING FLANGE. RE-INSTALL VINYL ROOF COVER OVER SHIM AND RE-CEMENT FELT SEAL IN POSITION.

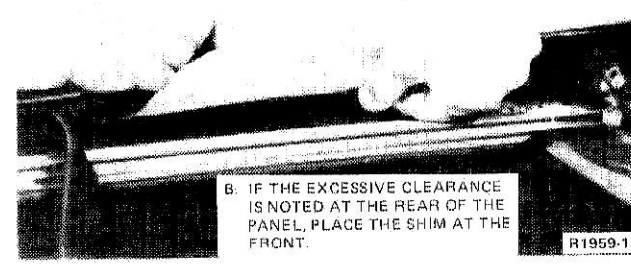


FIG. 25 Shimming Felt Seal-Full Vinyl Roof

RUBBER SEAL (WEATHERSTRIP)

Water collecting in the module area may be caused by the rubber seal at the rear of the sliding panel. The rubber seal must be positioned at the rear edge of the panel so that a water channel is provided to drain any water that bypasses the felt seal to the side drain troughs.

On models with foam rubber spacer mounted under the rubber seal, inspect for proper mating and that no gap exists. Water flowing through the gap will cause water to accumulate in the rear of the module (Fig. 27).

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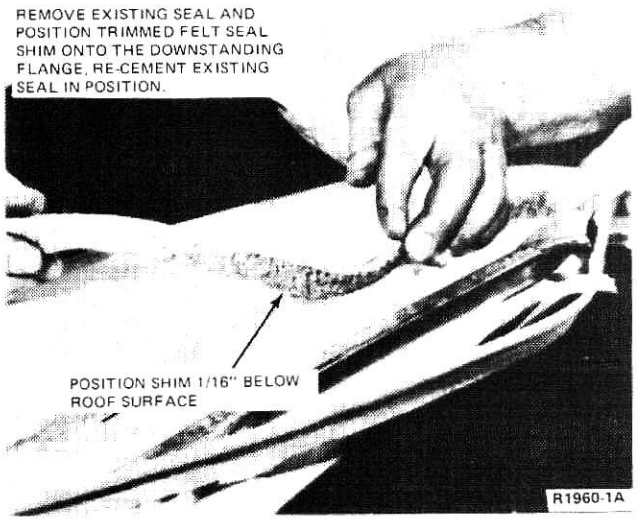


FIG. 26 Shimming Felt Seal-1/2 Vinyl Roof

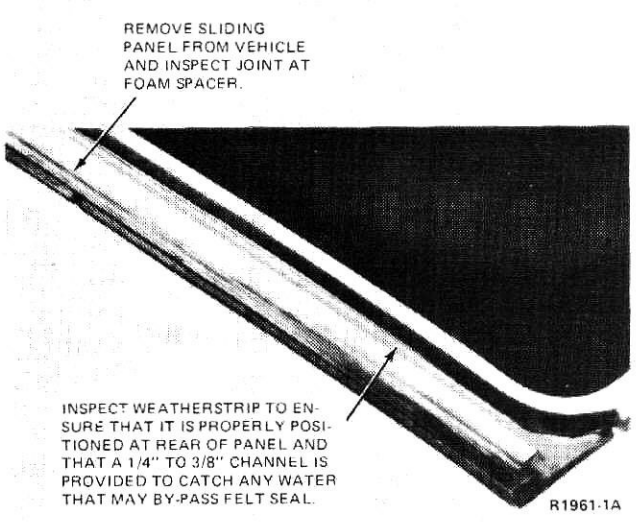


FIG. 27 Rubber Seal (Weatherstrip) Inspection

If the water leak is at the foam spacer, apply a bead of clear silicone sealer or liquid butyl sealer along the surface of the panel where the filler strip is attached as shown in Fig. 28.

WET HEADLINER—SIDES

Water may drip from the headliner above the door or quarter window because:

1. Module is not sealed to underside of roof panel at the rear of the opening. Apply caulking cord in joint between roof panel and module as shown in Fig. 29.
2. Weld burn exists in the drain trough area. Use paintable plastic sealer and touch up with appropriate color. Refer to Fig. 30.
3. Drain tube(s) disconnected from module. Apply trim cement on metal drain tube nipple, and insert drain hose (Fig. 18).

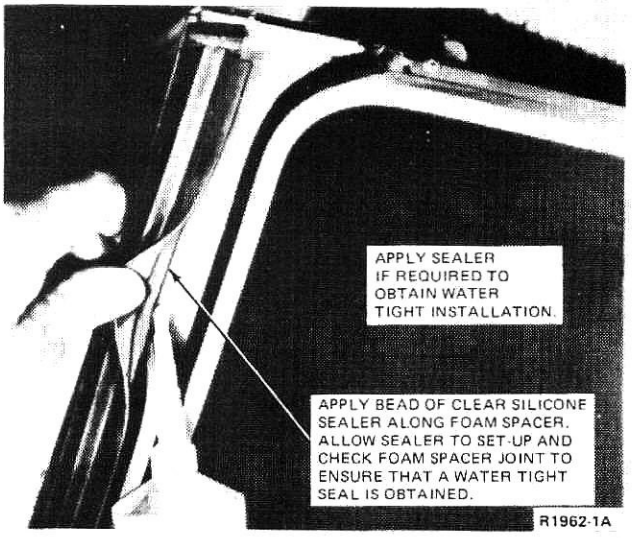


FIG. 28 Applying Sealer to Foam Spacer

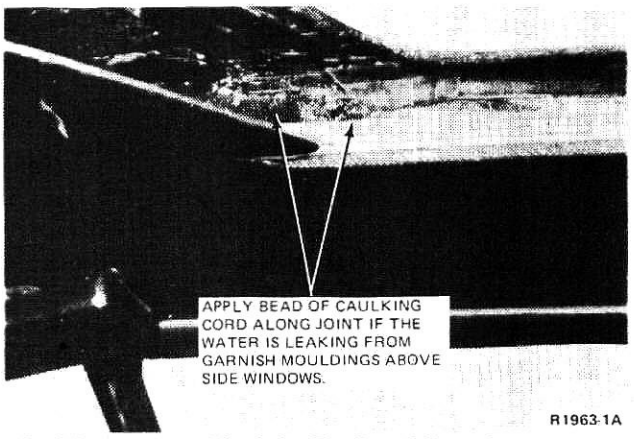


FIG. 29 Sealing Module-To-Roof Panel

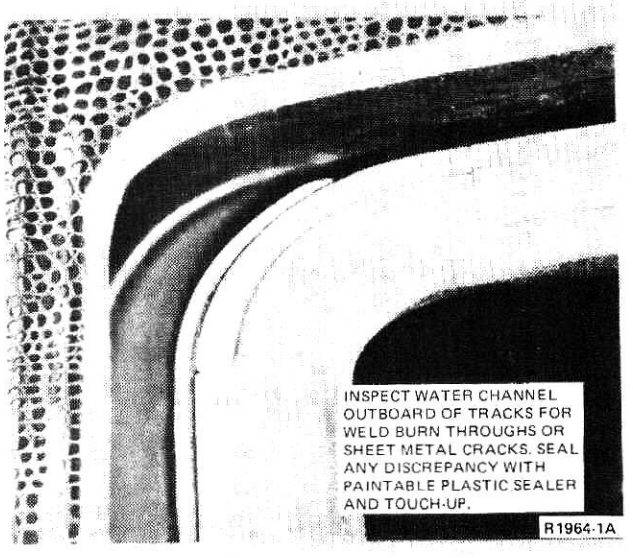


FIG. 30 Inspecting Drain Trough Area

OVERCROWNED REAR ROOF PANEL

If the roof panel is overcrowned to the contour of the sliding panel (at rear of sliding panel), this can cause wind noise or water leak conditions.

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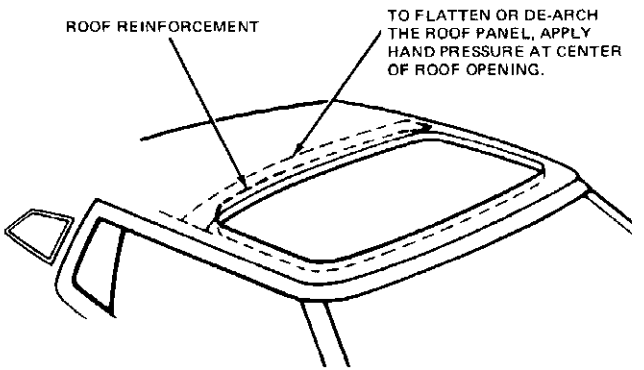


FIG. 31 Overcrowned Roof Panel

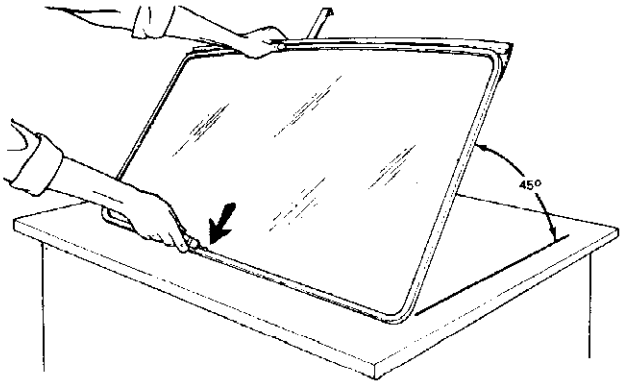


FIG. 32 Applying Sealer-Glass-To-Frame

Remove sliding panel from vehicle and apply hand pressure on center of roof panel to flatten the contour (Fig. 31).

UNDERCROWNED FRONT ROOF PANEL

A glass panel scratch can be caused by the front of the roof panel being slightly undercrowned.

Open the sliding panel assembly slightly and compare the contour of roof panel and glass panel. If the roof panel appears flattened in the center, and the glass scuffs are on the underside of the roof panel, remove the sliding panel from the vehicle and re-arch the roof panel by using your feet and pushing up on underside of roof panel to increase the roof panel arch.

WATER LEAK AT GLASS MOULDING

A water leak occurring in the area of the halo moulding is usually caused by an inadequate seal between the glass and the metal frame. To correct a leak between the metal frame and the glass, remove the sliding panel from the vehicle. Use a clear silicone sealer—3M Part No. 8551 auto glass sealer (procure from local glass repair shop) or equivalent and apply a bead around the edge of the metal frame as shown in Fig. 32.

CAUTION: DO NOT ATTEMPT TO PRY THE METAL FRAME UPWARD TO APPLY THE SEALER, AS THIS CAN RESULT IN GLASS BREAKAGE.

ROOF ELECTRICAL CONNECTIONS

The electrical circuit schematic is shown in Fig. 33. The parts component chart is shown in Fig. 34.

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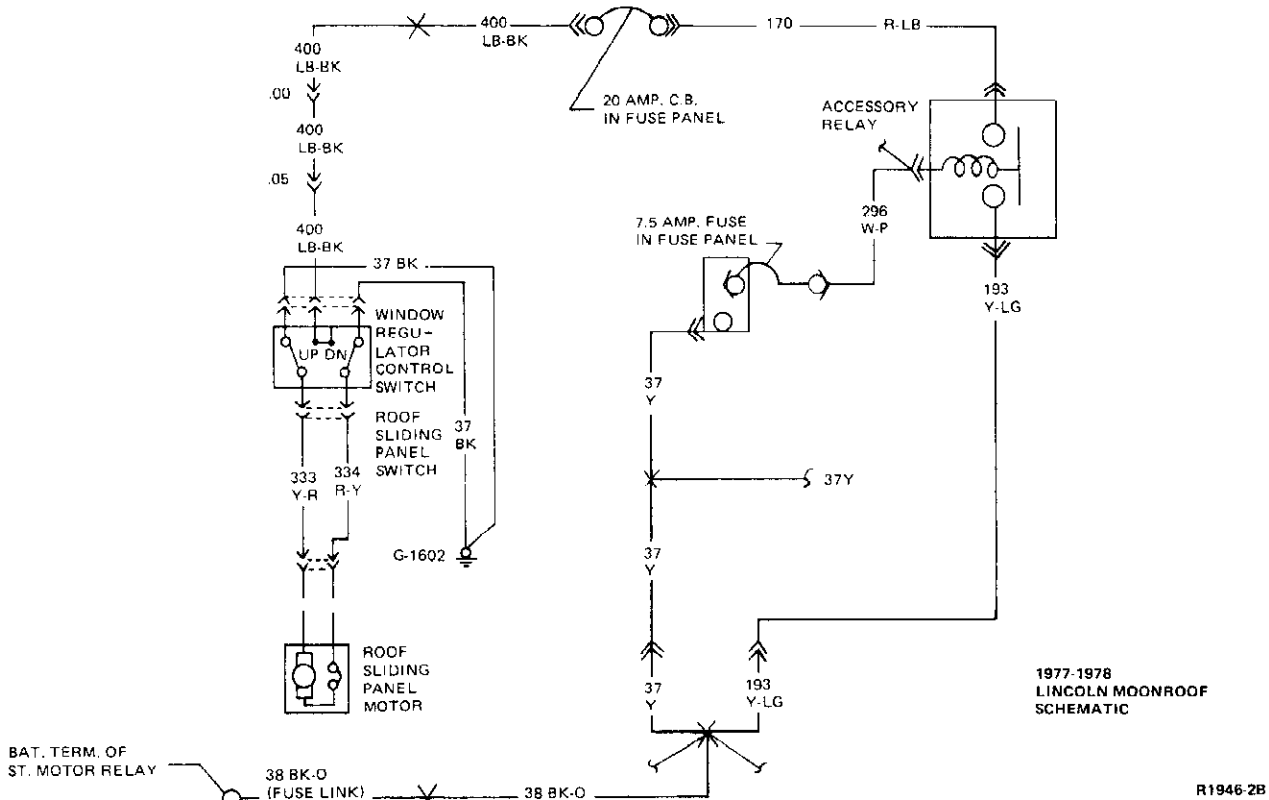
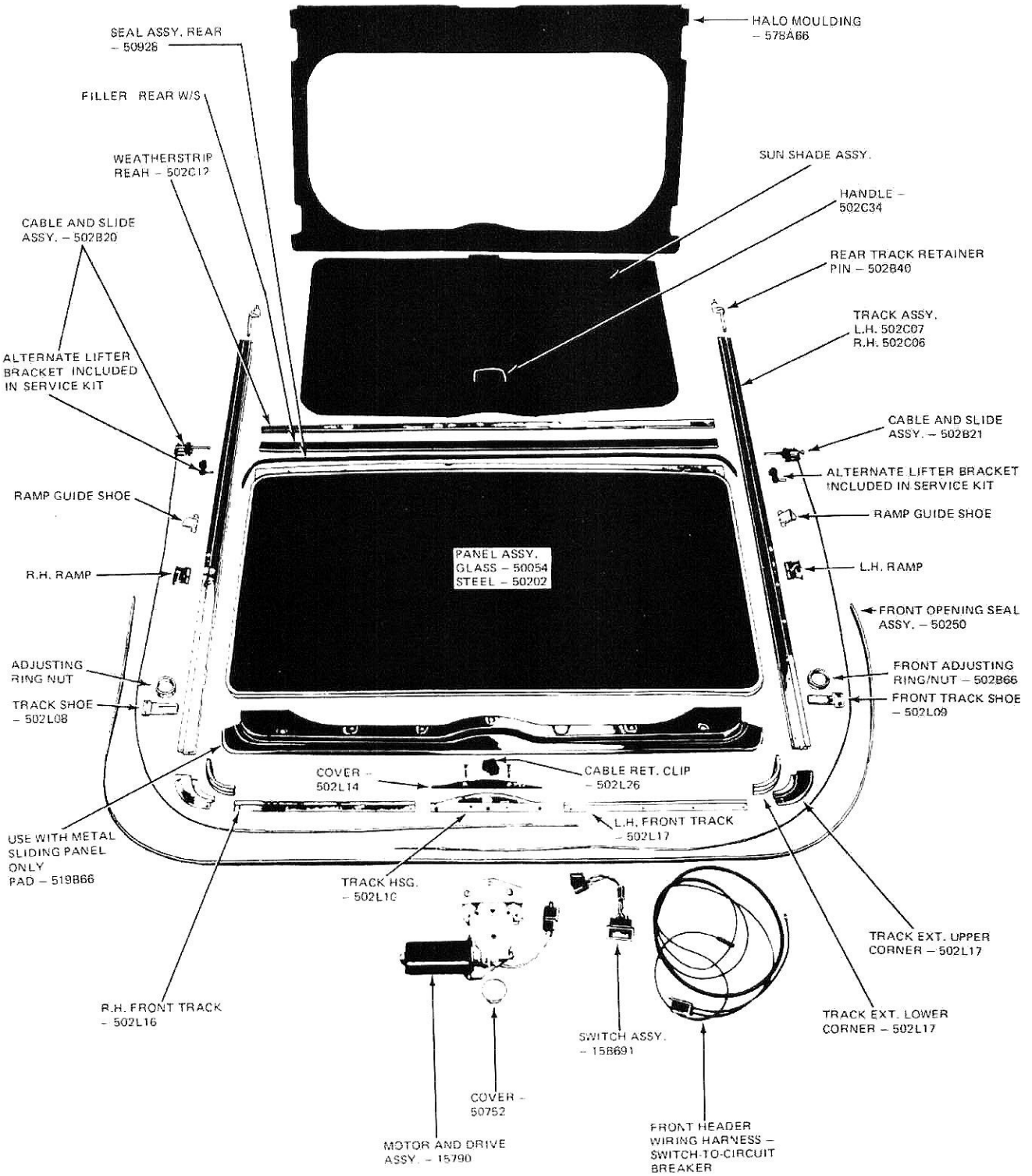


FIG. 33 Circuit Schematic—Electric Moon Roof—Lincoln Continental Shown

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FIG. 34 Moon Roof—Exploded View Parts Component Chart

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Manual Sun Roof

PART 46-11

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DESCRIPTION AND OPERATION

The manual sun roof panel slides on guide rails. It is operated by a crank. The crank is splined to a shaft and pinion that drives two flexible cables. Each cable is attached to a slide that moves on the guide rails. The left and right rear slides are attached by mounting brackets to the rear of the sliding panel. Front guides attached to the front of the sliding panel and slide on the left and right guide rails, respectively.

To operate the sliding panel, pull the handle from its stowed position and turn handle counterclockwise to open; turn clockwise to close.

ADJUSTMENTS

Before making any adjustments, remove the trim (inner) panel from the sliding panel for access. Open the sliding panel about five inches. Disengage the trim panel from the sliding panel by pulling the seven trim clips loose. Slide the trim panel to the rear for stowage. Crank the sliding panel to closed.

ROOF SLIDING PANEL ALIGNMENT FOR FLUSH FIT

Sliding Panel Front Edge-Up or Down for Pinto and Bobcat

Both sides may be adjusted, as necessary.

Loosen the two screws that attach the front slide assembly to the knurled adjusting nut at the front of the panel (Figs. 1 and 4). Turn the adjusting nut clockwise to lower; counterclockwise to raise. When t ghtening the two attaching screws, be sure that the front slide assembly is perpendicular to the guide rail and that the base of the slide throat does not contact the guide rail (Fig. 1).

Sliding Panel Front Edge—Up Or Down For Mustang II

To adjust the Mustang II roof sliding panel loosen the two screws that attach the front slide assembly to the double bossed tapping plate. Move the tapping plate rearward to lower the front of the panel, or forward to raise the panel (on the Mustang II equipped with glass panel, add shims to raise panel). When the front edge of the panel is flush, tighten the attaching screws into the tapping plate (Fig. 2). Be sure the front slide assembly is perpendicular to the guide rail, and that the base of the slide throat does not contact the guide rail.

NOTE: The blue slide assembly is for the driver's side and the white slide assembly is used on the passenger side.

ROOF SLIDING PANEL REAR EDGE—UP OR DOWN

Both sides may be adjusted, as necessary.

Loosen the rear slide adjusting screw (Figs. 1 and 4), and raise or lower the sliding panel until flush with the stationary roof panel. Tighten the adjusting screw to hold the correct position.

FORE AND AFT, SIDE-TO-SIDE ALIGNMENT OF PANEL IN ROOF OPENING

This adjustment is automatically achieved when the sliding panel is attached and adjusted in the full closed position. See Removal and Installation.

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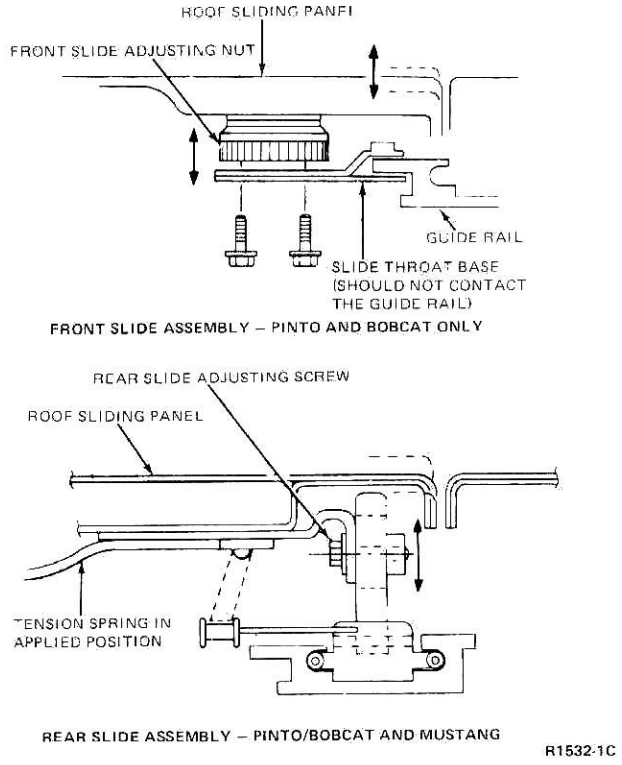


FIG. 1 Roof Sliding Panel Adjustments

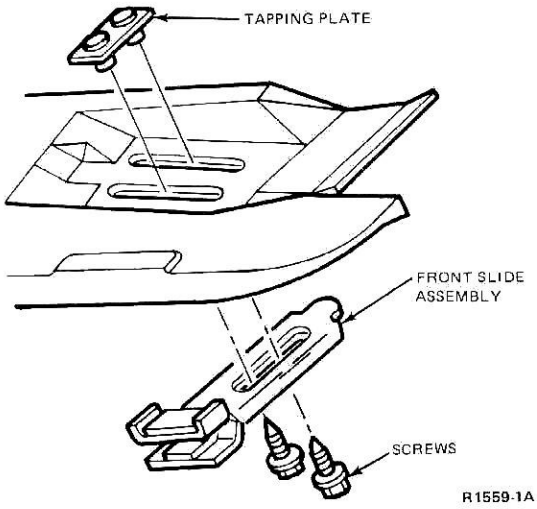


FIG. 2 Front Slide Assembly—Mustang II Only

CABLE ALIGNMENT

Cable misalignment can cause the sliding panel to jam on one side. To correct, remove the sliding panel, crank handle, escutcheon, and drive assembly.

Make sure that both cables are in the front guide rail channels and through the front retainer. Then, push each rear slide forward until they are seated firmly against the cable side cover stops. Install the drive assembly, escutcheon and crank handle and sliding panel.

REMOVAL AND INSTALLATION

ROOF AND SLIDING PANEL

1. Open the sliding panel open five inches (Fig. 3).



FIG. 3 Trim Panel-To-Sliding Panel Attachment

2. Disengage the trim (inner) panel from the sliding (outer) panel by pulling the seven trim clips loose (Fig. 3).
3. Slide the trim panel to rear for stowage, and crank the sliding panel closed (Fig. 4).
4. Release the rear slide tension springs (left and right) by rotating them to the inboard position (Fig. 4).
5. Detach the sliding panel from both left and right front slide assemblies (2 screws each side, Fig. 4).
6. Detach the sliding panel from the two rear slide assemblies by removing each slide mounting bracket retainer from the tabs in the panel (2 screws, Figs. 4 and 5).
7. Pull the sliding panel forward and out of the roof panel opening.
8. Before installing the sliding panel, be sure that the crank handle is rotated clockwise as far as it will go. Set the sliding panel in the roof panel opening and attach it to the four slide assemblies (right and left, front and rear), as shown in Figs. 4 and 5. Rotate the tension springs outboard and lock them into applied position.
9. Crank the sliding panel open about five inches, pull the trim panel forward, and engage it to the sliding panel at the seven trim clips (Fig. 2).

CRANK HANDLE AND DRIVE ASSEMBLY

1. Remove the crank handle from the drive assembly and the escutcheon from the housing, as shown in Fig. 6.

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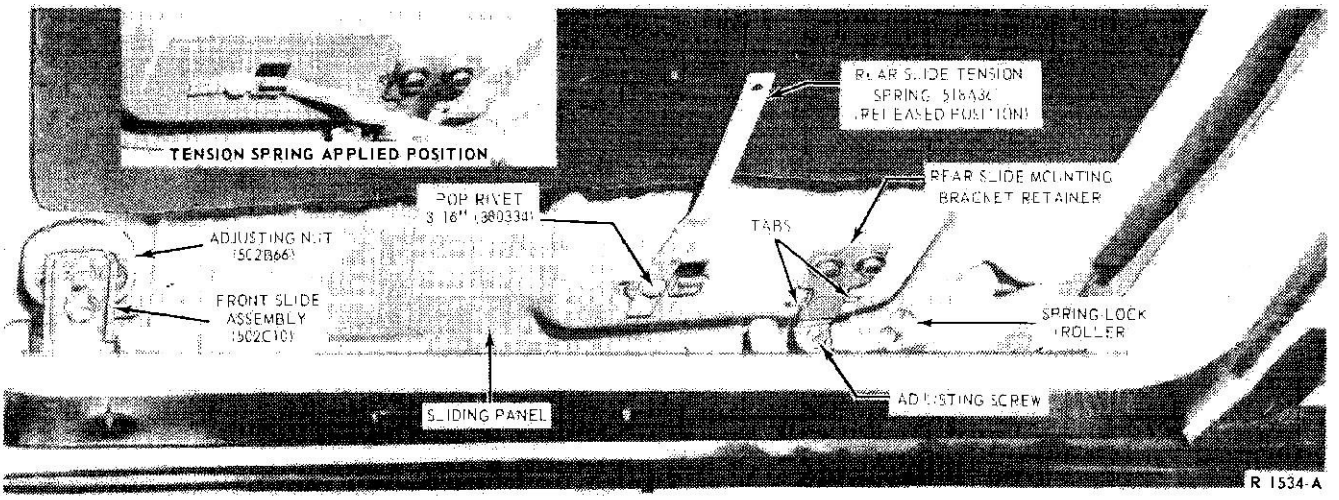


FIG. 4 Roof Sliding Panel Assembly (Right Side Shown)

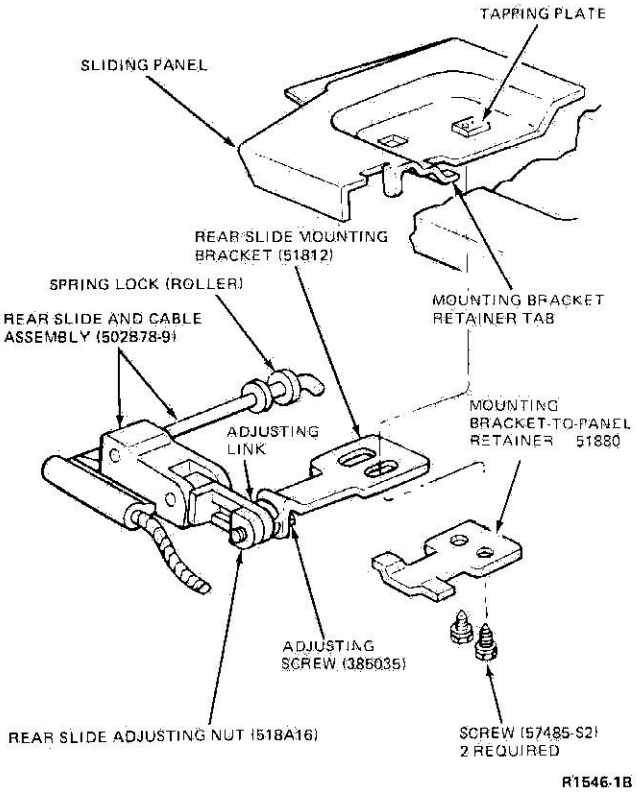


FIG. 5 Sliding Panel-To-Rear Slide Attachment—Pinto, Bobcat and Mustang II

2. Remove the drive assembly (two screws).

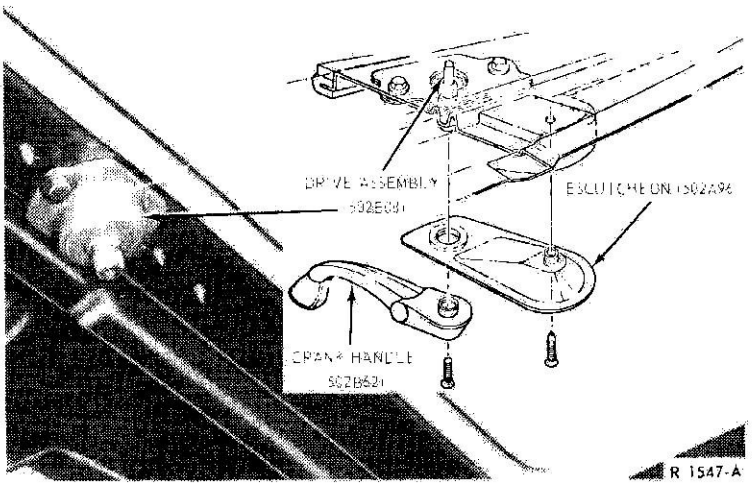


FIG. 6 Crank Handle and Drive Assembly

GUIDE RAIL, SLIDE AND CABLE SYSTEM

Removal

1. Remove the roof sliding panel and the crank handle and drive assembly.
2. Remove the cable front cover (8 screws), the two cable side covers (3 screws each), and the cable front retainer (Fig. 7).
3. Remove the two retaining screws at the center of the cable front guide rail (Fig. 7), slide the locating

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tabs at the left and right ends of the front guide rail from the left and right guide rails, respectively, and remove the front guide rail (Fig. 8).

4. Slide the cable left and right guide rails from their respective rear retainers and lift them out of the panel housing (Fig. 8). The guide rails will contain the rear slide and cable assemblies.
5. Remove the sliding panel trim piece from its stowed position in the roof panel.
6. Remove the rear slide and cable assemblies from the guide rails, by sliding them forward and out (Fig. 8).

Installation

1. Insert the rear slide and cable assemblies into the guide rails. The plastic rollers on each rear slide assembly should be inboard, so that the right and left slides will be installed in the right and left guide rails, respectively (Fig. 8).
2. Install the left and right guide rails in the panel housing, sliding them onto their respective rear retainer (Fig. 8). Be sure that the guide rail rear retainers are engaged in their brackets at the rear of the housing assembly, inside the roof.
3. Install the front guide rail in the housing, so that the locating tabs on each end engage the right and left guide rails (Fig. 8). Then install the two retaining screws near the center of the front guide rail (Fig. 7).
4. Install the two cable side covers (3 screws each, Fig. 7), and pull both rear slide assemblies forward against the stops of the cable side covers.
5. Thread the right cable into the outboard channel of the left guide rail and the left cable into the inboard channel of the right guide rail (Fig. 8).
6. Seat the cable into the front guide rail and install the cable front retainer on top of the cables in the center of the front guide rail (Figs. 7 and 8).
7. Lubricate the top of each cable at the front guide rail with ESB-M1C93A (Ford Part No. 19584 or equivalent) polyethylene grease. Wipe the excess grease into the guide rail channels.
8. Make sure that the cable rear slides are still positioned against the stops of the cable side covers, and then install the cable front cover (9 screws, Fig. 7).
9. Install the drive assembly, the escutcheon and the crank handle, as shown in Fig. 6. Make sure that the rear slides are still positioned at the stops of the cable side covers.
10. Cycle the cables and rear slides to make sure that the cable and guide rail system functions without binding.
11. Install the trim panel by sliding it into the guide rails from the front. Then, slide the trim panel to the extreme rear position.
12. With the rear slide assemblies against the stops of the side covers and the slide adjusting links in the vertical position, place the roof sliding panel into the roof opening.
13. Attach the sliding panel to the left and right rear slide assemblies. To make this attachment, position each slide mounting bracket over the tapping plate holes and between the retainer tabs in the sliding panel. Then slide the mounting bracket retainer into the tabs against the bracket and secure with two retaining screws (Figs. 4 and 5).
14. On Pinto and Bobcat only, turn the sliding panel front adjusting nut counterclockwise to the mid-position on each front slide adjusting stud (Fig. 1). For Mustang II, position the front guides midway on the adjusting ramp (Fig. 2).
15. Engage the left and right front slides to the left and right guide rails, respectively, and attach each slide to its adjusting nut on the sliding panel (2 screws each, Figs. 1 and 4). The slide assembly should be perpendicular to the guide rail. To avoid binding, be sure that the base of the slide throat does not contact the guide rail (Fig. 1). **Do not jamb the slide to the guide rail.**
16. Raise or lower the sliding panel to proper alignment with the roof, as outlined in the Adjustment Section.
17. Lock each rear slide tension spring in applied position, by rotating it outboard and engaging it in the plastic roller (Fig. 4).

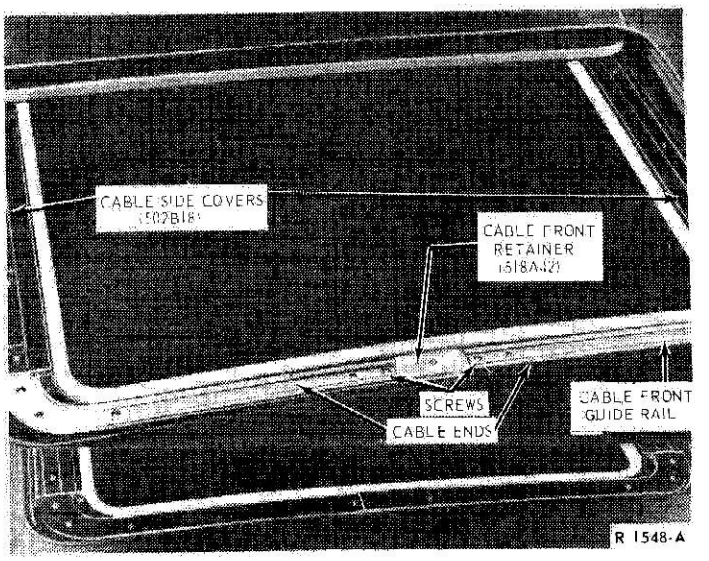


FIG. 7 Cables and Guide Rails Installed

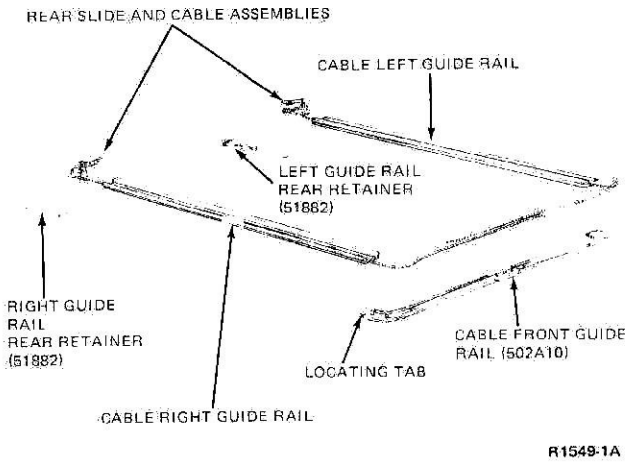


FIG. 8 Guide Rail and Cable System

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18. Crank the roof sliding panel open about five inches, pull the trim panel forward, and engage it to the sliding panel at the seven trim clips (Fig. 2).
19. Crank the sliding panel to the closed position, and check the crank handle alignment within the escutcheon cup (Fig. 6). Realign the handle on the drive shaft, if necessary.

REAR SLIDE AND CABLE ASSEMBLY

1. Remove the roof sliding panel from the roof panel, as outlined under Roof Sliding Panel, Steps 1 through 7.
2. Remove the crank handle and drive assembly.
3. Remove the guide rail(s), as outlined under Guide Rail, Slide and Cable System, Steps 2 through 6.
4. Install the rear slide to the guide rail and the guide rail to the housing, as outlined under Installation, Steps 1 through 19.

FRONT SLIDE

1. Remove the trim panel from the roof sliding panel, as described under Roof Sliding Panel, Steps 1 through 3.
2. Remove the front slide assembly from the adjusting nut or adjusting ramp, at the front end of the sliding panel (2 screws, Fig. 4).
3. When installing the slide, engage it to the guide rail and attach it to the adjusting nut or adjusting ramp, on the sliding panel. The slide assembly should be perpendicular to the guide rail. To avoid binding, be sure that the base of the slide throat does not contact the guide rail (Fig. 1). **Do not jam the slide to the guide rail.**

REAR SLIDE TENSION SPRING

1. Remove the trim panel and slide it to the rear (stowed) position, as outlined under **Roof Sliding Panel,** steps 1 through 3.
2. Using a 3/16-inch drill, remove the rivet that retains the spring to the roof sliding panel (Fig. 4).
3. Install a new spring washer and spring with a pop rivet.

SLIDING PANEL HOUSING ASSEMBLY

1. Crank the roof sliding panel to the half open position.
2. Remove the crank handle and escutcheon assembly (Fig. 6).
3. Remove the headlining retainer and the headlining, as outlined in Part 45-41.
4. Disconnect the four drain hoses (Fig. 10).
5. Remove the (7) nuts (for Pinto and Bobcat, (6) nuts for Mustang II) that retain the housing assembly to the roof panel, and lower the housing from the roof (Fig. 9). **The housing should be held in position, while the retaining nuts are being removed.**
6. When installing the housing assembly, tighten the retaining nuts to a torque of 3 to 7 ft-lbs.

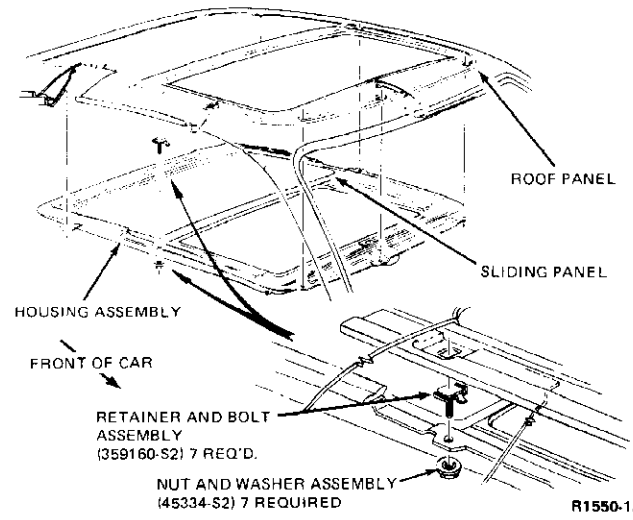


FIG. 9 Sliding Panel-To-Roof Panel Attaching Points

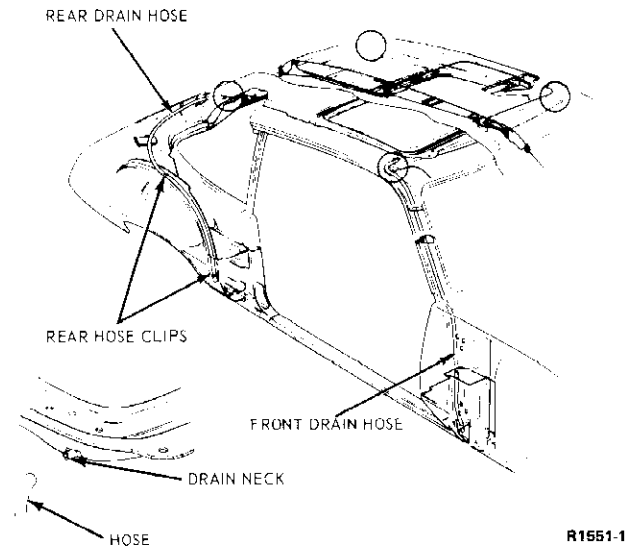


FIG. 10 Roof Drainage System

DRAIN HOSES

To replace front drain hose, the headlining assembly must be lowered at the windshield header area for access. Disconnect the hose from the roof front drain neck (Fig. 10). Remove the cowl side trim panel for access to the lower end of the hose. Attach the replacement hose to the lower end of the existing hose. Pull the new hose into place from below, as the existing hose is pulled out at the top.

To replace a rear drain hose, pull the headlining down from the affected corner of the roof panel for access. Then disconnect the hose from the roof rear drain neck (Fig. 10). Remove the quarter trim panel for access to the lower end of the hose. Attach the replacement hose to the lower end of the existing hose, and remove the retaining clips. The new hose can then be pulled into place from below, as the existing hose is pulled out at the top. Secure the new hose with the retaining clips before installing the quarter panel.

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During regular maintenance, check the drain hole at each of the four corners of the roof, to see if it is free of foreign material. Any hole that is plugged may be cleaned out with a flexible hose of smaller diameter, or with air pressure.

ROOF SLIDING PANEL REAR SEAL

1. Remove the roof sliding panel from the roof, as outlined in this Section.
2. Remove the rear seal from the rear vertical flange of the panel, as shown in Fig. 11.
3. Remove the weatherstrip from the rear horizontal flange of the panel, as shown in Fig. 11.

ROOF SLIDING PANEL FRONT SEAL

1. Remove the sliding panel housing assembly, as outlined in this Section.
2. Drill out the blind rivets from the seal and remove the seal assembly (Fig. 12).

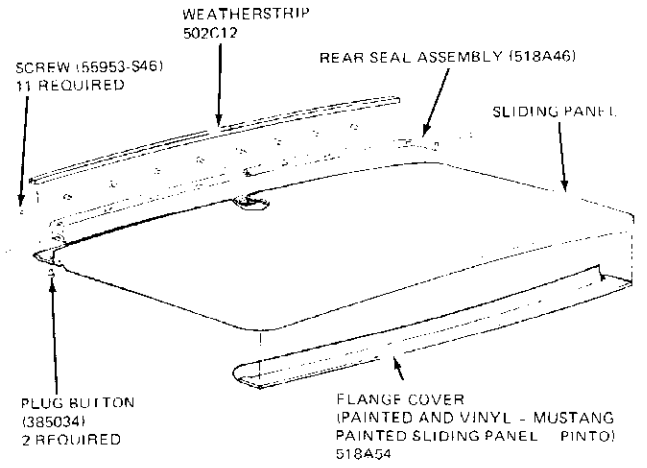


FIG. 11 Rear Seal Replacement

3. Install the new seal assembly to the roof panel reinforcement flange. Trim the seal to the proper length at the notches in the flange of the roof reinforcement.
4. Pierce rivet holes in the seal assembly. Use the existing holes in the roof flange as guides.
5. Secure the seal, using seven 1/8-inch blind rivets.
6. Install the sliding panel housing assembly back in the roof, as outlined in this Part.

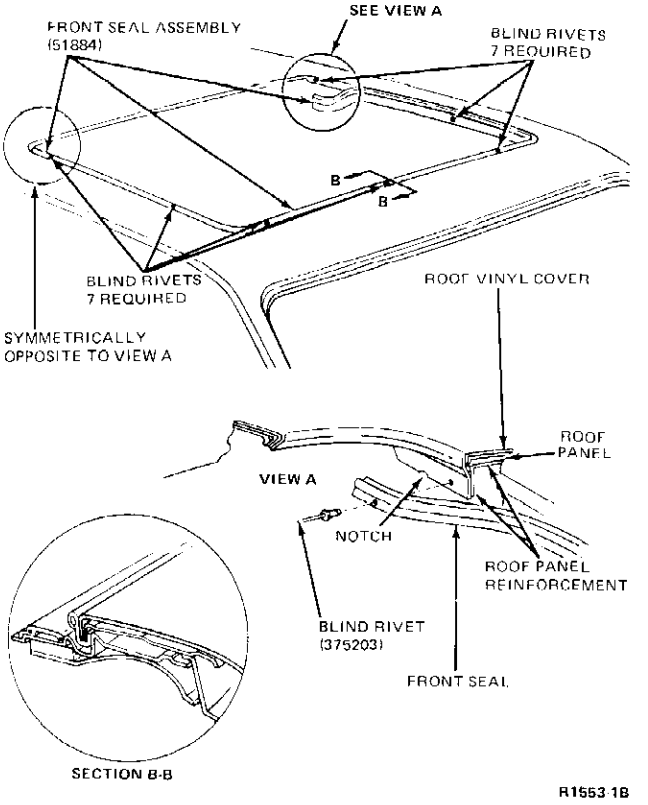


FIG. 12 Front Seal and Vinyl Cover Installation

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Manual Sun Roof -- Removable

PART 46-12

CR2854-2A

REMOVABLE SUN ROOF OPERATION

The optional removable sun roof is operated as follows: To open to vent position, move the release lever as far forward and upward as it will go. To close, move the lever to its full rearward position (Fig. 1).

PANEL REMOVAL

To remove the glass panel, move the release lever to mid-position. Then squeeze the attaching links together to disengage the latching mechanism from the roof panel. From outside the vehicle, raise the rear edge of the glass and remove it by lifting upward and rearward (Fig. 2).

PANEL STOWAGE

Whenever the glass panel is removed, it should be stored in the stowage bag provided (Fig. 3). The glass panel and sunshade should never be stored anywhere else in the vehicle. The stowage bag consists of two compartments that can safely accommodate the removable glass and sun shade.

The stowage bag on 2-door models rests against the rear seat back at the bottom edge and clips to the drain trough beneath the weatherstrip at the top edge. On 3-door models it is strapped to the rear floor on the passenger side of the vehicle.

PANEL INSTALLATION

To install the glass panel, align the two hinges at the front of the glass with the hinge sockets in the roof panel (Fig. 4). Hinges should be fully seated in their sockets before the rear edge of the panel is lowered. From inside the vehicle, squeeze the connecting links together and insert them in their respective sockets. Glass can then be locked in position by actuating the release lever.

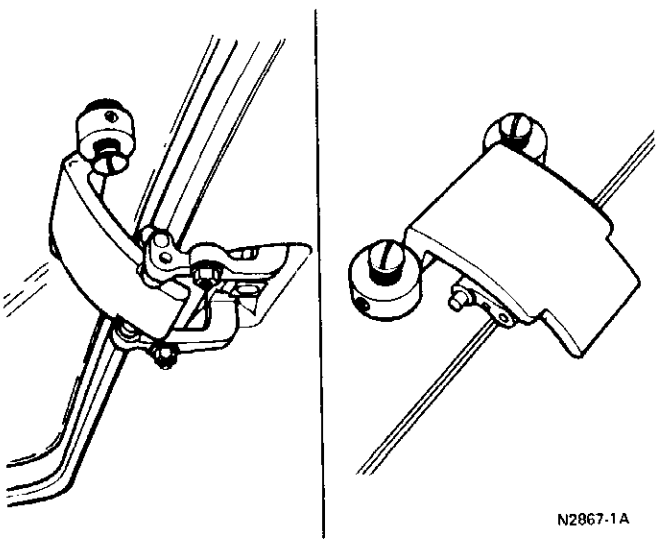


FIG. 1 Removable Sun Roof Operation

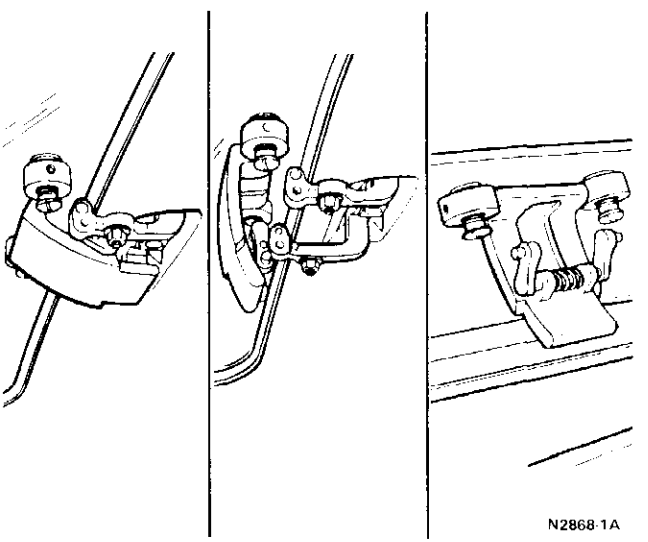


FIG. 2 Panel Removal

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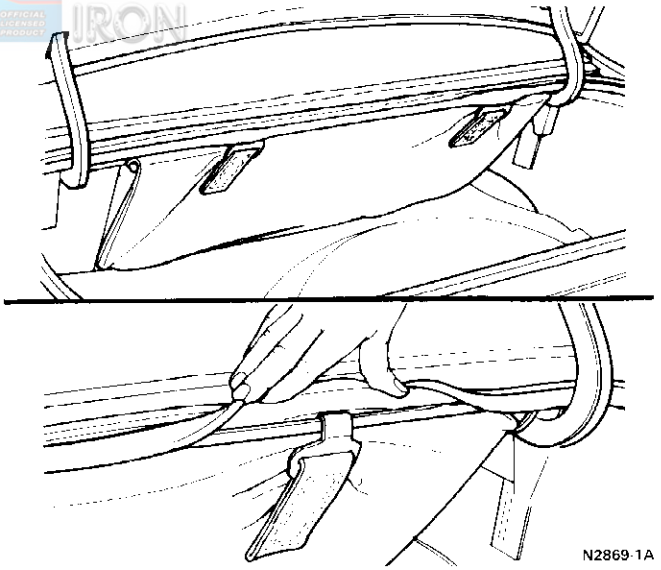


FIG. 3 Panel Stowage

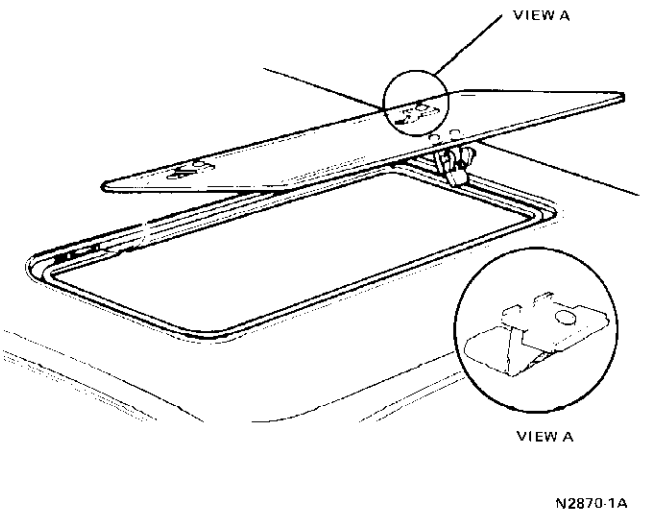


FIG. 4 Panel Installation

REPAIR PROCEDURES

GLASS REPLACEMENT

Remove the hinge brackets from the broken glass by removing the attaching screws at the center of each bracket. Loosen the allen set screws on the latch mechanism and unscrew the two attaching bolts to separate from the broken glass. Be sure to transfer all sleeves and washers to the new installation (See Fig. 5).

Recommended attaching torque is 36-54 in-lbs.

ADJUSTMENT

After the glass panel is installed in the vehicle the latching mechanism can be adjusted to obtain optimum fit. Adjustment is accomplished by moving the latch sleeves up or down and locking them in place with the set screws.

The portion of the latch that is attached to the roof panel can be adjusted fore and aft by loosening the two 1/4-20 bolts and repositioning the bracket.

WEATHERSTRIP REPLACEMENT

If weatherstripping is removed or replaced it should be secured as follows:

Body opening seal: remove attaching pop-rivets and install new seal with pop-rivets drill-at-assembly.

Weatherstrip roof opening: pull off and reinstall new part by pushing on (no adhesive required).

HINGE SOCKET REPLACEMENT

In order to replace the front hinge sockets, it is necessary to locally lower the headlining for access.

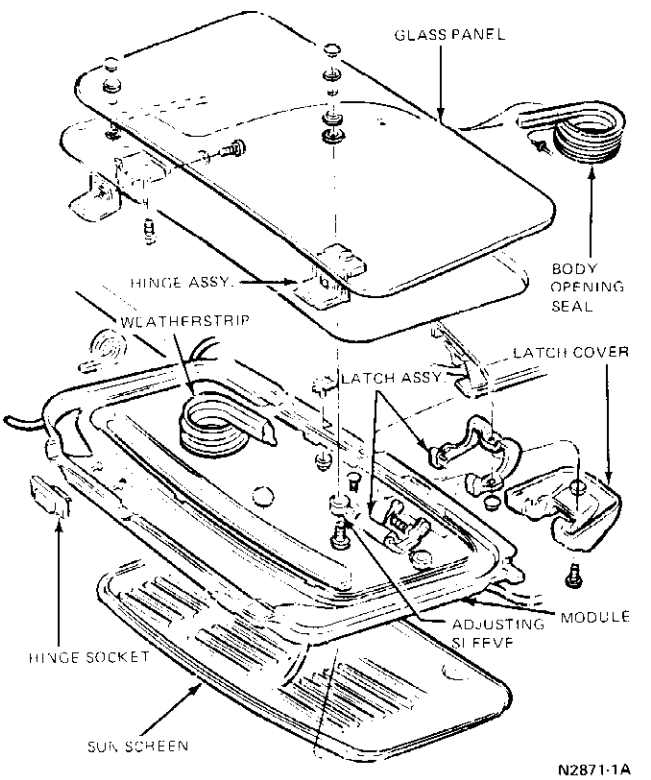


FIG. 5 Glass

Parts can then be removed and replaced in the normal manner (2 attaching screws).

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Roof Outside Cover

PART 46-20

SUBJECT	PAGE
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Roof Outside Cover – Non-Ensolite Pad	20-1
Roof Outside Cover – W/Ensolite Pad	20-8

SUBJECT	PAGE
MAJOR REPAIR	
All Vinyl Roof Material	20-12
General Repair Information	20-8
Levant Type Pattern Only	20-7

REMOVAL AND INSTALLATION

ROOF OUTSIDE COVER—NON-ENSOLITE PAD (FIGS. 1-4)

If some of the following steps do not apply to the particular model being serviced, proceed to the next step.

Removal

1. Unpack the new cover and spread it out to remove the wrinkles.
2. Cover the fenders, seats and rear deck.
3. Remove the rear seat cushion and seat back.
4. On models with roof side ornaments, remove the blind quarter interior trim panel for access to the ornament retaining nuts. Remove the ornaments. For trim panel removal see Group 45.
5. Remove the weatherstrips (Group 44) and the exterior mouldings around the windshield and rear window (Group 43). In some cases, part of the interior garnish moulding may have to be removed for access to weatherstrip retaining screw(s). Also remove the exterior trim moulding from the opera window, if so equipped.
6. Remove the drip rail mouldings and weatherstrips (Groups 44 and 47).
7. Remove the side and rear belt mouldings (Group 47).
8. Remove screws that retain the cover at front and rear window openings (one at each seam).
9. Remove the cover from the roof.
10. Clean all mouldings and retainers. Clean excess sealer from around the windshield and back window.

Installation

1. With Thunderbird and Continental Mark V only—if the roof side front or rear pads are torn or damaged, pull off the old pad and clean the sheet metal area with a wire brush. Apply adhesive (19C525 or equivalent) to the roof sheet metal and the underside of the new pad(s). Position the pad(s) to the top sheet metal as shown in Fig. 2.
2. Measure and mark the center of the new cover fabric.
3. Measure and mark the center of the vehicle roof.
4. Apply adhesive to the underside of the new roof cover assembly between the center mark and one of the outboard seams. **Do not apply adhesive to those parts of the assembly which cover the roof sides and the area around the door, windshield and back window openings.**
5. Apply adhesive to the corresponding half of the roof. **Do not apply adhesive to the roof sides and the sheet metal area around the door, windshield, and the back window openings.**
6. Position the cover to the roof, and align the center marks. Then, cement the cover to the roof. Stretch out all wrinkles.
7. Apply adhesive to the remaining half of the roof and cover as described in Steps 4 and 5. Position the cover to the roof as described in Step 6, and stretch out all wrinkles.
8. Apply adhesive to the body and underside of the cover in the area below the back window. Position the cover and remove any wrinkles.
9. Apply adhesive to the roof sides and door openings and to the underside of the cover. Make angle cuts at the corners as necessary. Then, stretch the cover and cement in place.
10. Trim the roof cover at the windshield and back window openings. Leave 1/2 inch of material at the openings for cover attachment in the window opening recess.
11. Apply adhesive to the back window opening and the underside of the roof cover. Make angle cuts as necessary at the corners and cement the material in the back window opening recess. Trim the cover around the moulding retainer weld studs.
12. Apply adhesive to the windshield opening and the underside of the roof cover. Make angle cuts as necessary at the corners and cement the material in the windshield opening recess. Trim the cover around the moulding retainer weld studs.

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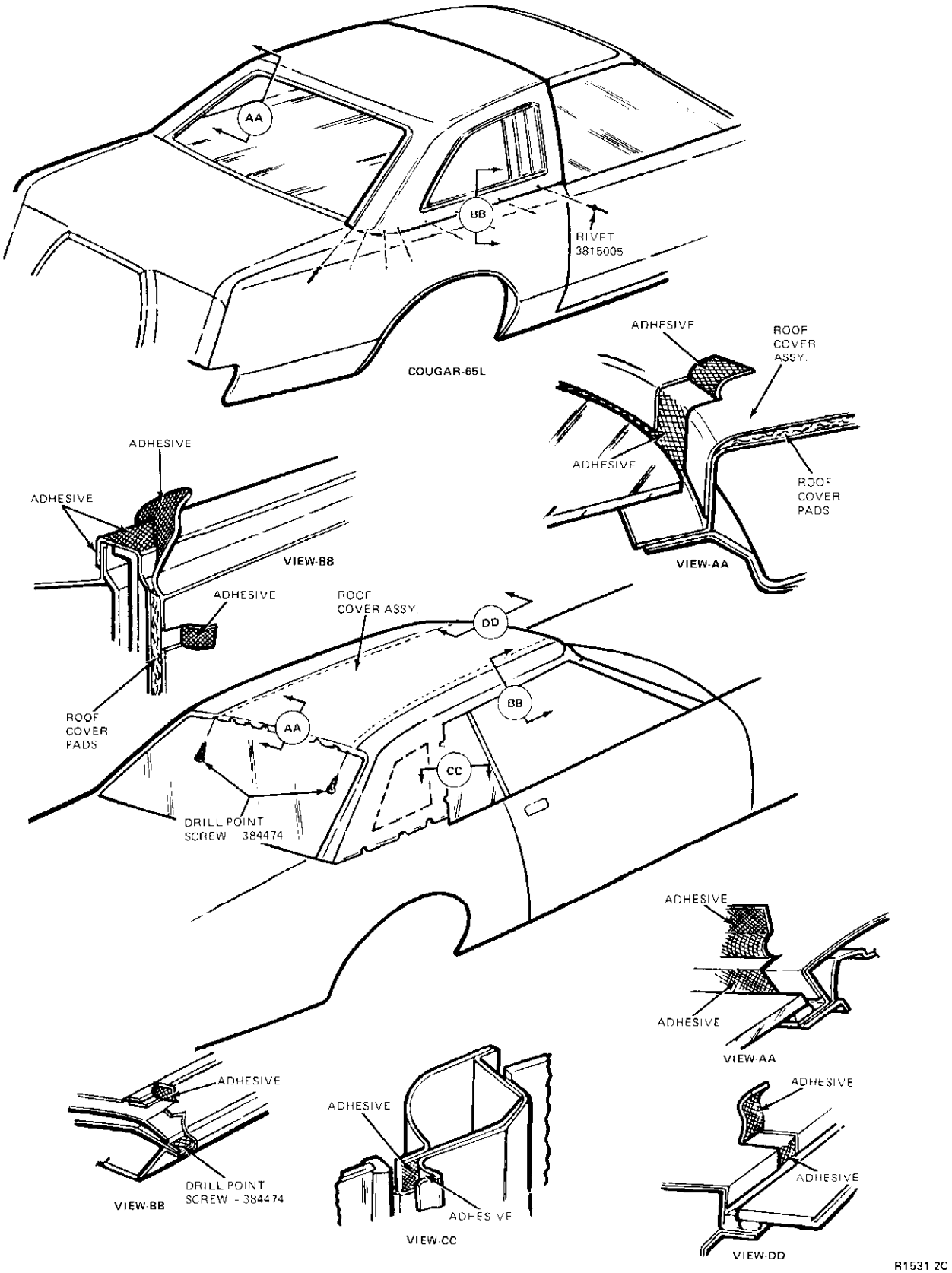


FIG. 1 Roof Outside Cover Installation—LTD II and Cougar

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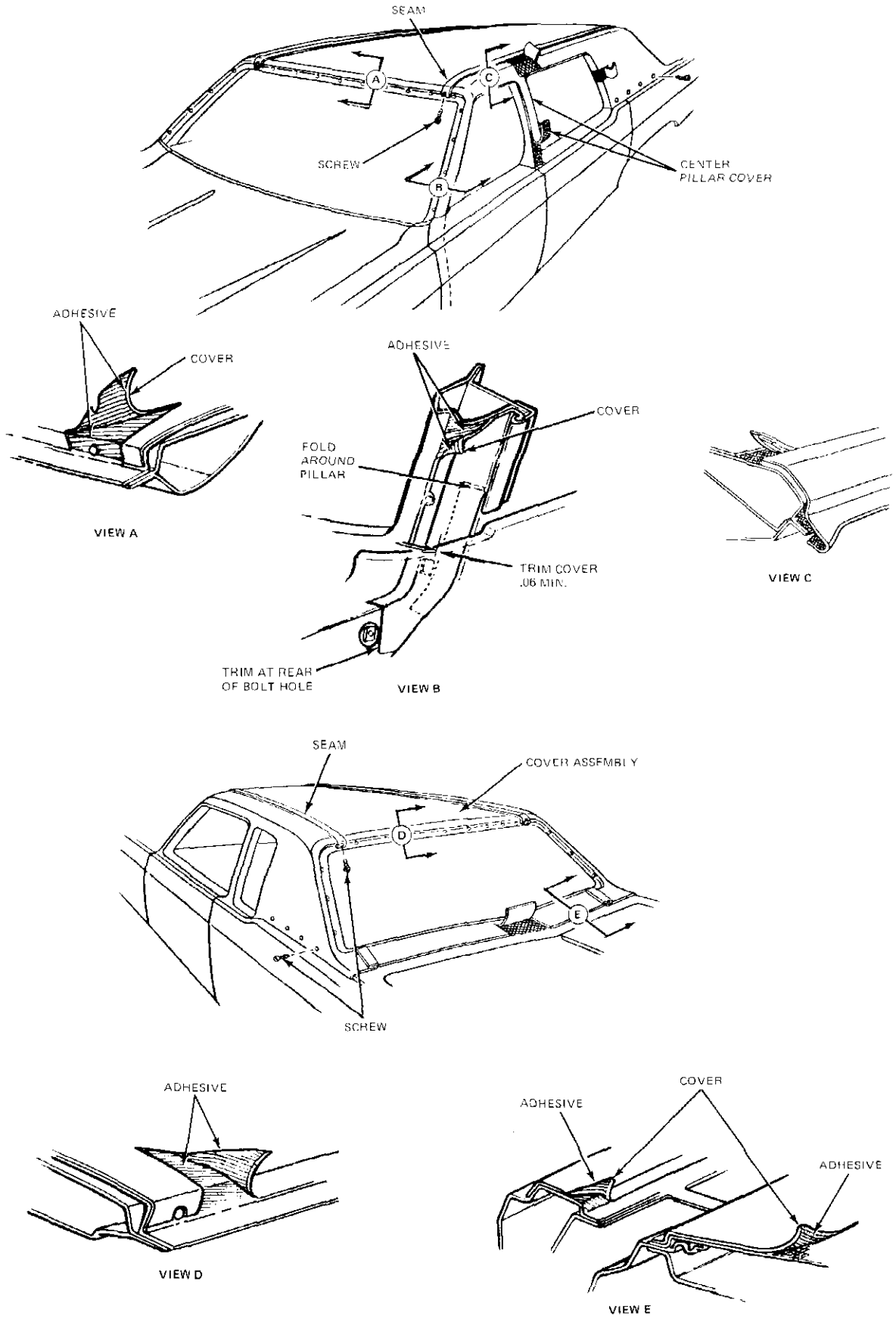


FIG. 2 Roof Outside Cover Installation—Lincoln Continental

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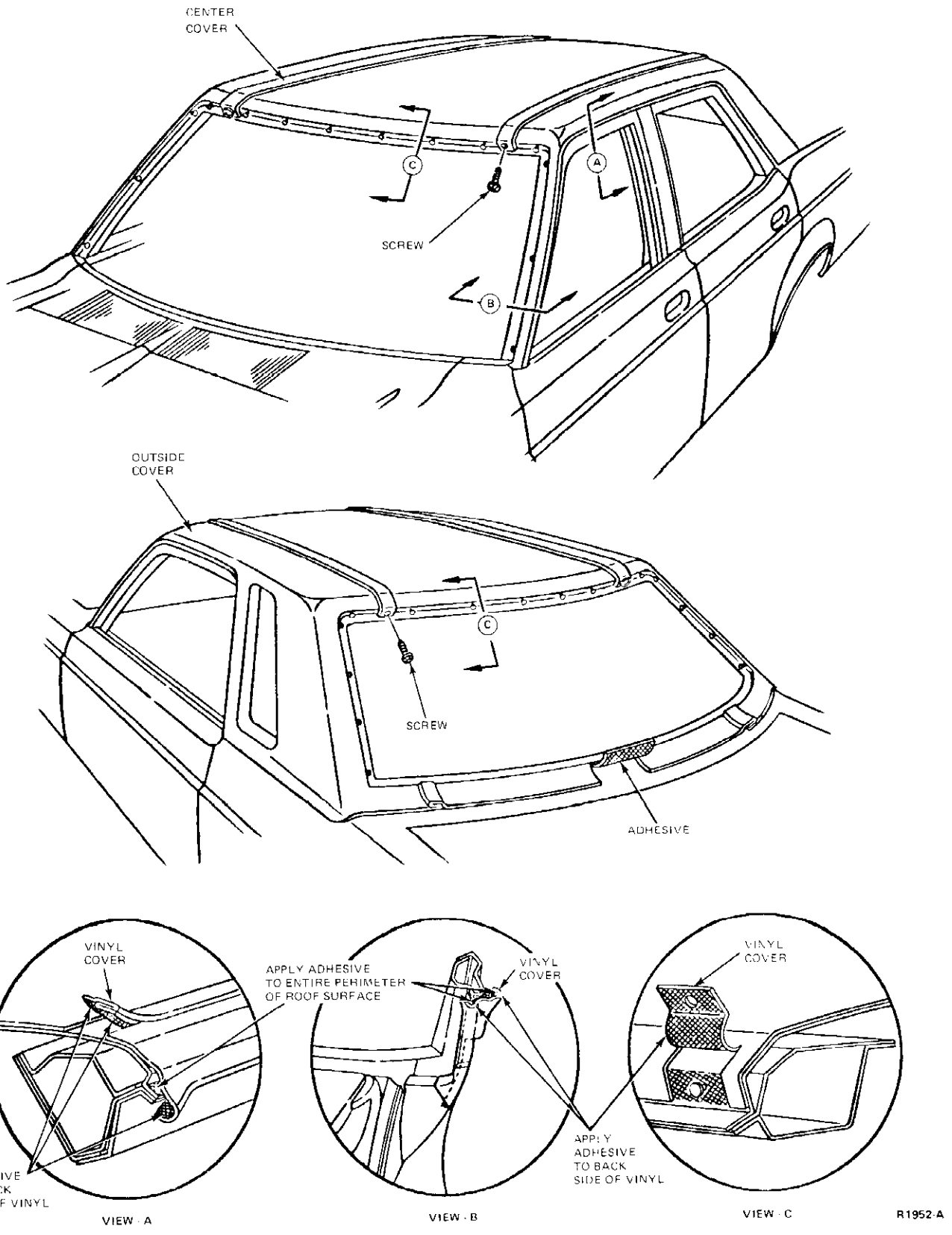
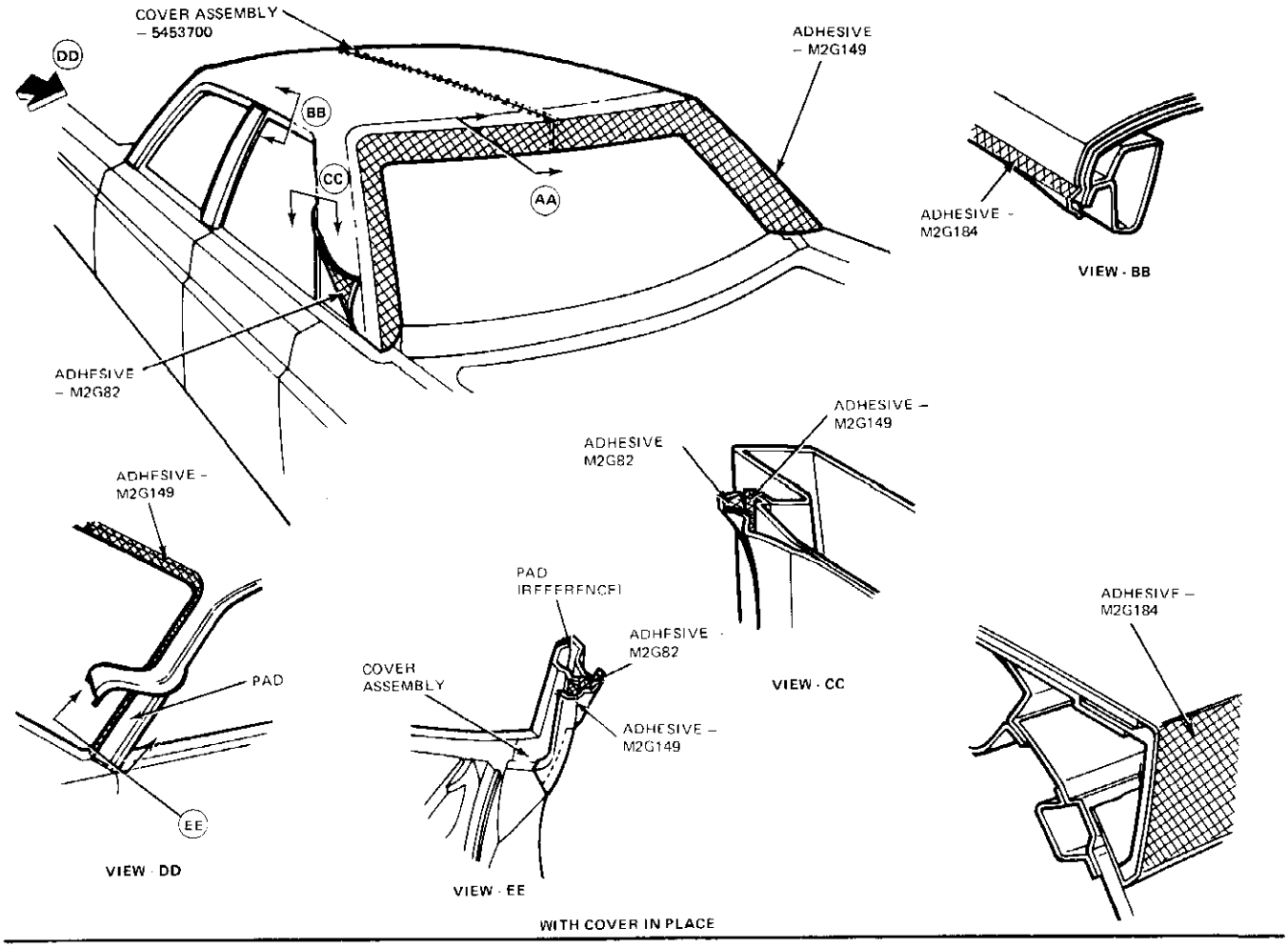
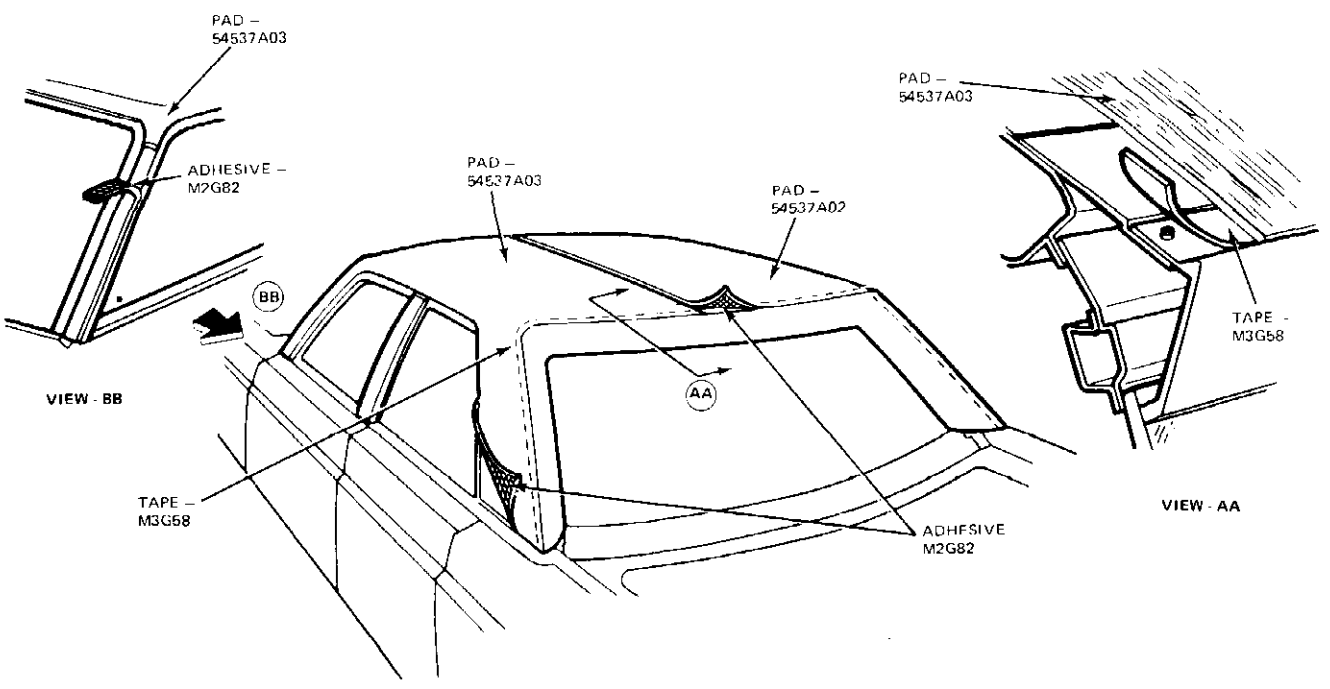


FIG. 3 Roof Outside Cover Installation—Granada and Monarch

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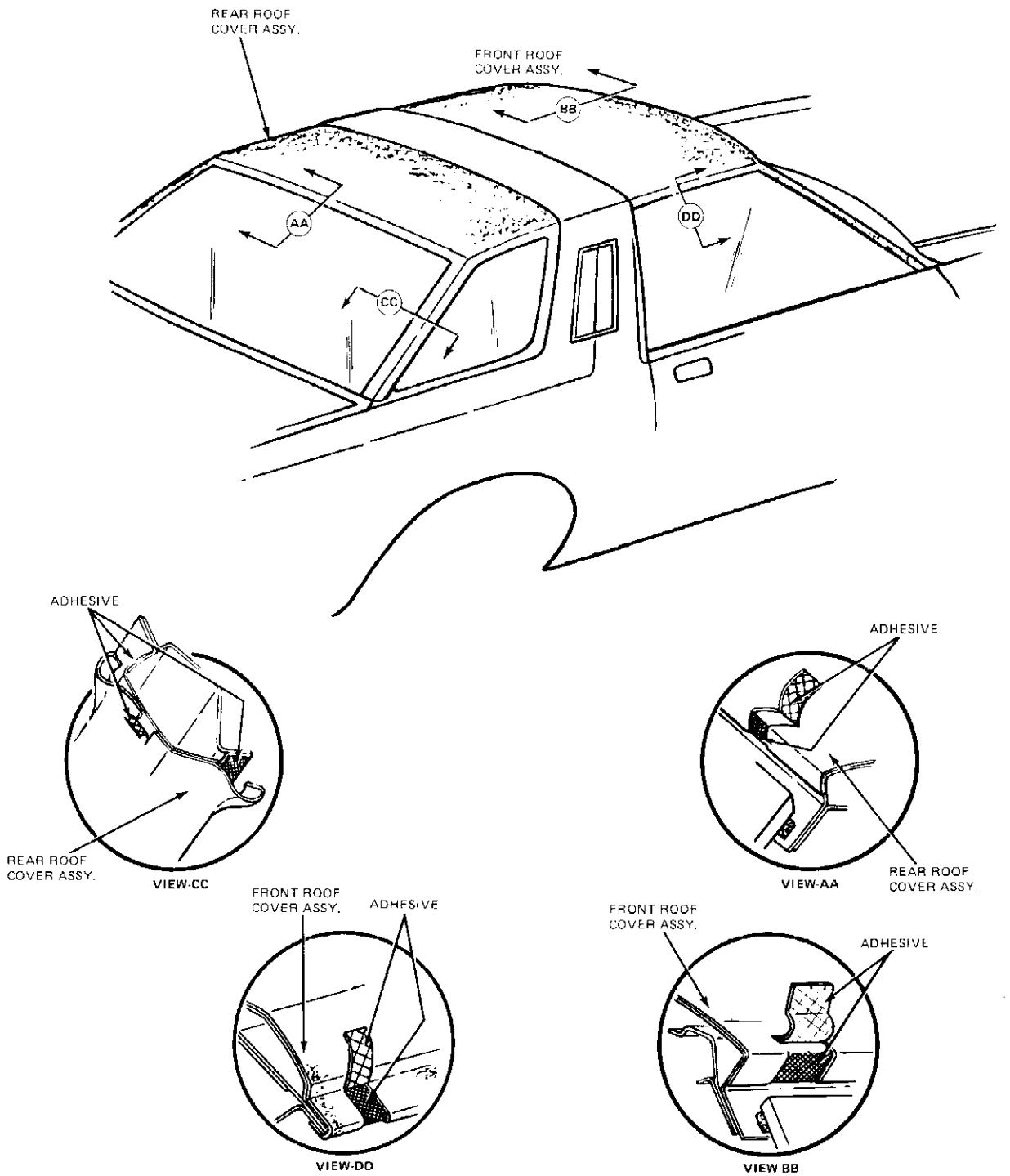


N4086-2A

FIG. 4 Roof Outside Cover Installation—Versailles

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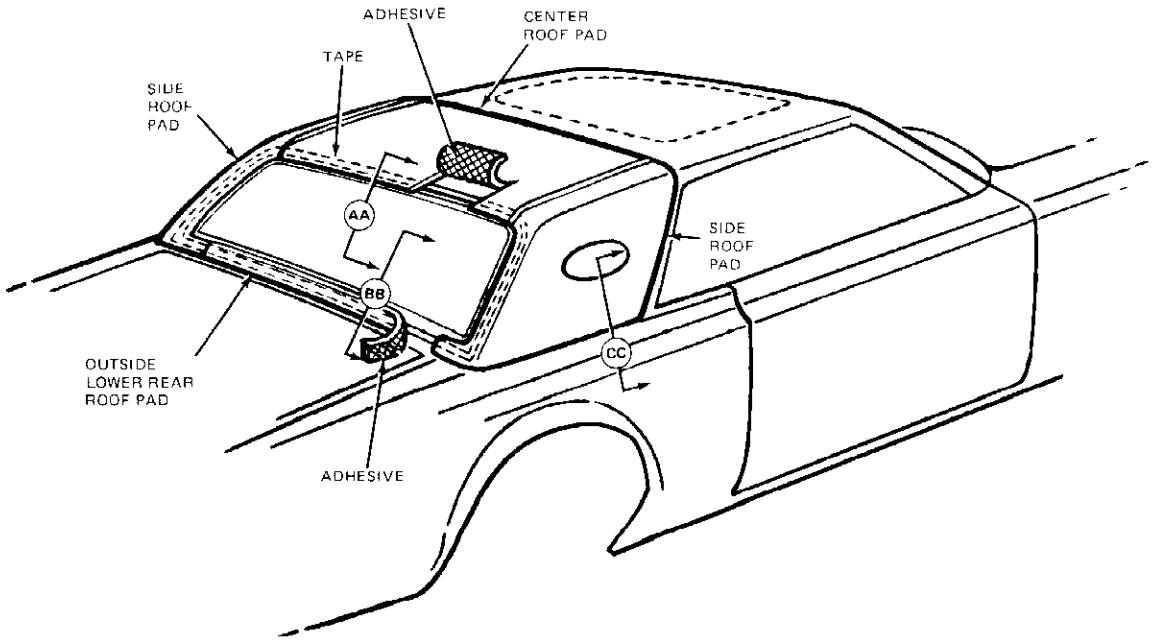
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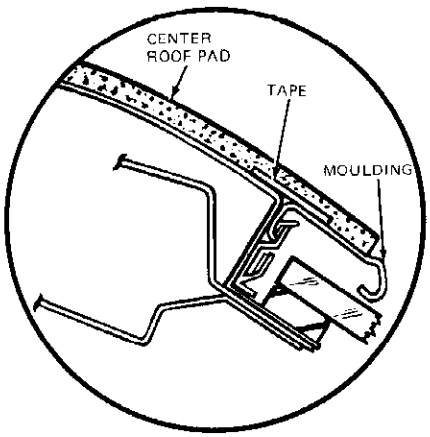


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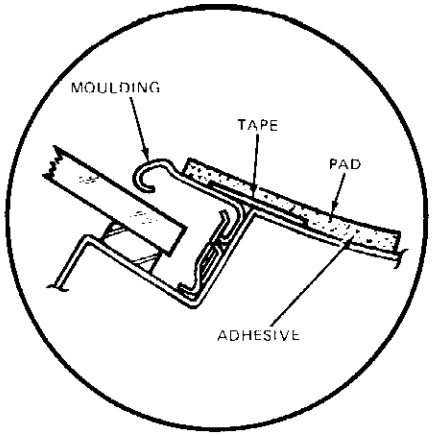
FIG. 5 Roof Outside Cover Installation—(Non-Ensolite Pad)—Thunderbird

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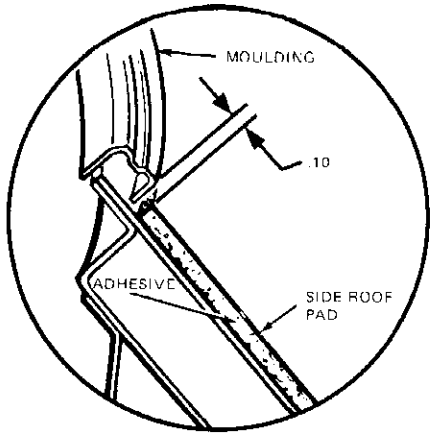




VIEW—AA



VIEW—BB



VIEW—CC

1. PAD ROOF OUTSIDE LOWER REAR (1) REQUIRED
2. PAD ROOF OUTSIDE CENTER (1) REQUIRED
3. PAD ROOF OUTSIDE SIDE (2) REQUIRED
4. ADHESIVE
5. TAPE,.75" WIDE APPLIED AROUND REAR WINDOW (ESB-M3G58-A)
6. MOULDING

R1942-2B

FIG. 6 Roof Outside Cover Installation—(Ensolite Pad)—Continental Mark V

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13. At each roof rear quarter, locate and punch two holes for the roof side ornament on models so equipped. Install each side ornament with the studs entering the punched holes; then, from inside the vehicle, install the retaining nuts on the studs. Apply sealer around the nuts.
14. Re-install all interior trim panels, garnish mouldings, weatherstrips and exterior mouldings that were removed before cover replacement.

NOTE: Any exterior mouldings using positive bolt-on fasteners must be installed prior to installation of interior trim parts.

15. Clean the glass, mouldings, top and surrounding area.

ROOF OUTSIDE COVER—W/ENSOLITE PAD

Continental Mark V (Fig. 6)

Removal

1. Unpack new cover and new pad, spread out to remove the wrinkles.
2. Cover the hood, fenders, rear deck and seats with protective covers.
3. Remove rear seat cushion and seat back assemblies (Group 41).
4. Remove upper and lower 1/4 trim panels right and left (Group 45).
5. Remove opera windows and outside opera window mouldings.
6. Remove 1/4 window housing right and left, to gain access to T-Bolt nuts that retain the outer belt moulding.
7. Remove windshield garnish moulding and sun visors including sun visor brackets.
8. Remove staples and pull headliner down on both sides and across front at windshield.
9. Remove T-Bolts nuts retaining the halo mouldings along both sides, across front of roof and across lower roof panel at rear. Lower rear roof panel T-Bolt nuts can be reached from inside trunk.
10. Remove all roof cover retaining mouldings and rear window outside mouldings and clips (Group 43).
11. Mark all seam and hole locations. This will aid in lining up new cover.
12. Remove all screws and clips retaining cover to roof.
13. Remove the cover from roof.
14. Remove rubber backing from roof and scrape off all excess backing.
15. Repair areas damaged by scraping.
16. Grind excess cement and padding from roof area prior to priming.
17. Mask area for priming and wipe with solvent.
18. Prime entire top (1st) coat.
19. Prime entire top (2nd) coat.
20. Scuff sand, blow and wipe roof area clean.

Installation

1. Position all mouldings in place to line up pad for proper alignment of cover to mouldings.

NOTE: It is very important that the mouldings be installed around the backlite and beltline to properly position the Ensolite pad before any cutting is done. If the pad is not properly positioned to the mouldings, the cover will have a gap at the mouldings (Fig. 5).

2. Tape all mouldings to prevent spraying glue on them.
3. Spray glue to roof and pads and install to roof. Trim excess pad.
4. Remove tape from mouldings and remove mouldings.
5. Remove backing from pad.
6. Cut opening in pad for opera windows.
7. Position cover on top and inspect for proper fit.
8. Position and mark cover and roof area for proper alignment.
9. Spray glue to pad and cover and install cover to pad. Loosely install halo mouldings and mark and trim excess cover.
10. Cut opening in cover for opera windows, trim and install outer retainers.
11. Cut holes in cover at weld studs and punch holes for retaining screws and install screws.
12. Install retainers and clips and install mouldings.
13. Apply clear silicone sealer in backlite opening.
14. Install rear window garnish mouldings.
15. Install halo mouldings.
16. Install all interior trim and staple headliner.
17. Remove all tape and paper.
18. Clean interior and exterior.

MAJOR REPAIR

GENERAL REPAIR INFORMATION

Repairs on White Vinyl

Although repairs can be performed on white vinyl tops, the repair is more difficult with white (particularly when repairing a cut or scuff on the vinyl surface). However, with certain precautions the repair can be made to an acceptable level.

It is important that the vinyl surface is thoroughly cleaned before the repair is made and also that excessive heat be avoided to prevent possible charring of the vinyl. The recommended cleaning procedure and temperatures are outlined under Repair Procedures.

The following vinyl top repair material and tools can be obtained from a local automotive parts supply jobber or direct from:

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Detroit Autobody Equipment Company
100 Park Street
Troy, Michigan 48064

Model 750-HDA electric heat gun, heavy duty industrial grade 750°F

Special formula heat curable vinyl patching compound.

Applicator Trowel tools

Scalper knife

Grain-die compound

Silicone mold release

Practice vinyl samples

General Information

Applying patching compound is a multiple layer procedure at alternate filling and curing.

On flat or horizontal roof areas, use a moist sponge (not wet) to cool the repair area between heat cycles to prevent the patching compound from setting up too fast. Cooling is also accomplished by operating the heat gun on the COLD position.

On sloped or vertical roof areas, keep the work area warm so the patch compound will partially set up as it is applied to the joint to prevent running and tear-drop effects.

Sand down high spots with 200 grit open coat paper, then regrain and re-spray, or cut out undesirable area and repeat repair procedure.

If repair is too low, refill, recure, regrain and spray color.

Keep patching compound away from the heat gun air stream to prevent hardening in the jar. Store compound in a cool place.

Practice Procedure

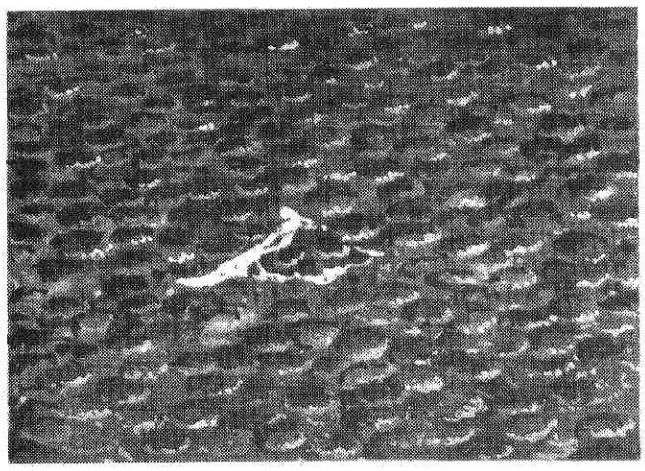
Use sample vinyl swatches in kit for practice. Cut a hole or slit in the sample and glue it to a piece of sheet metal with trim cement. After trim cement dries, make practice repairs in the flat position. Follow by making practice repairs in the vertical position.

Instructions On Use Of Heat Gun

1. Gun is hottest when using shortest possible heavy duty extension cord. Beware of drop light cords and long extension cords with small wires where the line of voltage drop can seriously reduce heat output of the gun.
2. Gun is hottest when adjustable air intake louvers are closed. Regraining procedures require maximum temperature - use closed louvers with nozzle distance 1 inch from work.
3. Curing each layer of Vinyl Patching Compound is normally done at 1 inch nozzle distance. Adapt louver opening to suit rate of cure desired.
4. Move gun nozzle in circular motion over repair area (whether curing or regraining) to get best temperature distribution at the vinyl surface.
5. Before turning gun OFF, flip switch from hot to cold for a few seconds to cool the heater element.
6. Do not drop gun - the ceramic heater element may fracture.

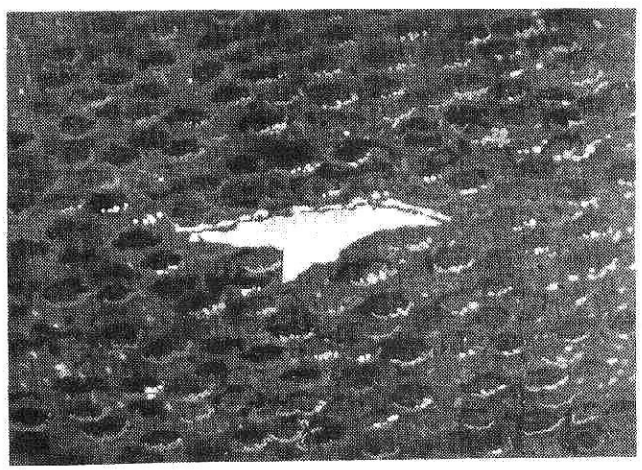
Vinyl Roof Repair Procedure

1. Make a grain die by following the Vinyl Grain Pattern Die procedure which is given in this Part. This die will be used later to regrain the repaired area.
2. If damaged area is small (Fig. 8), use scalpel knife to cut out loose vinyl material back to where vinyl material is securely bonded to roof. Cut out all fibrous strands. Cut to obtain a clean edge condition as shown in Fig. 8.



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FIG. 7 Typical Vinyl Roof Damage



R1601-1A

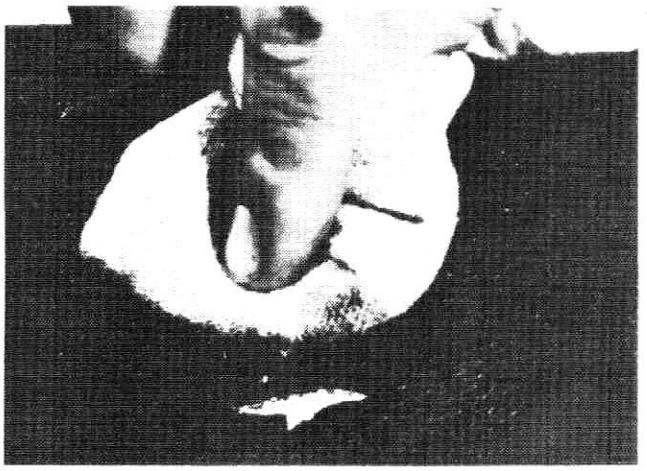
FIG. 8 Vinyl Roof Damage After Trimming

If damaged area is larger, cement loose material back into place with trim cement and allow to dry. Cut out at least 1/16 inch of material on both sides of the tear line in which to place the vinyl patching compound.

3. Clean the area to be repaired with vinyl prep conditioner by spraying the conditioner **onto a clean cloth** and wiping the area (Fig. 9). **Do not spray the prep conditioner directly onto the repair area.**

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R1602-1A

FIG. 9 Cleaning Damaged Area

4. Apply patching compound with applicator trowel tool as follows (Refer to Figs. 10 and 11):



R1603-1A

FIG. 10 Applying Patching Compound

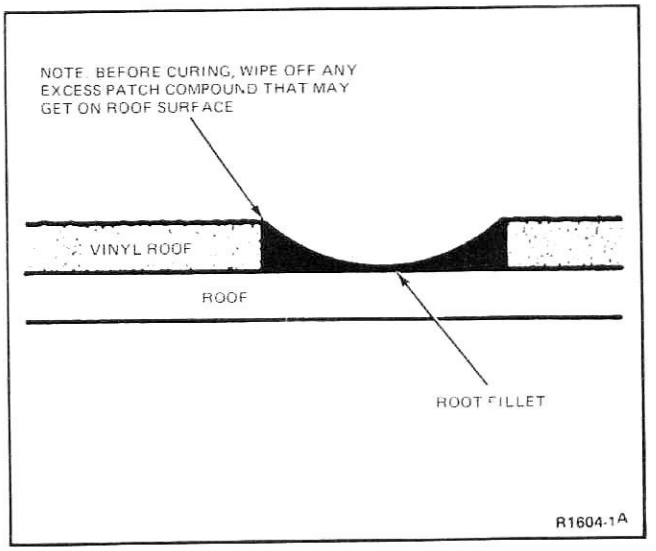


FIG. 11 Patching Compound—First Layer

Apply the first layer in small quantities to the metal-vinyl edge joint to make a root fillet as shown in Fig. 11. Before curing, wipe off any excess patch compound above the joint with a clean dry cloth.

Hold the heat gun approximately 1 inch away from the repair and move the gun in a circular motion. Curing takes about 20 seconds and is complete when the compound turns from white to translucent. Press down on the roof material around the joint with fingers during heat-cure cycles to keep area flat.

Repeat the procedure of applying patching compound and heat curing - always in thin layers. (Refer to Figs. 12 and 13.) Usually three layers are adequate to complete the job but larger holes may require four to five layers.

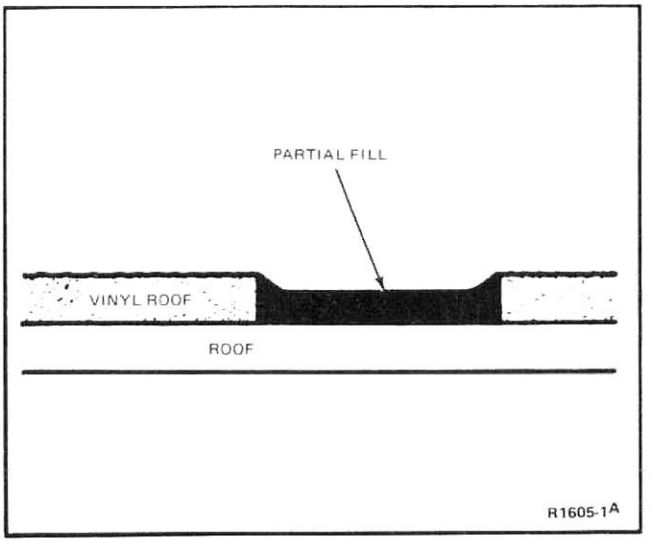


FIG. 12 Patching Compound—Intermediate Layer(s)

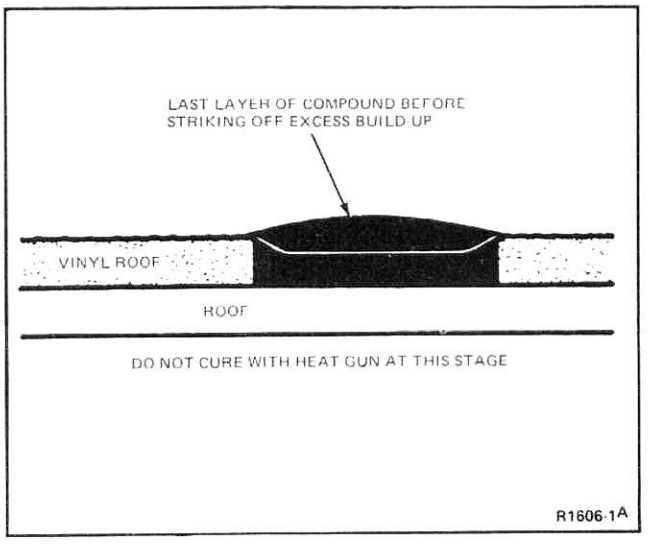


FIG. 13 Patching Compound—Last Layer

After heat curing the next-to-last layer, the joint cross-section will appear as shown in Fig. 12 and be warm. Apply patching compound to obtain a slight build-up above the vinyl surface as shown in

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Fig. 13. Wait until this last application turns to a gel-like consistency (about 10 seconds). **DO NOT CURE WITH HEAT GUN AT THIS STAGE.** Then, draw the side edge of the trowel tool over the face of the patch area to strike off the excess build-up to get a level surface (Fig. 14). Also, remove any excess compound that may smear on the vinyl roof material adjacent to the patch area otherwise it will cure to the roof material and cause unwanted build-up on the surrounding area. Joint is now ready for the final heat cure and regraining procedure.

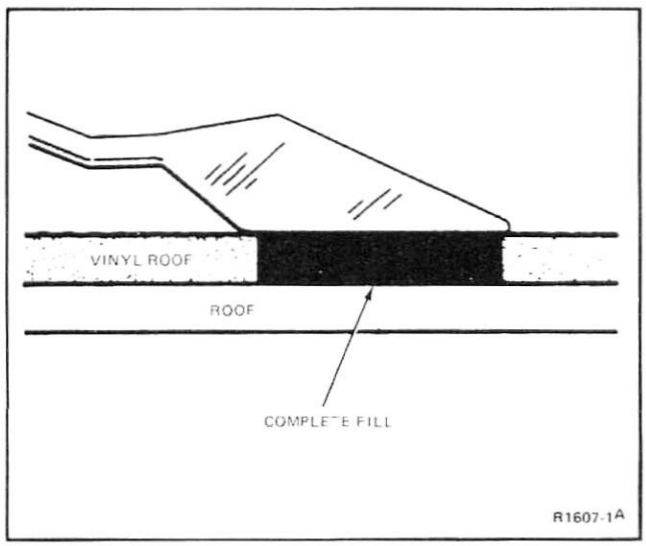


FIG. 14 Leveling Surface

5. Cure this last leveled layer by heating the patched area for about 30 seconds at 1 inch nozzle distance (always moving the gun nozzle in a circular motion) until the immediate surrounding vinyl develops a shiny glazed appearance. Have grain pattern die ready in the other hand.

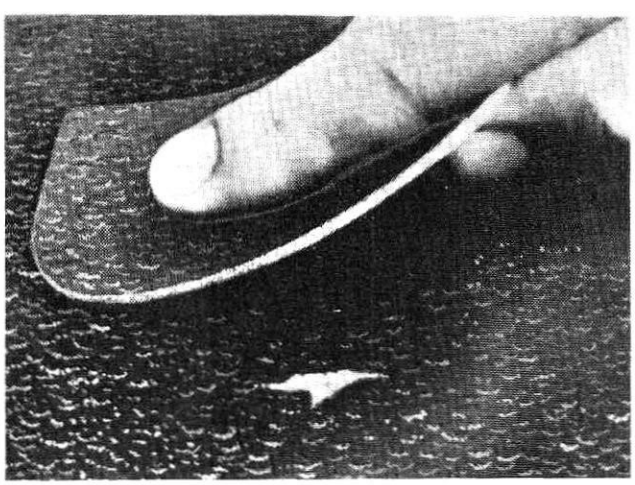


FIG. 15 Applying Grain Pattern Die

6. Remove heat and immediately press grain pattern die with force (Fig. 15). Hold die on repair for at least 10 seconds to obtain a good impression.
7. Cool the repaired area with a moist sponge or **cold** air blast from the gun.
8. Spray vinyl prep conditioner on a clean cloth and lightly dab the area. **Do not rub.**
9. After the repair area has cooled, color spray with a back and forth sweep to fog in the vinyl roof color.

Vinyl Grain Pattern Die

A graining die can be made to duplicate any print desired. It is made by taking an impression from the vinyl material in an area adjacent to the repair or from a piece of scrap having the same grain.

1. Clean the vinyl material from which the print will be made with any suitable mild vinyl cleaner.
2. Dry the material.
3. Spray a 6 x 8 inch area with Silicone Mold Release or equivalent.
4. On a glass surface, place about two tablespoons of Grain Die Compound and add seven drops of Fast Set Liquid Hardener or equivalent to the compound (Fig. 16). Mix thoroughly with a stick or spatula.

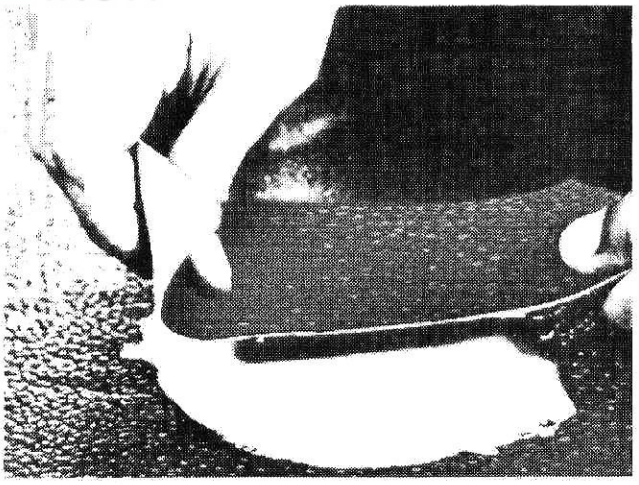


FIG. 16 Mixing Grain Die Compound

5. Scrape the mixture onto the vinyl material that has been sprayed with mold release and level out on a 4 x 6 inch area.
6. Cut an 6 x 8 inch piece of vinyl material of the same grain pattern, and place it over the compound. Place the grain side up, fabric side down. Refer to Fig. 17.

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R1610-1A

FIG. 17 Place Vinyl Material Over Die Compound Mixture

7. Place a flat board (such as 1/2 inch plywood) on top of the vinyl material and place a weight on the board.
8. Allow to dry for 20 minutes.
9. Peel off the completed vinyl grain pattern die and trim edges with scissors.
10. Spray the die face with Mold Release to provide a non-adhering silicone coated surface. The die can be used repeatedly to repair identical patterns. Die should be at room temperature when making grain on repair area.

ALL VINYL ROOF MATERIAL

Tools and Material

The following are the recommended tools and material required to perform the various types of repairs on all vinyl roof material.

Before ordering from the sources listed, it is suggested that local jobbing shops or radio equipment outlets be contacted for availability of these items.

TOOLS

1. Heat Gun—Model HG-501. (Source: Electric Tool & Service Co., 6188 12th St., Detroit, Michigan 48208) or equivalent.
2. Soldering Iron consisting of (1 each): No. 6100—Imperial Unger Handle... No. 6102—Imperial Unger Standard 2-wire cord... No. 6202—Imperial Unger 25-Watt heating cartridge... No. 6372—Imperial Unger Tip. (Source: Radio Specialties Co., 12775 Lyndon Ave., Detroit, Michigan 48227) or equivalent.
3. Transformer Model No. 10B Superior Variable... Bud Metal Box Model No. C-1606. (Source: Radio Specialties Co., 12775 Lyndon Ave., Detroit, Michigan 48227) or equivalent.
4. Hypodermic Syringe 2-1/2 cc with a No. BD-18 needle (Plastipakz)... Source: Any medical supply company.

MATERIALS

1. Rubber Cement Pick-Up (DRAFCO)... Source: Procure locally or Drafting Materials Inc., 4851 Woodward Ave., Detroit, Michigan 48201.
2. Abrasive Cellulose Sponge No. 7010 (Scotchbrite Brand 3M) (Surfa Scuff Sponge)... Source: Procure locally.
3. Vinyl Top Cleaner—Part No. 19526 (or equivalent)... Source: Facing Parts Depot.
4. Vinyl Top Adhesive Part No. 19C525 (or equivalent)... Source: Master Parts Depot.
5. Vinyl Paint—Spray Can net wt. 5 Oz. Avd. (or equivalent):

Color	Part Number
Black	VR-1724-S
White	VR-1525-S
Blue	VR-1903-S
Gold	VR-1915-S
Parchment	VR-1631-A
Brown	VR-2045-S
Dulling Agent	VR-95F17-S

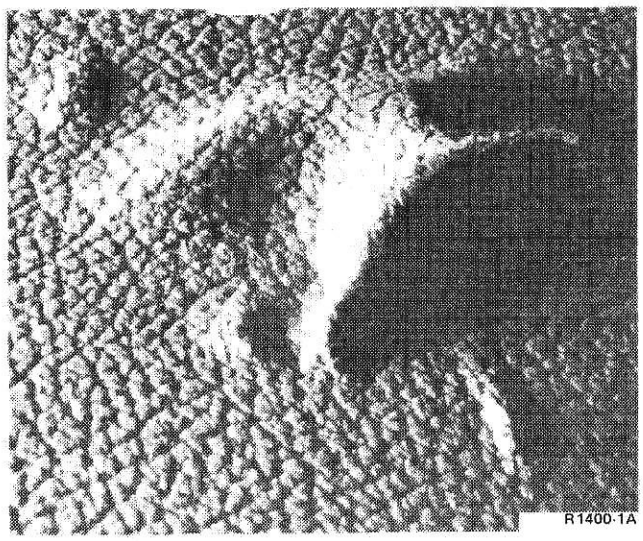
The above colors are packaged in quantities of (6). When ordering always select any combination of (6) colors by Part Number.

Types of Repair

The following are the various types of items that can be repaired:

Bubbles

A separation between the vinyl cover and metal surface due to trapped air (Fig. 18).



R1400-1A

FIG. 18 Air Bubble

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Scuffs and Abrasions

Surface damage caused by rubbing action (Fig. 19).

Major Cuts

A cut which has penetrated through both the vinyl surface and cloth backing (Fig. 20).

Wrinkles

A crease or small fold on the surface of the material. This condition is usually evident outboard of the bonded seam (Fig. 21).

Minor Cuts

A surface cut which has not penetrated the cloth backing (Fig. 22).

Looseness

Vinyl material that has not been drawn tight over a sharp bend in the sheet metal such as around the backlite or over padded material used on certain models and body styles (Fig. 23).

Separated Bonded Seam

Seams in which the two pieces of material have a gap between the sections (Fig. 24).

Adhesive Smears

These are smears of the type that normal cleaning will not remove such as trim cement, drip rail sealer, or the adhesive which is used for vinyl roof installation.

These are typical of the kind of items that are repairable. However, there are certain considerations regarding the type of repairs to be performed (e.g., whether repair is to be performed during pre-delivery, color of vinyl roof involved, location of defect, etc.).

Repair Procedures

Before proceeding with any repairs thoroughly clean the vinyl roof with cleaner, Part No. 19526 (or

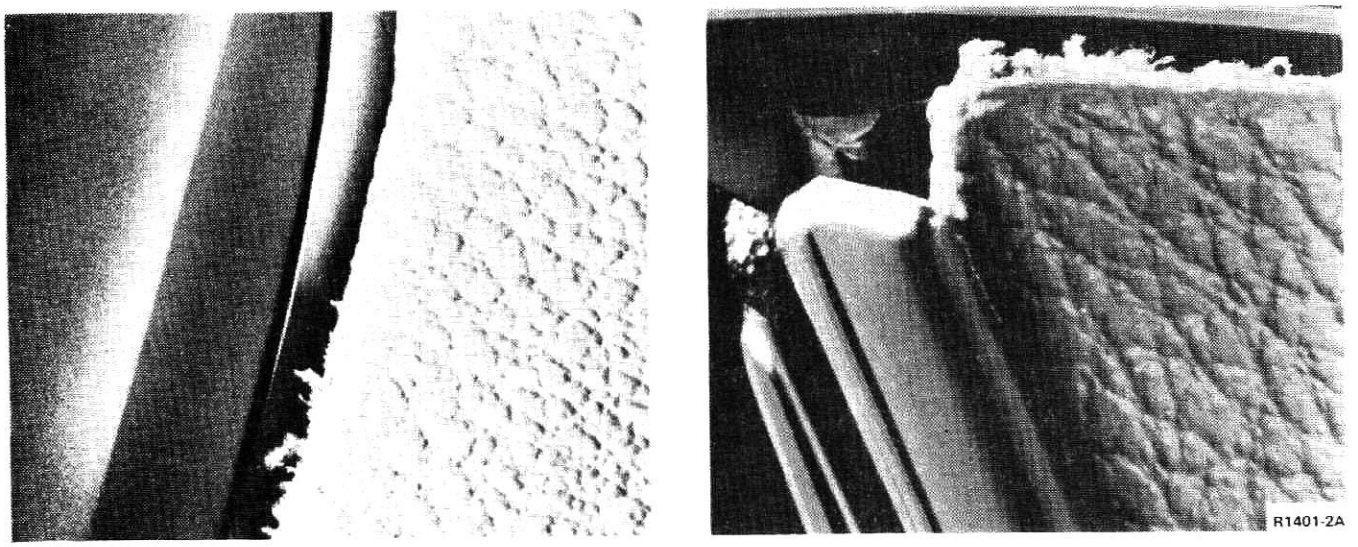


FIG. 19 Scuffs or Abrasions

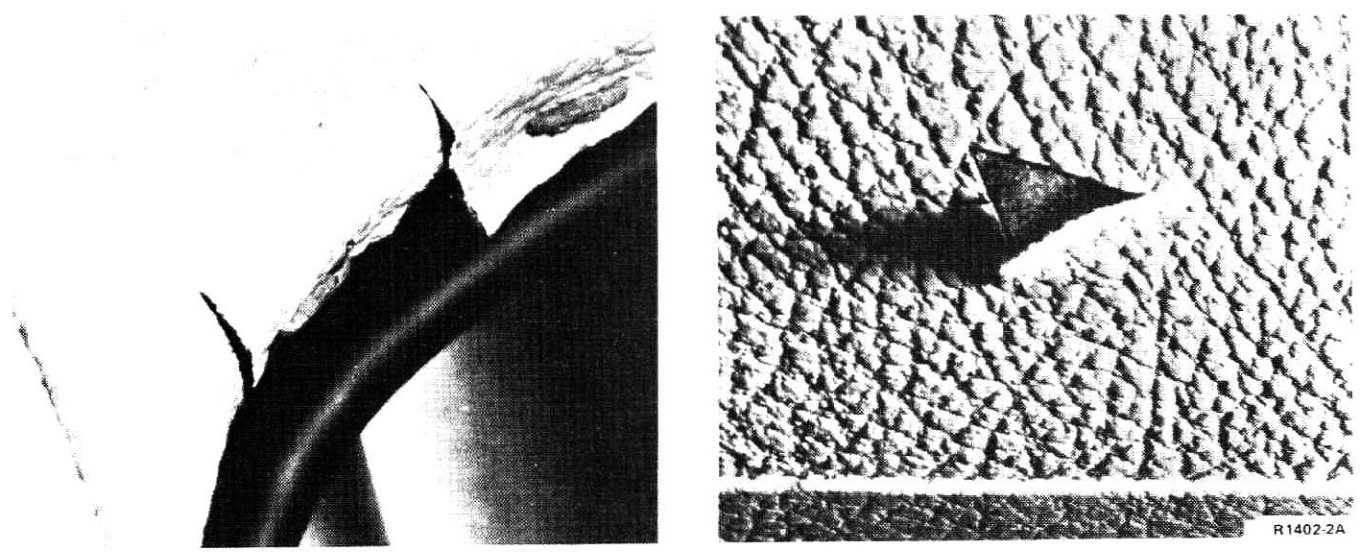


FIG. 20 Major Cuts

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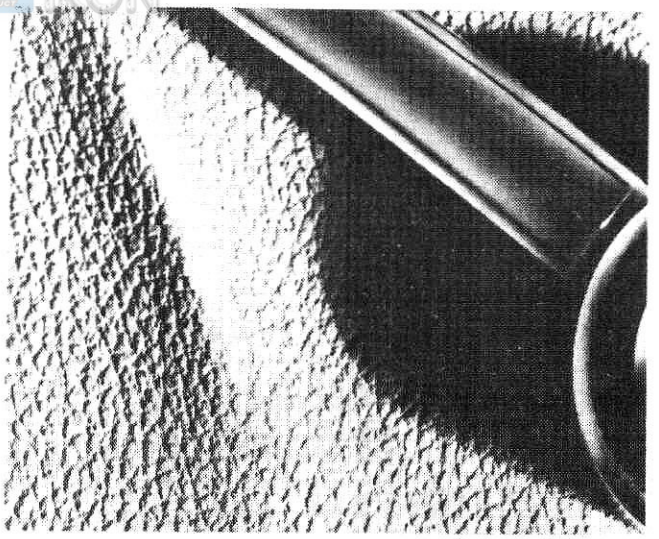
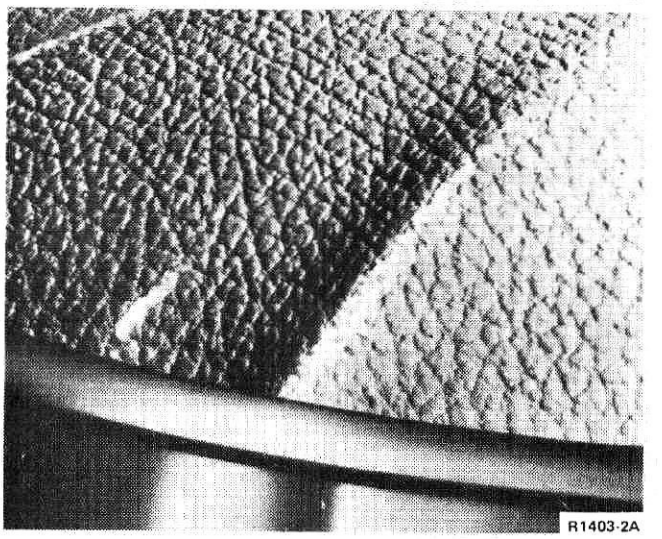


FIG. 21 Wrinkles



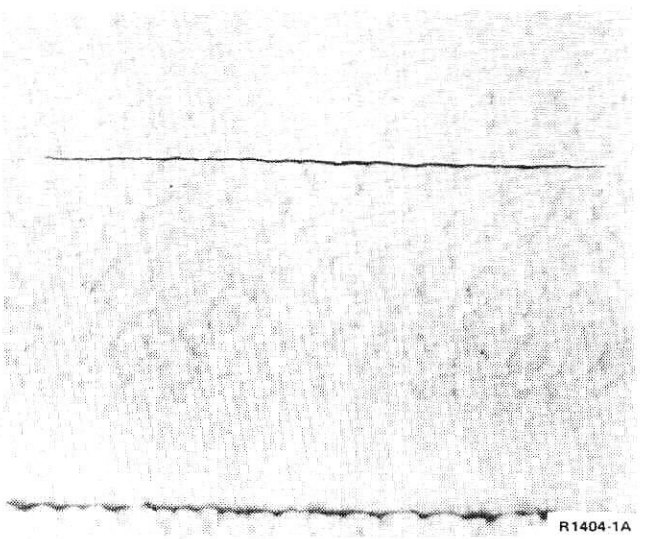


FIG. 22 Minor Surface Cut

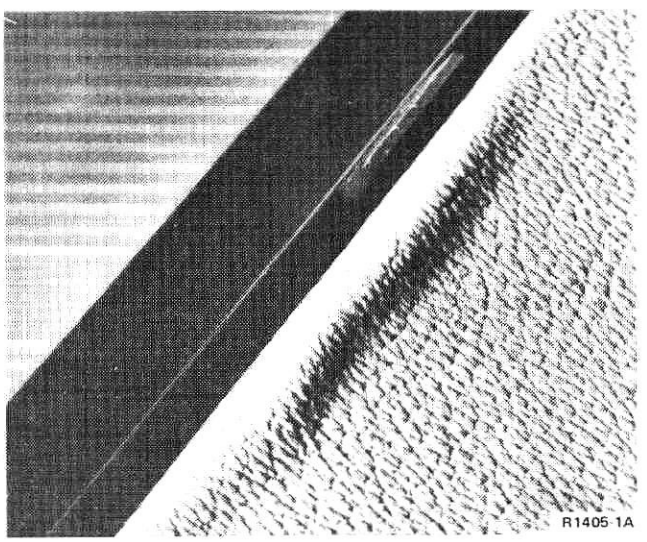


FIG. 23 Looseness

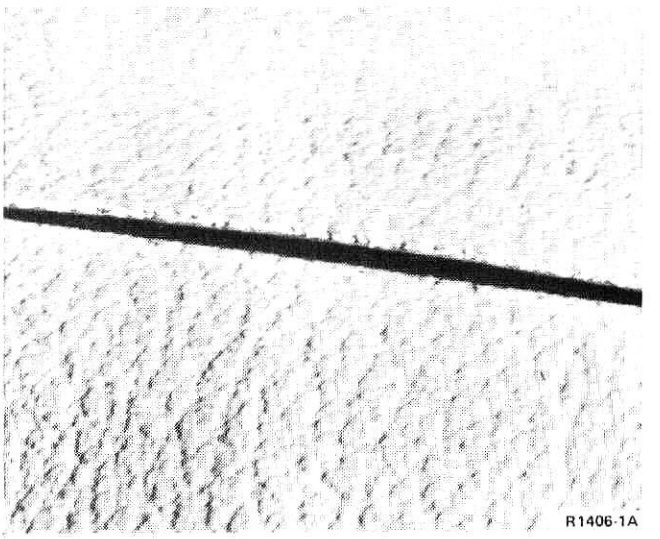


FIG. 24 Bonded Seam Separation

equivalent). Use a scrub brush to remove all dirt imbedded in the graining. Repeat the cleaning operation as often as required, particularly on white vinyl tops.

Scuffs or Abrasions

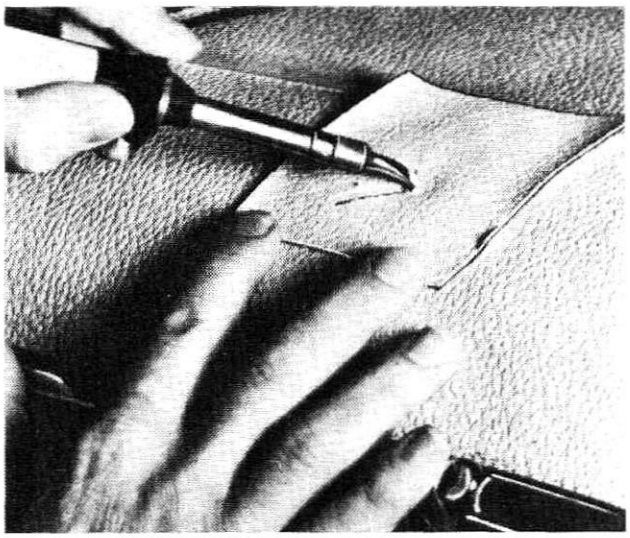
Connect the soldering iron and set the transformer heat range to No. 7 position (approximately 225°F).

Clean the soldering iron tip thoroughly with the abrasive pad. This must be done frequently while performing the repair to avoid vinyl build-up on the tip.

Lightly slide the soldering tip over the scuff mark several times using short overlapping strokes until the frayed vinyl has fused to the surface.

The vinyl surface may have been removed by the scuff exposing the cloth backing. If this is encountered, it will be necessary to fill in with vinyl as shown in Fig. 25. This is typical where vinyl must be added and is accomplished by stripping a small quantity of vinyl off a piece of scrap material with the hot tip of the solder gun as shown in Fig. 25. Carefully fill in as required using short overlapping strokes. **(Several stripping operations may be required to adequately fill the**

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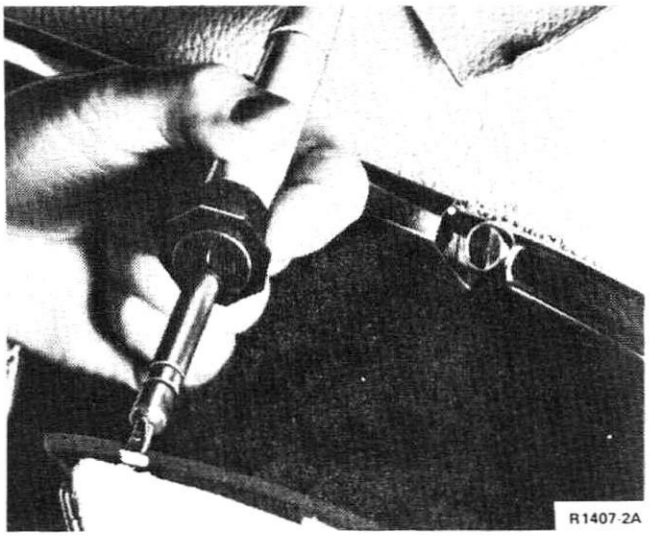


FIG. 25 Stripping and Filling Scuffed Area With Vinyl

scuffed area.) The graining effect in the vinyl can be restored by carefully etching the grain pattern into the vinyl with the sharp edge of the soldering tip. The gloss or shiny surface created by the repair can be removed with the dulling agent or by spraying the area with liquid vinyl as shown in Fig. 26. Several color coats may be required. The last coat should be a fog coat to minimize gloss.

This repair can be applied to scuffs or abrasions in most areas of the vinyl top.

Minor Surface Cuts

Connect the soldering gun and set the transformer heat range to No. 7 position (approximately 225°F).

Clean the soldering iron tip thoroughly with the abrasive pad. This must be done frequently during the repair to avoid vinyl build-up on the tip. Lightly slide the soldering tip across the cut surface using very short strokes (1/4 inch or less) until the cut is covered with vinyl. Again go over the cut lengthwise with the soldering tip to smooth out the surface. The graining effect can be restored by carefully etching the grain pattern into the vinyl with the sharp edge of the soldering tip.

If required, the gloss or shine on the vinyl surface created by the repair can be removed with the dulling agent and then spraying the area with liquid vinyl as shown in Fig. 26. Several color coats of liquid vinyl may be required. The last coat should be a fog coat to minimize gloss.

Major Cuts

Connect the soldering iron and set the transformer heat range to No. 7 position (approximately 225°F).

Clean the soldering iron tip with the abrasive pad. This must be done frequently during the repair to avoid vinyl build-up on the tip. If damage is over an inch long, apply a light coat of adhesive as shown in Fig. 27. (It is not necessary to use cement if the cut is over a padded area.)

Start at the center of the cut and lightly slide the soldering tip across the cut surface, as shown in Fig. 28,

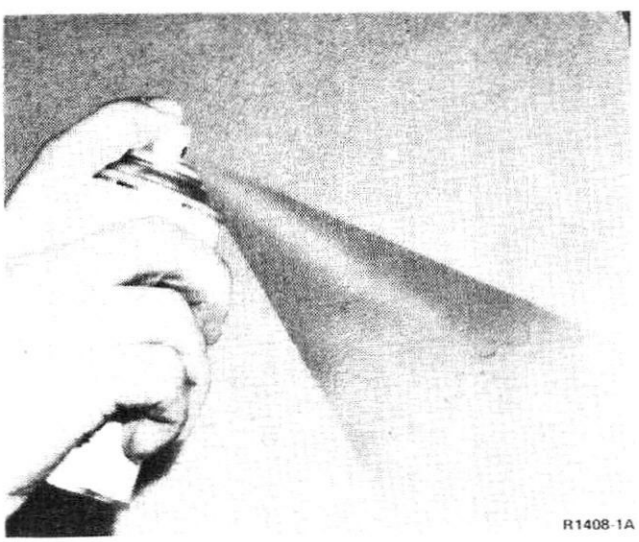


FIG. 26 Spraying Repaired Area

using very short strokes (1/4 inch or less) until the cut is covered with vinyl.

Again go over the cut lengthwise with the soldering tip to smooth out the surface.

The graining can be restored by carefully etching the grain pattern into the vinyl with the sharp edge of the soldering tip.

If required the gloss or shine created by the repair can be removed with the dulling agent or by spraying the area with liquid vinyl as shown in Fig. 26. Several coats may be required. The last coat should be a fog coat to minimize gloss.

Bubbles

Generally, an air bubble is caused by trapped air and can be corrected by expelling the air with a hypodermic needle as shown in Fig. 29. It will be necessary to activate the adhesive under the vinyl after the air has been expelled by applying heat with the heat gun until the vinyl surface is hot to the touch (see Fig. 30). Then, work the material down with the fingers as

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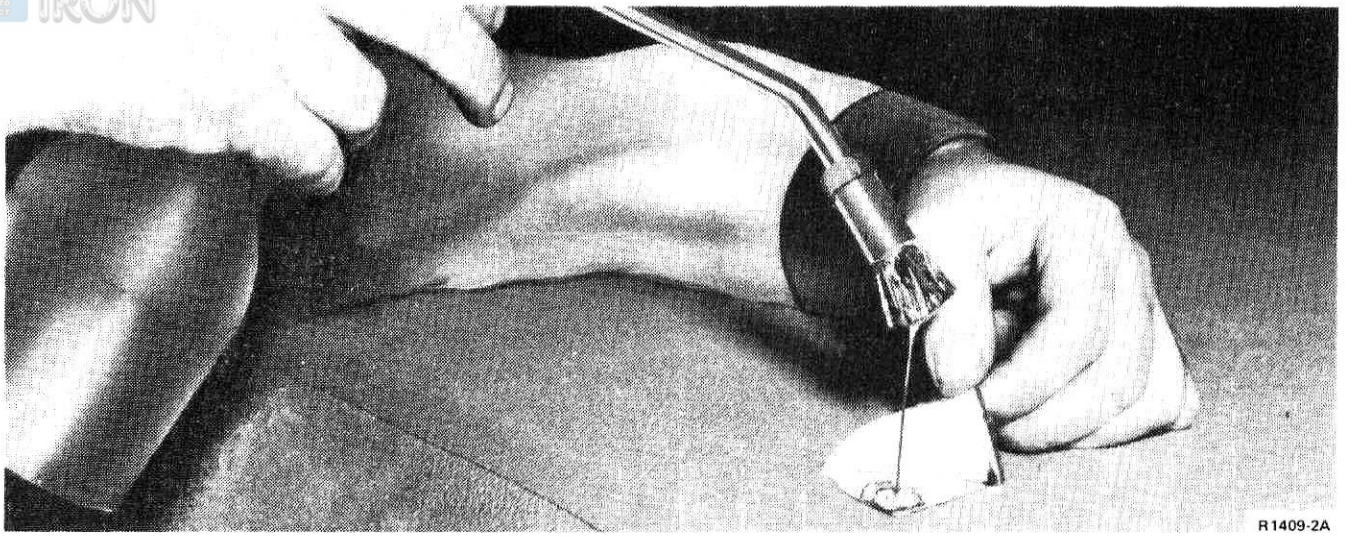


FIG. 27 Application of Adhesive

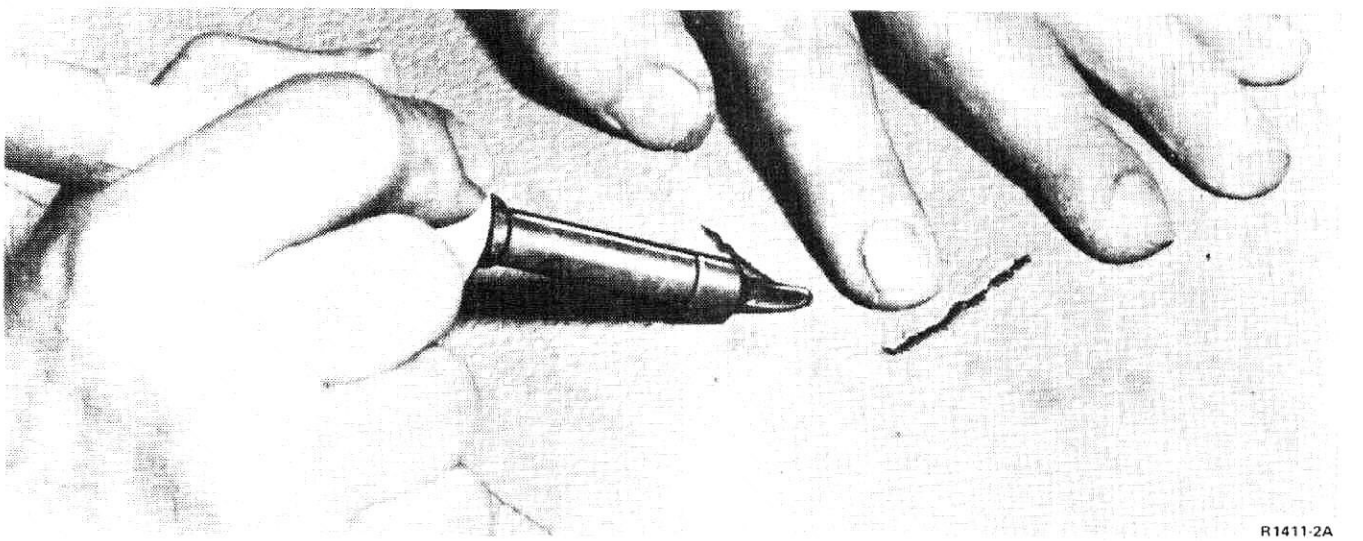


FIG. 28 Fusing Cut with Soldering Iron

shown in Fig. 29. **To avoid overheating and possible damage to the vinyl, hold the heat gun about 10 to 12 inches from the surface and constantly move the gun in a circular motion. In some cases where a good bond cannot be obtained, insert a small amount of adhesive. Part No. 19C525 under the vinyl material with a syringe as shown in Fig. 29.**

Wrinkles

Do not confuse a wrinkle with a bubble. Usually a wrinkle has small radial folds with an excessive amount of slack material which cannot be displaced without rearranging the material. The following repair procedure, for example, describes the correction of a wrinkle at the front corner.

Partially or completely remove any mouldings or ornamentation in the immediate area of the wrinkle.

Pull the vinyl material free from the roof panel up to the bonded seam and along the side drip rail for approximately 10 inches.

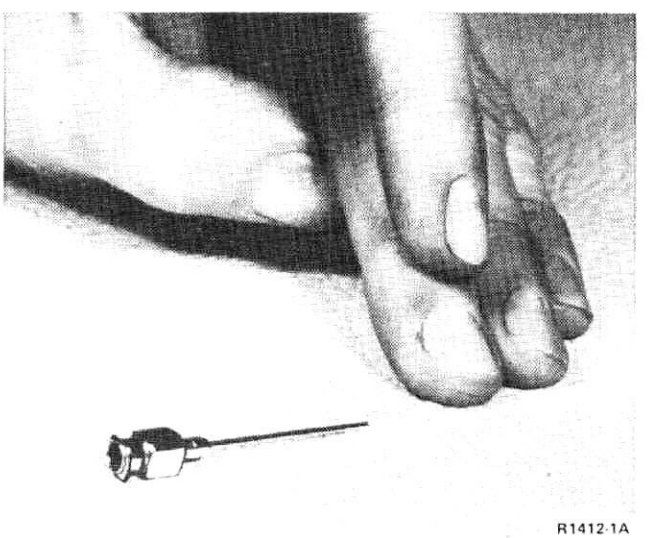


FIG. 29 Expelling Air With Hypodermic Needle

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Clean the surface thoroughly of the old adhesive. Apply a thin film of adhesive to both the vinyl material and along the drip rail. Allow the adhesive to air dry for several seconds.

Grasp the material firmly, then draw the material taut until all wrinkles are removed as shown in Fig. 31. Fold the material under the drip rail flange.

Secure the front edge of the material with as many drive nails as needed to prevent the material from creeping. Apply sealer under the drive nail to prevent possible water leak.

Install the mouldings and weatherstrips.

Looseness

Loose vinyl roof material usually occurs at padded areas of the vinyl roof which is used only in certain body styles. The following is a typical repair of loose material at the blind quarter area and generally applies to other areas such as around the backlite opening.

Partially or completely remove mouldings or ornamentation in the immediate area to be repaired.

Carefully peel the edge of the material free from the sheet metal.

Clean the metal surface thoroughly of the old adhesive. Apply a thin film of adhesive to both the vinyl and metal surface. Allow the adhesive to air dry for several seconds.

Grasp the material firmly, then draw the material taut. Secure the edge of the material with drive nails or sheet metal screws as needed to prevent the material from creeping.

Apply sealer over the drive nails or sheet metal screws to prevent possible water leaks. Install the mouldings.

Gap Between Vinyl Top and Moulding

In some instances, vinyl top material that is to short to be concealed under the roof moulding can be corrected by adjusting the moulding or stretching the material. If it is necessary to stretch the material, pop rivets must be used to prevent the vinyl from returning to its original position. Should there be an insufficient amount of material to allow the use of pop rivets, the complete vinyl top cover must be replaced. To determine whether there is a sufficient amount of material, perform the following procedure:

1. If applicable, loosen the moulding retainers and reposition the moulding sufficiently to cover the edge of the vinyl roof material. Re-torque the moulding retainers. **If the edge of the vinyl material cannot be covered by repositioning the moulding, proceed to Step 2.**
2. Partially or completely remove the moulding(s) or ornamentation in the area in which the vinyl roof is too short or gaps to the moulding(s). Refer to Group 47 for removal and installation of exterior mouldings and/or ornamentation.
3. Carefully peel the vinyl material free from the roof panel 4 to 6 inches.
4. Using Silicone and Wax Remover (D160-3721-A or equivalent) clean the sheet metal surface thoroughly, removing all of the old adhesive.

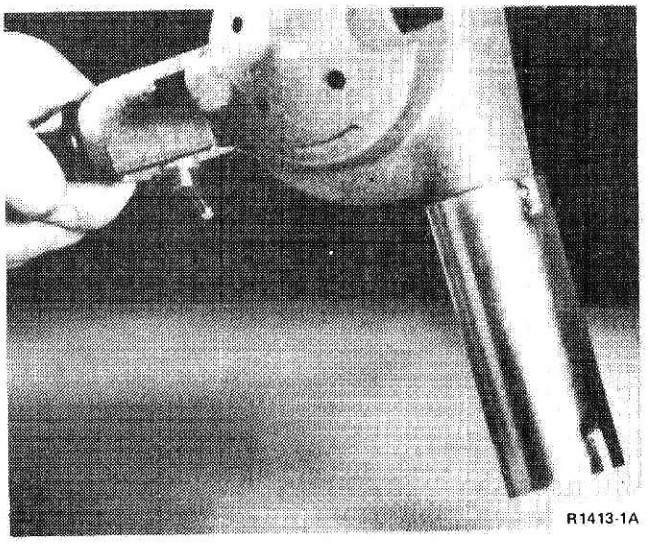


FIG. 30 Applying Heat With Heat Gun

5. Apply a thin film of adhesive (D4AZ-19C525-A or equivalent) to both the vinyl material and the sheet metal surface and allow the adhesive to air dry for several seconds.
6. With a heat gun, apply heat to the vinyl, then grasp the material firmly and stretch the material so it can be installed beneath the moulding(s).

CAUTION: To avoid overheating the vinyl, hold the heat gun about 12 inches from the surface and constantly move the gun in a circular motion.

NOTE: If after stretching the material, it is evident that pop-rivets can not be hidden by the mouldings, the vinyl roof cover will have to be replaced. However, if it is determined that the pop-rivets can be used, proceed to Step 7.

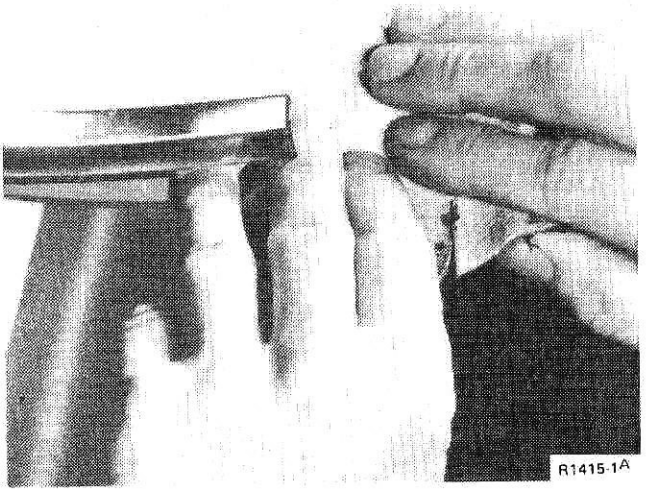


FIG. 31 Correcting Wrinkles at Front Corner

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7. Drill a sufficient number of 9/64 inch diameter holes in the edge of the vinyl to assure that it can be adequately secured to the roof panel with 381500-S (1/8 x 3/8) pop-rivets.

8. Install the necessary pop-rivets and reinstall the moulding(s) or ornamentation removed in Step 1.

Separated Bonded Seam

Connect the soldering iron and set the transformer heat range to No. 7 position (approximately 225°F).

Clean the soldering iron tip thoroughly with the abrasive pad. This must be done frequently while performing the repair to avoid vinyl build-up on the tip. Start at one end of the separated seam and insert the tip of the soldering iron between the bonded seam as shown in Fig. 32. Note the position of the curved tip. Slowly move the tip along the underside of the seam following immediately with the fingers to press the seam together.

Reverse the soldering iron tip as shown in Fig. 33 and again slowly move the tip along the edge of the seam.

This completes the repair and, if performed correctly, should not require paint touch-up. If, however, the vinyl surface outboard of the seam has a glossy or shiny appearance created by the repair, the area can be restored to its original satin finish with a dulling agent or by applying liquid vinyl as shown in Fig. 26. Several coats may be required. The last coat should be a fog coat to minimize gloss.

Adhesive Smears

Adhesive smears can be removed in most cases, provided this is done immediately and the adhesive is not allowed to age on the vinyl roof. Therefore, it is imperative that the clean-up is performed as soon as possible. Fresh sealer smears can be removed by rubbing the smear off with a rubber cement pick-up block such as the type described in the list of materials.

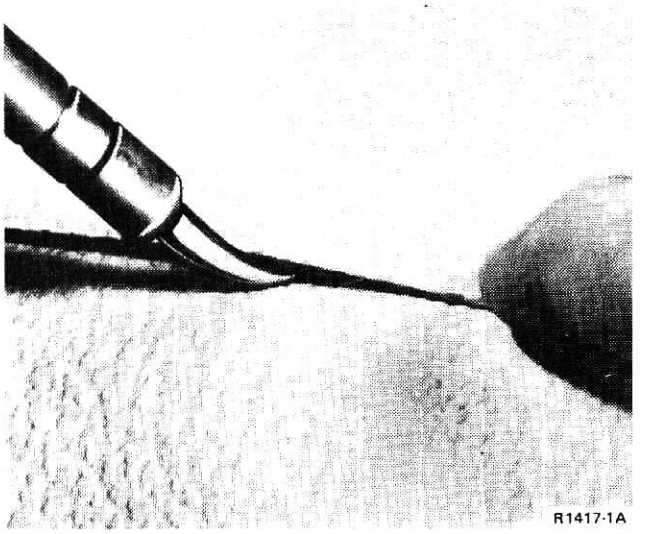


FIG. 32 Applying Heat to Underside of Bonded Seam

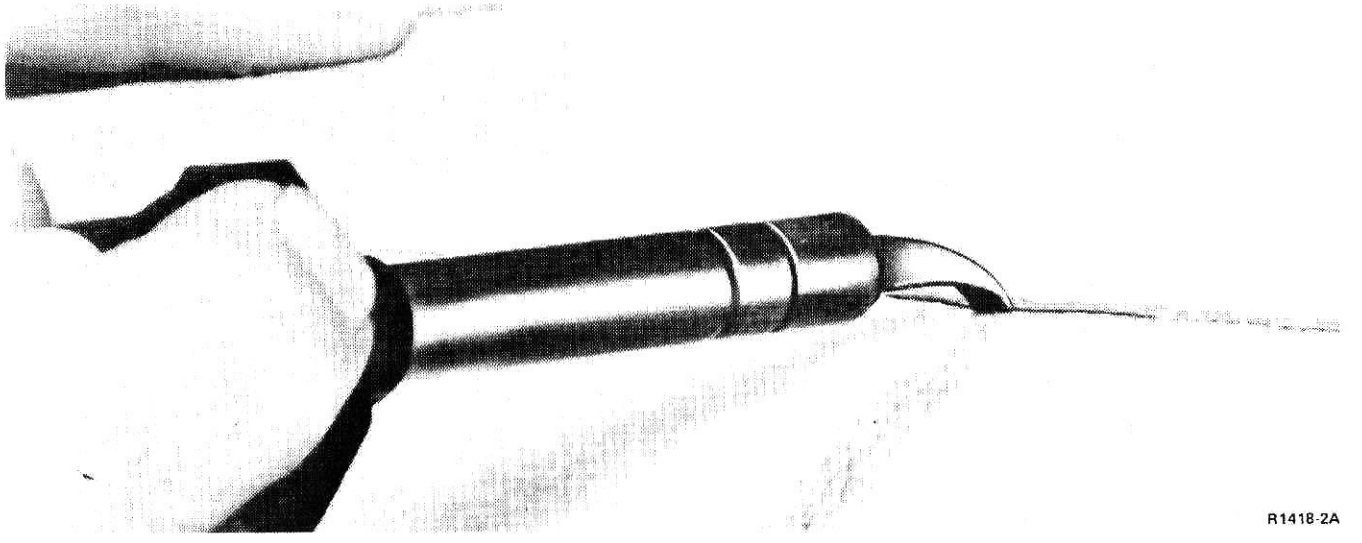


FIG. 33 Applying Heat to Edge of Bonded Seam

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Wood Grain Transfer

PART 46-30

CR2856 A

REMOVAL AND INSTALLATION

PRESSURE SENSITIVE WOOD GRAIN TRANSFER REPAIR

It is not necessary to replace the vinyl wood grain transfer because of blisters, air bubbles, chips or scratches.

To repair blisters or air bubbles, pierce the air bubble or blister with a pin. Work the trapped air out of bubble and press the transfer firmly against the sheet metal. It may be necessary to preheat the metal slightly, to soften the adhesive.

For chips or scratches, use touchup paint to repair the damaged areas. The available paints are shown in Fig. 1. Refer to the master parts catalog for part numbers.

Color
Highlight Color (Dark Brown)
Solid Background Color (Light Brown)
Black

CR1488-1C

FIG. 1 Wood-Grain Transfer Repair Paints

If the wood-grain transfer lifts off the sheet metal, check the recessed surface for pin holes. If holes are evident, exhaust the trapped air through the holes, ensure the transfer is adhering to the sheet metal and then patch the holes with a small scrap of transfer to create the necessary vacuum to hold the transfer in the depression.

If the transfer has lifted off the sheet metal and holes are not evident, cut a slit approximately 1/4 inch long in the transfer near the edge of the depression (not in the depression or the vacuum will be lost) to exhaust the air and adhere the transfer to the sheet metal.

PRESSURE SENSITIVE WOOD-GRAIN TRANSFER REPLACEMENT

Removal

1. Remove the wood-grain plastic trim rail(s) or mouldings.
2. Clean the surface to be sure it is free of dirt, oil, wax and/or other foreign material. Use a clean rag, paper towel or sponge wet with Silicone and Wax Remover (DL 60-3721-A or equivalent). **Be sure the flanges, corners and any depressions are clean to assure maximum transfer adhesion.**
3. Repair the panel by metal finishing, if required.

Installation

1. If the original grained transfer has been damaged (scratched or cut) or partially removed during metal finishing, the damaged area should be sanded smooth and the original transfer film feather-edged with 320-grit or finer sandpaper.
2. Apply Lacquer Spot Putty (19B542 or equivalent) to the damaged area with a squeegee or flexible glazing knife to build up the surface to the level of the original film. This should be done only on a small area. If the damaged area is large, apply primer with a spray gun to build up the surface to the level of the original film.
3. Allow the primer or spot putty to dry thoroughly. Then, sand the primer and the entire grained panel with 320 grit or finer sandpaper. Repeat step 5 if necessary.
4. If the repair is being made to a door, trim the existing transfer film from the leading and trailing edges of the panel. Sand the edges of the panel and the inner surface of the flanges. Use the same procedure for the trailing edge of the fender and the leading edge of the quarter panel.
5. Prepare a wetting solution by mixing one ounce Liquid Car Wash (19B521 or equivalent) in a pail of warm water.
6. Cut the repair transfer to the desired size, using care to align the wood grain with the surrounding panels.
7. Place the transfer face down on a clean bench or other suitable flat surface and pull the paper backing off the transfer film. **Be careful not to stretch or tear the transfer film.**
8. Apply the wetting solution liberally to the tacky side of the transfer and to the panel being repaired with a rag or sponge. **It is extremely important that the vehicle panel surface, the transfer film and the wetting solution all be at a moderate temperature (at least 65 degrees F.) when performing this repair.** Live steam, hot water or an electrically heated air blower may be used to warm the panel. It may also be used to soften the repair transfer film to make it conform to the vehicle panel and to aid in bending the transfer around the panel edges.
9. Position the transfer film on the panel. The presence of the wetting solution will help to prevent the pressure sensitive adhesive from sticking to the panel. This permits moving the transfer film to align the simulated caulk lines or wood grain pattern with the adjacent panels.

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10. Smooth the transfer film on the panel with a rag or sponge wet with the wetting solution to remove large air pockets.
11. Squeegee the transfer film on the panel, working from the high point of a contour line on the panel. This will remove the wetting solution from between the transfer film and the panel and allow the adhesive on the film to stick to the panel. Remove any air or water bubbles as necessary by pricking them with a pin, and squeegee.
12. Wrap the transfer film around the edges of the door and quarter panels and the trailing edge of the front fender (as applicable). Apply heat to the edges and press the transfer film firmly against the flange, and squeegee.
13. Wipe the surface dry with a clean soft cloth and install the grained plastic trim rails or mouldings.

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BODY SHELL, EXTERIOR TRIM, FRAME AND UNDERBODY

GROUP 47

PART TITLE	PART NO.
Body Shell, Exterior Trim, Frame and Underbody General Service	47-01
Continental Mark V	47-03
Ford and Mercury	47-05
LTD II, Cougar and LTD II Ranchero	47-06
Lincoln Continental	47-02
Fairmont and Zephyr	47-08
Granada, Monarch and Versailles	47-11
Mustang II	47-10
Pinto and Bobcat	47-09
Thunderbird	47-04
Versailles	47-12

CR2008-2B

Body Shell, Exterior Trim, Frame And Underbody General Service

PART 47-01

SUBJECT	PAGE
GENERAL INFORMATION	
Body Side Protection Mouldings (Pressure Sensitive Tape Type)	01-1
General Hoisting Instructions	01-2
Types of Body Sealer	01-1
DIAGNOSIS AND TESTING	01-3
ADJUSTMENTS	
Body Alignment	01-4
ADJUSTMENTS (Cont'd.)	
Frame Alignment	01-4
Frame Repairs	01-5
Unitized Body Alignment	01-4
CLEANING AND INSPECTION	
Body Maintenance	01-5
Floor Pan Plugs and Grommets	01-5
Rattle Elimination	01-5
Trim	01-5

CN1842-2B

GENERAL INFORMATION

BODY SIDE PROTECTION MOULDINGS (PRESSURE SENSITIVE TAPE TYPE)

To install the optional body side moulding (Tedlar or Urethane), wipe the area surface with naphtha or a suitable cleaning solvent to remove all foreign material. Then, remove protective paper, at room temperature, from pressure sensitive tape on the mouldings. Position moulding and press firmly to assure adhesion.

TYPES OF BODY SEALER

Caulking Cord 19560

This sealer has a plastic base with an asbestos filler and is commonly known as permagum. It is used on spotweld holes, around moulding clips, or between two surfaces not properly sealed by a gasket. Apply with a putty knife.

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DETROIT IRON

Trim Cement 19C525

This cement is recommended for body panel plastic watershield and on some soft trim installations and also other vinyl and rubber trim.

Rubber Cement 19552

This quick-drying, strong adhesive material is designed to hold weather stripping on doors, bodies, deck lids, cowl ventilators and the surrounding metal.

Windows and windshields which are set in rubber can be sealed effectively against leakage by flowing cement into the affected areas.

Clean all grease, dirt, and old sealer from the surfaces to be cemented and apply a medium coat of cement to both surfaces, allow it to dry until tacky, and press both surfaces firmly together.

Silicon Lubricant 199532 JELLY

This lubricant is to be used on the door and mini-vent window weatherstrips. It is recommended that silicone lubricant be applied to the weatherstrips at every lubrication period. Its use makes the doors easier to close, avoids weatherstrip squeaks, retards weatherstrip wear from chafing between the door glass upper frame and the weatherstrip, and helps to retain door window alignment by reducing friction between the glass frame and rubber weatherstrip.

GENERAL HOISTING INSTRUCTIONS

Damage to suspension, exhaust and steering linkage components may occur if care is not exercised when positioning the hoist adapters of 2-post hoists. Place the adapters under the front suspension lower arms. **Do not allow the adapters to contact the steering linkage.**

On the Lincoln Continental, Continental Mark V, Thunderbird, Elite, LTD II and Cougar, rear suspension lower arms prevent positioning of fork lifts outboard of the suspension lower arms. Place fork lifts under the axle housing inboard of the suspension arm brackets.

Do not position hoist pads under Number 3 crossmember.

Refer to the Owner's Manual when using the jack supplied with the vehicle.

Fairmont, Zephyr, Granada, Monarch, Versailles, Pinto, Bobcat and Mustang II

The unitized body-frame construction requires special precautions and procedures when the vehicle is jacked up or hoisted. In some cases, special hoist adapters must be used as recommended by hoist manufacturers.

Drive-On Type Hoist

To prevent damage to the underbody, do not drive the vehicle onto the drive-on type hoist without first checking for possible interference between the upright flanges of the hoist rails and the underbody. Should there be interference, the hoist flanges should be modified as necessary or the approach ramps built up to provide the needed clearance.

Rail Type—Free Wheeling Hoist

Front

The front adapters or hoist plates must be carefully positioned in contact with the lower suspension arms to assure safe, accurate lifting.

Rear

The hoist adapters must be positioned to avoid damage to the shock absorbers when the vehicle is raised. The hoist rails should be raised slowly and the position of the adapters checked.

Fork Lift—Twin Post Hoist

Front

To assure safe hoisting, the front post adapters must be positioned carefully to contact the center of the lower suspension arms (Figs. 1 and 2).

Rear

To prevent damage to the shock absorbers, the rear forks must contact the axle at points not farther out

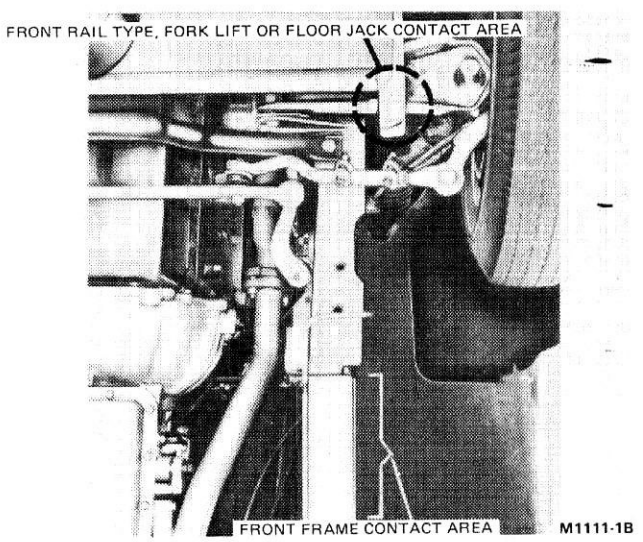


FIG. 1 Front Hoist Contact Areas

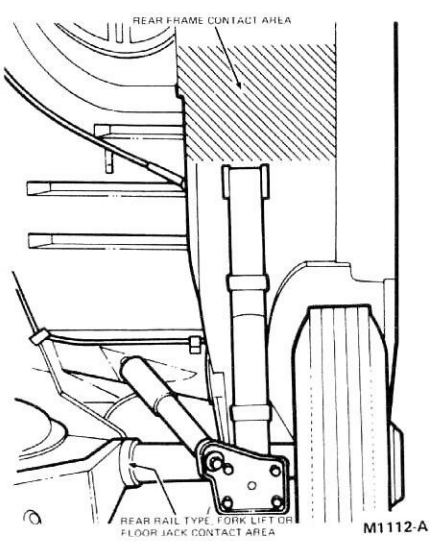


FIG. 2 Rear Hoist Contact Areas

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board than one inch from the circumference welds near the differential housing. Carefully raise the rear post and check the position of the fork (Figs. 1 and 2).

Floor Jack—Pinto, Bobcat and Mustang II

When using a floor jack, the vehicle may be raised at several locations. The front of the car may be lifted by positioning the jack under the center of the number two crossmember. The front, as well as either side of the rear end, may be lifted by positioning the floor jack under the rocker flange at the contact points used for the jack supplied with the vehicle. To lift both sides of the rear at once, position the floor jack under the differential housing.

Floor Jack—Other Models

When a stationary floor jack or a roll jack is to be used, there are several specific recommended points of contact. Either side of the vehicle may be raised at the front by jack contact at the lower arm strut connection. Either side of the front end of the vehicle may also be raised by jack pressure on the front crossmember, or on the crossmember to which the stabilizer is connected. **Do not attempt to use jack pressure on either front or rear Fairmont, Zephyr, Granada, Monarch, Versailles, Pinto, Bobcat or Mustang II bumpers.**

On Continental Mark V and Thunderbird, position jacks under the rear axle housing between the suspension arm brackets and the differential housing. Do not place jacks under the suspension arm brackets. To unload ball joint front suspensions, position jack as shown in Fig. 3.

Frame Contact Hoist

On frame contact hoists, adapters are necessary to lift the vehicle. The adapters must be centered at four contact points as shown in Fig. 4. All four contact points must contact the adapters.

NOTE: Exercise care when hoisting vehicles equipped with catalytic converter(s). On vehicles so equipped, assure necessary clearance between hoist and exhaust system components before energizing hoist.

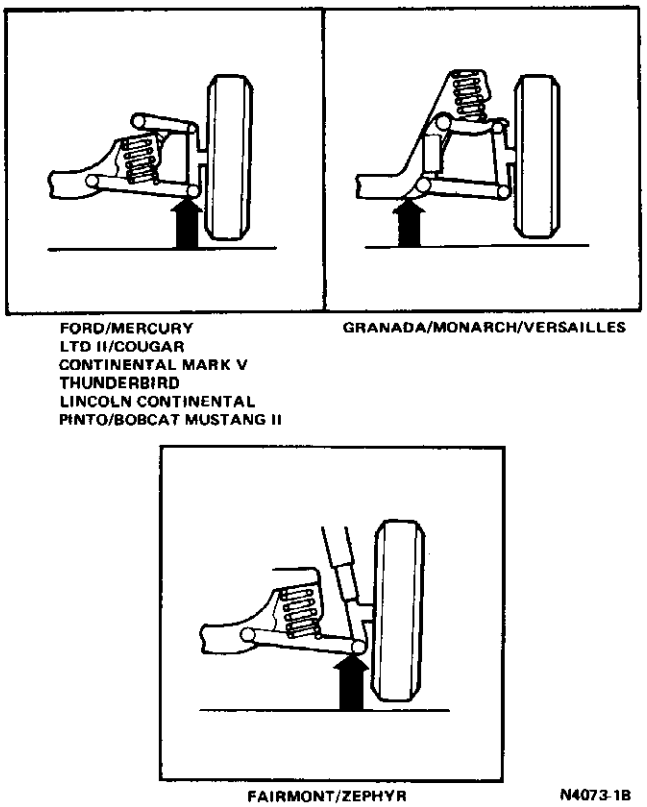
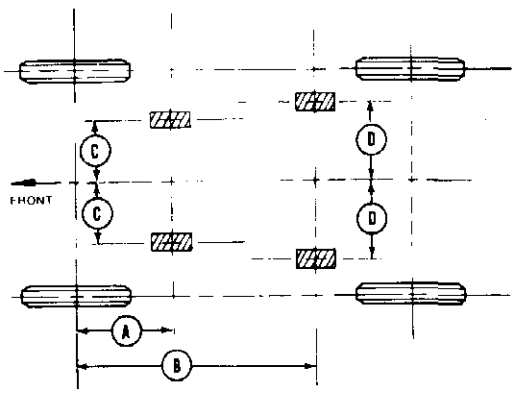


FIG. 3 Front Suspension Lift Points for Ball Joint Unloading



Dimension (Inches)	Car Line									
	Cougar LTD II	Continental Mark V	Ford	Lincoln Continental	Fairmont/ Zephyr	Mercury	Mustang	Pinto Bobcat	Thunderbird	Granada Monarch Versailles
A	22.0	24.9	21.5	21.7	*	21.5	17.5	17.5	22.0	21.5
B	83.4 ① 87.4 ②	102.9	97.5	103.7	*	100.5	75.0	75.0	83.4	83.5
C	25.0	25.0	23.0	23.5	*	23.0	12.0	12.0	25.0	26.4
D	27.5	26.0	25.0	27.0	*	25.0	24.0	24.0	27.5	26.4

① 2-Door ② 4-Door

* Not available at time of printing.

Y1511-1E

FIG. 4 Frame Contact Lift Points

DIAGNOSIS AND TESTING

DUST AND WATER LEAKS

Sealer locations should be considered when checking for dust or water leaks. The forward motion of the vehicle causes any unsealed small opening in the lower section of the body to permit air to be drawn into the body. Dust will follow any path taken by the air from the point of entry into the passenger and luggage compartments. Opening the ventilator air ducts will equalize these pressures. Dust accumulates in the rocker panel, and may eventually work its way to the kick-up or the rear body pillar, and follow the contour of the wheelhouse into the luggage compartment.

To eliminate dust leakage, determine the exact point at which the dust enters. The point of entry is often

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DETROIT IRON

deceptive, in that the dust may enter at one point, then follow the passages formed by interior trim to another point.

Under certain conditions, water can enter the body at any point where dust can enter. Any consideration of water leakage must take into account all points covered under dust leaks.

To determine the exact location of a dust leak, it may be necessary to remove the following trim from the vehicle:

1. Cowl trim panel.
2. Quarter trim panel.
3. Rear seat back and seat cushion.
4. Luggage compartment floor mats, spare wheel, and side trim panel.
5. Center pillar trim on 4-door models.
6. Scuff plates.

After removing the trim, the location of most leaks will be readily evident. The entrance of dust is usually indicated by a pointed shaft of dust or silt. Seal these leaks, and road test the vehicle on a dusty road to make sure that all leaks are sealed.

After the road tests, check for indications of a dust pattern around the door openings, cowl panel, lower part of the quarter panel, and in the luggage compartment.

Sometimes leaks can be located by putting bright lights under the vehicle, with the above components removed, and checking the interior of the body joints and weld lines. The light will show through where leaks exist. Rotunda Ultra-Sonic Leak Detector or equivalent can locate dust leaks, as well as wind noise and water leaks.

ADJUSTMENTS

UNITIZED BODY ALIGNMENT

Servicing the unitized body should present no unusual difficulties or necessitate additional equipment, other than required for conventional frame and body repair. The application of heat and the use of heavy duty jacks must be carefully controlled because of the difference in the gauge of the metal in the sub-frame of a unitized body and the stress points developed in a single welded unit construction. It is possible to pull damaged areas back into alignment with the use of light-weight jacks and hydraulic equipment, without heating the metal.

Rough-out badly damaged areas before taking measurements for squaring up a body. If necessary, remove the glass from the damaged area to prevent breakage. In severe cases, reinforcement brackets and other inner construction may have to be removed or cut to permit restoration of the outer shell and pillars, without excessive strain on the parts. Straighten, install, and secure all such parts in place, before attempting to align the body.

In cases of severe or sharp bends, it may be necessary to use heat. Any attempt to cold-straighten a severely bent bracket may cause ruptures of the welds and may also cause cracks in the bent part. Never heat the area more than a dull red.

Checking Underbody for Misalignment

The dimensions of the underbody must be restored in the repair of major body damage, to provide correct front and rear wheel geometry. The underbody dimensions are given in each Part of this Group for the respective models. All the dimensions are detailed to the center line of existing holes in the underbody assembly. Once the frame and suspension members are aligned, the balance of the repair can be performed.

BODY ALIGNMENT

When checking alignment of a badly damaged body, be sure that all necessary frame corrections have been made before attempting to align the body.

Rough out badly damaged areas before taking measurements for squaring up a body. Remove the glass to prevent breakage. In severe cases, reinforcement brackets and other inner construction may have to be removed or cut to permit restoration of the outer shell and pillars without excessive strain on the parts. Straighten, install and secure all parts in place before attempting to align the body.

In cases of severe or sharp bends, it may be necessary to use heat. Any attempt to cold-straighten a severely bent bracket may cause ruptures of the welds (if any) and may also cause cracks in the bent part. Never heat the area more than enough to give a dull red.

Checking Body for Misalignment

To align or square up a body, take two opposite diagonal measurements between the front, center, or rear pillars. Take the measurements between reference points, such as crease lines or weld joints which are diagonally opposite each other, on the two pillars being measured. Since all measurements should be made from the bare metal, remove all interior trim from the checking points.

Do not attempt to correct any serious misalignment with one jacking operation. This is particularly true if other sections of the body also require aligning. Align each section proportionately, until the proper dimensions are obtained. If frame alignment is questionable, refer to the frame dimensions given in each Part of this Group for the respective models.

FRAME ALIGNMENT

Frame misalignment can affect front wheel alignment, body alignment, and the operation of the chassis parts. Window glass cracks, door and window opening troubles, and air or water leaks at the doors are often caused by improperly tightened body bolts or frame misalignment.

Before checking frame alignment, inspect all frame members for cracks, twists, or bends. Check all welded

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connections for cracks. Inspect the bolts and body support brackets for looseness. Make any necessary repairs or replacements.

FRAME REPAIRS

To prevent internal stresses in the metal, frame straightening should be limited to parts which are not severely bent. If heat is needed to straighten a frame member, keep the temperature below 1200 degrees F. Excessive heat may weaken the metal in the frame members and cause permanent damage.

Electric welding equipment should be used for all frame welding and **heat should be kept to a minimum area** so that the hardness of the metal will not be affected.

When a reinforcement is to be welded to a frame side member, run the welds lengthwise along the side of the reinforcement.

If a damaged frame member is to be replaced, use the same method of attachment as on the original frame member. New bolts, required for replacement of parts, should be of the same specifications as the original bolts.

CLEANING AND INSPECTION

FLOOR PAN PLUGS AND GROMMETS

Many plugs and grommets are used in the floor pan and dash panel. The floor-pan plugs seal the various access holes. If any plugs are missing or improperly installed, a dust or water leak may result. This also applies to the grommets used on the dash panel. When dust or water leaks are evident, these plugs and grommets should be checked for proper installation.

RATTLE ELIMINATION

Most rattles are caused by a loose bolt or screw. Foreign objects such as nuts, bolts, or small pieces of body deadener in the door wells, pillars and quarter panels, are often the source of rattles. Door wells can be checked by carefully striking the underside of the door with a rubber mallet. The impact made by the mallet will indicate if loose objects are in the doorwell.

All bolts and screws should be tightened periodically. In the event that tightening the bolts and screws, located on such assemblies as the doors, hood, and deck lid does not eliminate the rattles, the trouble is probably caused by misalignment. If this is the case, follow the adjustment and alignment procedures for these assemblies.

Rattles and squeaks are sometimes caused by weatherstripping and antisqueak material that has slipped out of position. Apply additional cement or other adhesive, and install the material in the proper location, to eliminate this condition.

TRIM

The bright metal parts of the vehicle require no special care. Periodic cleaning will preserve the beauty and life of these finishes. Wash with clear water, or if the parts are very dirty use multi-purpose cleaner (19523 or equivalent). Using a clean soft cloth or a sponge and water, rinse and wipe the parts dry. Chrome Cleaner may be used sparingly to remove rust or salt corrosion from chrome plated parts. Do not scour aluminum or chrome finished parts with steel wool or polish them with products containing abrasives. A custom silicone polish (19530 or equivalent) will provide excellent protection for all bright metal parts.

BODY MAINTENANCE

Regular body maintenance preserves the vehicle's appearance during the life of the vehicle. The following steps are suggested as a guide for regular body maintenance.

1. Vacuum the interior thoroughly and wash the vehicle.
2. Check all openings for water leaks, and seal where necessary.
3. Cement all loose weatherstrips which are still usable.
4. Replace all door and deck lid weatherstrips which are unfit for service.
5. Apply silicone lubricant to the weatherstripping.
6. Replace all cracked, fogged, or chipped glass.
7. Align the hood, doors, and deck lid if necessary.
8. Inspect the windshield wiper blades and replace them if necessary.
9. Tighten the sill plate and garnish moulding screws.
10. Clean the seats, door trim panels, and headlining.
11. Touch up paint chipped or scratched areas.
12. Drain holes located on the underside of each rocker panel, quarter panel, and door, should be cleared periodically.

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DETROIT IRON

Lincoln Continental

PART 47-02

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Front Bumper	02-1
REMOVAL AND INSTALLATION (Cont'd.)	
Radiator Grille	02-1
Rear Bumper	02-2

CN2875-2B

REMOVAL AND INSTALLATION

RADIATOR GRILLE

The radiator grille is attached to the front of the vehicle with 8 nuts which can be removed from the grille opening panel rearward of the front bumper (Fig. 1).

FRONT BUMPER

Removal

1. Remove three (3) bolts attaching each isolator to the bumper reinforcement and, with an assistant, remove the bumper and reinforcement from the vehicle. Before removing the reinforcement-to-bumper attaching bolts, the license plate bracket must be removed. Remove cooling slot grille.
2. To remove bumper grille, remove 2 screws from each end of grille, slide grille sideways to clear slot, and rotate forward. To install, reverse procedure.
3. Remove the reinforcement- to-bumper attaching bolts, and separate the reinforcement from the bumper (Fig. 2). Then, remove the stone deflector.
4. Remove the bumper guards and pads from the bumper. NOTE: The bumper pad attaching tabs may be destroyed upon removal, if so equipped. Damage will be avoided by squeezing the retaining

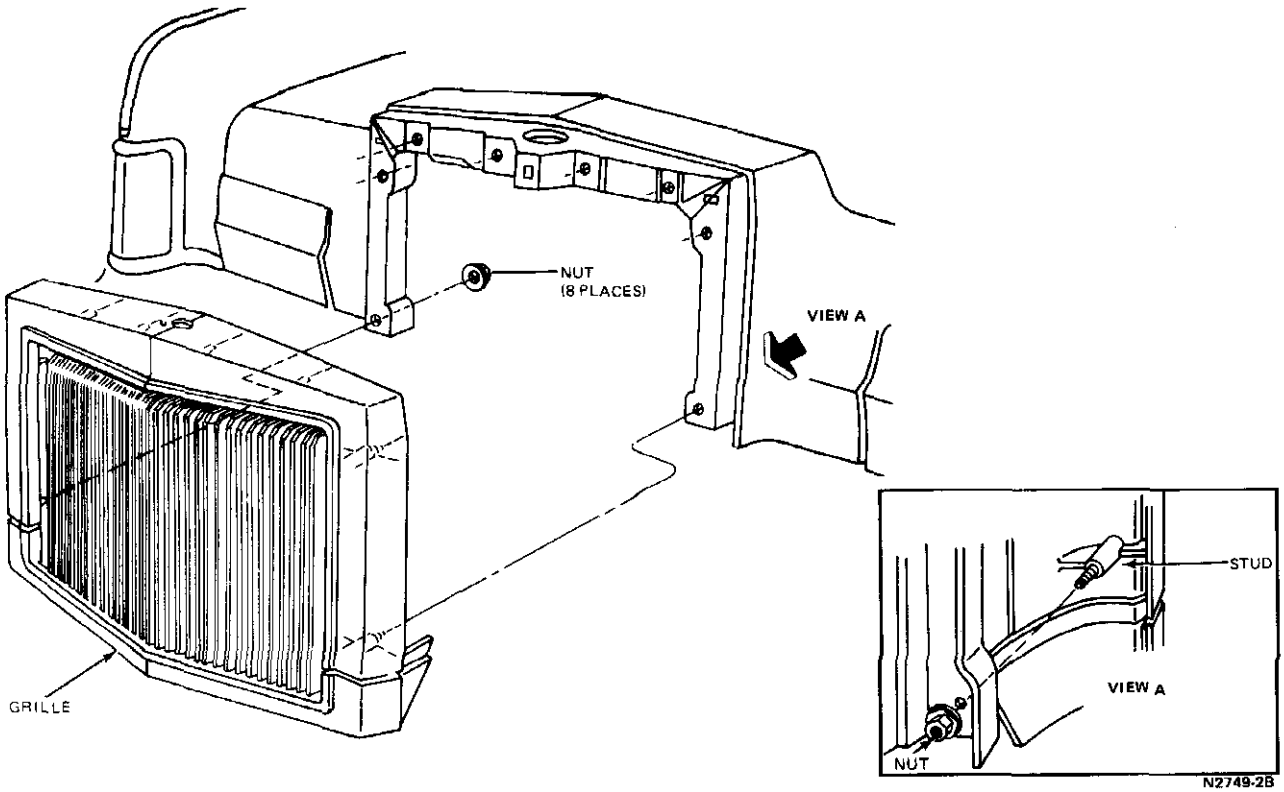


FIG. 1 Grille Installation—Lincoln Continental

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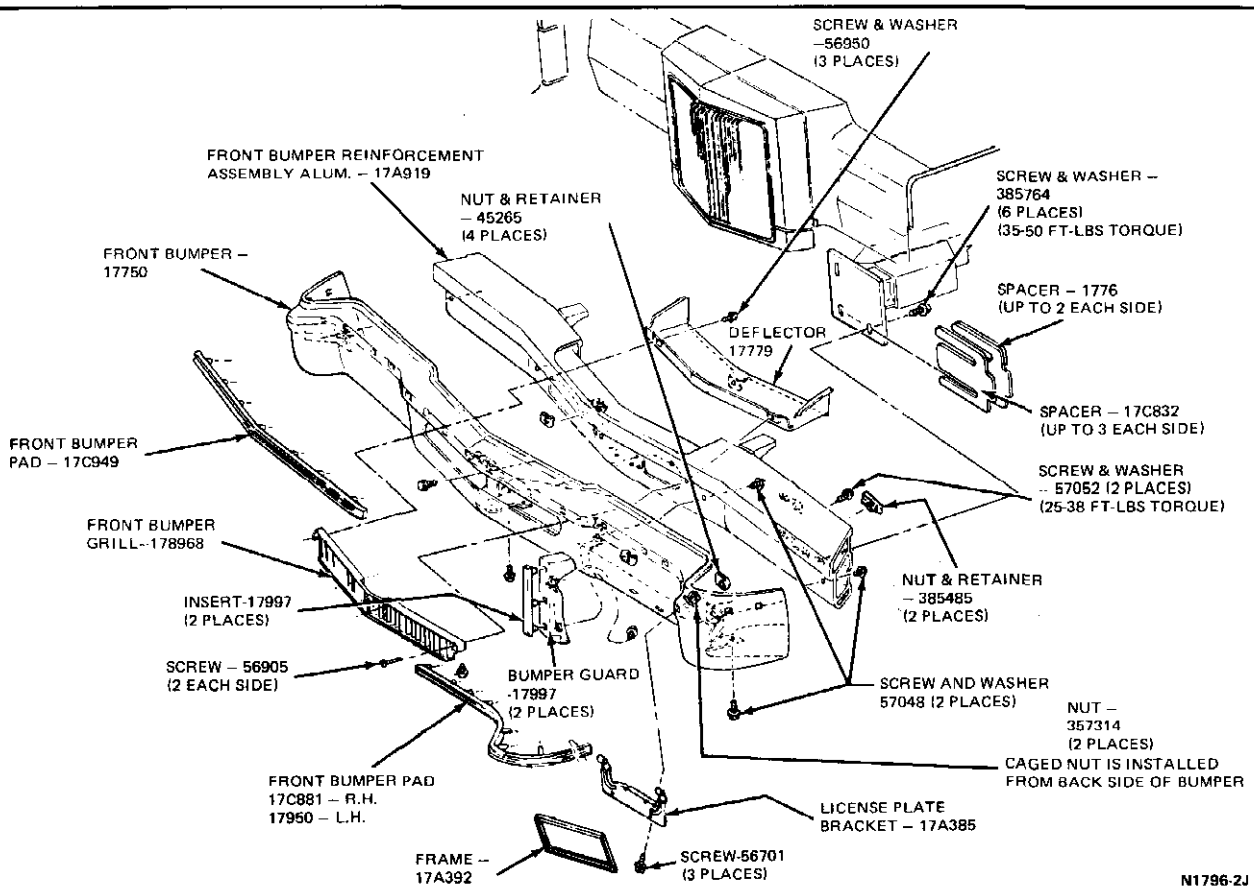


FIG. 2 Front Bumper Installation—Lincoln Continental

tabs with pliers until tabs can be pushed through holes in bumper.

5. Remove the license plate mounting bracket from the bumper.
6. If the reinforcement is to be replaced, transfer the bumper opening grille and stone deflector to the new reinforcement.

Installation

1. Install the bumper guards and pads on the bumper.
2. Position the reinforcement to the bumper and install the attaching bolts. Install the cooling slot grille, stone deflector and licence plate mounting bracket.
3. Position the bumper and spacers to the isolators and install the attaching bolts.
4. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Fig. 4. Then, adjust the bumper for body clearance at the centerline of the parking lamp so that the vertical and horizontal body to bumper measurements meet the dimensions in Fig. 4. Tighten the isolator-to-reinforcement bolts to 35-50 ft-lbs torque.

REAR BUMPER

Removal

1. Remove (3) bolts attaching each isolator to the bumper reinforcement and, with an assistant, remove the bumper and reinforcement from the vehicle. Remove the opening shield and licence plate mounting bracket. Remove the push-on rub strips.

NOTE: The bumper pad attaching tabs may be destroyed upon removal, if so equipped. Damage will be avoided by squeezing the retaining tabs with pliers until tabs can be pushed through holes in bumpers.

2. Remove the reinforcement- to-bumper attaching bolts (Fig. 3), and separate the reinforcement from the bumper.
3. If the bumper is to be replaced, transfer the bumper guards and pads to the new bumper (Fig. 3).
4. If the reinforcement is to be replaced, transfer the stone deflector supports and license plate lamp assembly to the new reinforcement (Fig. 3).

Installation

1. Position the reinforcement to the bumper and install the attaching bolts. Tighten the bolts to 25-38 ft-lbs torque. Install opening shield and license plate mounting bracket. Install push-on rub strips.
2. Position the bumper and reinforcement to the isolator and install the attaching bolts.
3. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Fig. 4. Then, adjust the bumper for body clearance at the centerline of the tail lamp so that the vertical and horizontal body to bumper measurements meet the dimensions in Fig. 4. Tighten the isolator- to-reinforcement bolts to 35-50 ft-lbs torque.

EXTERIOR MOULDINGS

Before removing the exterior mouldings, it should be determined by the type of retainer used whether a respective door, quarter or luggage compartment trim panel must first be removed to provide access (Figs. 5

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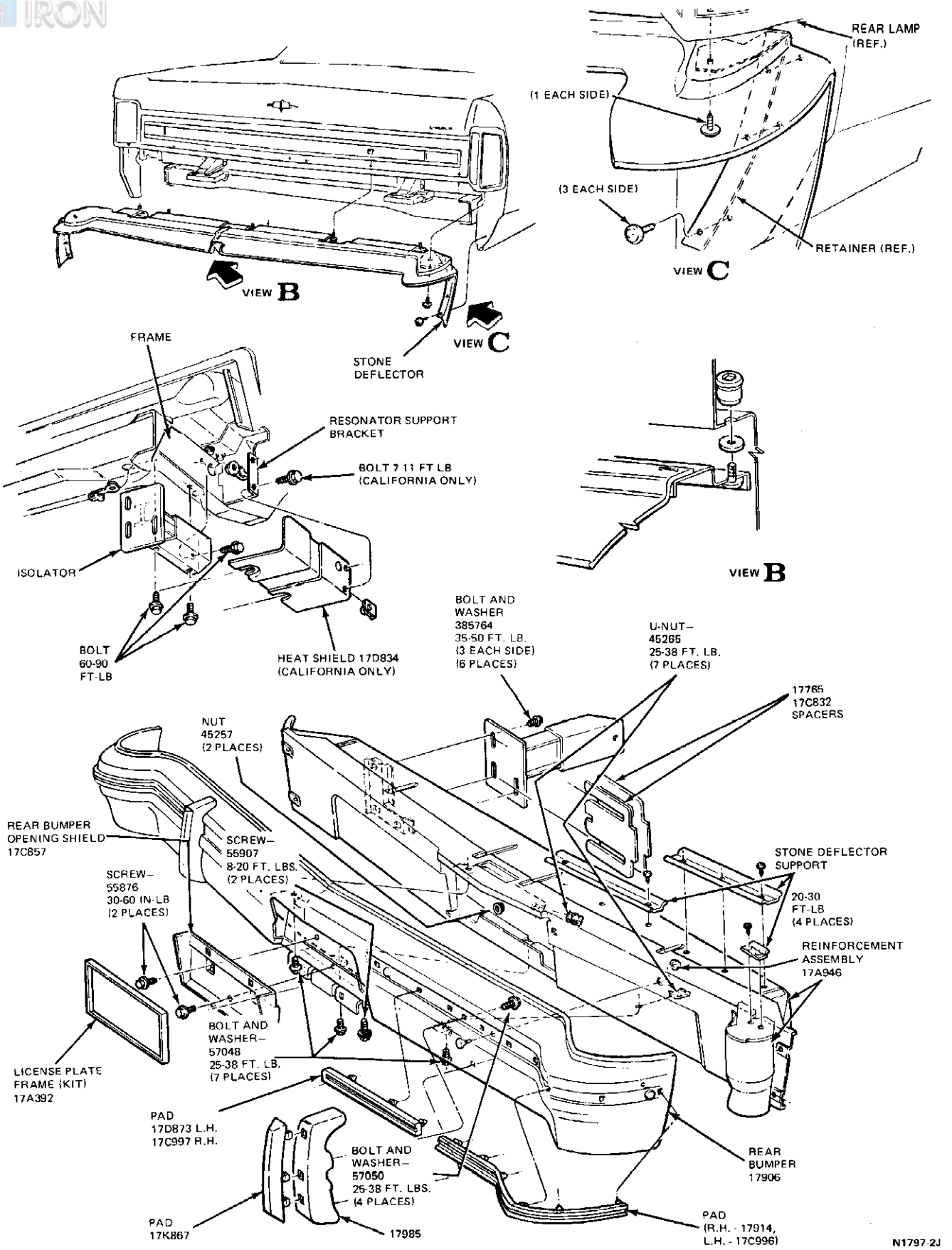


FIG. 3 Rear Bumper Installation—Lincoln Continental

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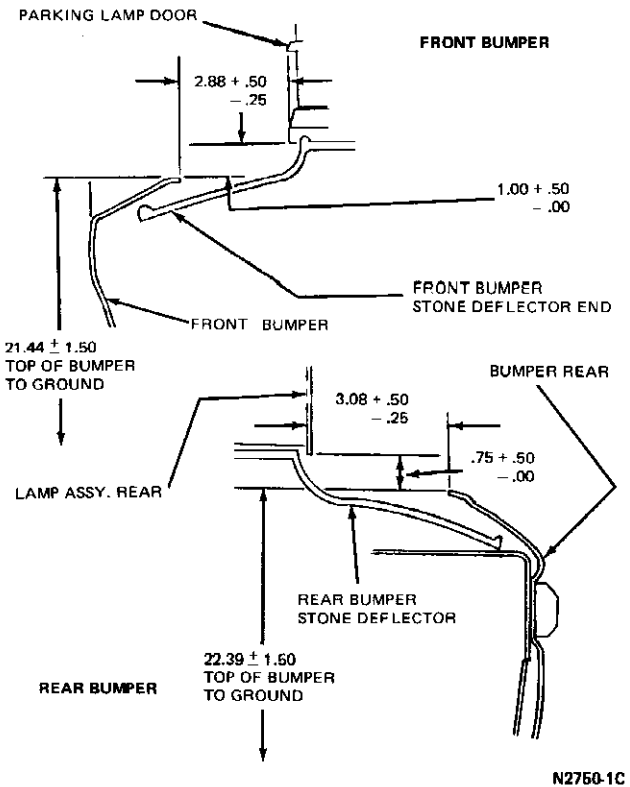


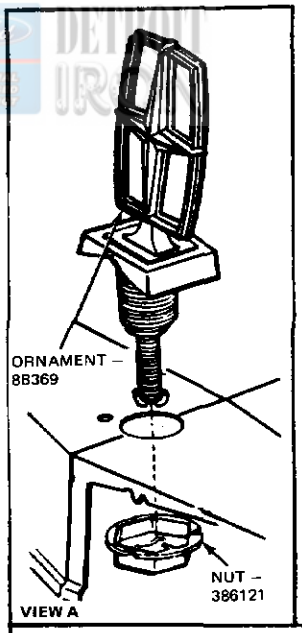
FIG. 4 Bumper Adjustment Specifications—Lincoln Continental

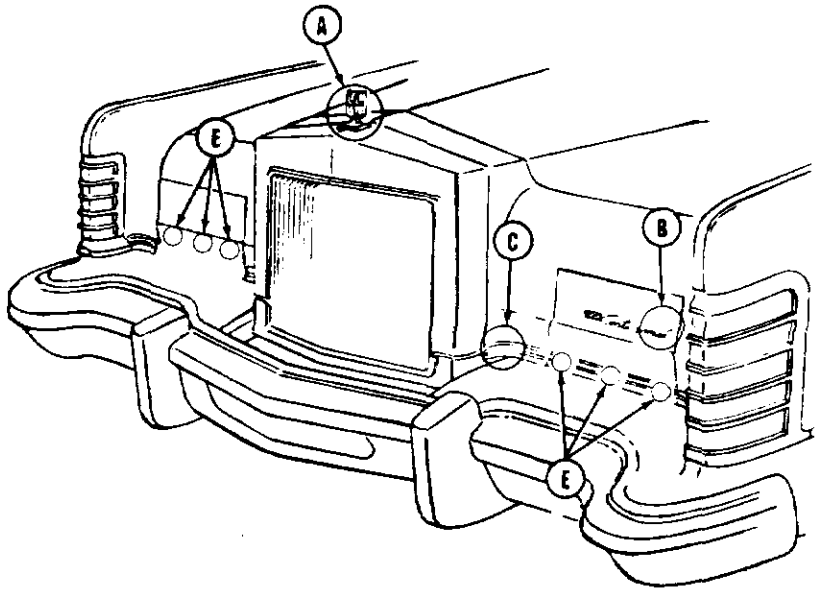
and 6). If a weld stud is distorted or broken off, it should be replaced with an oval head blind rivet (Part No. 383229-S).

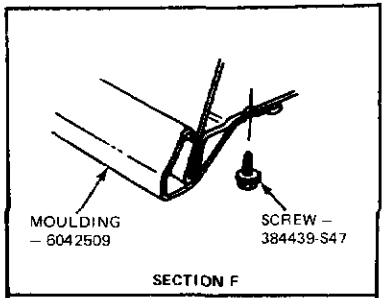
FRAME DIMENSIONS

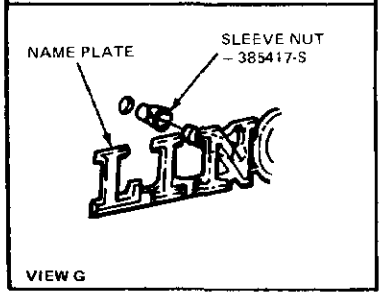
The Lincoln Continental frame dimensions are shown in Fig. 7. The frame checking and repair procedures are given in Part 47-01.

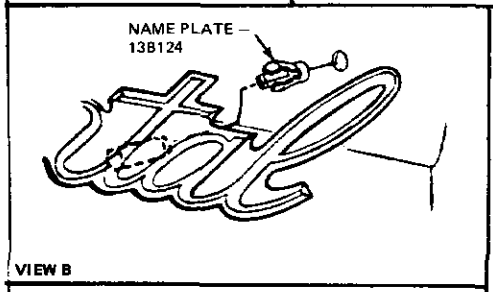
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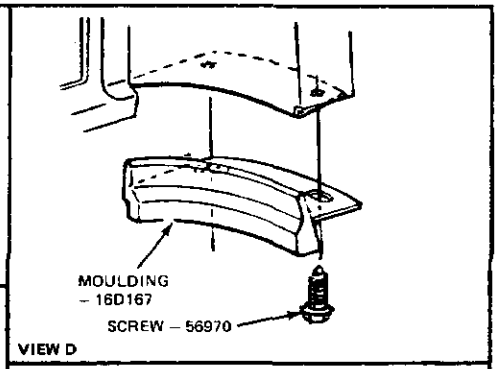


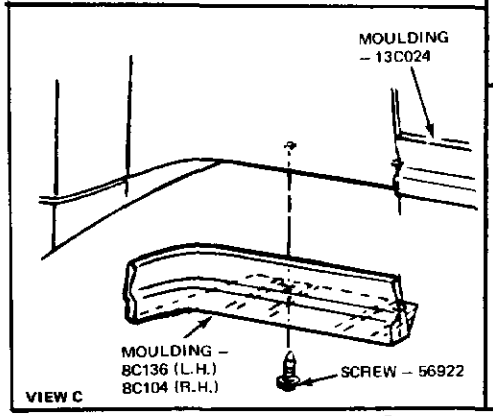


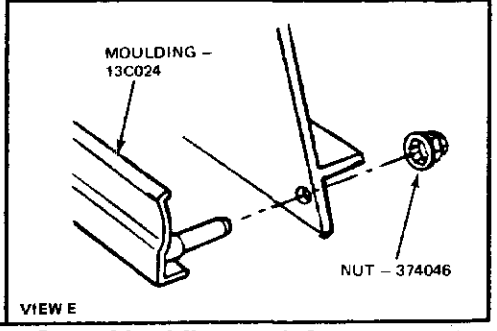


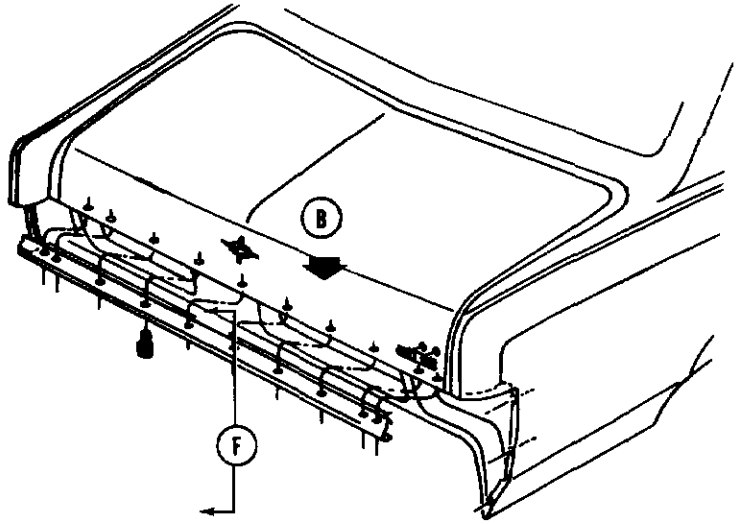












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FIG. 5 Lincoln Continental—Front and Rear Moulding and Ornamentation

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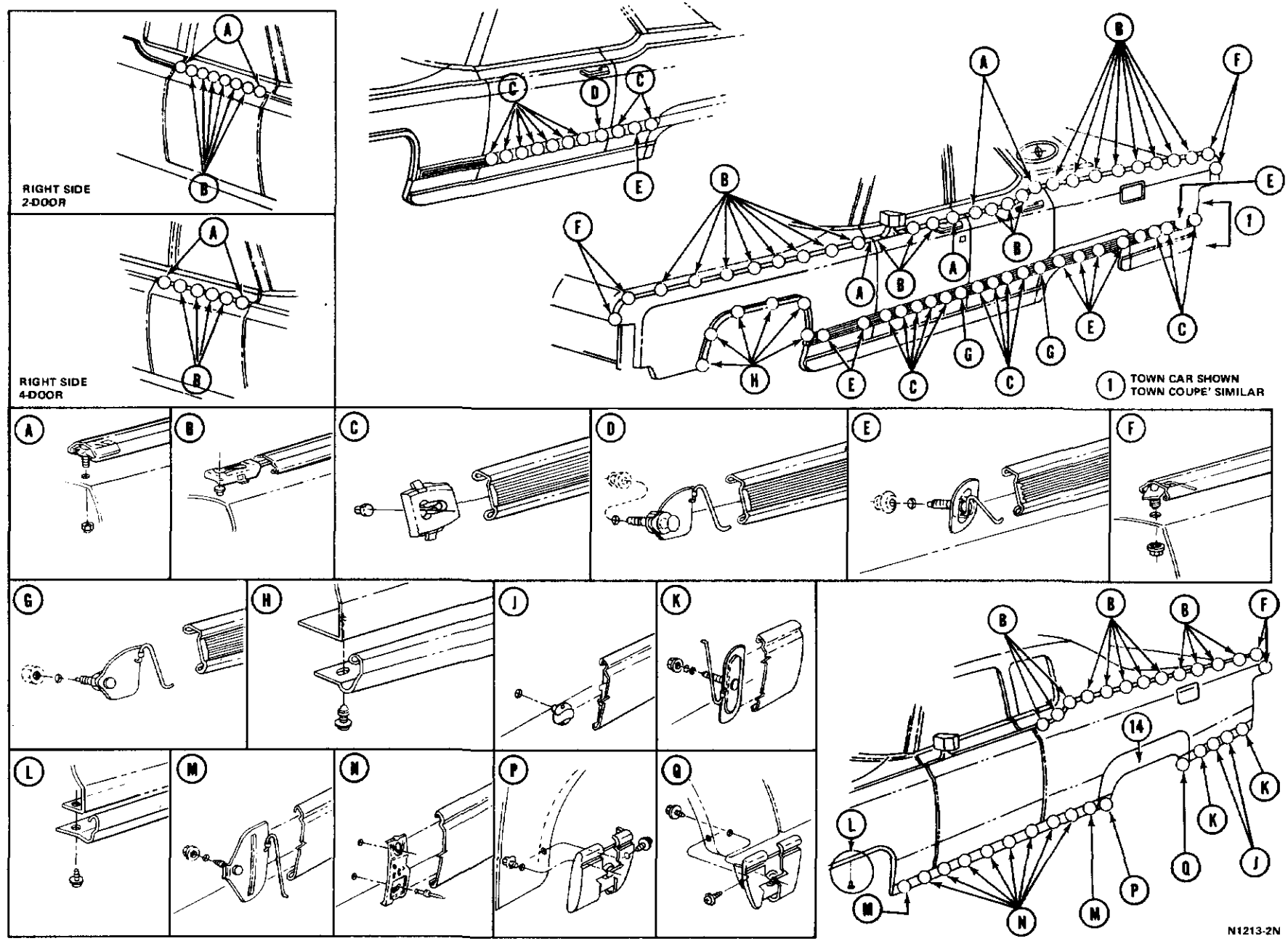


FIG. 6 Exterior Side Moulding Installation—Lincoln Continental

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DETROIT IRON

FRAME AND BODY MOUNTS
LINCOLN CONTINENTAL

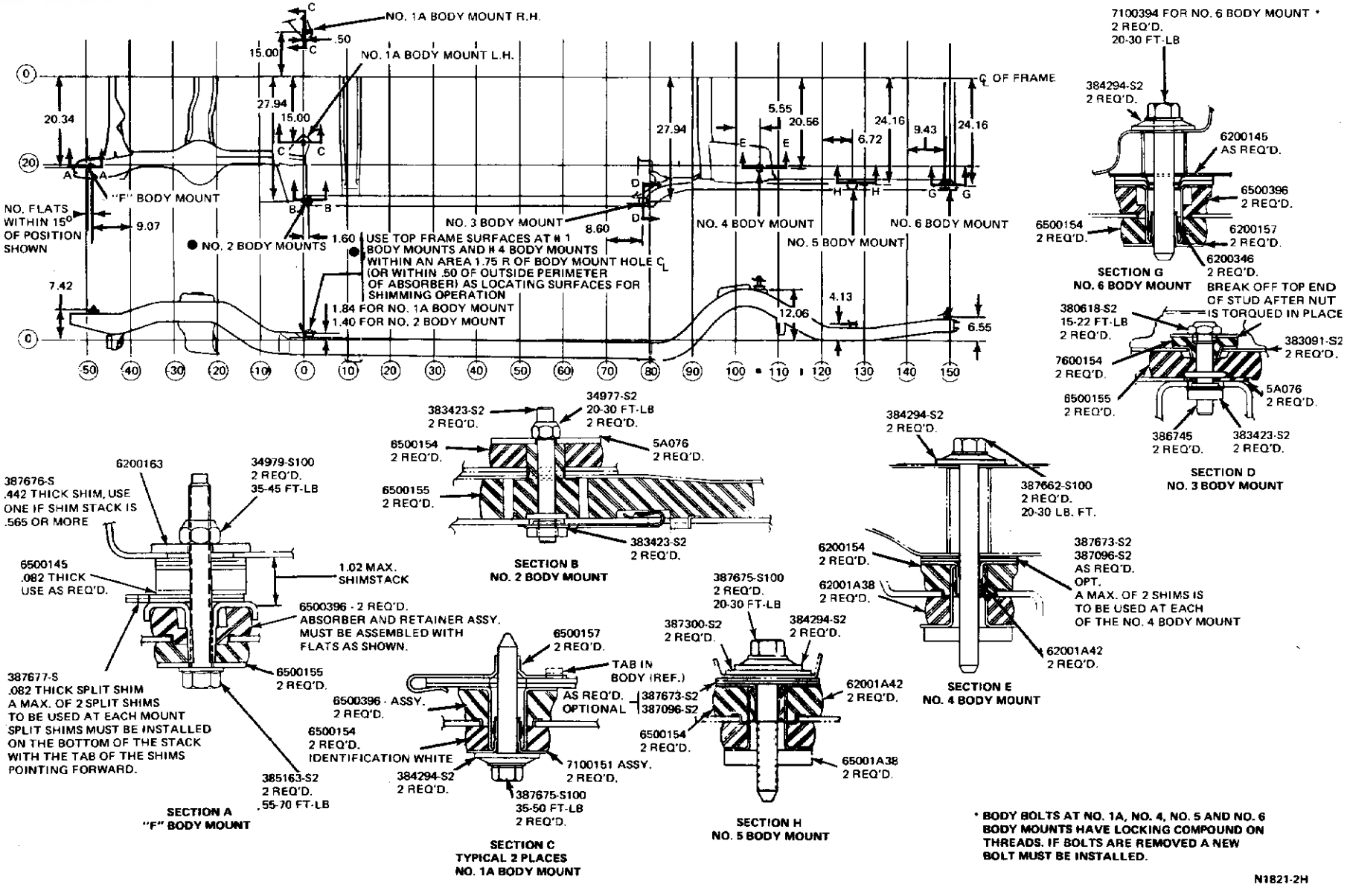


FIG. 7 Frame Dimensions—Lincoln Continental

47-02-7

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Continental Mark V

PART 47-03

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REMOVAL AND INSTALLATION

RADIATOR GRILLE

Removal

1. Remove 13 radiator upper shield attaching screws and remove the shield.
2. Remove two nuts retaining each side of the grille to the grille opening lower panel (Fig. 1).
3. Remove two bolts attaching each side of the grille to the grille outer support panels (Fig. 1).
4. Remove one bolt attaching the top center of the grille to the hood latch support, and remove the grille.

Installation

1. Transfer the grille ornaments seals bracket and clips to a new grille if the grille is to be replaced.
2. Position the grille assembly to the grille opening. Install the four retaining nuts and five attaching screws finger tight.
3. Align the grille with the hood, grille opening lower panel and the bumper. Then, tighten the retaining nuts and attaching bolts securely.
4. Install the radiator upper shield.

FRONT BUMPER

Removal

1. Remove three bolts attaching each isolator to the reinforcement assembly (Fig. 2). Remove the bumper and reinforcement assembly from the vehicle.

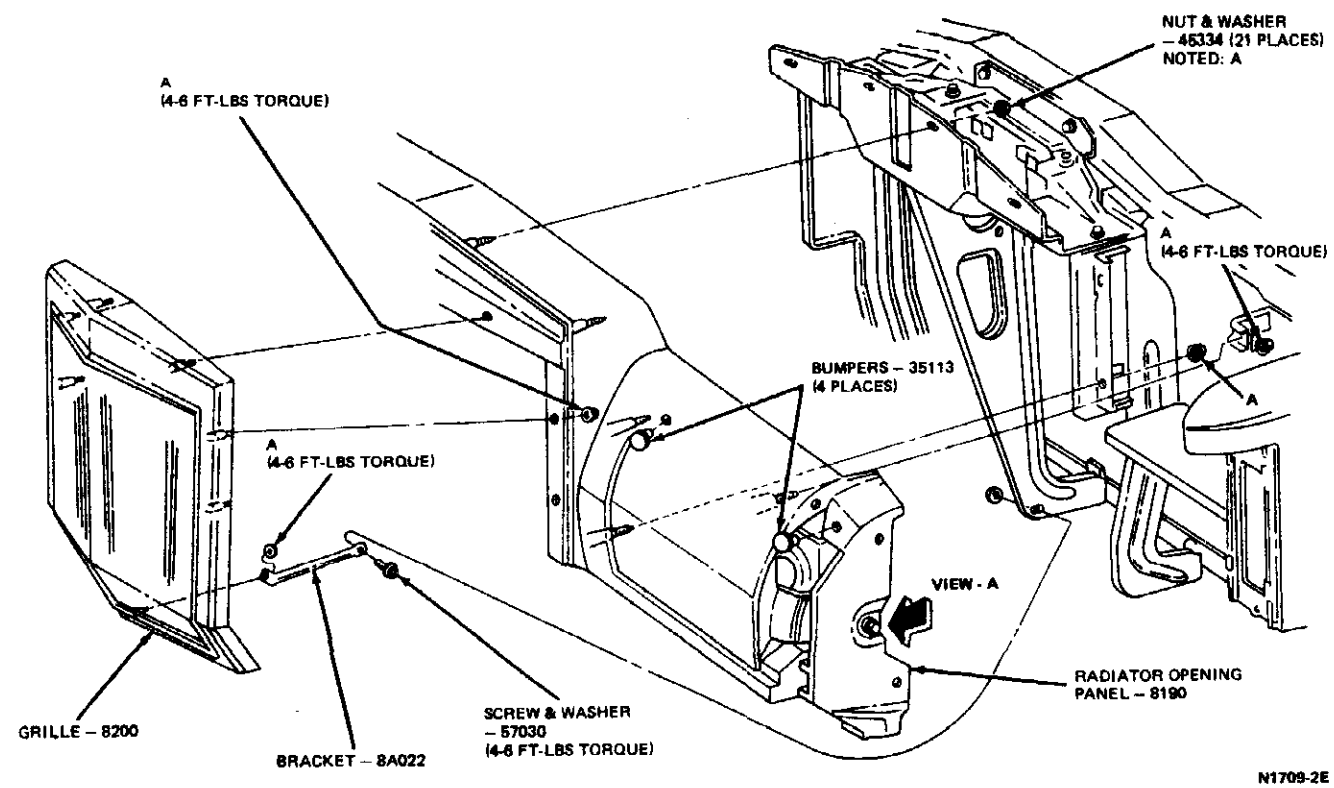


FIG. 1 Grille Installation—Continental Mark V

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2. Remove the reinforcement assembly, bumper guards, license bracket and pads from the bumper.

NOTE: The bumper pad attaching tabs may be destroyed upon removal, if so equipped. Damage will be avoided by squeezing the retaining tabs with pliers until tabs can be pushed through holes in bumper. Remove the stone deflectors.

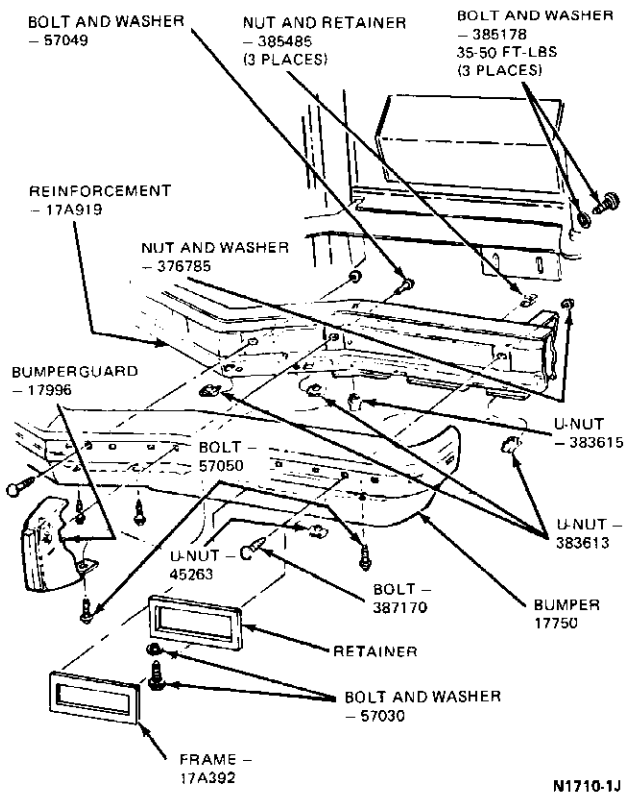


FIG. 2 Front Bumper Installation—Continental Mark V

Installation

1. Position the reinforcement to the bumper and install the attaching bolts. Tighten the fasteners to 25-38 ft-lbs torque. Install opening shield and license plate mounting bracket. Install pads to bumper assembly (Fig. 2). Install bumper guards to bumper and tighten attaching bolts 25-38 ft-lbs. torque.
2. Position the bumper and reinforcement to the isolator and install the attaching bolts. Space with shims (17D899/17A923) between reinforcement and isolator, if required.
3. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Fig. 4. Then, adjust the bumper for body clearance of 30.75" from the center of the grille so that the horizontal body to bumper measurements meet the dimensions in Fig. 4 (zero clearance at sight shield). Tighten the isolator-to-reinforcement bolts to 35-50 ft-lbs torque.

REAR BUMPER

Removal

1. Remove three bolts attaching each isolator to the reinforcement and, with an assistant, remove the bumper and reinforcement from the vehicle.
2. Remove the reinforcement- to-bumper attaching bolts, and separate the reinforcement from the bumper (Fig. 3).
3. If the bumper is to be replaced, transfer the bumper guards and the pads to the new bumper (Fig. 3).

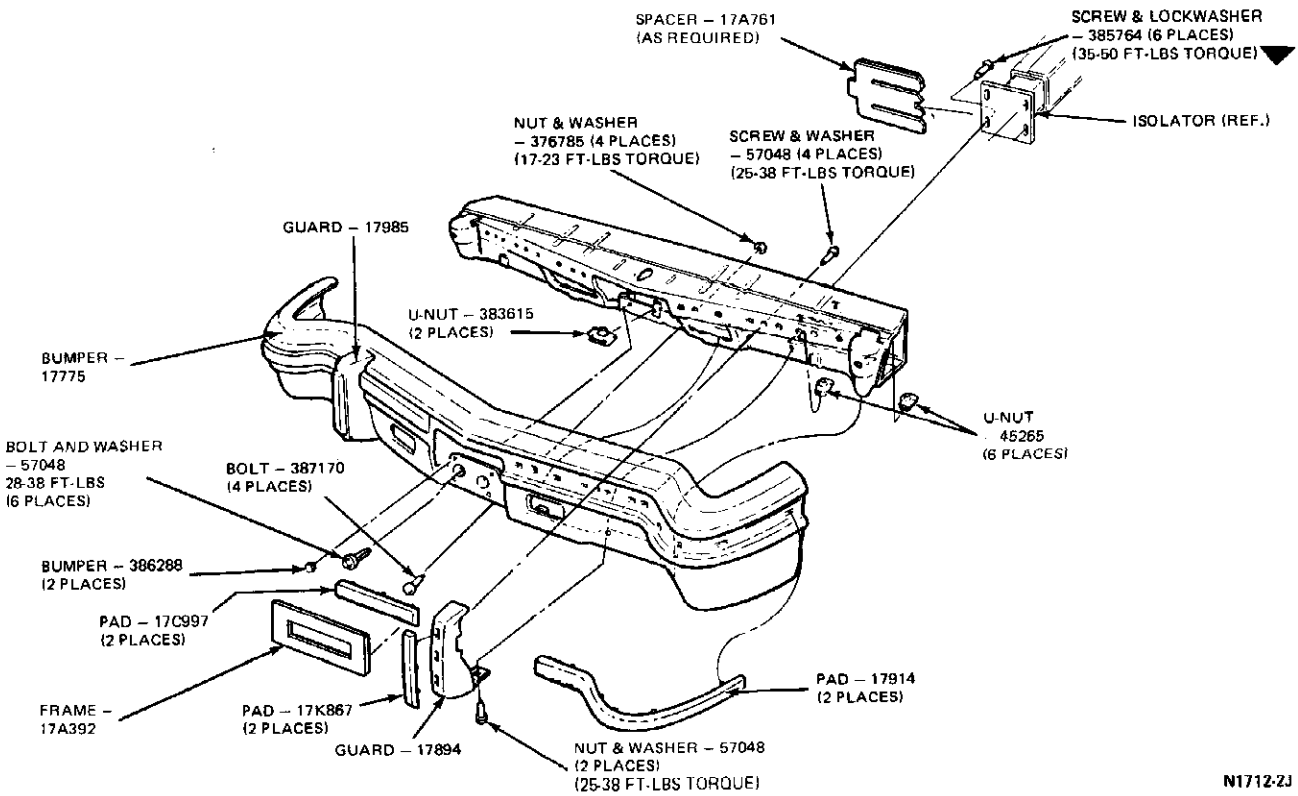


FIG. 3 Rear Bumper Installation—Continental Mark V

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NOTE: The bumper pad attaching tabs may be destroyed upon removal, if so equipped. Damage will be avoided by squeezing the retaining tabs with pliers until tabs can be pushed through holes in bumper.

Installation

1. Position the reinforcement to the bumper, and install fasteners (Fig. 3). Install the bumper guards to the bumper. Tighten the fasteners to 25-38 ft-lbs torque.
2. Position the bumper and reinforcement to the isolator with the shim(s), if required, between the isolator and reinforcement (Fig. 3). Install the three attaching bolts at each isolator.
3. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Fig. 4. Then, adjust the bumper for body clearance at the centerline of the tail lamp so that the vertical and horizontal body to bumper dimensions meet the specifications in Fig. 4. Tighten the isolator- to-reinforcement bolts to 35-50 ft-lbs torque.

EXTERIOR MOULDINGS

NOTE: Determine position of positive fasteners to preclude possible damages.

Before removing the exterior mouldings, it should be determined by the type of retainer used whether a respective door, quarter or luggage compartment trim panel must first be removed to provide access (Figs. 5, 6 and 7). If a weld stud is distorted or broken off, it should be replaced with an oval head blind rivet (Part No. 383229-S).

FRAME DIMENSIONS

The Continental Mark V frame dimensions are shown in Fig. 8. The frame checking and repair procedures are given in Part 47-01.

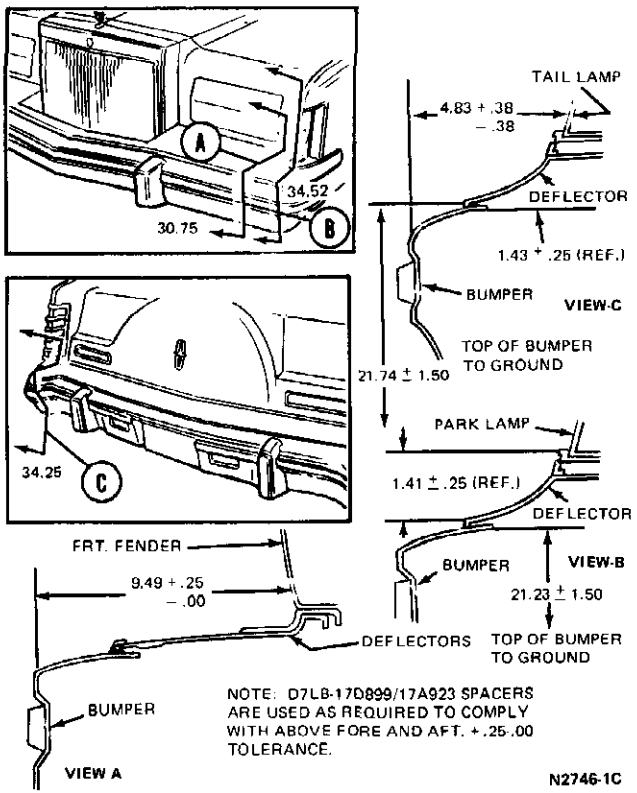


FIG. 4 Bumper Adjustment Specifications— Continental Mark V

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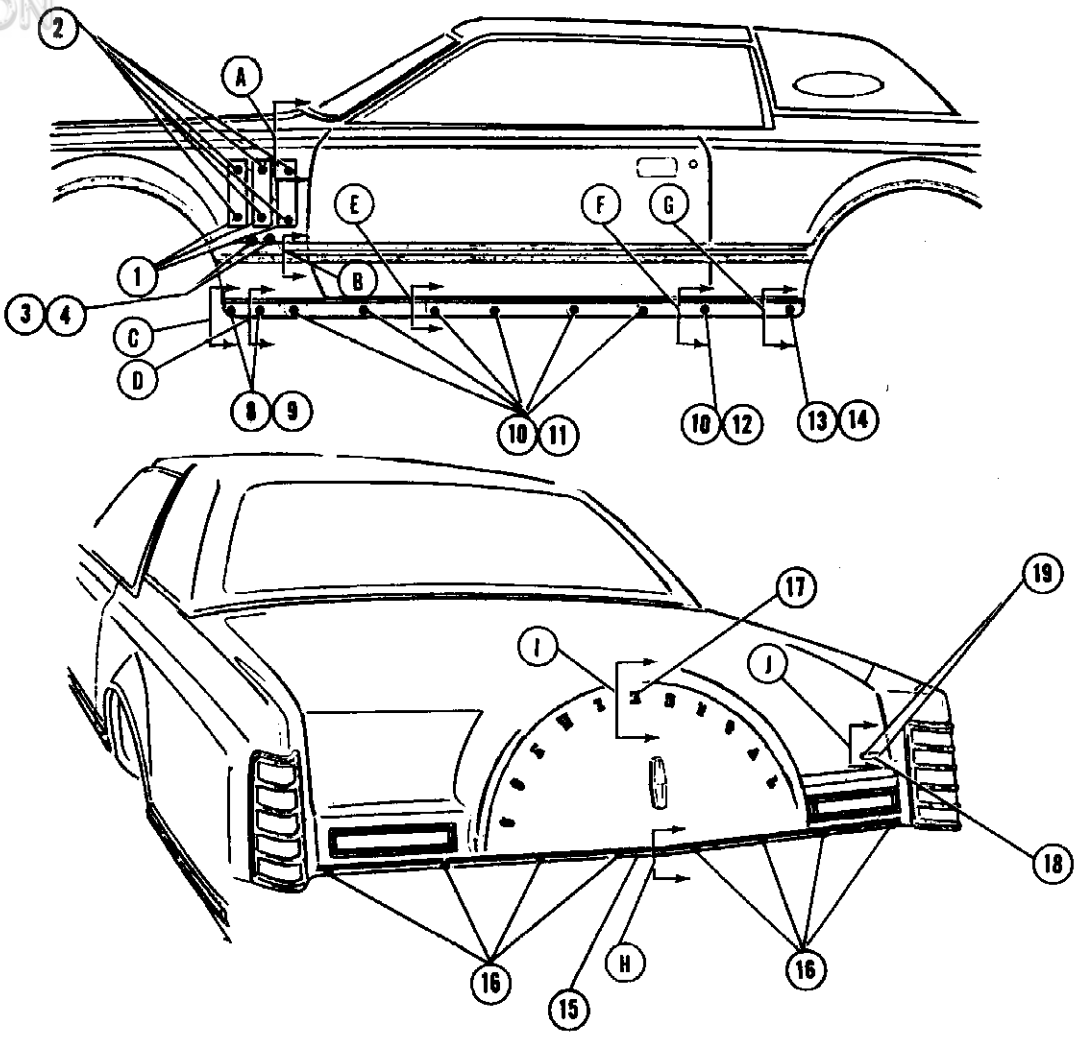
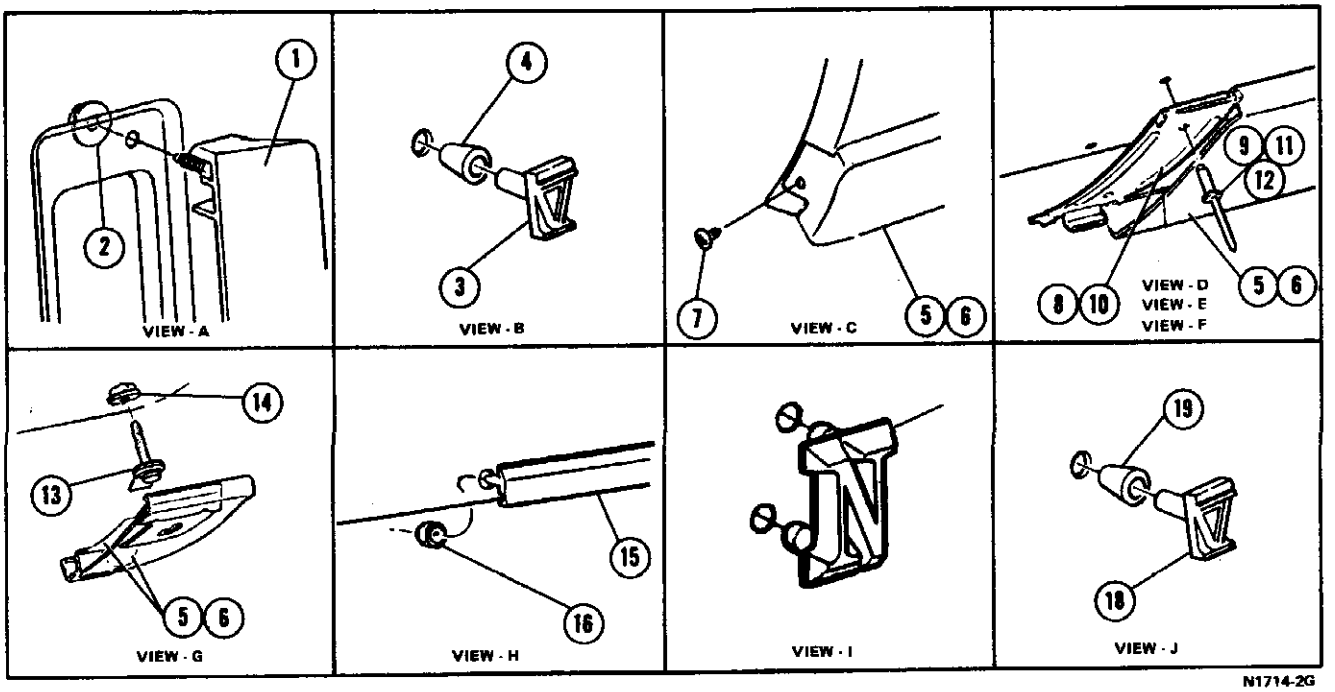


FIGURE - 1



N1714-2G

FIG. 5 Exterior Side and Rear Moulding Installation—Continental Mark V

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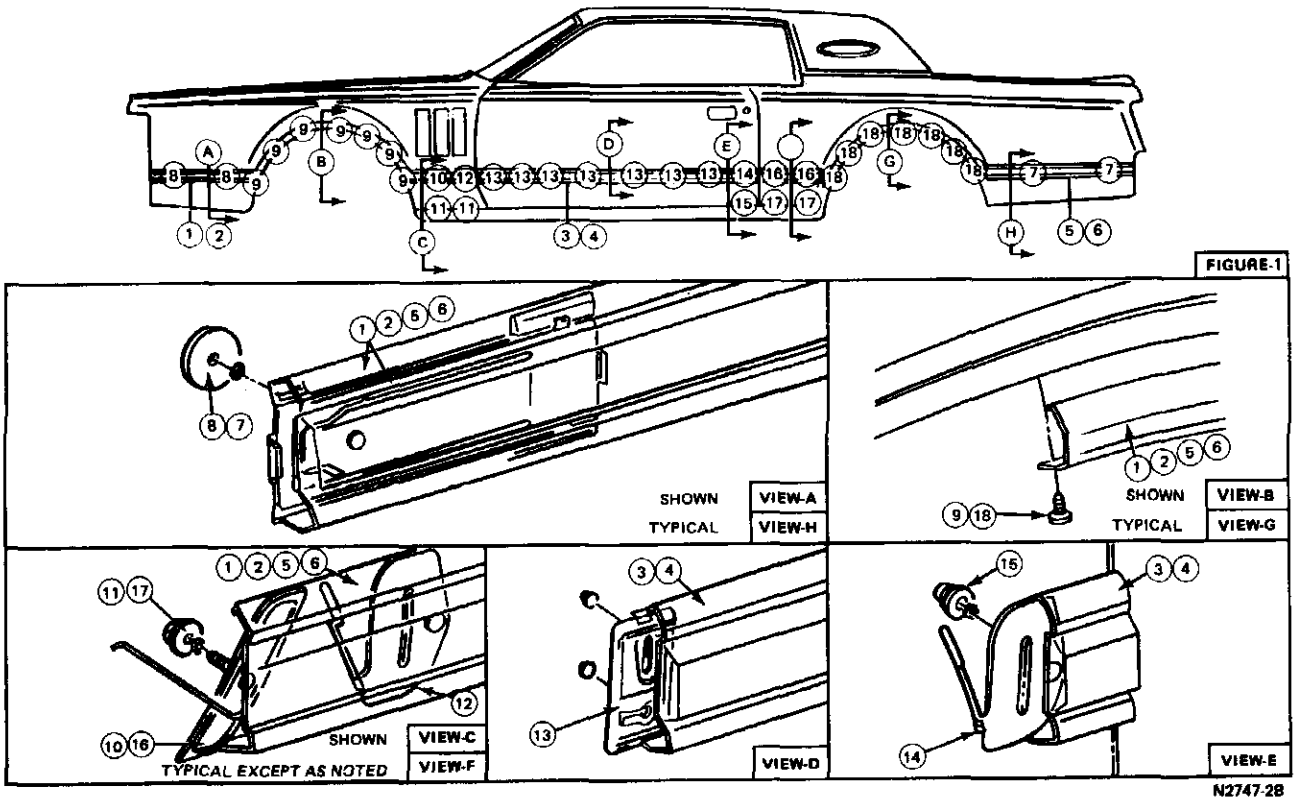


FIG. 6 Exterior Side Moulding Installation—Continental Mark V

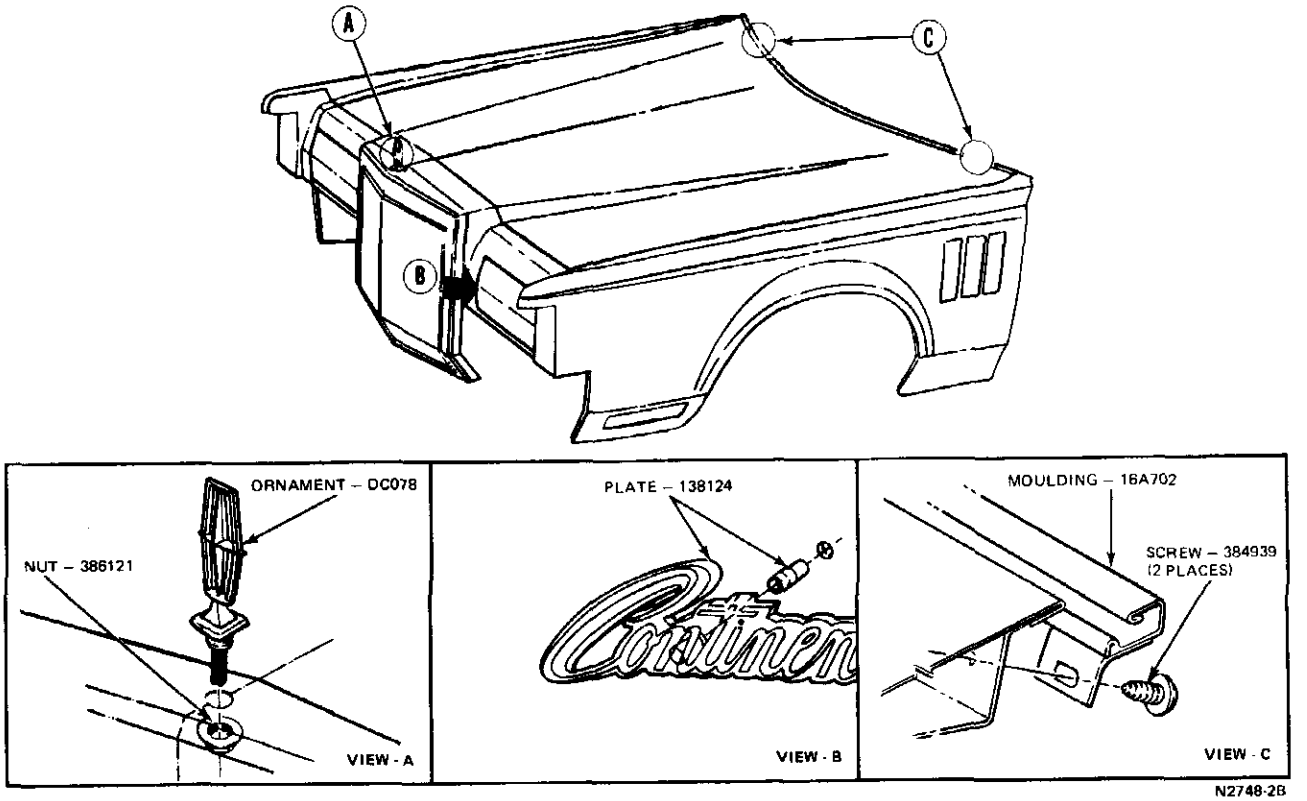
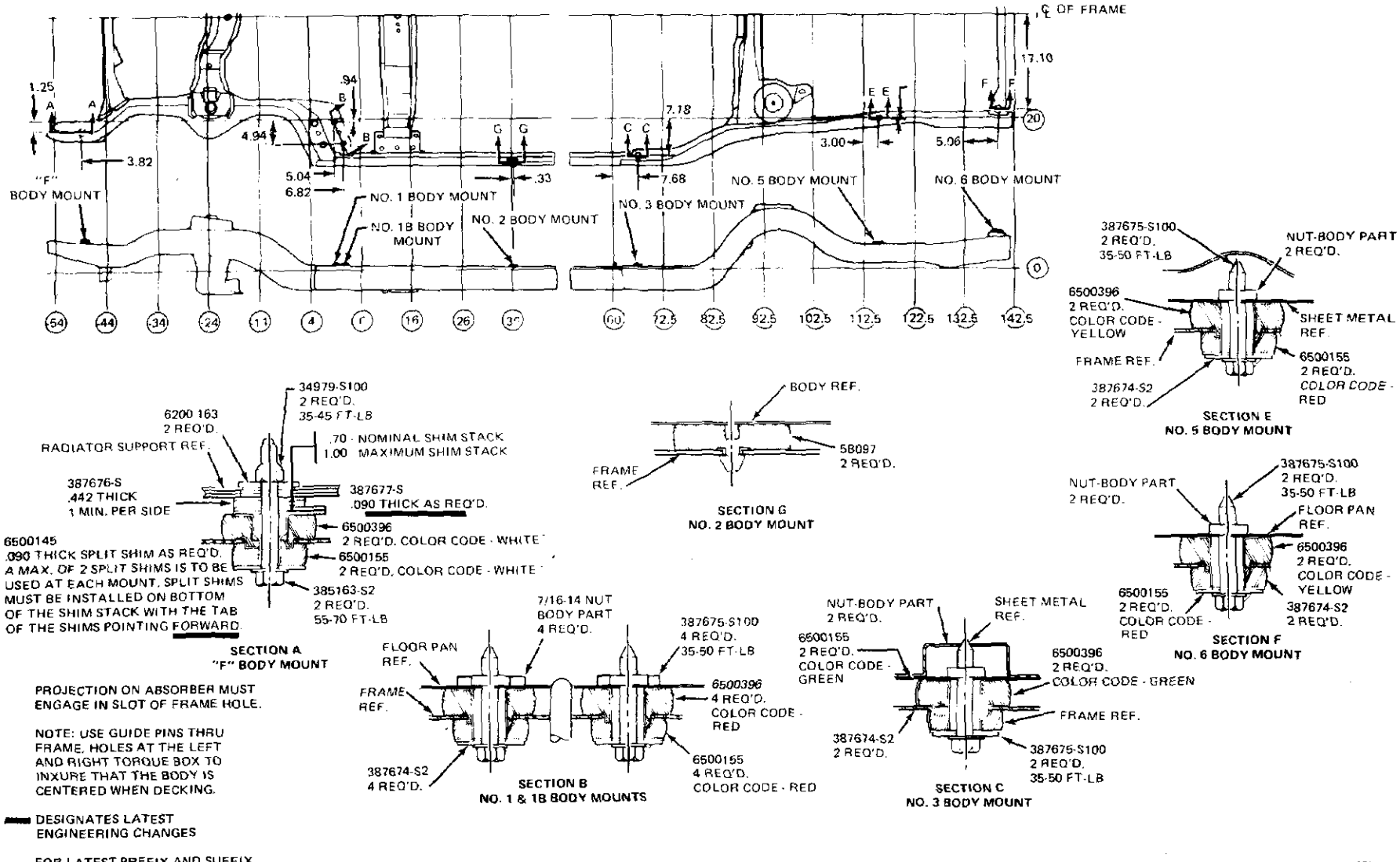


FIG. 7 Front Ornamentation—Continental Mark V

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DETROIT IRON

FRAME AND BODY MOUNTS
CONTINENTAL MARK V



PROJECTION ON ABSORBER MUST ENGAGE IN SLOT OF FRAME HOLE.

NOTE: USE GUIDE PINS THRU FRAME, HOLES AT THE LEFT AND RIGHT TORQUE BOX TO INXURE THAT THE BODY IS CENTERED WHEN DECKING.

▬ DESIGNATES LATEST ENGINEERING CHANGES

FOR LATEST PREFIX AND SUFFIX SEE ENGINEERING PARTS LIST

N2050-2B

FIG. 8 Frame Dimensions—Continental Mark V

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Thunderbird

PART 47-04

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REMOVAL AND INSTALLATION	
Exterior Mouldings	04-3
Frame Dimensions	04-4
Front Bumper	04-1
Radiator Grille	04-1
Rear Bumper	04-3

REMOVAL AND INSTALLATION

REMOVAL OF GRILLE ASSEMBLY

To remove the radiator grille assembly (Fig. 1), remove the ten nut and conical washer assemblies from the back side of the grille opening panel. Pull the radiator grille assembly forward until all locating pins and studs are clear of the grille opening panel.

REMOVAL OF RADIATOR GRILLE FROM ASSEMBLY

1. Remove the two spring legs from the notches on the bottom of the grille. Remove the two screws at the hinges and lift up and forward.
2. To remove the spring from the surrounding moulding, remove the three screws and rectangular washer.

INSTALLATION OF RADIATOR GRILLE INTO GRILLE ASSEMBLY

1. Place spring in the notches on the moulding. Bend on legs face rearward.
2. Attach screw and rectangular washer at the center bars.
3. Attach the two outboard screws and rectangular washer.
4. Set the grille into the moulding. Attach hinge and secure with two screws.
5. Snap spring leg into notches.

INSTALLATION OF GRILLE ASSEMBLY

1. Align grille to the grille opening panel assembly utilizing the locating pins.
2. Secure grille assembly with ten nut and conical washer assemblies.

FRONT BUMPER

1. Remove the bumper from the vehicle (six bolts) and remove the bumper and bumper guard- to-reinforcement attachments (five bolts and four nuts Fig. 2).
2. Remove the pad assemblies. NOTE: The bumper pad attaching tabs may be destroyed upon removal, if so equipped. Damage will be avoided by squeezing the retaining tabs with pliers until tabs can be pushed through holes in bumper.

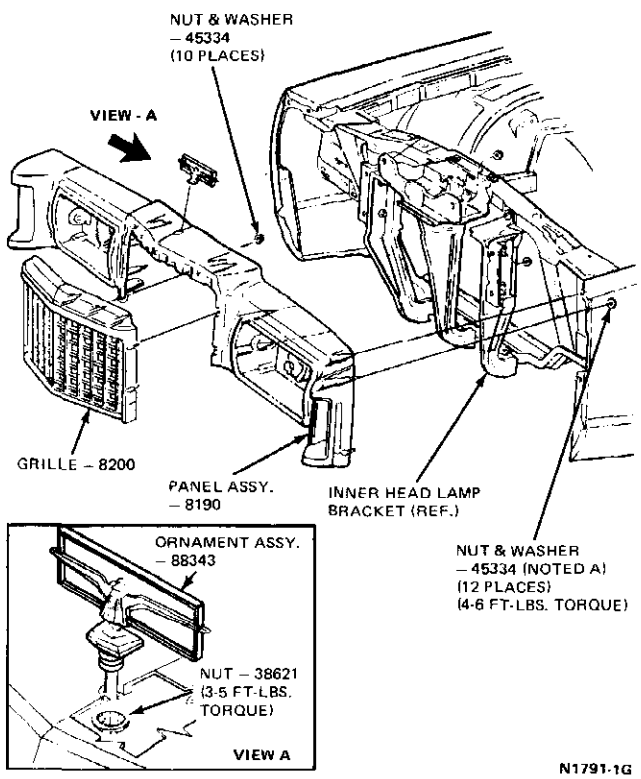


FIG. 1 Radiator Grille—Thunderbird

3. Transfer the license plate and bracket assembly to the new bumper if the bumper is to be replaced.
4. Install the pad assemblies.
5. Position the bumper assembly to the vehicle and install the attaching bolts snug (Fig. 2).
6. Adjust the bumper height so that the distance from the top edge to the ground meets the specification in Fig. 3. Then, adjust the bumper for body clearance at the centerline of the parking lamp so that the vertical and horizontal body to bumper dimensions meet the specifications in Fig. 3. Tighten the isolator- to-reinforcement bolts to 35-50 ft-lbs torque.

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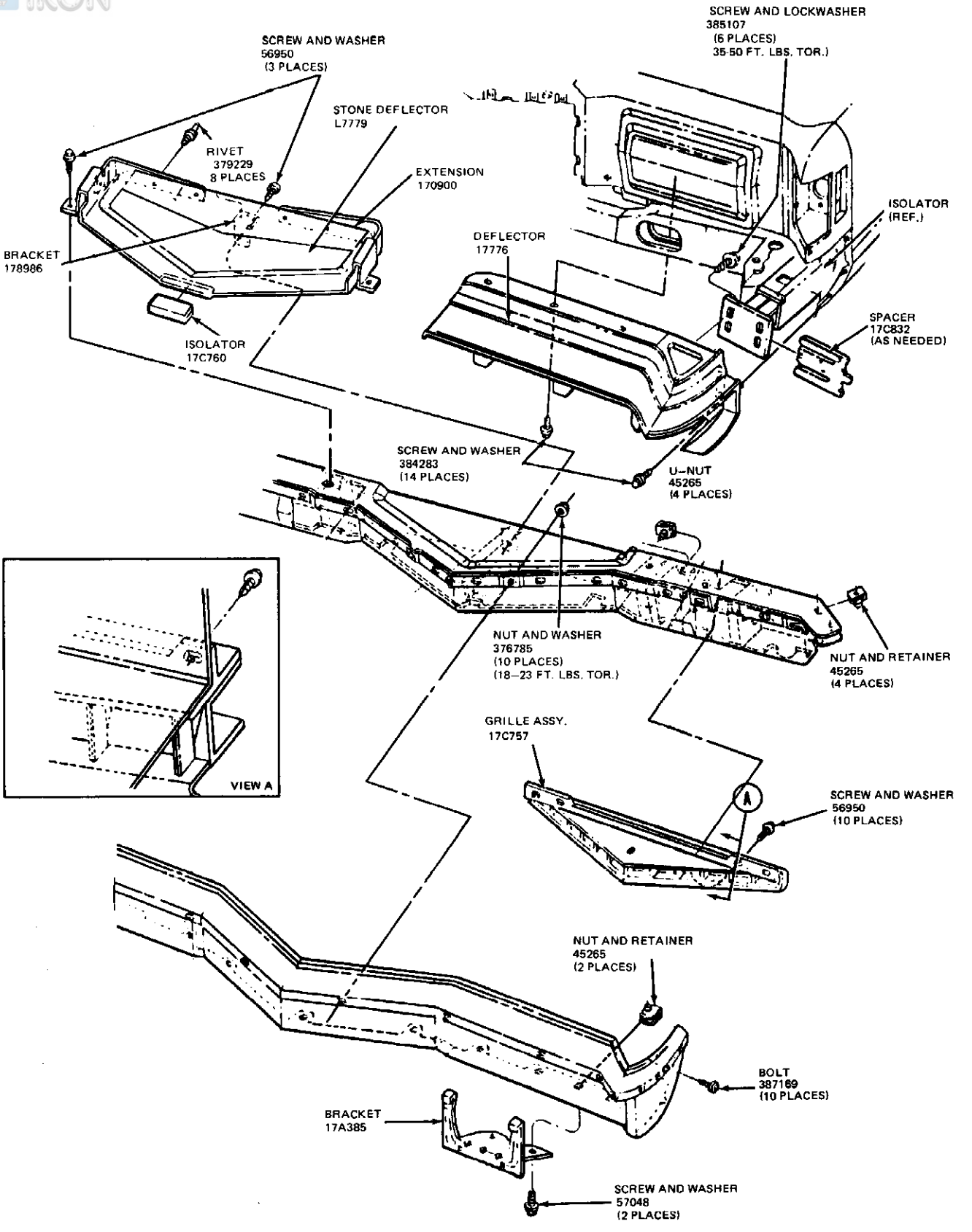


FIG. 2 Front Bumper—Thunderbird

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REAR BUMPER

1. Disconnect the license lamp wire from under the vehicle.

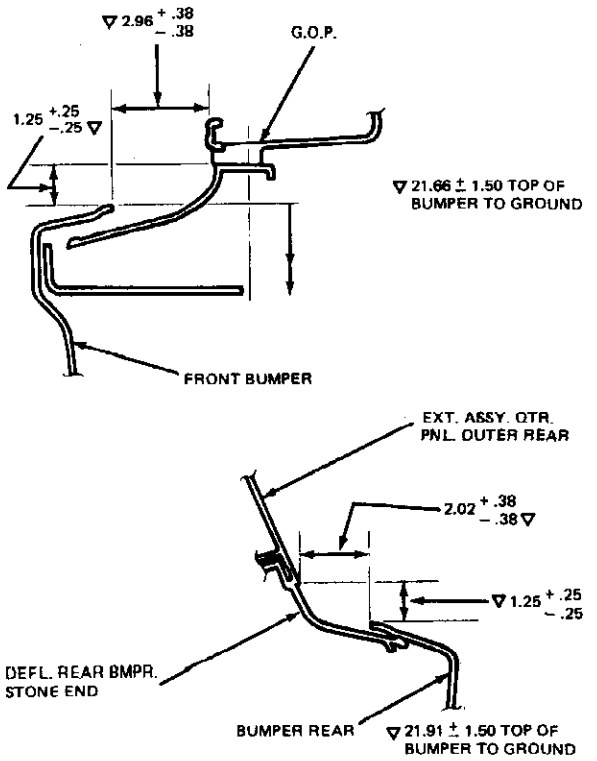


FIG. 3 Bumper Adjustment Specifications—Thunderbird

2. With an assistant, remove three bolts attaching the reinforcement to each isolator, and remove the bumper and reinforcement from the vehicle (Fig. 4).
3. Remove the reinforcement- to-bumper attaching bolts, and separate the reinforcement from the bumper.
4. If the bumper is to be replaced, transfer the bumper guards, pads and license plate bracket to the new bumper. NOTE: The bumper pad attaching tabs may be destroyed upon removal, if so equipped. Damage will be avoided by squeezing the retaining tabs with pliers until tabs can be pushed through holes in bumper.
5. Assemble the reinforcement to the bumper and install the attaching bolts.
6. Position the bumper and reinforcement to the isolators and install the attaching bolts.
7. Adjust the bumper height so that the distance from *the top edge to the ground meets the specification* in Fig. 3. Then, adjust the bumper for body clearance at the centerline of the tail lamp so that the vertical and horizontal body to bumper dimensions meet the specifications in Fig. 3. Tighten the isolator- to-reinforcement bolts to 35-50 ft-lbs torque.
8. Connect the license lamp under the vehicle.

EXTERIOR MOULDINGS

Before removing the exterior mouldings, it should be determined by the type of retainer used whether a respective door, quarter or luggage compartment trim panel must first be removed to provide access (Figs. 5, 6 and 7). If a weld stud is distorted or broken off,

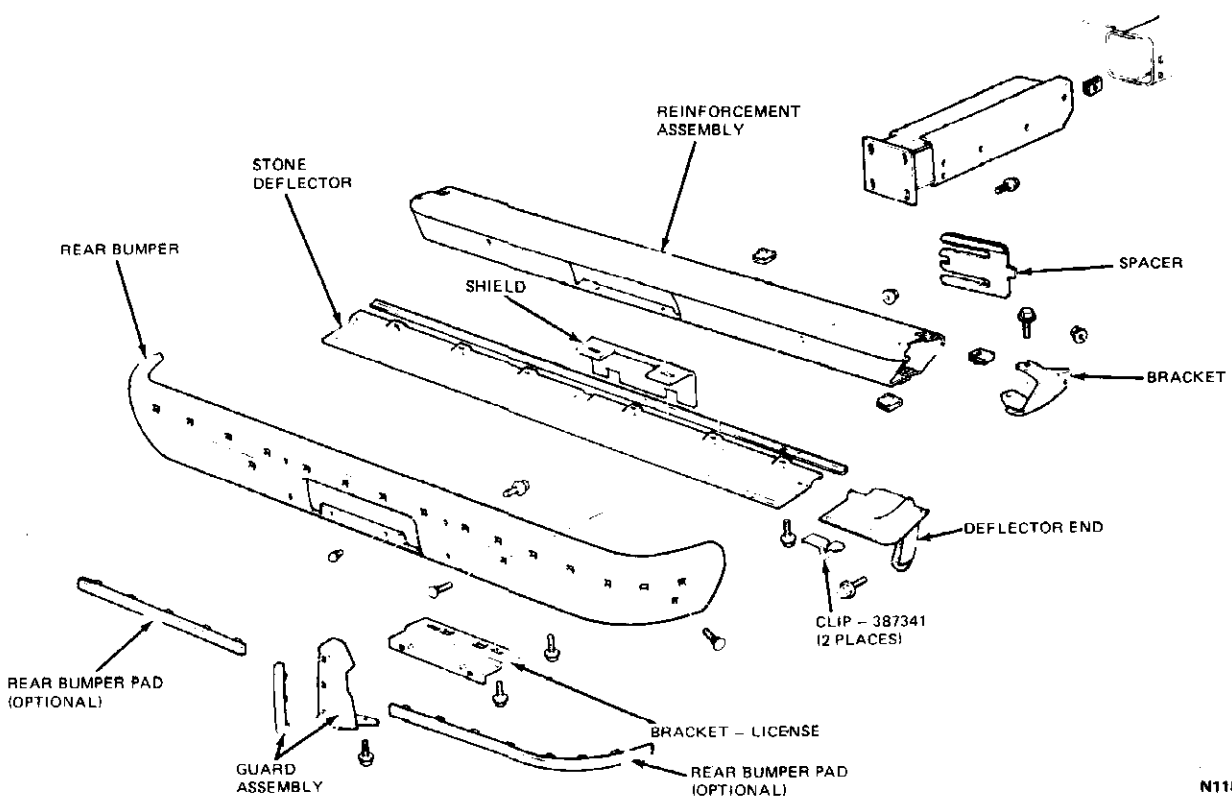


FIG. 4 Rear Installation—Thunderbird

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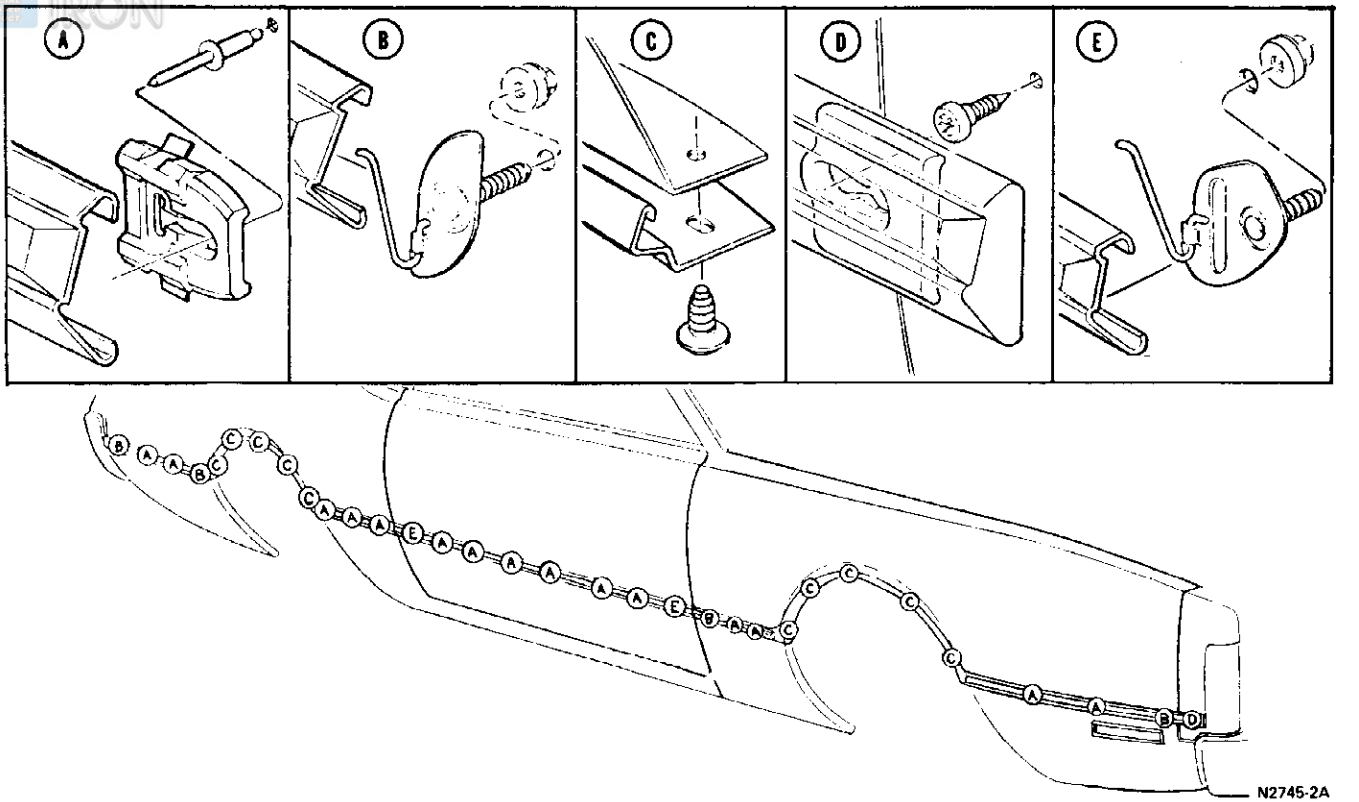


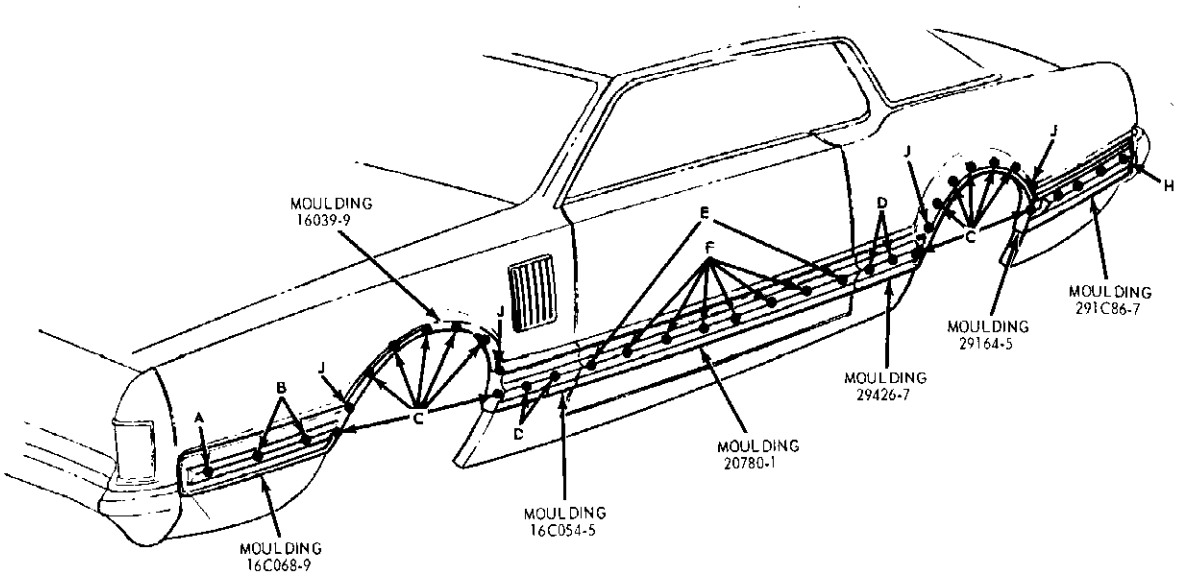
FIG. 5 Exterior Side Moulding Installation—Thunderbird

it should be replaced with an oval head blind rivet (Part No. 383229-S).

FRAME DIMENSIONS

The Thunderbird frame dimensions are shown in Fig. 8. The frame checking and repair procedures are given in Part 47-01.

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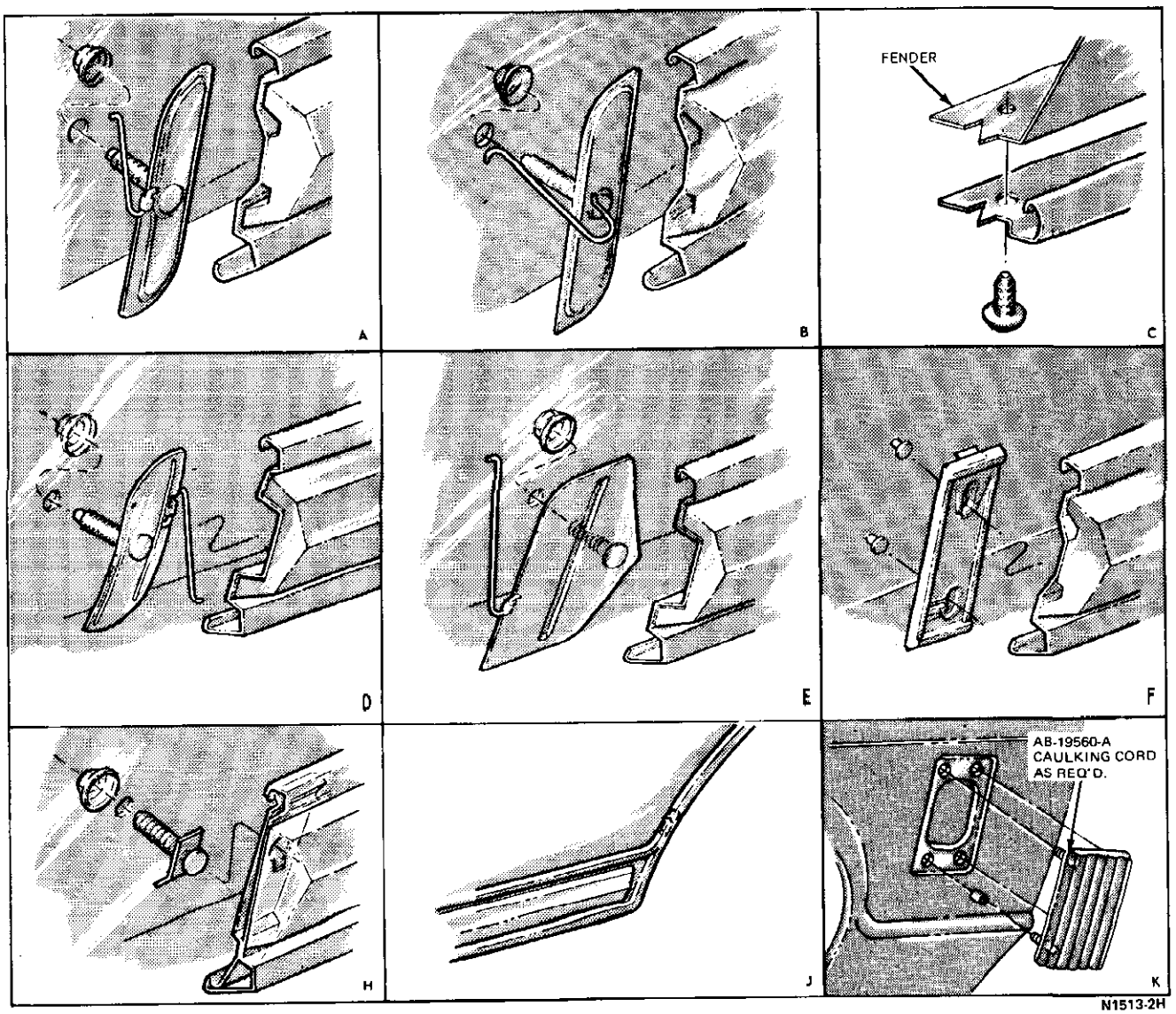


FIG. 6 Optional Exterior Side Moulding Installation—Thunderbird

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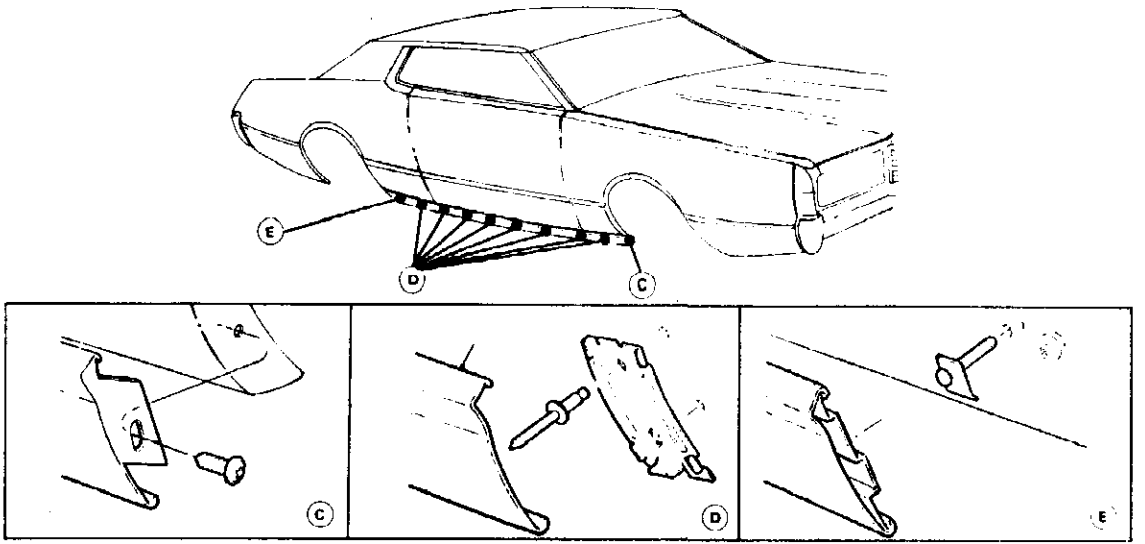
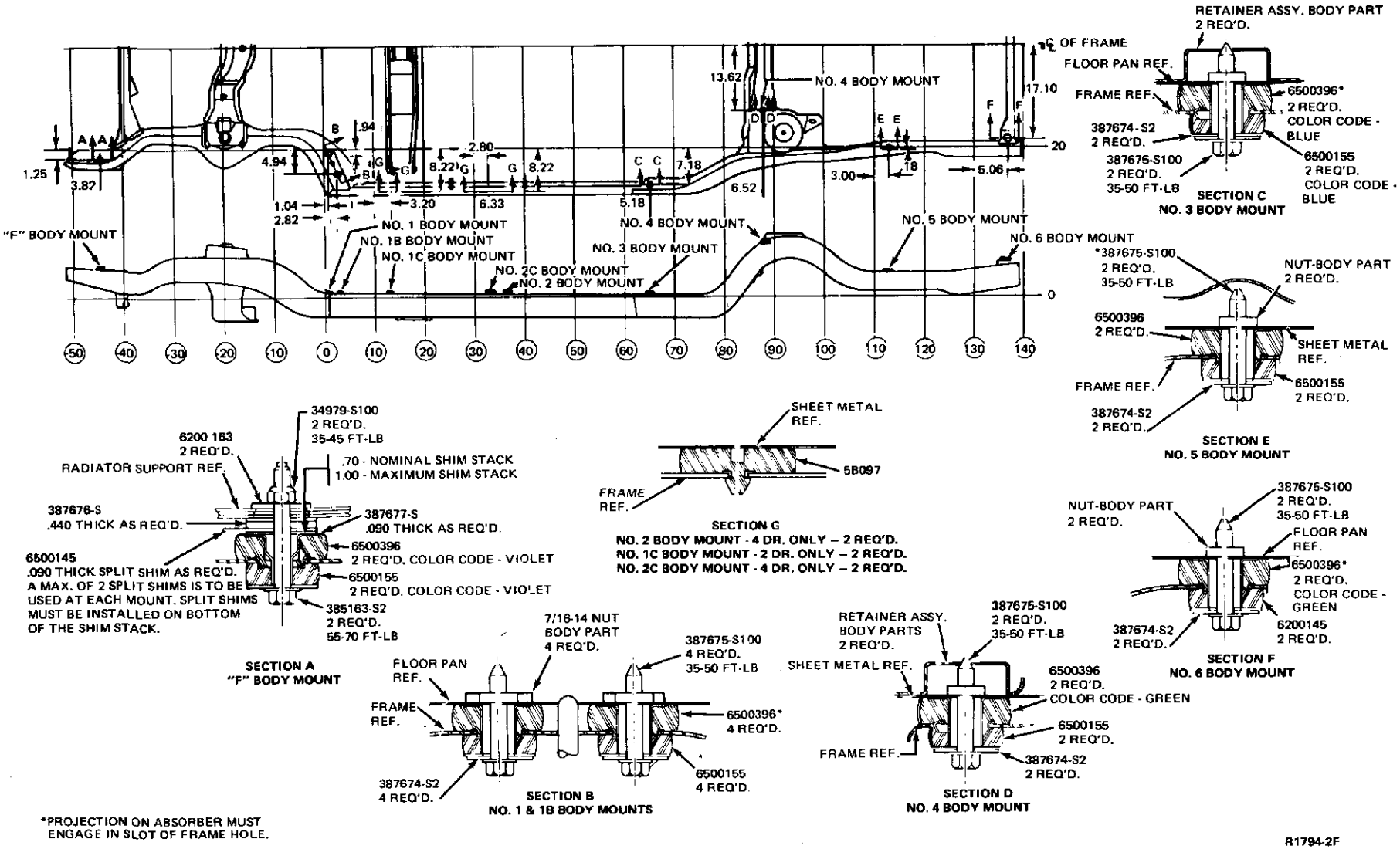


FIG. 7 Optional Exterior Side Moulding Installation—Thunderbird

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FRAME AND BODY MOUNTS

THUNDERBIRD



*PROJECTION ON ABSORBER MUST ENGAGE IN SLOT OF FRAME HOLE.

R1794-2F

FIG. 8 Frame Dimensions—Thunderbird

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DETROIT IRON

Ford and Mercury

PART 47-05

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CN2877-2B

REMOVAL AND INSTALLATION

RADIATOR GRILLE

Ford High and Low Series Center Grille

The radiator grille is attached to the front of the vehicle with six screws which can be removed from the front of the grille (Figs. 1 and 2). To install, simply reverse the procedure.

RADIATOR GRILLE

MERCURY HIGH SERIES

Center Grille

1. Remove seven radiator center grille attaching screws (Fig. 3), and remove the center grille from the vehicle.
2. Position the center grille to the vehicle, and install the seven attaching screws.

HEADLAMP MOULDING ASSEMBLY (MERCURY ONLY)

Removal

1. Open headlamp door and remove six self-threading nuts that secure the moulding to the door.
2. Close the door and remove the moulding assembly.

Installation

1. Position the moulding on the headlamp door.
2. Open the door and install six self-threading nuts securing the moulding to the door.

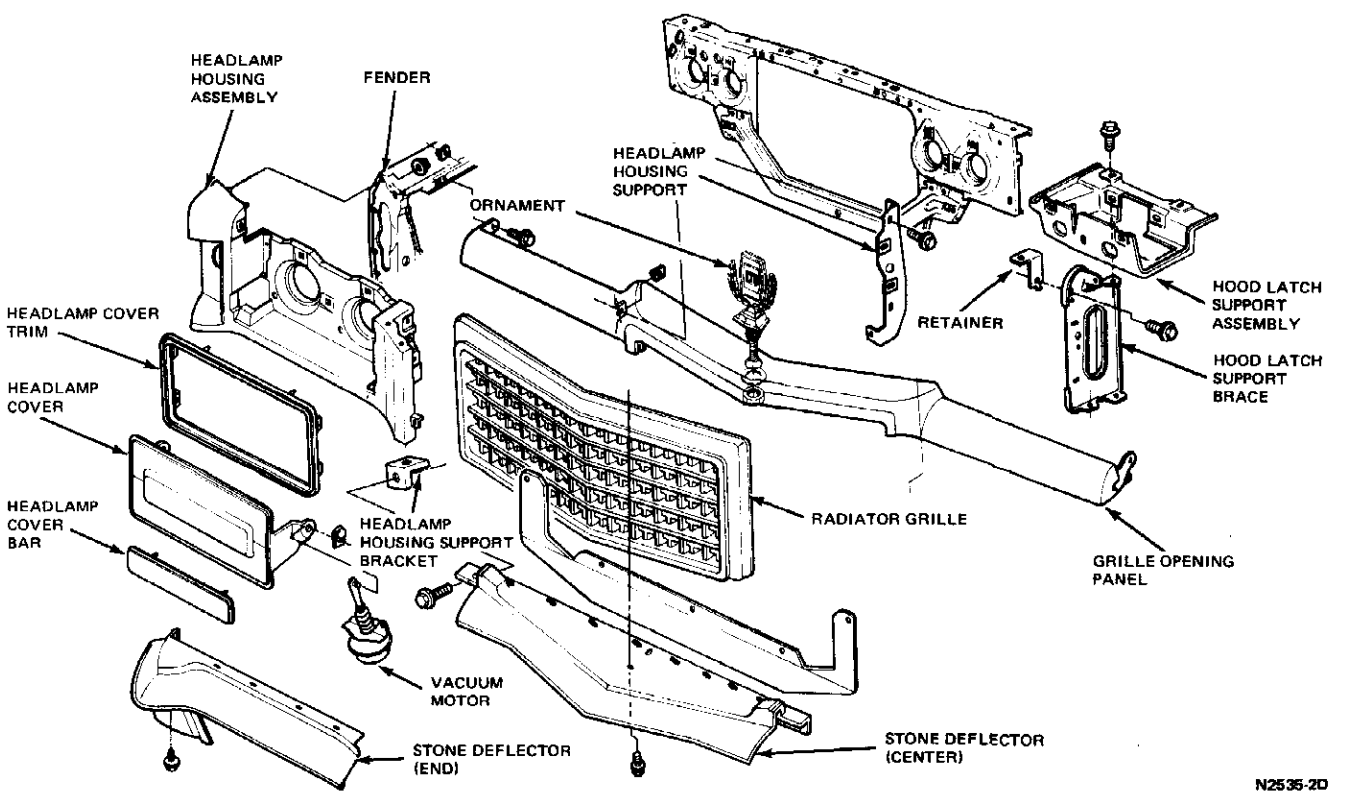


FIG. 1 Radiator Grille Installation—Ford High Series

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HEADLAMP DOOR ORNAMENT

Removal

1. Open the headlamp door and remove the two self-threading nuts that secure the ornament to the door.
2. Close the door and remove ornament.

Installation

1. Position ornament on headlamp.
2. Open door and install the two self-threading nuts that secure the ornament to the door.

FORD LOW SERIES HEADLAMP DOORS

1. Remove two (2) upper bright screws and lift door out of lower attaching access notches in grille open panel (Fig. 2).
2. Position lower headlamp door tabs into notches in grille opening panel, rotate door upward and rearward to flush fit and install attaching bright screws.

FRONT BUMPER

FORD

Removal

1. Remove six bolts (three on each side), attaching the reinforcement to the isolator (Fig. 4).
2. Remove the bumper assembly from the vehicle. Remember to replace the spacers between reinforcement and mounting plate (if so equipped).
3. Remove the bumper guards (two nuts) on each side. License plate must be removed prior to removal of reinforcement from bumper.
4. Remove the license plate and bracket assembly.
5. Remove the reinforcement- to-bumper (thirteen bolts and six nuts).
6. Remove bumper pads, if so equipped. **NOTE: The bumper pad attaching tabs may be destroyed upon removal, if so equipped.** Damage may be avoided by squeezing the retaining tabs with pliers until tabs can be pushed through holes in bumper.

Installation

1. Install the license plate and bracket. Install three new bumper pads, if so equipped.
2. Install the reinforcement assembly to the bumper (Fig. 4). Torque nuts to 17-23 ft-lbs and the thirteen bolts to 25-38 ft-lbs. License plate bracket must be installed after reinforcement is assembled to bumper.
3. Install the bumper guards. Install 2 new bumper pads, if required.
4. Install deflector front air with 10 screws.
5. Position the bumper assembly to the vehicle, replace spacers and install the attaching bolts snug.
6. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Fig. 6. Then, adjust the bumper for body clearance at the centerline of the parking lamp so that the vertical and horizontal body to bumper dimensions meet the specifications in Fig. 6. Tighten the isolator- to-reinforcement bolts to 35-50 ft-lbs torque.

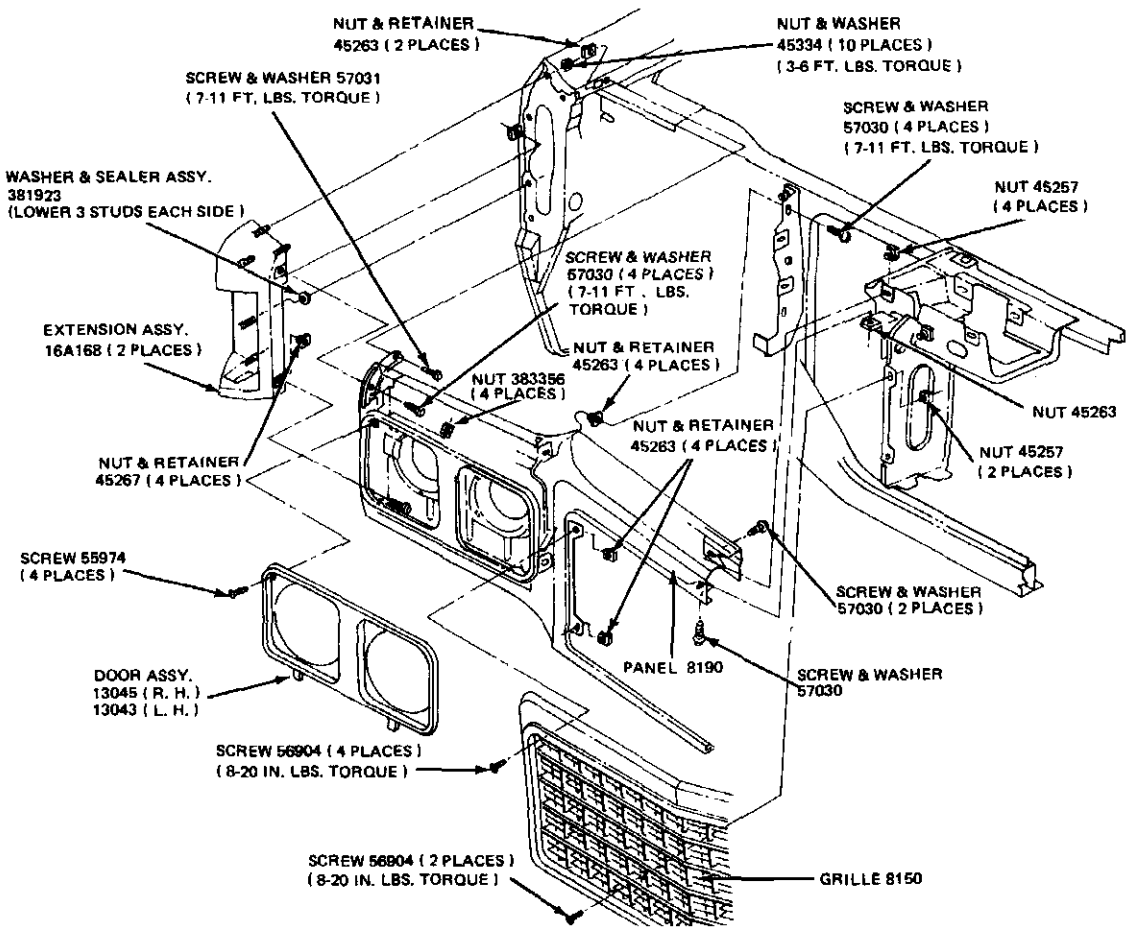


FIG. 2 Radiator Grille Installation—Ford Low Series

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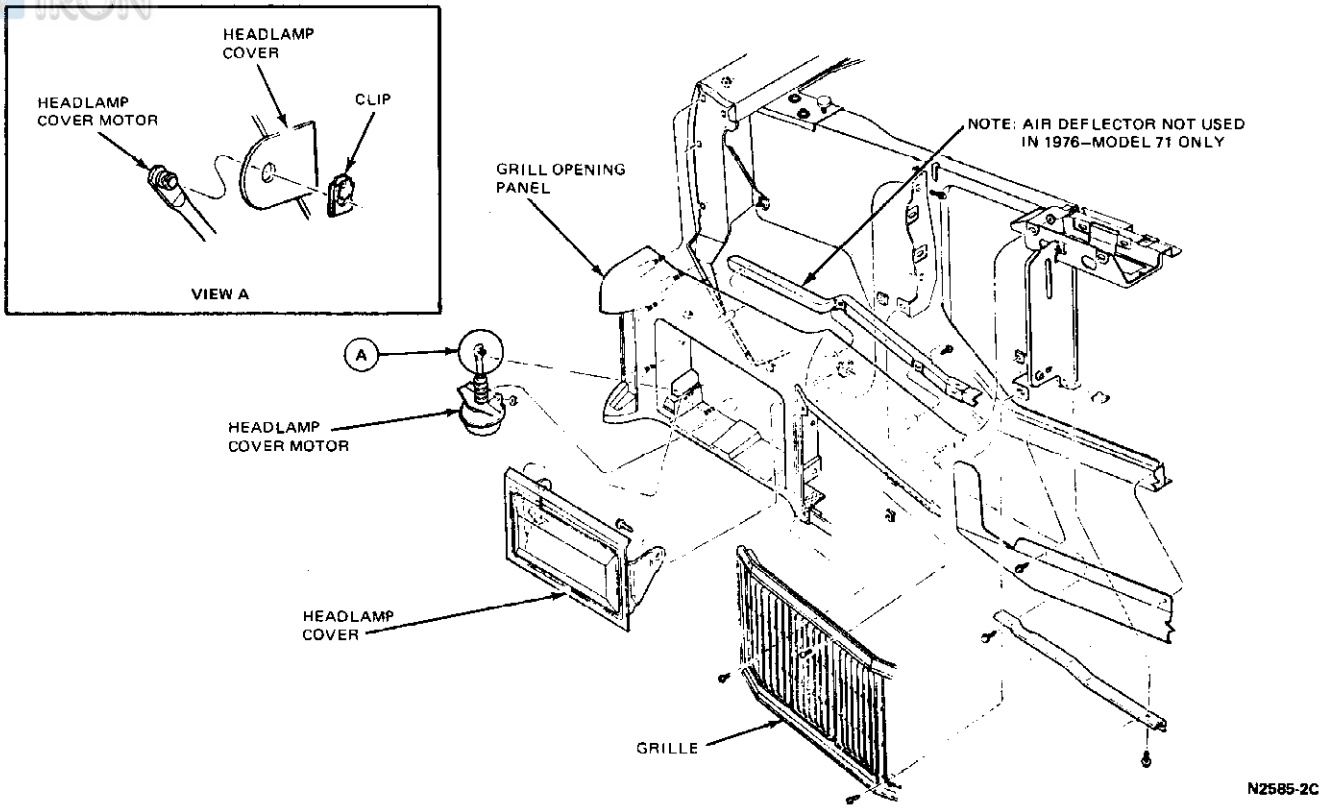


FIG. 3 Radiator Grille Installation—Mercury High Series

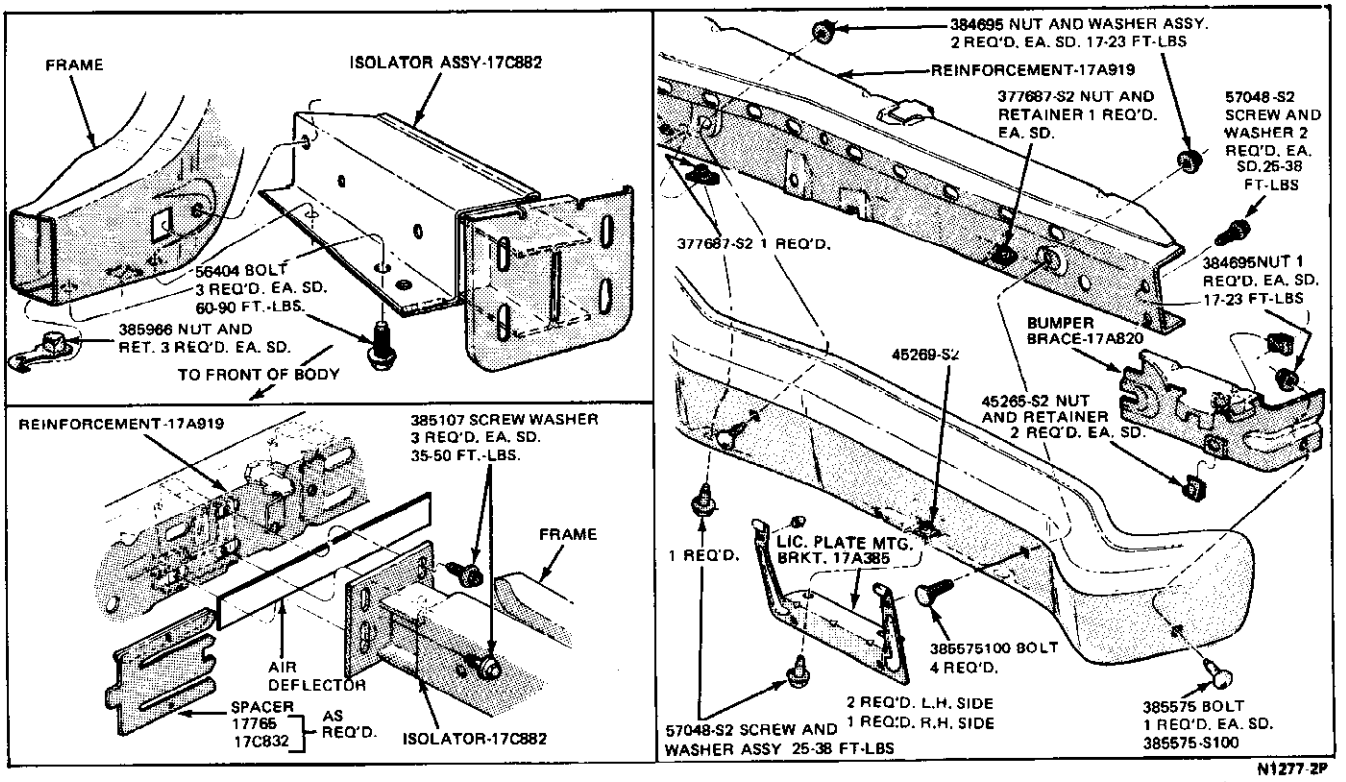


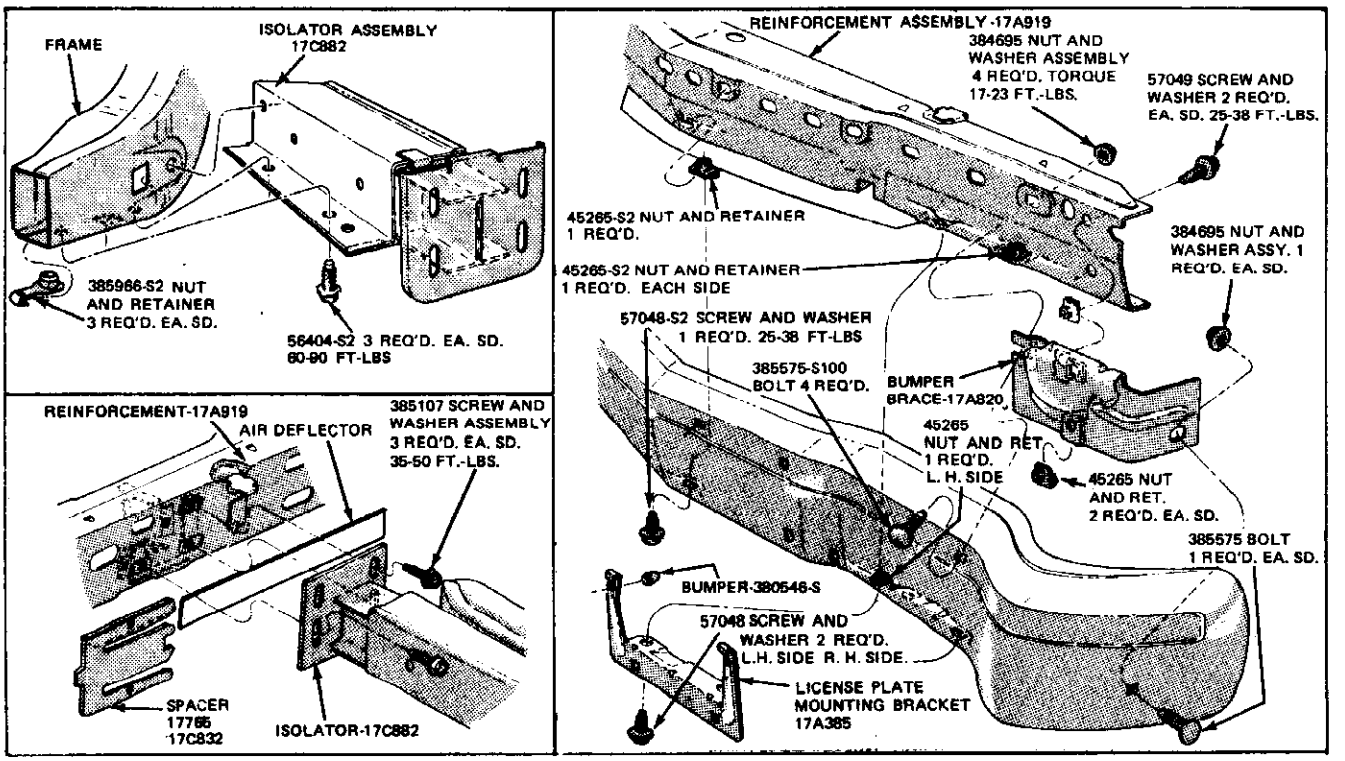
FIG. 4 Front Bumper Installation—Ford

MERCURY

Removal

1. Remove six isolator-to-bumper reinforcement bolts and remove the bumper assembly (Fig. 5).
2. Remove bumper assembly from vehicle.
3. Remove the bumper guards (two nuts per side).
4. Remove the license plate and bracket assembly.
5. Remove the reinforcement from the bumper (Fig. 5) (18 bolts and 6 nuts).

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N1751-2J

FIG. 5 Front Bumper Installation—Mercury

6. Remove the pad assemblies from the bumper (if so equipped).

Installation

Remember to replace the spacers between the bumper reinforcement and isolator mounting face (if so equipped).

1. Install license plate and bracket and three bumper pads, if so equipped. Install reinforcement assembly to bumper. Torque nuts to 17-23 ft-lbs and nuts to 25-38 ft-lbs.
2. Install the bumper guards.
3. Install the pad assemblies to the bumper (if so equipped).
4. Position the bumper assembly to the vehicle, replace spacers, and install the attaching bolts snug. Install front air deflector with 12 screws.
5. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Fig. 6. Then, adjust the bumper for body clearance at the centerline of the parking lamp so that the vertical and horizontal body to bumper dimensions meet the specifications in Fig. 6. Tighten the isolator- to-reinforcement bolts to 35-50 ft-lbs torque.

REAR BUMPER

FORD EXCEPT STATION WAGON

Removal

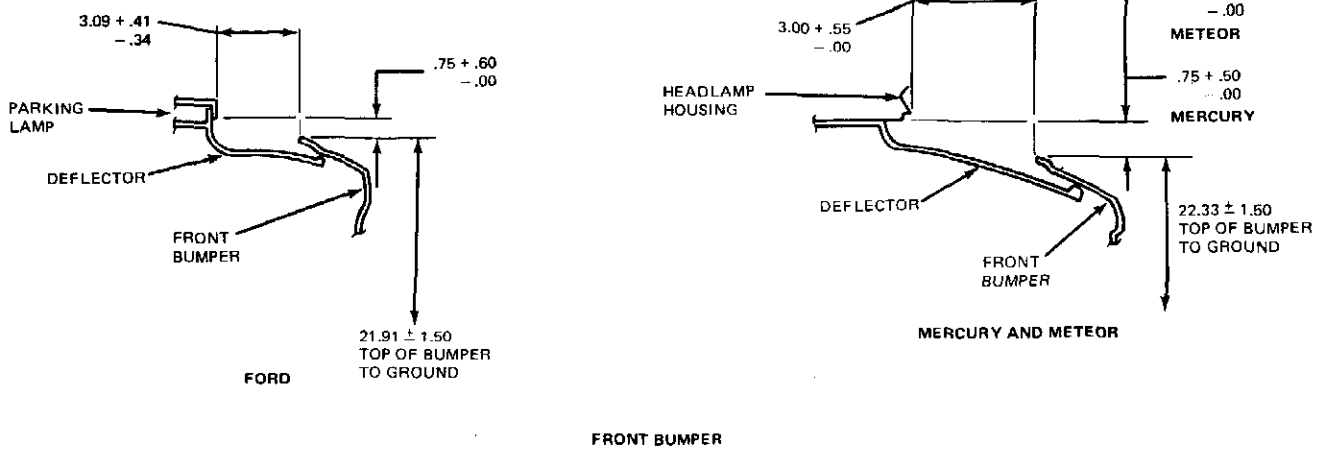
1. Open the luggage compartment and disconnect the license light wire at the connector.
2. Remove three bolts (each side) attaching the reinforcement to the isolator and remove the bumper assembly (Fig. 7).
3. Remove license plate, bracket assembly and shield (2 bolts, 1 screw).
4. Remove ten bolts and four nuts and remove the reinforcement assembly (Fig. 7).
5. Remove the bumper guards (4 bolts).

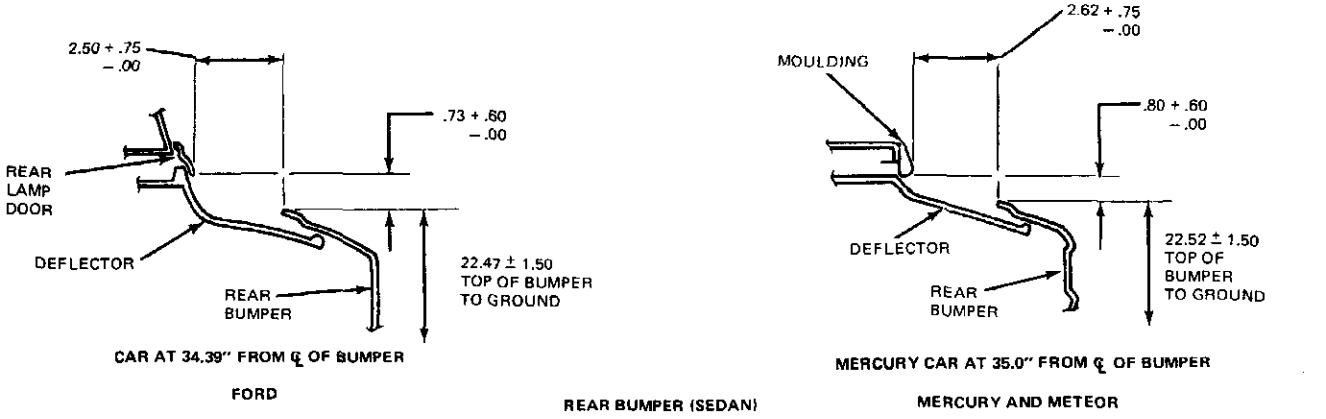
   NOTE: The bumper pads attaching tabs will be destroyed upon removal.
6. Transfer the license plate and bracket assembly to a new bumper if the bumper is to be replaced.

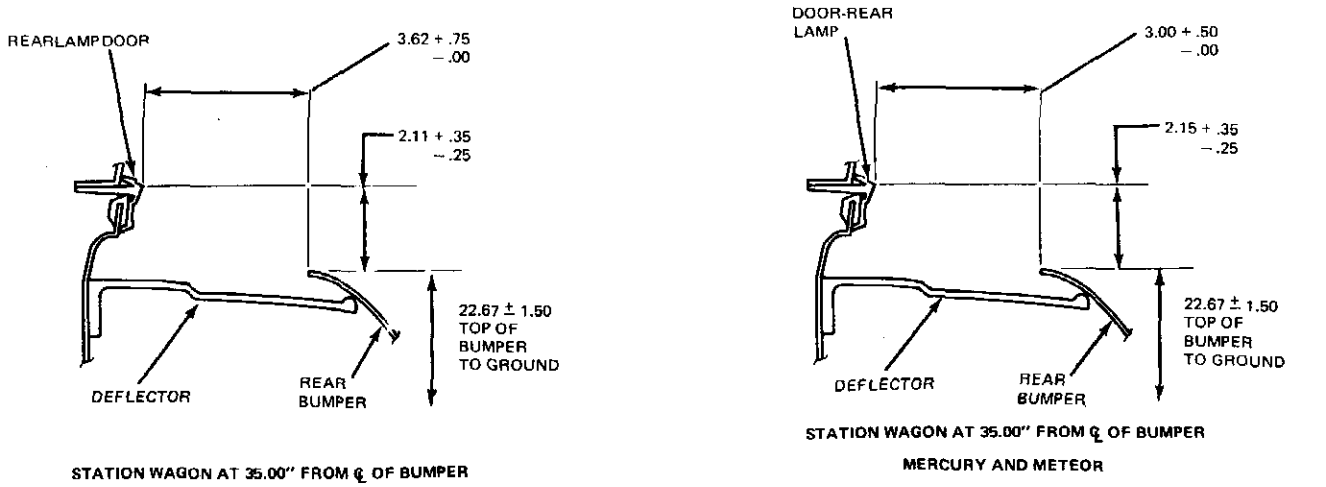
Installation

1. Install the three new pads and bumper guards (four bolts to 25-38 ft-lbs)to the bumper, if so equipped.
2. Install the reinforcement to the bumper assembly (ten bolts to 25-38 ft-lbs and four nuts to 17-23 ft-lbs).
3. Install license plate and bracket.
4. Position the bumper assembly to the isolators and install the attaching bolts snug (Fig. 7). Replace spacers and bumper bracket to reinforcement-to-isolator (if so equipped).
5. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Fig. 6. Then, adjust the bumper for body clearance at the centerline of the tail lamp, so that the vertical and horizontal body to bumper dimensions meet the specifications in Fig. 6. Tighten

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N2586-2D

FIG. 6 Bumper Adjustment Specifications—Ford, Mercury

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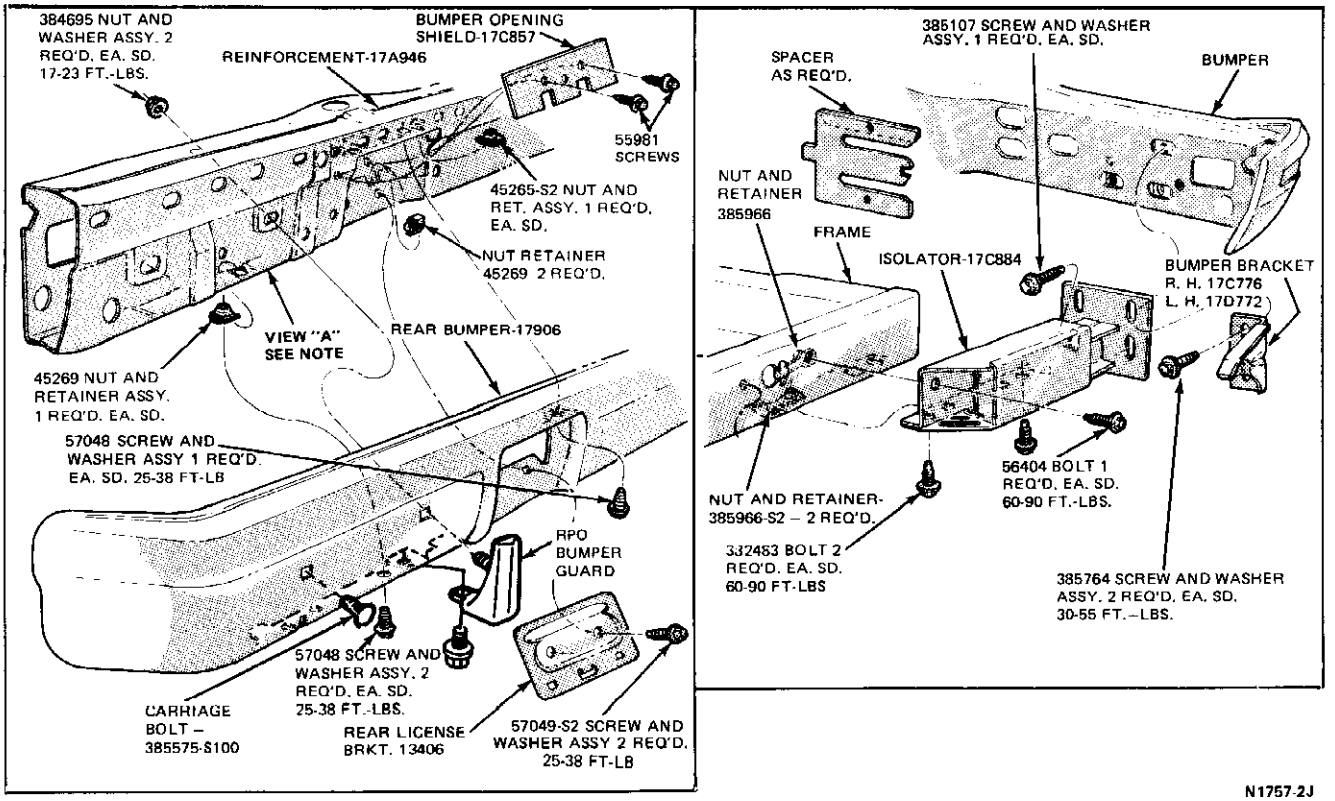


FIG. 7 Rear Bumper Installation—Ford Except Station Wagon

the isolator- to-reinforcement bolts to 35-50 ft-lbs torque.

6. Connect the license light wire to the connector.

MERCURY EXCEPT STATION WAGON

Removal

1. Disconnect the license light wire from the connector and push the wire and grommet through the lower panel.
2. Remove three bolts (each side) attaching the reinforcement to the isolator and remove the bumper assembly (Fig. 8).
3. Remove the license plate and bracket assembly and shield (2 bolts, 1 screw).
4. Remove six bumper-to-reinforcement bolts and four nuts.
5. Remove the bumper guards (four bolts) and separate the bumper assembly from the reinforcement.

Installation

1. Install the pads and bumper guards to the bumper. Install the retaining nuts to the reinforcement. Assemble the bumper to the reinforcement with the attaching bolts.
2. Install the license plate bracket, license plate and shield to the bumper.
3. Position the bumper assembly to the vehicle and install the isolator- to-reinforcement bolts snug. Replace spacers between reinforcement and isolator face plate (if so equipped).
4. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Fig. 6. Then, adjust the bumper for body clearance at the centerline the tail lamp, so that the vertical and horizontal body to bumper dimensions meet the specifications in Fig. 6. Tighten the isolator- to-reinforcement bolts to 35-50 ft-lbs torque.
5. Position the license plate wire through the lower panel, seat the grommet and connect the wire to the connector.

FORD AND MERCURY STATION WAGON

Removal

1. Open the tailgate, disconnect the license lights at the connectors and push the grommets and wires through the lower panel and remove the license lights.
2. Remove the license plate and shield from the bumper.
3. Remove three bolts attaching the bumper assembly to the isolators, and remove the bumper (Fig. 9).
4. Remove nine bolts and five nuts, bumper-to-reinforcement (Fig. 9).
5. Remove the bumper guards.
6. Transfer the bumper bolts and retainers and license bracket to a new bumper if the bumper is to be replaced.

Installation

1. Install four new pads and the bumper guards to the bumper if so equipped.

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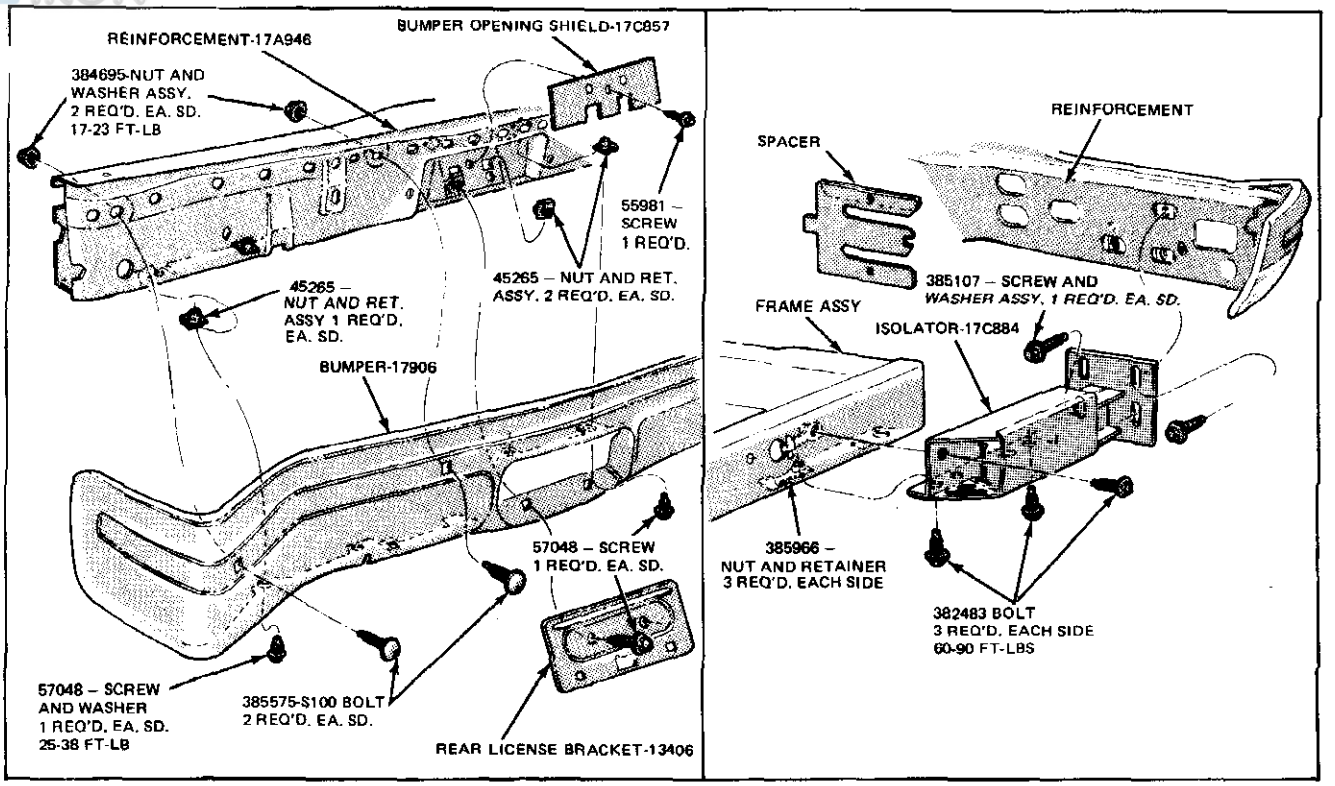


FIG. 8 Rear Bumper Installation—Mercury Except Station Wagon

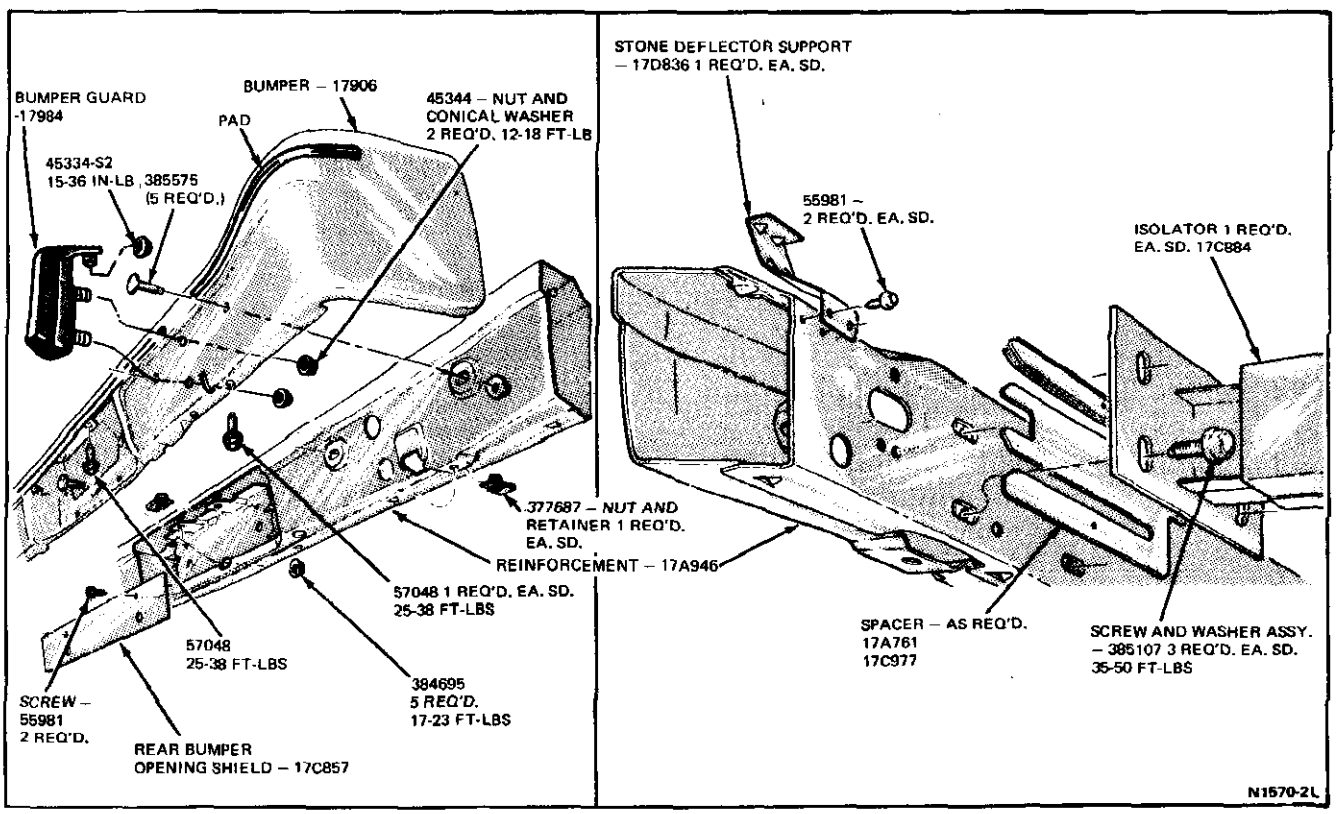


FIG. 9 Rear Bumper Installation—Ford and Mercury Station Wagon

2. Position the reinforcement to the bumper and install the attaching bolts (25-30 ft-lbs) and nuts (17-23 ft-lbs) (Fig. 9).
3. Install shield, license plate and bracket assembly.
4. Position the bumper assembly to the vehicle and install the isolator- to-reinforcement bolts snug.

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Replace the spacers between reinforcement and isolator face plate (if so equipped).

5. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Fig. 6. Then, adjust the bumper for body clearance at the centerline of the tail lamp, so that the vertical and horizontal body to bumper dimensions meet the specifications in Fig. 6. Tighten the isolator- to-reinforcement bolts to 35-50 ft-lbs torque.

6. Install the license lights, position the wires through the lower panel, seat the grommets and connect the wires to the connectors.

EXTERIOR MOULDINGS

Before removing the exterior mouldings, it should be determined by the type of retainer used whether a respective door, quarter or luggage compartment trim panel must first be removed to provide access (Figs. 10 through 18). If a weld stud is distorted or broken off, it should be replaced with an oval head blind rivet (Part No. 383229-S).

FRAME DIMENSIONS

The Ford and Mercury sedan and station wagon frame dimensions are shown in Figs. 19 and 20. The frame checking and repair procedures are given in Part 47-01.

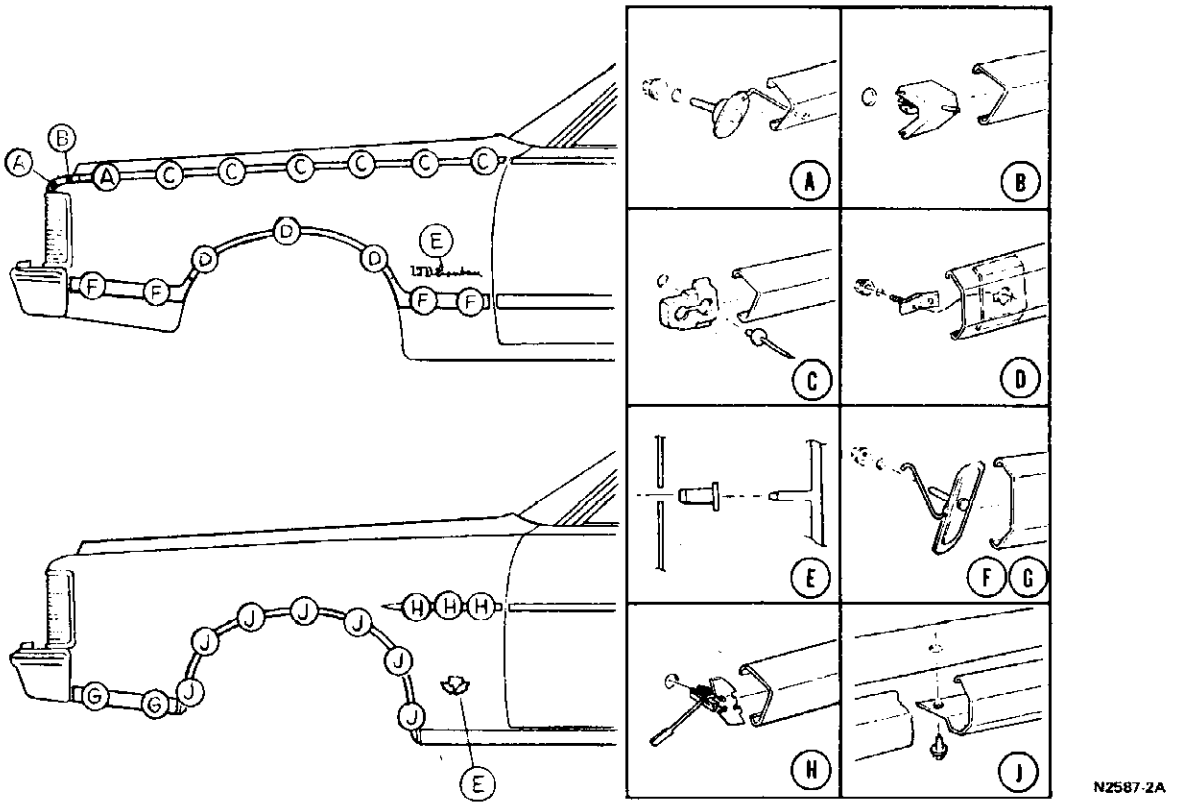
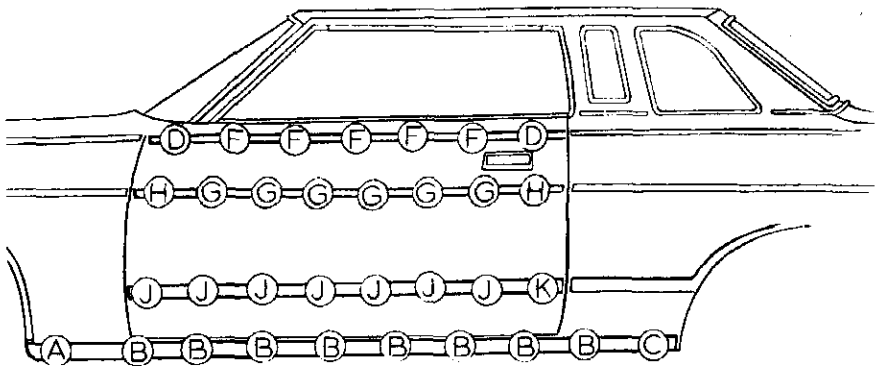
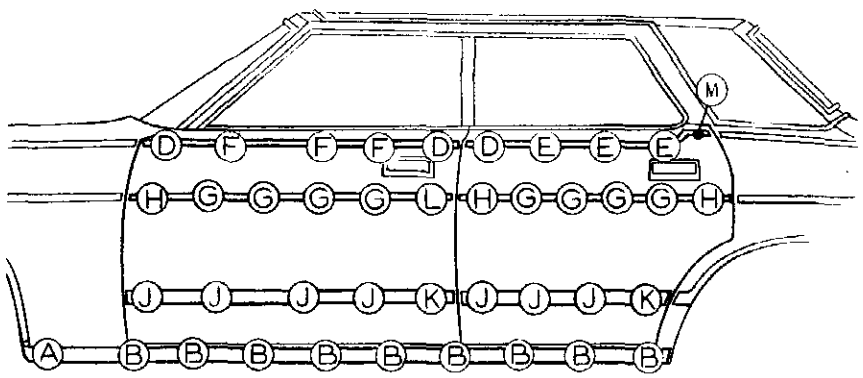


FIG. 10 Exterior Side Moulding Installation—Ford

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2-DOOR



4-DOOR AND STATION WAGON

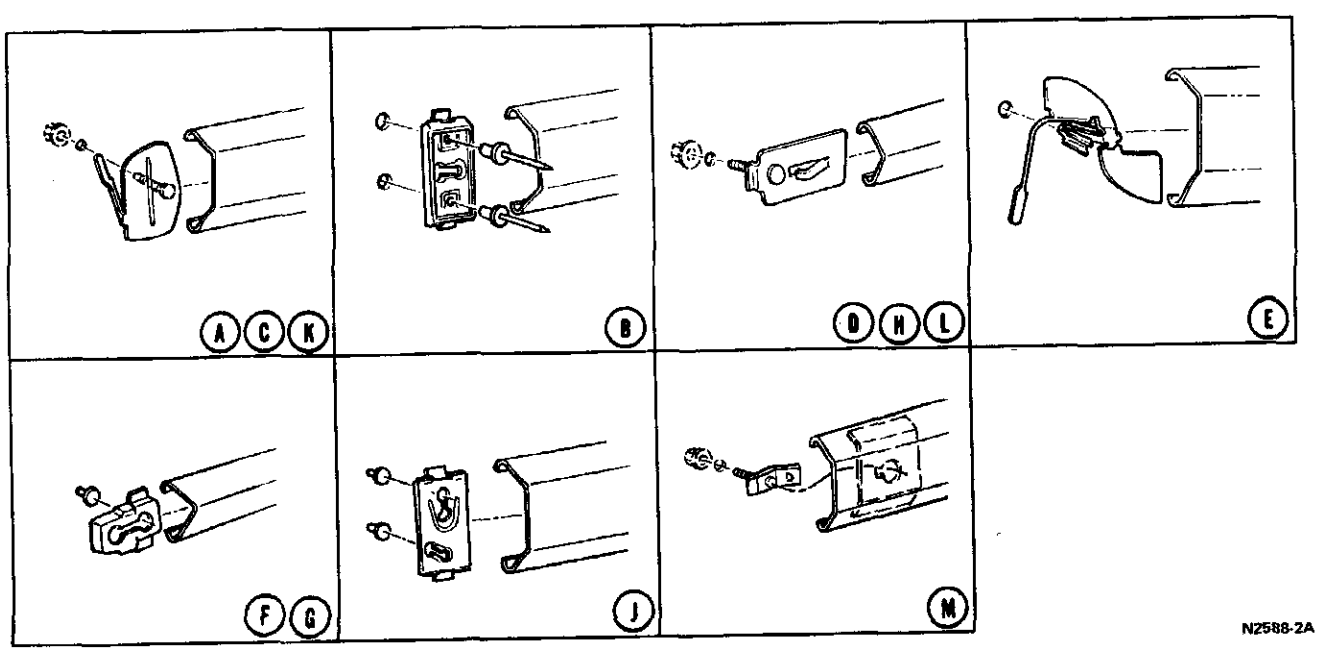
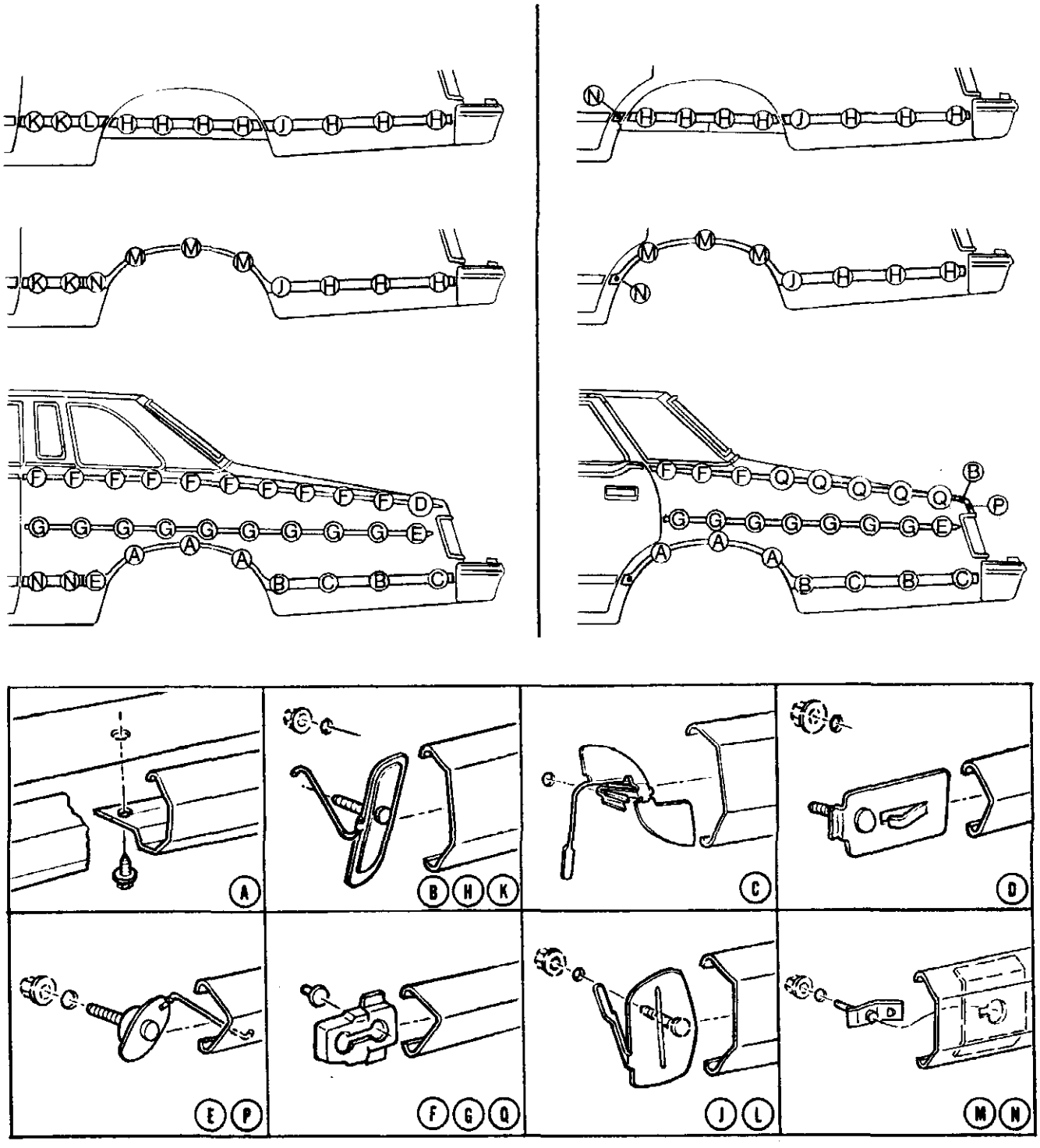


FIG. 11 Exterior Side Moulding Installation—Ford

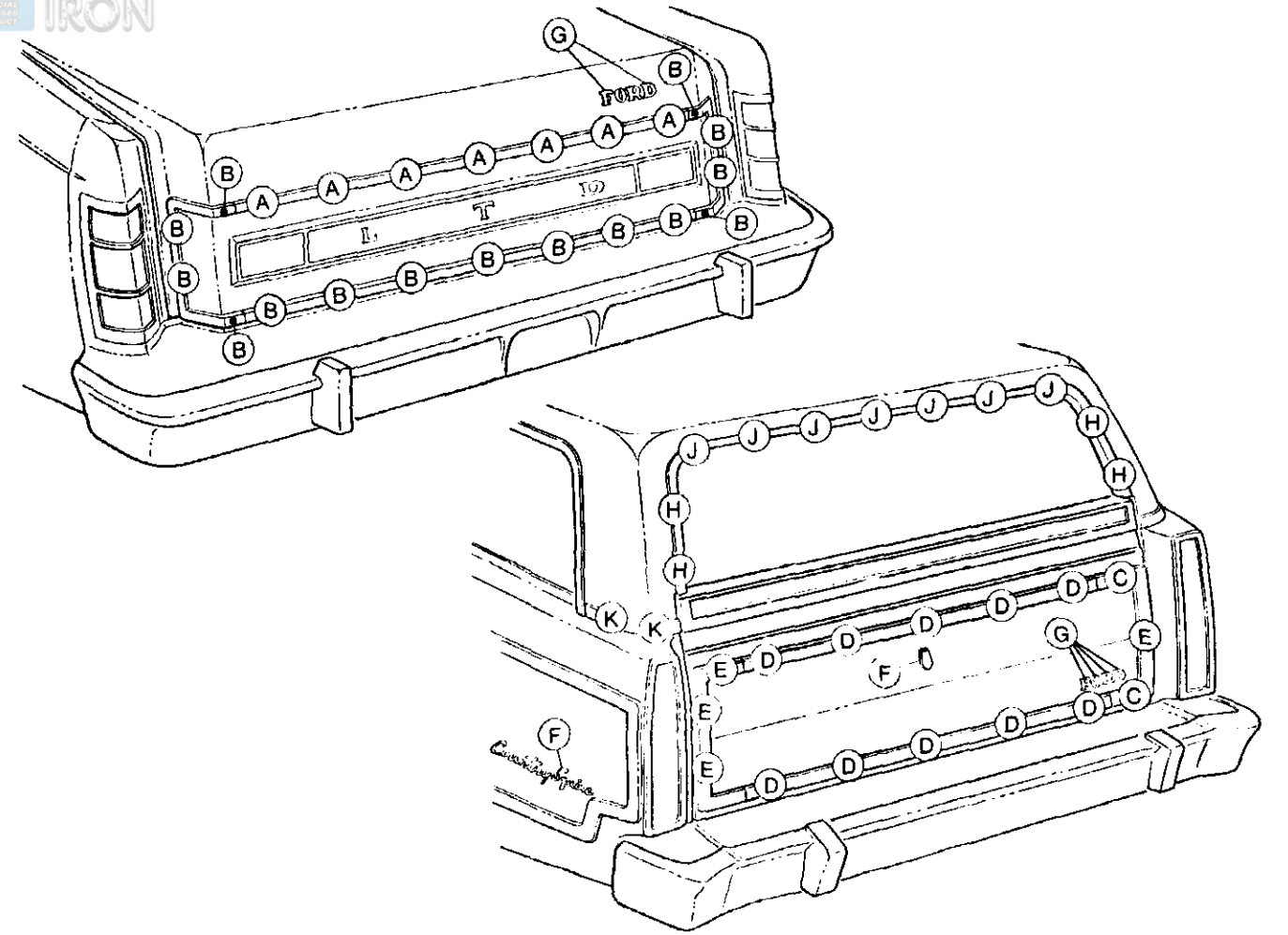
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N2589-2B

FIG. 12 Exterior Moulding Installation—Ford

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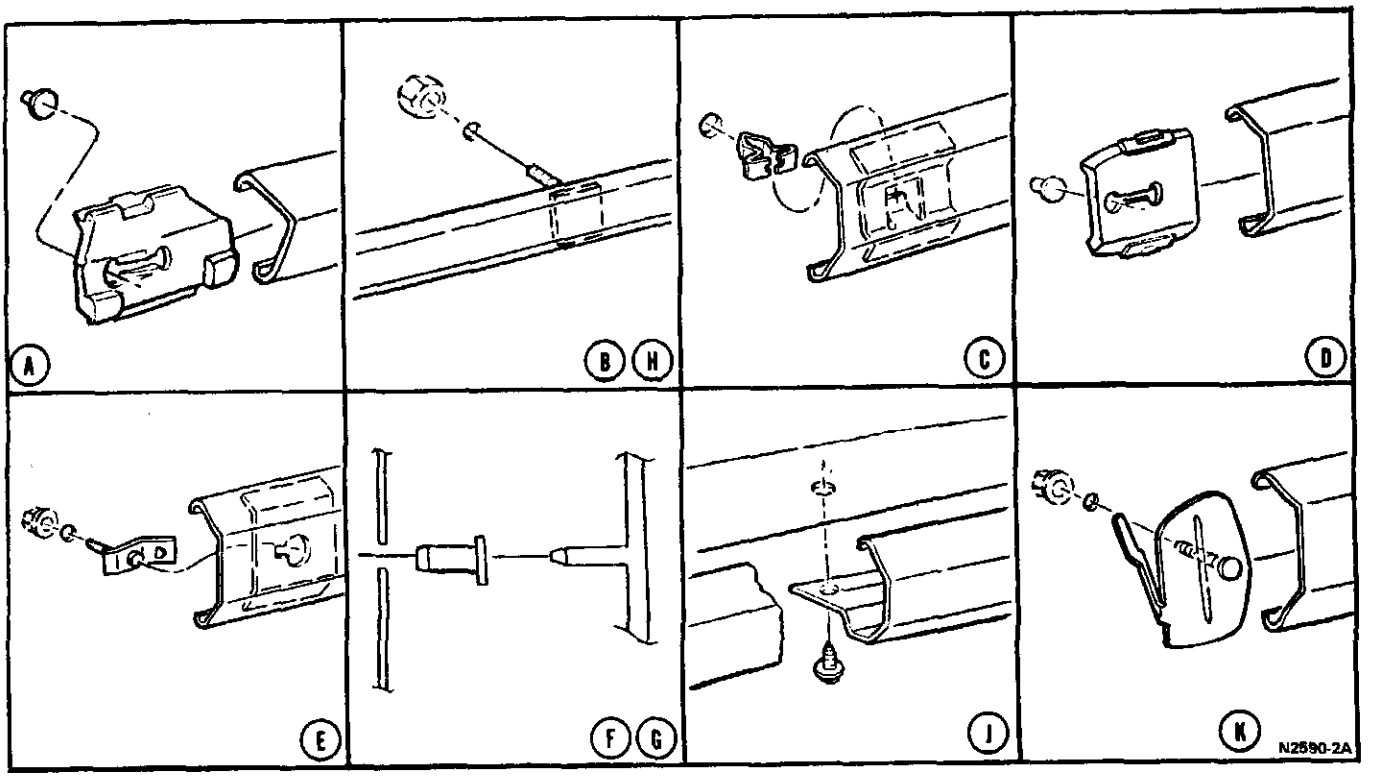
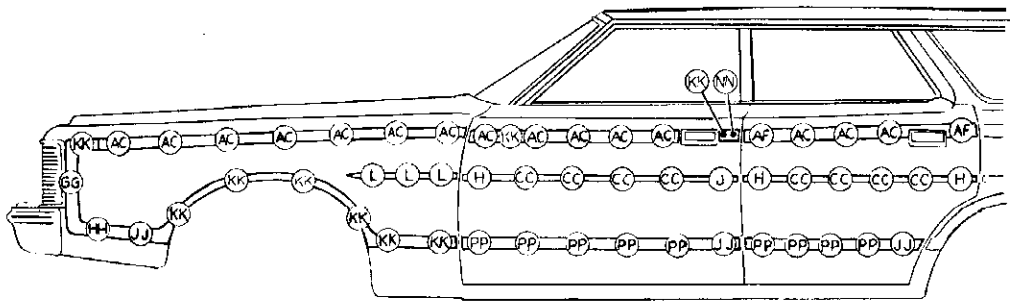
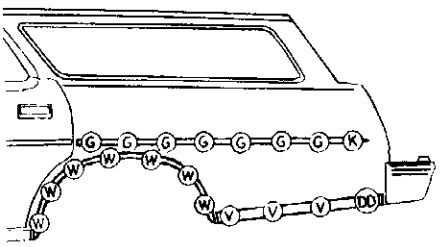


FIG. 13 Rear Moulding Installation—*Ford*

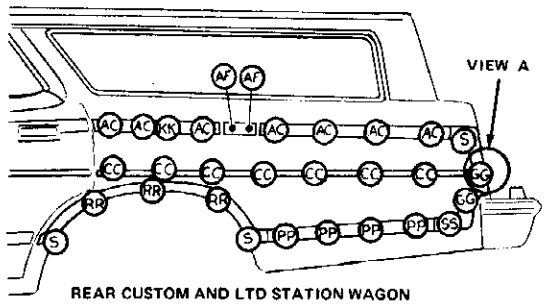
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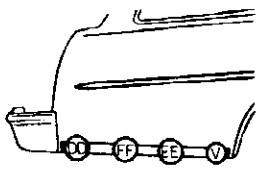
FRONT STATION WAGON-TYPICAL



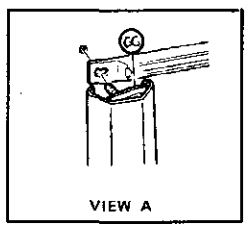
REAR SQUIRE STATION WAGON
LEFT HAND SIDE SHOWN



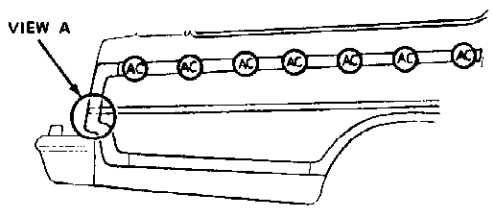
REAR CUSTOM AND LTD STATION WAGON
LEFT HAND SIDE SHOWN



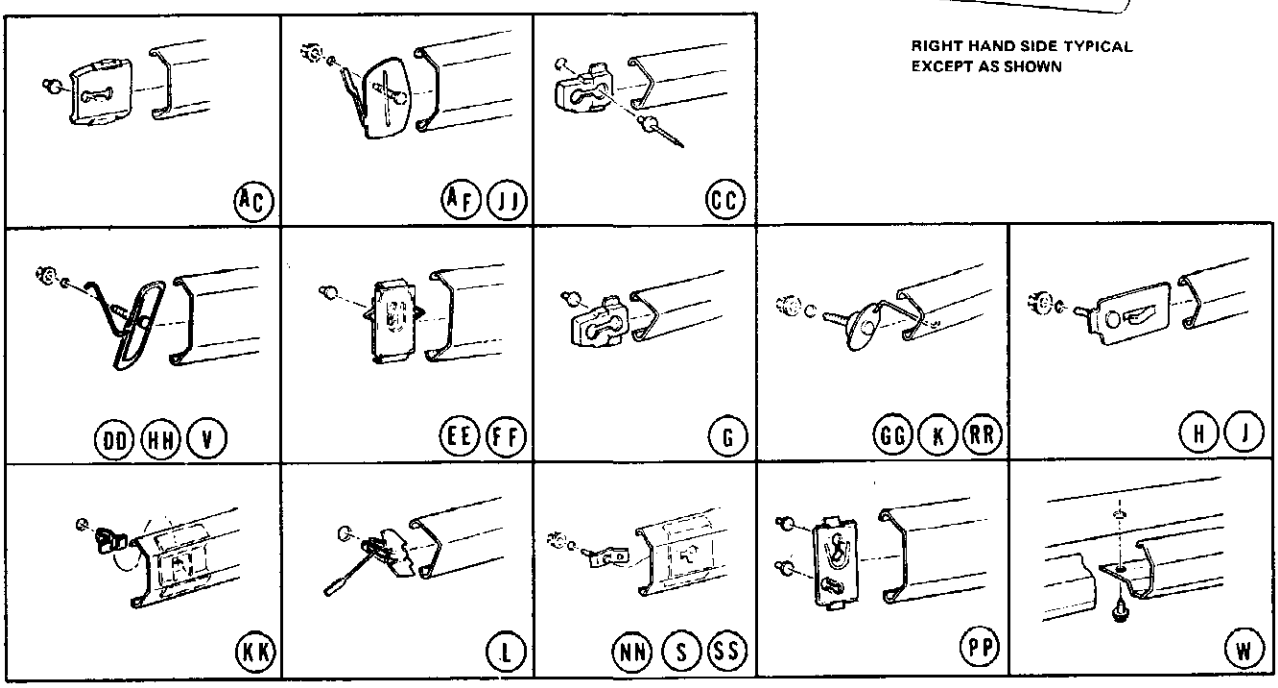
RIGHT HAND SIDE
TYPICAL EXCEPT AS
SHOWN



VIEW A



RIGHT HAND SIDE TYPICAL
EXCEPT AS SHOWN



N2502-2B

FIG. 14 Exterior Side Mouldings—Ford Station Wagon

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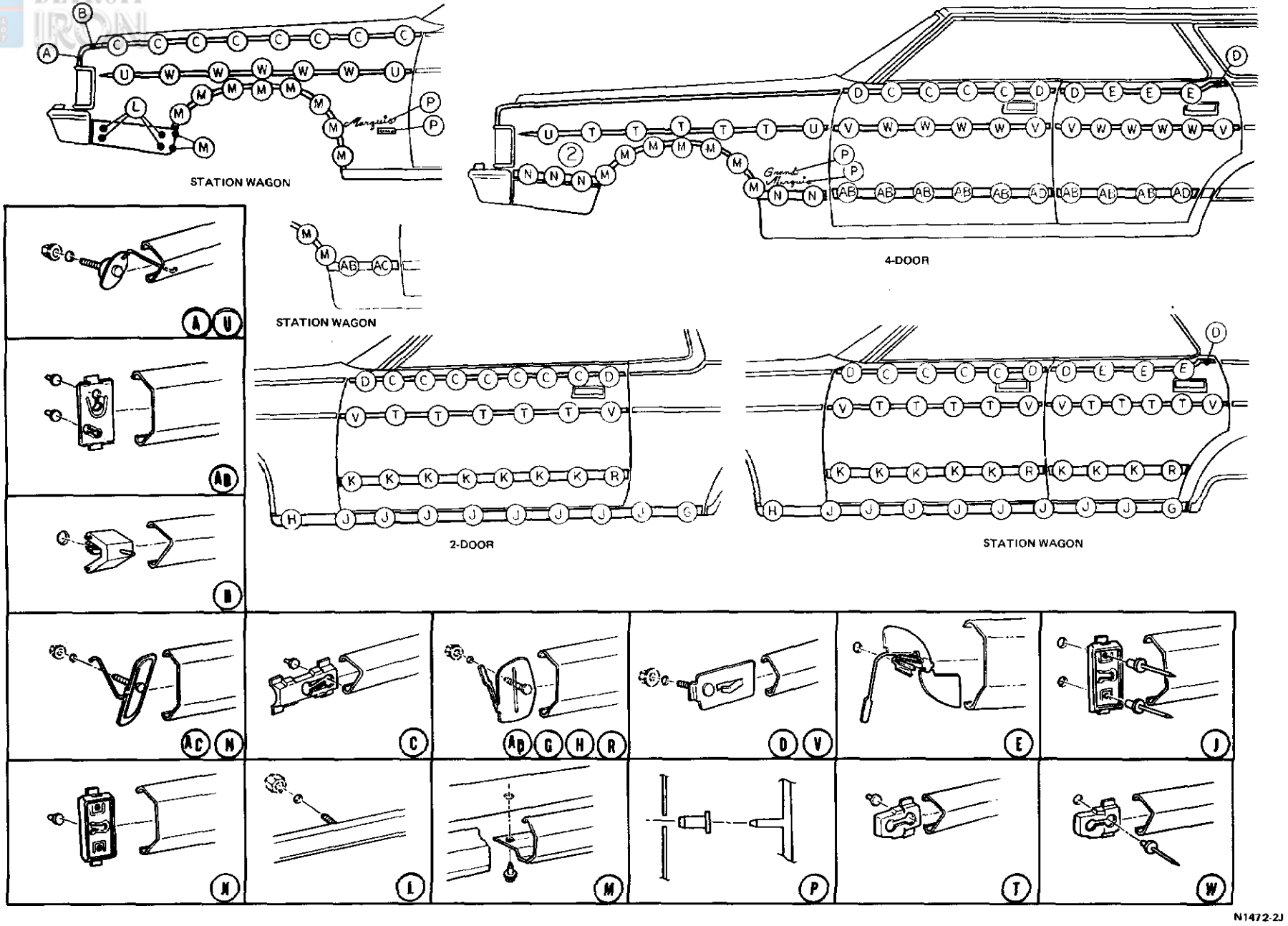


FIG. 15 Exterior Side Moulding Installation—Mercury

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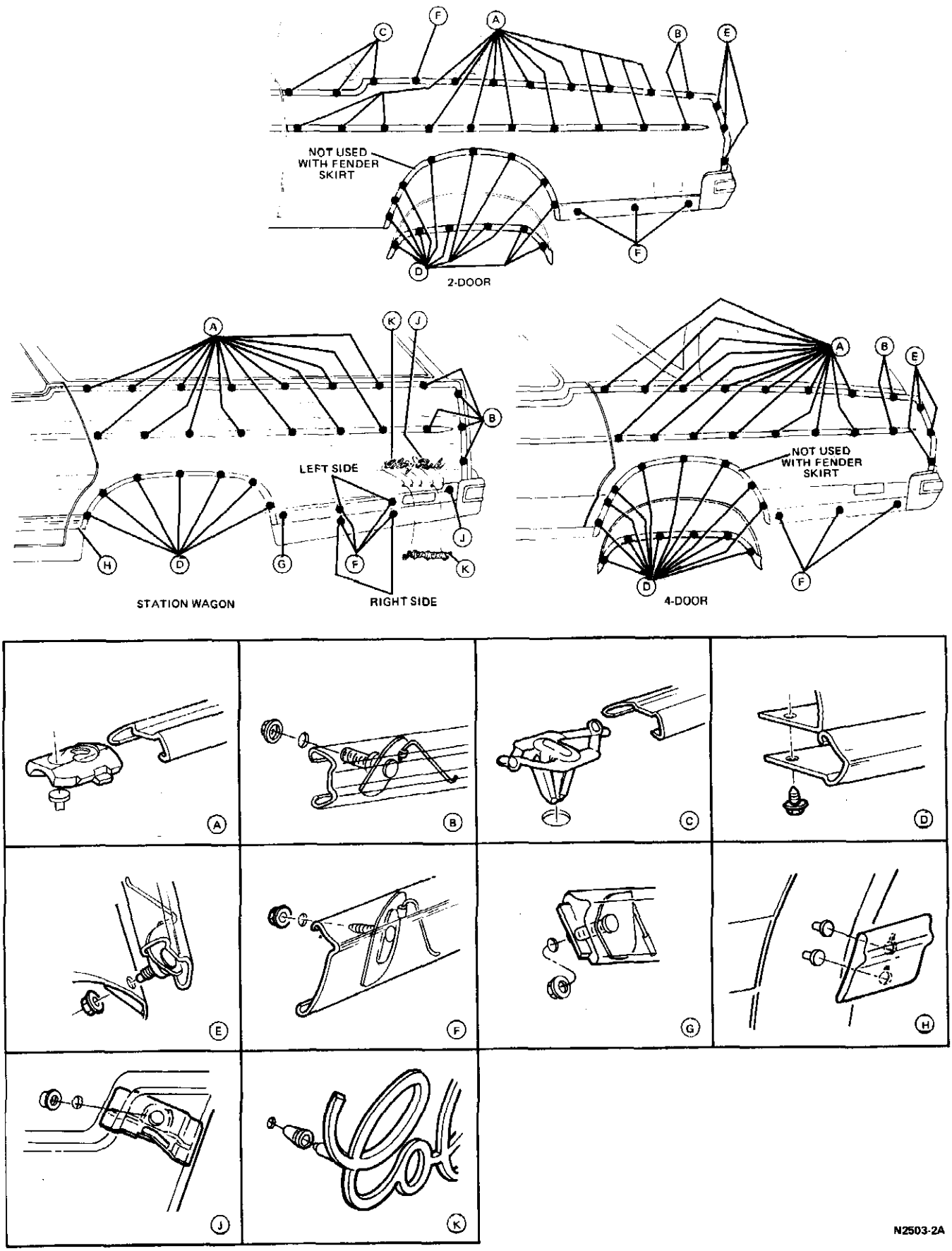


FIG. 16 Exterior Rear Side Moulding Installation—Mercury

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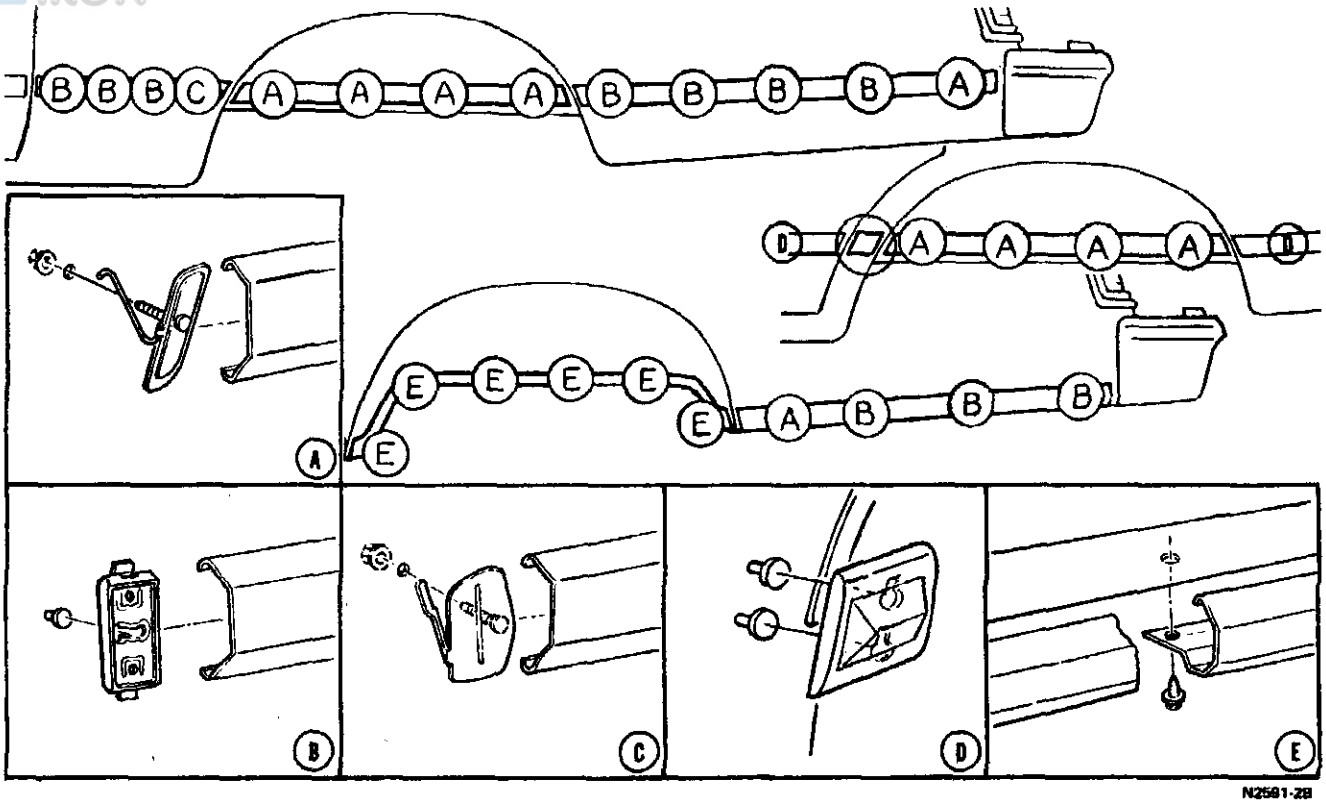


FIG. 17 Optional Exterior Side Moulding Installation—Mercury (with Fender Skirts)

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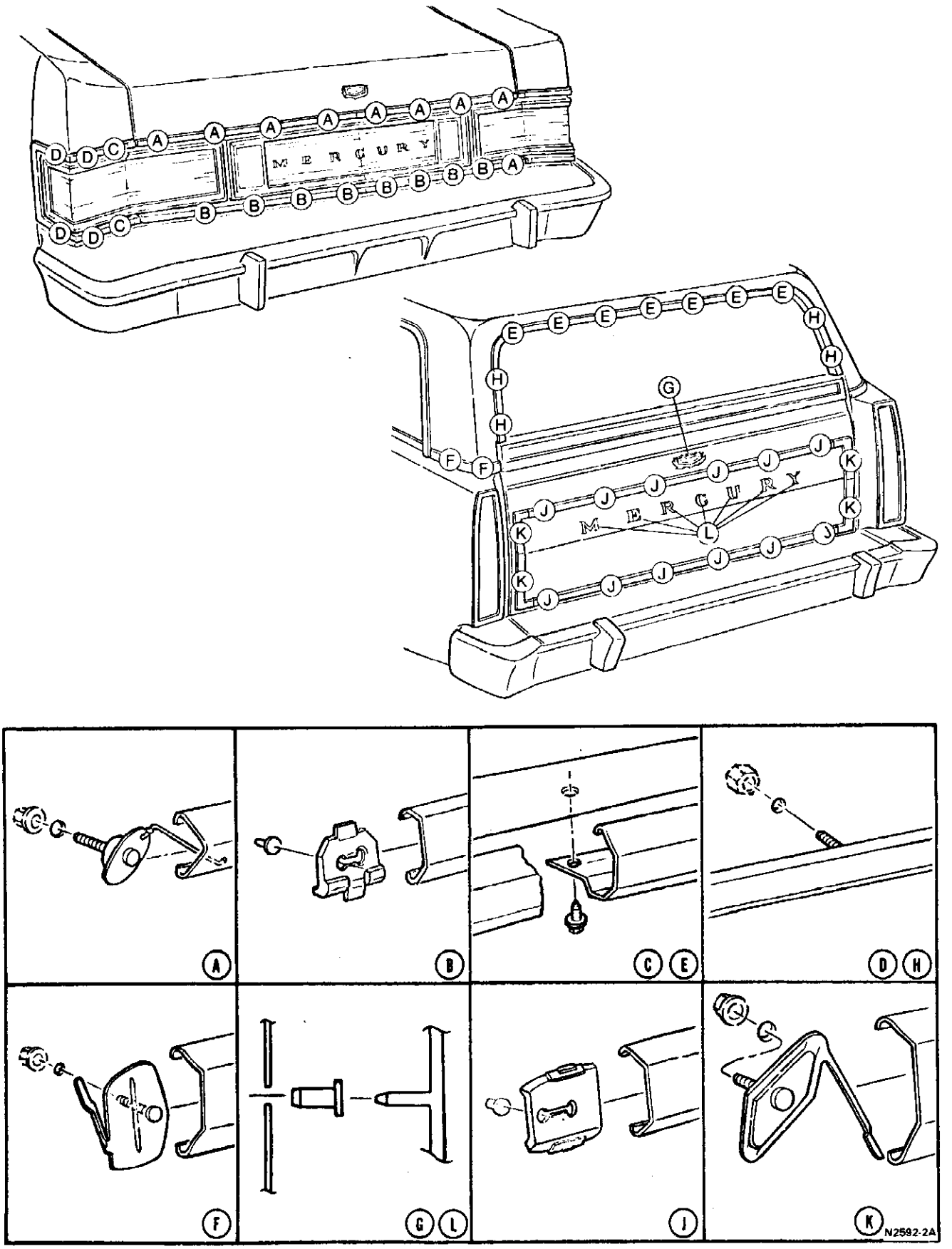


FIG. 18 Exterior Rear Ornamentation—Mercury

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DETROIT IRON

FRAME AND BODY MOUNTS
FORD & MERCURY SEDAN

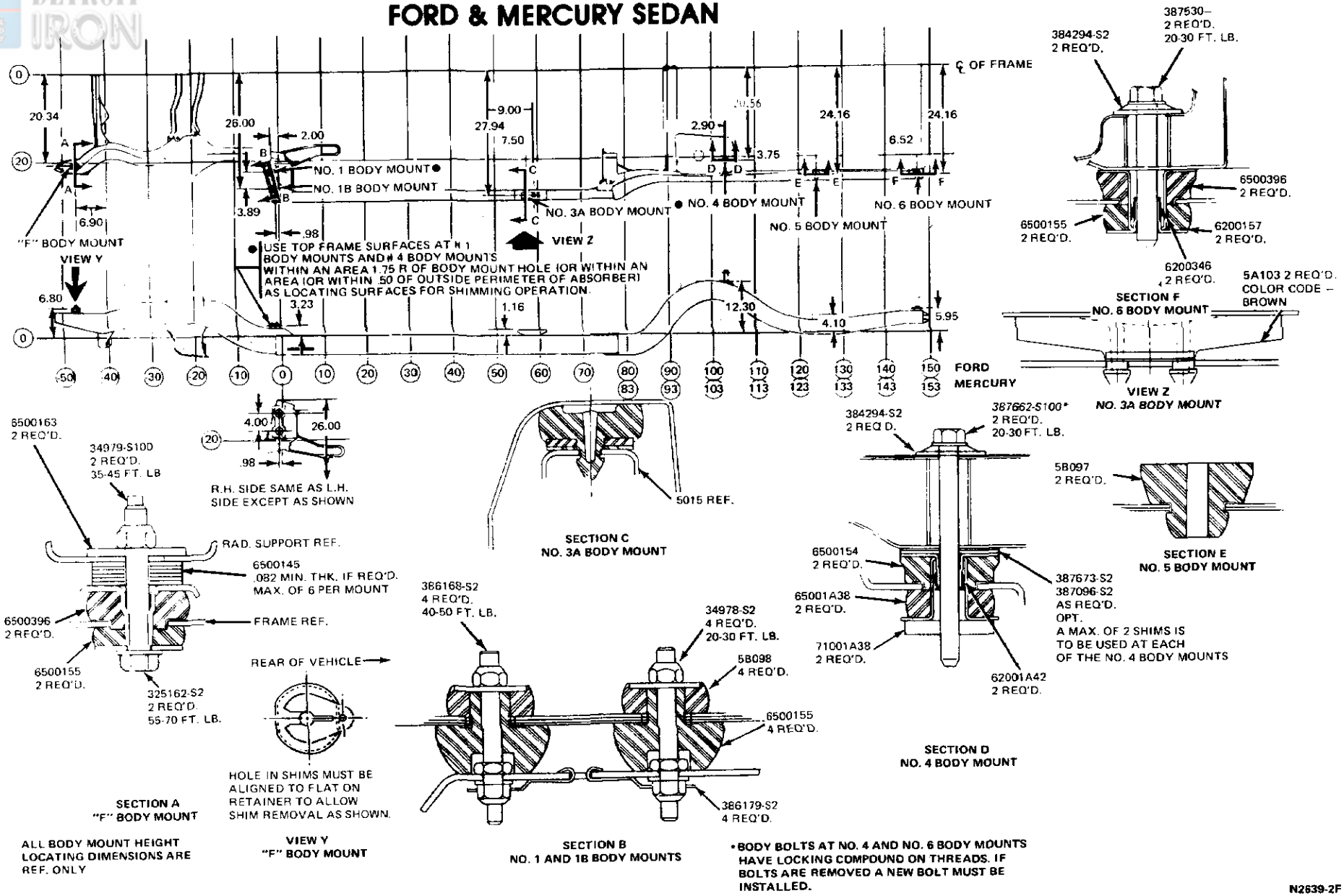
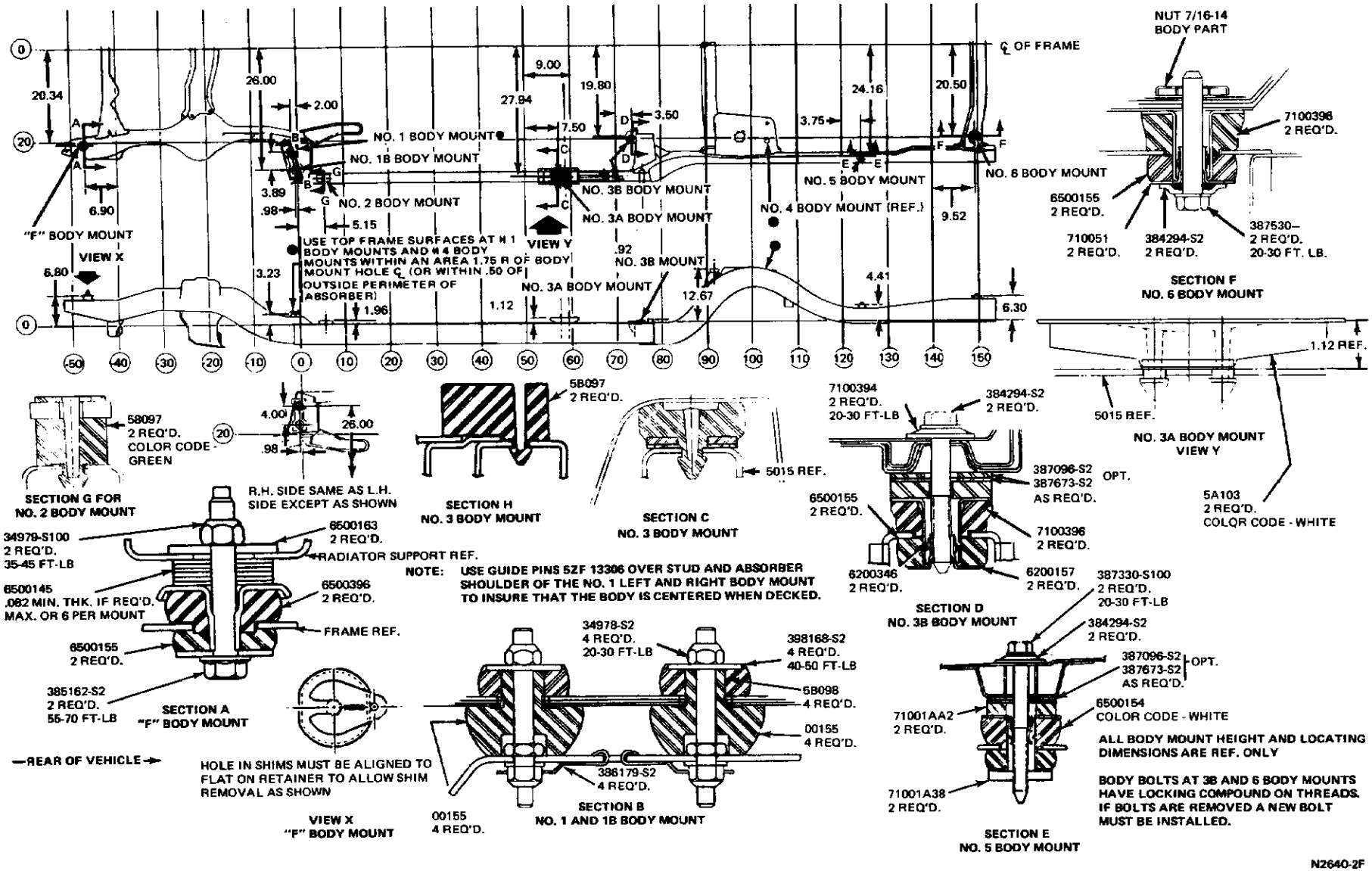


FIG. 19 Frame Dimensions—Ford and Mercury—Sedan

47-05-17

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FRAME AND BODY MOUNTS
FORD & MERCURY STATION WAGON



N2640-2F

FIG. 20 Frame Dimensions—Ford and Mercury—Station Wagon

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DETROIT IRON

LTD II, Cougar and LTD II Ranchero

PART 47-06

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Frame Dimensions	06-4
Front Bumper	06-2
Radiator Grille and Headlamp Door	06-1
REMOVAL AND INSTALLATION (Cont'd.)	
Rear Bumper	06-2
Underbody Dimensions	06-4

CN4028-2B

REMOVAL AND INSTALLATION

RADIATOR GRILLE AND HEADLAMP DOOR

LTD II and LTD II Ranchero

Removal

1. Remove screws attaching each headlamp door, lean forward to disengage from locating pins and lift away from the grille panels (Fig. 1).
2. Remove seven grille retaining screws, and remove the grille assembly (Fig. 1).

Installation

1. If the grille is to be replaced, transfer the emblem to the new grille. Place 7 retaining nuts on tabs provided.
2. Position the grille assembly to the vehicle and install the seven grille retaining nuts and screws.
3. To install headlamp door, lean top edge forward and engage bottom locating pins in holes provided in grille opening panel. Rotate rearward, position door against plastic nuts and install two screws.

COUGAR

Removal

1. To remove grille, open the hood and detach the six nut and washer assemblies that attach it to the grille opening panel (Fig. 2).

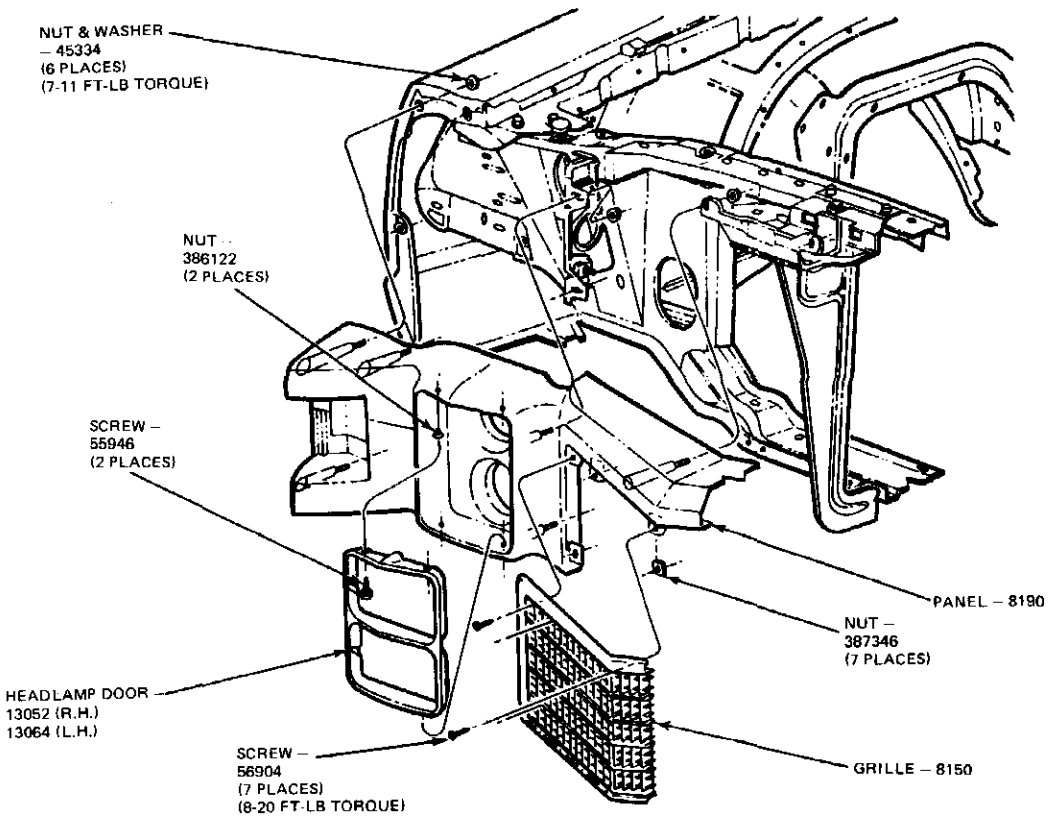


FIG. 1 Radiator Grille—LTD II and LTD II Ranchero

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2. To remove headlamp doors, unscrew the eight attaching screws and lift from grille opening panel (Fig. 2).
3. To remove grille opening panel, open hood and detach the 12 nut and washer assemblies (Fig. 2). Lift the panel away. The panel may be removed with the headlamp doors and grille attached.

Installation

1. Locate studs on grille opening panel with appropriate holes and 'set' into place. Attach nut and washer assemblies and torque to 4 to 6 ft-lbs.
2. Install headlamp doors with eight screws each.
3. Locate studs on grille with appropriate holes in grille opening panel. 'Set' studs into place and install nut and washer assemblies with 4-6 ft-lbs torque.

Hood Ornament

See Fig. 3 for installation procedure for LTD II and Cougar (all models).

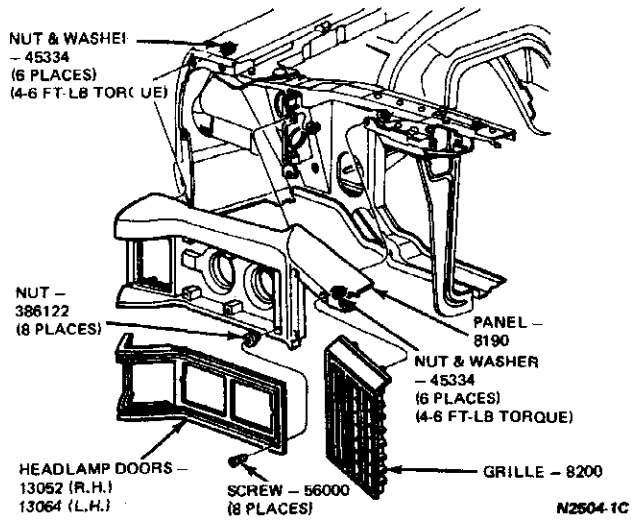


FIG. 2 Radiator Grille—Cougar

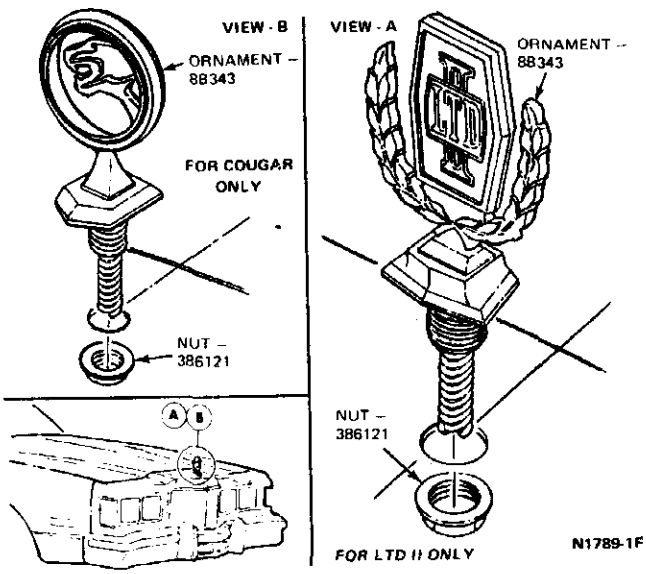


FIG. 3 Ornament Assemblies—Cougar and LTD II (all models)

FRONT BUMPER

LTD II and Cougar

Removal

1. Remove three bolts attaching the bumper reinforcement to each isolator, and remove the bumper assembly from the vehicle (Fig. 4).
2. Remove three screws attaching the stone deflector to the reinforcement, and remove the stone deflector.
3. Remove the stone deflector insulator(s) (Figs. 5 and 6).
4. Remove the reinforcement, end braces and license plate mounting bracket from the bumper.
5. Remove the bumper guards (4 bolts), and the pads from the bumper.

NOTE: The bumper pad attaching tabs may be destroyed upon removal, if so equipped. Damage will be avoided by squeezing the retaining tabs with pliers until tabs can be pushed through holes in bumper.

Installation

1. Install the bumper guards on the bumper.
2. Position the pads to the bumper and push firmly at each attachment until seated.
3. Install the reinforcement, end braces and license plate mounting bracket on the bumper. Tighten bolts and nuts to specified torque.
4. Install the front stone deflector insulator(s) (Figs. 5 and 6).
5. Install the stone deflector on the reinforcement.
6. Position the bumper assembly and shims to the isolators, and install the attaching bolts.
7. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Figs. 7 and 8. Then, adjust the bumper for body clearance so that the vertical and horizontal body *to bumper dimensions meet the specifications in* Figs. 7 and 8. Tighten the isolator- to-reinforcement bolts to 35-50 ft-lbs torque.
8. Lift up on the end deflector(s) and install two-way tape. Then press down on the end deflector(s) to achieve a flush fit.

REAR BUMPER

All Models Except Ranchero

1. Disconnect the license lamp wires at the connector. Push the grommet out of the lower back panel on sedan models.
2. Remove the reinforcement, end brackets and license bracket (Sedan only) from bumper (Fig. 9).

NOTE: The bumper pad attaching tabs may be destroyed upon removal if so equipped. Damage will be avoided by squeezing the retaining tabs with pliers until tabs can be pushed through holes in bumper.

3. *If the bumper is to be replaced, transfer* the bumper guards, pads and license plate lamp to the new bumper.

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DETROIT IRON

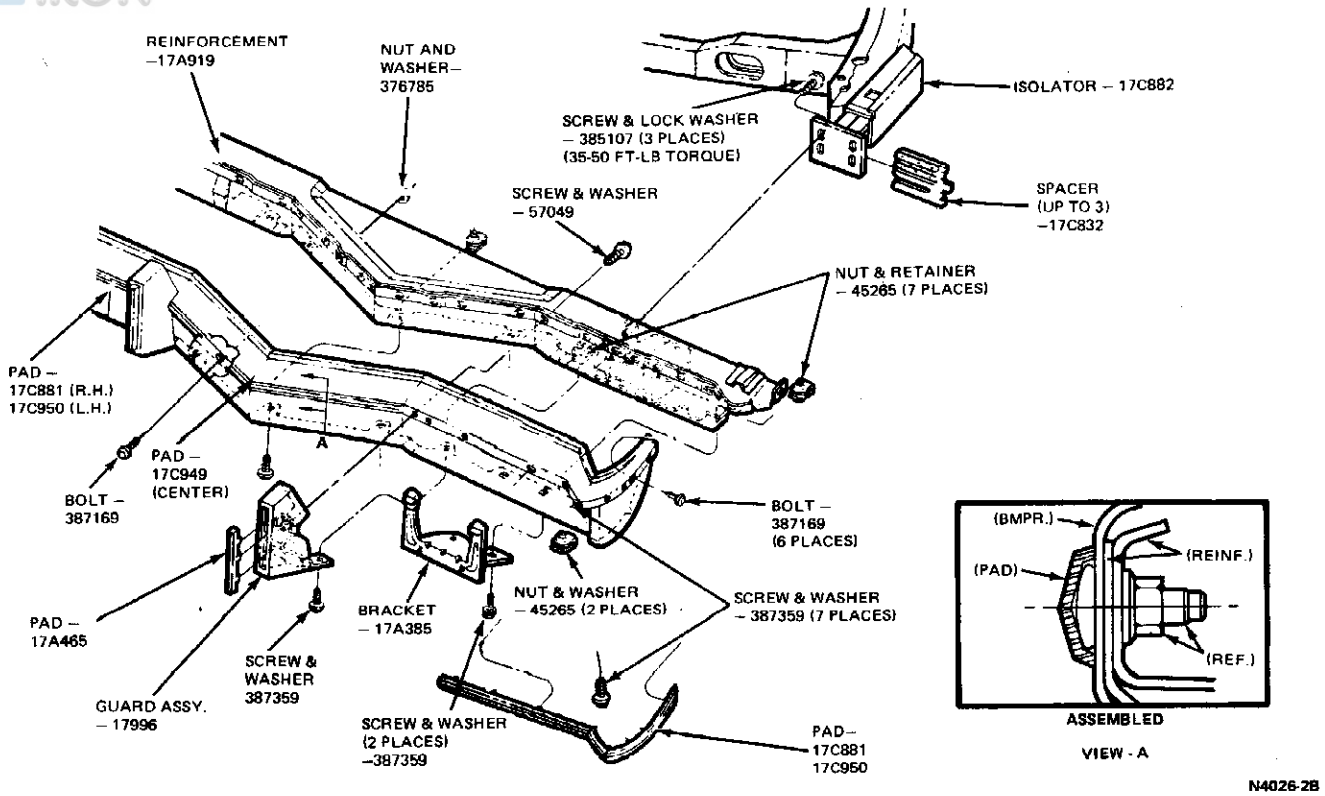


FIG. 4 Front Bumper—LTD II and Cougar

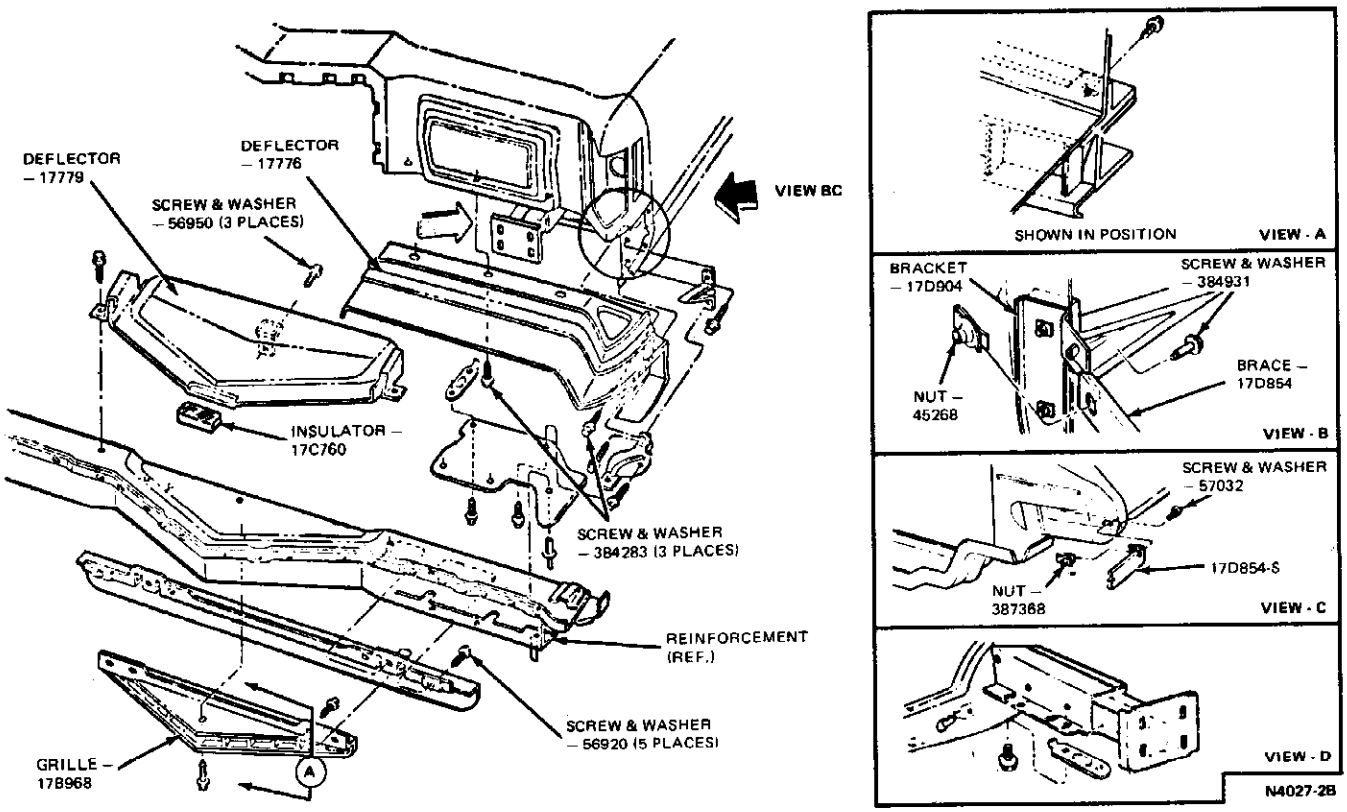


FIG. 5 Front Stone Deflector—Cougar

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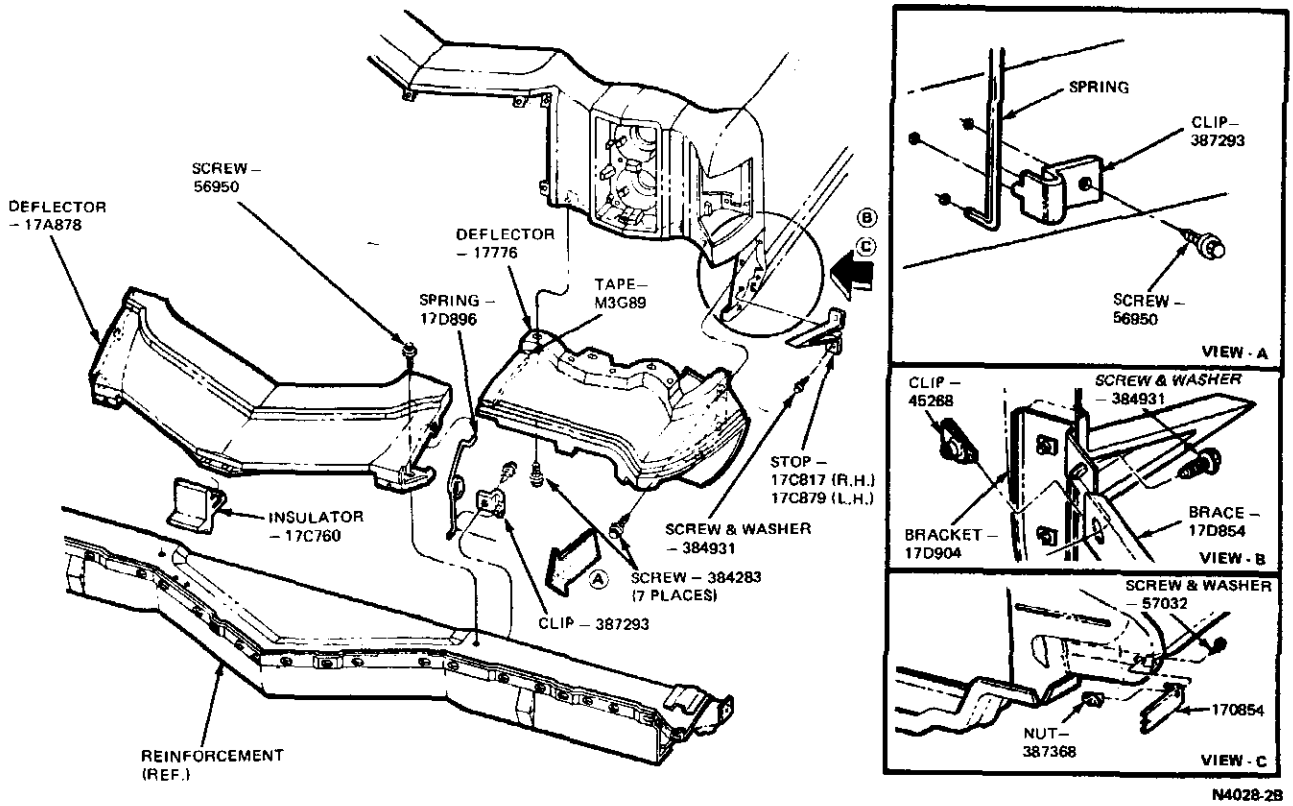


FIG. 6 Front Stone Deflector—LTD II

4. Install the reinforcement, end brackets and license *bracket (Sedan only) on the bumper.*
5. Position the bumper assembly and spacers to the isolators, and install the attaching bolts.
6. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Figs. 7 and 8. Then, adjust the bumper for body clearance at the centerline of the tail lamp so that the vertical and horizontal body to bumper dimensions meet the specifications in Figs. 7 and 8. *Tighten the isolator- to-reinforcement bolts to 35-50 ft-lbs torque.*
7. Connect the license lamp wire. Seat the wire grommet in the lower back panel on sedan models.

Ranchero

1. Disconnect the license plate lamp at the connectors and remove the lamp from the bumper.
2. Remove the bolts attaching the bumper arms to the *frame rails and remove the bumper (Fig. 10).*
3. If the bumper is to be replaced, transfer all parts to the new bumper.
4. To install, position the bumper assembly to the vehicle frame and install the attaching bolts finger tight.
5. Adjust the bumper for a good appearance and *tighten the attaching bolts to specification.*
6. Install the license plate lamp, and connect the wire at the connector.

EXTERIOR MOULDINGS (FIGS. 12-20)

Before removing the exterior mouldings, it should be determined by the type of retainer used whether a respective door, quarter or luggage compartment trim panel must first be removed to provide access (Fig. 11). If a weld stud is distorted or broken off, it should be replaced with an oval head blind rivet (Part No. 383229-S or equivalent). Refer to General Information (Part 47-01) for installation of Pressure Sensitive Tape Type (Bodyside Protection Mouldings).

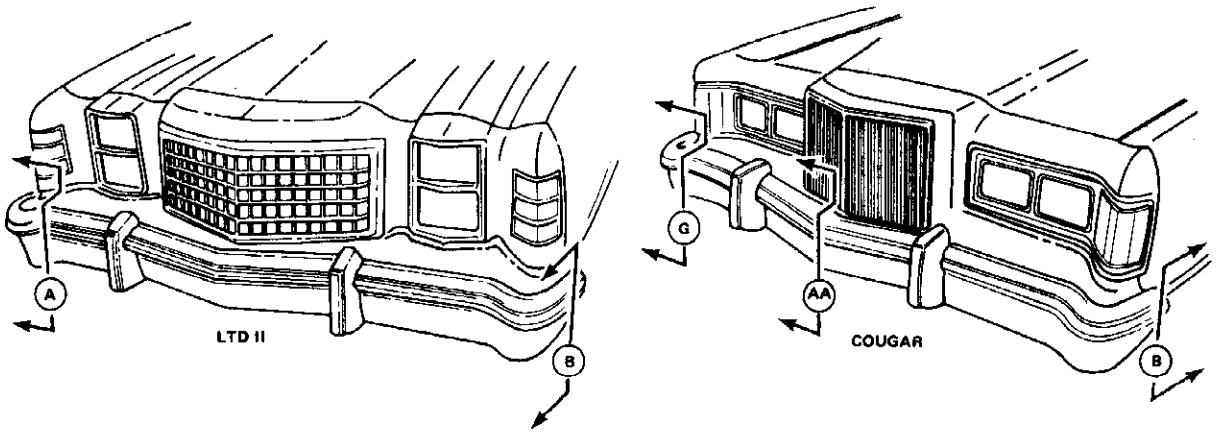
FRAME DIMENSIONS

The Cougar and Ranchero frame dimensions are shown in Figs. 21 and 22. The underbody checking and repair procedures are given in *Part 47-01.*

UNDERBODY DIMENSIONS

The Cougar and Ranchero underbody dimensions are shown in Figs. 21 and 22. The underbody checking and repair procedures are given in Part 47-01.

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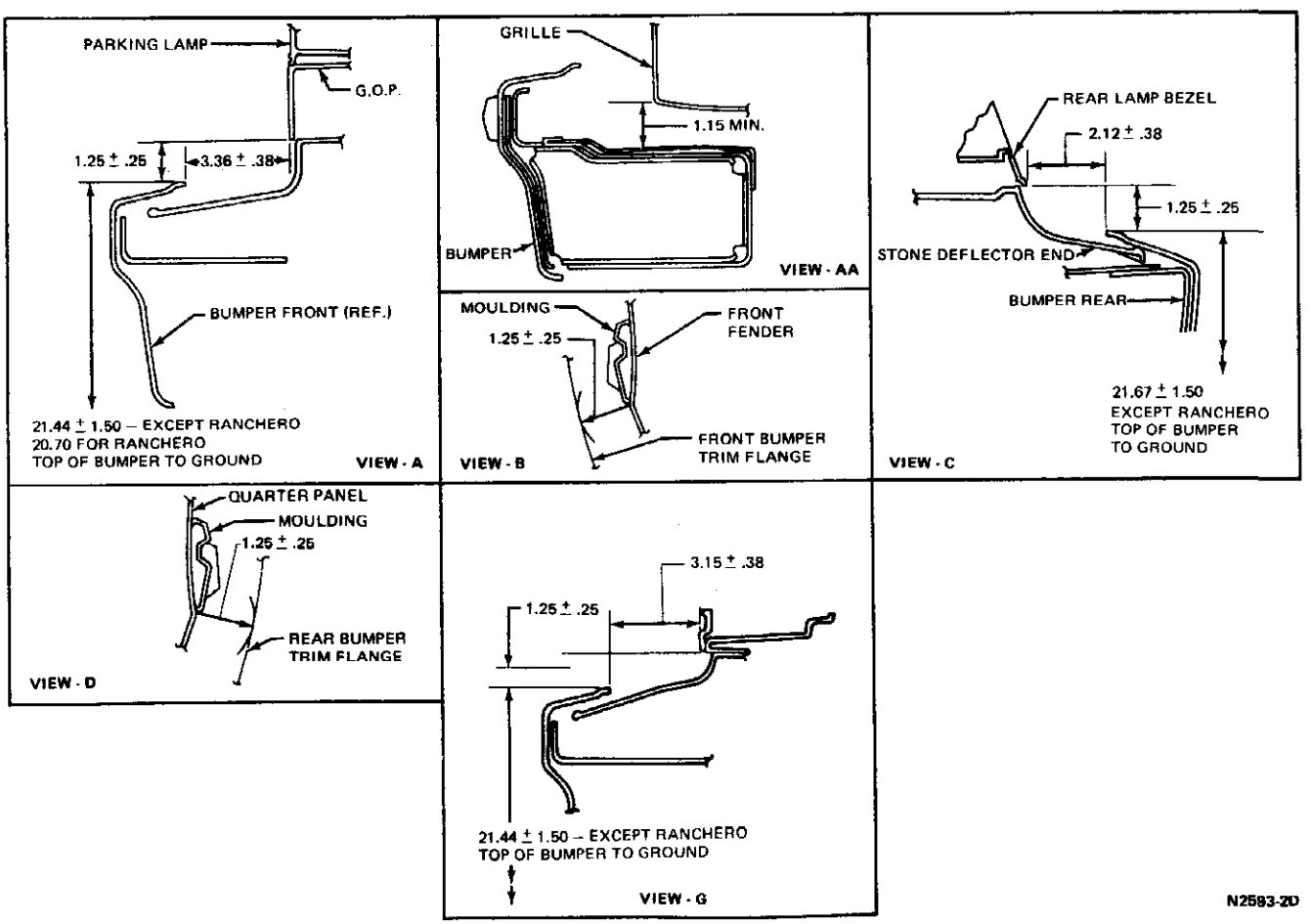


FIG. 7 Bumper Adjustment Specifications—Cougar and LTD II

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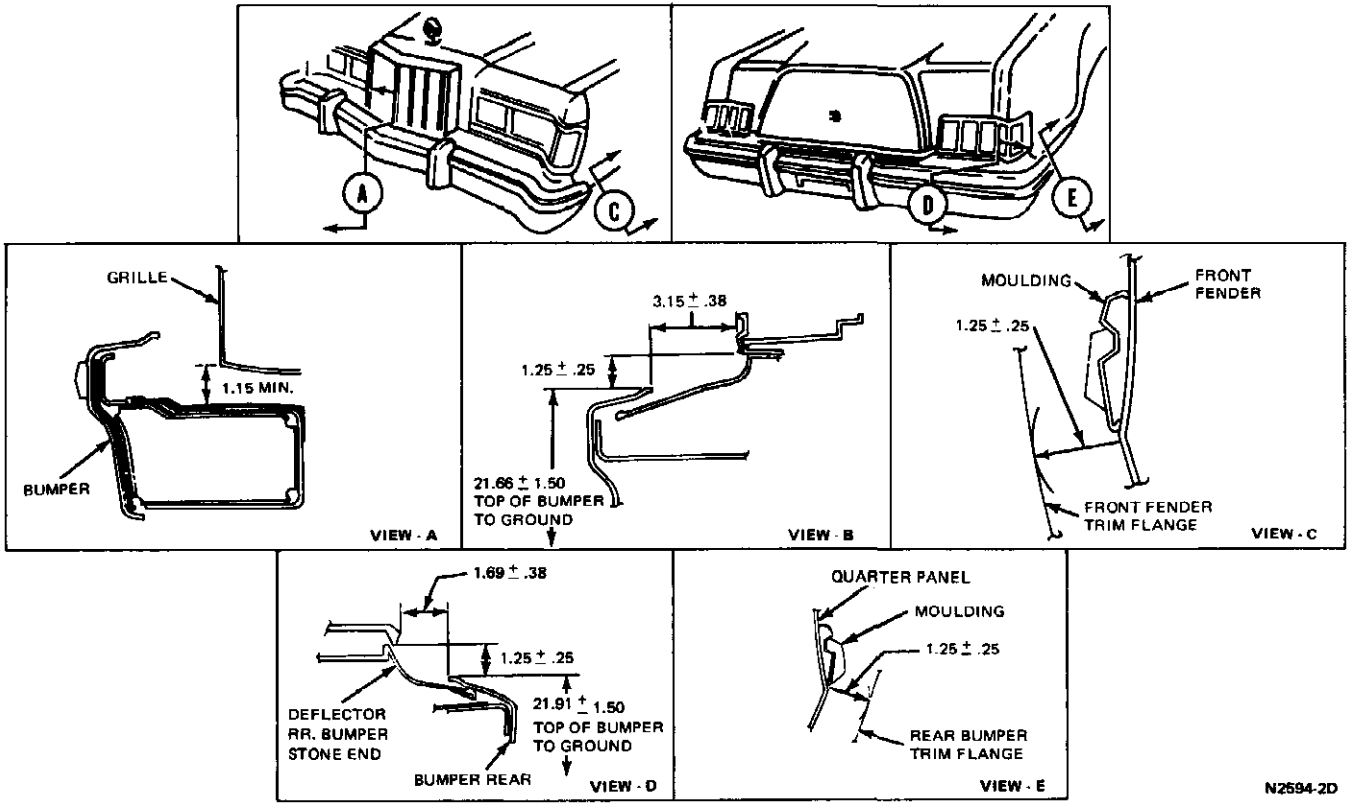


FIG. 8 *Bumper Adjustment Specifications—Cougar XR7*

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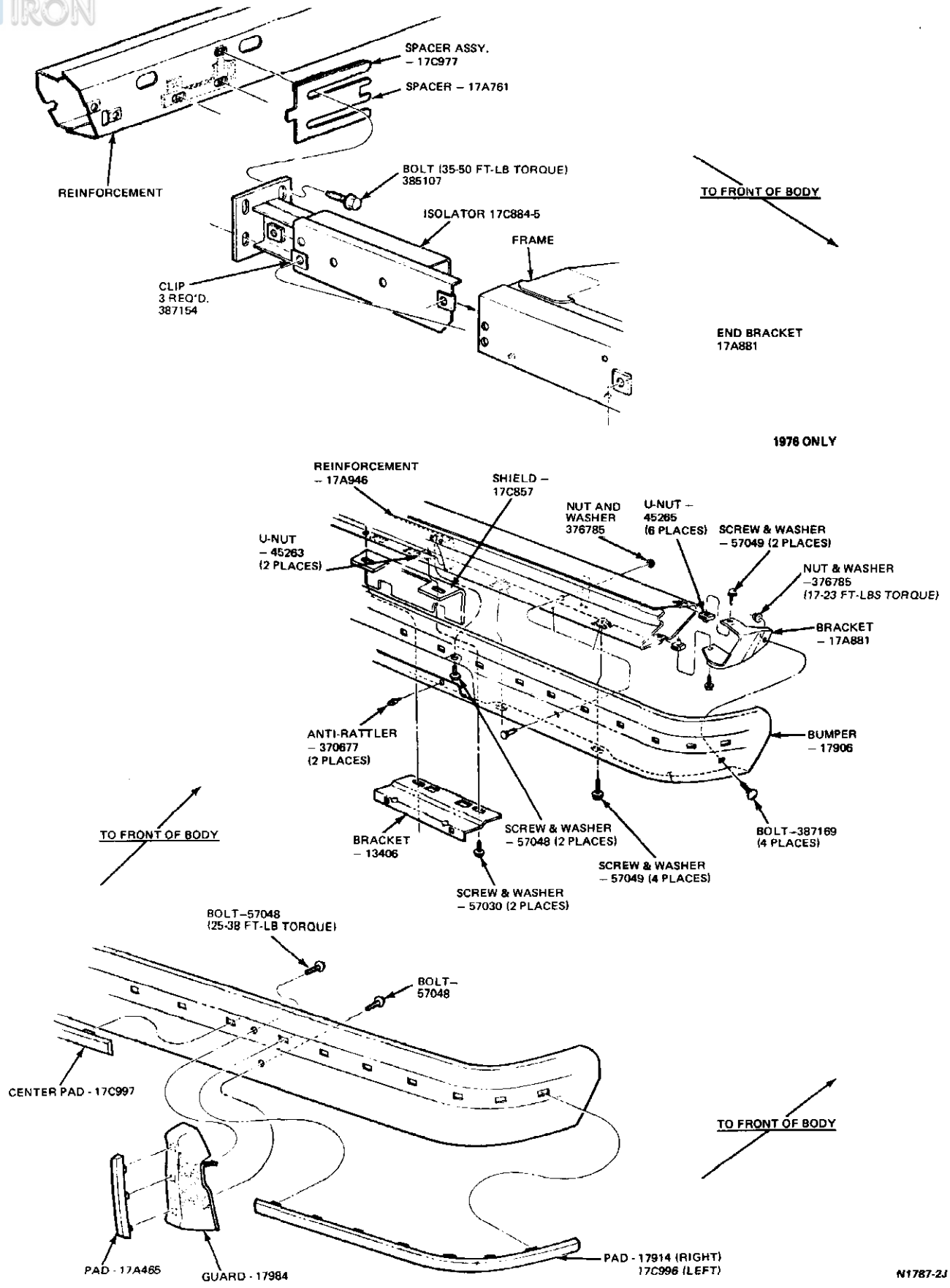


FIG. 9 Rear Bumper Installation—All Models Except Ranchero

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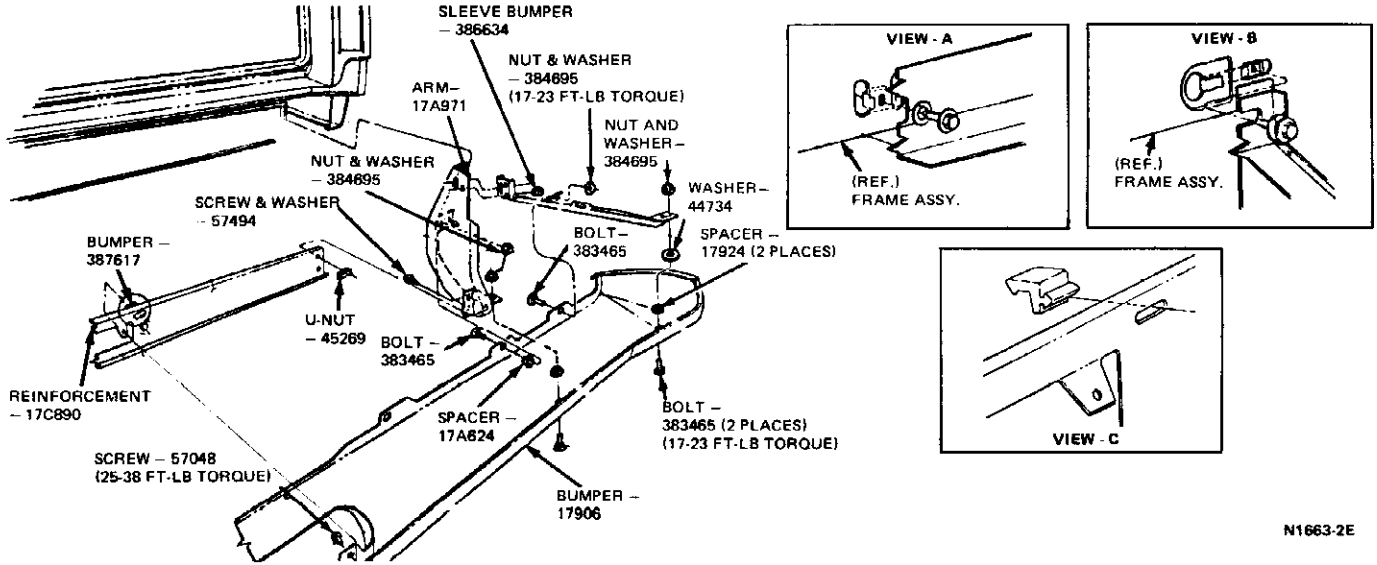


FIG. 10 Rear Bumper—Ranchero

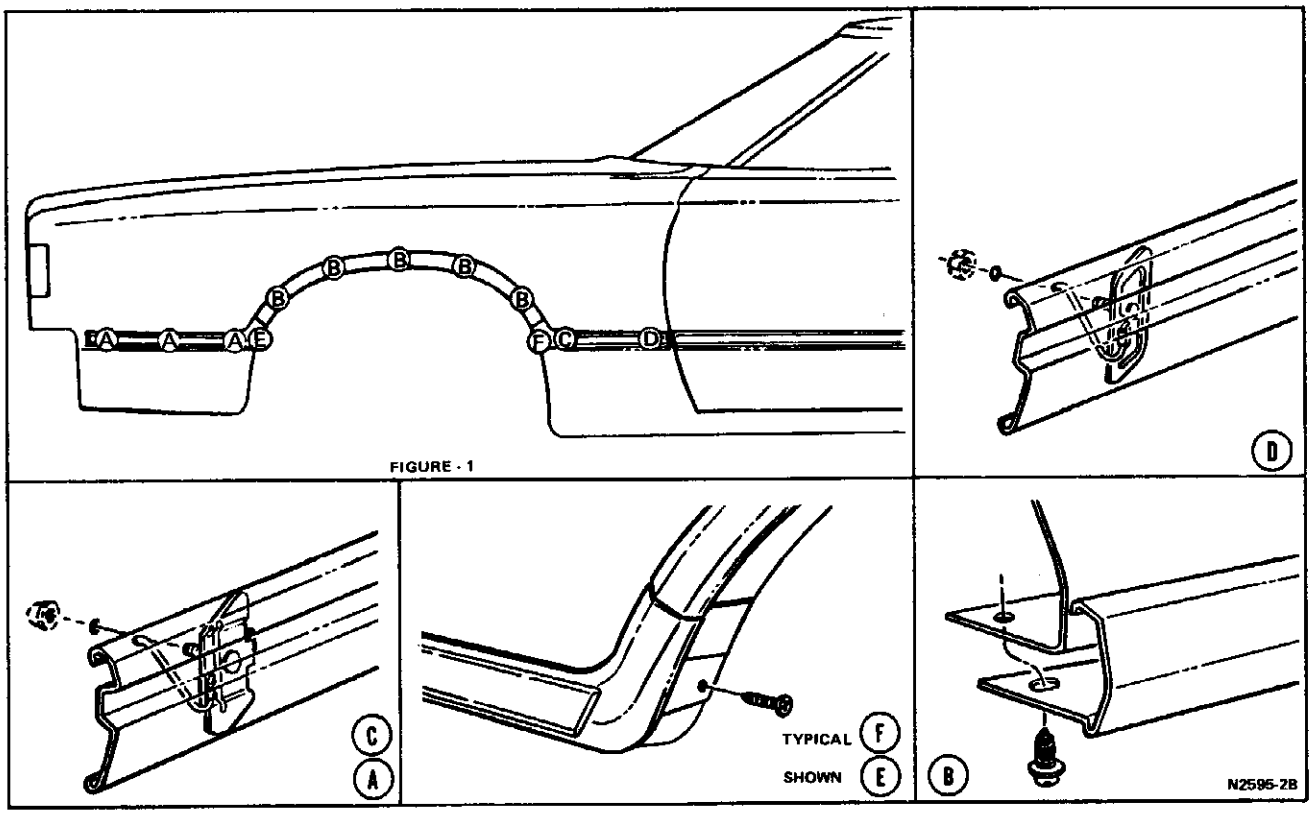


FIG. 11 Exterior Side Moulding Installation—LTD II

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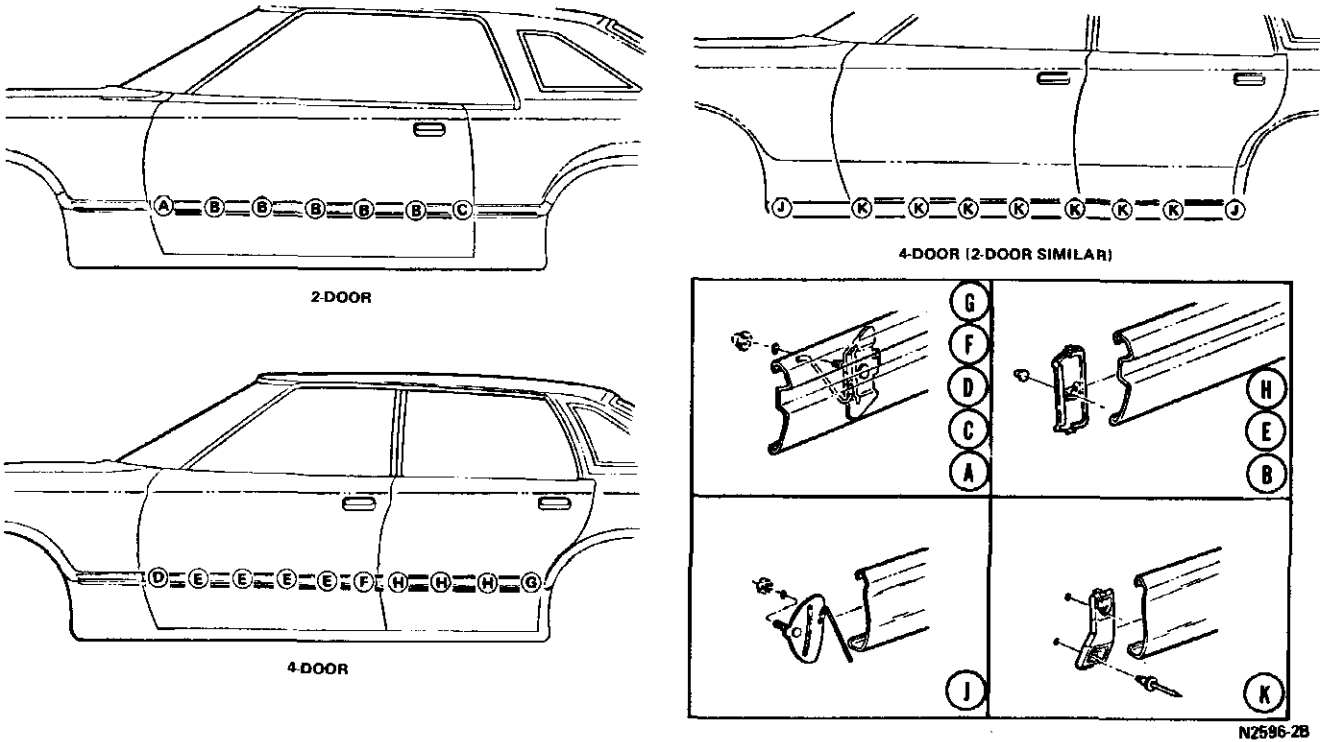
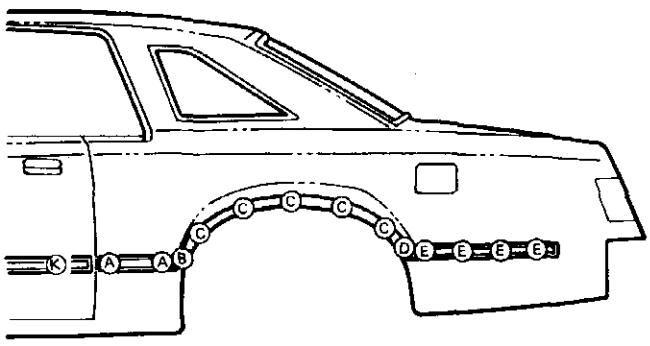
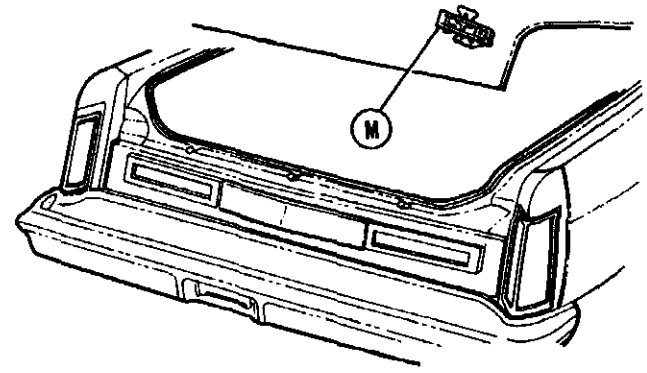


FIG. 12 Exterior Side Moulding Installation—LTD II

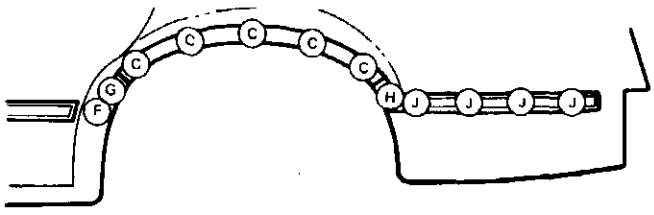
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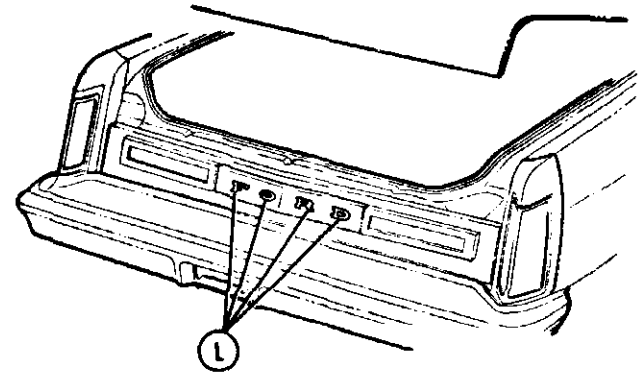
2-DOOR



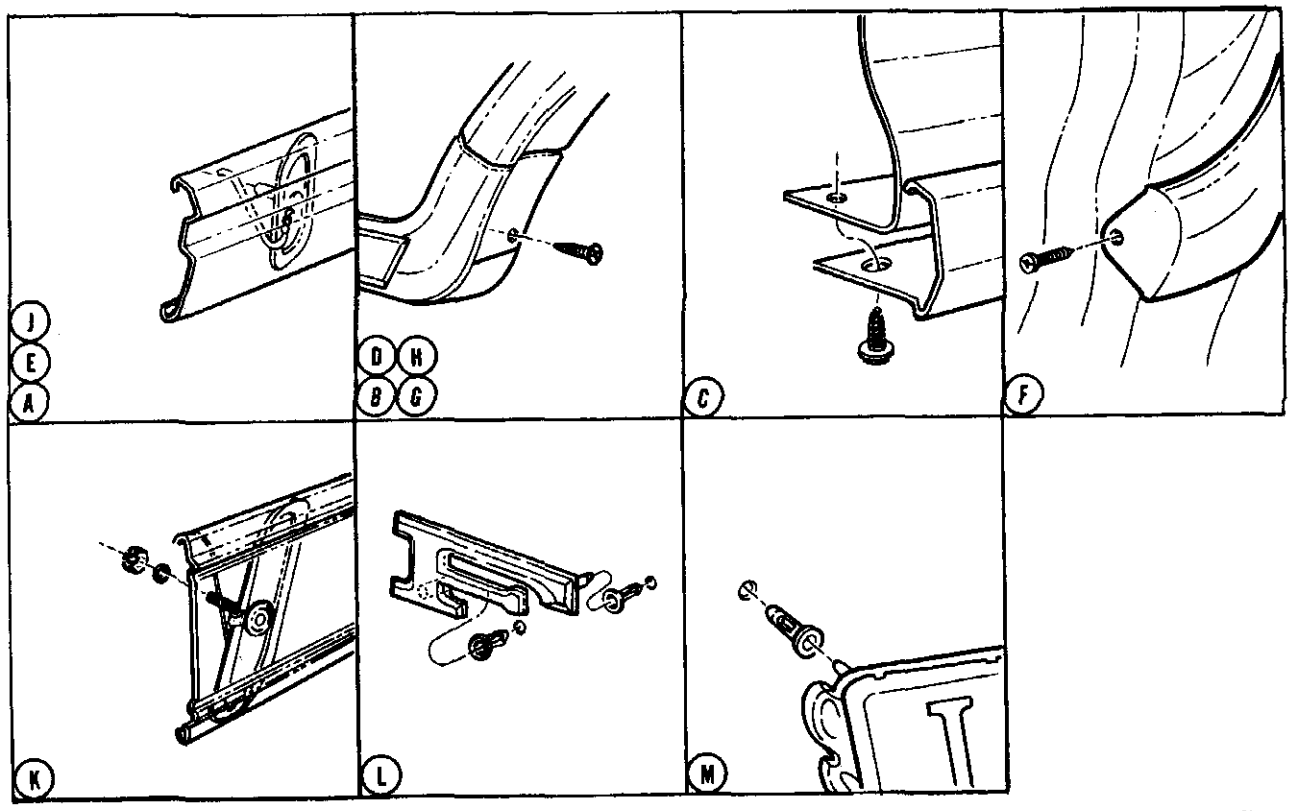
LTD II AND BROUGHAM



4-DOOR SHOWN,
2-DOOR SIMILAR



LTD II S



N2597-2C

FIG. 13 Exterior and Rear Moulding—LTD II

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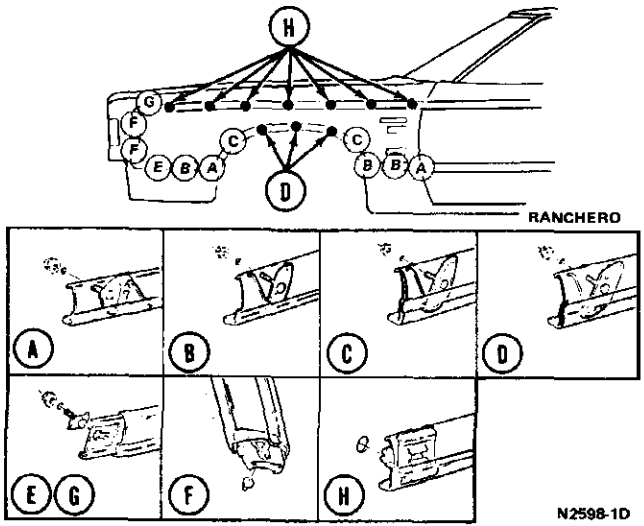
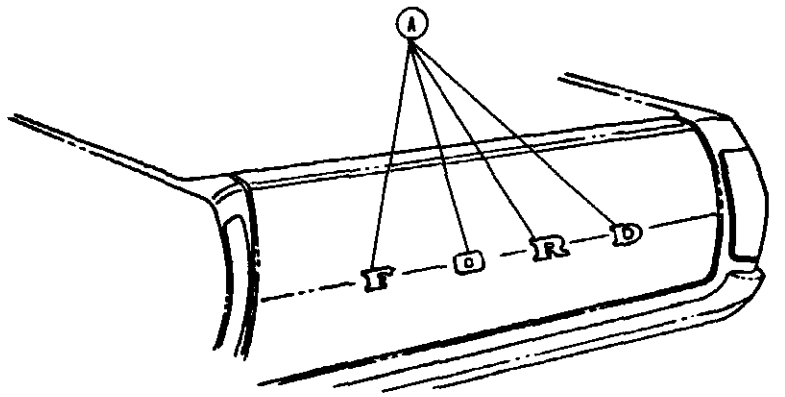
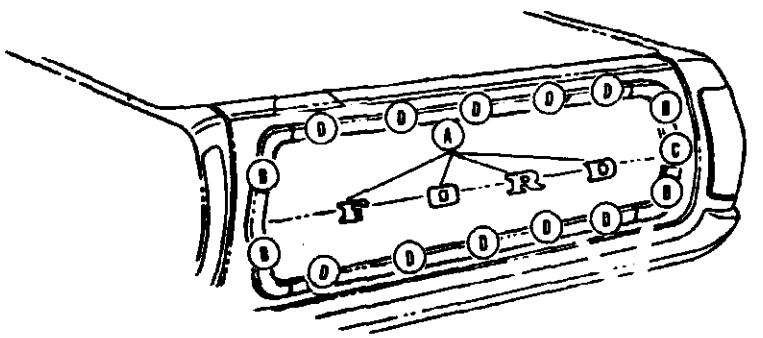


FIG. 14 Side Moulding Installation—LTD II

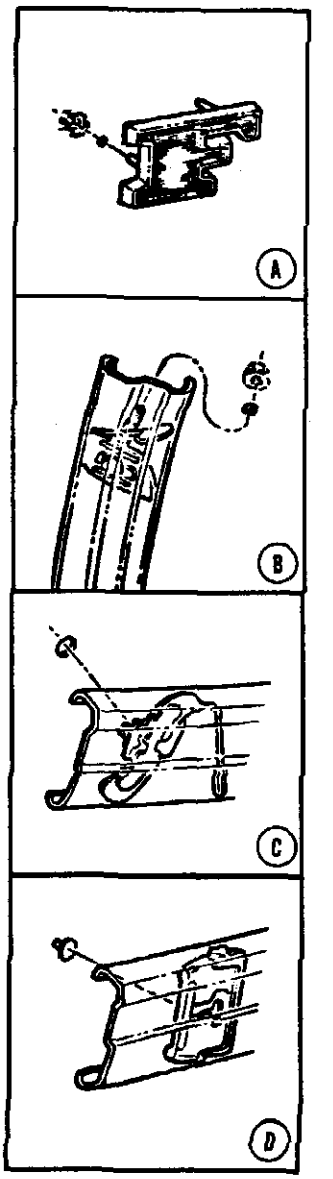
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LTD II RANCHERO



LTD II RANCHERO SQUIRE



N2599-2D

FIG. 15 Rear Exterior Moulding Installation and Ornamentation—LTD II Ranchero

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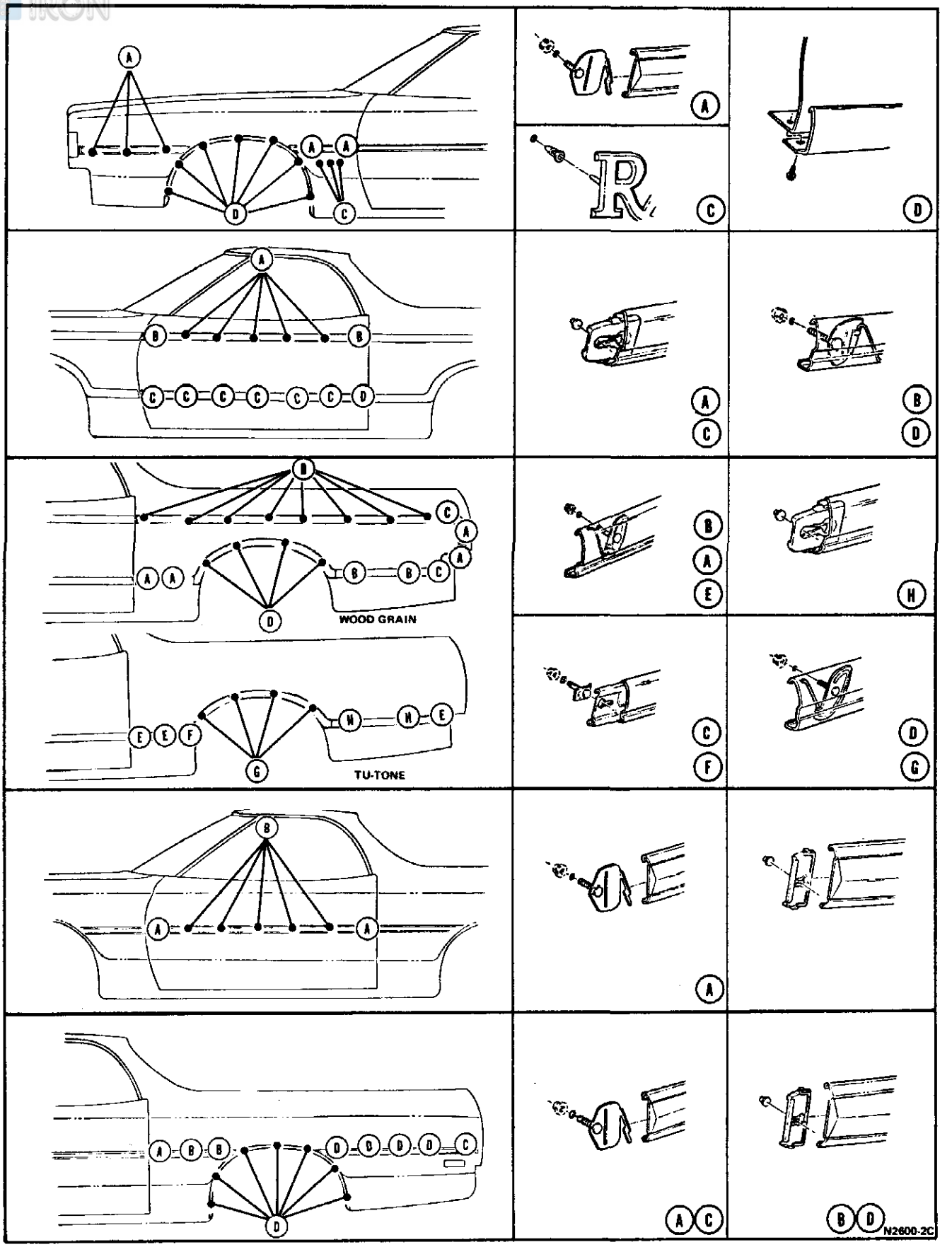
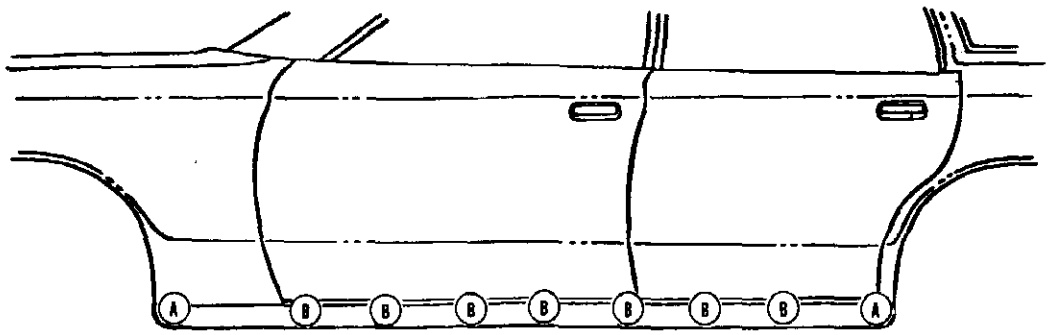


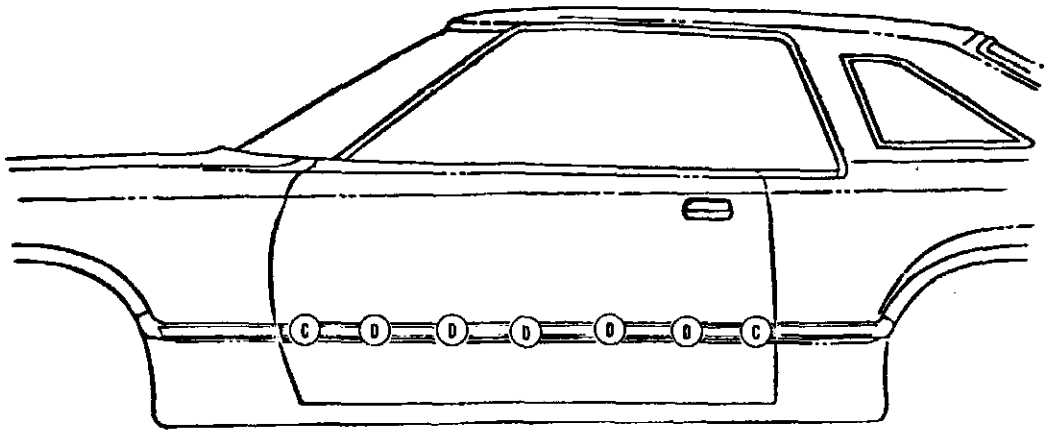
FIG. 16 Exterior Moulding Installation—LTD II Ranchero

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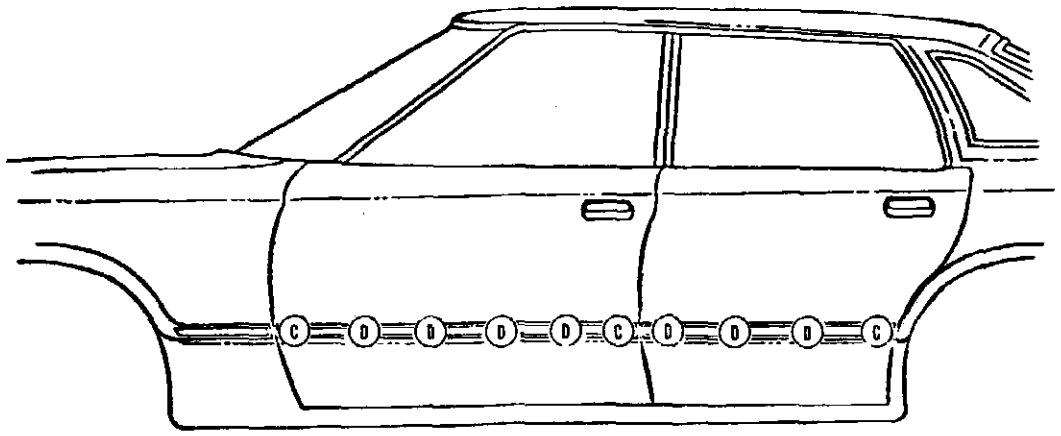
4-DOOR SEDAN

FIGURE - 1



XR7

FIGURE - 2



4-DOOR SEDAN

FIGURE -3

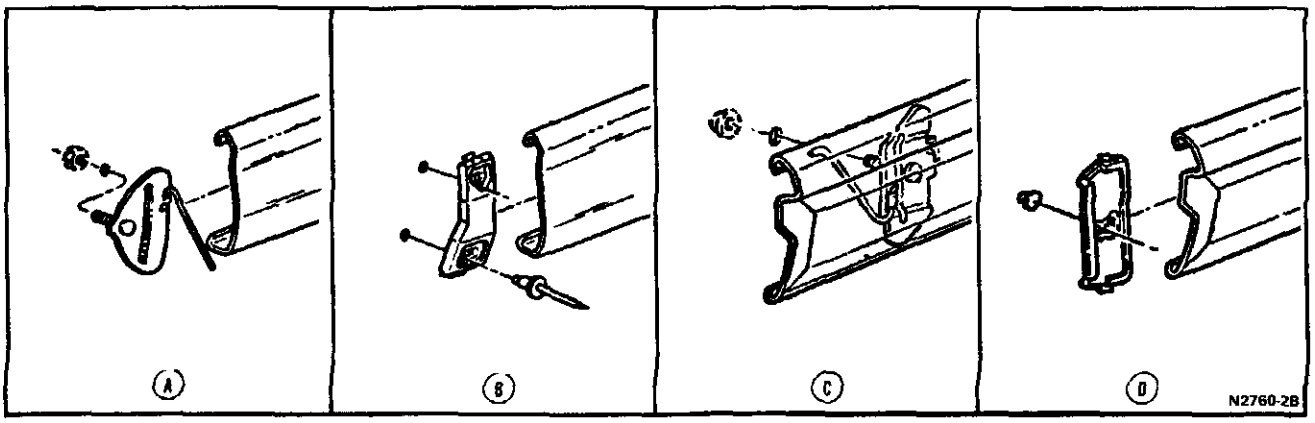


FIG. 17 Exterior Side Moulding Installation—Cougar

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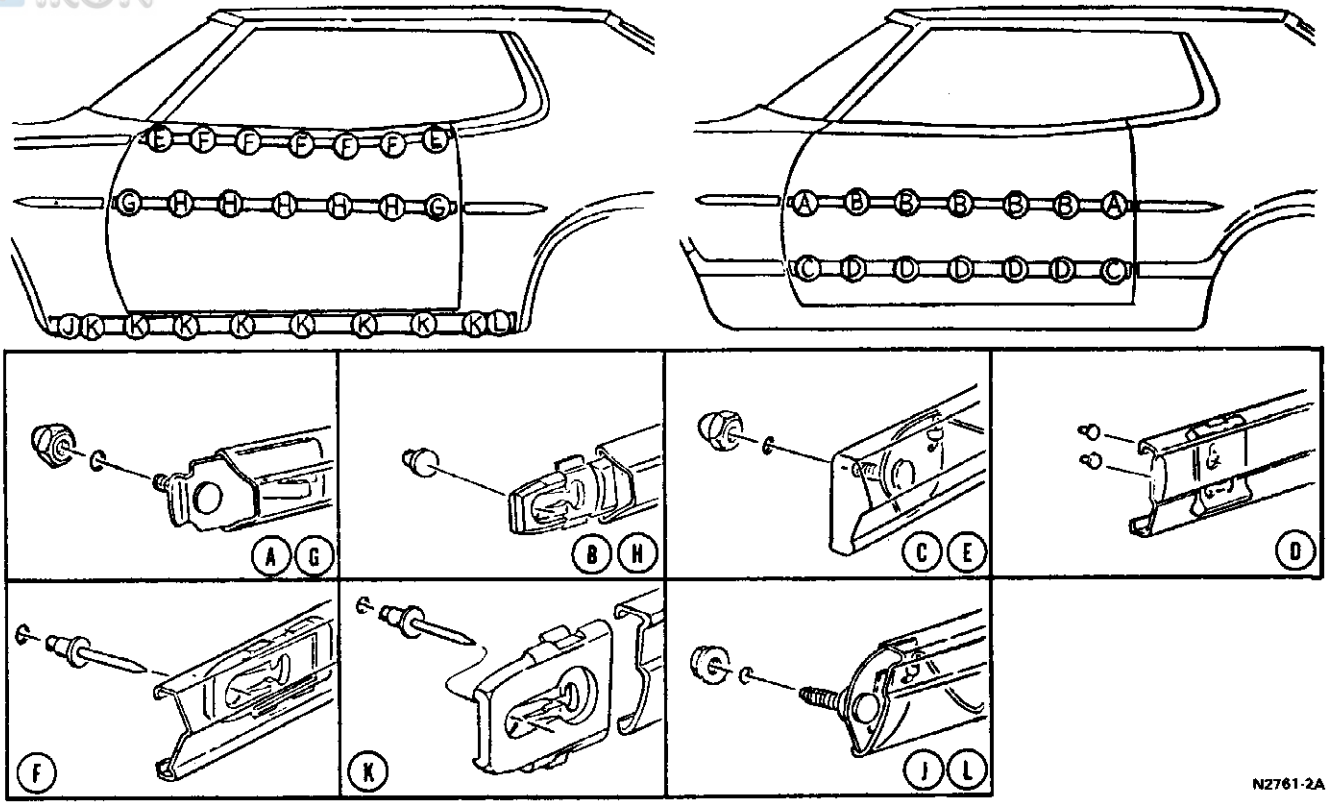


FIG. 18 Exterior Side Moulding Installation—Cougar

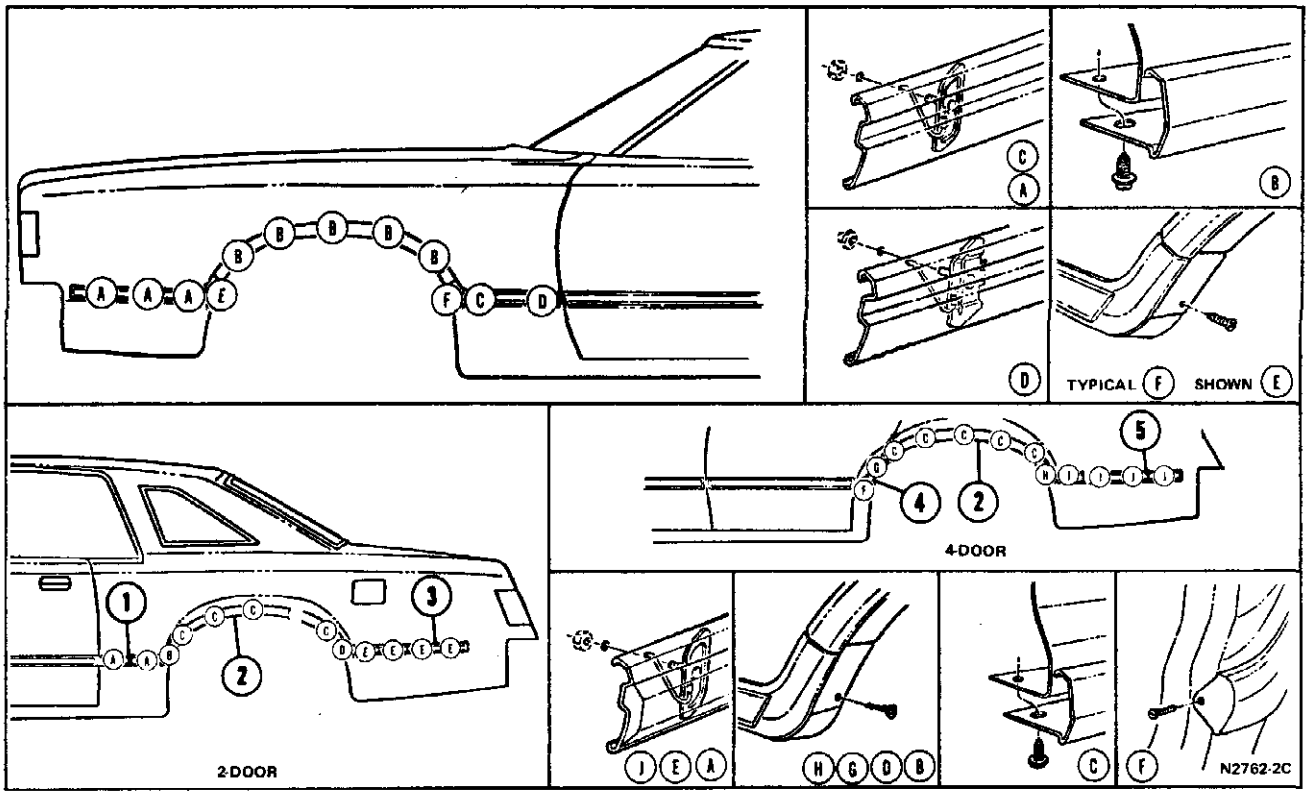


FIG. 19 Exterior Side Moulding Installation—Cougar

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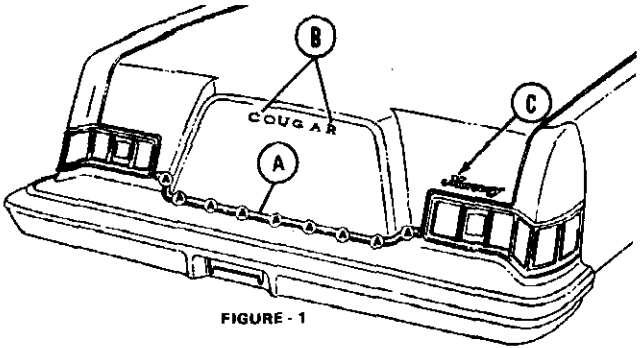


FIG. 20 Rear Exterior Moulding Installation– Cougar XR-7

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DETROIT IRON

FRAME AND BODY MOUNTS

LTD II, COUGAR 2 DOOR & 4 DOOR

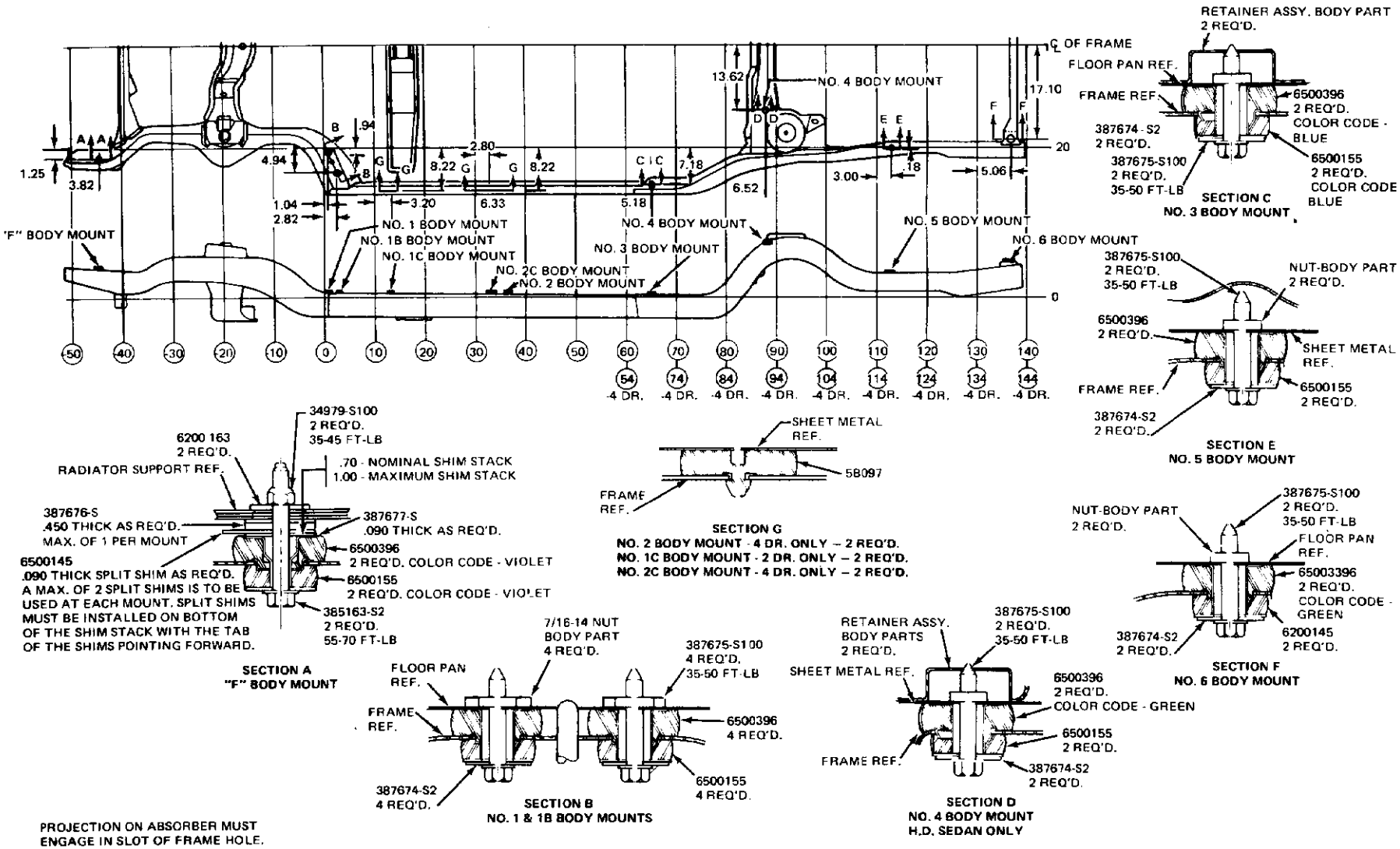


FIG. 21 Frame Dimensions—Sedan—LTD II and Cougar

47-06-17

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FRAME AND BODY MOUNTS
RANCHERO ONLY

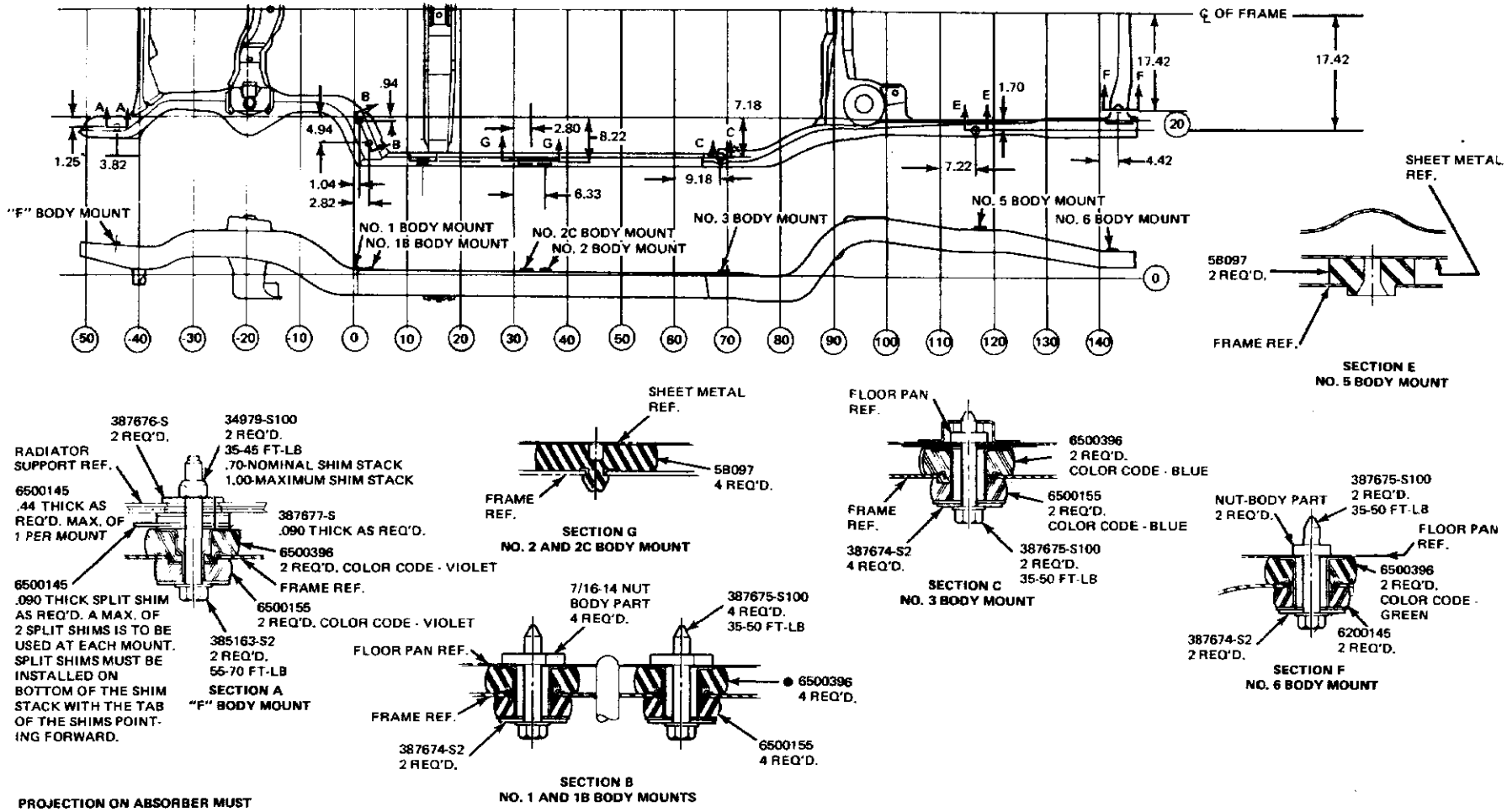


FIG. 22 Frame Dimensions—Ranchero

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Fairmont and Zephyr

PART 47-08

SUBJECT	PAGE
REMOVAL AND INSTALLATION	
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Front Bumper	08-2
Radiator Grille	08-1
REMOVAL AND INSTALLATION (Cont'd.)	
Rear Bumper	08-2
Underbody Dimensions	08-3

CN2874-2B

REMOVAL AND INSTALLATION

RADIATOR GRILLE

Fairmont and Zephyr

Removal

1. Open the hood and remove the retaining screws in the center of the grille and one snap rivet at each end of the grille (Fig. 1).
2. Disconnect the parking lamp wires at the multiple connectors. Remove the metal screws attaching the parking lamp ground wires at the radiator support. Remove the parking lamp bracket attaching screws, and remove the grille and parking lamps.
3. Remove the parking lamps and grille mounting brackets from the grille.
4. *Center bar: spread snap-on fingers and remove.*

Installation

1. If a new grille is being installed, transfer the lower locating pin grommets to the new grille.
2. Position the parking lamps and grille mounting brackets to the grille. Install the two retaining nuts for each parking lamp and support.
3. Position the grille assembly to the vehicle. Be sure the lower locating pins are inserted into the stone deflectors grommets.
4. Connect the parking lamp wire connectors and install the two screws attaching the parking lamp ground wires to the radiator support.

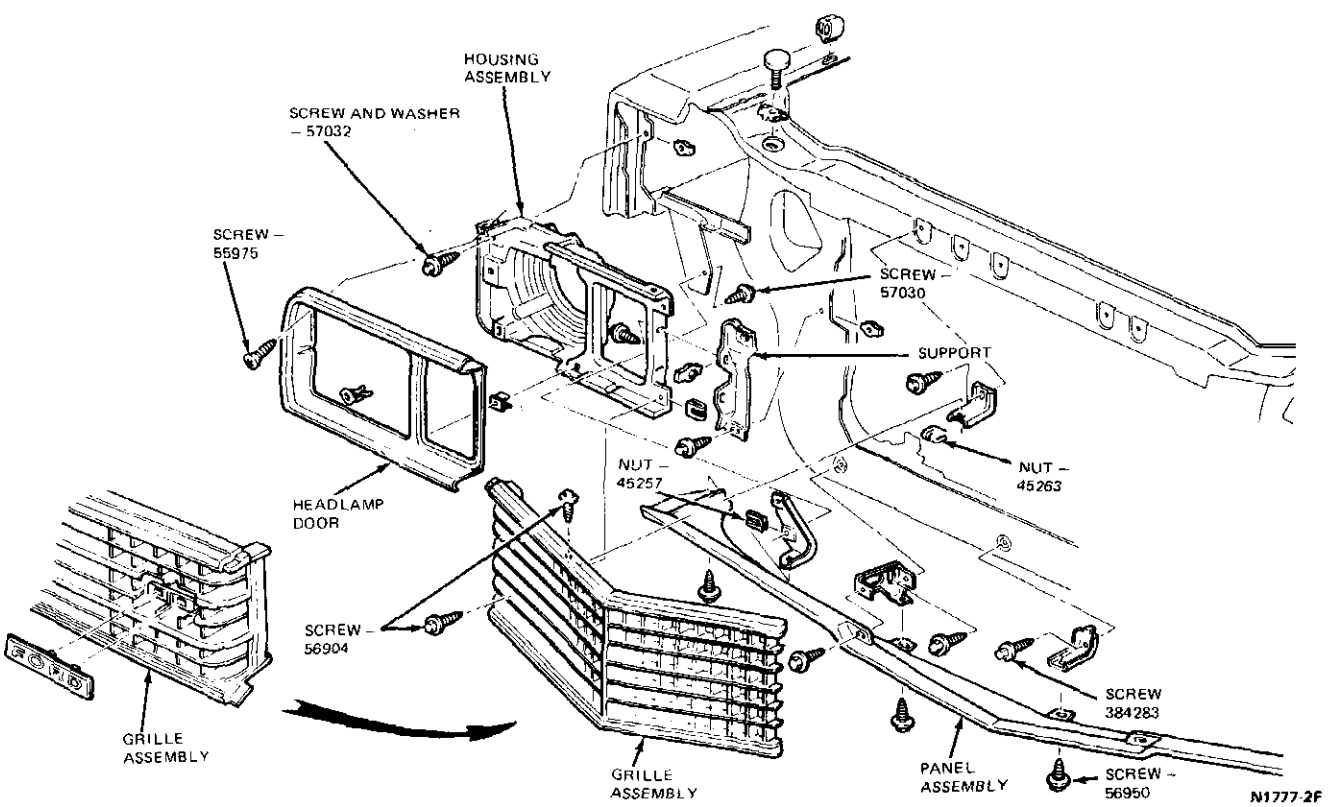


FIG. 1 Radiator Grille—Fairmont Shown—Zephyr Similar

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5. Install the center grille support retaining screws and the grille end to mounting brackets snap rivets.

FRONT BUMPER

Fairmont and Zephyr

Removal

1. Raise the front of the vehicle.
2. Remove six bolts attaching the bumper assembly to the isolators and remove the bumper (Fig. 2).
3. Remove the license plate and bracket assembly.
4. Remove the isolator mounting, brackets, center reinforcement and end braces.
5. Remove bumper guards (optional).

Installation

1. If a new bumper is installed, transfer the bumper guards (Fig. 2). Attach the license plate retaining nuts to the bumper.
2. Position the reinforcement, end braces and isolator mounting brackets to the bumper and install the attaching bolts and nuts.
3. Install the license plate and bracket assembly.
4. Position the bumper assembly to the vehicle and install the attaching bolts snug.
5. Adjust the bumper height so that the distance from the top edge of the ground meets the specifications in Fig. 4. Then, adjust the bumper for body clearance so that the vertical and horizontal body to bumper dimensions meet specifications in Fig. 4. Tighten the isolator- to-reinforcement attaching bolts to 25-38 ft-lb torque. Tighten absorber to underbody mounting bolts to 60-90 ft-lbs torque.

REAR BUMPER

Fairmont and Zephyr

Removal

1. Remove bolts attaching the bumper to the isolators, and remove the bumper assembly.
2. Remove the nuts and bolts attaching the isolator mounting brackets to the bumper, and separate the reinforcement and bumper guards (if so equipped) from the bumper (Fig. 3).
3. Station Wagon Only. Remove center reinforcement by drilling out blind rivets.

Installation

1. Position the isolator mounting brackets and bumper guards (if so equipped) to the bumper, and install the bolts and nuts. Tighten nuts to specification given in Fig. 3.
2. Station Wagon Only. Install center reinforcement using 14 blind rivets.
3. Position bumper assembly to the isolator and install the attaching bolts.
4. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Fig. 4. Then adjust the bumper for body clearance at the centerline of the tail lamp so that the vertical dimension meets the specifications in Fig. 4. Tighten the isolator-to-reinforcement bolts to 25-38 ft-lbs torque.

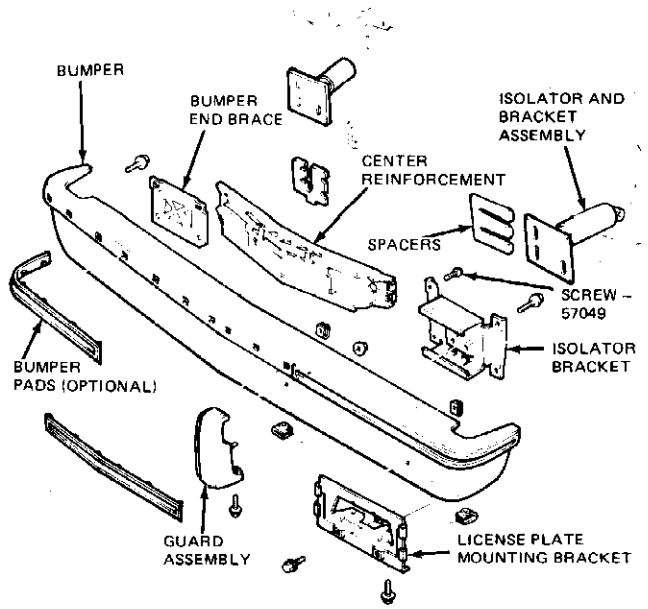


FIG. 2 Front Bumper Installation

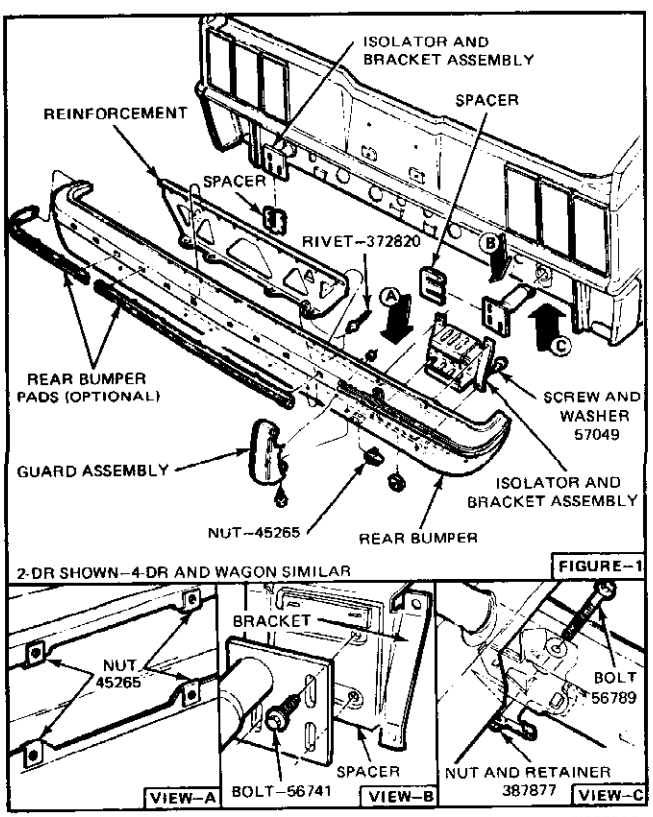


FIG. 3 Rear Bumper Installation

EXTERIOR MOULDINGS

Before removing the exterior mouldings, it should be determined by the type of retainer used whether a

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respective door, quarter or luggage compartment trim panel must first be removed to provide access (Figs. 5 through 10). If a weld stud is distorted or broken off, it should be replaced with an oval head blind rivet (Part No. 383229-S or equivalent). Refer to General Information (Part 47-01) for installation of Pressure Sensitive Tape Type (Body Side Protection Mouldings).

UNDERBODY DIMENSIONS

The under body dimensions are shown in Fig. 10. The underbody checking and repair procedures are given in Part 47-01.

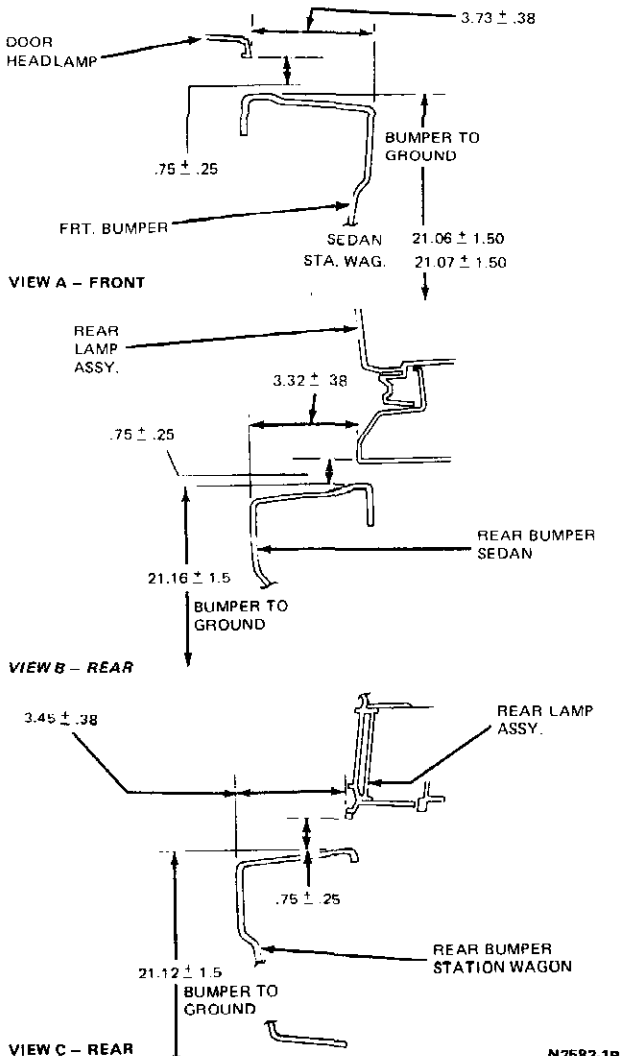


FIG. 4 Bumper Adjustment Specifications

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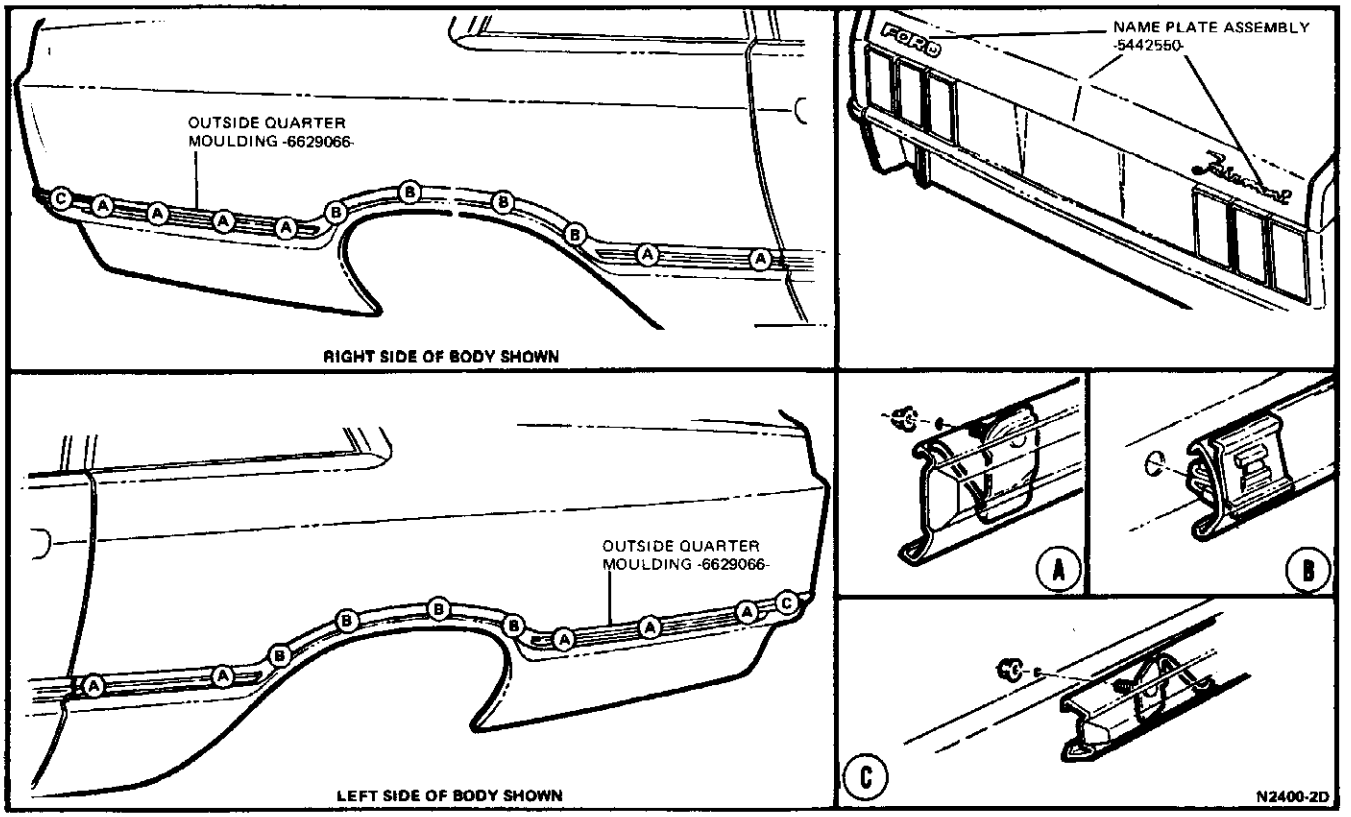


FIG. 5 Exterior Side Mouldings—Fairmont—2-Door Model—Zephyr Similar

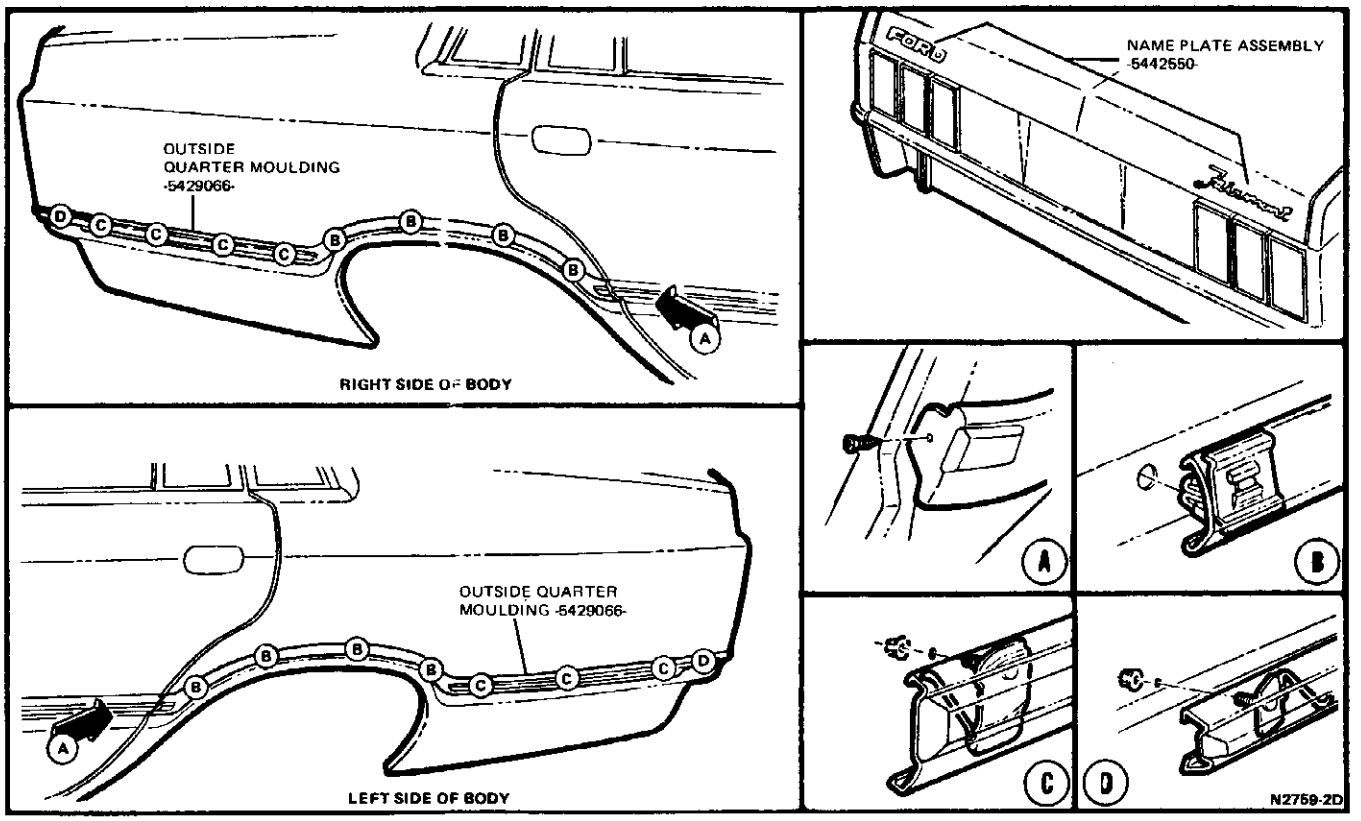


FIG. 6 Exterior Side Moulding Installation—Fairmont—4-Door Model—Zephyr Similar

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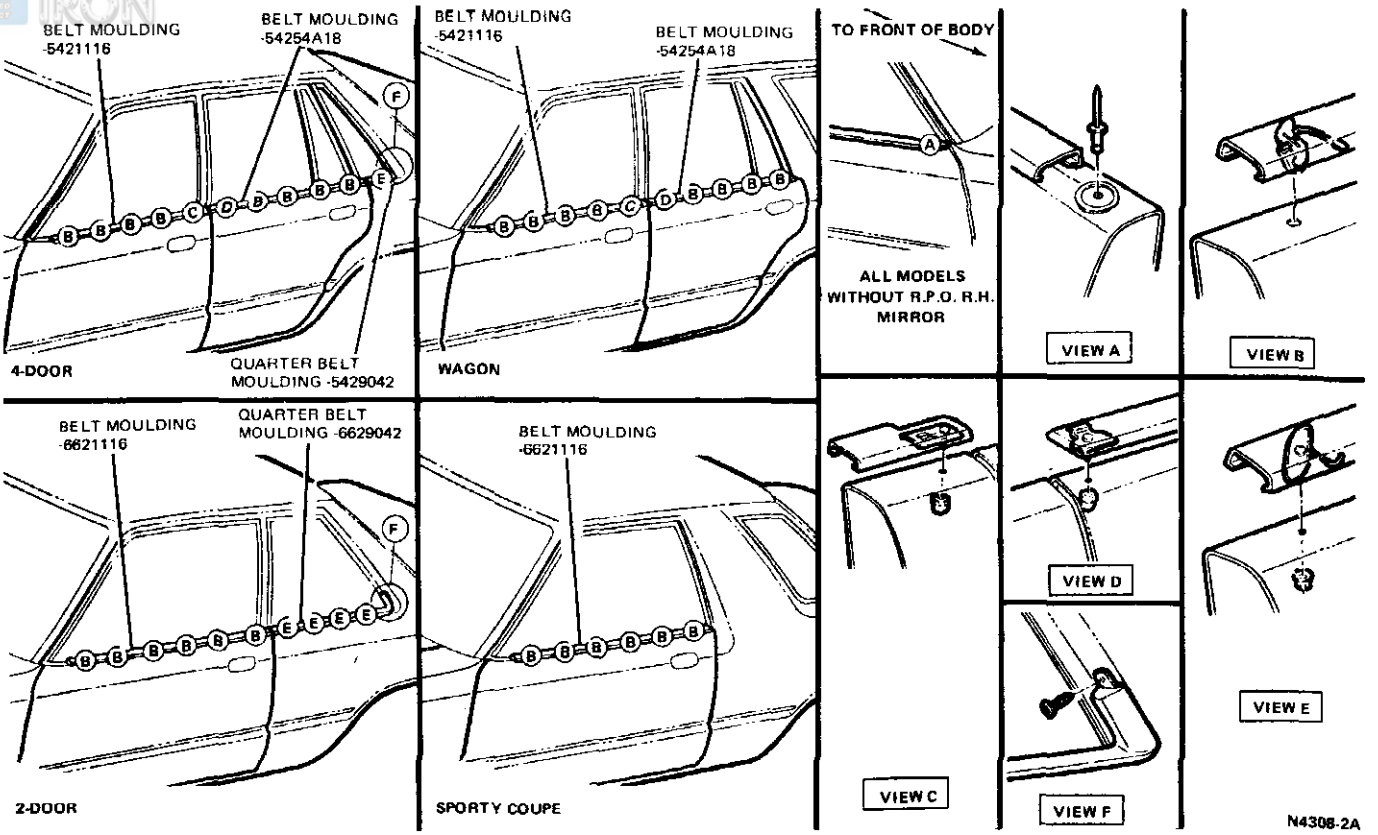


FIG. 7 Optional Exterior Belt Mouldings

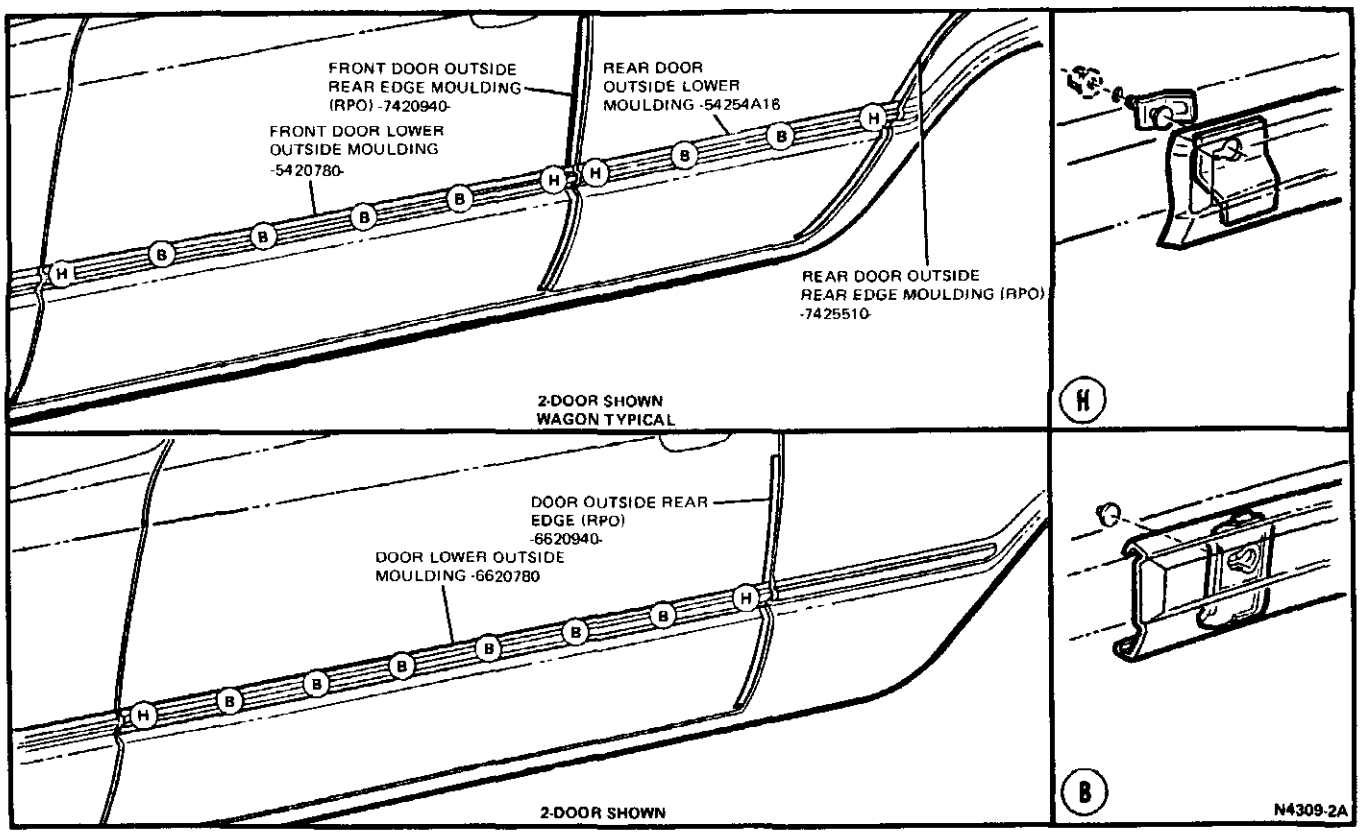
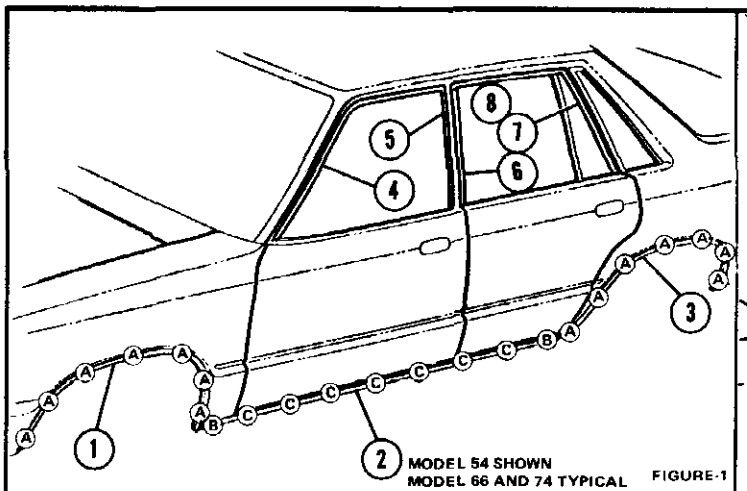
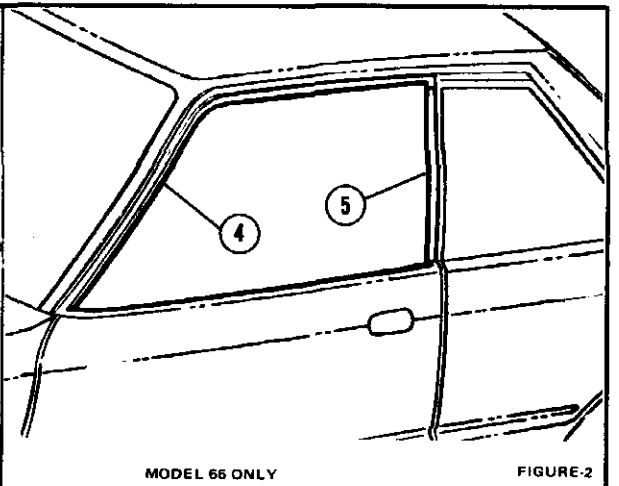


FIG. 8 Optional Exterior Door Mouldings

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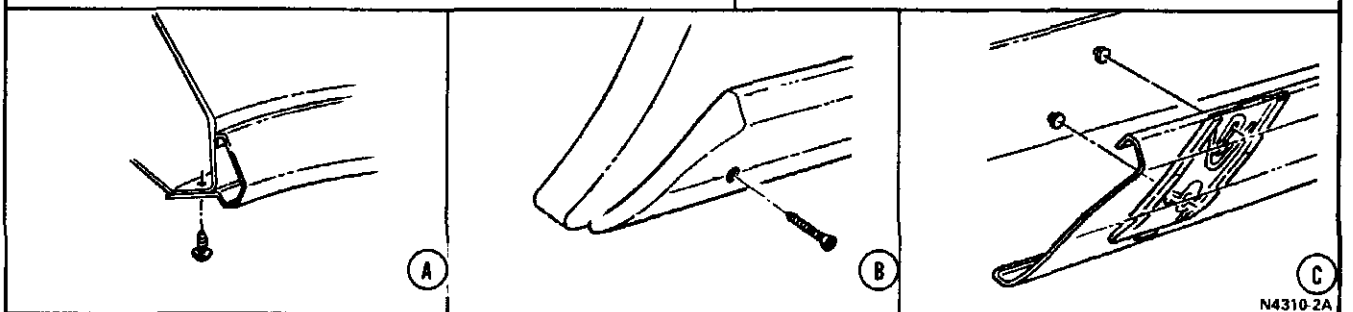


FIG. 9 Optional Exterior Ornamentation on Front Fender, Rocker and Quarter Panels

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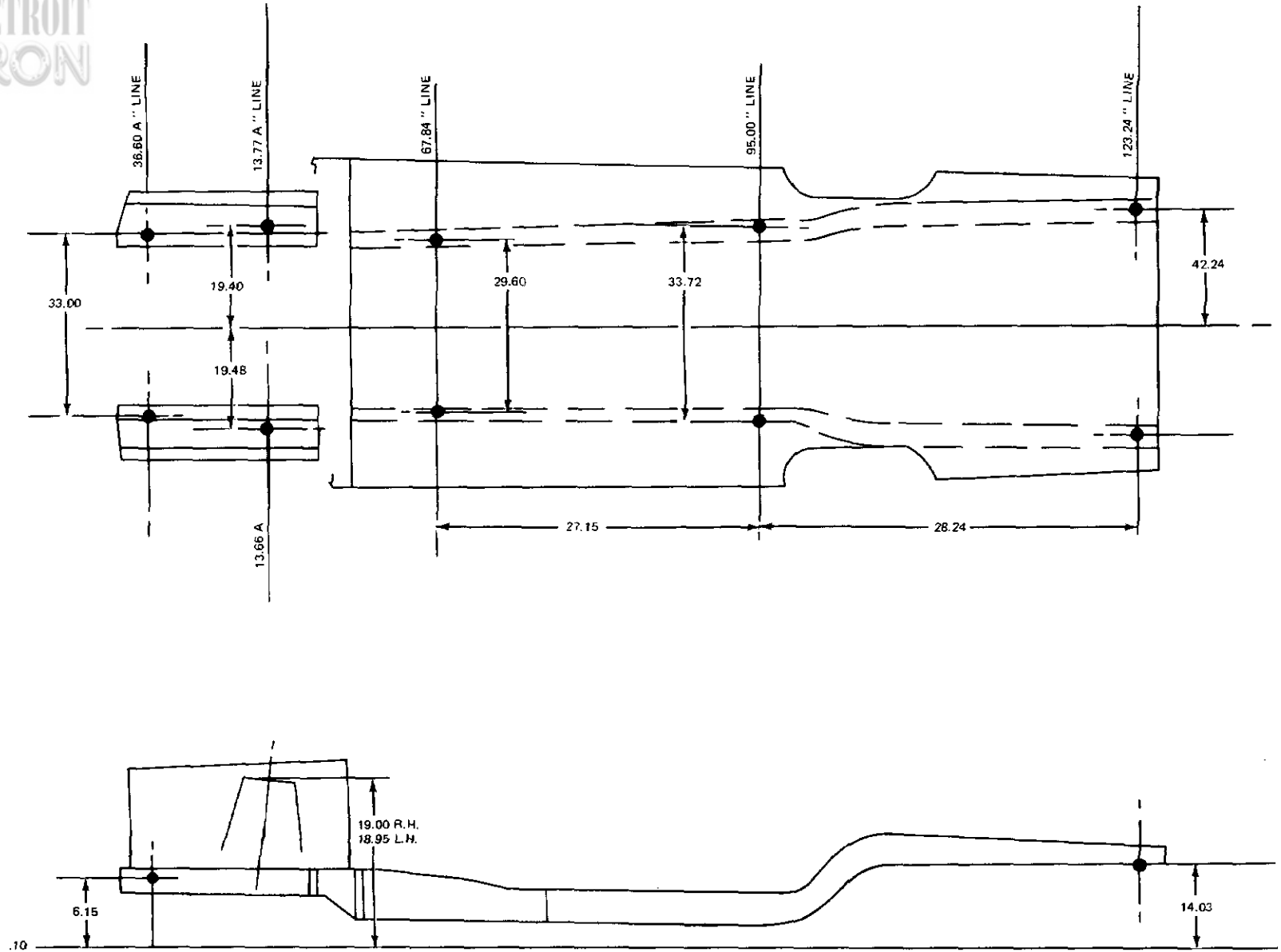


FIG. 10 Underbody Dimensions

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Pinto and Bobcat

PART 47-09

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CN2876-2B

REMOVAL AND INSTALLATION

RADIATOR GRILLE

PINTO

Removal

1. *Open hood and remove grille attaching screws* (Fig. 1), and remove the grille.

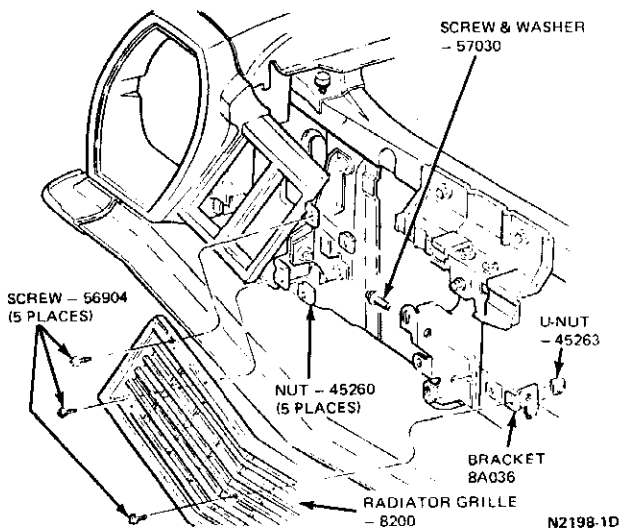


FIG. 1 Radiator Grille—Pinto

2. Replace any damaged clip nuts or retainers.

Installation

1. Position the grille to the vehicle and install the attaching screws loosely.
2. Adjust grille to obtain a uniform gap between side vertical surfaces of grille and vertical surfaces of fender extension assembly. Align lower surface of grille with lower surface of fender extension assembly.
3. Tighten 2 lower screws first, then tighten 3 remaining screws.
4. Position the parking lamp bulb and socket assemblies in the parking lamps, and rotate the socket clockwise to lock into place in the parking lamp.
5. Check the operation of the parking lamps and turn signals.

BOBCAT

Removal

1. Open the hood and remove one screw from the top of the grille, which attaches to the radiator grille mounting bracket (Fig. 2).
2. Remove one attaching screw that attaches to the hood latch support bracket, located at the bottom center of the grille.
3. Remove four attaching screws, two on each side of the grille, that attach to the parking lamp housing, and remove grille from car.

Installation

1. Position grille in vehicle and install four screws, two on each side, loosely.
2. Install lower attaching screw and upper attaching screw, loosely.
3. Adjust grille to obtain a 0.532-inch uniform gap between the sight shield and grille, and a similar uniform gap between the hood moulding and the top of the grille, then, tighten the upper and lower attaching screws.
4. Tighten the four screws, two on each side of the grille.

FRONT BUMPER

REMOVAL

1. Remove the isolator-to-reinforcement bolts and screws and remove the bumper assembly from the vehicle (Fig. 3).

INSTALLATION

1. Transfer the bumper guards, pads and license plate bracket and braces to a new bumper if the bumper is being replaced (Fig. 3).
2. To install, position the bumper assembly to the isolators and install the attaching bolts and retaining nuts snug.
3. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Fig. 5. Then, adjust the bumper for body clearance so that the vertical and horizontal body to bumper dimensions meet the specifications in Fig. 5. Tighten the isolator-to-bumper bolts to 35-50 ft-lbs torque.

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REAR BUMPER

REMOVAL

1. Remove two license lamp attaching screws and disconnect license plate lamp wiring from socket behind bumper.
2. Remove two bolts attaching each isolator to the bumper reinforcement and remove the bumper assembly (Fig. 4).
3. If the bumper is to be replaced, transfer the bumper guards, pads and license bracket to the new bumper.
4. Inspect the isolators for fluid leakage. If leakage is found, replace the isolator(s).

INSTALLATION

1. Install the license plate lamp assembly.
2. Position the bumper assembly to the isolators and install the attaching bolts.
3. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Fig. 5. Then, adjust the bumper for body clearance so that the vertical and horizontal body to bumper dimensions meet the specifications in Fig. 5. Tighten the isolator- to-reinforcement bolts to 35-50 ft-lbs torque.
4. Connect the license lamp to the body wiring.

EXTERIOR MOULDINGS

Before removing the exterior mouldings, it should be determined by the type of retainer used whether a respective door, quarter or luggage compartment trim panel must first be removed to provide access (Figs. 6 through 15). If a weld stud is distorted or broken off, it should be replaced with an oval head blind rivet (Part No. 383229-S).

UNDERBODY DIMENSIONS

The Pinto underbody dimensions are shown in Figs. 15 and 16. The underbody checking and repair procedures are given in Part 47-01.

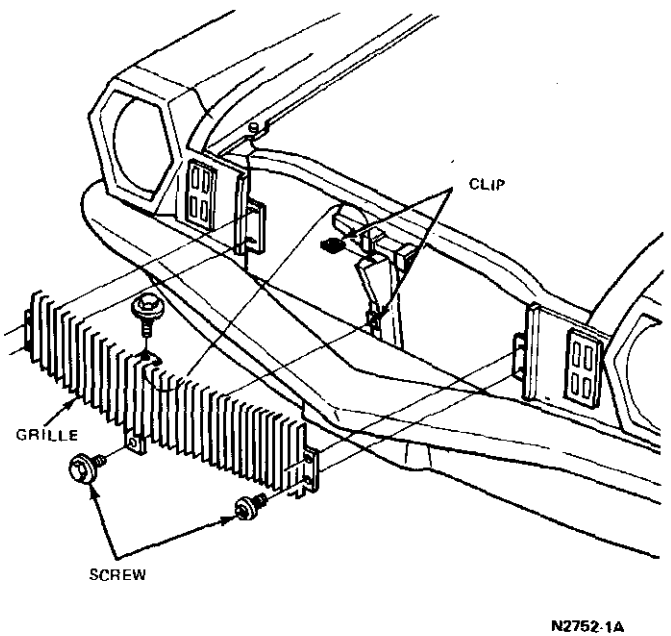


FIG. 2 Radiator Grille—Bobcat

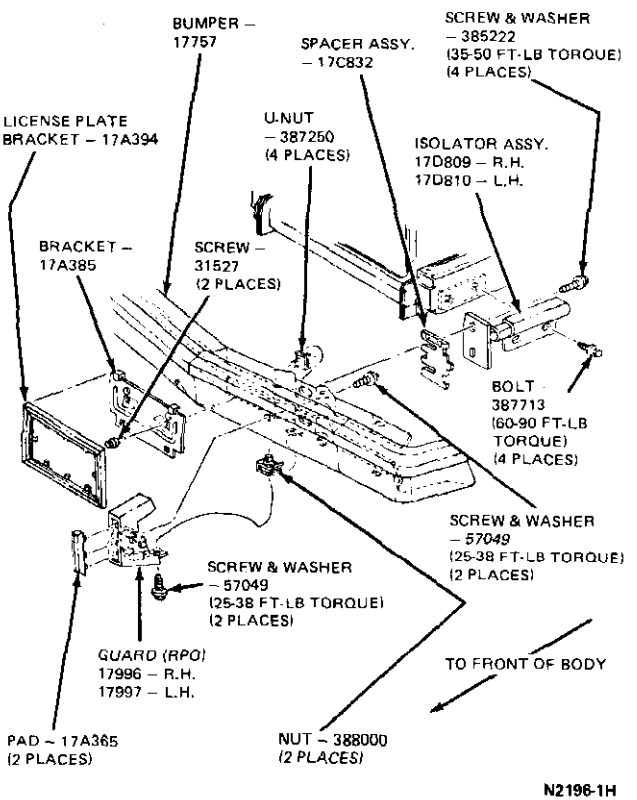
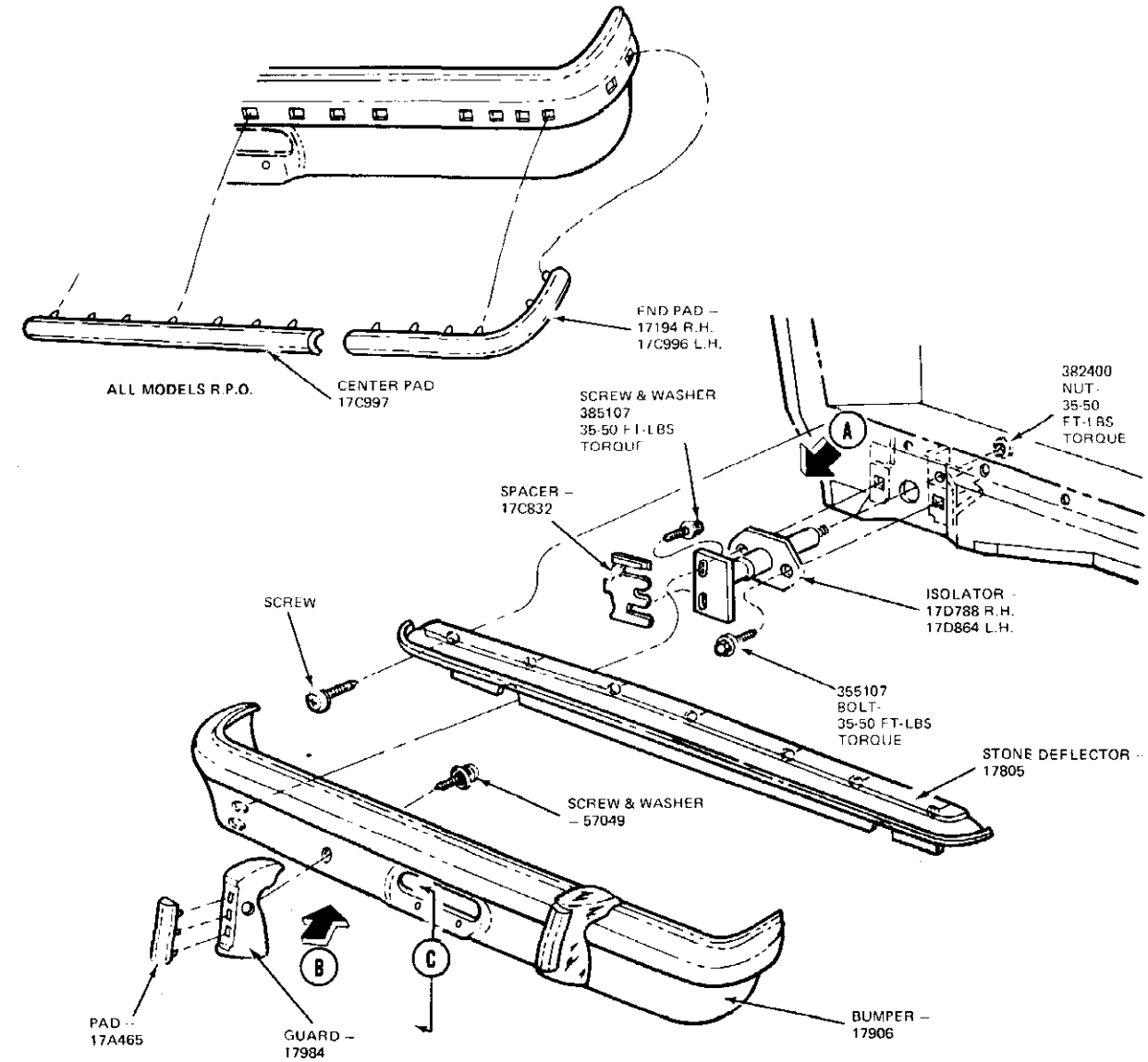


FIG. 3 Front Bumper Installation—Pinto and Bobcat

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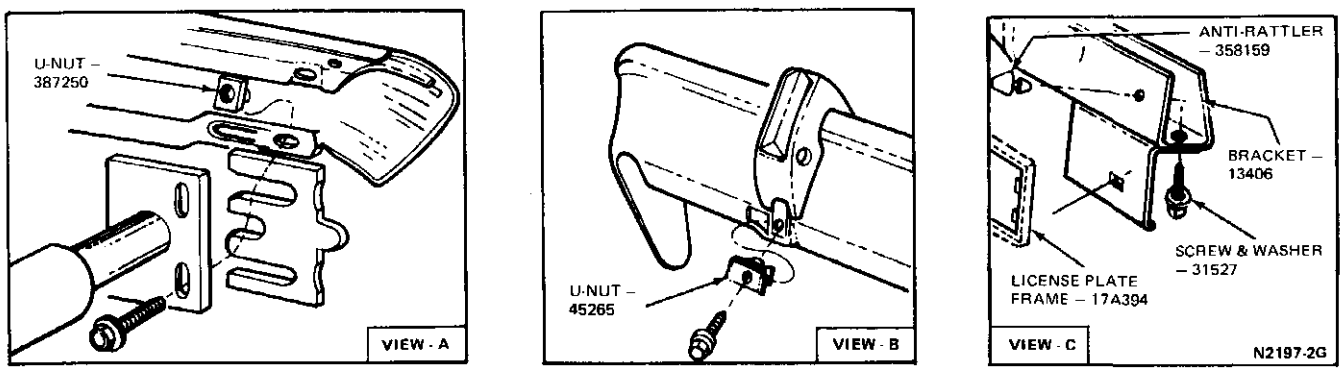


FIG. 4 Rear Bumper Installation—Pinto and Bobcat

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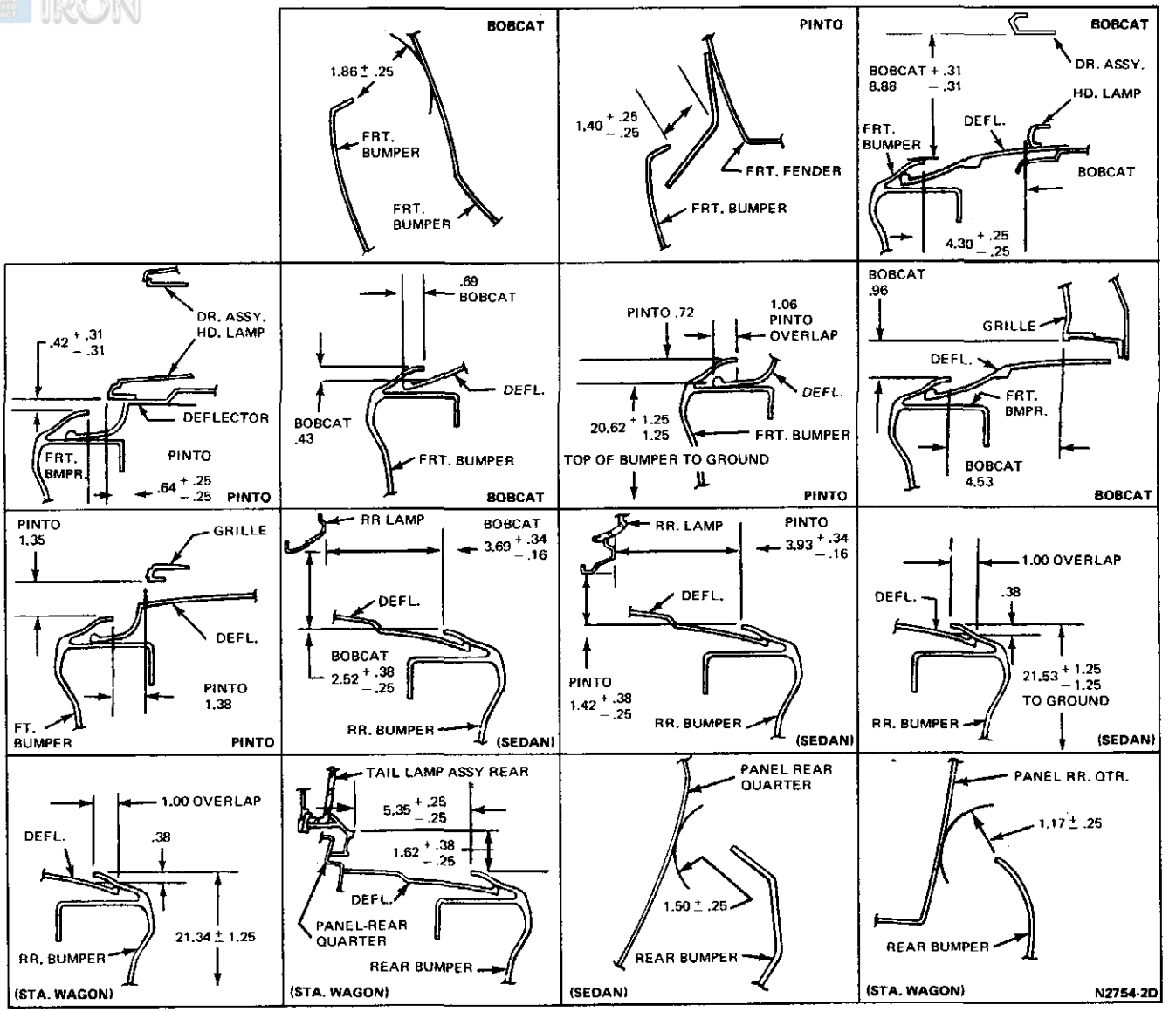


FIG. 5 Bumper Adjustment Specifications—Pinto and Bobcat

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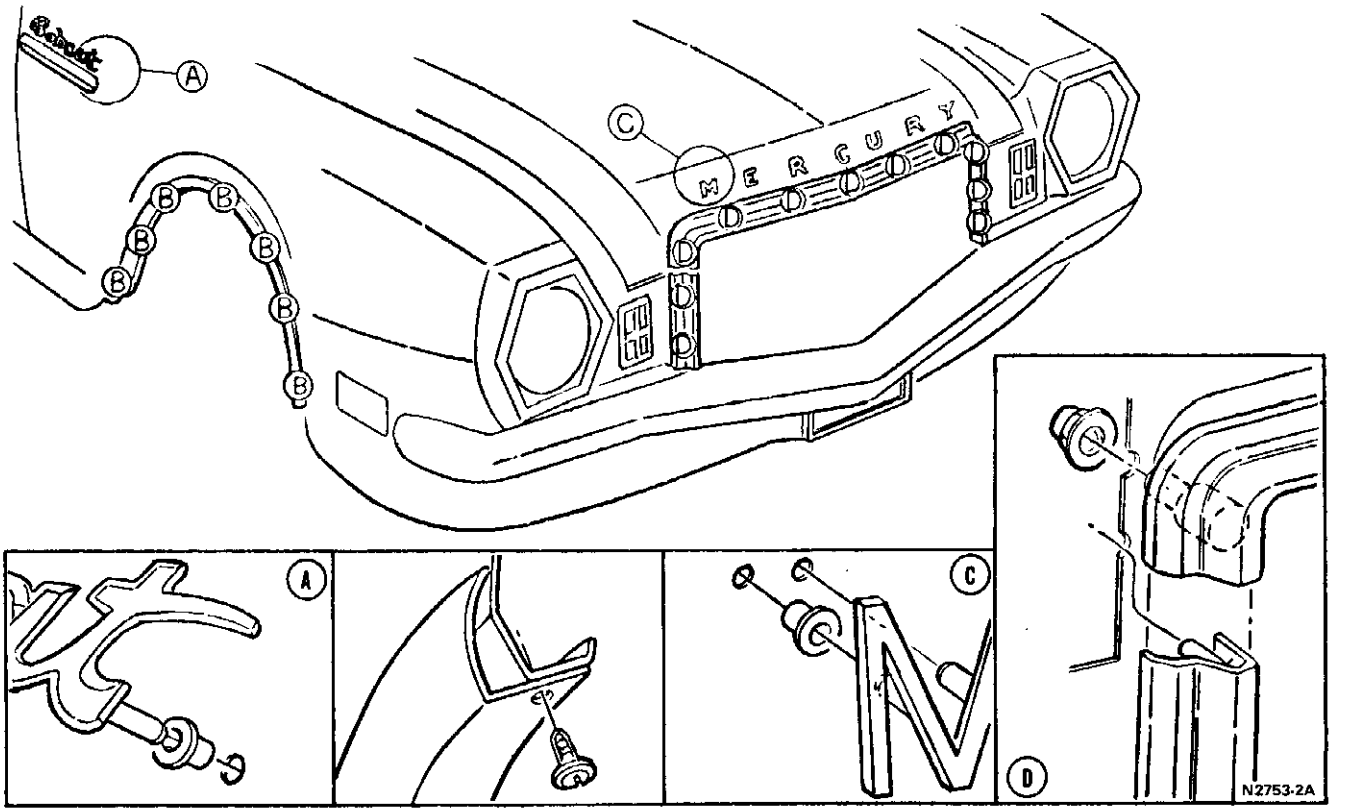


FIG. 6 Front Fender and Hood Exterior Moulding Installation—Bobcat

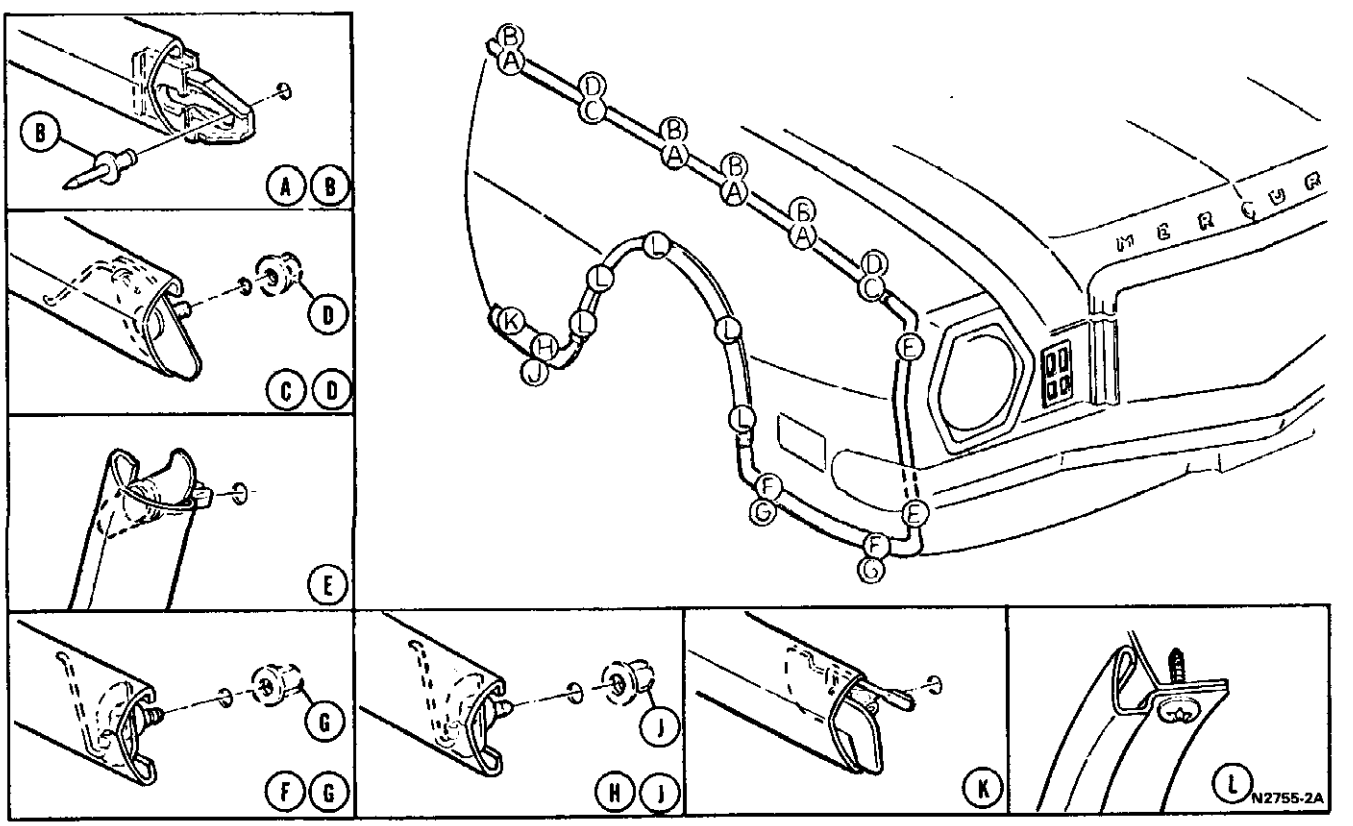


FIG. 7 Front Fender Exterior Moulding Installation—Bobcat Station Wagon

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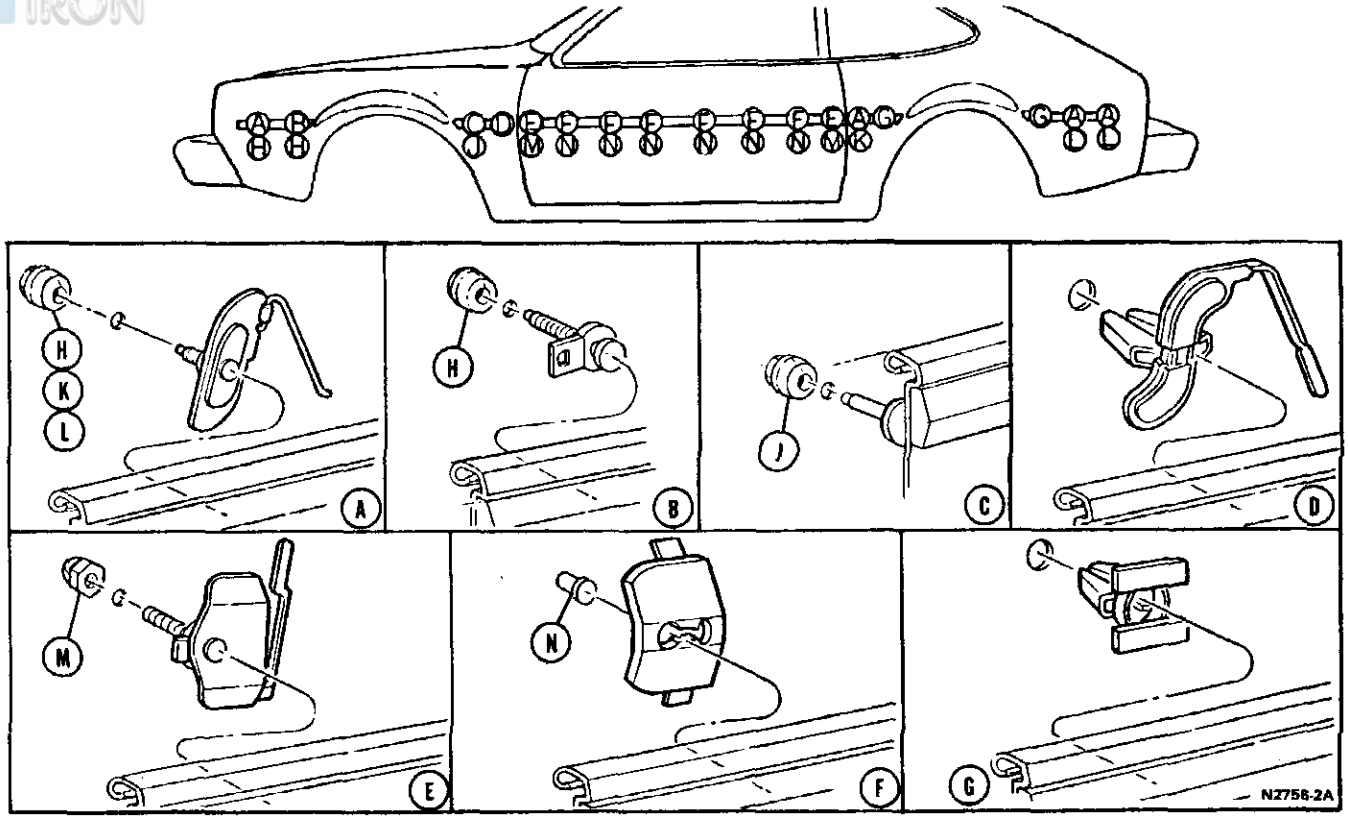


FIG. 8 Optional Vinyl Insert Exterior Side Moulding Installation—Pinto and Bobcat

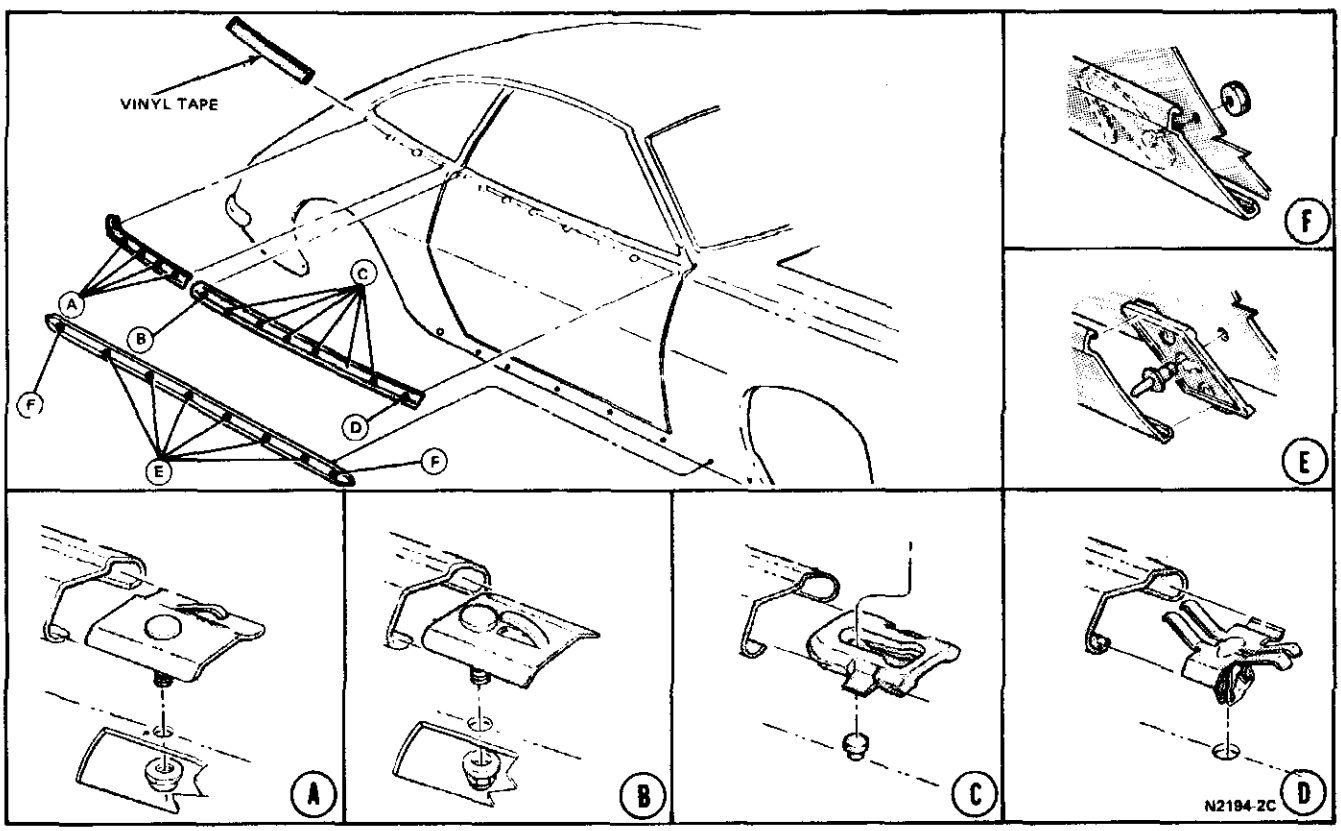
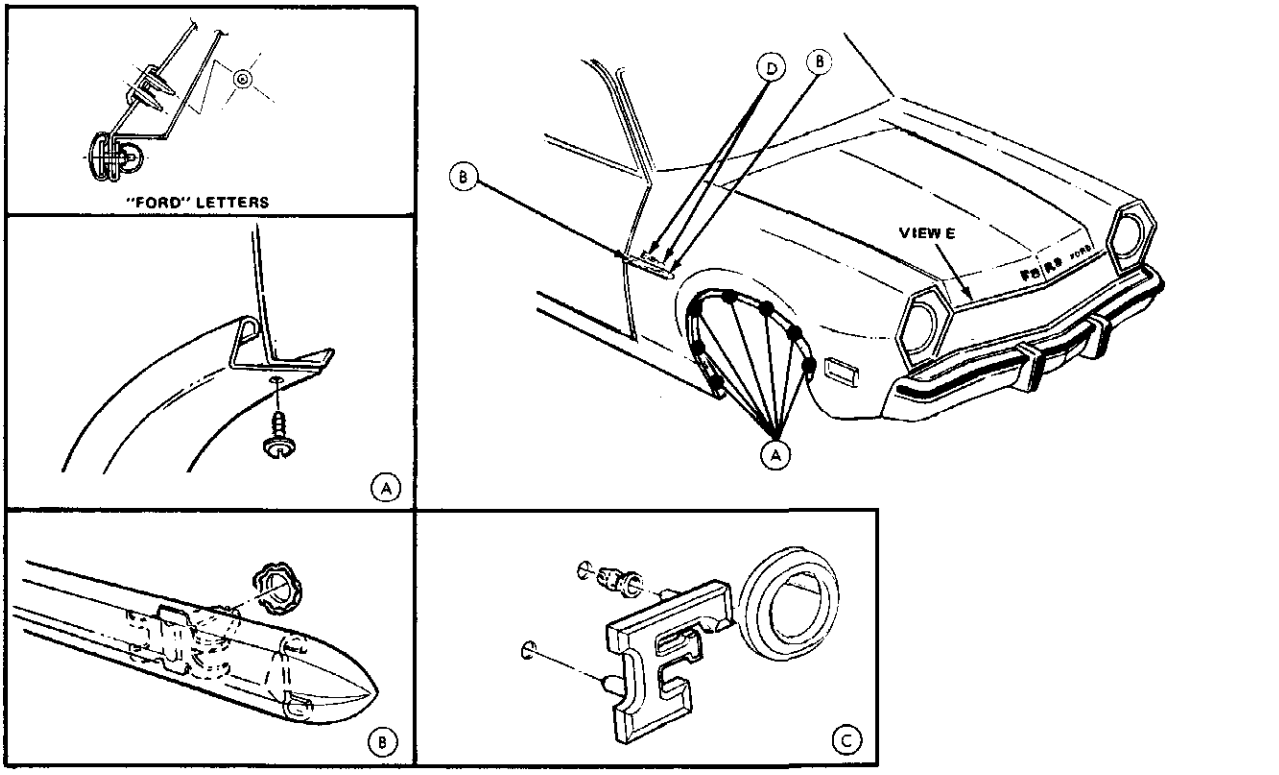


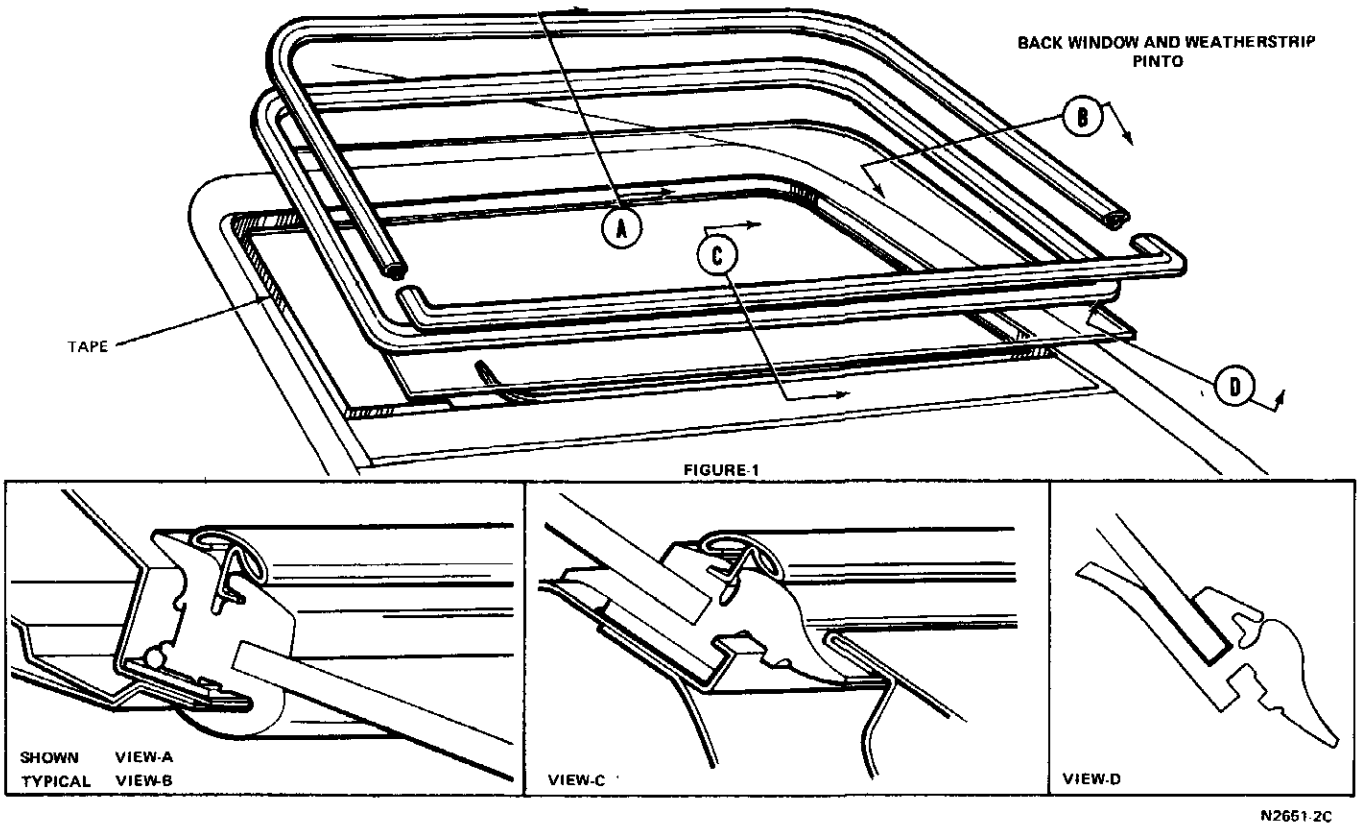
FIG. 9 Optional Body Side Exterior Moulding Installation—Pinto and Bobcat Sedan

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N2193-2C

FIG. 10 Front Fender and Hood Exterior Moulding Installation—Pinto



N2661-2C

FIG. 11 Roof-Outside Rear Exterior Moulding Installation

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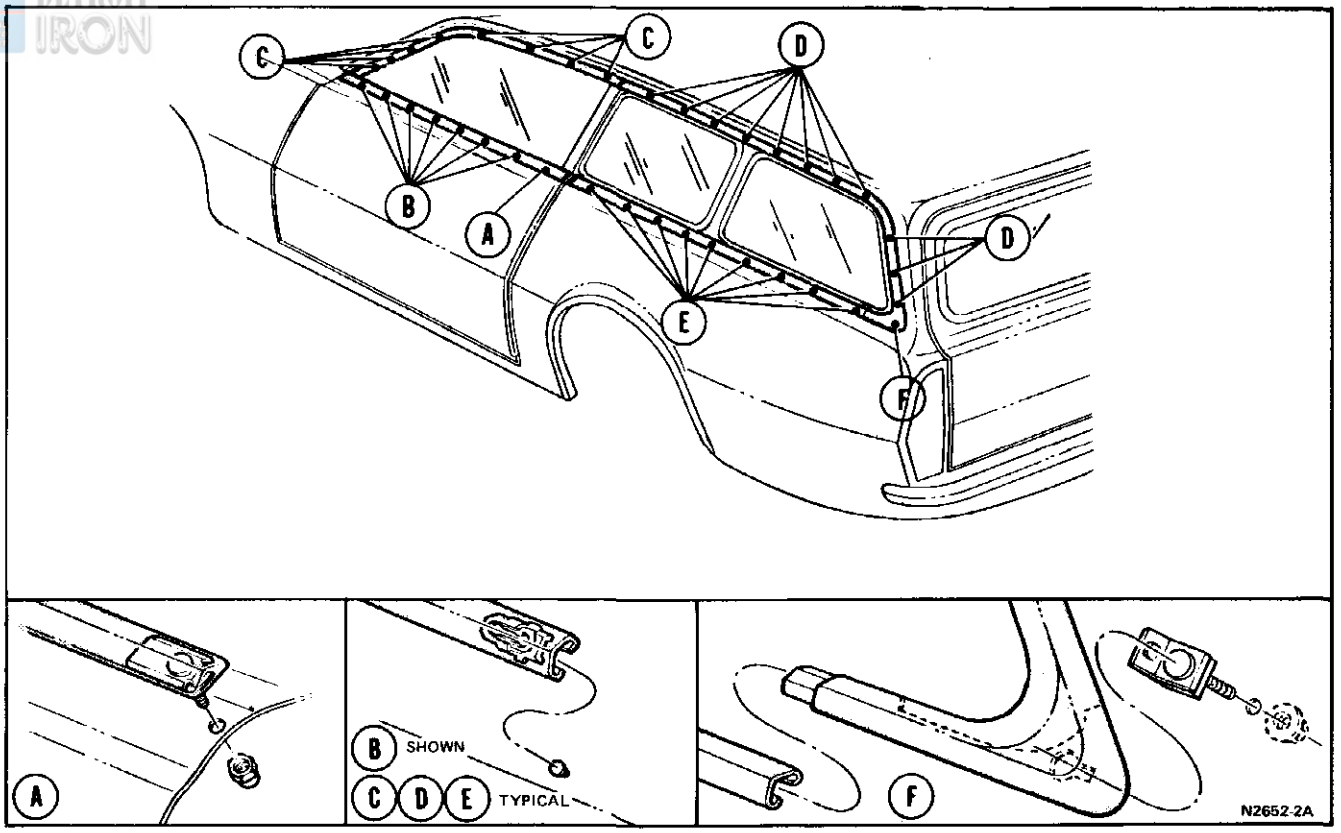


FIG. 12 Belt-Door Window and Quarter Exterior Moulding Installation—Pinto and Bobcat Station Wagon

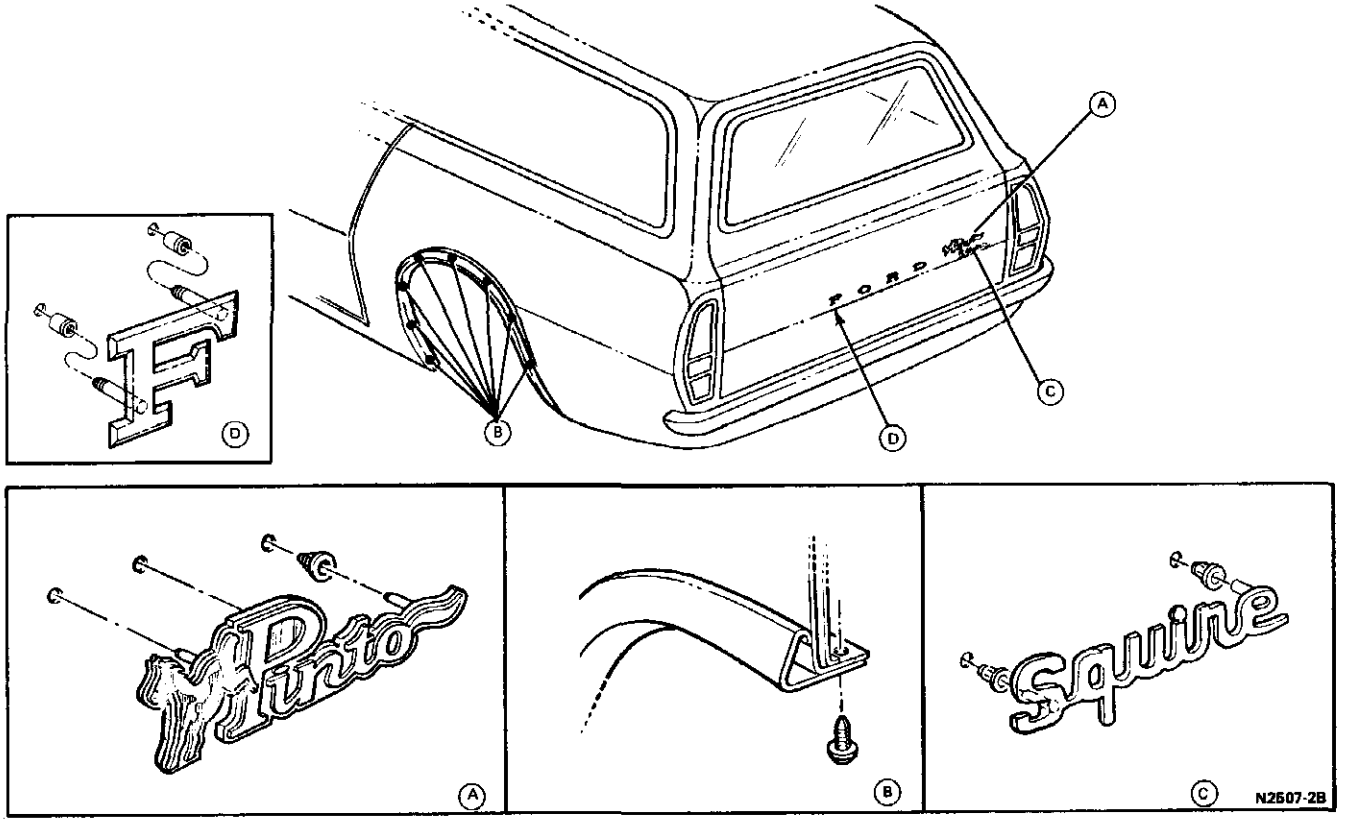


FIG. 13 Body Quarter and Rear Exterior Moulding Installation—Pinto Station Wagon

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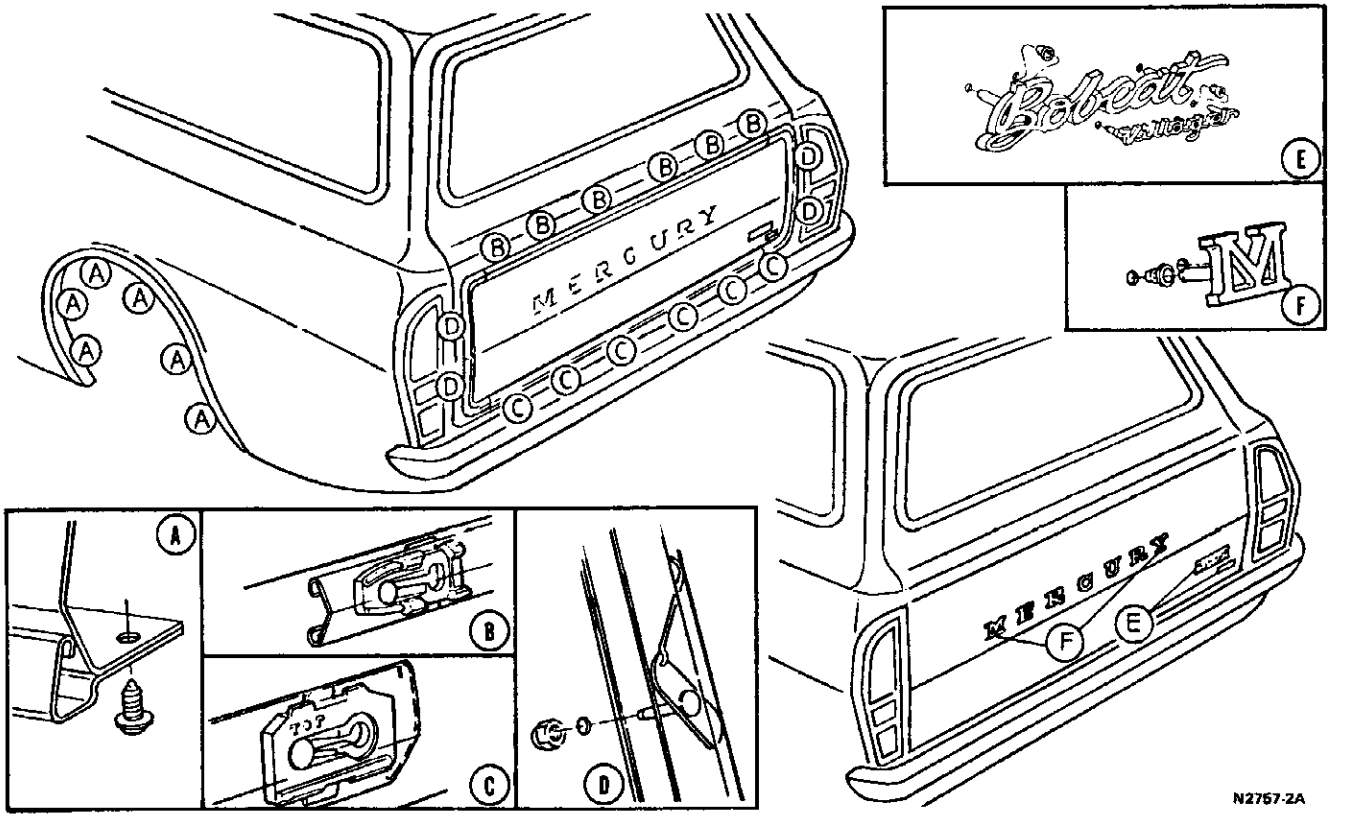


FIG. 14 Body Quarter and Rear Exterior Moulding Installation—Bobcat Station Wagon

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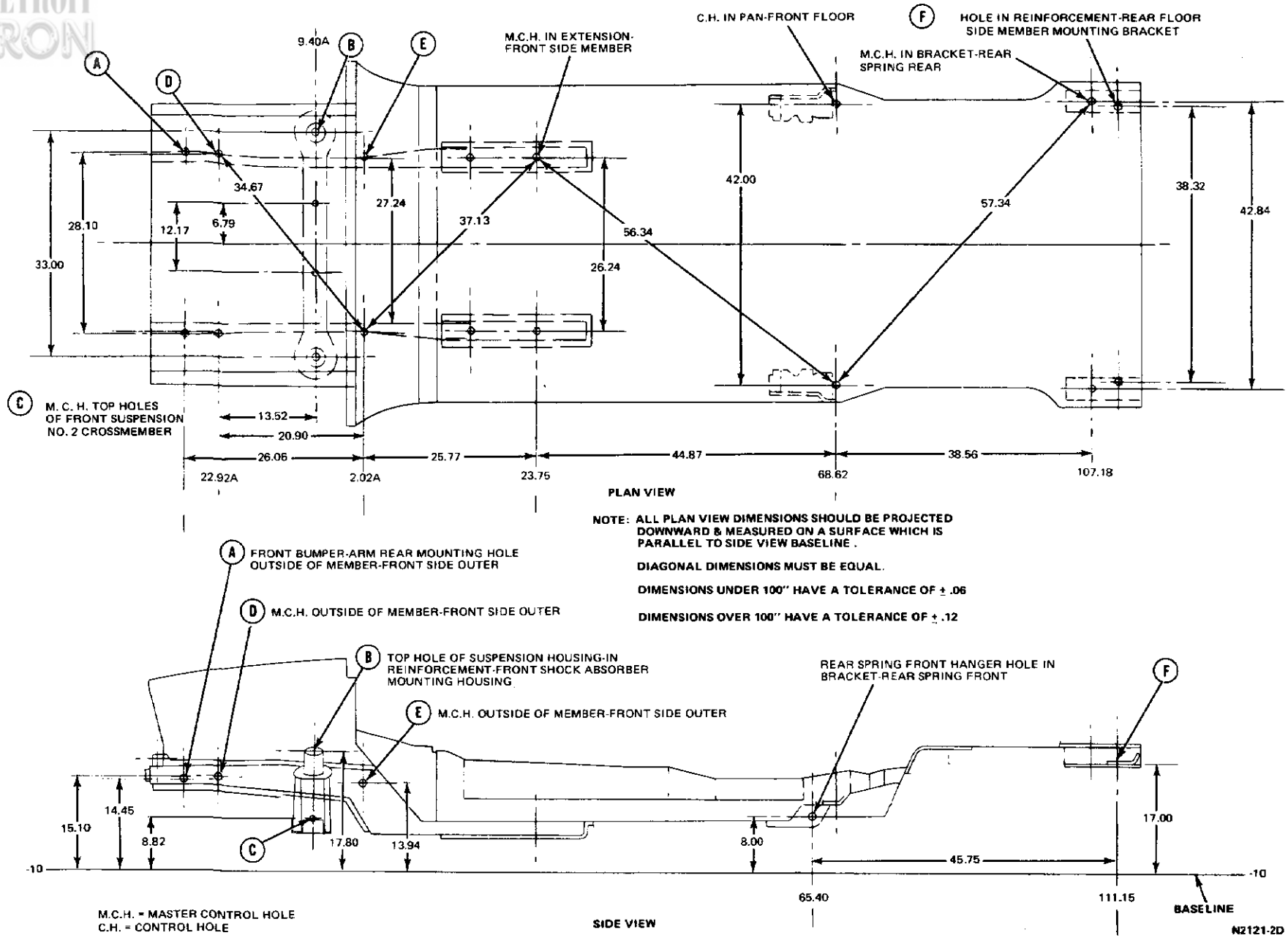


FIG. 15 Underbody Dimensions—Sedan—Pinto and Bobcat

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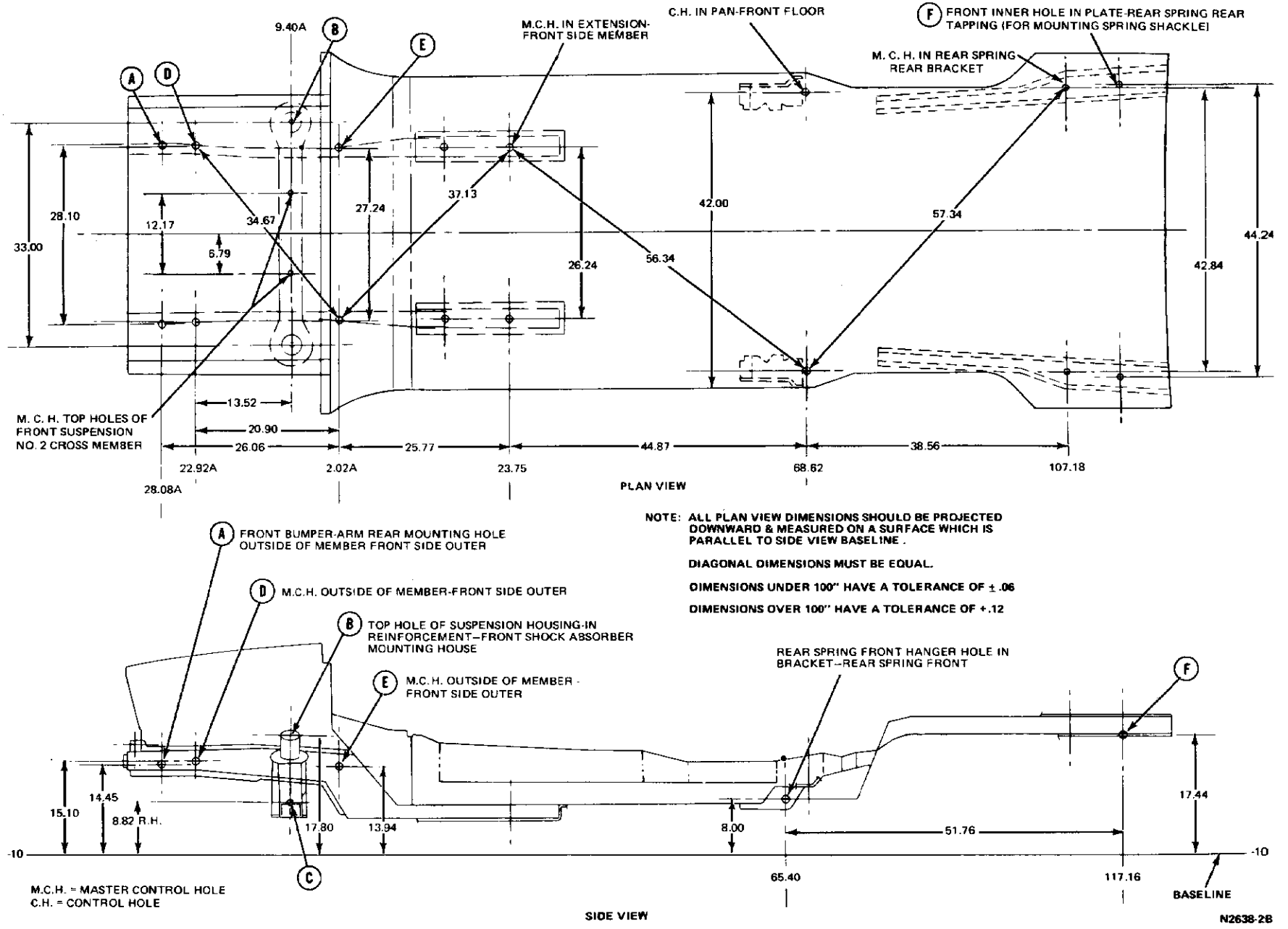


FIG. 16 Underbody Dimensions—Station Wagons—Pinto and Bobcat

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DETROIT IRON

Mustang II

PART 47-10

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CN2878-2B

REMOVAL AND INSTALLATION

RADIATOR GRILLE

Removal

1. Open the hood and remove the two parking lamp bulb and socket assemblies from the parking lamps by rotating the bulb sockets counterclockwise and pulling them out of the lamp body.
2. Remove seven grille attaching screws (Fig. 1), and remove the grille.

Installation

1. If the grille is to be replaced, transfer the parking light bodies to the new grille (2 push-on clips each).
2. Position the grille to the grille opening panel and install the seven attaching screws.
3. Position the bulb sockets to the parking lights, and rotate the bulb socket clockwise to lock it into place.

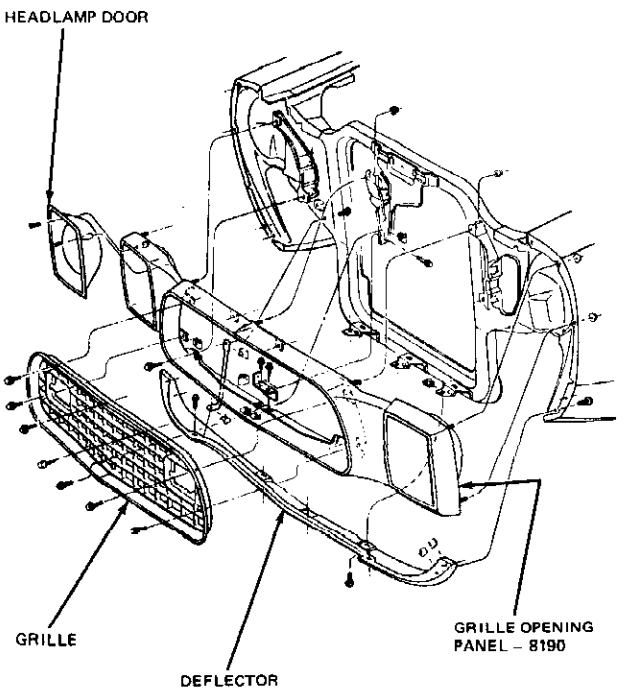
BUMPER—FRONT AND REAR

Removal

1. Remove four bolts attaching the bumper assembly reinforcement to the isolators and remove the bumper from the vehicle.
2. Remove the reinforcement retaining nuts and bolts (Figs. 2 and 3), and separate the reinforcement from the bumper.

Installation

1. If the bumper is to be replaced, transfer the bumper guards and moulding (if so equipped) to the new bumper.
2. Inspect the isolators for fluid leakage. If leakage is found, replace the isolator (Figs. 2 and 3).
3. Position the reinforcement to the bumper and install the retaining nuts and bolts. Tighten the bolts to specification (Figs. 2 and 3).
4. Position the bumper assembly to the isolator and install the attaching bolts.
5. Adjust the bumper height so that the distance from the top edge to ground meets the specifications in Fig. 4. Then, adjust the bumper for body clearance so that the horizontal body to bumper dimensions meet the specifications in Fig. 4. Tighten the isolator-to-reinforcement bolts to 35-50 ft-lbs torque.



N1792-1E

FIG. 1 Radiator Grille Installation—Mustang II

Bumper Guard Rub Strips

Do not remove the bumper guard(s) to replace the bumper guard rub strip(s). Refer to Steps 1 and 2 (Fig. 5) for removal procedures.

Installation

1. Partially insert new spring clips (if needed) into holes in guards.
2. Engage "Tee Bars" on back of rub strip into the head of the clips.
3. Drive the rub strip down with a sharp blow of a **soft-face** mallet over the top clip, and then the bottom clip.

Front and Rear Bumper Rub Strips

Removal

1. Remove the bumper assembly from the isolators.

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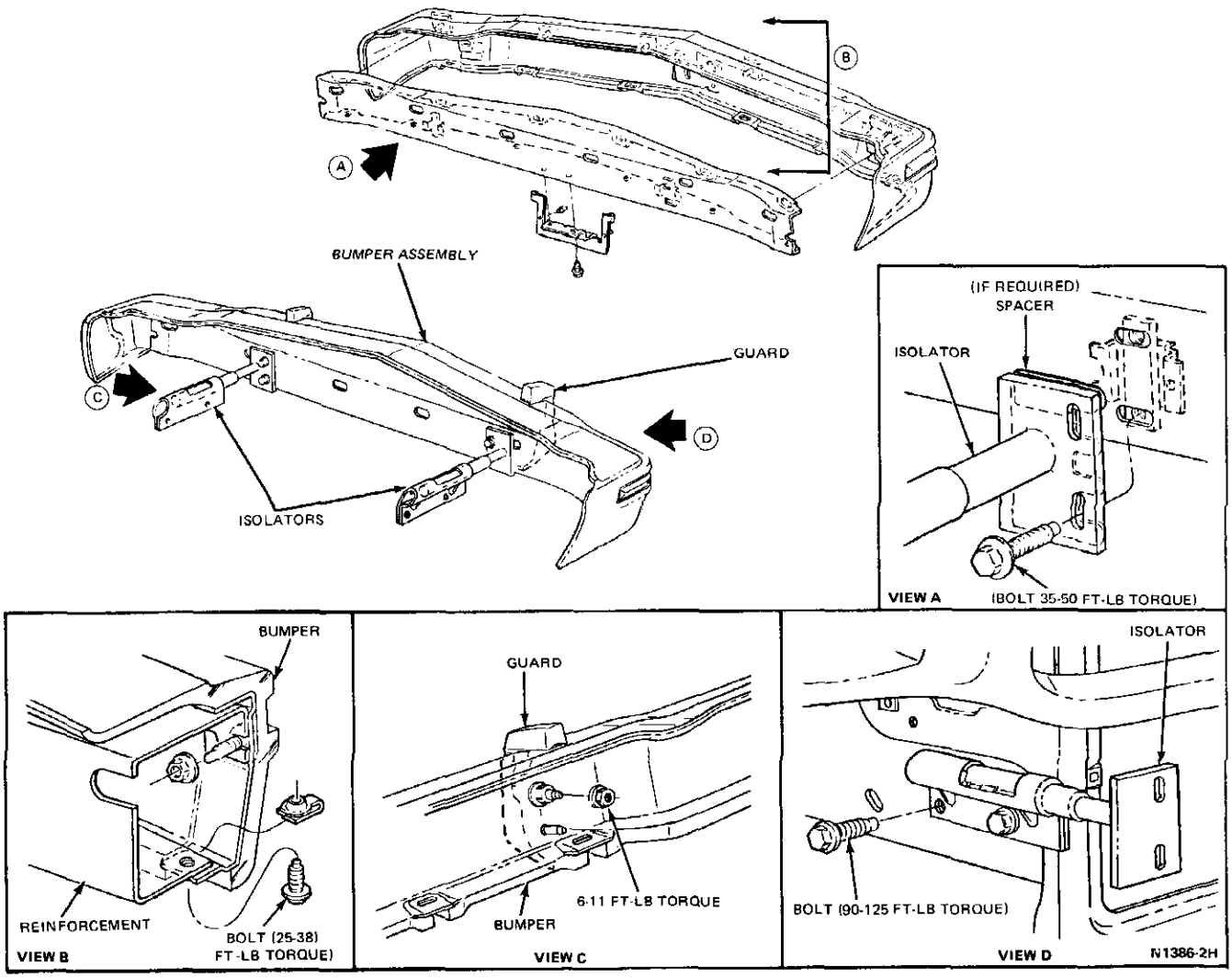


FIG. 2 Front Bumper Installation—Mustang II

2. Place the bumper assembly on a clean work bench to protect the painted surface while removing the rub strips.
3. Remove the bumper guards (if so equipped).
4. From the back side, remove two nuts (one at each end) attaching the end rub strip sections.
5. Using a hammer, drive the metal spring clips outward. ***Do this only on the rub strip to be replaced.***
6. From the front of the bumper, use a screwdriver to pry off the damaged rub strip. **Protect the surface with masking tape before using the screwdriver so as not to damage the surface of the bumper.**

Installation

1. *Insert spring clips in holes in bumper. If 386787* clips are used, insert the long tip to full depth using a light mallet. If 387044 clips are used, insert by hand and only to the depth of the barbs.
2. Insert retainer(s) at end of rub strip, placing threaded end(s) in hole(s) in bumper, while inserting rub strip into pocket in end of bumper.
3. Engage the "Tee Bars" on back of rub strip(s) into the heads of the spring clips.
4. Drive the rub strip(s) down with a sharp blow of a **soft-face** mallet over each spring clip.
5. Install the end retaining nuts.
6. Install the bumper guards (if so equipped) and tighten the retaining nuts 6-11 ft-lbs torque.
7. Install the reinforcement to the bumper if it was removed and tighten the retaining bolts and nuts to specification (Figs. 2 and 3).
8. Install the bumper to the isolator, adjust the bumper height (Fig. 4) and tighten isolator-to-reinforcement bolts 35-50 ft-lbs torque.

EXTERIOR MOULDINGS

Before removing the exterior mouldings, it should be determined by the type of retainer used whether a respective door, quarter or luggage compartment trim panel must first be removed to provide access (Figs. 6 through 9). If a weld stud is distorted or broken off, it should be replaced with an oval head blind rivet (383229-S). Refer to General Information (Part 47-01)

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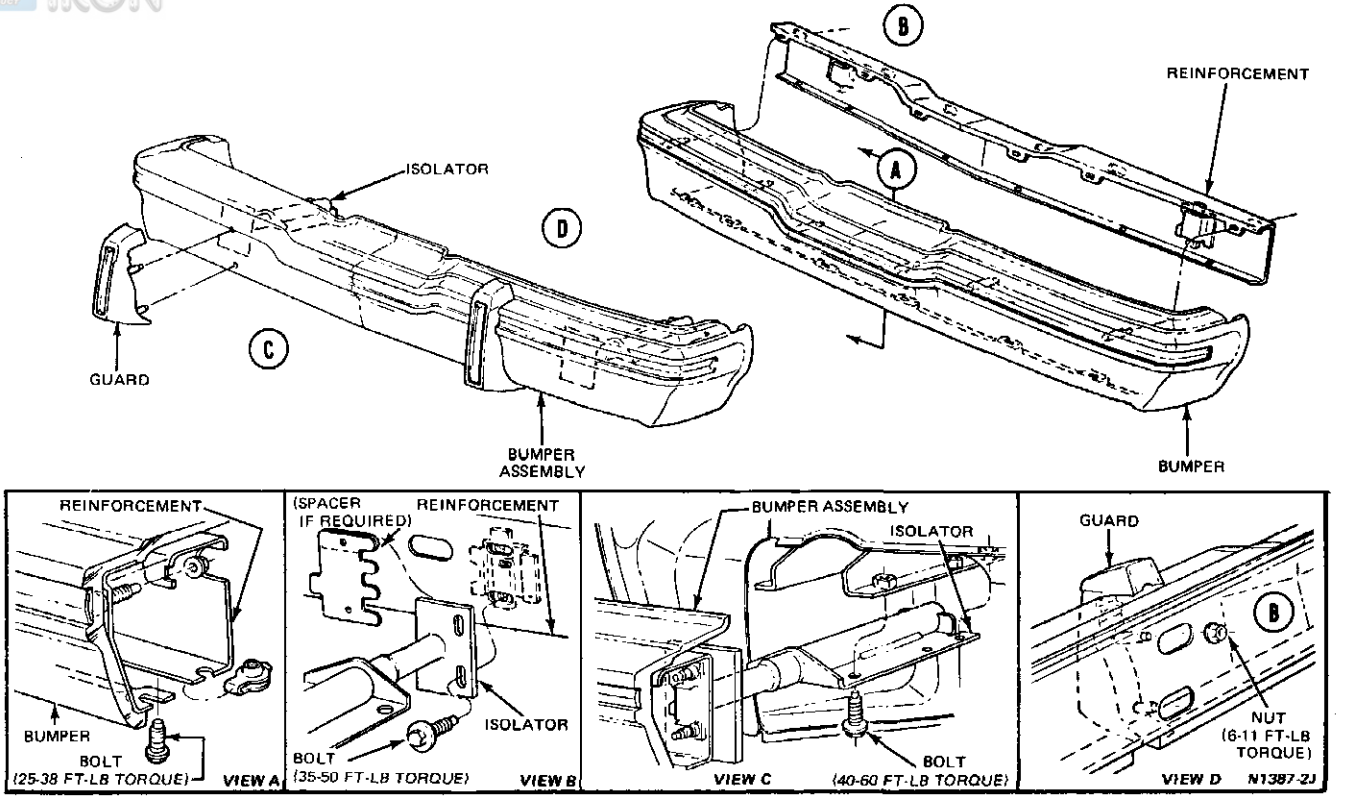


FIG. 3 Rear Bumper Installation—Mustang II

for installation of Pressure Sensitive Tape Type (Body Side Protection Mouldings).

UNDERBODY DIMENSIONS

The Mustang II under body dimensions are shown in Fig. 10. The under body checking dimensions are given in Part 47-01.

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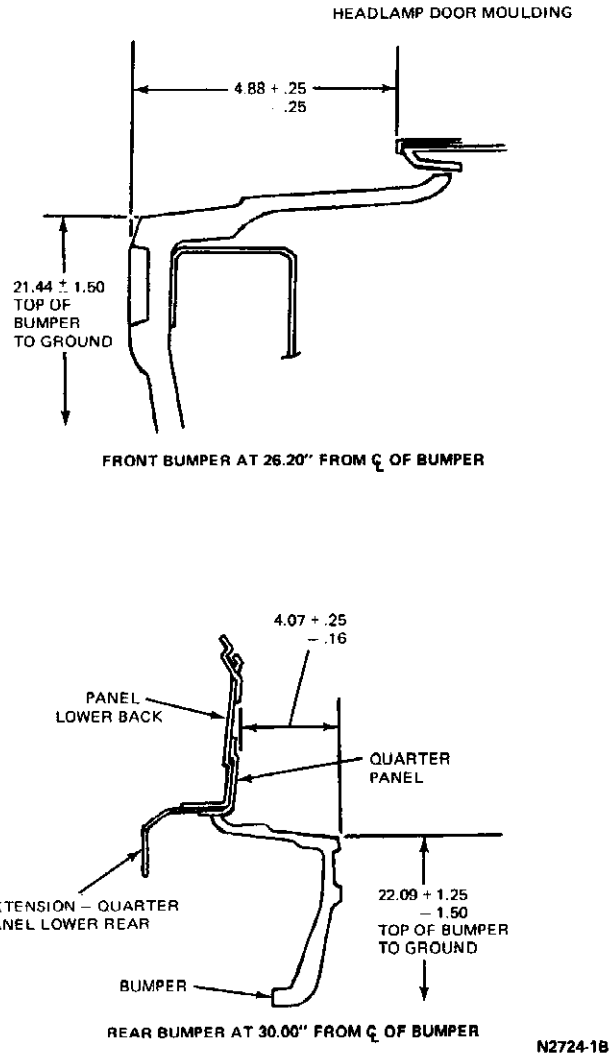
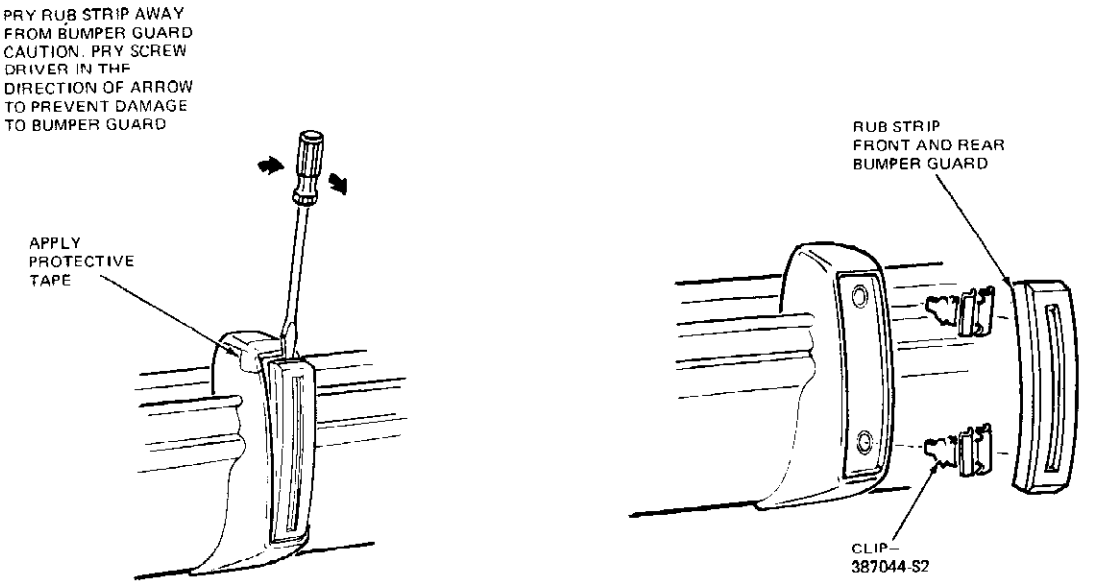
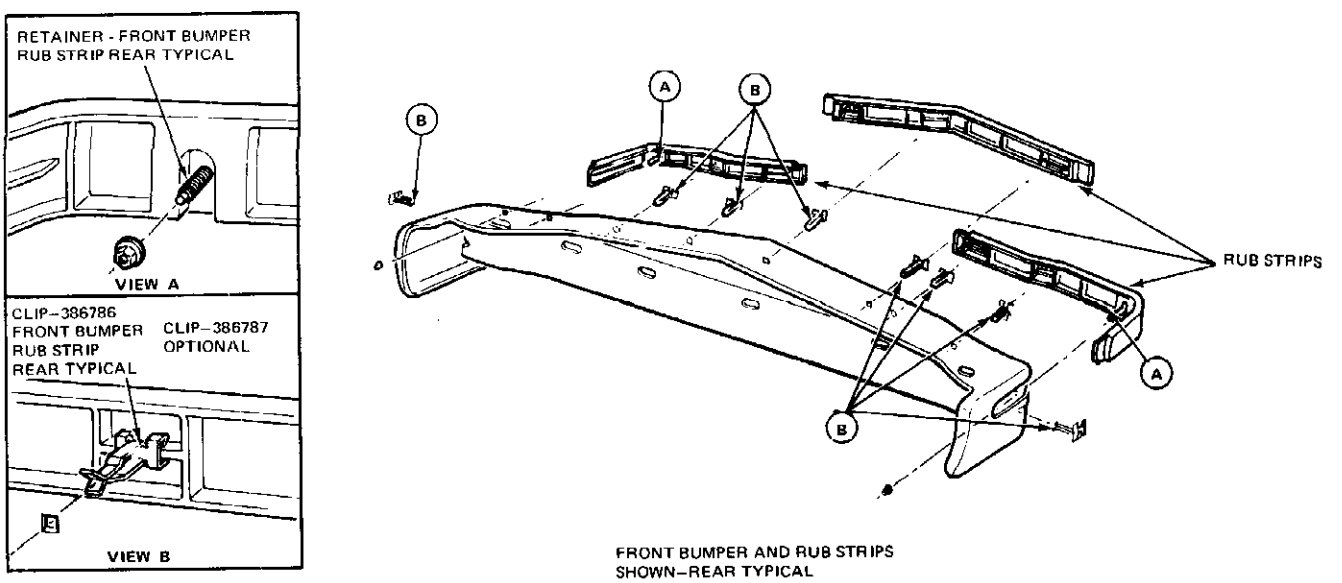


FIG. 4 Bumper Adjustment Specifications—Mustang II

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BUMPER GUARD RUB STRIP REMOVAL



FRONT BUMPER AND RUB STRIPS SHOWN–REAR TYPICAL

N2775-2B

FIG. 5 Front Bumper Rub Strips Removal—Rear Similar

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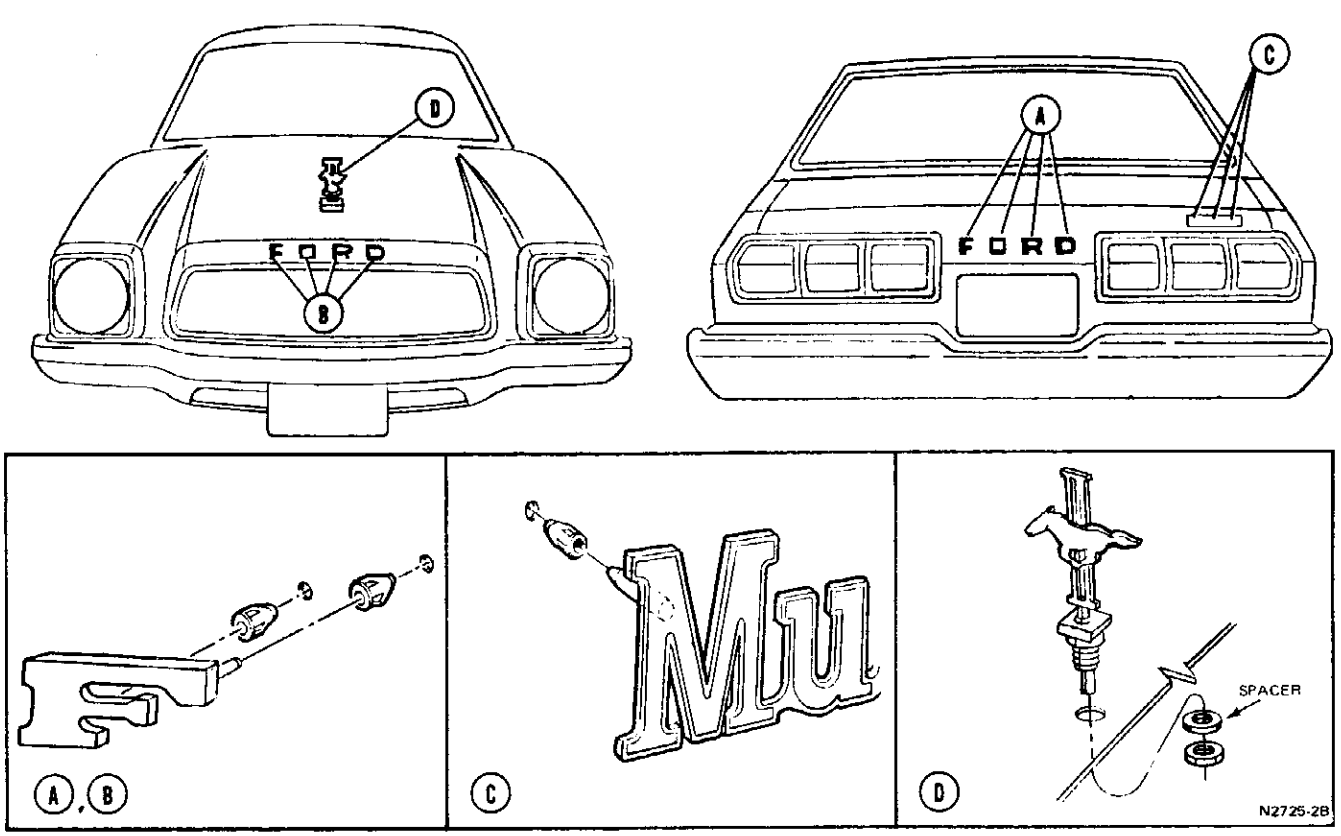


FIG. 6 Front and Rear Moulding Installation—Mustang II

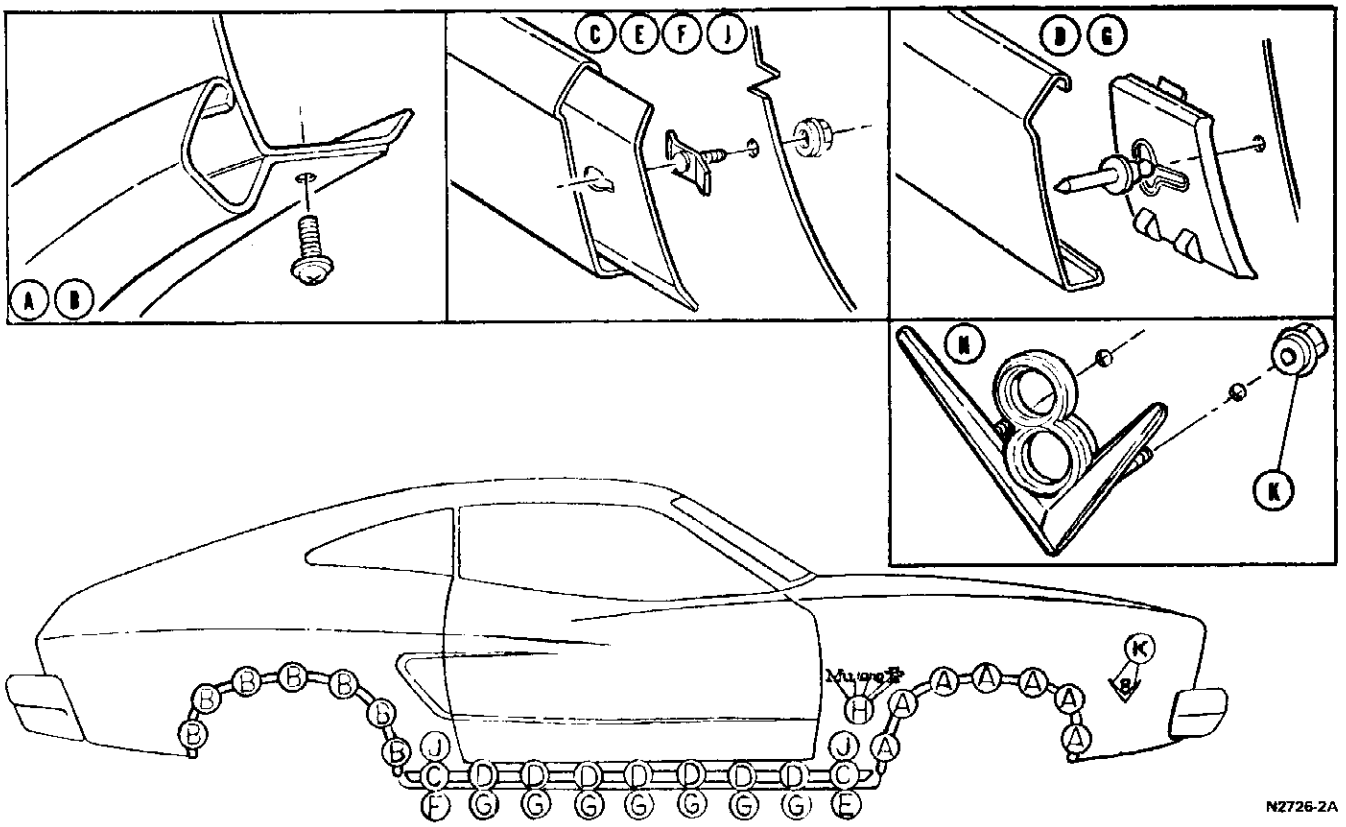
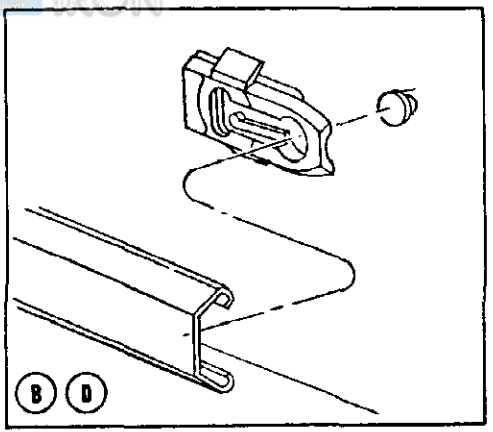
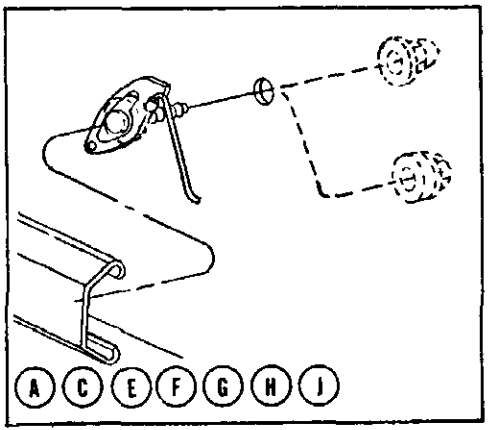
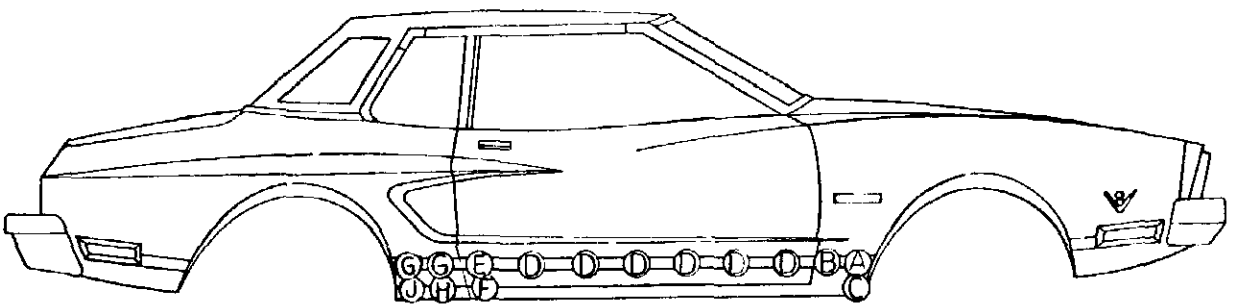


FIG. 7 Exterior Side Moulding Installation—Mustang II

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N2727-2A

FIG. 8 Exterior Side Moulding Installation—Mustang II

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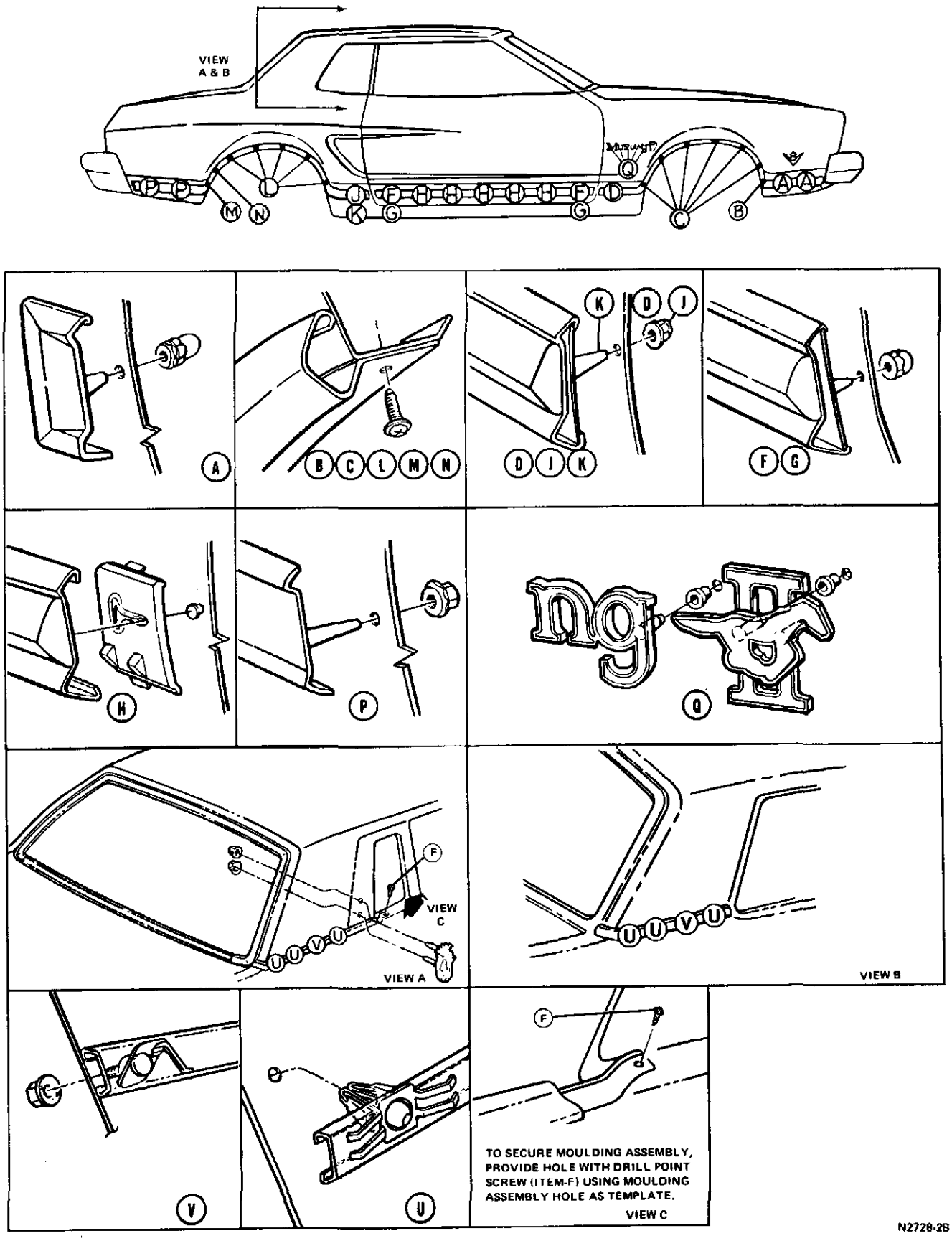


FIG. 9 Exterior Side Moulding Installation—Mustang II

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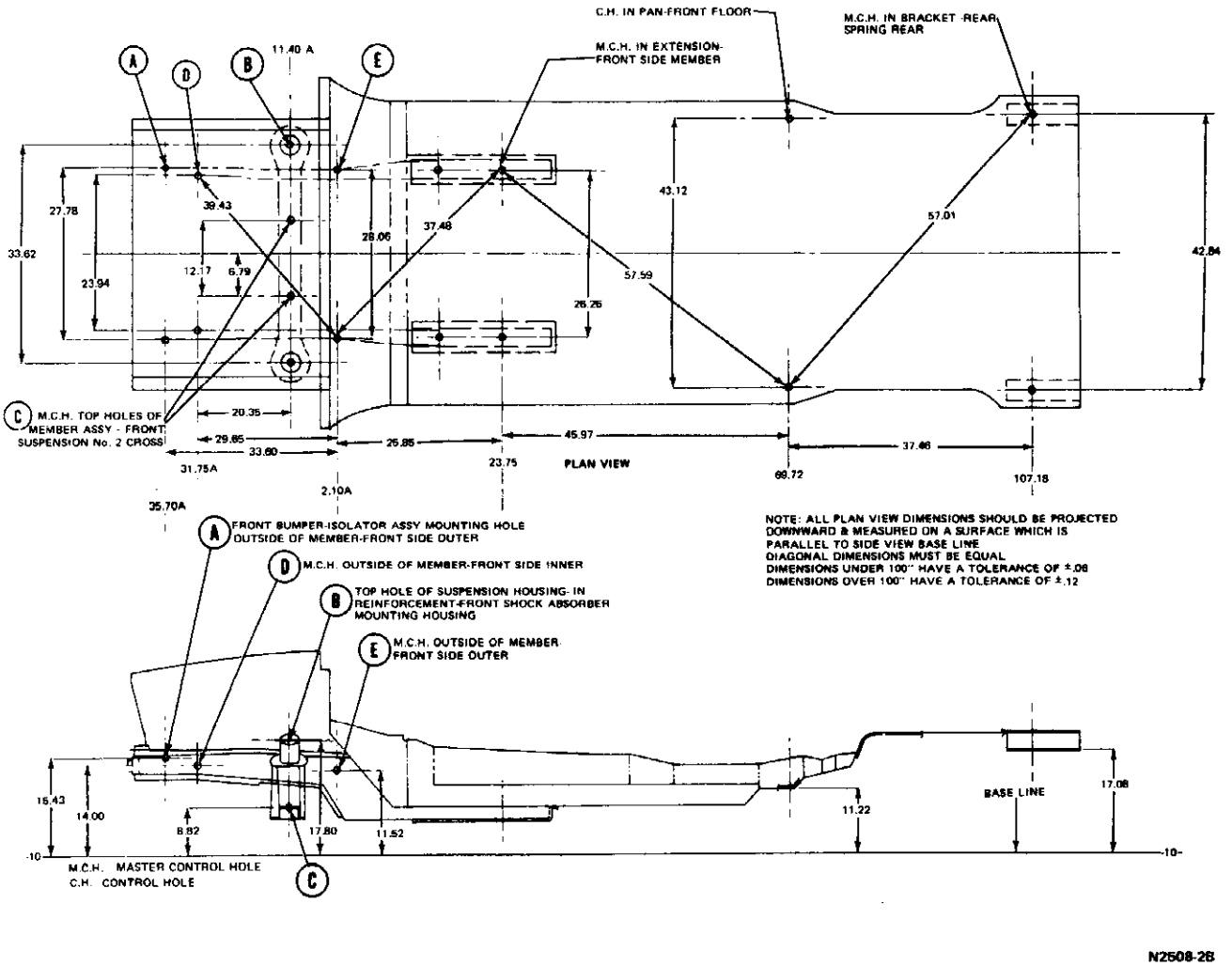


FIG. 10 Underbody Dimensions—Mustang II

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Monarch and Granada

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REMOVAL AND INSTALLATION

RADIATOR GRILLE

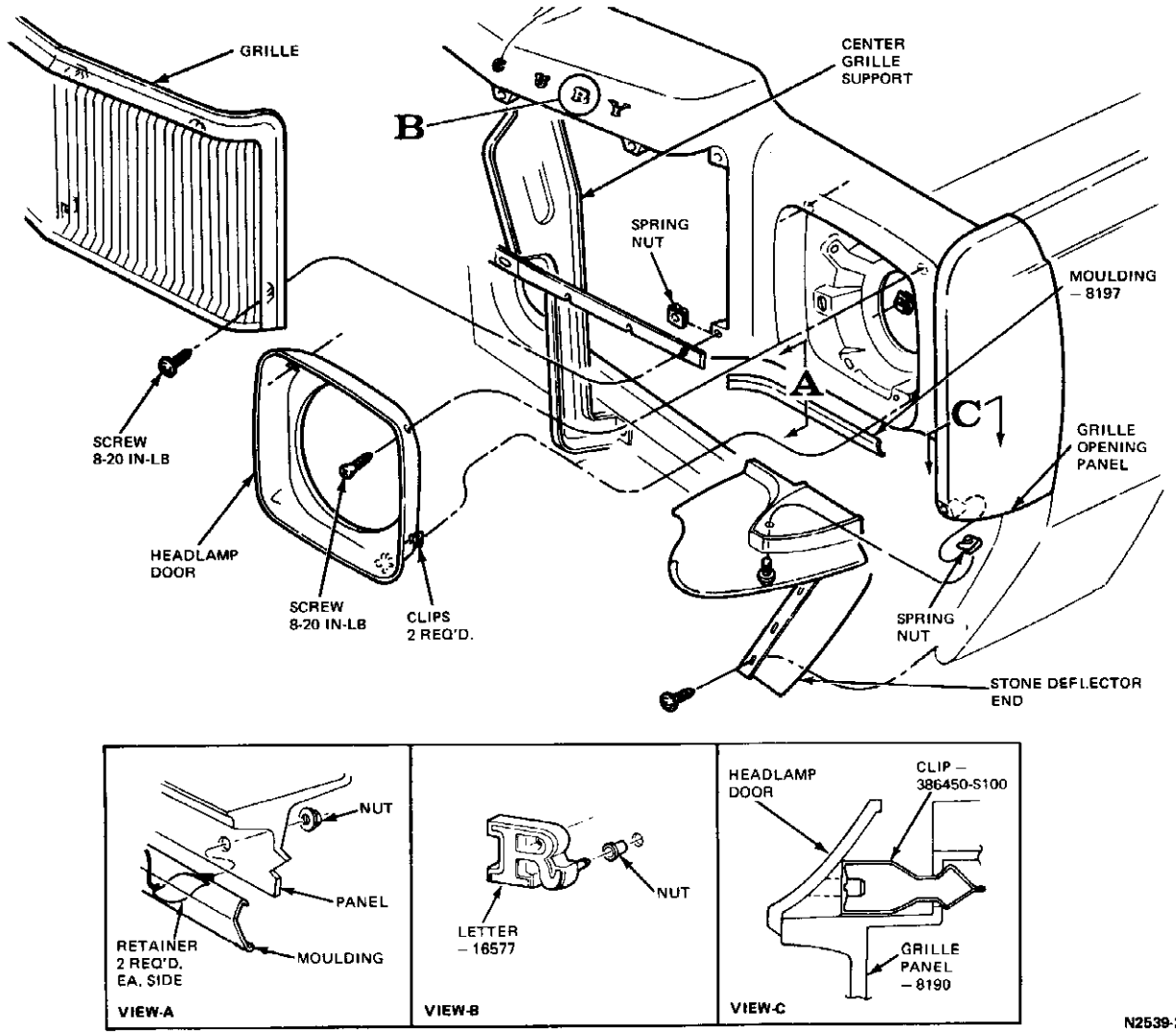
GRANADA AND MONARCH (FIG. 1)

Removal

1. Remove seven screws attaching radiator grille assembly to the grille opening panel.
2. Remove the radiator grille assembly.

Installation

1. Position the radiator grille assembly to the radiator grille opening panel and secure with seven screws.



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FIG. 1 Grille Installation—Granada and Monarch

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AIR DEFLECTOR (FIG. 1)

GRANADA AND MONARCH

Removal

1. Remove radiator and deflector upper attachments.

Installation

1. Install screw in round hole of deflector for the first attachment to the grille opening panel.
2. Install remaining screws making sure deflector is sealing to underside of grille opening panel.

FRONT BUMPER

Removal

1. Remove three (3) bolts attaching each isolator to the bumper reinforcement and, with an assistant, remove the bumper and reinforcement from the vehicle.
2. Remove the reinforcement- to-bumper and end bracket to bumper attaching bolts and separate the reinforcement from the bumper and end bracket (Fig. 2).
3. Remove the bumper guards and pads from the bumper.
4. Remove the license plate mounting bracket from the bumper.
5. If the reinforcement is to be replaced, remove the sight shield attaching bolts and remove the top sight shield and cooling ducts from the reinforcement.

Installation

1. Install the bumper guards and pads on the bumper. Install the license plate bracket.
2. Position the cooling ducts and sight shields to the reinforcement and install attaching bolts.
3. Position bumper end brace between bumper and reinforcement and install bumper attaching bolts.
4. Install the bumper center stone deflector to reinforcement.
5. Position the bumper and spacers to the isolators and install the attaching bolts.
6. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications

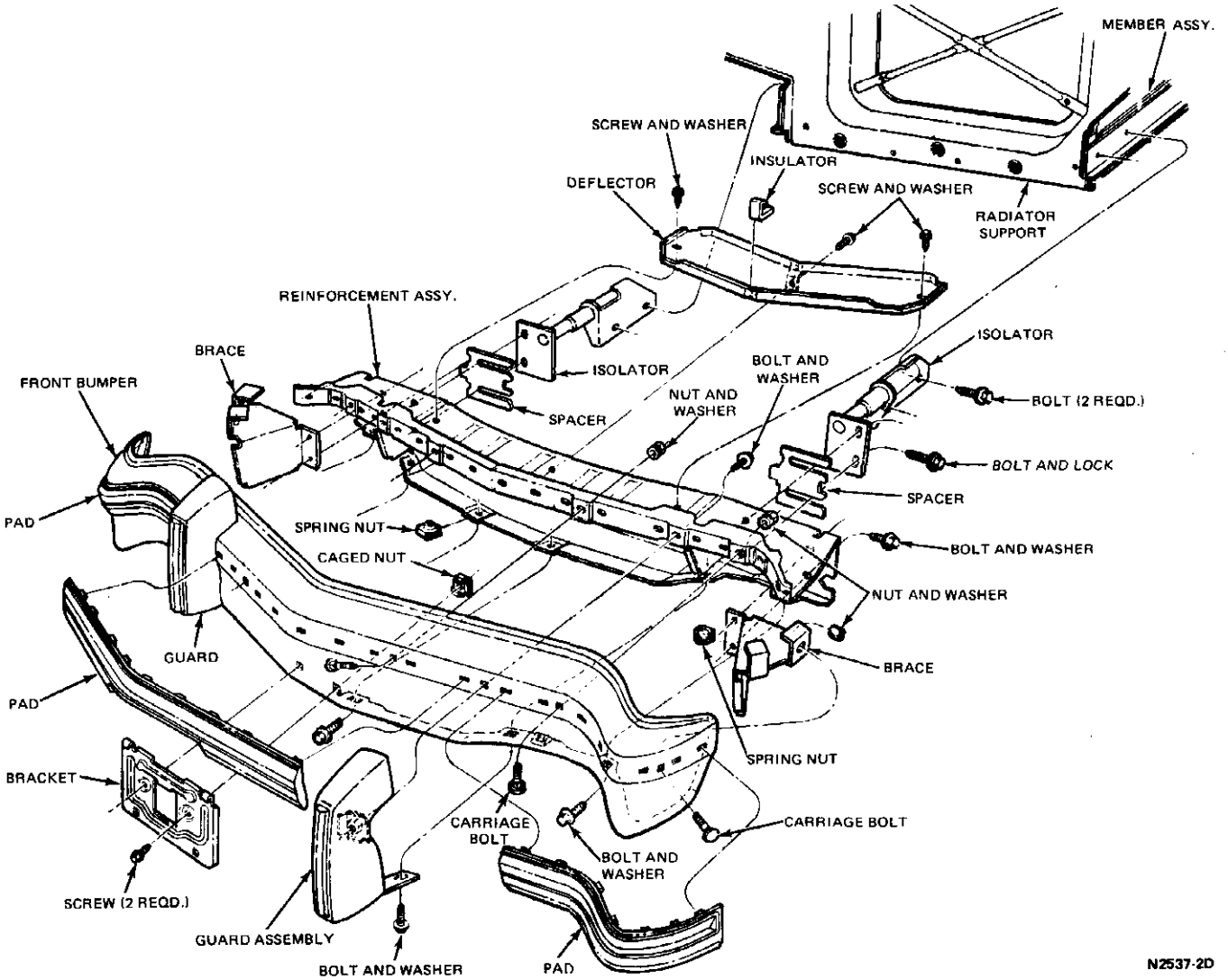


FIG. 2 Front Bumper Installation—Granada and Monarch

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in Fig. 3. Then, adjust the bumper for body clearance at the centerline of the parking lamp so that the vertical and horizontal body to bumper dimensions meet the specifications in Fig. 3. Tighten the isolator- to-reinforcement bolts to 35-50 ft-lbs torque.

7. Lift up the end sight shields. Apply 2-way tape to the center shield, remove top protective backing and press down firmly on end shield to obtain a flush fit.

REAR BUMPER

Removal

1. Disconnect the license plate lamp wire from the underbody harness.

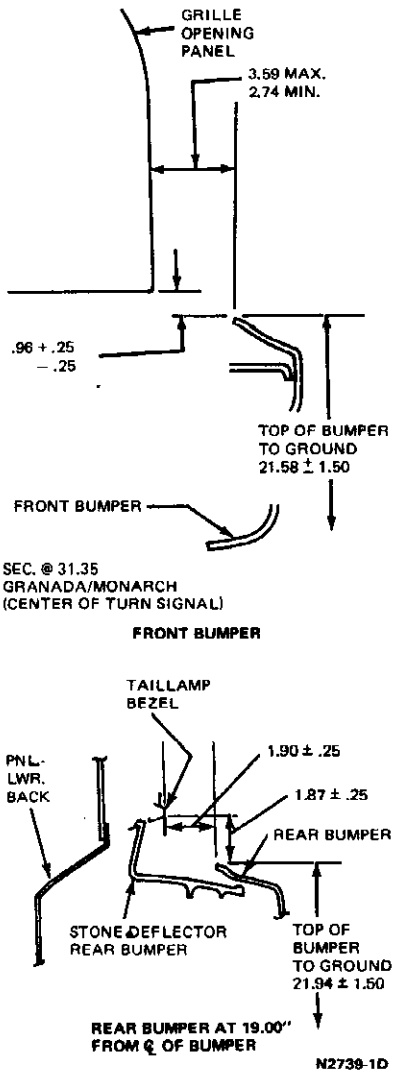


FIG. 3 Bumper Adjustment Specifications—Granada and Monarch

2. Remove two bolts attaching the reinforcement to each isolator, and remove the bumper assembly.

3. Remove the license bracket from the bumper. Remove two screws retaining license plate light to the reinforcement and remove the light.

4. Remove the nuts and bolts attaching the reinforcement to the bumper, and separate the reinforcement and bumper guards (if so equipped) from the bumper (Fig. 4).

Installation

1. Position the reinforcement and bumper guards (if equipped), to the bumper and install the bolts and nuts. Tighten nuts to specification given in Fig. 4.

   NOTE: Reinstallation of the end brackets is optional. If the end brackets are not installed and the bumper has holes provided for attaching the brackets, install the bolts and nuts into the holes.

2. Install the license bracket on bumper, and tighten bolts to specification (Fig. 4). Install the license light to the reinforcement (two screws). Route the wire through the hole in the back of the reinforcement.

3. Position bumper assembly to the isolator and install the attaching bolts.

4. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Fig. 3. Then, adjust the bumper for body clearance so that the vertical and horizontal body to bumper dimensions meet the specifications in Fig. 3. Tighten the isolator- to-reinforcement bolts to 35-50 ft-lbs torque.

EXTERIOR MOULDINGS

Before removing the exterior mouldings, it should be determined by the type of retainer used whether a respective door, quarter or luggage compartment trim panel must first be removed to provide access (Figs. 5 thru 8). If a weld stud is distorted or broken off, it should be replaced with an oval head blind rivet (Part No. 383229-S). Refer to General Information (Part 47-01) for installation of Pressure Sensitive Tape Type (Body Side Protection Mouldings).

UNDERBODY DIMENSIONS

The Granada and Monarch underbody dimensions are shown in Fig. 9. The underbody checking and repair procedures are given in Part 47-01.

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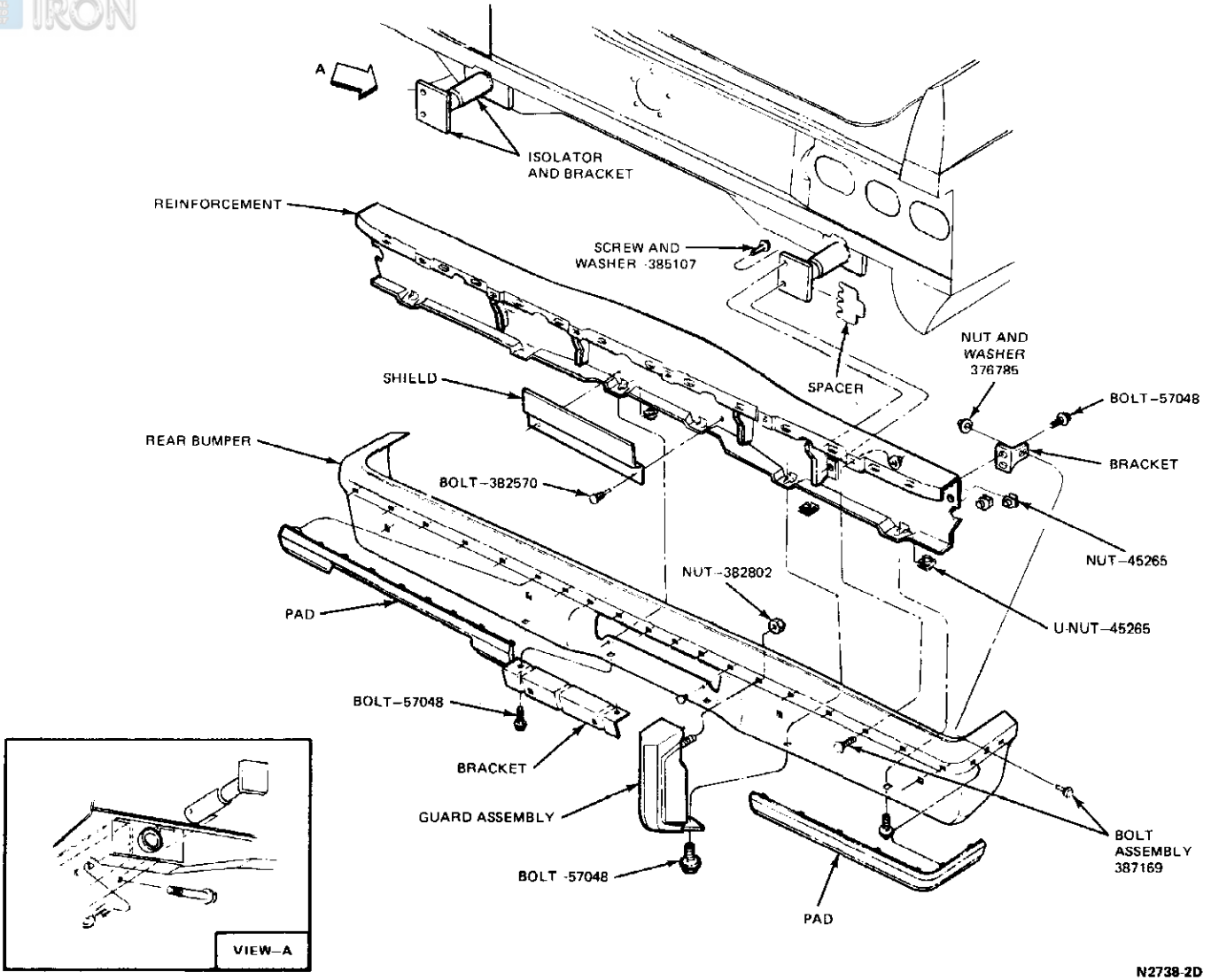


FIG. 4 Rear Bumper Installation—Granada and Monarch

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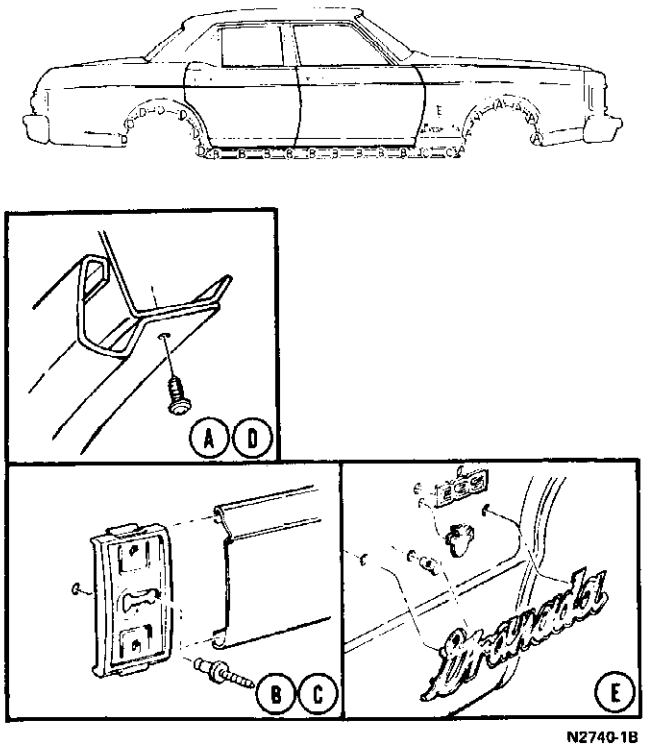


FIG. 5 Exterior Side Moulding Installation—Granada Shown—Monarch Typical

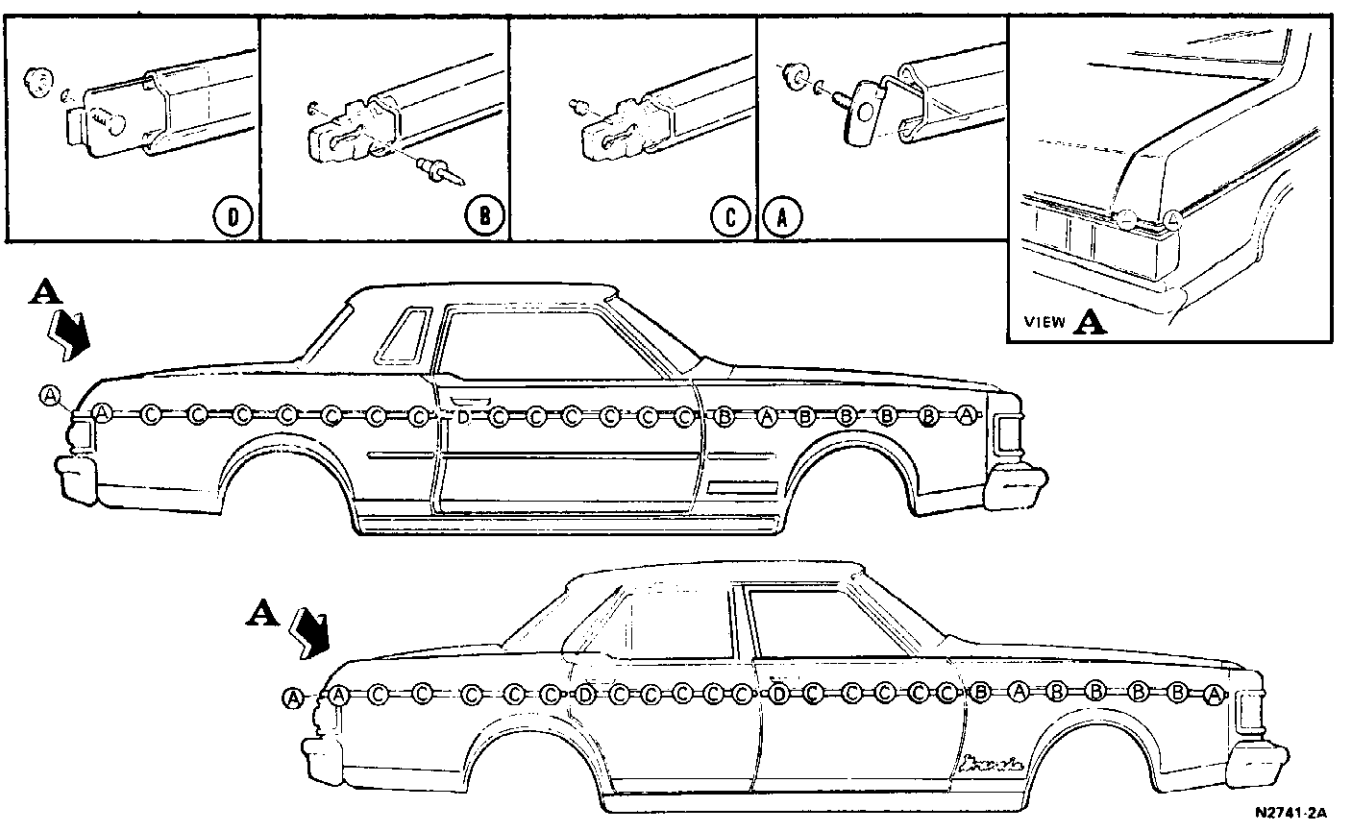


FIG. 6 Exterior Side Moulding Installation—Granada Shown—Monarch Typical

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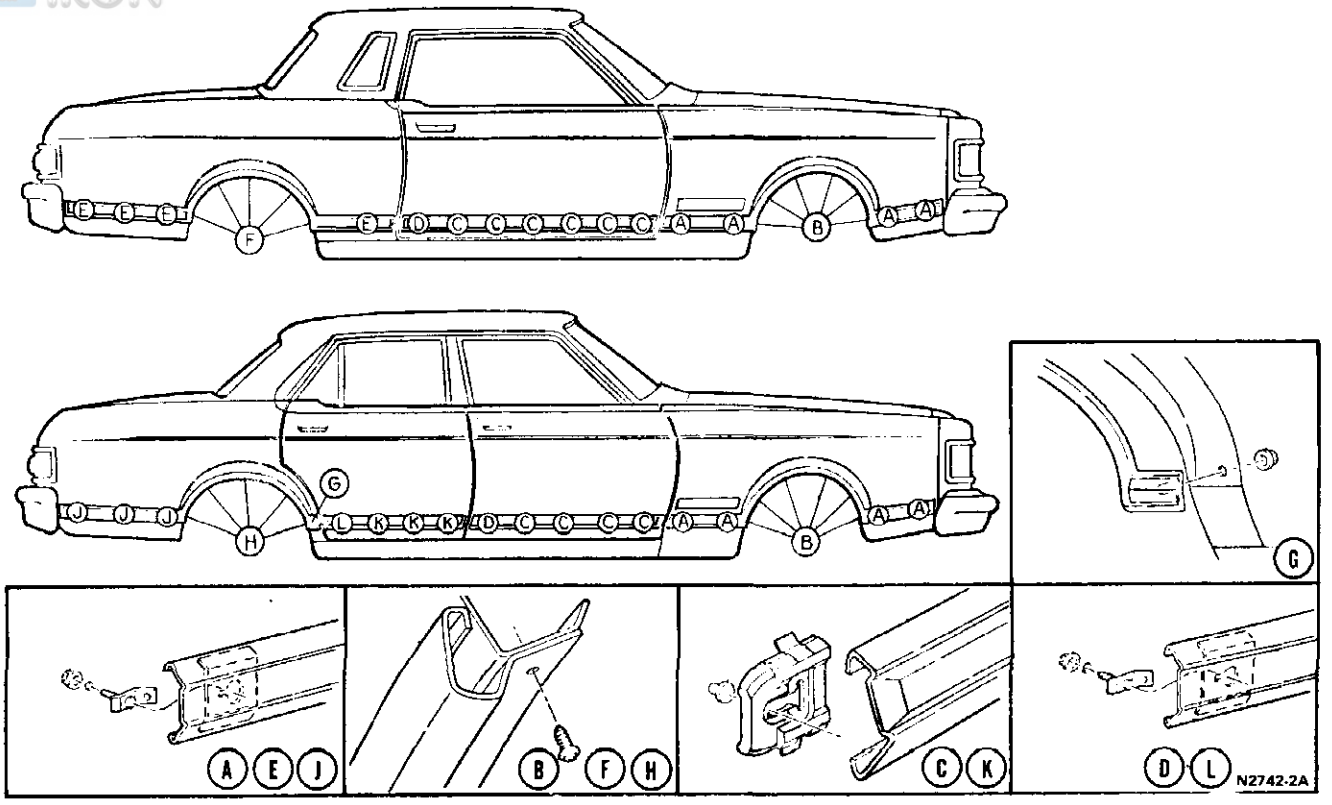


FIG. 7 Exterior Side Moulding Installation—Granada Shown—Monarch Typical

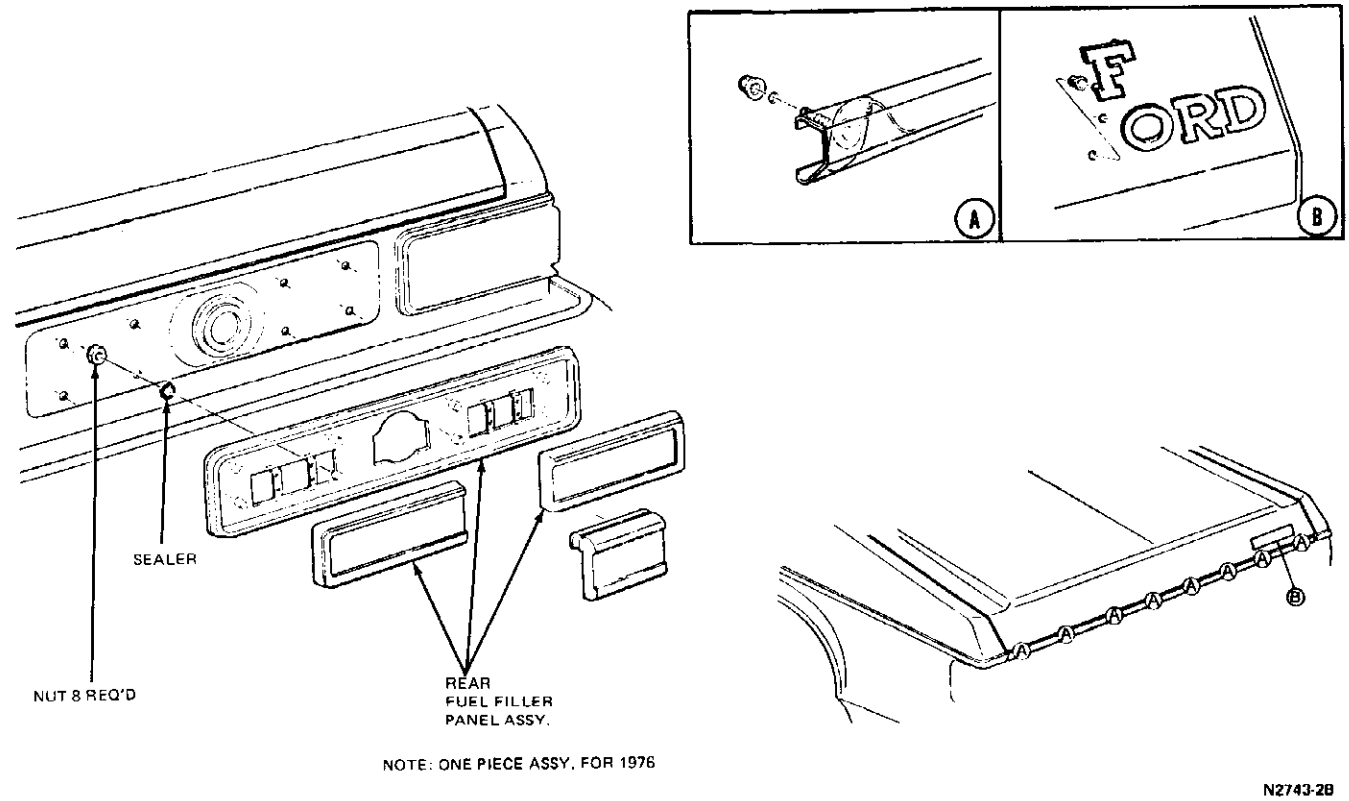


FIG. 8 Rear Exterior Moulding Installation—Granada Shown—Monarch Typical

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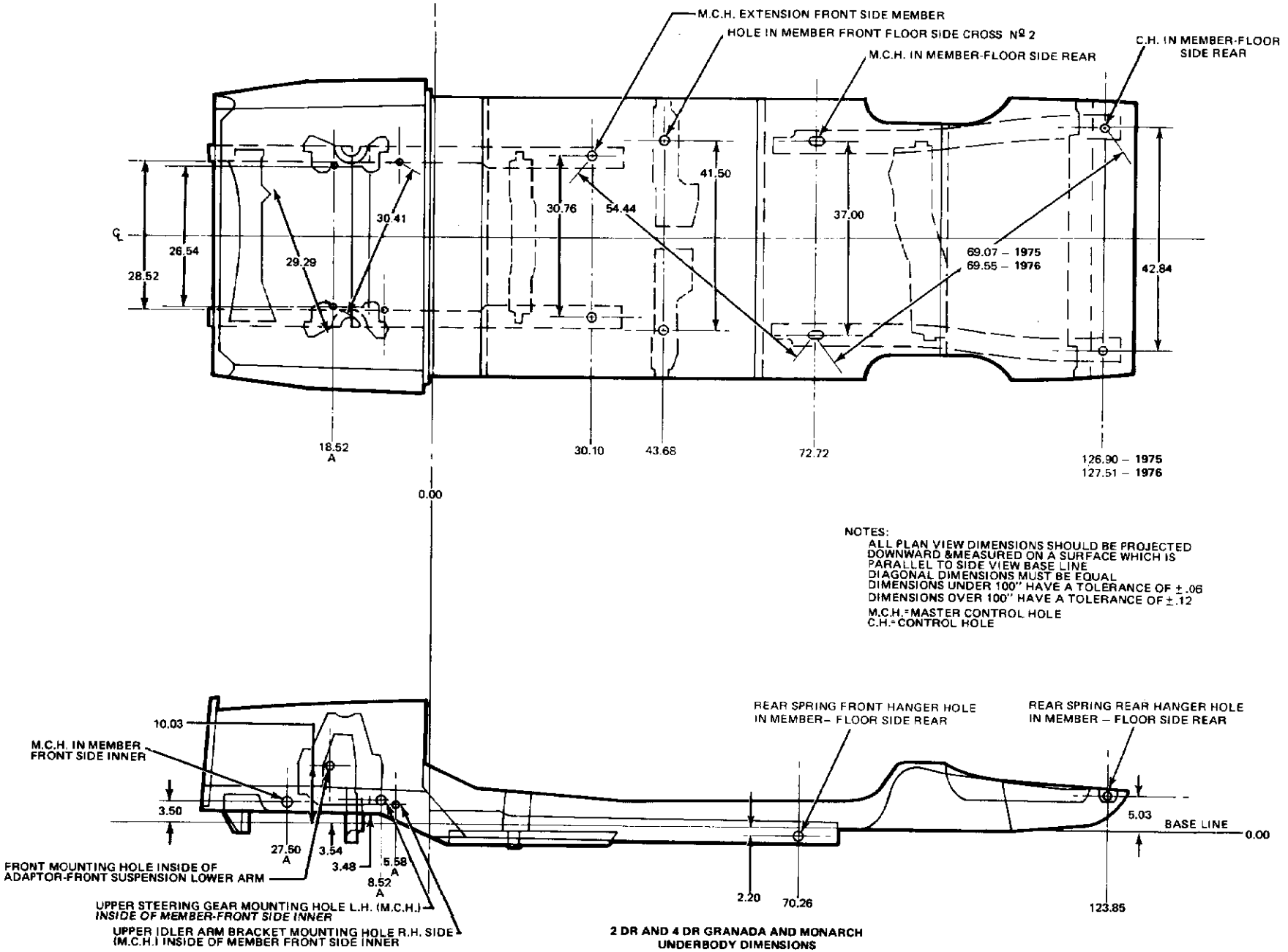


FIG. 9 Underbody Dimensions—Granada and Monarch

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Versailles

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REMOVAL AND INSTALLATION

RADIATOR GRILLE

REMOVAL

1. Remove the six 1/4-20 nuts behind the raiator grille opening panel (see Fig. 1).
2. Remove grille assembly.
3. Remove the four self-tapping screws retaining the spring wire to radiator grille (outer).
4. Remove two clips retaining the spring at the bottom of the grille by prying legs apart from the front of the grille.
5. Remove four screws on pivot clips at the top of the grille and slide upward and off.

INSTALLATION

1. Lay spring on grille with lower legs seated in slots provided.
2. Install retainer clips.
3. Slide pivot clips into position over spring on two ears at top of grille and install screws loosely.
4. Install grille into grille panel, engaging spring into slots. Center grille in opening and install four self-tapping screws.
5. Adjust height of grille so that there is .100" margin between the grille and grille (outer) at the lower legs. Tighten the four screws securing the pivot clips.
6. Install the assembly into radiator grille opening panel and secure with six 1/4-20 nuts from behind.

HEADLAMP DOORS

REMOVAL

1. Remove the six self-tapping screws from the front. (See Fig. 1.)
2. Remove headlamp door.
3. Remove two screws retaining the lower parking lamp.

INSTALLATION

1. Install the two screws that retain the lower parking lamp.
2. Locate the headlamp door into position.
3. Fasten headlamp door with six self-tapping screws.

FRONT BUMPER

REMOVAL

1. Remove three (3) bolts attaching each isolator to the bumper reinforcement and, with an assistant, remove the bumper and reinforcement from the vehicle.
2. Remove the reinforcement-to-bumper and end bracket to bumper attaching bolts and separate the reinforcement from the bumper and end bracket (Fig. 2).
3. Remove the bumper guards and pads from the bumper.
4. Remove the license plate mounting bracket from the bumper.
5. If the reinforcement is to be replaced, remove the sight shield attaching bolts and remove the top sight shield from the reinforcement.

INSTALLATION

1. Install the bumper guards and pads on the bumper. Install the license plate bracket.
2. Position the sight shields to the reinforcement and install attaching bolts.
3. Position bumper end brace between bumper and reinforcement and install bumper attaching bolts.
4. Install the bumper center stone deflector to reinforcement.
5. Position the bumper and spacers to the isolators and install the attaching bolts.
6. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications

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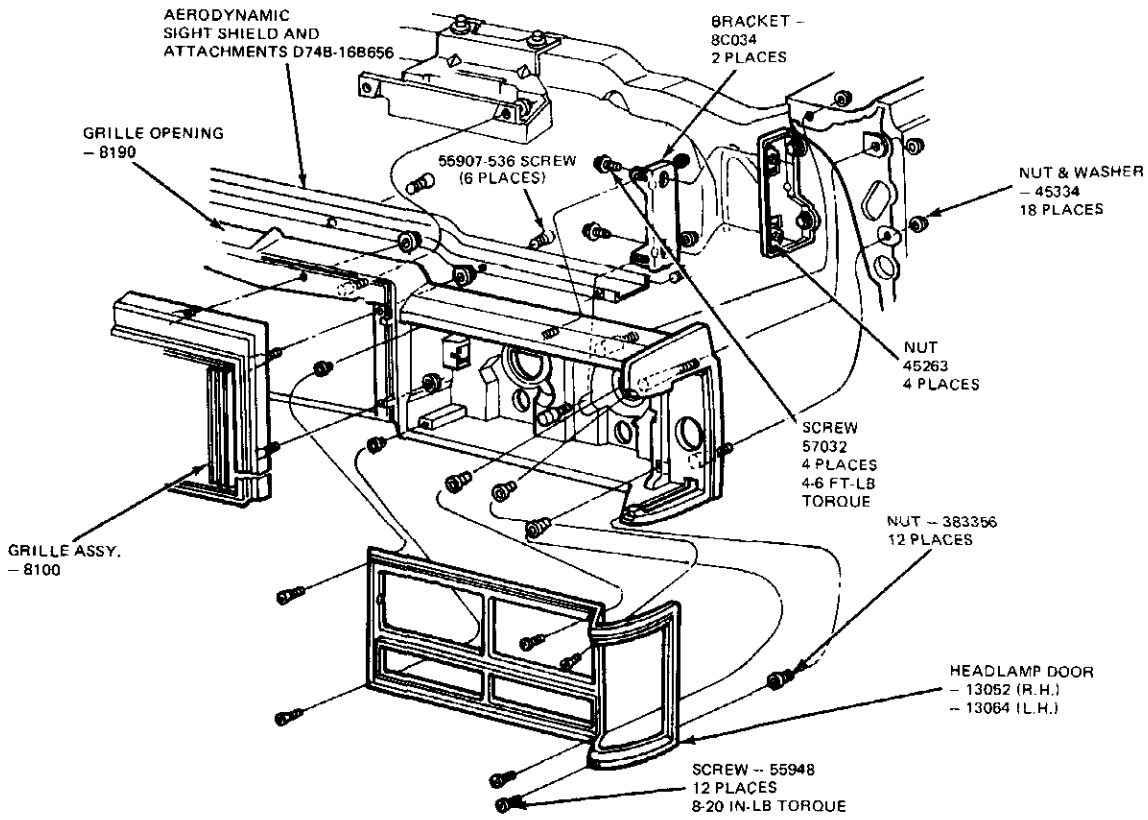


FIG. 1 Grille and Headlamp Door Installation

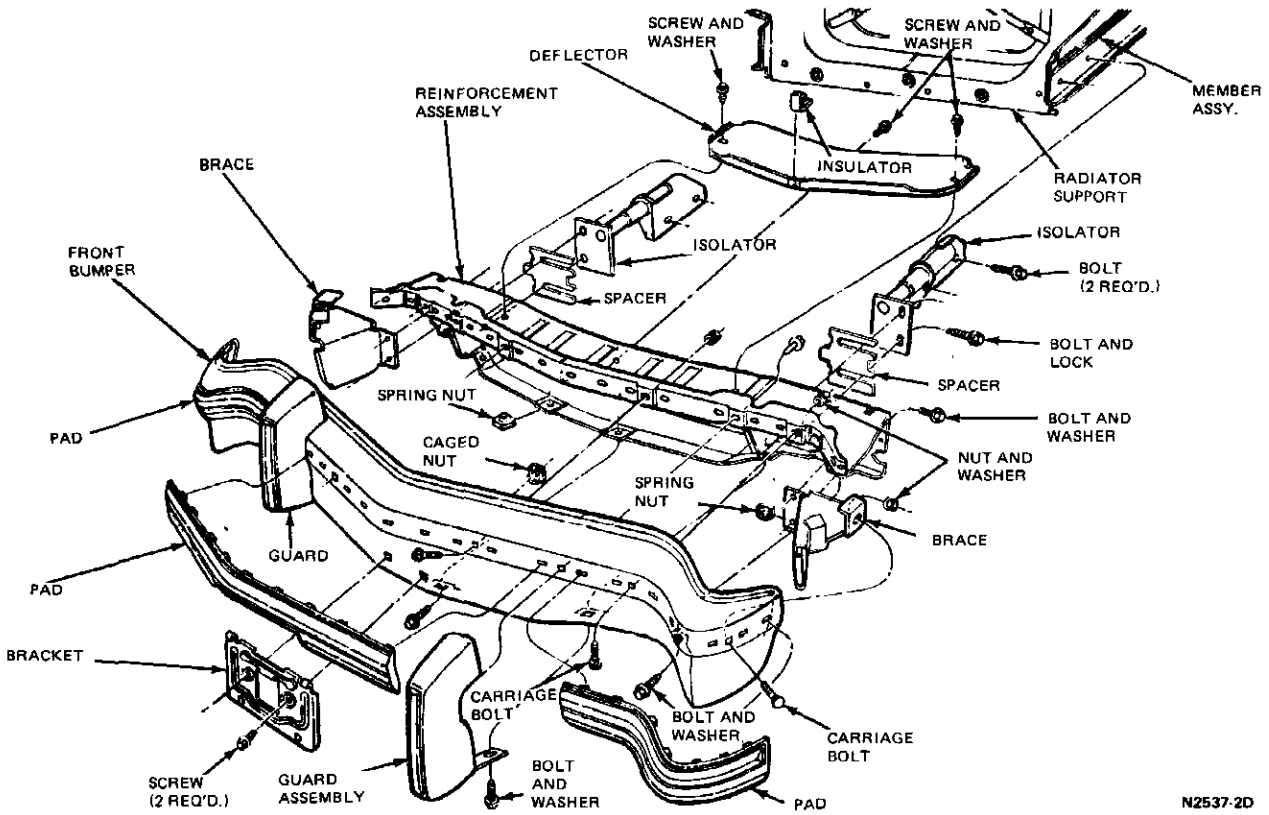


FIG. 2 Front Bumper Installation

in Fig. 5. Then, adjust the bumper for body clearance at the centerline of the parking lamp so that the vertical and horizontal body to bumper dimensions meet the specifications in Fig. 5. Tighten the isolator-to-reinforcement bolts to 35-50 ft-lbs torque.

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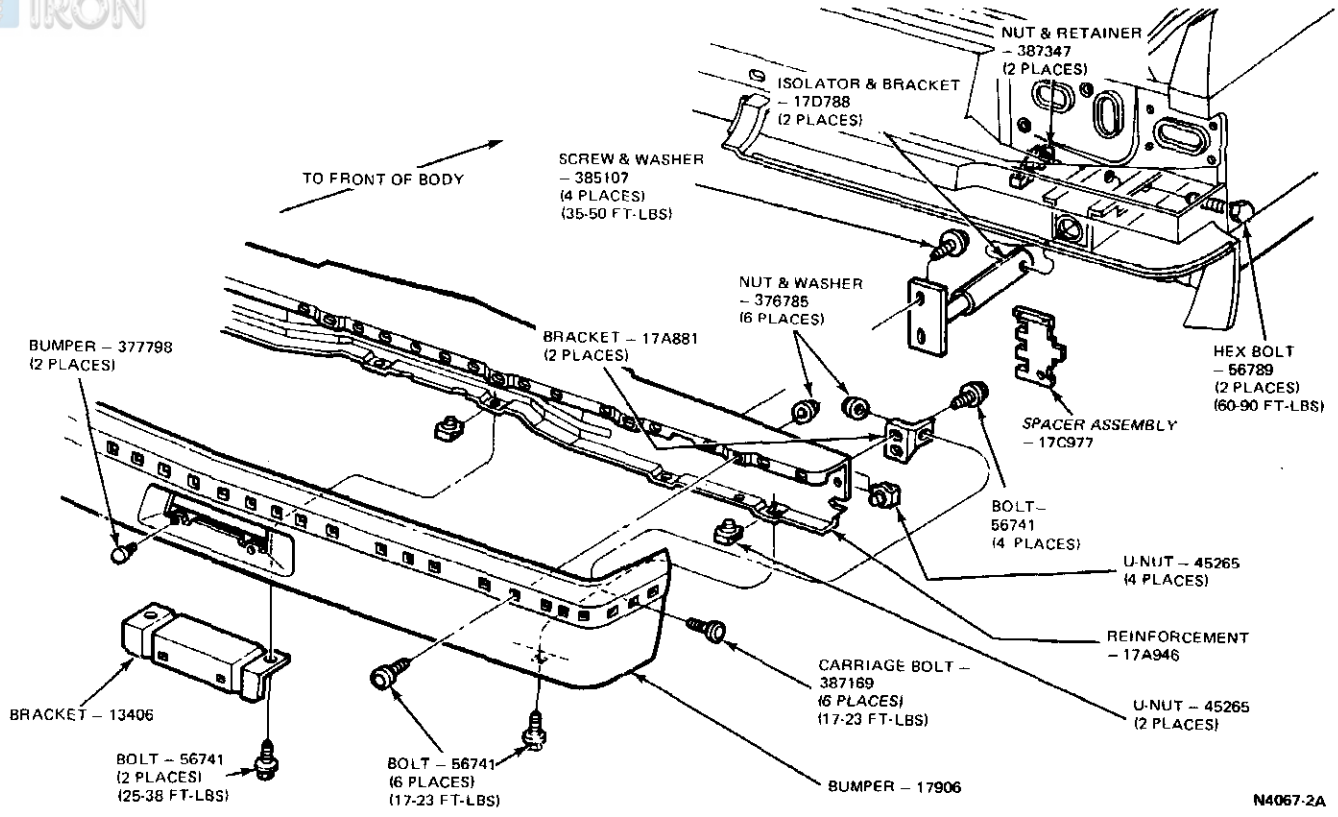


FIG. 3 Rear Bumper Installation

REAR BUMPER

REMOVAL

1. Disconnect the license plate lamp wire from the underbody harness.
2. Remove two bolts attaching the reinforcement to each isolator, and remove the bumper assembly.
3. Remove the license bracket from the bumper. Remove two screws retaining license plate lamp to the reinforcement and remove the lamp.
4. *Remove the nuts and bolts attaching the* reinforcement to the bumper, and separate the reinforcement and bumper guards (if so equipped) from the bumper (Figs. 3 and 4).

INSTALLATION

1. Position the reinforcement and bumper guards (if equipped), to the bumper and install the bolts and nuts. Tighten nuts to specification given in Fig. 3.

   NOTE: Reinstallation of the end brackets is optional. If the end brackets are not installed and the bumper has holes provided for attaching the brackets, install the bolts and nuts into the holes.
2. Install the license bracket on bumper, and tighten bolts to specification (Fig. 3). Install the license lamp to the reinforcement (two screws). Route the wire through the hole in the back of the reinforcement.
3. Position bumper assembly to the isolator and install the attaching bolts.
4. Adjust the bumper height so that the distance from the top edge to the ground meets the specifications in Fig. 5. Then, adjust the bumper for body clearance so that the vertical and horizontal body to bumper dimensions meet the specifications in Fig. 5. Tighten the isolator-to-reinforcement bolts to 35-50 ft-lbs torque.

EXTERIOR MOULDINGS

Before removing the exterior mouldings, it should be determined by the type of retainer used whether a respective door, quarter or luggage compartment trim panel must first be removed to provide access (Figs. 6 thru 9). If a weld stud is distorted or broken off, it should be replaced with an oval head blind rivet (Part No. 383229-S). Refer To General Information (Part 47-01) for installation of Pressure Sensitive Tape Type (Body *Side Protection Mouldings).*

UNDERBODY DIMENSIONS

The underbody dimensions are shown in Fig. 10. The underbody checking and repair procedures are given in Part 47-01.

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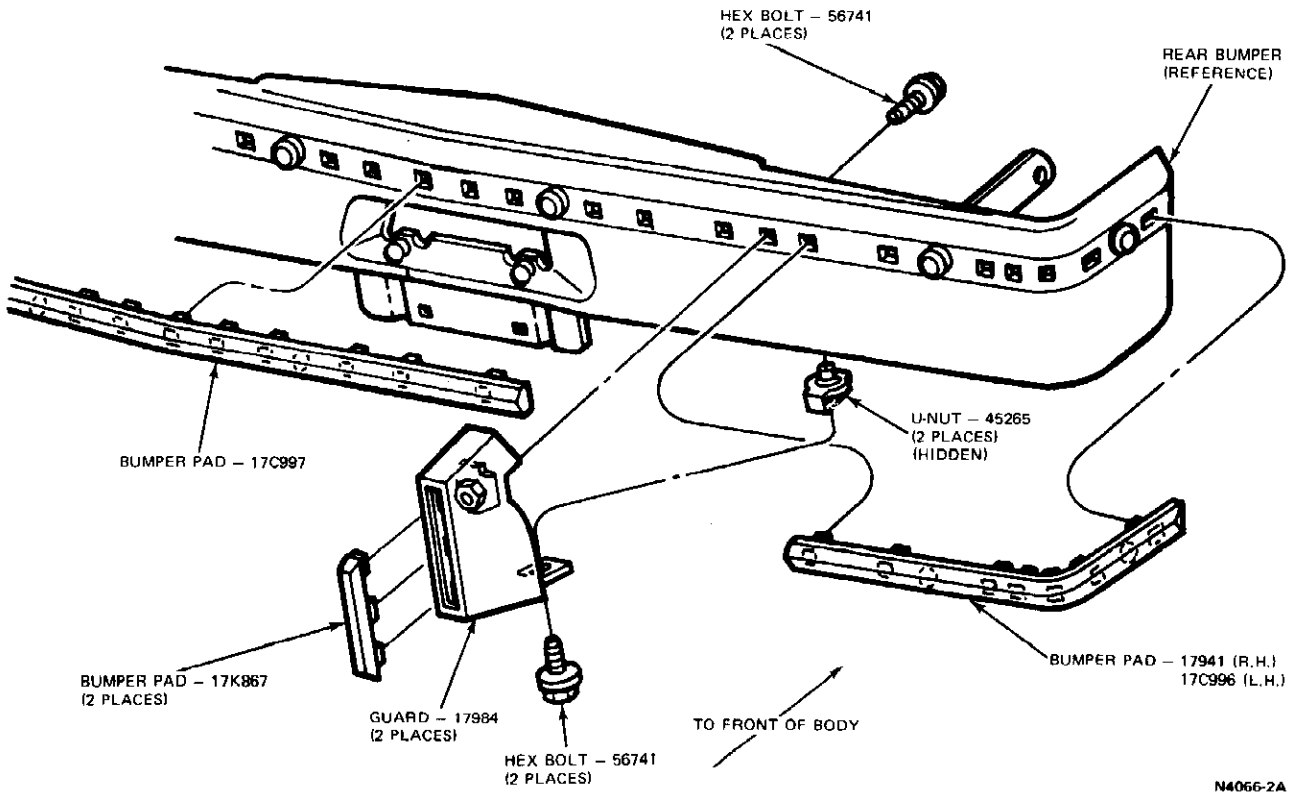


FIG. 4 Bumper Guard Installation

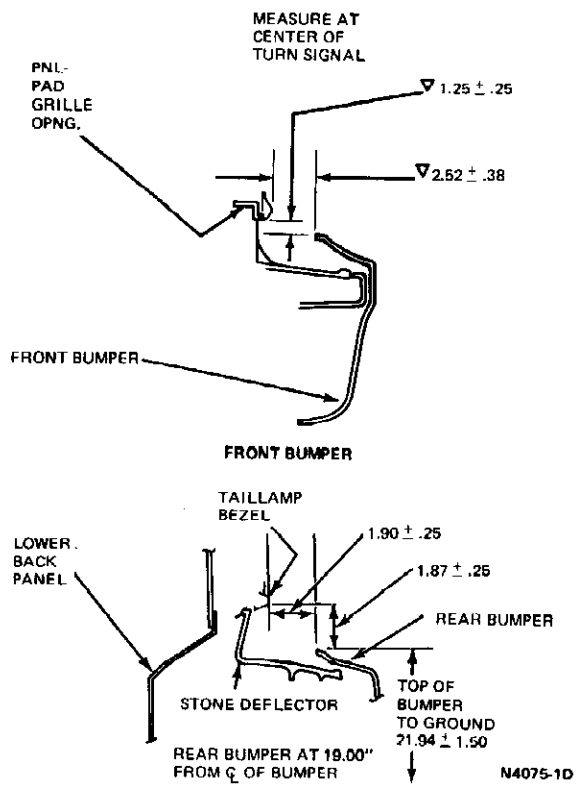


FIG. 5 Bumper Adjustment Specifications

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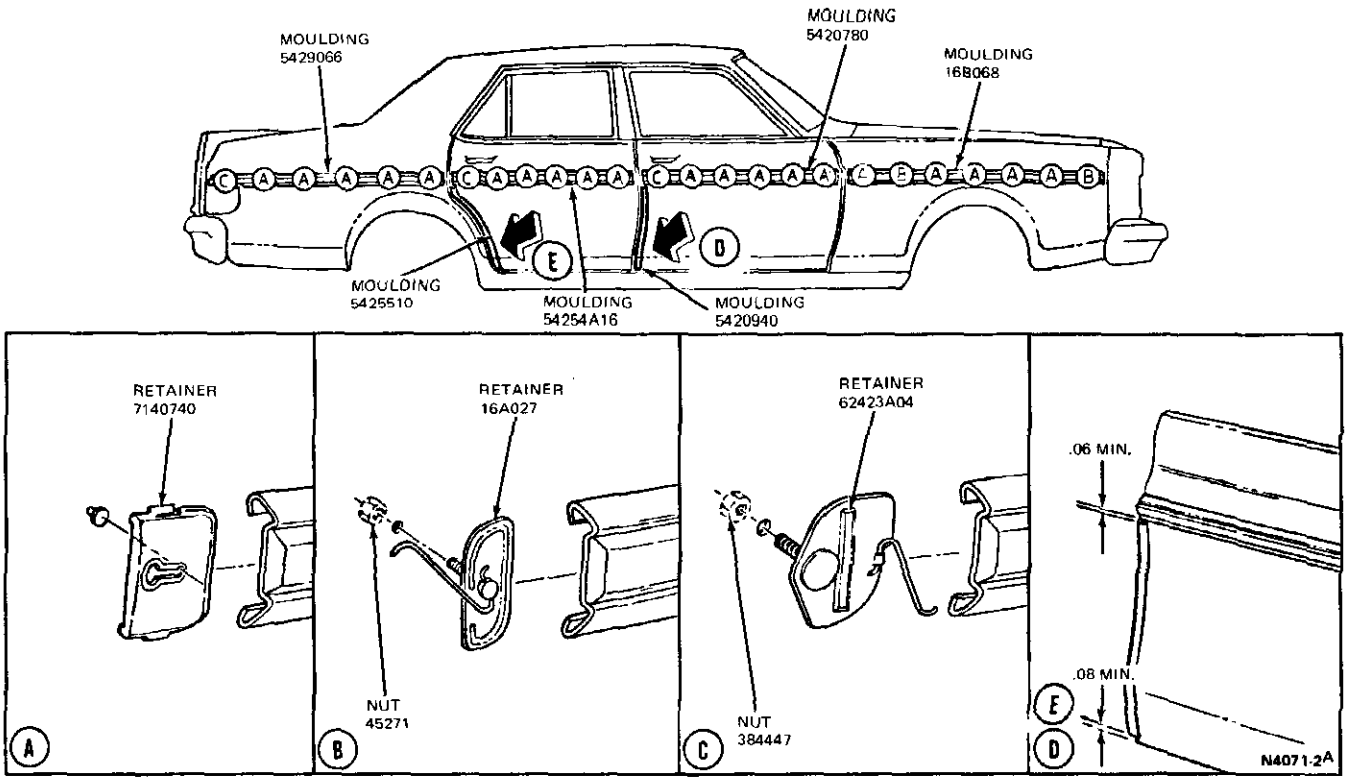


FIG. 6 Exterior Side Moulding Installation

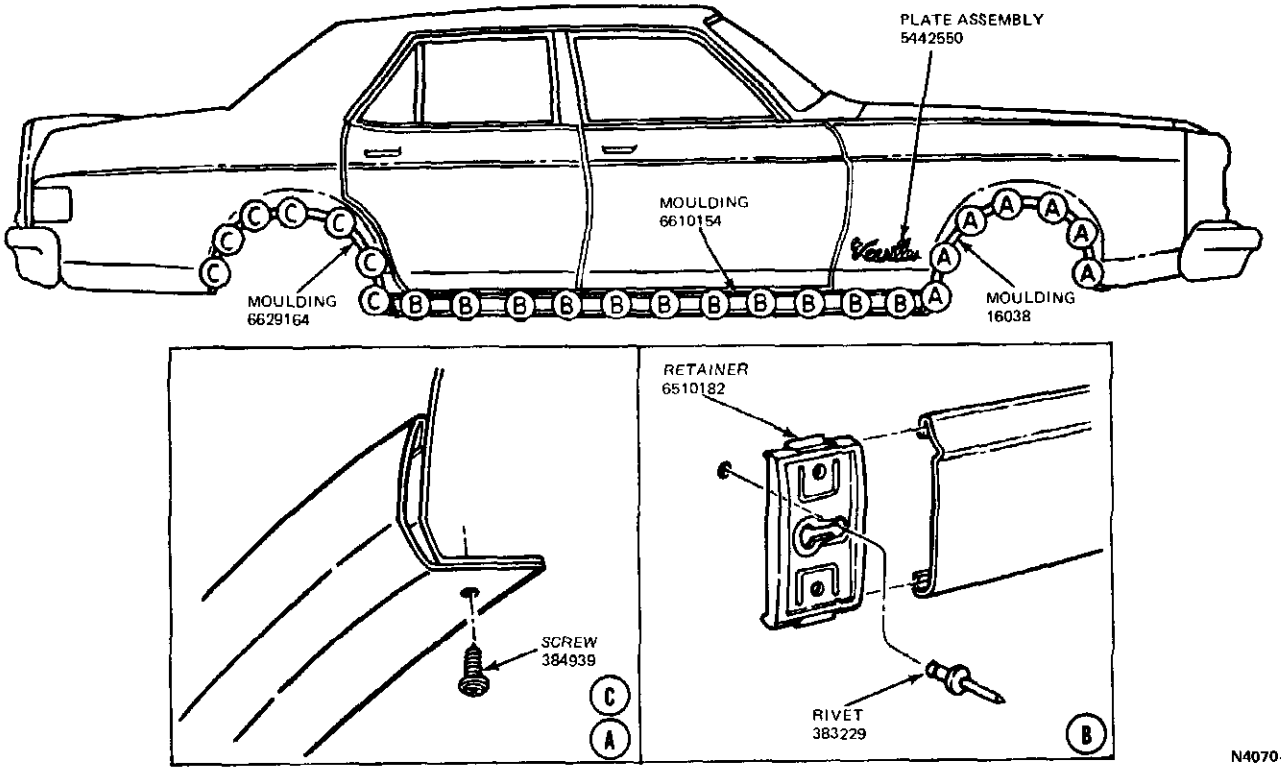


FIG. 7 Exterior Side Moulding Installation

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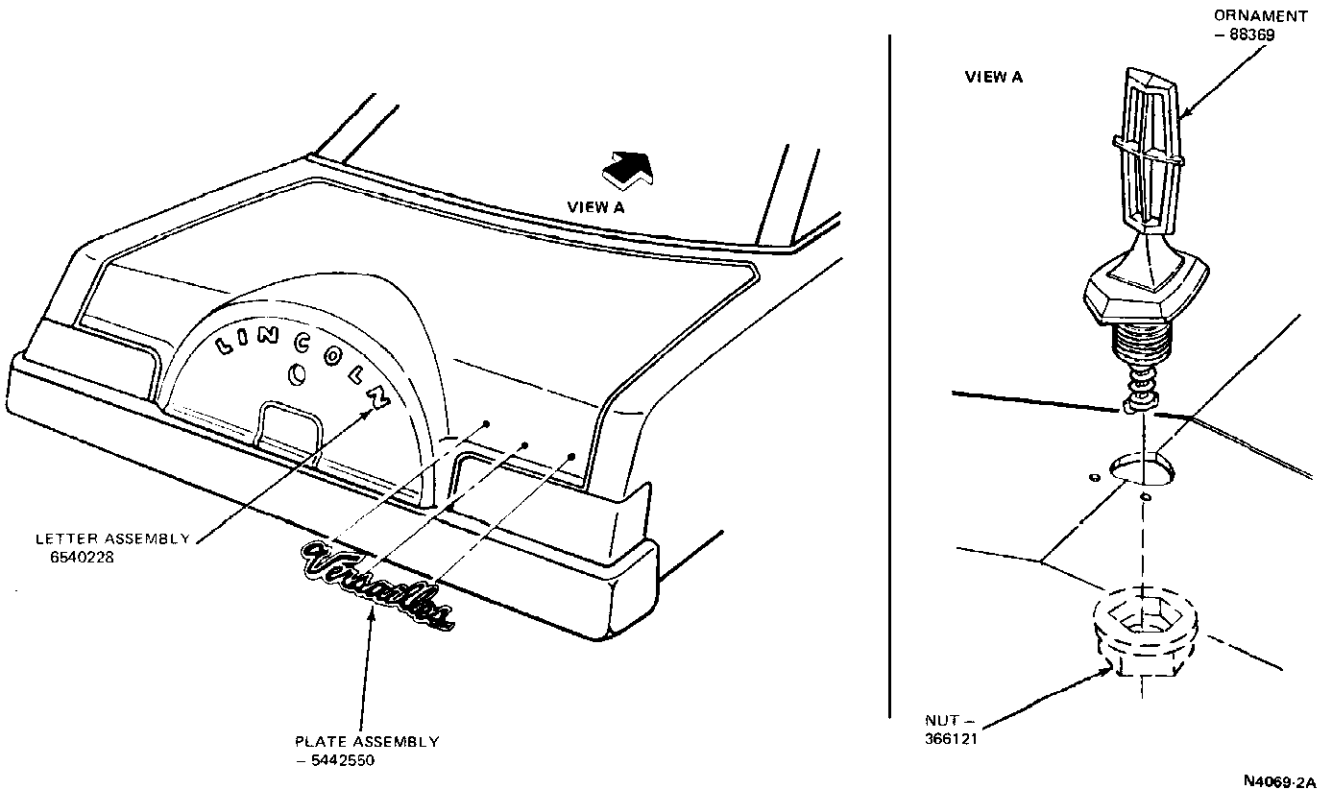


FIG. 8 Identification and Ornament

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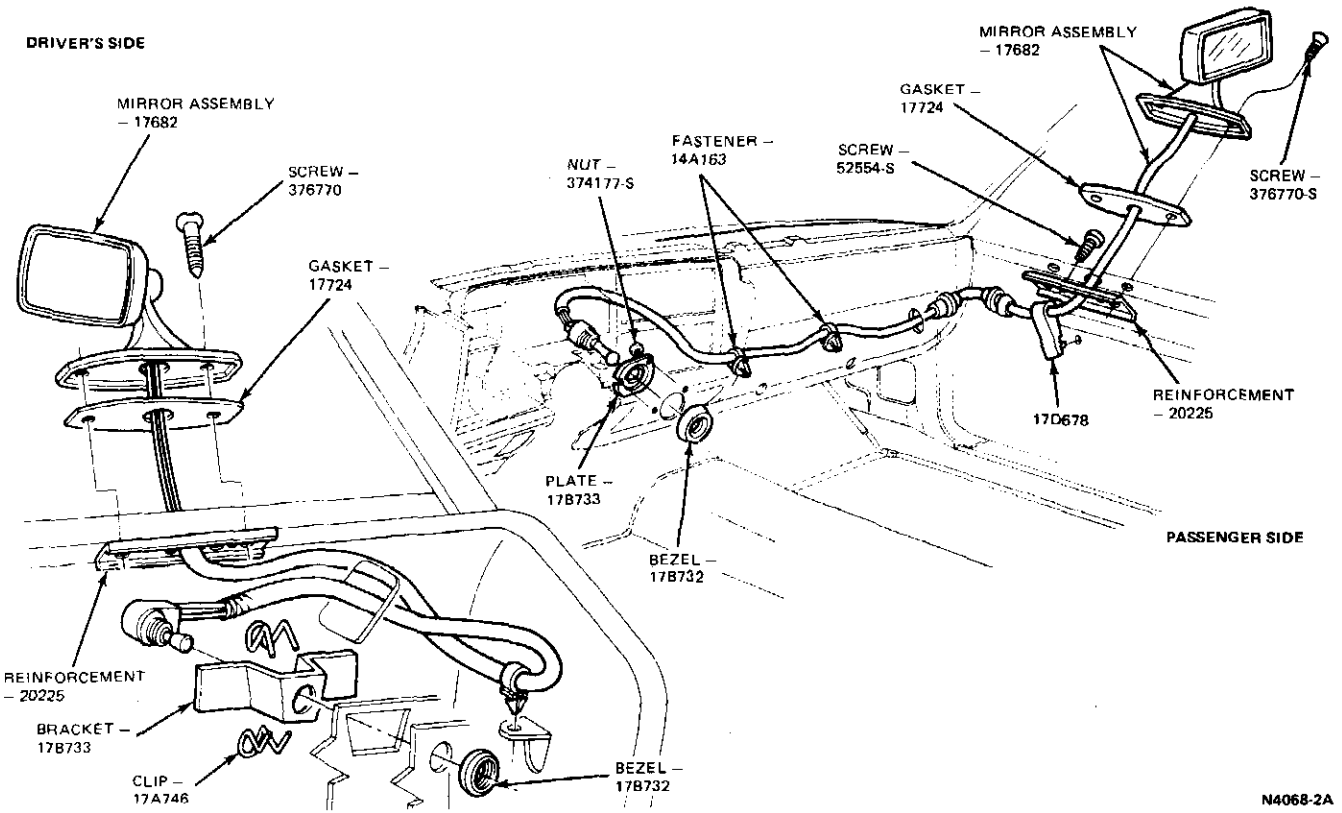


FIG. 9 Mirror Attachment

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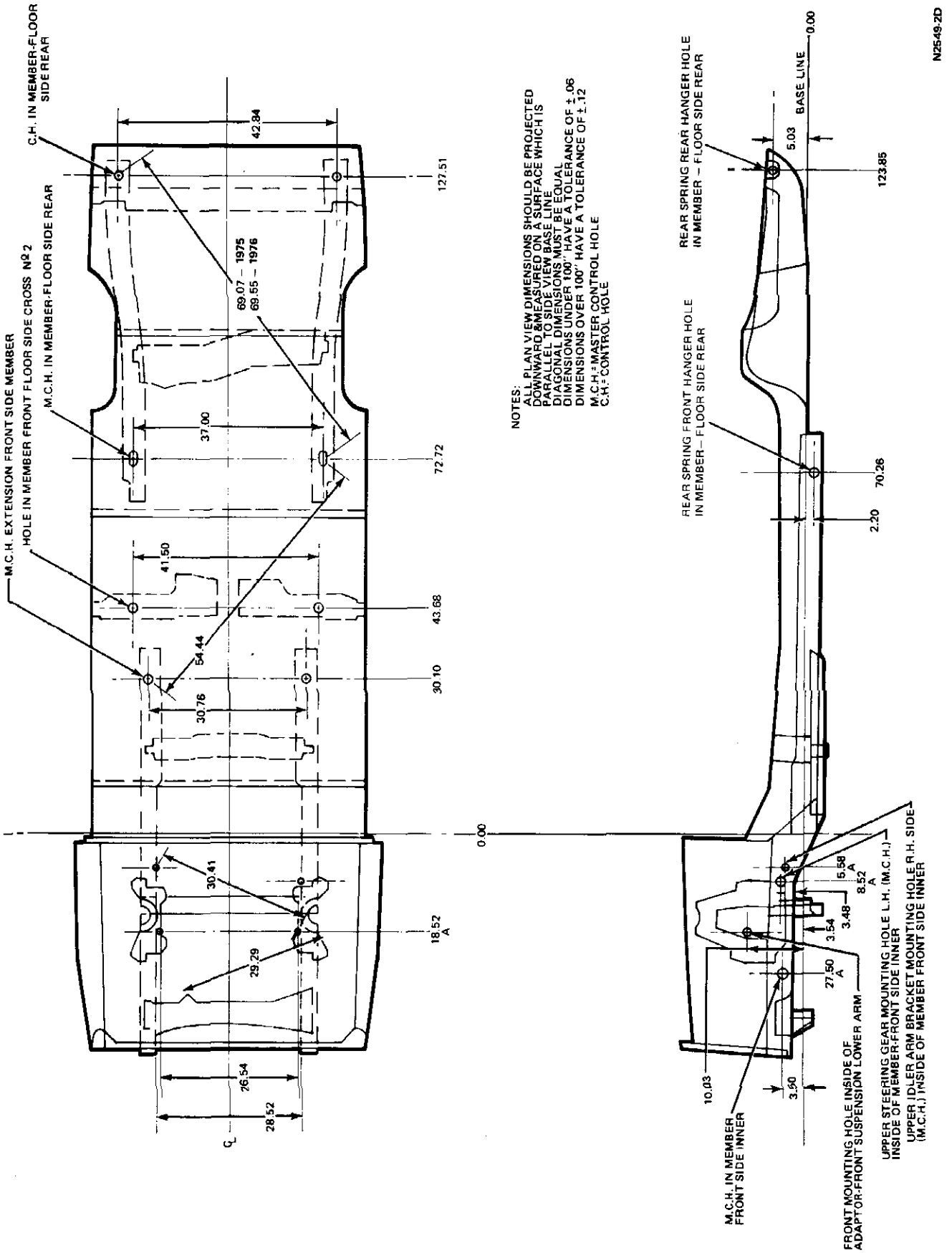


FIG. 10 Underbody Dimensions

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1978 Car Shop Manual Volume 5 Pre-Delivery, Maintenance and Lubrication



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GROUP AND PART INDEX

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GROUP 50

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DETROIT IRON

foreword...

This 1978 Car Shop Manual has been prepared to provide information covering normal service repairs and maintenance for 1978 Ford Passenger Cars manufactured in the United States and Canada. It is divided into five volumes, each covering a specific major area:

Volume 1 – Chassis
Volume 2 – Engine
Volume 3 – Electrical
Volume 4 – Body
Volume 5 – Maintenance and Lubrication.

Information in each volume is divided into Groups covering a general system. The table of contents on the cover of each volume indicates the Group title, number, and volume in which each Group is located.

For 1978, the basic part number for components covered in the Groups is also included in parenthesis after the Group number.

Example: Cooling System (General System Covered in Group) Group 27 (Group Number) (8000) (Basic Part Number for Cooling System Components)

Some components covered within a Group do not have the same basic part number. In these cases, more than one part number will appear on the Group index.

Example: Gasoline Engines (General System Covered in Group) Group 21 (6000 (Basic Part Number for Gasoline Engine Components) & 9000) (Intake and Exhaust Manifold Basic Part Number Only)

For easy reference, information in each Group has been divided into smaller units or Parts. There is one Part for each component in the system, as well as a General Service Part in some Groups to cover procedures common to several components within the Group. In general, each Part contains the Description, Operation, Diagnosis and Testing, Removal and Installation and Disassembly and Assembly procedures for the component covered in the Part. Diagnosis Charts are also included in some Parts to help you systematically locate and service conditions encountered. In most cases, specifications are included at the end of each Part.

To aid in locating specific items in this manual, the index at the front of each volume provides an alphabetical listing, with page number, for all Parts in the volume. The tab locator on the right side of this index will help you find the first page of each Group.

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On the first page of each Group there is an index listing the Part title and Part number for each component covered within the Group. The first page of each Part contains an index to locate service operations covered in that Part. This Group-Part breakdown is also indicated in the page number located at the top of each page.

Example: **11-02-21** = **(Group) 11 — (Part) 02 — (Page) 21**

Metric conversion tables have been included at the back of each volume to aid in converting specifications in this manual to the metric equivalent.

The descriptions and specifications in this manual were in effect at the time this manual was approved for printing. Ford Motor Company reserves the right to discontinue models at any time, or change specifications or design without notice and without incurring obligation.

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PRE-DELIVERY, MAINTENANCE AND LUBRICATION

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Identification Codes

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CA4232-2A

GENERAL DESCRIPTION

OFFICIAL VEHICLE IDENTIFICATION NUMBER

The official Vehicle Identification Number (VIN)(Fig. 1) for title and registration purposes is stamped on a metal tab that is fastened to the instrument panel close to the windshield on the driver's side of the car and is visible from outside.

VEHICLE CERTIFICATION LABEL

The Vehicle Certification Label (V.C. Label)(Fig. 1) is affixed on the left front door lock face panel or door pillar. The upper half of the label contains the name of manufacturer, month and year of manufacture, Gross Vehicle Weight Rating (GVWR), Gross Axle Weight Rating (GAWR), and the certification statement.

The V.C. label also contains the Vehicle Identification Number. This number is also used for warranty identification of the vehicle. The first number indicates the model year. The letter following the model year number indicates the manufacturing assembly plant. The next two numbers designate the Body Serial Code followed by a letter expressing the Engine Code.

The last six digits of the Vehicle Identification Number indicate the Consecutive Unit Number of each unit built at each assembly plant. The Consecutive Unit Numbers begin as follows:

100,001—Ford, LTD II, Ranchero, Mustang II, Thunderbird, Granada, Fairmont and Pinto.

500,001—Mercury, Cougar, Zephyr, Monarch and Mercury Bobcat.

800,001—Lincoln Continental, Versailles and Continental Mark V.

The remaining information on the V.C. Label consists of the following vehicle identification codes:

The BODY code is two numerals and a letter identifying the body style.

The COL (color) code is a number and letter indicating the exterior paint color code.

The TRIM code consists of a two-letter or a letter-number combination designating the interior trim.

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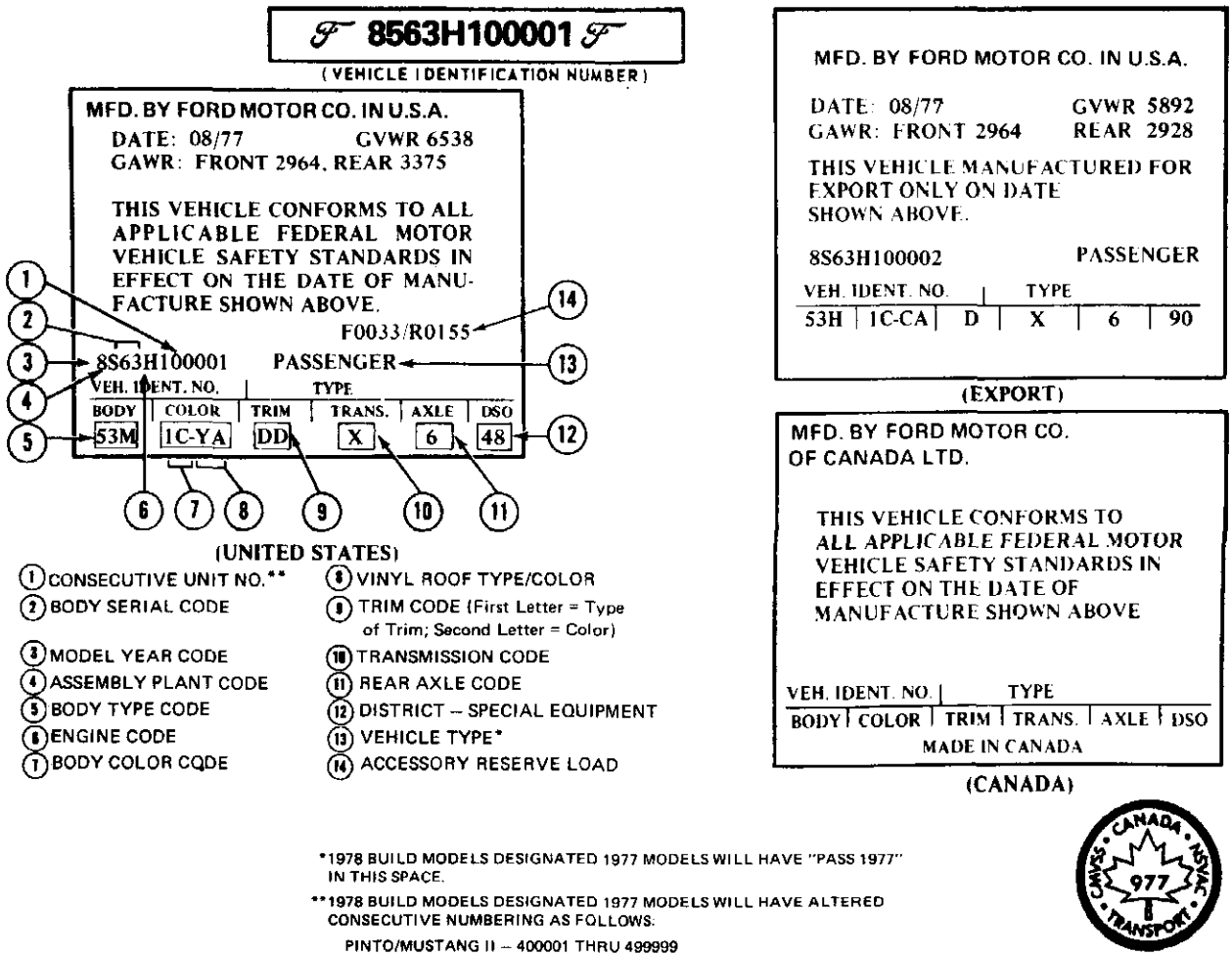


FIG. 1 Vehicle Identification and Certification Labels

The AXLE code is a number or letter indicating the rear axle ratio and standard or locking type axles.

The TRNS. code is a number or letter indicating the type of transmission.

The DSO code, consisting of two numbers, designates the district in which the car was ordered and may appear in conjunction with a Domestic Special Order or Foreign Special Order number when applicable. Ford of Canada DSO codes consist of a letter and number.

The following charts provide the various codes and their respective identification:

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IDENTIFICATION CODES

ASSEMBLY PLANT CODES

Code Letter	District
A	Atlanta
B	Oakville (Canada)
E	Mahwah
F	Dearborn
G	Chicago
H	Lorain
J	Los Angeles
K	Kansas City
P	Twin Cities
R	San Jose
S	Allen Park (Pilot)
T	Metuchen
U	Louisville
W	Wayne
X	St. Thomas
Y	Wixom
Z	St. Louis

ENGINE CODES

Codes	No. of Cyls.	Displacement Litres	Displacement CID
A	8	7.5	460-4V
C	8	7.5	460-4V (Police Interceptor)
F	8	5.0	302-2V
H	8	5.8	351-2V
L	6	4.1	250-1V
S	8	6.6	400-2V
T	6	3.3	200-1V
Y	4	2.3	139-2V (2.3L)
Z	6	2.8	169-2V (2.8L)

TRANSMISSION CODES

Codes	Type
	MANUAL
1	3 Speed
5	4 Speed Overdrive
6	4 Speed @
7	4 Speed (b)
	AUTOMATIC
V	XP (C-3)
W	XP (C-4)
X	FMX]
U	XPL (C-6)
Z	XPL (Special)

@ Borg-Warner (b) Hummer

DISTRICT CODES LINCOLN-MERCURY

Code	District
00	Special
11	Boston
15	New York
16	Philadelphia
17	Washington
21	Atlanta
22	Dallas
23	Jacksonville
26	Memphis
31	Buffalo
32	Cincinnati
33	Cleveland
34	Detroit
41	*Chicago*
42	St. Louis
46	Twin Cities
51	Denver
52	Los Angeles
53	Oakland
54	Seattle
84	*Home Off. Reserve*
90's	Export

FORD OF CANADA

Mercury Code	Region	Ford Code
A1	Central	B1
A2	Eastern	B2
A3	Atlantic	B3
A4	Midwestern	B4
A6	Western	B6
A7	Pacific	B7
12	Export	12

REAR AXLE RATIO CODES

Conventional Lock		Ratio
Y		3.08
8		2.47
1	J	2.50
8		2.73
2		2.75
3		2.79
6	Ø	3.00
4		3.18
7		3.40

DISTRICT CODES FORD

Code	District
00	Special
11	Boston
12	Buffalo
13	New York
14	Pittsburgh
15	Newark
16	Philadelphia
17	Washington
21	Atlanta
22	Charlotte
23	Memphis
24	Jacksonville
25	Richmond
26	*New Orleans*
28	Louisville
41	Chicago
42	Cleveland
43	Milwaukee
45	Lansing
46	Indianapolis
47	*Cincinnati*
48	Detroit
52	Dallas
53	Kansas City
54	Omaha
55	St. Louis
56	Davenport
57	*Houston*
58	Twin Cities
71	Los Angeles
72	San Jose
73	Salt Lake City
74	Seattle
75	Phoenix
76	*Denver*
83	Government
84	Home Off. Reserve
85	American Red Cross
86	Recreational Veh. Pool
87	Body Company
89	Transportation Services
90's	Export

EXTERIOR PAINT COLOR CODES

Code	Ref. #	Color
1C	1724	Black
1G	5299	Silver Met.
1N	5476	Dove Gray
1P	5523	Med. Gray Met.(Tie Tone only)
1Q	5527	Med. Silver Met.
2M	3413	Dark Red
2R	5440	Brt. Red
2U	5455	Lipstick Red
3G	5094	Brt. Dk. Blue Met.
3U	5467	Lt. Blue
31	5499	Midnight Blue
34	5041	Med. Blue
46	5328	Dk. Jade Met.
47	5404	Lt. Green
4V	5233	Dk. Yellow Green Met.
5Q	5477	Dk. Brown Met.
6E	5080	Brt. Yellow
6P	5406	Cream
6U	5441	Lt. Tan
7Q	5479	Lt. Aqua Mt.
7S	5489	Dk. Emerald Met.
8G	5466	Vista Orange
8H	5470	Tan
8K	5486	*Brt. Saddle Met.*
8N	5496	Dk. Cordovan Met.
8P	5471	Lt. Cordovan
8Y	5494	Champagne Met.
83	5524	Chamois
84	5525	Dk. Cordovan
9D	5418	White

(RPO) UNIQUE COLORS (NON POLISH) "D"

2Y	5492	Rose Met.
3V	5480	Brt. Blue Met.
6V	5298	Tan Met.
	5460	Med. Gold Met.
7H	5482	Brt. Aqua Met.
7L	5483	*Lt. Jade Met.*
7T	5490	Med. Emerald Met.
8J	5484	Med. Tan Met.
8W	5491	Chamois Met.

(RPO) DIAMOND BRIGHT (POLISH) "W"

2S	5444	Dk. Red Met.
2G	5070	Med. Red Met.
32	5511	Med. Blue Met.
8V	5495	Med. Ember Met.
8Z	5510	Med. Nectarine Met.
1R	5512	Lt. Silver Met.

(RPO) DIAMOND FLARE (POLISH) "G"

1J	5411	Silver Met.
1L	5472	Black Met.
2T	5462	Rose Met.
6Y	5461	Brt. Yellow Gold Met.
7B	5463	Crystal Jade Met.

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BODY SERIAL AND STYLE CODES

Vehicle	Body Serial Code	Body Style Code	Body Type	Model
PINTO	10	62B	2-Dr. Sedan	Base
	11	64B	3-Dr. Sedan	Base
	12	73B	Wagon	Base
BOBCAT	20	64H	3-Dr. Sedan	U.S.A. & Canada
	22	73H	Wagon	U.S.A. & Canada
	23	62B	2-Dr. Sedan	Canada Only
	24	64B	3-Dr. Sedan	Canada Only
	25	73B	Wagon	Canada Only
MUSTANG II	02	60F	2-Dr.	Base
	03	69F	3-Dr.	Base
	04	60H	2-Dr.	Ghia
	05	69R	3-Dr.	Mach I
GRANADA	82	54H	4-Dr. Sedan	Base
	81	66H	2-Dr. Sedan	Base
MONARCH	34	54H	4-Dr. Sedan	Base
	33	66H	2-Dr. Sedan	Base
VERSAILLES	*84*	*54M*	*4-Dr. Sedan*	*Base*
LTD II	25	65B	2-Dr. Hardtop	LTD II S
	27	53B	4-Dr. Pillar Hardtop	LTD II S
	30	65D	2-Dr. Hardtop	LTD II
	31	53D	4-Dr. Pillar Hardtop	LTD II
	43	71K	LTD II Squire	Wagon
	47	97D	500	LTD II
	48	97R	GT	Ranchero
	49	97K	*Squire*	
FAIRMONT	92	54B	4-Dr. Sedan	Base
	91	66B	2-Dr. Sedan	Base
	93	66R	2-Dr. Sedan	Sport Coupe
	94	74B	Wagon	

Vehicle	Body Serial Code	Body Style Code	Body Type	Model
COUGAR	92	53D	4-Dr. Pillar Hardtop	Cougar
	91	65D	2-Dr. Hardtop	Cougar
	93	65L	2-Dr. Hardtop	Cougar XR-7
THUNDERBIRD	87	60H	2-Dr. Pillar Hardtop	Base
FORD	52	60D*	2-Dr. Pillar Hardtop	Custom 500
	53	53D	4-Dr. Pillar Hardtop	Custom 500
	62	60H	2-Dr. Pillar Hardtop	LTD
	63	53H	4-Dr. Pillar Hardtop	LTD
	64	53L	4-Dr. *Pillar Hardtop*	*LTD Landau*
	65	60L	2-Dr. Pillar Hardtop	LTD Landau
	72	71D	Custom 500/LTD II	Wagon
	74	71H	LTD	Wagon
MERCURY	62	53H	4-Dr. Pillar Hardtop	Marquis (FLD)
	61	65H	2-Dr. Hardtop	Canada Only
	66	53L	4-Dr. Pillar Hardtop	Grand Marquis
	65	65L	2-Dr. Hardtop	Grand Marquis
	64	53K	4-Dr. Pillar Hardtop	Marquis Brougham
	63	*65K*	*2-Dr. Hardtop*	*Marquis Brougham*
	74	71K	Marquis**	Wagon
CONTINENTAL MARK V	89	65D	2-Dr. Hardtop	Base
LINCOLN CONTINENTAL	81	60B	2-Dr. Pillar Hardtop	Base
	82	53B	4-Dr. Pillar Hardtop	Base
ZEPHYR	32	54D	4-Dr. Sedan	Base
	31	66D	2-Dr. Sedan	Base
	35	36R	2-Dr. Sedan	Sport Coupe
	36	74D	Wagon	

CY1615-2E

VINYL ROOF TYPE AND COLOR IDENTIFICATION

Code	Vinyl Type	Code	Vinyl Type
W	Lugano Full	Z	Valino Front Half
X	*Lugano Half*	T	*Valino Coach*
K	Lugano Front Half	B	Crosshatch Full
M	Lugano Coach	R	Crosshatch Half
D	Milano Full	S	Levant Full
E	Milano Half	E	Levant Half Rear (Mustang Dev.)
F	Milano Halo	G	Odense Full
Q	Cayman Full	N	Odense Half
U	Cayman Half	A	Odense Front Half
V	Valino Full		
Y	Valino Half		

Code	Vinyl Color	Code	Vinyl Color
A	Black	F	Cordovan
B	*Blue, Medium*	K	*Cordovan, Light*
S	Blue, Midnight		Gold, Galveston
5	Blue, Wedgewood	E	Gray, Dove
T	Brown, Dark	R	Jade, Dark
V	Camel, Lt.	M	Jade, Light
Y	Camel, Medium	4	Jade, Medium
U	Chamois	3	Jade, Wedgewood
6	Champagne, Light	D	Red/Russet
J	Champagne, Midnight	P	Silver
		W	White

When a Vinyl Roof is installed the type and color codes will be reflected after the two digit Exterior Paint Color Code.
Example: Code – 1CYA = 1C–Black Car, YA–Valino Black Half Roof.

CY1615-2E1

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Pre-Delivery And Non-Emission System Maintenance Schedules

PART 50-02

SUBJECT	PAGE	SUBJECT	PAGE
PRE-DELIVERY SERVICES	02-1	NON-EMISSION SYSTEMS MAINTENANCE	02-6

CN4045-2A

PRE-DELIVERY SERVICES

PRE-DELIVERY SERVICES

(Perform the following inspections and adjustments as required.)

UNDERHOOD

- Check and top-up all fluids to specified levels—engine oil, brake master cylinder, windshield and rear window washer reservoirs, engine cooling system (test coolant protection), automatic transmission, power steering (hot).
- Check battery for 1.230 specific gravity (12.45 open circuit voltage on maintenance-free). Recharge if necessary.
- Check throttle operation and idle return.
- Check and adjust curb idle, fast idle, and throttle solenoid positioner off speeds (refer to vehicle emission control information decal for "under 100 mile" specifications).
- Check and adjust idle mixture on vehicles with specifications for "under 100 miles" shown on vehicle emission control information decal.

BODY

- Install loose items such as wheel covers, cigar lighter, antenna, luggage rack and other optional equipment.
- Check operation of doors, trunk lid, hood and glove box. Adjust as necessary.
- Check operation of all locks and keys.
- Check operation of windows and vents. Adjust as necessary.
- Check operation of seats and seatback latches.
- Check operation of sun roof.

CHASSIS

- Check and top-up fluid levels in manual transmission and axle.
- Adjust tire pressures to specification.
- Check exhaust system, steering gear and flex coupling, steering linkage, suspension and fluid lines for damage or loose *fasteners, tighten as required.*
- Remove transit brackets.

ROAD TEST

- Check steering column ignition lock.
- Check starting of engine in park and neutral. Adjust neutral switch as necessary.
- Check operation of horn, windshield wiper and washer, lights, signals and instruments.
- Check operation of heater/air conditioner/defroster/ventilation system, radio, seat belt warning system and all other optional equipment.
- Check brakes (including parking brake and warning light).
- Check steering control.
- Check engine driveability (including choke function).
- Check automatic transmission or manual transmission/clutch performance. Perform linkage adjustments as necessary.
- Check for squeaks, rattles, and belt noise. Tighten obvious loose fasteners or belts.

APPEARANCE

- Check exterior and interior for proper appearance and fit. Perform adjustments as necessary.
- Wash and perform detailed clean up of interior and exterior.
- Touch up minor paint blemishes (brush, aerosol can and/or spot polish).
- Check for necessary owner information material in glove box.
- Remove seat and carpet protective covers.

CY1616-2C

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UNDERHOOD

CHECK ENGINE OIL LEVEL

On all engines, the oil level should be within the SAFE range on the dipstick.

CHECK BRAKE MASTER CYLINDER FLUID LEVEL

Push the master cylinder cap retainer to one side and remove the filler cap and cover gasket cap from the master cylinder. The gasket which seals the master cylinder should come off with the cap. Fill the reservoir full or 1/4 inch from the top. Install the filler cap, making sure the gasket is properly seated in the cap. Use only brake fluid meeting specifications.

CHECK WINDSHIELD WASHER RESERVOIR LEVEL

Add fluid appropriate to season, if necessary.

CHECK AUTOMATIC TRANSMISSION FLUID LEVEL

If the transmission is not at an operating temperature of 150°F to 170°F and it becomes necessary to check the fluid level (such as pre-delivery) the fluid may be checked at Room Temperature 70° F to 95°F (Dipstick Cool to Touch).

1. With the transmission in Park "P" position, engine at curb idle rpm, foot brakes applied and vehicle on level surface, move the transmission selector lever through each range, allowing time in each range to engage transmission. Return to Park "P" position and apply parking brake. **Do not turn off the engine during the fluid level check.**
3. Clean all dirt from the transmission fluid dipstick cap before removing the dipstick from the filler tube.
4. Pull the dipstick out of the tube, wipe it clean and push it all the way back into the tube. Be sure it is fully seated.
5. Pull the dipstick out of the filler tube again and check the fluid level. The level should be between the middle and top holes on the dipstick. If the fluid level is below the middle hole or above the top hole:

   On C4 and FMX Transmissions: Add or remove fluid to bring level between the middle hole and the "Add" mark.

   On JATCO, C6 and C3 Transmissions: Add or remove fluid to bring level between the middle hole and the top hole.
6. If it becomes necessary to add fluid to a transmission, be sure to use the correct fluid, as specified on the transmission dipstick.
7. Install the dipstick, making sure it is fully seated in the tube.

If the transmission fluid level is correctly established at 70°F to 95°F, it will appear between the "Add" and "Full" mark on the dipstick when the transmission reaches an operating temperature of 150°F to 170°F (66°C to 77°C). **Do not over-fill or under-fill.**

Overfill can cause the fluid to foam and spill out through the transmission vent with resultant transmission malfunction.

Underfill can result in transmission loss of engagement or slipping. This condition is most evident in cold weather or when the vehicle is parked or being driven on a hill.

If the transmission fluid level is checked when the fluid is cold, the dipstick could indicate that fluid should be added. If fluid is added at this time, an overfill condition could result when the fluid reaches operating temperatures of 150°F to 170°F (66°C to 77°C) (Dipstick hot to touch)

Transmission fluid level may also be checked if transmission is at normal operating temperature. See Part 50-17 for procedure.

CHECK MANUAL SHIFT TRANSMISSION LUBRICANT LEVEL

Clean dirt and grease from the area around the filler plug and remove the filler plug from the side of the case.

If lubricant does not flow from the filler hole, fill the case with the specified lubricant until it is level with the bottom of the filler hole with car in a level position. Install the filler plug.

CHECK REAR AXLE LUBRICANT LEVEL

Clean dirt and grease from the area around the filler plug, and check level. When checking, the axle must be in normal curb position. Replace the filler plug.

CHECK POWER STEERING PUMP RESERVOIR FLUID LEVEL

Run the engine until the fluid is at normal operating temperature, turn the steering wheel all the way to the left and right several times, and shut off the engine.

Check the fluid level in the power steering reservoir. The level must show between the cold full mark and the bottom of the dipstick when cold, or between the full cold and full hot marks when hot. Do not overfill. Remove excess fluid with a suction device. Check for adequate power steering hose clearances to moving parts (belts, pulleys) and the exhaust manifold.

If the level is low, add power steering fluid meeting specifications to the proper level on the dipstick.

CHECK RADIATOR COOLANT LEVEL

With the engine cold (at ambient temperature), check crossflow radiators to see that coolant level is 2-1/2 to 4 inches below the pressure cap seat in the radiator filler neck. Downflow radiators should be maintained at 3/4 to 1-1/2 inches below the pressure cap seat in the radiator filler neck.

COOLING RECOVERY SYSTEM

On cooling systems equipped with a coolant recovery system, it is not necessary to have coolant in the overflow reservoir.

CHECK ANTI-FREEZE (COOLANT PROTECTION) LEVEL

Be sure the engine is at operating temperature. Check the anti-freeze in the cooling system by using a permanent anti-freeze test hydrometer. Standard protection is to -20°F (-35°F for Canadian and Alaskan vehicles).

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CHECK BATTERY CHARGE

With battery temperature at 80 F, the battery should have a specific gravity reading of not less than 1.230 for non-maintenance free batteries and an open circuit voltage of not less than 12.45 volts for maintenance free batteries. Recharge if necessary.

CHECK THROTTLE OPERATION AND IDLE RETURN

Inspect the throttle linkage for proper installation. Remove the air cleaner, and with the accelerator fully depressed, observe the position of the carburetor throttle plate(s). They should be vertical (wide open position). If equipped with the model 2700 VV carburetor, the venturi valve should be wide open.

Check accelerator for sticking or binding, full return and sufficient height to fully open throttle.

ADJUST CURB AND FAST IDLE

CURB AND IDLE AND FAST IDLE SPEED CHECK PROCEDURE

NOTE: To minimize complaints of excessive high idle speeds after engine 'break-in', idle speed reduction values for 'green' engines have been established. A 'green' engine is an engine which has been operated for less than 100 miles. The 'green' engine idle speed *adjustment is the final engine adjustment made during pre-delivery. Idle mixture and timing adjustments are* made with the idle speed set to 'normal' specifications—then the 'green' engine idle speed is set. The 'normal' and 'under 100 miles' specifications are shown on the Vehicle Emission Control Information Decal. Note that the 'Idle Speed Reduction' rpm is subtracted from the 'normal' specification to obtain the 'green' engine idel speed. The idle rpm tolerances shown on the VECI decal do not apply to 'green' engines.

All applications:

1. Apply the parking brake and block the wheels.
2. Connect a tachometer.
3. Remove the air cleaner assembly and plug the vacuum line(s) to the air cleaner.
4. Turn off all accessories.
5. Check the fast idle speed for all carburetors as *follows:*

   With the engine running at normal operating temperature, the choke plate fully opened, and the transmission in neutral, set the choke linkage on the specified step of the fast idle cam and measure the fast idle rpm. Adjust to specification, if required.
6. Check curb idle speed on all carburetors as follows:

   Run engine at approximately 2500 rpm for 15 seconds. Allow engine to return to curb idle and place automatic transmission in drive (manual transmission in neutral).

   Allow engine to stabilize at curb idle speed. Check curb idle speed. If required, adjust to specification.

   Reinstall air cleaner assembly.

   Stop engine, remove all test equipment and torque air cleaner wing nut(s).

BODY

INSTALL WHEEL COVERS

Inspect wheel covers or hub caps for dents or other shipping damage.

Center the tire valve stem in the wheel cover hole and position the cover on the wheel with the valve stem side of cover tight against wheel. Use rubber mallet to tap cover in place beginning on outer perimeter opposite valve stem. **NOTE:** Never apply mallet to any part of the wheel cover other than the outer rim as the cover may be dented or distorted. Be sure cover is fully seated against wheel all around perimeter of cover.

INSTALL RADIO ANTENNA

Check type and location specified, and install, using installation instructions and template supplied with antenna kit.

INSTALL CIGAR LIGHTER

INSTALL LUGGAGE RACK

Follow manufacturers instructions supplied with kit.

CHECK OPERATION OF DOORS, TRUNK LID, HOOD AND GLOVE BOX

Examine fit of doors, deck lid, sun roof, tailgate, *fenders and hood. Be sure all doors open easily and close securely without being slammed.*

Adjust as necessary. Adjustments requiring shims may be claimed under provisions of the warranty.

CHECK OPERATION OF SEATS AND SEATBACK LATCHES

Manual Seat

Check lever operation. Test freeness of seat movement on track and for solid engagement on both sides with lever release.

Power Seat

Test for smooth operation of seat and proper operation of switches.

Reclining Seat

Check operation of seat in all adjustable positions. *Seat should operate smoothly without binding and it* should lock in any selected position.

Fold-Down Rear Seat

Check ease of operation of levers, latches and hinges. Check panels for flush fit.

Check self locking mechanism on all folding seats. Seatback must lock automatically in its normal upright position. Lock should release easily with manual *pressure on lever.*

If equipped with automatic latch, check for unlatching with car door open, and check for positive latching with car door closed.

CHECK OPERATION OF SUN ROOF

Check for ease of operation. Check panel for flush fit.

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CHASSIS

ADJUST TIRE PRESSURES

Check each tire to be sure the air pressure agrees with that specified for the tire and vehicle model. Adjust pressure as necessary.

CHECK EXHAUST SYSTEM

Inspect for proper assembly and components. Check for adequate clearance to adjacent parts. Tighten obviously loose fasteners.

CHECK STEERING LINKAGE

Inspect for proper assembly and components. Check steering linkage and steering gear-to-rail attachments for looseness or omission. Check for installation of cotter pins, where applicable. Check for interference between steering linkage and adjacent components through full left and right turn.

Check for adequate power steering hose clearance to moving parts (belts, pulleys) and the exhaust manifold. Tighten obviously loose fasteners.

CHECK FRONT AND REAR SUSPENSION

Inspect for proper assembly and components. Check upper and lower ball stud-to-spindle attachments for cotter pins. Check upper and lower suspension arm inner pivot attachments and strut attachments for looseness or omission of parts. Tighten obviously loose fasteners.

REMOVE TRANSIT BRACKETS

Remove transit brackets and discard from applicable vehicles.

ROAD TEST

CHECK STEERING COLUMN IGNITION LOCK

Place transmission selector lever in PARK position on vehicles equipped with column shift automatic transmission; place in any position if equipped with manual transmission. Turn key to LOCK position. Manual transmission and floor shift models are equipped with lock button on the left side of steering column, which must be depressed first.

Turn the steering wheel left or right slightly, until it snaps into the lock detent.

Check to see if the steering wheel is locked in both directions. The selector lever will remain locked in PARK position on the column-shift vehicles only. The key can be removed from the ignition lock in LOCK position only. With key in the ignition lock, open driver's door to check operation of key removal warning buzzer.

CHECK NEUTRAL START SWITCH OPERATION

Start the engine with transmission selector lever in PARK and again in NEUTRAL. Engine should start in these gears only. Adjust the switch if necessary.

CHECK HORNS

Check horns to be sure horn(s) blow at all contact positions.

CHECK HEADLIGHT COVERS

On vehicles equipped with headlight covers: with the engine running (or vacuum in the system), actuate the headlight switch and observe the headlight housings for full opening and closing. Inspect the mountings for looseness.

CHECK LIGHTS

Check head, tail, signal, courtesy, instrument warning and indicator lights for proper operation of switches and brightness, including operation of oil pressure and alternator warning lights (if so equipped). Check detent action and return of turn signal lever by making full left and right turns during road test. Check the operation of hazard warning flasher system.

CHECK WINDSHIELD WIPERS/WASHERS

Check for proper operation, including wiper sweep and park. Adjust if required. Check washer operation and adjust as required.

CHECK HEATER, AIR VENTS AND AIR CONDITIONER OPERATION

Check for the following items: air leaks at vent openings, around door seals and windows, sufficient heat from floor outlets. Blower operation in each switch position, temperature control and water valve operation, operation of open air ducts and vents, operation of air conditioner function controls for proper air discharge and air conditioning discharge temperatures. See Part 50-32 for special instructions.

CHECK AND SET RADIO

Check for proper operation of radio and tape player, if so equipped. Set radio push-buttons for local stations.

CHECK SEAT AND SHOULDER BELTS

Check seat belt warning system for proper operation. Check automatic retractors for full extension, retraction and retention of belt. Check buckle and clasp for proper retention, release, and length adjustment.

CHECK BRAKES

Depress foot brake pedal for good pedal height before road testing. Check and correct, if required, the following conditions: pull in either direction, harshness or noise, excess pedal effort, spongy feel, and operation of the brake warning light. Avoid sudden hard stops—make slow, gradual stops.

Check the operation of the parking brake and indicator light. If equipped with an indicator light, be sure it glows when parking brake is engaged.

CHECK STEERING CONTROL

Check for harshness, noise, wander or free play. Check steering wheel return for stiffness or inconsistency in either direction.

CHECK ENGINE DRIVEABILITY

During start-up, acceleration, cruise and deceleration, check for objectionable drive characteristics such as stumble, stall, hesitation, surge or prolonged cranking. Necessary repairs may be claimed under provisions of the warranty.

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CHECK AUTOMATIC TRANSMISSION PERFORMANCE

Check Transmission Initial Engagement

Initial engagment checks are made to determine if initial band and clutch engagements are smooth.

Run the engine until its normal operating temperature is reached. With the engine at the correct idle speed, shift the selector lever from N to 2, D1, and R. Observe the initial band and clutch engagements. Band and clutch engagements should be smooth in all positions.

Check Shift Points

Check the minimum throttle upshifts in D (Drive). The transmission should start in first gear, shift to second and then shift to third within the shift points specified in the Ford Car Performance Specifications Book.

With transmission in third gear, depress the accelerator pedal through the detent (to the floor). The transmission should shift from third to second, or third to first, depending on the transmission type and vehicle speed.

CHECK MANUAL TRANSMISSION AND CLUTCH PERFORMANCE

Check the transmission shifting for smooth cross-over action and engagement in all gear positions.

Check clutch free travel, full return of the clutch pedal and disengagement of the clutch. Check for chatter, slipping, excess pedal effort or noise. See Part 16-02.

CHECK FOR SQUEAKS, RATTLES AND LOOSE BELTS

Throughout the road test and especially on rough roads, listen for squeaks or rattles.

Listen for anything loose and for objectionable wind noise or vibration.

Tighten obvious loose fasteners or belts. Major diagnosis and repair may be claimed under provision of the warranty.

APPEARANCE

CHECK EXTERIOR AND INTERIOR APPEARANCE

Examine fit of exterior body panels and interior trim panels. Perform minor adjustments as necessary.

Bumpers and Trim Mouldings—Check condition, fit and alignment.

Weatherstrips—Check fit and retention.

Vinyl Roof—Visually inspect vinyl roofs for good fit. Check for cuts, wrinkles, bubbles, excess adhesive around the edges and be sure there are no exposed, raw, or cut edges.

Major repairs may be claimed under provisions of the warranty.

WASH AND CLEAN UP INTERIOR AND EXTERIOR

1. Wash the car completely using warm water. Wipe dry.
2. Remove glass markings, tape and stickers.
3. Ford multi-purpose cleaner or equivalent can be used effectively on exteriors, carpets, headliners and white sidewall tires.
4. Remove the protective wax from bumpers.
5. Wipe the steering wheel. Make sure no grease or smudges have been left on any controls.
6. Check closely for any excess adhesive not removed by washing.
   - Check around the edges of vinyl roofs
   - Check around seals at windows or doors
   - Check around windshield and rear window seals.

TOUCH UP MINOR PAINT BLEMISHES

Check for any imperfections in paint and metal finish.

Correct minor chips and scratches with brush or spray can touch-up paint and polish out any surface blemishes.

Check glove compartment for:

- *Warranty Facts Booklet*
- Ownercard
- Owner Manual
- Consumer Information Folder
- Other Owner Publications

See that the starting instructions sleeve is on the left hand visor.

REMOVE SEAT AND CARPET PROTECTIVE COVERS

Remove the plastic covers from the upholstery. See that there are no stains or dirt on the upholstery.

Remove protective covers from the carpeting and make sure there is no dirt beneath them.

UNIQUE CALIFORNIA PRE-DELIVERY ITEMS

CHECK CHOKE OPERATION

Freedom of Linkage and System Integrity Check

Apply parking brake and block wheels. Bring engine to normal operating temperature. Turn off the engine. Remove the air cleaner assembly and plug vacuum line(s) to air cleaner assembly. Verify that vacuum hoses, solenoid and electric choke wires are properly connected and intact. Check all carburetor linkages for freedom of operation.

Choke Functional Check

Set choke on high cam. *Without touching the* throttle, start the engine and verify the following:

1. That the choke pulldown diaphragm retracts.
2. That the choke plate rotates to the specified position.

Return engine to curb idle speed and then turn off the engine.

CHECK ENGINE COMPARTMENT AND SECURE ALL VACUUM AND ELECTRICAL CONNECTIONS RELATED TO EMISSION SYSTEM COMPONENTS

Physically check vacuum and electrical connections to insure system integrity. Reconnect as necessary.

CHECK BASIC TIMING

CAUTION: Apply the parking brake and block the wheels before starting the engine.

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NOTE: If the engine has the "Dura Spark I" ignition system (grey coil tower), use the following equipment to perform this maintenance operation:

1. Timing Light—Designed for High Energy Ignition (Inductance Pickup)
2. Tachometer—Special service 02-0362 or equivalent.
3. Optional—Special service diagnostic console 36-0036 or equivalent.

Clean the timing marks on the damper surface and place a white mark on the proper degree line on the damper and pointer according to specification noted on engine decal. Disconnect the vacuum line(s) at the distributor and plug.

Connect a clamp-on type timing light to No. 1 cylinder spark plug wire.

Connect a tachometer.

Start engine. With engine at normal operating temperature, set timing idle speed according to vehicle/service specification instructions.

Check engine initial timing:

1. If in error, loosen distributor hold down bolt and adjust initial timing to specification (see Note below).
2. Torque hold down bolt to vehicle/service specification.
3. Recheck timing after hold down bolt has been torqued.
4. Visually verify that advance vacuum line is routed to "spark port" of carburetor. Retard vacuum should be routed to manifold vacuum.

With all distributor vacuum lines properly connected, check the curb idle speed and reset if necessary.

Stop the engine and remove timing light and tachometer.

NOTE: When the white mark on the damper (refer to Step 1) is directly in line with pointer mark, the initial ignition timing is correct.

Record timing and curb idle data on Pre-Delivery Service Record (FPS365-13177-A1).

PERFORM IDLE EMISSIONS TEST AND THERMACTOR SYSTEM CHECK

Perform idle emissions test with air dump valve deactivated (disconnect the uppermost vacuum line on the air bypass valve). While vacuum line is disconnected, insert "sniffer" pick-up into exhaust pipe and note readings (Idle, normal operating temperature).

Record idle emissions test data on Pre-Delivery Service Record (FPS365-13177-A1).

Listen and feel around the thermactor air bypass valve for air being dumped.

Any necessary repairs may be claimed under provisions of the warranty.

PERFORM EGR VALVE OPERATION CHECK

Check the operation of the EGR valve by performing the appropriate part of one of the following diagnostic procedures, depending on the type of EGR valve used on the engine being checked:

For Vacuum Operated EGR Valve – SSD-1 (EGR System Diagnosis), found in Part 29-02 (Engine Diagnosis and Service) of this Shop Manual.

For Pressure Operated EGR Valve – SSD-27 (V.O.A. Pneumatic EGR System), found in Part 29-02 (Engine Diagnosis and Service) of this Shop Manual.

NON EMISSION SYSTEMS MAINTENANCE

The maintenance recommendations are included in this Part for your reference. The emission systems required maintenance is not listed here, but appears in Part 50-29; Emission Systems Maintenance. Be sure to perform all services by referring to each of the services schedules in both Parts.

Any modification of the emission control systems is subject to the penalties of federal law, if made prior to the first sale and registration, and is subject to penalties under the laws of some states, if made thereafter. Further, federal law prohibits vehicle manufacturers or dealers from knowingly removing or rendering an emission control system inoperative after sale and delivery to an ultimate purchaser.

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DETROIT IRON

SCHEDULED MAINTENANCE SERVICES

MAINTENANCE SCHEDULES A AND B (Schedules A and B have been combined into one chart. Follow the schedule which corresponds to the car's code letter.) MAINTENANCE OPERATION	SERVICE INTERVAL – Time in months or miles (or kilometres) in thousands, whichever occurs first, unless otherwise specified.					
MONTH/MILES	7.5	15	22.5	30	37.5	45
KILOMETERS	12	24	36	48	60	72
NON-EMISSION CONTROL DEVICES AND SYSTEMS						
Inspect Exhaust System heat shields (1)			AB		AB	
Inspect Brake Lining, lines, Hoses and Front Wheel Bearing Lube (2)				AB		
Lubricate Front Suspension and Steering Linkage				AB		
Check Brake Master Cylinder Fluid Level				AB		
Check Clutch Pedal Free-Play (2)		AB	AB	AB	AB	AB
Drain and refill automatic transmission fluid – Continuous service only (3) (4)			AB			AB

NOTES

1. • If so equipped.
   • Remove accumulated debris and inspect shield and attachment. Perform each 10,000 miles (16,000 kilometers) for severe service usage over unpaved roadways or off-road applications.
2. Adjust, repair or replace as required.
3. Adjust bands at 7,500; 15,000; and 45,000 miles (12,000; 24,000; 48,000 and 72,000 kilometers) for severe service.
4. When vehicle is operated under any of the following conditions, perform severe service maintenance operations:
   • Extended periods of idling or low speed operation such as police, taxi or door-to-door delivery.
   • *Towing trailers over 1,000 lbs. (450 kg) gross loaded weight for long distances.*
   • Operation when outside temperature remains below +10°F (−12°C) for 60 days or more and most trips are less than 10 miles (16 kilometers).
   • Operation in severe dust conditions.

SCHEDULED MAINTENANCE SERVICES

Applies to Canadian and Non-Catalyst Export Vehicles Only

MAINTENANCE SCHEDULE C (Canadian and Non-Catalyst Export Vehicles) MAINTENANCE OPERATION	SERVICE INTERVAL – Time in months or miles (or kilometres) in thousands, whichever occurs first, unless otherwise specified.							
MILES	6	12	18	24	30	36	42	48
KILOMETERS	9.6	19.2	28.8	38.4	48	57.6	67.2	76.8
NON-EMISSION CONTROL DEVICES AND SYSTEMS								
Check Brake Master Cylinder					C			
Adjust Clutch Pedal Free Play (1)		C		C		C		C
Inspect Exhaust System Shields (2)			C			C		
Inspect Brake Lines, Hoses, Linings and Front Wheel Bearing Lube (1)					C			
Lubricate Front Suspension and Steering Linkage						C		
Drain and Refill Automatic Transmission Fluid (severe or continuous service only) (3) (4)			C			C		

NOTES

1. Adjust, repair or replace as required.
2. If So Equipped – remove accumulated debris and inspect shields and attachments. (Repair or replace as required.) Perform each 6,000 miles (9,600; 19,200; 48,000; and 76,800 kilometres).
3. *For severe service or taxi* and police use adjust bands at 6,000; 12,000; 30,000; and 48,000 miles (9,600; 19,200; 48,000; and 76,800 kilometers).
4. When vehicle is operated under any of the following conditions, perform severe service maintenance operations:
   • Extended periods of idling or low speed operation such as police, taxi or door-to-door delivery.
   • Towing trailers over 1,000 lbs. (454 kg) gross loaded weight for long distances.
   • Operation when outside temperature remains below +10°F (−12°C) for 60 days or more and most trips are less than 10 miles (16 kilometers).
   • Operation in severe dust conditions.

Inspect means a visual observation of a system.

Check means a functional measurement of a system's operation (performance) – correct as required.

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NON-SCHEDULED MAINTENANCE

Items should be checked periodically and service performed when required. These services are not covered by the Warranty, you will be charged for the labor, parts and lubricants used.

MAINTENANCE OPERATION	WHEN PERFORMED
Inspect wheels and tires for damage and tighten nuts.	Periodically or if wheels are noisy.
Balance and rotate wheels and tires.	Tires show uneven wear pattern or vibrate.
Replace tires.	When tread wear indicator appears.
Front suspension check.	Abnormal tire wear.
Check front wheel alignment and steering linkage.	Abnormal tire wear if normal realignment is not required.
Check tire air pressure.	At least twice monthly.
Check power steering reservoir.	Periodically.
Inspect steering mechanism.	Hard steering, excessive free play, or unusual noise.
Check parking brake operation.	Periodically.
Check air conditioning system.	At beginning of warm weather season.
Check headlight alignment.	Light beam appears improperly aimed.
Inspect exterior lights and replace bulbs as required.	When performing regular car services (fueling, cleaning, etc.)
Check operation of turn signals, high beam indicator, and hazard flashers.	When performing regular car services (fueling, cleaning, etc.)
Check operation of engine warning lights.	Each time engine is started.
Check accelerator pedal operation.	If uneven pressure is observed or pedal does not function smoothly.
Inspect brake system components.	When brake light glows with engine running; if brakes are noisy or brake pedal travel is excessive.
Check and lubricate hood latches and auxiliary catch, hood, door, and trunk lid hinges and checks, and all lock cylinders.	When performing regular car service or when noisy or hard to operate.
Replace windshield wiper blade elements.	Blades do not properly clean windshield after wiper blades and glass have been properly cleaned.
Check windshield washer reservoir level.	When fueling or after extended use.
Clean body drain holes.	Improper water drainage from body is suspected.
Check locking of seatback latches.	Periodically (with doors closed).
Check seat belt buckles, release mechanisms, and retractor locking.	Regularly.
Inspect seat belt webbing for cuts or broken fibers.	Regularly (replace if cut or broken).
Check horn operation.	Regularly and periodically or when malfunction is suspected.
Check for fluid leaks on pavement (water dripping from A/C afer use is normal).	After car has been parked a while or when possible to observe underbody when vehicle is raised.
Lubricant automatic transmission controls and kickdown linkage.	When moving parts and connections are sluggish in action.
Check engine coolant level and add as required.	When engine overheats, or once a month.
Check heater and radiator hoses.	Regularly (replace if cut or broken).
Check engine oil level and add as required.	When fueling vehicle.
Check battery water and add as required.	Periodically, more often in hot weather.
Lubricate door weatherstrips.	When squeaky or noisy during window operation or visual inspection shows need.
Test anti-theft alarm system operation.	Periodically or when malfunction is suspected.
Lubricate clutch linkage.	When moving parts and connections are sluggish in action.
Inspect exhaust system pipes and hangers.	When performing regular car service on hoist.

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DETROIT IRON

Lubrication Charts and Lubricant Specifications

PART 50-03

All Models

SUBJECT	PAGE
LUBRICATION	
Lubrication Charts	03-1
SPECIFICATIONS	03-11

CA4240-A

LUBRICATION

LUBRICATION CHARTS

Figs. 1 thru 9 show typical chassis and engine lubrication points for current production vehicles. Vehicles with optional or special equipment may have slightly different, or additional lubrication points.

A table of recommended lubricants is included at the end of this Part.

See Part 50-29 for recommended service intervals and procedures for individual emission-related components.

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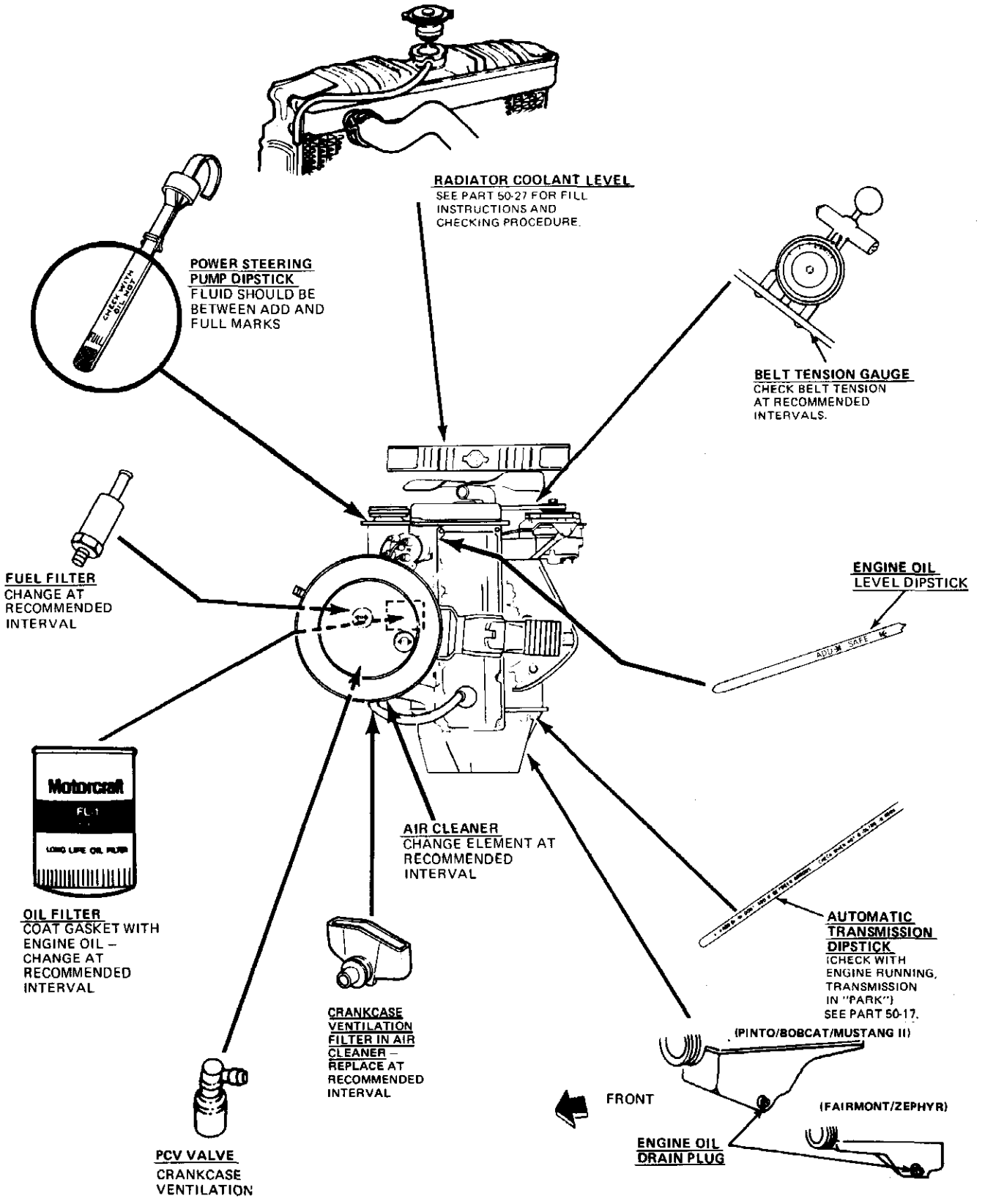


FIG. 1 Four Cylinder Engine Lubrication Points

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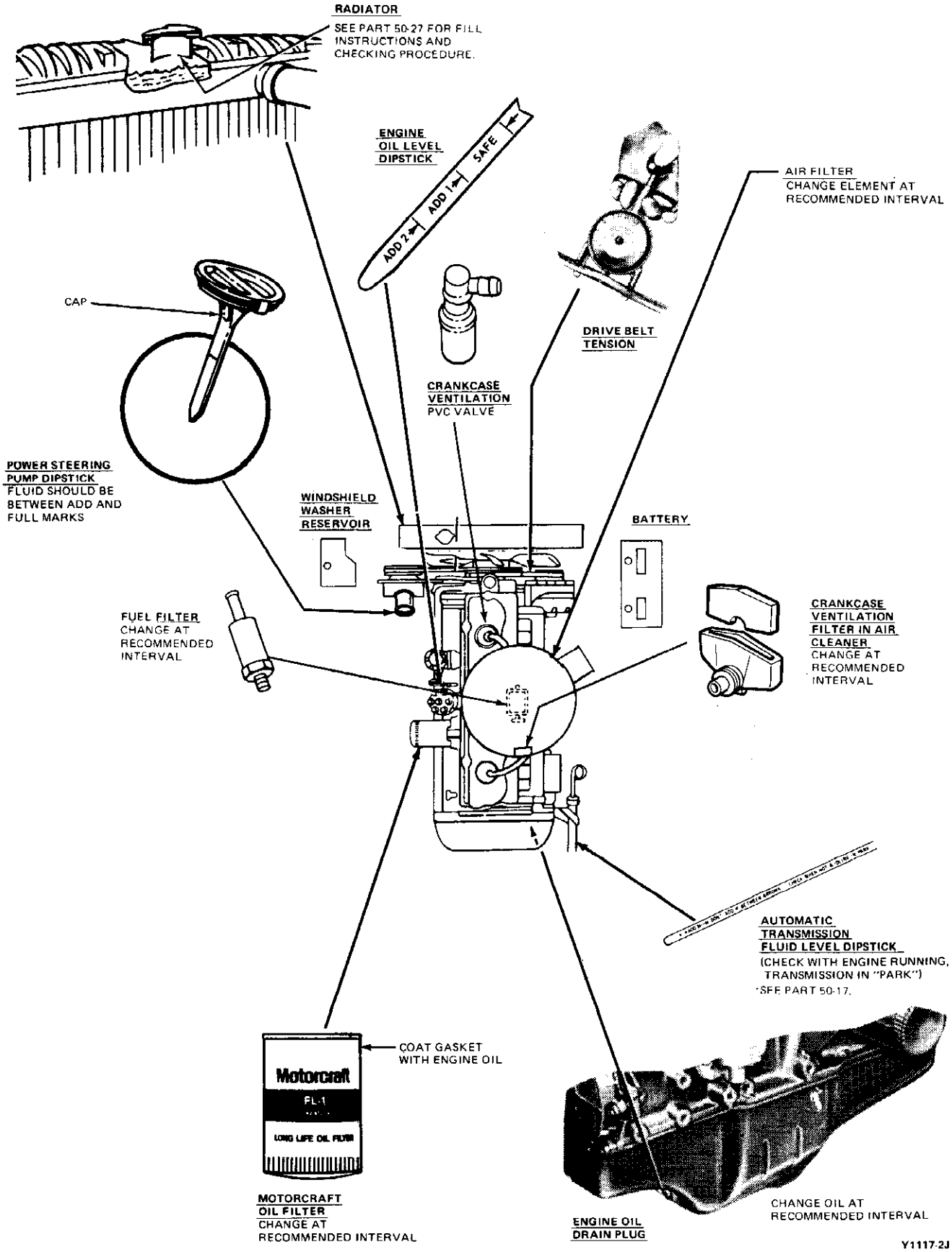


FIG. 2 In-Line Six-Cylinder Engine Lubrication Rack Service Points

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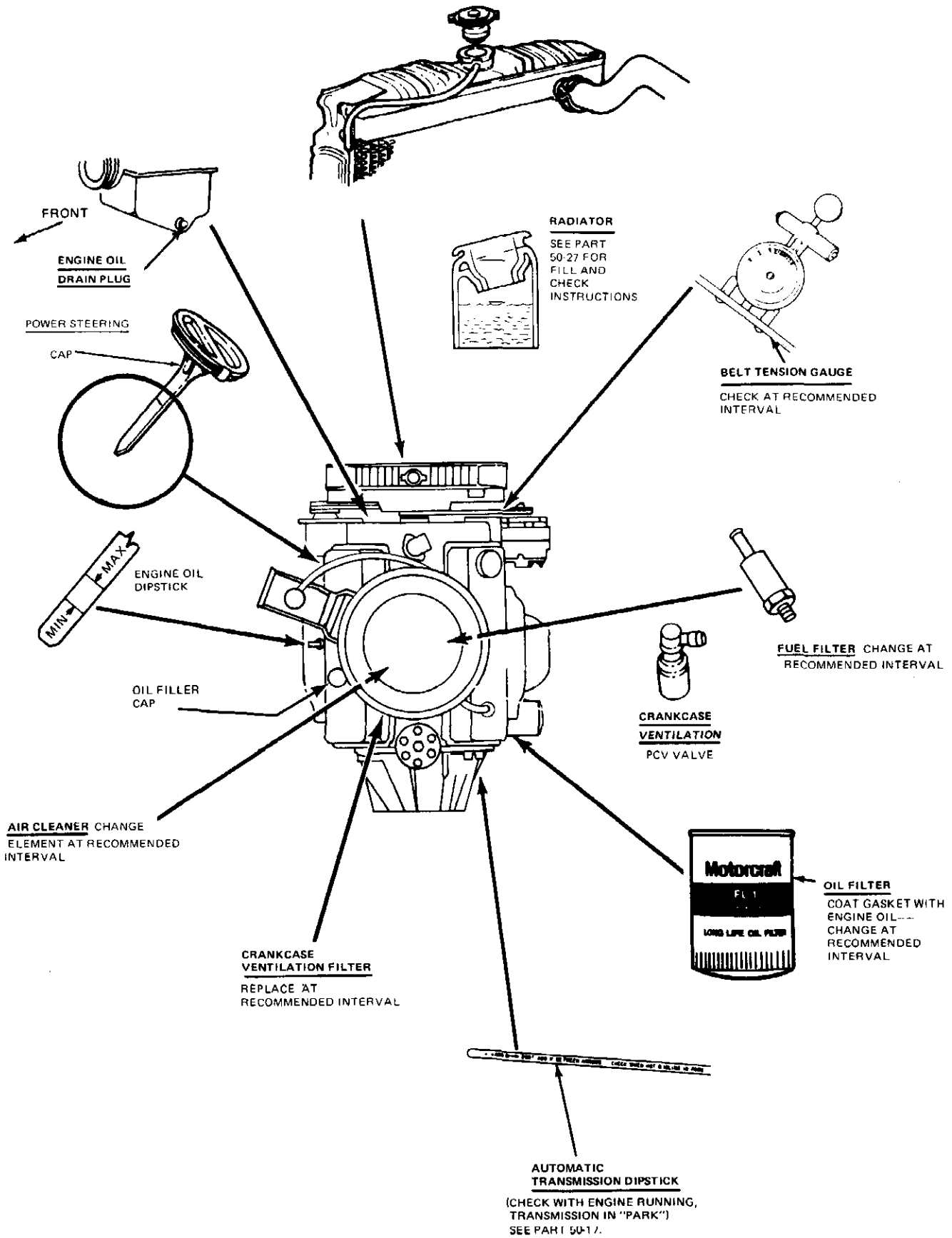


FIG. 3 V-6 Engine Lubrication Rack Service Points

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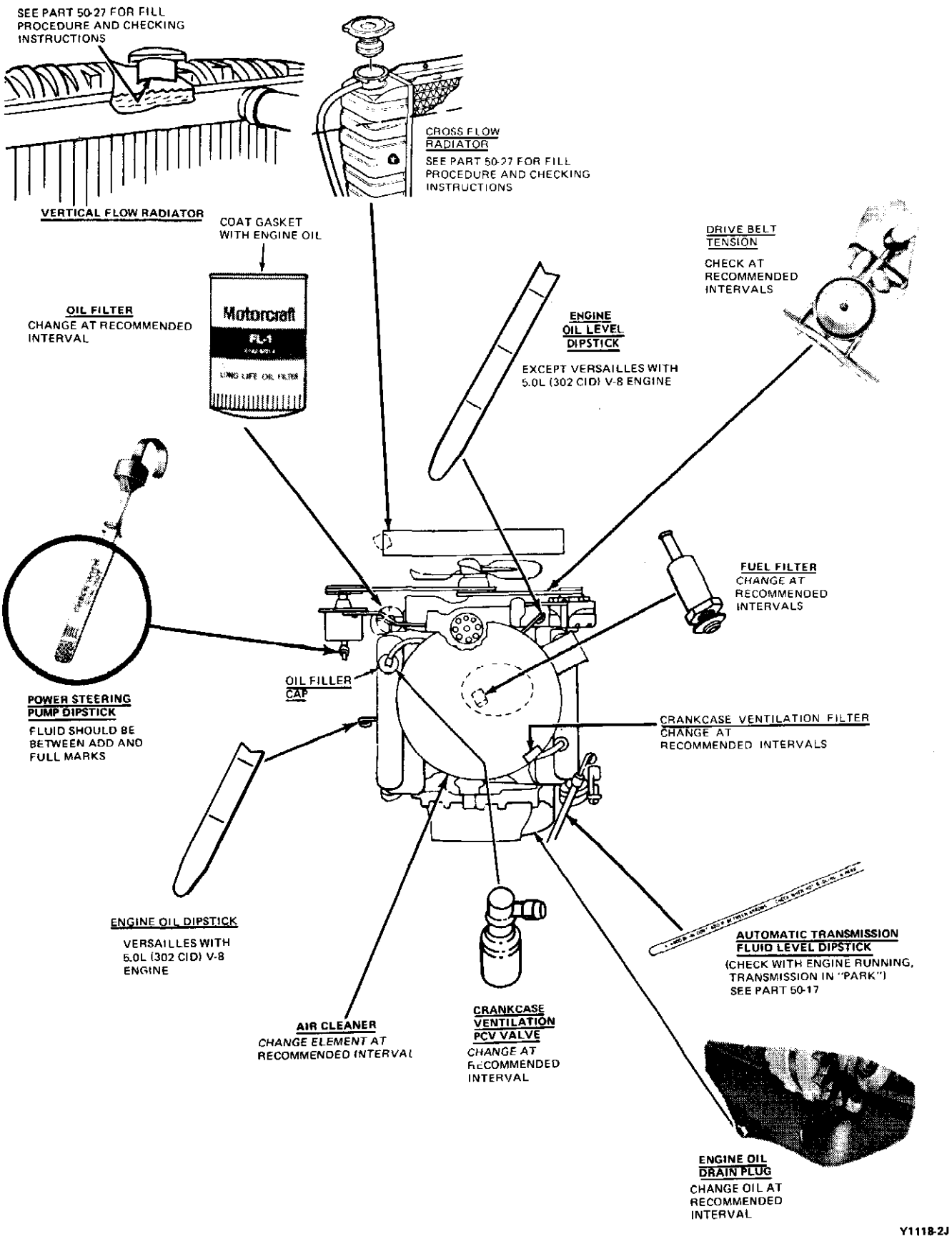


FIG. 4 V-8 Engine Lubrication Rack Service Points

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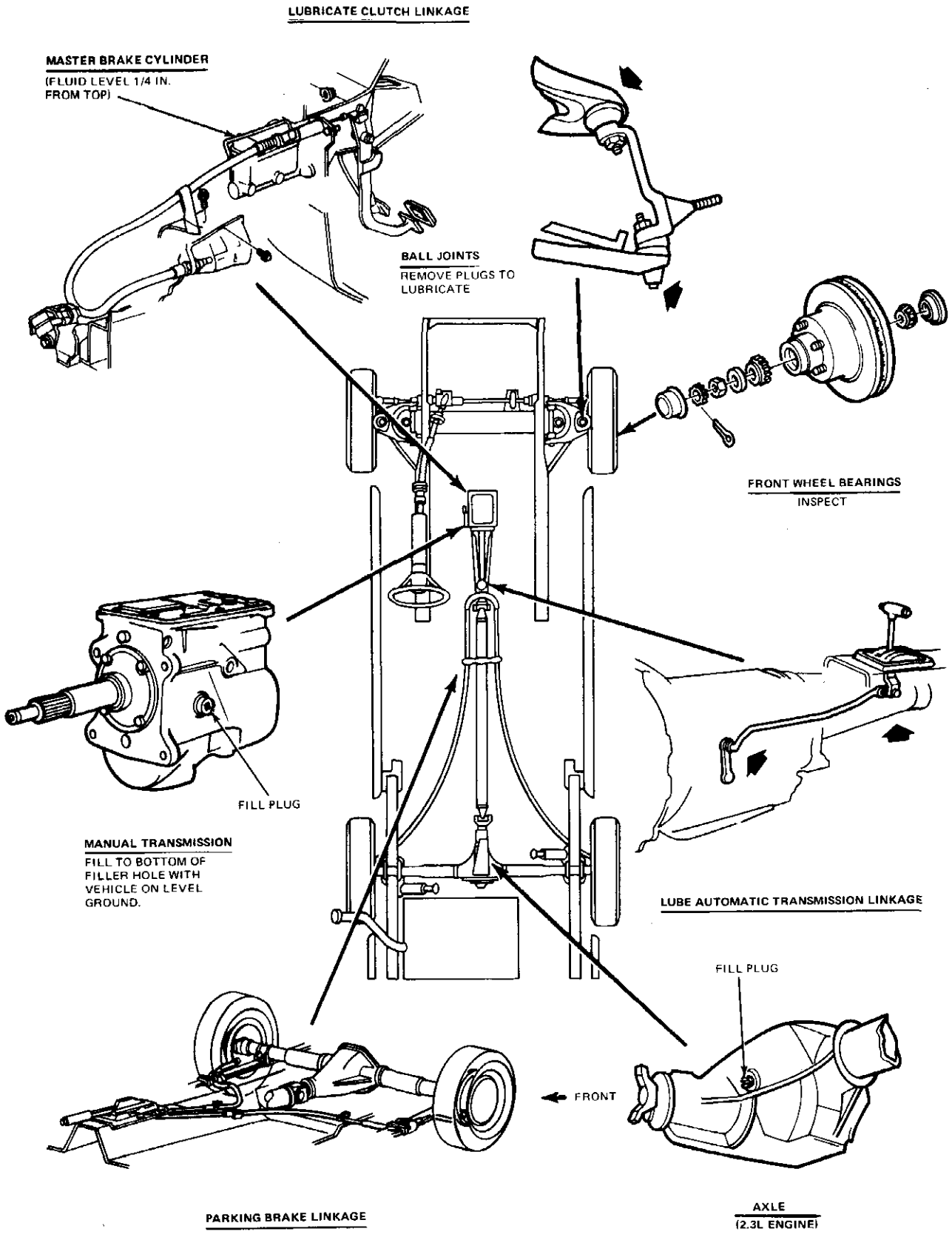


FIG. 5 Chassis Lubrication Points—Pinto, Bobcat and Mustang II

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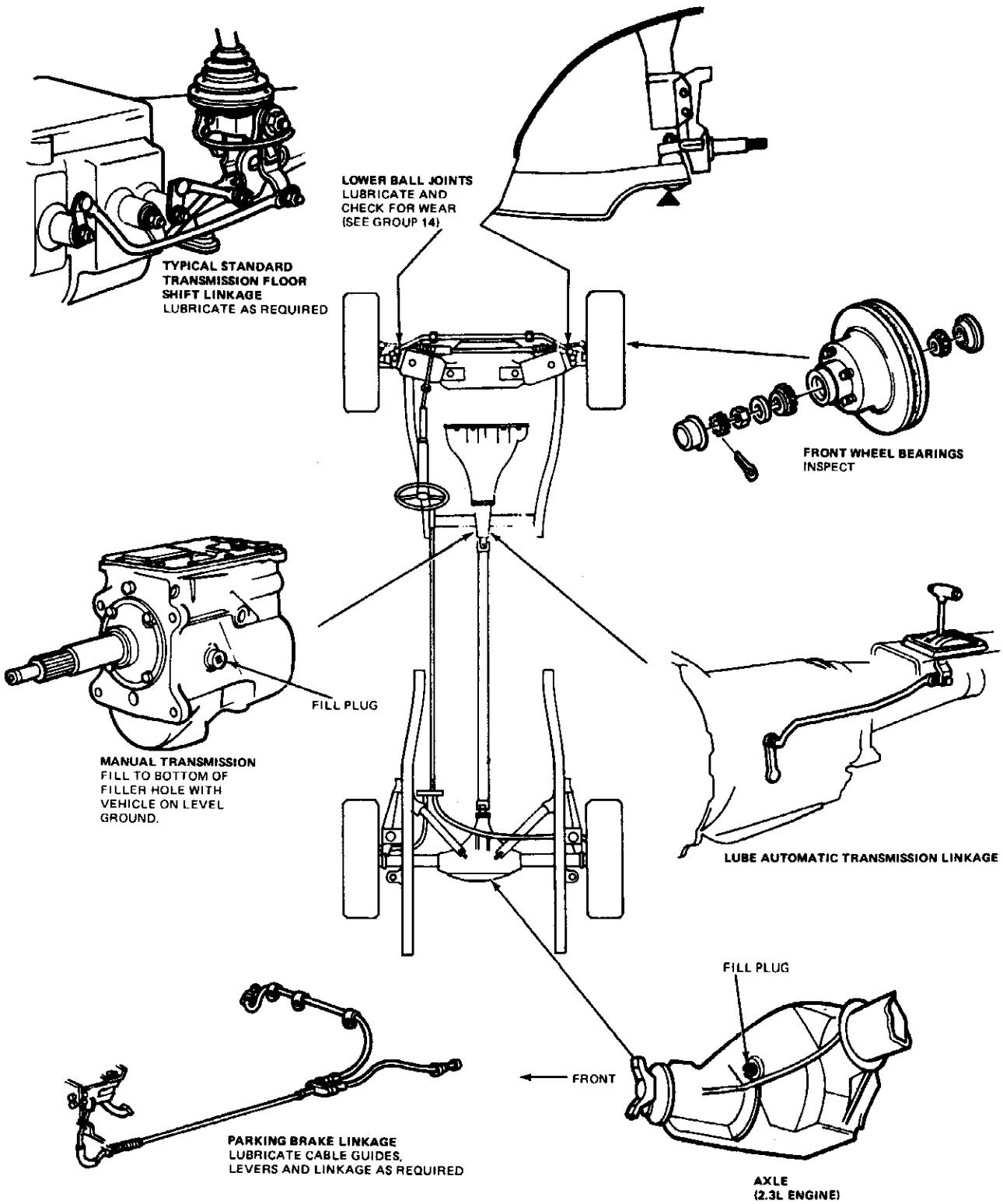


FIG. 6 Typical Chassis Lubrication Points -Fairmont and Zephyr

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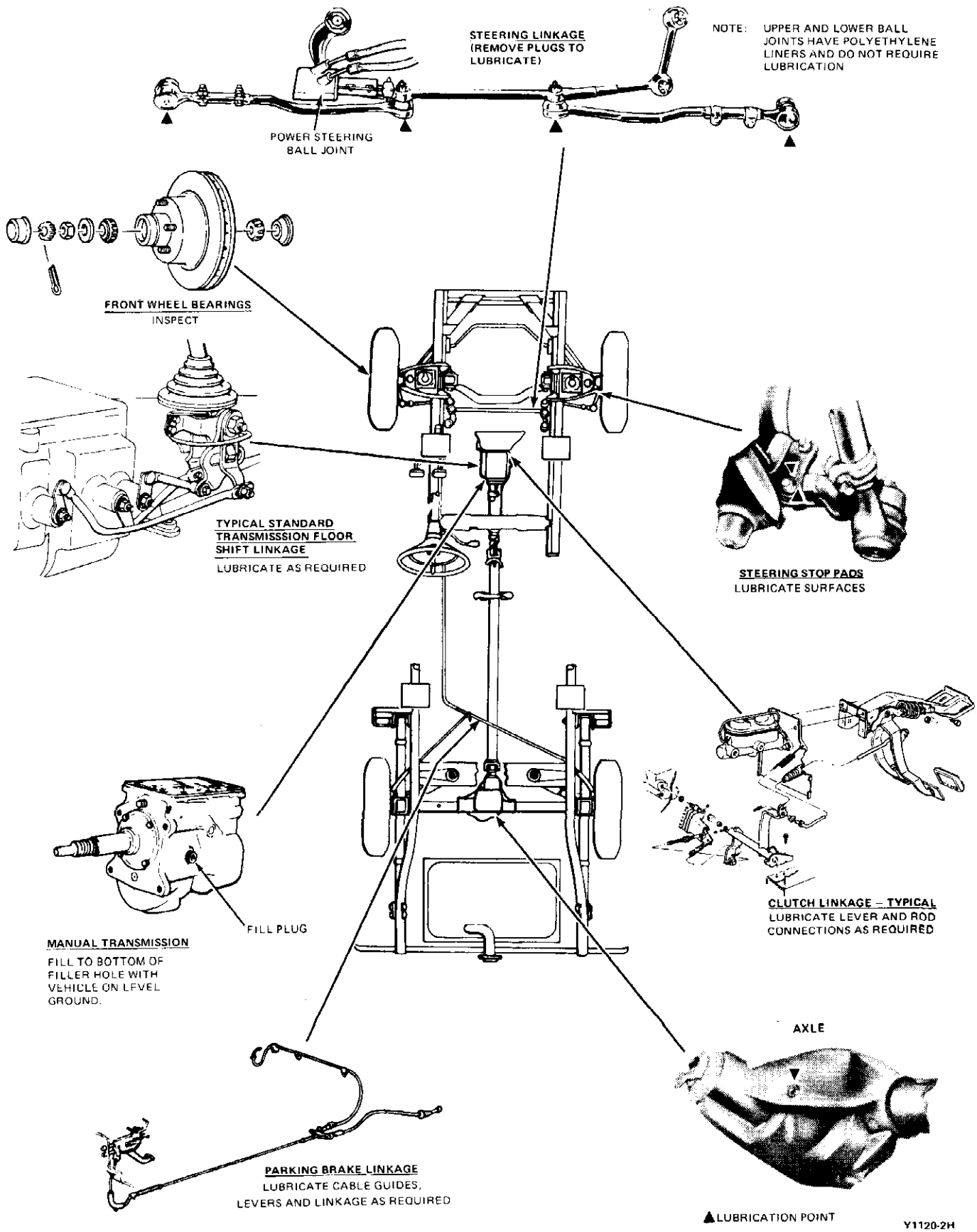


FIG. 7 Typical Chassis Lubrication Points—Granada, Monarch and Versailles

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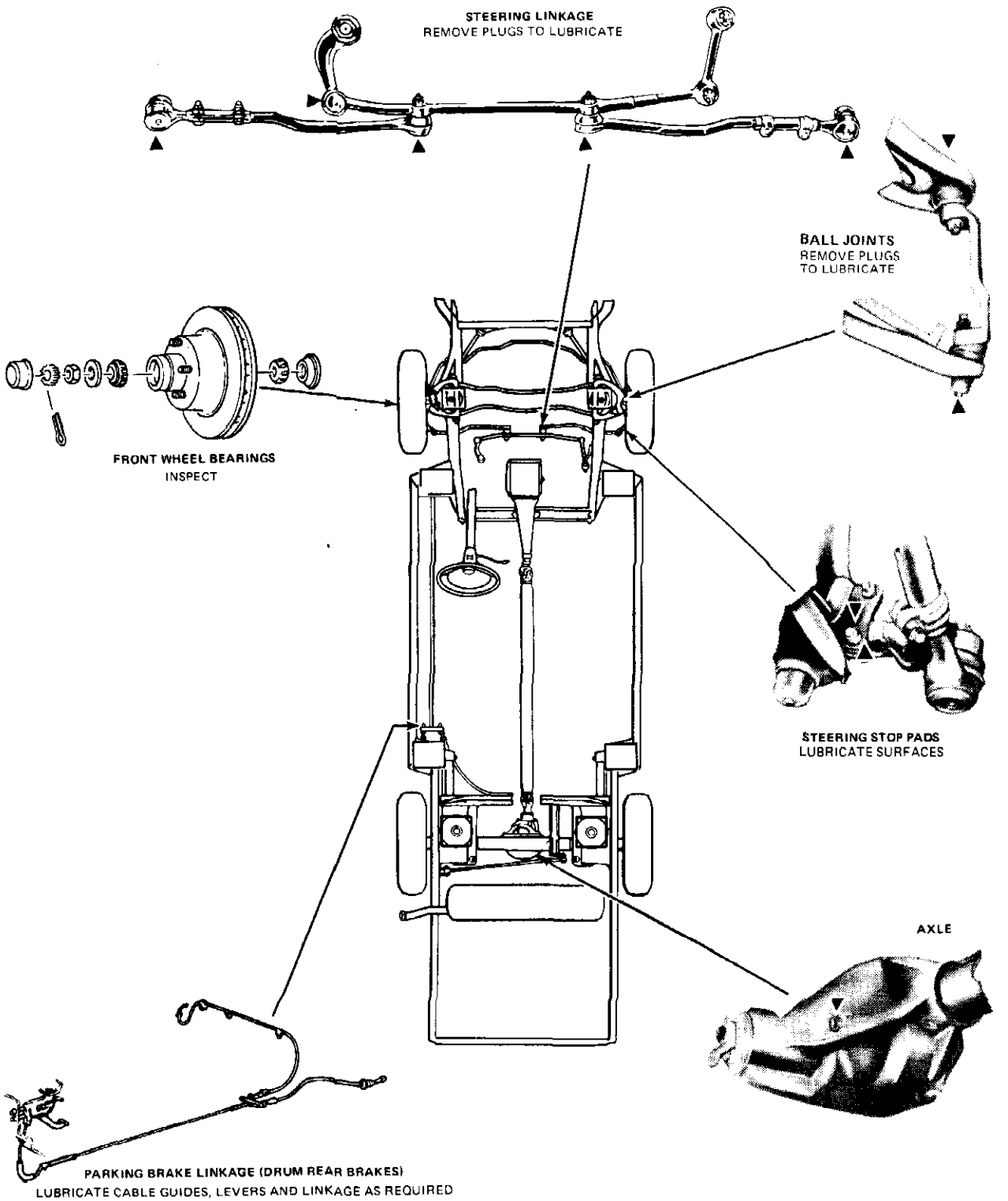
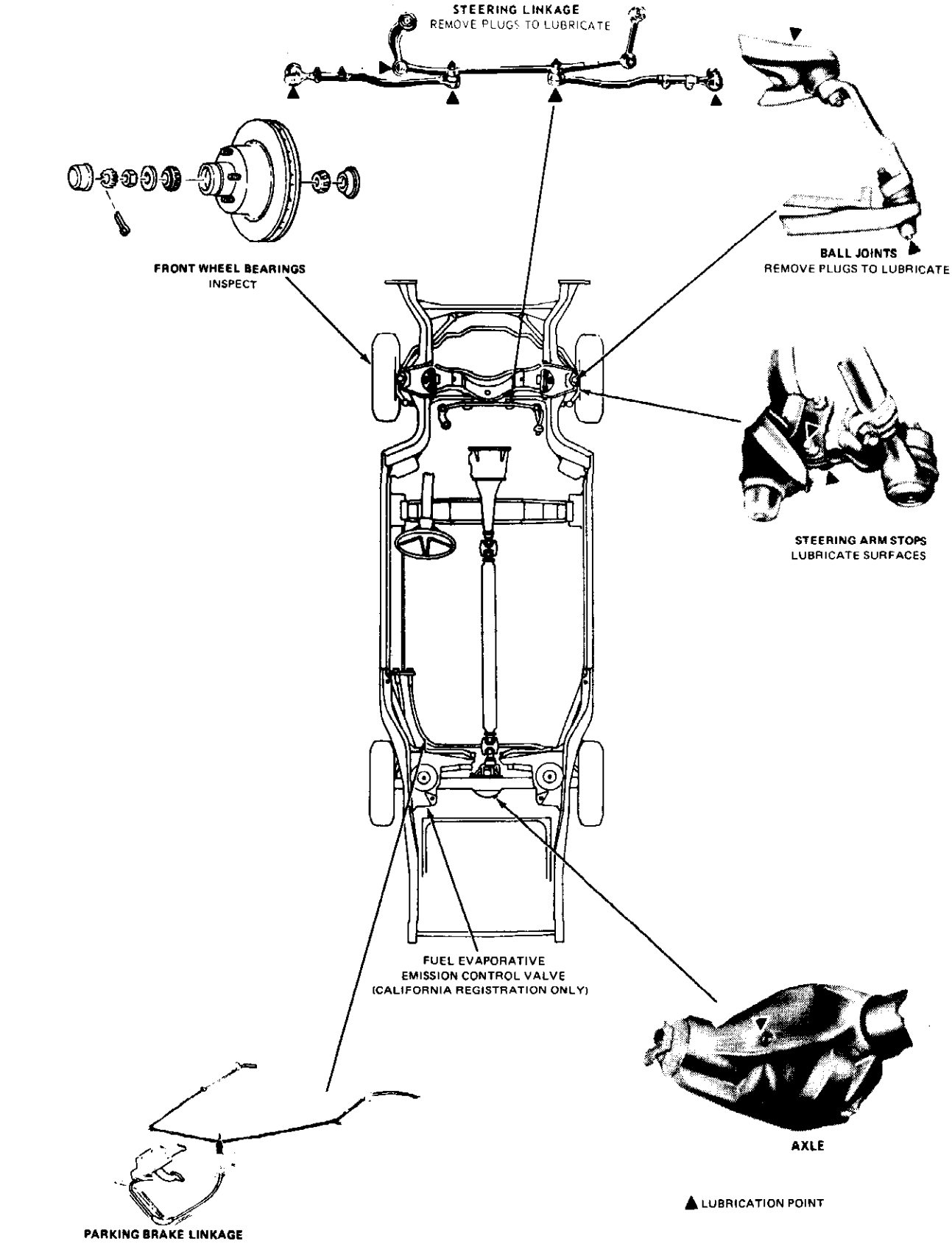


FIG. 8 Typical Chassis Lubrication Points—Ford, Mercury and Lincoln Continental

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FIG. 9 Chassis Lubrication Points--Continental Mark V, LTD II, Ranchero and Cougar

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DETROIT IRON OFFICIAL LICENSED PRODUCT

SPECIFICATIONS

LUBRICANT SPECIFICATIONS

Item	Part Name	Ford Part No.	Ford Specification
Hinges, Hinge Checks and Pivots	Polyethylene Grease	C4AZ-19584-B	ESB-M1C106-B
Front Suspension Ball Joints	Long Life Lubricant	C1AZ-19590-B	ESA-M1C75-B
Steering Linkage	Steering Linkage Lube	C6AZ-19590-A	ESA-M1C92-A Type II
Power Steering Control Valve Ball Stud	Long Life Lubricant	C1AZ-19590-B	ESA-M1C75-B
Transmission Linkage			
Steering Arm Stops	Steering Arm Stop Lube	C7AZ-19590-A	ESB-M1C25-A
Hood Latch and Auxiliary Catch	Polyethylene Grease	C4AZ-19584-B	ESB-M1C106-B
Lock Cylinders	Lock Lubricant	B4A-19587-A	ESB-M2C20-A
Rear Axle (Conventional)	Hypoid Gear Lube	D2AZ-19580-B	ESW-M2C105-A
Rear Axle (Traction-Lok)		C9AZ-19580-A	ESW-M2C119-A
Steering Gear Housing (Manual)	Steering Gear Grease	C3AZ-19578-A	ESW-M1C87-A
Steering Gear (Rack and Pinion)	Hypoid Gear Lube	D2AZ-19580-B	ESW-M2C105-B
Steering – Power (Pump Reservoir) (Lincoln Continental, Continental Mark V)	Power Steering Fluid	D5AZ-14582-A	ESW-M2C128-A
Steering-Power (Pump Reservoir) (Except Lincoln Continental and Continental Mark V)	Auto. Trans. Fluid	C1AZ- 19582-A	ESW-M2C33-F (Type F)
Transmission (Automatic) C3, C4 & FMX	Auto. Trans. Fluid	C1AZ-19582-A	ESW-M2C33-F (Type F)*
Transmission (Automatic) C6 & JATCO	Auto. Trans. Fluid	D7AZ-19582-A	ESP-M2C138-CJ*
Transmission (Manual)	Manual Trans. Lube	C3AZ-19C547-B	ESP-M2C83-C
Engine Oil Filter	*Long Life Oil Filter*	*C1AZ-6731-A*	*ES-C8AF-6714-A/-C*
Engine Oil	Long Life Engine Oil	(1)	ESE-M2C144-A
Speedometer Cable	Speedometer Cable Lube	D2AZ-19581-A	ESF-M1C160-A
Engine Coolant	Cooling System Fluid	8A-19549-A or -B	ESE-M97B18-C
Front Wheel Bearings and Hubs	Long Life Lubricant	C1AZ-19590-B	ESA-M1C75-B
Front Wheel Bearing Seals			
Brake Master Cylinder	H.D. Brake Fluid	C6AZ-19542-A	ESA-M6C25-A
Brake Master Cylinder Push Rod and Bushing	SAE 10W-30 Engine Oil	(1)	ESE-M2C144-A
Drum Brake Shoe Ledges	High Temp. Grease	C0AZ-19553-A	ESR-M13P4-A
Disc Brake Caliper and Anchor Plate Slides	Disc Brake Caliper and Anchor Plate Slide Lubricant		ESA-M1C167-A
Rear Disc Brake Caliper (Internal)	Silicone Grease		ESA-M1C169-A
Parking Brake Cable	White Waterproof Grease		ESB-M1C31-A
Brake Pedal Pivot Bushing	SAE 10W-30 Engine Oil	(1)	ESE- M2C144-A
Tire Mounting Bead (of Tire)	Synthetic Rubber Lube		ESA-M99C45-A or ESA-M1BC-A
Clutch Pedal Pivot Bushing	*SAE 10W-30 Engine Oil*	*(1)*	*ESE-M2C144-A*
Clutch Equalizer Bar Assembly Bore & Pivot (Both Ends)	Long Life Lubricant	C1AZ-19590-B	ESA-M1C75-B
Clutch Cable Connection (Both Ends)			
Clutch Pedal to Idler Lever Rod (Both Ends)			
Clutch Release Rod			
Clutch Release Lever – At Fingers (Both Sides and Fulcrum)			
Swivel Clutch Release Idler Lever			
Clutch Release Bearing Retainer			

(1) Part Number depends on viscosity and container size.

* Refer to vehicle certification label on left front door pillar for transmission code to determine transmission type.

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Hoisting, Jacking and Towing

PART 50-04

SUBJECT	PAGE
DESCRIPTION	
General Hoisting Instructions	04-1
DESCRIPTION (Cont'd.)	
Towing	04-2

CN4048-2A

DESCRIPTION

GENERAL HOISTING INSTRUCTIONS

Damage to suspension, exhaust and/or steering linkage components may occur if care is not exercised when positioning the hoist adapters of 2-post hoists prior to lifting the car.

If a 2-post hoist is used to lift the vehicle, place the adapters under the front suspension lower arms. **Do not allow the adapters to contact the steering linkage.**

On the Lincoln Continental, Continental Mark V, Thunderbird, LTD II, Fairmont, Zephyr and Cougar, place fork lifts under the axle housing inboard of the suspension arm brackets.

Do not position hoist pads under Number 3 crossmember.

Refer to the Owner's Manual when using the jack supplied with the vehicle.

Granada, Monarch, Versailles, Pinto, Bobcat and Mustang II

The unitized body-frame construction requires special precautions and procedures when the vehicle is jacked up or hoisted. In some cases, special hoist adapters must be used as recommended by specific hoist manufacturers.

Drive-On Type Hoist

To prevent possible damage to the underbody, do not drive the vehicle onto the drive-on type hoist without first checking for possible interference between the upright flanges of the hoist rails and the underbody. Should there be interference, the hoist flanges should be modified as necessary and/or the approach ramps built up to provide the needed clearance.

Floor Jack—Pinto, Bobcat, Mustang II, Fairmont and Zephyr

When using a floor jack, the vehicle may be raised at several locations. The front of the car may be lifted by positioning the jack under the center of the number two crossmember. The front, as well as either side of the rear end, may be lifted by positioning the floor jack under the rocker flange at the contact points used for the jack supplied with the vehicle. To lift both sides of the rear at once, position the floor jack under the differential housing.

Floor Jack—Others

When a stationary floor jack or a roll jack is to be used, there are several specific recommended points of contact. Either side of the front of the vehicle may be raised by jack contact at the lower arm strut connection, or by jack pressure on the front crossmember, or on the crossmember to which the stabilizer is connected.

Do not attempt to use jack pressure on either front or rear Granada, Monarch, Versailles, Pinto, Bobcat or Mustang II bumpers.

On Fairmont, Zephyr, Ford, Mercury, Lincoln Continental and Continental Mark V, position jacks under the rear axle housing between the suspension arm brackets and the differential housing. Do not place jacks under the suspension arm brackets.

To unload ball joint front suspensions, position jack as shown in Fig. 1.

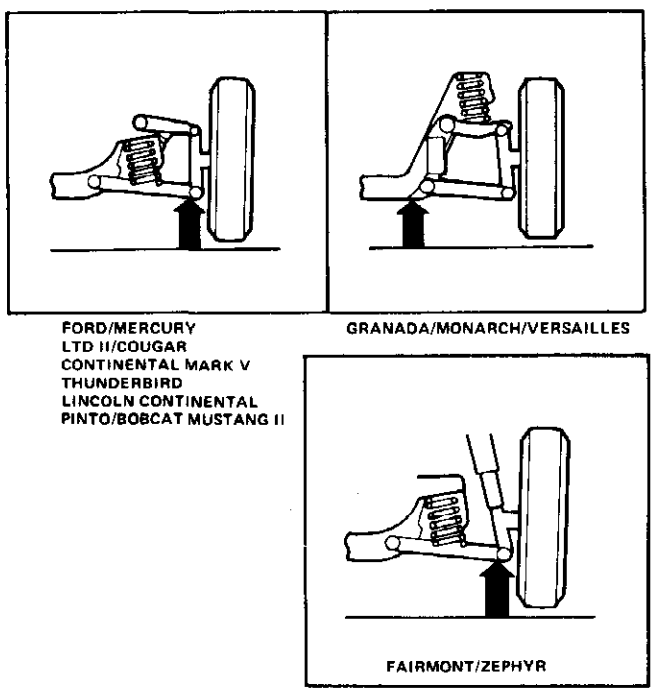


FIG. 1 Front Suspension Lift Points for Ball Joint Unloading

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Twin Post Hoist

To assure safe hoisting, the front post adapters must be positioned carefully to contact the center of the lower suspension arms (Fig. 2).

To prevent damage to the rear shock absorbers, the rear forks must contact the axle at points no more than one inch outboard from the circumference welds near the differential housing. Carefully raise the rear post and check the position of the fork (Fig. 3).

Rail Type—Free Wheeling Hoist

The front adapters or hoist plates must be carefully positioned in contact with the lower suspension arms to assure safe, accurate lifting.

The rear hoist adapters must be positioned carefully under the rear axle to prevent damage to the shock absorbers when the vehicle is raised. The hoist rails should be raised slowly and the position of the adapters checked.

Frame Contact Hoist

On frame contact hoists, adapters are necessary to lift the vehicle. The adapters must be placed at four contact points as shown in Fig. 4. Position the adapters so that they are centered on the adapter contact area. All four contact points must contact the adapters.

NOTE: Exercise care when hoisting vehicles equipped with catalytic converter(s). On vehicles so equipped, assure necessary clearance between hoist and exhaust system components before energizing hoist.

TOWING

Make sure the parking brakes are released and the transmission is in NEUTRAL. It is important to know that the transmission and rear axle are in proper working order before towing. To move a vehicle with an inoperative axle, it is necessary to raise the rear wheels. If the transmission is inoperative, the driveshaft must be

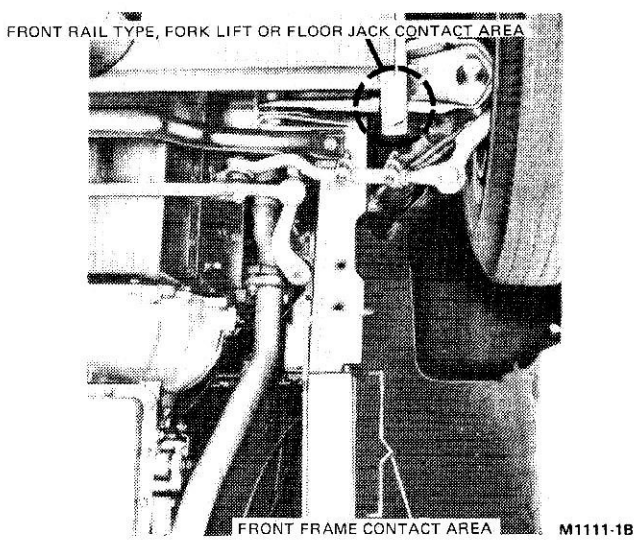


FIG. 2 Front Hoist Contact Areas—Typical

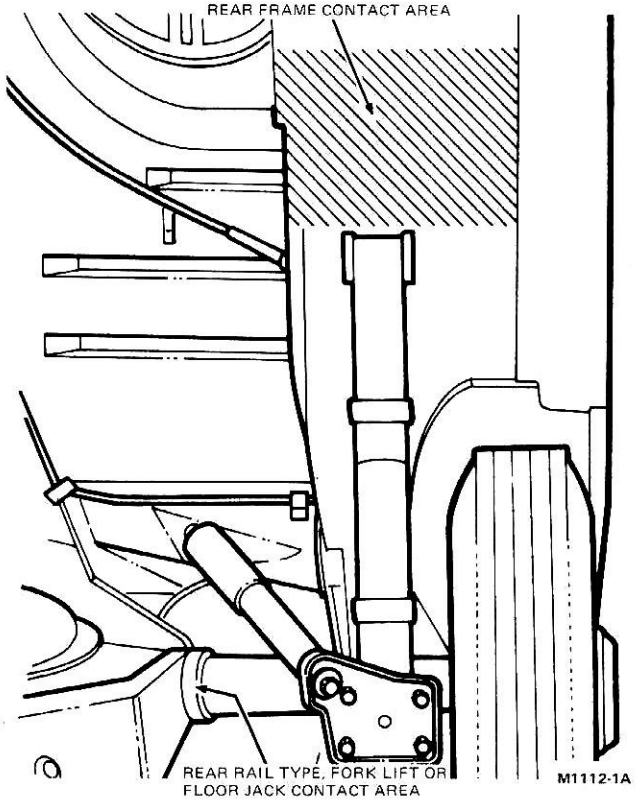
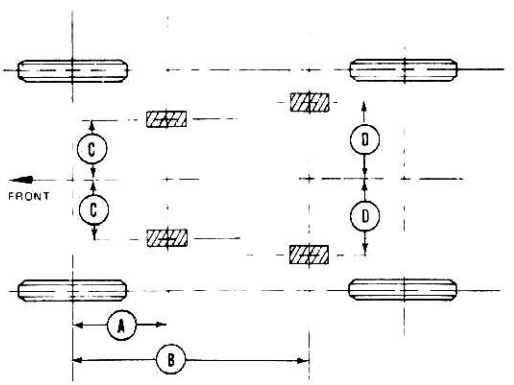


FIG. 3 Rear Hoist Contact Areas—Typical



Dimension (Inches)	Car Line									
	Cougar LTD II	Continental Mark V	Ford	Lincoln Continental	Fairmont/ Zephyr	Mercury	Mustang	Pinto Bobcat	Thunderbird	Granada Monarch Versailles
A	22.0	24.9	21.5	21.7	*	21.5	17.5	17.5	22.0	21.5
B	83.4 ① 87.4 ②	102.9	97.5	103.7	*	100.5	75.0	75.0	83.4	83.5
C	25.0	25.0	23.0	23.5	*	23.0	12.0	12.0	25.0	26.4
D	27.5	26.0	25.0	27.0	*	25.0	24.0	24.0	27.5	26.4

① 2-Door ② 4-Door

* Not available at time of printing.

Y1511-1E

FIG. 4 Frame Contact Lift Points

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removed or the rear wheels raised, whichever is more convenient.

To tow a vehicle with steering column and transmission locked and no ignition key available, lift vehicle from rear with wheels locked straight. If wheels are locked in a turn position, they MUST BE SUPPORTED with a DOLLY suitable for towing.

If the vehicle is being towed with the rear wheels on the ground, do not exceed 30 mph, or a distance of 15 miles. If this is not possible, tow the vehicle with the rear wheels raised off the ground, or with the driveshaft disconnected from the rear axle.

Towing Slings

To avoid metal to metal contact and possible damage to chrome or lower body panels, a special wide-belt sling should be used to lift and tow ALL cars. When attaching towing slings, take care to avoid damage to license plate and frame.

The suggested lifting and towing hook-ups are illustrated in Figs. 5 through 13.

Pinto and Bobcat

- Front (Fig. 5)

1. Attach J-hooks around outboard ends of lower control arms.
2. Position towbar behind front bumper, against body members.
3. Attach safety chains around front bumper energy absorbers.

- Rear (Fig. 6)

1. Attach J-hooks around axle outboard of spring mount.
2. Position towbar under rear bumper.
3. Attach safety chains around rear axle or around bumper energy absorbers. NOTE: Make sure chains are clear of brake lines and sufficient slack is allowed to prevent damage.

Mustang II (Except Cobra II)

- Front (Fig. 7)

1. Attach J-hooks to outboard ends of lower control arms.
2. Position towbar behind lower valence panel.
3. Attach safety chains around front anti-sway bar.

- Rear (Fig. 8)

1. Attach J-hooks around rear axle, outboard of spring mounts.
2. Position towbar behind bumper.
3. Attach safety chains around rear spring hangers.

Mustang Cobra II

- Front

CAUTION: The flexible spoiler should be lifted with the hand as the tow chains tighten to ensure that the sling straps and/or chains bear on the unpainted back side of the spoiler and do not crimp or drastically fold the spoiler.

1. Attach J-hooks to outboard ends of lower control arms.
2. Carefully position towbar behind lower valence panel (see CAUTION).
3. Attach safety chains around front anti-sway bar.

- Rear (See Mustang II).

Fairmont and Zephyr

- Front (Fig. 9)

1. Attach J-hooks to outboard ends of lower control arms.
2. Position towbar under radiator crossmember.

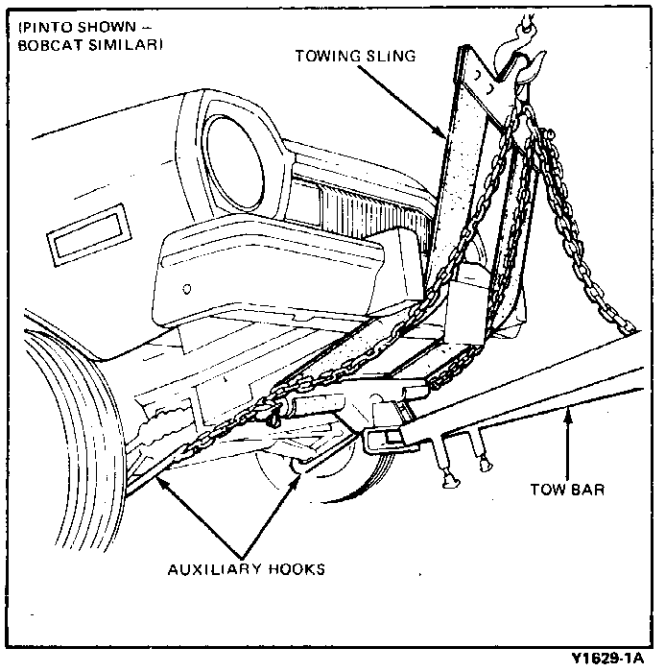


FIG. 5 Pinto and Bobcat Towing—Front

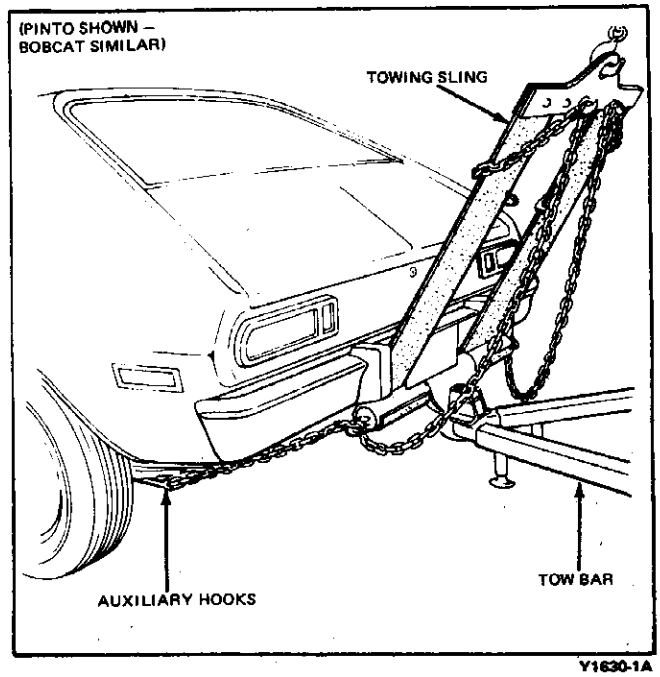


FIG. 6 Pinto and Bobcat Towing—Rear

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3. Attach safety chains around outer ends of lower control arms.

• Rear (Fig. 10)

1. Attach J-hooks around outboard ends of axle housing.
2. Position towbar under and slightly behind rear bumper.
3. Attach safety chains around outboard ends of axle housing. **NOTE: Make sure chains are clear of brake lines and that sufficient slack is allowed to prevent damage on turns.**

Granada and Monarch

• Front (Fig. 11)

1. Attach J-hooks to outboard ends of lower control arms.
2. Position towbar below front bumper. NOTE: Towbar will deform rubber air dam, but dam will return to acceptable shape.

• Rear (Fig. 12)

1. Attach J-hooks around axle housing outboard of spring mounts.
2. Position towbar below and slightly behind rear bumper.
3. Attach safety chains around outboard ends of axle housing. **NOTE: Make sure chains are clear of brake lines and that sufficient slack is allowed to prevent damage on turns.**

Versailles

• Front and Rear (Same as Granada and Monarch except position safety chains around bumper energy abosrbers—Figs. 13 and 14).

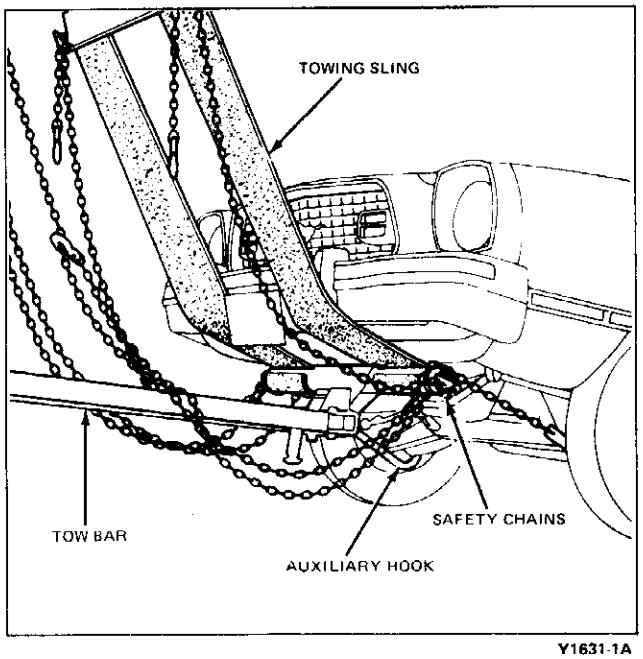


FIG. 7 Mustang II Towing—Front (Except Cobra II)

LTD II and Cougar Sedan

• Front (Fig. 15)

1. Attach J-hooks around lower control arms outboard of spring.
2. Position towbar behind front bumper (air dam will deform when chains are tightened, but will return to acceptable shape).
3. Attach safety chains around outboard ends of lower control arms.

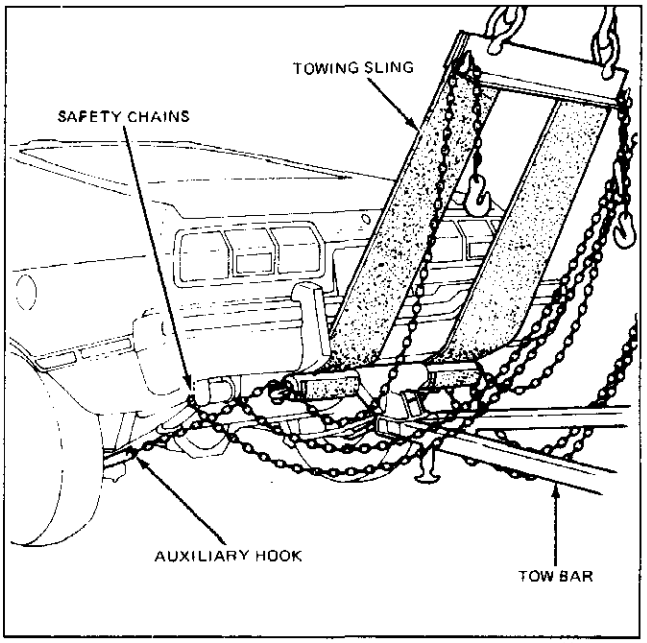


FIG. 8 Mustang II Towing—Rear

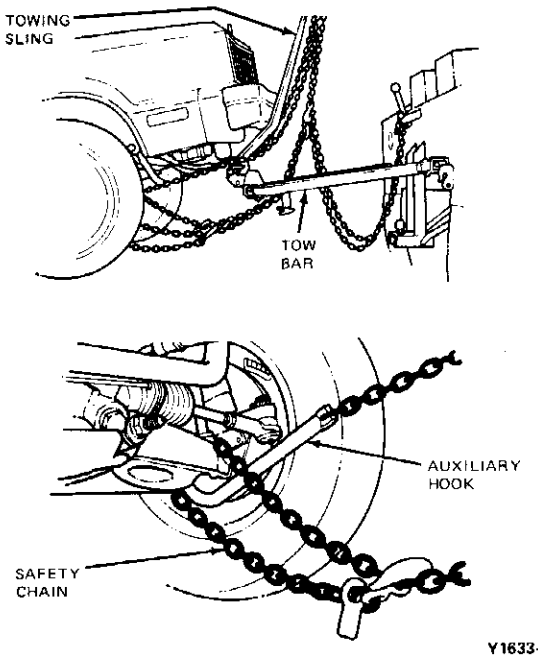


FIG. 9 Fairmont and Zephyr Towing—Front

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• Rear (Fig. 16)

1. Attach J-hooks in holes in underside of frame side rails.
2. Position towbar behind rear bumper.
3. Attach safety chains around outboard ends of rear axle housing. NOTE: Make sure chains are clear of brake lines, and that sufficient slack is allowed to prevent damage on turns.

Thunderbird and Cougar XR7

• Front (Fig. 17)

1. Attach J-hooks around lower control arms outboard of springs.
2. Position towbar under front bumper (be careful of lower grille).
3. Attach safety chains around front bumper energy absorbers.

• Rear (Same as LTD II and Cougar Sedans—Fig. 16)

LTD II Ranchero

• Front (Same as LTD II sedan—Fig. 15)

• Rear (Fig. 18)

1. Position 4" x 4" spacer behind rear bumper, against frame.
2. Position towbar below rear bumper.
3. Attach towing chains around rear frame members.
4. Attach safety chains around rear frame members.

Ford and Mercury

• Front (Fig. 19)

1. Attach J-hooks around lower control arm between ball joint and spring mount.
2. Position towbar under front bumper. (Rubber air dam will deform, but will return to acceptable shape).
3. Attach safety chains around lower control arms between spring mounts and inner bushing.

• Rear (Fig. 20)

1. Attach J-hooks around rear axle, inboard of coil spring mounts.
2. Position towbar under rear bumper.
3. Attach safety chains around rear axle housing inboard of coil spring mounts. **NOTE: Make sure chains are clear of brake lines and allow sufficient slack to prevent damage on turns.**

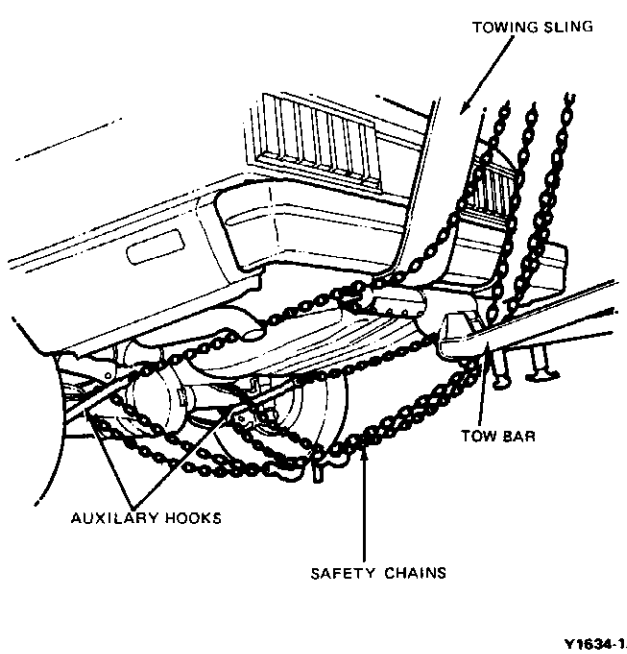


FIG. 10 Fairmont and Zephyr Towing—Rear

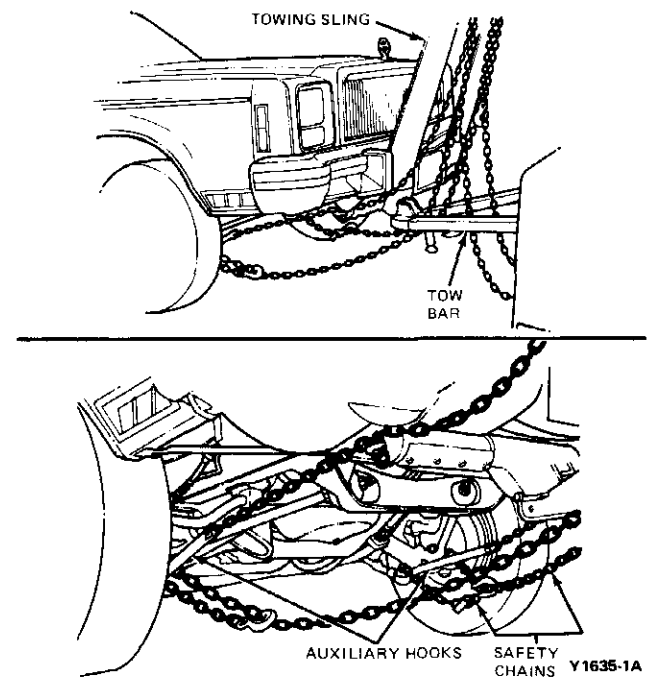


FIG. 11 Granada and Monarch Towing—Front

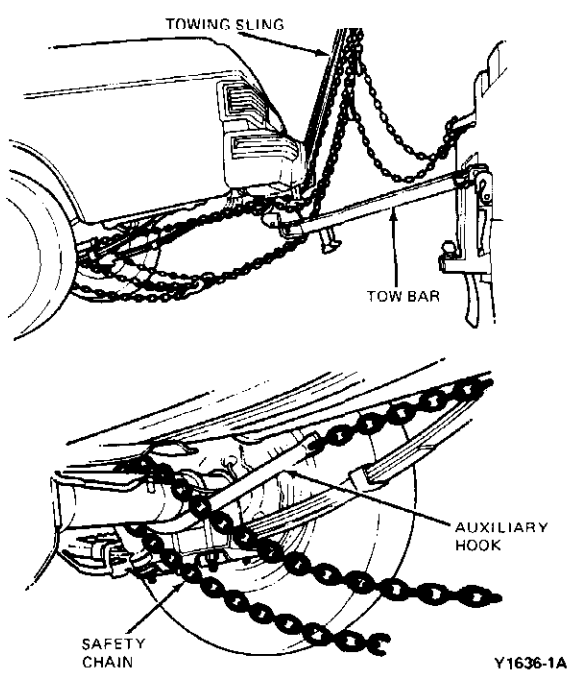


FIG. 12 Granada and Monarch Towing—Rear

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Lincoln Continental

- Front (Fig. 21)

1. Attach J-hooks around outboard ends of lower control arms.
2. Position towbar behind front bumper.
3. Attach safety chains around front bumper energy absorbers.

- Rear (Fig. 22)

1. Attach J-hooks in holes in underside of frame side rail.
2. Position 4" x 4" spacer behind rear bumper.
3. Position towbar under rear bumper.
4. Attach safety chains around rear bumper energy absorbers.

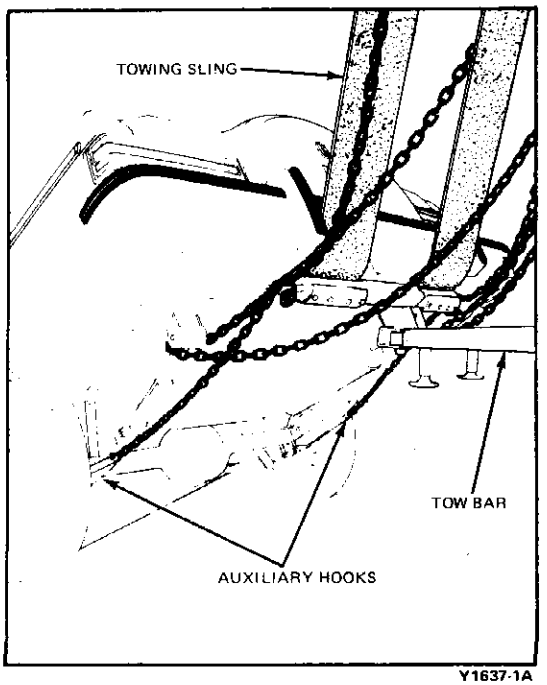


FIG. 13 Versailles Towing—Front

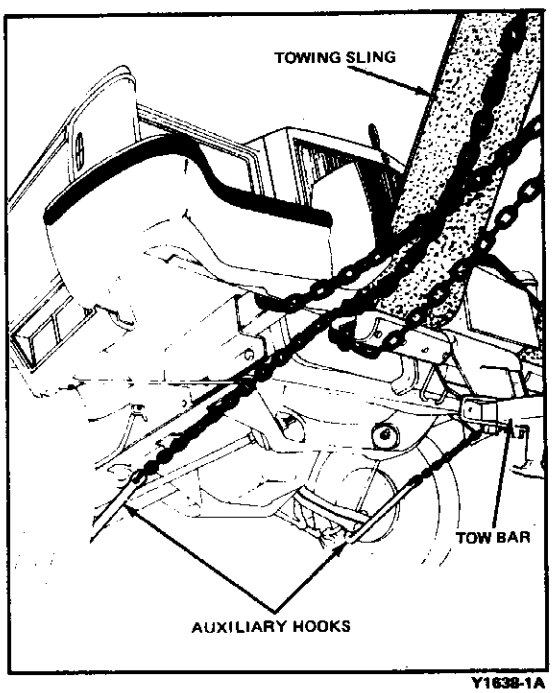


FIG. 14 Versailles Towing—Rear

Continental Mark V

- Front (Fig. 23)

1. Attach J-hooks around outboard ends of lower control arms.
2. Position towbar under front bumper.
3. Attach safety chains around front bumper energy absorbers.

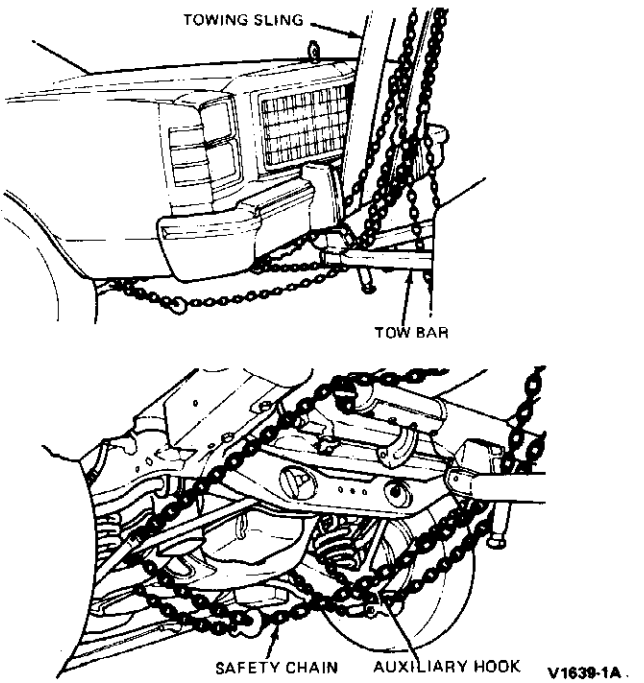


FIG. 15 LTD II and Cougar Sedan Towing—Front

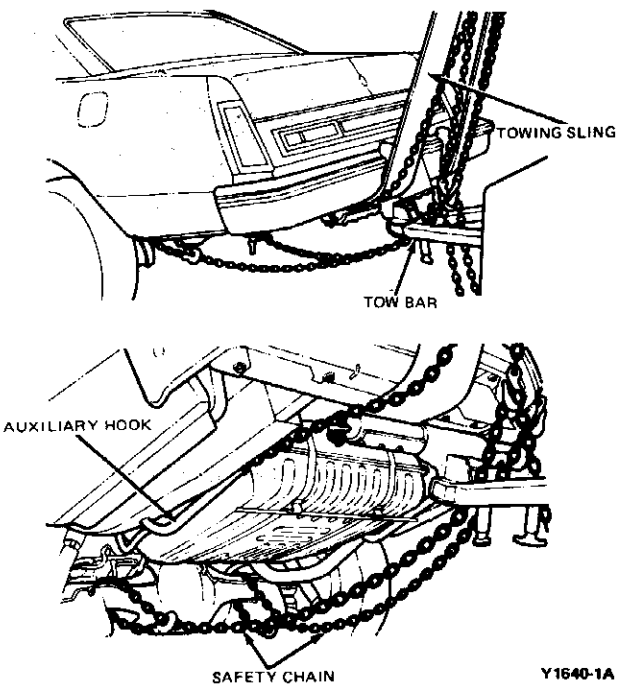


FIG. 16 LTD II and Cougar Sedan Towing—Rear

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- Rear (Fig. 24)

1. Attach J-hooks in holes in underside of frame side rail.
2. Position towbar under rear bumper.
3. Attach safety chains around rear bumper energy absorbers.

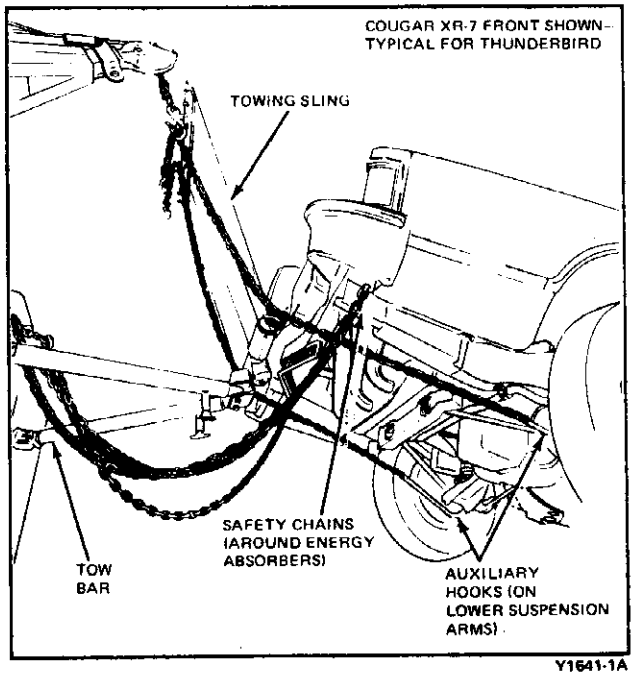


FIG. 17 Thunderbird and Cougar XR7 Towing—Front

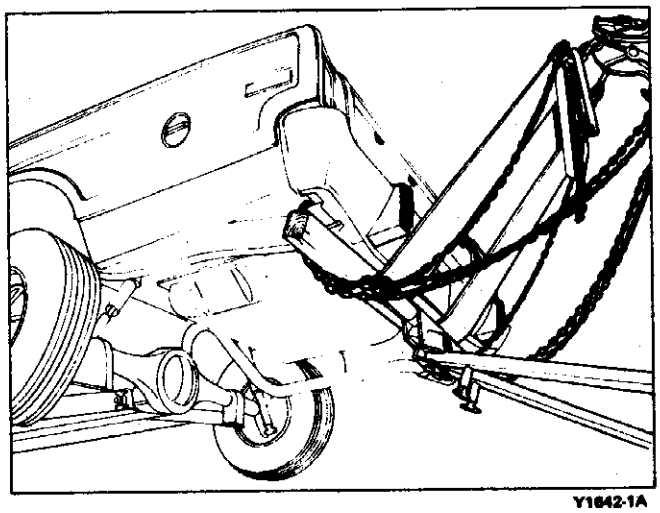


FIG. 18 LTD II Ranchero Towing—Rear

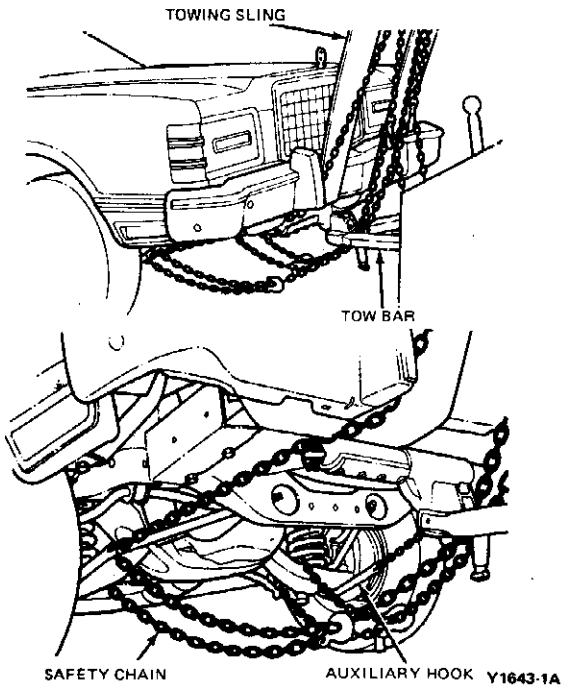


FIG. 19 Ford and Mercury Towing—Front

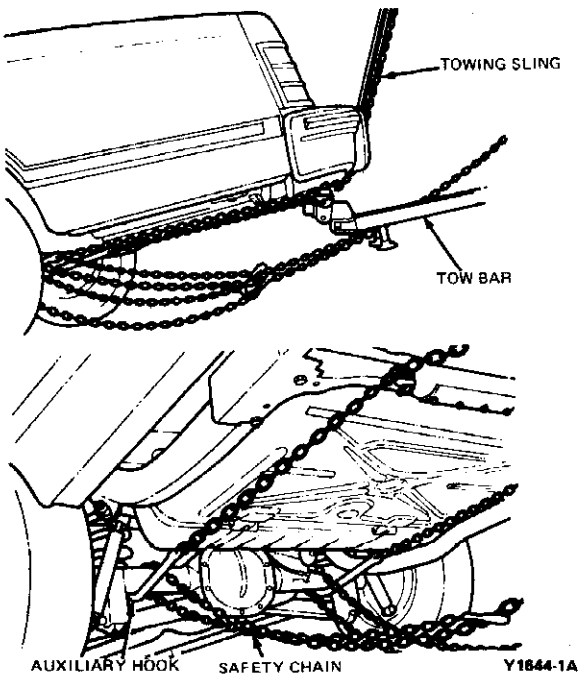


FIG. 20 Ford and Mercury Towing—Rear

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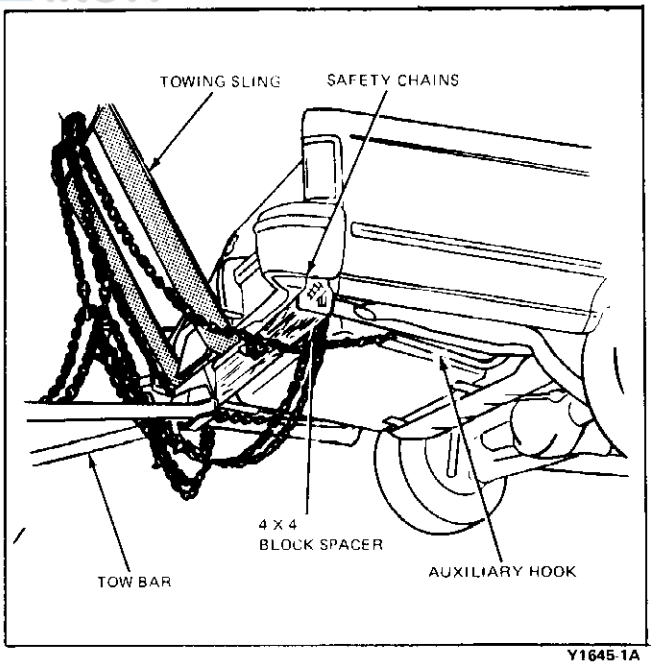


FIG. 21 Lincoln Continental Towing—Front

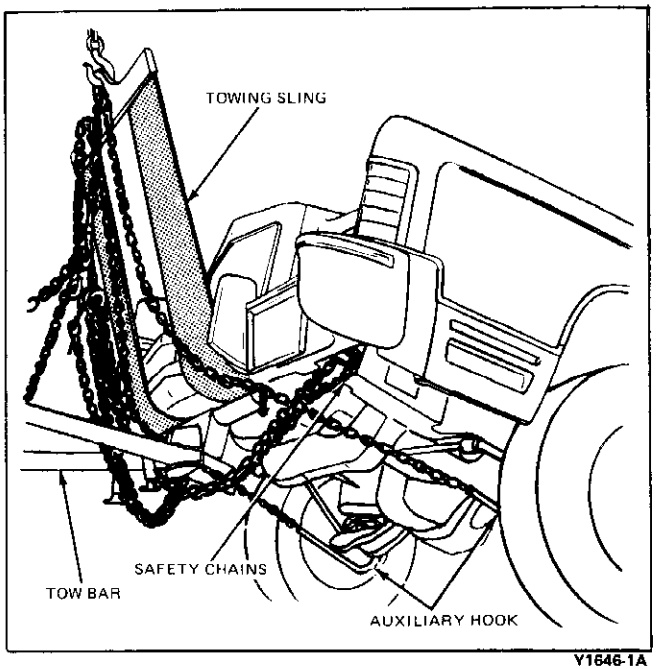


FIG. 22 Lincoln Continental Towing—Rear

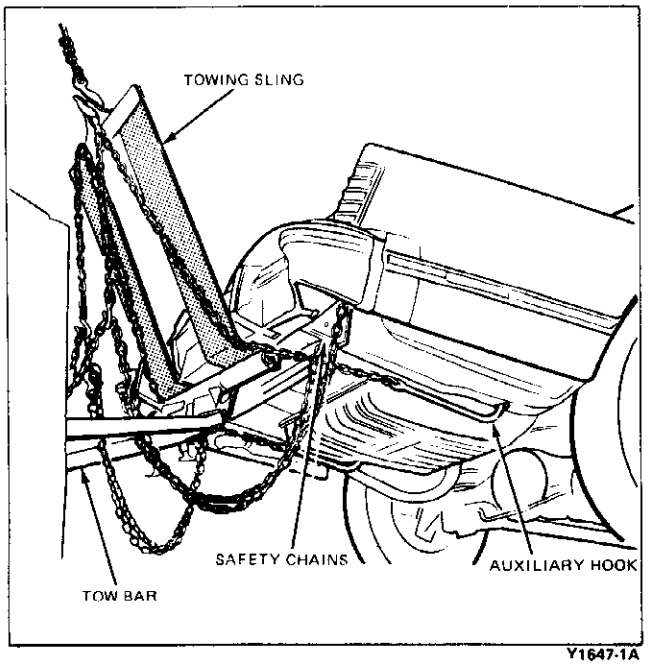


FIG. 23 Continental Mark V Towing—Front

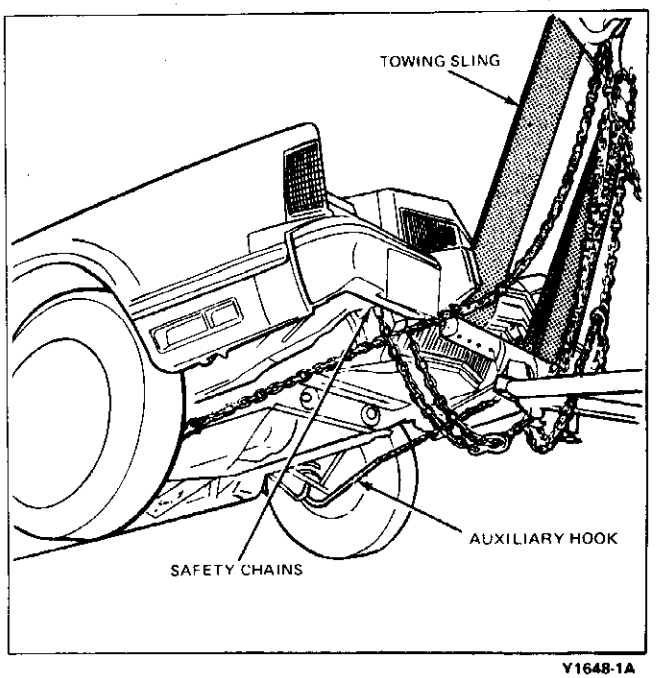


FIG. 24 Continental Mark V Towing—Rear

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Wheels, Tires, Wheel Hubs and Bearings

PART 50-11

All Models

SUBJECT	PAGE
MAINTENANCE	
Front Wheel Bearing Adjustment	11-2
Tires and Air Pressures	11-1
Tire Rotation	11-1
Wheel Balancing	11-1
LUBRICATION/INSPECTION	
Front Wheel Bearings, Brake Lines and Linings – Inspect	11-2
SPECIFICATIONS	11-3

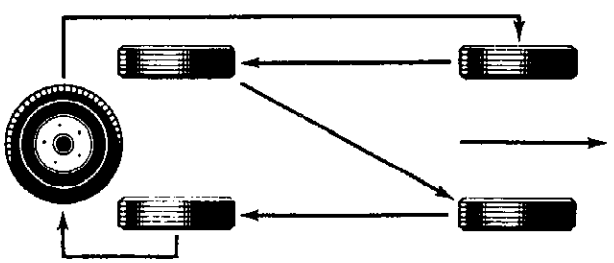
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MAINTENANCE

TIRE ROTATION

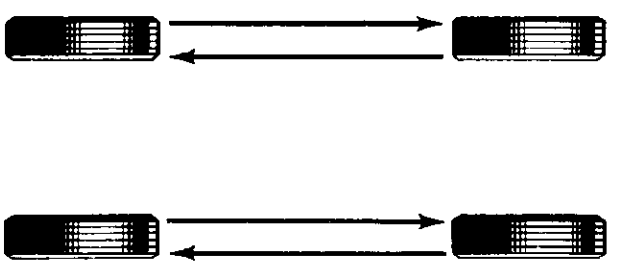
Tires should not be rotated until the cause of unusual or uneven wear is located and corrected. Bias and bias-belted tires may be cross-switched as shown in Fig. 1. If vehicle is equipped with radial ply tires, they may be rotated from front to rear as shown in Fig. 2. (Cross-switching is not recommended for radial ply tires.)

Note: If the car is equipped with the optional deflated storage spare tire, do not include it during rotation of the other four tires.



F1893-1A

FIG. 1 Tire Cross-Switching Diagram For Bias and Bias-Belted Tires



F1894-1C

FIG. 2 Tire Rotation Patterns for Radial Ply Tires

TIRES AND AIR PRESSURES

Inspect the tire treads, and remove all stones, nails, glass, or other objects that may be wedged in the tread. Check for holes or cuts that may permit air leakage from the tire, and make necessary repairs.

Inspect the tire side walls for cuts and other damage. If internal damage is suspected, remove tire from wheel for further inspection and repair or replace.

Check the tire valve for air leaks, and replace valve if necessary. Replace any missing valve caps.

The tires should be checked frequently to be sure that air pressures agree with those specified for the tires and vehicle model.

Inspect tires for uneven wear that might indicate the need for front end alignment or rotation.

WHEEL BALANCING

See the instructions provided with the wheel balancer.

Make certain that the brakes are not dragging before attempting to spin the wheels. On vehicles

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equipped with disc brakes, push the brake pads into the caliper to free the rotor.

FRONT WHEEL BEARING ADJUSTMENT

The front wheel bearings should be adjusted if the wheel is loose on the spindle or if the wheel does not rotate freely. The following procedure will bring the bearing adjustment to specification.

Disc Brakes

1. Raise the vehicle until the tire clears the floor.
2. Remove the wheel cover. Remove the grease cap from the hub.
3. Wipe the excess grease from the end of the spindle. Remove the cotter pin and nut lock.
4. Loosen the adjusting nut three turns and rock the wheel, hub and rotor assembly in and out several times to push the shoe and linings away from the rotor.
5. While rotating the wheel, hub, and rotor assembly, torque the adjusting nut to 17 to 25 ft-lb, to seat the bearings. (Fig. 3)
6. Loosen the adjusting nut one-half turn, then retighten to 10 to 15 in-lb, using a torque wrench.
7. Place the nut lock on the adjusting nut so the castellations on the lock are in line with the cotter pin hole in the spindle.
8. Install a new cotter pin and bend the ends around the castellated flange of the nut lock.
9. Check front wheel rotation. If the wheel rotates properly, reinstall the grease cap and wheel cover. If rotation is noisy or rough, disassemble and inspect as outlined in this Part.
10. Before driving the vehicle, pump the brake pedal several times to restore normal brake pedal travel.

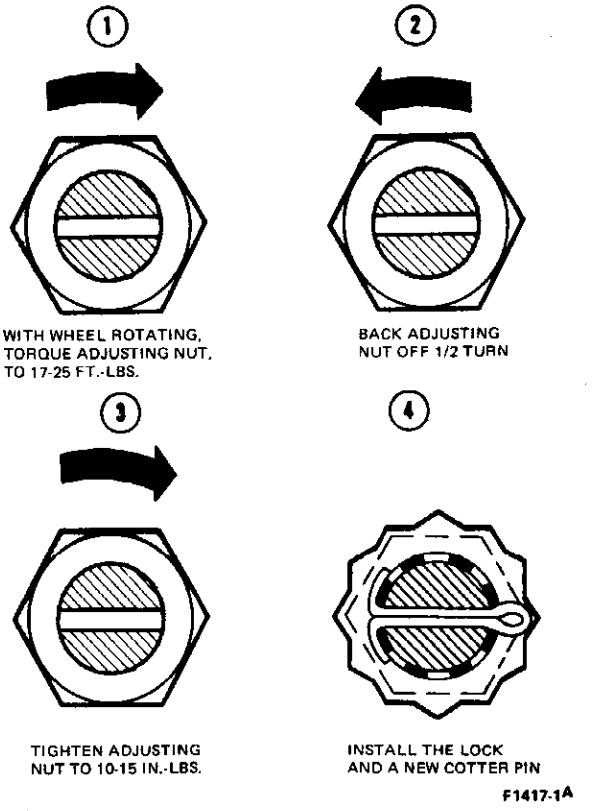


FIG. 3 Front Wheel Bearing Adjustment

LUBRICATION/INSPECTION

INSPECT BRAKE LINES, LININGS AND FRONT WHEEL BEARING LUBRICATION

It is recommended that brake lines, linings and front wheel bearing lubrication be inspected every 25,000 miles on all Ford-build passenger cars.

For information on brake line inspection refer to Part 50-12.

For information and specifications on brake lining wear, also refer to Part 50-12.

Inspect Front Wheel Bearing Lubrication

Disc Brakes

1. Raise the vehicle and remove the front wheel and tire.
2. Remove the brake caliper from the anchor plate, following the procedure and specifications given in Volume 1, Part 11-10. **Wire the brake calipter to the vehicle underbody to help prevent damage to the brake hose.**
3. Inspect the brake linings for wear, following the procedure and specifications given in Part 50-12. Replace the linings if necessary.
4. Inspect the area around the inner bearing seal for evidence of leakage. If leakage is not excessive, proceed to Step 5. If excessive leakage is found, replace both bearings and the grease seal. Inspect the bearing races; replace if necessary. Lubricate, re-assemble and reset bearing end play following the procedures under Front Wheel Bearing Adjustment in this Part and procedures described in Volume 1, Part 11-10. Proceed to Step 8.
5. Remove grease cap, cotter pin, retainer, nut and washer, and inspect for evidence of rust, water, metal particles or other contaminants in the lubricant. If these conditions are satisfactory, add lubricant as required, reassemble and proceed to Step 6. If any of the above conditions are found, replace both bearings and the grease seal. Inspect bearing races and replace if necessary. Lubricate, reassemble and reset end play. (See Volume 1, Part 11-10.) Proceed to Step 8.
6. Reassemble and reset end play.
7. Rotate rotor and check for grating noise. If noise does not exist, install grease cap. If noise exists, replace both bearings and the grease seal. Inspect bearing races and replace if necessary. Lubricate, reassemble and reset end play.
8. Clean and lubricate caliper slides (except Fairmont and Zephyr). (Refer to Volume 1, Part 12-20.)
9. Install caliper.
10. Install wheel and tire.

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SPECIFICATIONS

Refer to Volume One for the Wheel and Tire Specifications.

SPECIAL SERVICE TOOLS

Tool No.	Description	Tool No.	Description
Tool-1175-AC	Grease Seal Remover	Tool-1217-K	*Front Wheel Bearing Cup (Inner) Installer-Disc
T69L-1102-A	Front Wheel Bearing Remover		
T60K-1217-A	Front Wheel Bearing Cup (Outer) Installer-Disc	Tool-1175-AH	Grease Seal Installer-Disc

*Pinto, Bobcat, Mustang II, Fairmont, Zephyr, Granada, Monarch and Versailles only.

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DETROIT IRON

Brakes

PART 50-12

All Models

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Brake Hydraulic Lines Inspection	12-1
Brake Lining Inspection	12-1
MAINTENANCE (Cont'd.)	
Brake Tubing	12-1
Parking Brake Adjustment	12-2
SPECIFICATIONS	12-4

CA4241-2A

MAINTENANCE

NOTE: It is recommended that brake lines, linings and front wheel bearing lubrication be inspected every 25,000 miles on all Ford-built passenger cars. Bearing information is in Part 50-11.

BRAKE HYDRAULIC LINES—INSPECTION

Steel tubing is used throughout the brake system, with the exception of the flexible hoses at the front wheels, the rear axle housing brake tube connection, and rear disc brake calipers (if equipped).

Always bleed the applicable primary or secondary brake system after primary or secondary brake system hose or line replacement. Centralize the pressure differential valve after bleeding the system.

BRAKE TUBING

If a section of the brake tubing becomes damaged, the entire section should be replaced with appropriate replacement tubing. **Copper tubing should not be used in a hydraulic system.** When bending brake tubing to fit underbody or rear axle contours, be careful not to kink or crack the tube.

All brake tubing should be double flared properly to provide good leak-proof connections. Clean the brake tubing by flushing with clean brake fluid before installing.

When connecting a tube to a hose, tube connector, or brake cylinder, tighten the tube fitting nut to specified torque with Milbar Tool 1112-144 or equivalent.

BRAKE HOSE

A flexible brake hose should be replaced if it shows signs of softening, cracking, or other damage.

When installing a new front brake hose, position the hose to avoid contact with other chassis parts. On all models except Fairmont and Zephyr, place a new copper gasket over the hose fitting and thread the hose assembly into the front wheel cylinder (the Fairmont and Zephyr front hoses are reusable and do not require a copper gasket). Engage the opposite end of the hose to the bracket on the frame. Install the horseshoe-type retaining clip, and connect the tube to the hose with the tube fitting nut.

A rear brake hose should be installed so that it does not touch the muffler outlet pipe or shock absorber. Thread the hose into the rear brake tube connector. Engage the front end of the hose to the bracket on the frame. Install the horseshoe-type retaining clip, and connect the tube to the hose with the tube fitting nut.

BRAKE LINING—INSPECTION

Rear Drum Brakes

1. Raise the vehicle until the tire clears the floor. Install safety stands under the vehicle.
2. Remove the wheel cover or hub cap. Remove the wheel lug nuts and the wheel. Remove the drum.
3. If the wheel does not come off easily, remove the rubber plug and insert a narrow screwdriver through brake shoe adjusting hole at the back side of brake backing plate, and disengage the adjusting lever from the adjusting screw. While holding the adjusting lever away from the screw, back off the screw with the brake adjusting tool (Fig. 1). **Use care not to burr, chip, or damage the notches in the adjusting screw; otherwise, the self adjusting mechanism will not function properly.**
4. Inspect the drum and the linings. If the linings are worn to within 1/32-inch of the rivet heads, replace or reline both sets (primary and secondary) on the rear wheels. Under no circumstances replace only one lining or one wheel set. Both rear wheel sets should be replaced whenever one is worn or damaged. If the drum braking surface is excessively scored, refinish it. Do not machine drums so that I.D. exceeds maximum diameter shown cast on the outside of the drum.
5. If relining is required, refer to Part 12-02 for complete procedure.

Disc Brakes

1. Raise the vehicle until the wheel and tire clear the floor.

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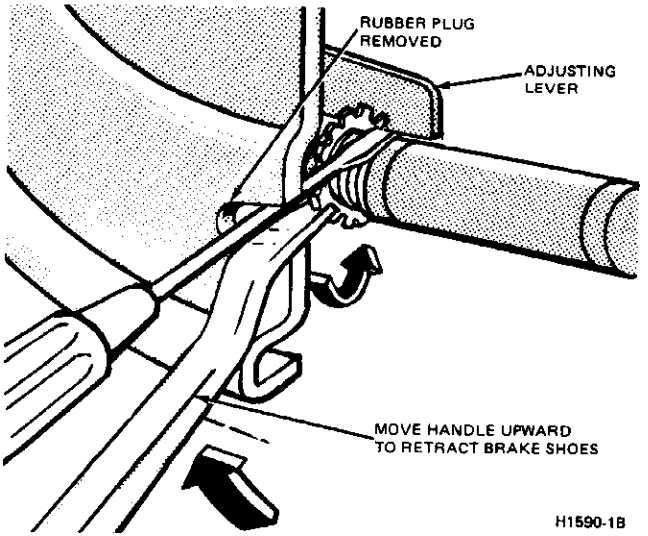


FIG. 1 Backing Off Brake Adjustment

2. Remove the wheel cover or hub cap from the wheel.
3. Remove the wheel and tire from the hub and rotor.
4. Inspect the brake shoes and lining for wear. If the lining is worn to within 1/8 inch of the shoe or if there is more than 0.125 inch (1/8 inch) taper from end to end or if lining shows evidence of brake fluid contamination, replace all (4) shoe and lining assemblies on both front or rear wheels.
5. Visually check the caliper. If the caliper housing is leaking, it should be replaced. If a seal is leaking, the caliper must be disassembled and new seals installed. If a piston is seized in the bore, a new caliper housing is required.

   Check the brake hoses for signs of cracking, leaks or abrasion. Replace them if necessary.
6. Install the wheel and tire assembly.

PARKING BRAKE ADJUSTMENT

All Models Except Pinto, Bobcat and Mustang II

1. Make sure that the parking brake is fully released.
2. Place the transmission in neutral. Raise the vehicle on an axle-type hoist.
3. Rear Drum Brakes Only:
   a. Tighten the adjusting nut against the cable equalizer or cable adjusting rod (Fig. 2) to cause rear wheel brake drag. Then, loosen the adjusting nut until the rear brakes are fully released. There should be no brake drag. Torque the lock nut (when used) to 7 to 10 ft-lbs.
   b. Lower the vehicle and check operation of the parking brake.
4. Rear Disc Brakes Only:
   a. Tighten adjusting nuts until levers on calipers just begin to move. Loosen nut just enough to obtain full return to stop position of both levers.
   b. Apply and release parking brake control inside vehicle. Check if parking brake levers (on calipers) are fully returned to stops by attempting to pull levers rearward. If lever(s) move rearward, adjustment is too tight. Repeat adjustment procedure.

NOTE: If levers do not return to stops, parking and service brake function will be affected as mileage is accumulated.

Pinto, Bobcat and Mustang II

1. Make sure the parking brake is fully released. Place transmission in **NEUTRAL** and raise the rear wheels.
2. Tighten the adjusting nut on the equalizer rod at the control assembly to cause rear wheel brake drag (Fig. 2). Then, loosen the adjusting nut until the rear brakes are fully released and torque jam nut to 7 to 10 ft-lbs. There should be no brake drag.
3. Lower the rear wheels and check operation of parking brake.

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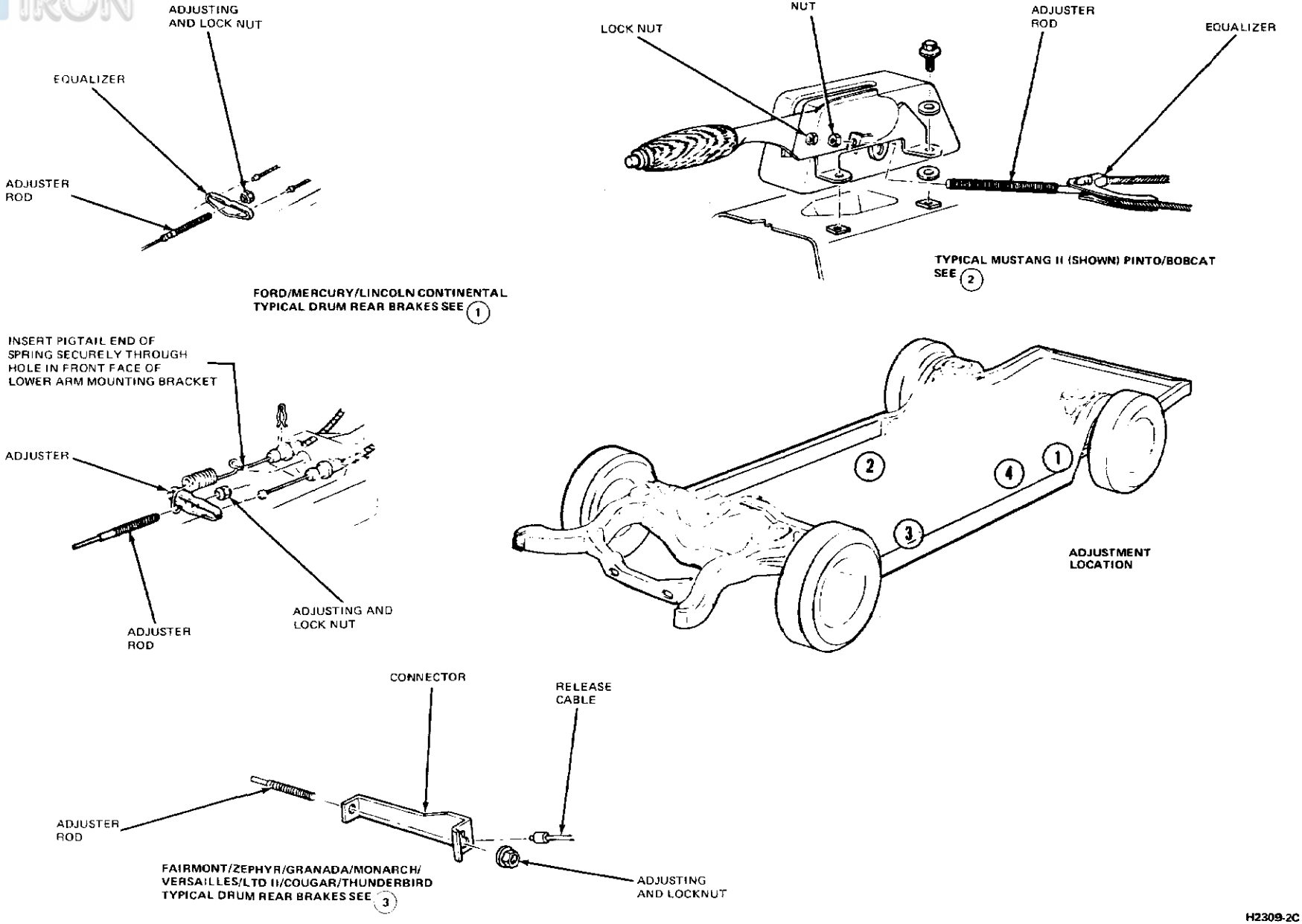


FIG. 2 Adjustment Points—Parking Brake

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SPECIFICATIONS

Refer to the Car Shop Manual, Volume One, for the Brake System Specifications.

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DETROIT IRON

Steering

PART 50-13

All Models

SUBJECT	PAGE
LUBRICATION	
Power Steering Control Valve Ball Stud Lubrication	13-1
Power Steering Pump Reservoir Fluid Level Check	13-1
Steering Arm Stops Lubrication	13-1
Steering Gear Housing Lubricant Level Check	13-1
Steering Linkage Lubrication	13-1
MAINTENANCE	
Drive Belt Tension – Check and Adjust	13-2
Steering Linkage and Connections Check	13-2
SPECIFICATIONS	13-2

LUBRICATION

NOTE: If the vehicle has been parked in a temperature below 20 degrees F, park it in a heated garage for 10 minutes, until the joints will accept lubricant.

Wipe any accumulated dirt from around the lubrication plugs.

Use a rubber-tipped, hand-operated grease gun at low pressure, loaded with lubricant which meets specifications. Force lubricant into the joint until the joint boot can be felt or seen to swell, indicating that the boot is full of lubricant. **Do not over-lubricate, until lubricant escapes from the boot, as this destroys the weathertight seal. Install the plug.**

LUBRICATE STEERING ARM STOPS

Clean all friction points. Steering arm stops are located on inside of steering arm and upturned end of front suspension strut, where it is attached to the lower control arm (Part 50-03).

LUBRICATE POWER STEERING CONTROL VALVE BALL STUD (IF SO EQUIPPED)

Remove the lubrication plug and install a fitting in its place. Use a hand operated grease gun filled with ESA-MIC47-A (or equivalent) lubricant. Force tube into assembly until the ball stud boot can be felt or seen to swell (.35-.55 oz). **Do Not Overfill.** Replace the plug after lubrication.

LUBRICATE STEERING LINKAGE

Ford, Mercury, LTD II, Cougar, Thunderbird, Continental Mark V, Lincoln Continental, Granada, Versailles and Monarch

1. Remove plugs from each tie rod end.
2. Apply the recommended lubricant (Part 50-03) to each tie rod end with grease gun.

STEERING GEAR HOUSING LUBRICANT LEVEL CHECK—MANUAL AND LINKAGE TYPE POWER STEERING

Remove filler plug and lower cover bolt from cover to expose holes. Slowly turn the steering wheel to the left stop; lubricant should rise within the lower cover bolt hole; then slowly turn the steering wheel to the right stop; lubricant should rise within the filler plug hole. If lubricant does not rise in both the cover bolt hole and the filler plug hole, add lubricant meeting specifications.

CHECK POWER STEERING PUMP RESERVOIR FLUID LEVEL

Run the engine until the fluid is at normal operating temperature. Then turn the steering wheel all the way to the left and right several times, and shut off the engine.

1. Check the fluid level in the power steering reservoir. The level must show between the "COLD FULL" mark and the "NOT FULL" mark, depending on the temperature. (Part 50-03). **Do not overfill.** Remove excess fluid with a suction device. Check for adequate power steering hose clearances to moving parts (belts, pulleys) and the exhaust manifold.
2. If the level is low, add power steering fluid meeting specifications to raise the level to the FULL mark on the dipstick.

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MAINTENANCE

CHECK STEERING LINKAGE AND CONNECTIONS

Check for looseness at the tie-rod ends. Looseness can affect the toe readings and adjustment.

Check the front suspension ball joints and mountings for looseness. Check the brake caliper attaching bolts. Torque all loose nuts and bolts to specifications. Be sure all cotter pins are correctly installed.

Check the steering gear mountings and all steering linkage connections for looseness. Torque all loose mountings to specifications.

CHECK AND ADJUST POWER STEERING DRIVE BELT TENSION

Refer to the Maintenance Section of Part 50-21 for procedure.

SPECIFICATIONS

Refer to the Car Shop Manual Volume 1 for any Specifications or Special Tools not contained in this part.

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DETROIT IRON OFFICIAL LICENSED PRODUCT

Suspension

PART 50-14

SUBJECT	PAGE
LUBRICATION	14-1
MAINTENANCE	14-1
SPECIFICATIONS	14-1

CA4260-2B

LUBRICATION

LUBRICATE FRONT SUSPENSION BALL JOINTS, PITMAN ARM AND IDLER ARM (IF EQUIPPED)

NOTE: If the vehicle has been parked in a temperature below 20°F, park it in a heated garage for 30 minutes, or until the joints will accept lubricant.

The plugs are located on the top of the upper ball joint and on the underside of the lower ball joint, and on the pitman arm and idler arm (on some models).

Granada, Monarch and Versailles ball joints have *polyethylene liners and do not require lubricant.*

Wipe any accumulated dirt from around the lubrication plugs. Remove the plugs and install appropriate lubrication fittings.

Use a hand-operated, low pressure grease gun loaded with chassis and ball-joint lubricant which meets specifications. Force lubricant into the joint until the joint boot can be felt or seen to swell, indicating that the boot is full of lubricant. **Do not over-lubricate until lubricant escapes from the boot, as this destroys the weathertight seal.** Remove the lubrication fittings and install the plugs.

MAINTENANCE

CHECK FRONT WHEEL ALIGNMENT, SUSPENSION AND LINKAGE

See Group 14, Part 14-01 for all Front End Suspension Checks and Alignment Procedures.

SPECIFICATIONS

Refer to the Car Shop Manual Volume I for any Specifications or Special Tools not contained in this Part.

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Rear Axle

PART 50-15

CA4239-2A

LUBRICATION

CHECK REAR AXLE LUBRICANT LEVEL

Clean dirt and grease from the area around the filler plug, and check level as described in Specifications.

When checking lubricant level, the axle must be in normal curb position. If checked on a frame contact hoist, use safety stands to hold the axle in normal curb position. Replace the filler plug.

SPECIFICATIONS

Refer to the Car Shop Manual Volume 1 for any Specifications or Special Tools not contained in this Section.

LUBRICANT CAPACITIES AND CHECKING PROCEDURES

Vehicle	Engine Displacement	Axle Type	Ring Gear Size	Lubricant Capacity (U.S. Pints)	Lubricant Capacity (Imperial Pints)
Pinto, Bobcat, Mustang II	2.8 Litre		8 inch	4.0	3-3/8
Granada, Monarch, Versailles (1)	4.1L (250 CID), 5.0L (302 CID)		8 inch	5.0	3-3/8
Cougar, LTD II, Ford, Mercury, Thunderbird	5.8L/6.6L (351M/400 CID)		9 inch	5.0	4.0
Lincoln Continental, Continental Mark V (2)	7.5L (460 CID)		9 inch	5.0	4.0
Pinto, Bobcat	2.3 Litre	Integral Carrier (Conventional)	6.75 inch	3.0 (3)	1.8 (3)
Mustang II	2.3 Litre				
Ford, Mercury	5.8L/6.6L (351M/400 CID)	Integral Carrier (WER)	8.7 inch	4.0 (2)	3-3/8 (2)
Fairmont, Zephyr	All	Integral Carrier	7.5 inch	3.50 (5)	2.8 (5)

All conventional axles use ESW-M2C-105-A lubricant. All limited slip axles use ESW-M2C-119-A lubricant.
(1) Approximate refill capacity – Actual lubricant capacities are determined by filling to 3/8 inch below filler plug hole.
(2) Approximate refill capacity – Actual lubricant capacities are determined by filling to 1/2 inch below filler plug hole.
(3) Approximate refill capacity – Actual lubricant capacities are determined by filling to 1/4 inch below filler plug hole.
(4) To check these axles, the plug should be backed out slowly. If seepage occurs around the threads, the plug should be turned back in immediately to avoid any drainage. This indicates that specified amount of lubricant is present in axle housing.
(5) Approximate refill capacity – Actual lubricant capacities are determined by filling to 1-1/4 inch below filler plug hole.

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DETROIT IRON

Clutch And Manual Transmissions

PART 50-16

LUBRICATION

CLUTCH LINKAGE LUBRICATION

Lubricate dry or noisy clutch linkage pivot points with Long Life lubricant C1AZ-19590-B (Ford Specification ESA-M1C75-B). **NOTE: Do not lubricate clutch cable linings.**

CHECK TRANSMISSION LUBRICANT LEVEL

1. Clean dirt and grease from the area around the filler plug, and remove the filler plug from the side of the case.
2. If lubricant does not flow from the filler hole, fill the case with the specified lubricant until it is level with the bottom of the filler hole with car in a level position.
3. Install the filler plug.

LUBRICATE TRANSMISSION SHIFT CONTROL AND LINKAGE

Clean and lubricate the shift linkage, trunnions and external shift mechanism (floor shift) with lubricant meeting Ford specifications (See Part 50-03).

MAINTENANCE

CLUTCH PEDAL

Adjust the clutch pedal free travel whenever the clutch does not disengage properly, or when new clutch parts are installed. Improper adjustment of the clutch pedal is one of the most frequent causes of clutch failure and can be a contributing factor in some transmission failures.

See Part 16-03 for clutch free play adjustment.

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Automatic Transmissions

PART 50-17

All Models

SUBJECT	PAGE
LUBRICATION	
Fluid Level Check	17-1
Kickdown Linkage Lubrication	17-1
MAINTENANCE	
Band Adjustment	17-2
MAINTENANCE (Cont'd.)	
Neutral Start Switch Adjustment	17-5
Shift Lever Check	17-2
SPECIFICATIONS	17-8

CA4238-2B

LUBRICATION

LUBRICATE TRANSMISSION KICKDOWN LINKAGE

Lubricate all pivot points in the kickdown linkage with lubricant meeting Ford Chassis and Ball Joint Lube specifications.

CHECK TRANSMISSION FLUID LEVEL

With Transmission Hot (Operating Temperature)

The automatic transmission is designed to operate with the oil level between the ADD and FULL mark on the dipstick at an operating temperature of 150°F to 170°F, (dipstick is hot to the touch) and should be checked at those temperatures. The operating temperature may be obtained by driving 15 to 20 miles of city type driving with the outside temperature above 50°F. Check the fluid level as follows:

1. With transmission in **PARK** position, engine at curb idle rpm, foot brakes applied and vehicle on level surface, move the transmission selector lever through each range, allowing time in each range to engage transmission. Return to **PARK** position, and apply parking brake.

   Do not turn off the engine during the fluid level check.
2. Clean all dirt from the transmission fluid dipstick cap before removing the dipstick from the filler tube.
3. Pull the dipstick out of the tube, wipe it clean, and push it all the way back into the tube. **Be sure it is fully seated.**
4. **With transmission at operating temperature (*150 degrees F to 170 degrees F*):** *Pull the* dipstick out of the tube again and check the fluid level. The fluid level should be between the **add** and **full** mark. If additional fluid is required, add enough fluid through the filler tube to bring level between the **add** and **full** marks on the dipstick. **Do not overfill the transmission,** as foaming and loss of fluid through the vent may result in transmission malfunction. If the transmission is operated with the fluid level too low, extreme cold temperatures can cause the fluid to contract and may result in transmission malfunction.
5. Insert the dipstick, **making sure it is fully seated in the tube.**

With Transmission Cold (Room Temperature)

If the transmission is not at an operating temperature of 150°F to 170°F and it becomes necessary to check the fluid level (such as pre-delivery) the fluid may be checked at room temperature 70°F to 95°F (dipstick cool to touch).

1. With the transmission in Park "P" position, engine at idle rpm, foot brakes applied and vehicle on level surface, move the transmission selector lever through each range, allowing time in each range to engage transmission. Return to Park "P" position and apply parking brake. **Do not turn off the engine during the fluid level check.**
2. Clean all dirt from the transmission fluid dipstick cap before removing the dipstick from the filler tube.
3. Pull the dipstick out of the tube, wipe it clean and push it all the way back into the tube. Be sure it is fully seated.
4. Pull the dipstick out of the filler tube again and check the fluid level. The level should be between *the middle and top holes on the dipstick* (See Attached Illustration). If the fluid level is below the middle hole or above the top hole:

   On C4 and FMX Transmissions: Add or remove fluid to bring level between the middle hole and the "Add" mark.

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On Jatco, C6 and C3 Transmissions: Add or remove fluid to bring level between the middle hole and the top hole.

5. If it becomes necessary to add fluid to a transmission, be sure to use the correct fluid, as specified on the transmission dipstick.
6. Install the dipstick, making sure it is fully seated in the tube.

If the transmission fluid level is correctly established at 70°F to 95°F, it will appear between the "Add" and "Full" mark on the dipstick when the transmission reached an operating temperature of 150°F to 170°F. **Do not overfill or underfill.**

Overfill can cause the fluid to foam and spill out through the transmission vent with resultant transmission malfunction.

Underfill can result in transmission loss of engagement or slipping. This condition is most evident in cold weather or when the vehicle is parked or being driven on a hill.

If the transmission fluid level is checked when the fluid is cold, the dipstick could indicate that fluid should be added. If fluid is added at this time, an overfill condition could result (Fig. 1) when the fluid reaches operating temperatures of 150°F to 170°F (Dipstick hot to touch).

Fig. 1 shows how the fluid will expand with temperature increase, causing a rise in fluid level.

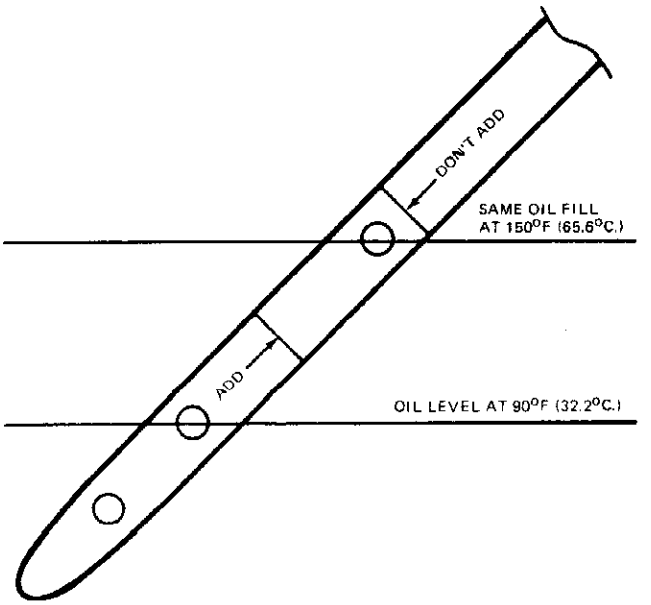


FIG. 1 Typical Fluid Expansion During Transmission Warm-up

Note: If the vehicle has been operated under such conditions as hot weather operation in Downtown Traffic, extended periods of high speed driving or trailer towing, the fluid may have become hotter than 150°-170°F. When this has happened, the fluid should be allowed to cool before attempting to check the fluid level.

MAINTENANCE

CHECK TRANSMISSION SHIFT LEVER

Check and adjust, if necessary, to match transmission range and lever in the D position. Refer to Part 17-02 of Volume 1.

ADJUST TRANSMISSION BAND(S)

Refer to Part 50-02, Maintenance Schedule, for recommended frequency of band adjustment.

Automatic transmissions used in current production vehicles are variations of five basic transmissions; FMX, C6, C4, JATCO or C3. As a guide to band adjustment, Fig. 2 lists the combination of bands used in each transmission.

To prevent damage to the transmission and to assure proper band adjustment, it is essential that the tools and procedures described here are used whenever the bands are adjusted.

C3 TRANSMISSION FRONT BAND ADJUSTMENT

1. Remove the downshift rod from the transmission downshift lever.
2. Clean all dirt from the band adjusting screw area. Remove and discard the locknut.
3. Install a new locknut on the adjusting screw. Using Tool Kit T71P-77370-A or equivalent (Fig. 3), tighten the adjusting screw until the tool handle clicks. The tool is a preset torque wrench that clicks and breaks when the torque on the adjusting screw reaches 10 ft-lbs.
4. **Back off the adjusting screw exactly one and a half turns.**
5. Hold the adjusting screw from turning and torque the locknut to specification.
6. Install the downshift rod on the transmission downshift lever.

FMX Transmission—Front Band Adjustment

1. Loosen the pan attaching bolts, starting at the rear of the pan and working toward the front. When

Transmission	Band Location	Used For
FMX, C3, C4	Front	Second Gear
	Rear	Manual Low Gear and Reverse Gear
C6, JATCO	Intermediate	Second Gear

CY1144-1E

FIG. 2 Band Arrangement of Automatic Transmissions

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most of the fluid has drained from the pan, remove the remainder of the attaching bolts. **If the same fluid is to be used again in the transmission after the band adjustment, filter the fluid through a 100-mesh screen as it drains from the transmission. Make sure that the container is clean. Reuse the fluid only if it is in good condition.**

2. Remove and thoroughly clean the pan and check oil filter for contamination. NOTE: If oil filter is contaminated, replace it. **Do not attempt to clean the oil filter.** Discard pan gasket. Remove all gasket material from pan and pan mounting face of case.
3. Loosen the front servo adjusting screw locknut two full turns.
4. Pull back on the actuating lever; then, insert the gauge block, Tool 7225-C13-B, of front band adjusting Tool 7225-C (Fig. 4) between the servo piston stem and adjusting screw.

   Tighten the adjusting screw until the wrench overruns (this should be exactly 10 in-lbs.). Remove the gauge block. Tighten the adjusting screw an additional 3/4-turn. Hold the adjusting screw stationary and tighten the locknut to 20 to 25 ft-lbs. torque.
5. Install the transmission fluid screen and clips. Install the pan, using a new gasket.
6. Refill the transmission to the proper level with the specified fluid.

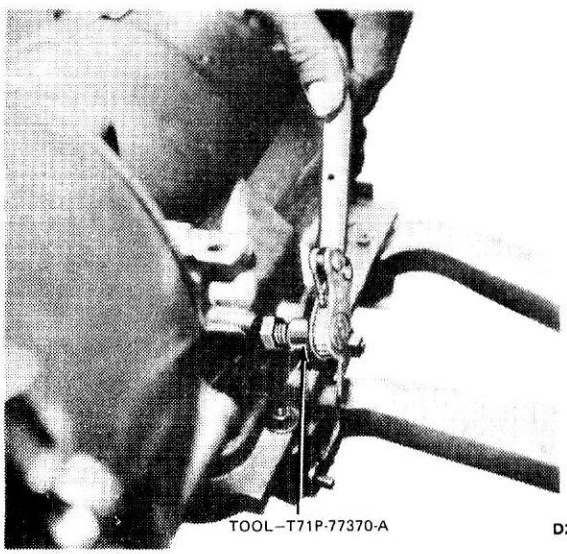


FIG. 3 Front Band Adjustment—C3 Transmission

FMX FRONT BAND ADJUSTMENT—ALTERNATE METHOD

1. Drain the fluid from the transmission. **If the fluid is to be used again after the band adjustment, filter the fluid through a 100-mesh screen as it drains from the transmission. Re-use the fluid only if it is in good condition.**
2. Remove and thoroughly clean the pan and check oil filter for contamination. NOTE: If oil filter is contaminated, replace it. **Do not attempt to clean the oil filter.** Discard the pan gasket.
3. Loosen the front servo adjusting screw locknut two full turns with a 9/16-inch wrench. Check the adjusting screw for free rotation in the actuating lever after the locknut is loosened, and free the screw, if necessary.
4. Pull the adjusting screw end of the actuating lever away from the servo body, and insert the 1/4-inch adjusting tool gauge block (Fig. 4) between the servo position stem and the adjusting screw.

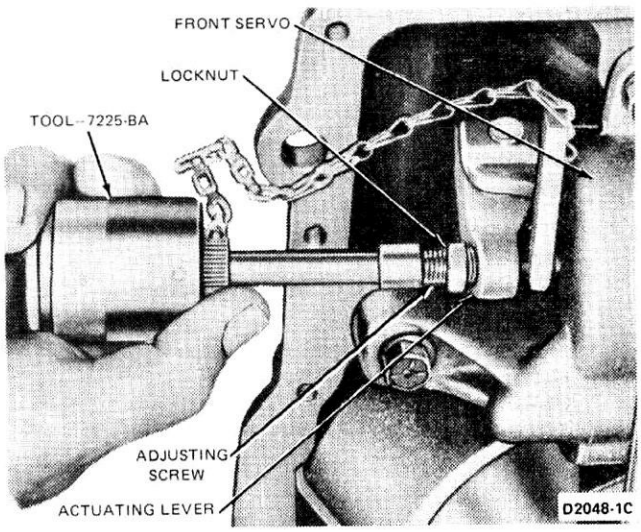


FIG. 4 Typical Front Band Adjustment—FMX

5. Install the socket handle on the 9/16-inch socket (Fig. 5).
6. Insert the T-handle extension through the socket handle and socket, and install the screwdriver socket on the T-handle extension.
7. Place the tool on the adjusting screw so that the screwdriver socket engages the screw and the 9/16-inch socket engages the locknut.
8. With a torque wrench on the T-handle extension, torque the adjusting screw to 10 in-lbs. Remove the gauge block. Tighten the adjusting screw an additional 3/4 turn.
9. Hold the adjusting screw stationary, and torque the locknut to 20 to 25 ft-lbs. torque.
10. Place a new gasket on the pan, and install the pan on the transmission.
11. Refill the transmission to the proper level with the specified fluid.

FMX TRANSMISSION—REAR BAND ADJUSTMENT

1. Remove all dirt from the adjusting screw threads, then oil the threads.
2. Loosen the reverse band adjusting screw locknut. Using the torque wrench shown in Fig. 6 or 7,

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tighten the adjusting screw until the tool handle clicks. The tool is a preset torque wrench which clicks and breaks when the torque on the adjusting screw reaches 10 ft-lbs.

3. If the screw is found to be tighter than wrench capacity (10 ft-lbs. torque), loosen the screw and tighten until the wrench clicks and breaks.
4. Back off the adjusting screw 1-1/2 turns. Hold the adjusting screw stationary and tighten the adjusting screw locknut to 35 to 40 ft-lbs. torque. **Severe damage may result if the adjusting screw is not backed off exactly 1-1/2 turns.**

C-4 TRANSMISSION INTERMEDIATE BAND ADJUSTMENT

1. Clean all the dirt from the band adjusting screw area. Remove and discard the adjustment screw locknut. Install a new locknut on the adjustment screw, and leave it loose.
2. With the tool shown in Fig. 8, tighten the adjusting screw until the tool handle clicks. The tool is a preset torque wrench which clicks and breaks when the torque on the adjusting screw reaches 10 ft-lbs.
3. Back off the adjusting screw **exactly** 1-3/4 turns.
4. Keep the adjusting screw from turning and torque the locknut to 35 to 40 ft-lbs torque.

C-4 TRANSMISSION—LOW-REVERSE BAND ADJUSTMENT

1. Clean all the dirt from the band adjusting screw area. Remove and discard the adjustment screw locknut. Install a new locknut on the adjustment screw and leave it loose.

   To remove the locknut on Pinto or Bobcat, use a 1-1/2 inch drive 3/4 x 1-1/2 inch long socket and socket handle.

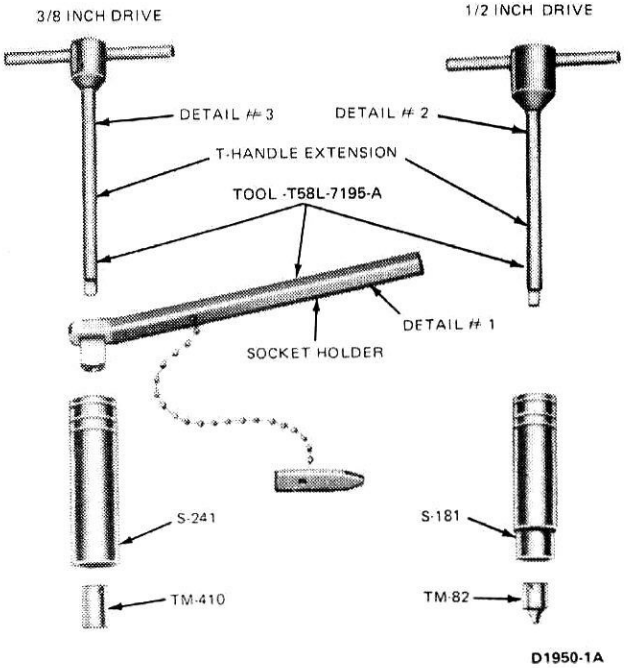


FIG. 5 Front and Rear Band Adjusting Tools

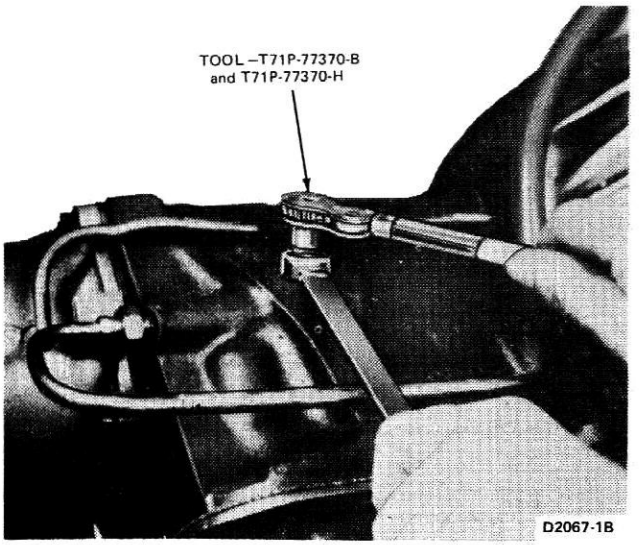


FIG. 6 Adjusting Rear Band

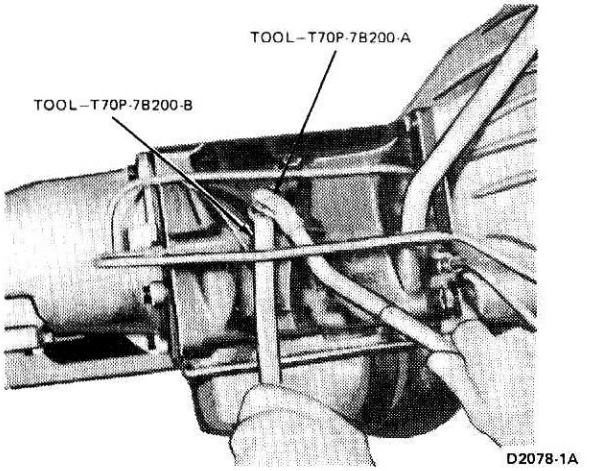


FIG. 7 Adjusting Rear Band—Restricted Work Space

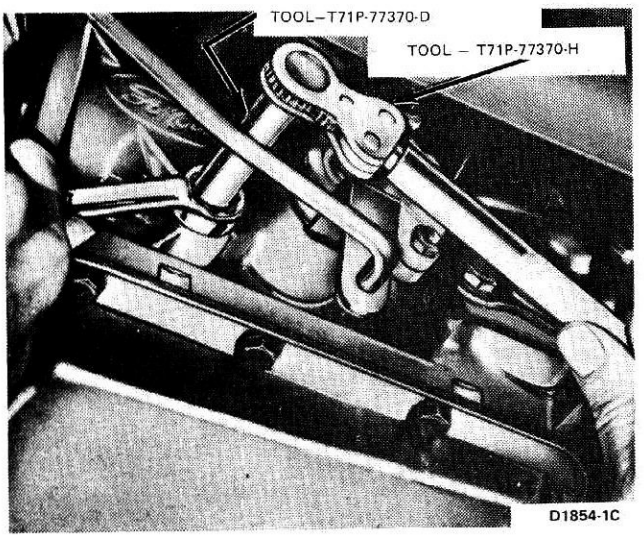


FIG. 8 Front (Intermediate) Band Adjustment—C4 Transmission

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2. With the tools shown in Fig. 9, tighten the adjusting screw until the tool handle clicks. The tool is a preset torque wrench which clicks and breaks when the torque on the adjusting screw reaches 10 ft-lbs.
3. Back off the adjusting screw exactly 3 full turns.
4. Keep the adjusting screw from turning and torque the locknut to 35 to 45 ft-lbs. torque. On a Pinto or Bobcat, use Tool T70P-7B200-B to tighten the locknut. Then secure the adjustment with a 3/4 x 1-1/2 inch socket and torque wrench.

C-6 TRANSMISSION INTERMEDIATE BAND ADJUSTMENT

1. Raise the vehicle on a hoist or jack stands.
2. Clean the threads of the intermediate band adjustment screw.
3. Remove and discard the adjustment screw locknut. Install a new lock nut on the adjustment screw, and leave it loose.
4. Tighten the band adjustment screw, as shown in Fig. 10, until the wrench breaks (this should be exactly 10 ft-lbs); then, back it off **exactly** 1-1/2 turns.
5. Hold the adjusting screw stationary and torque the locknut to 35 to 45 ft-lbs. torque.

JATCO TRANSMISSION INTERMEDIATE BAND ADJUSTMENT

1. Raise the vehicle on hoist or jack stands.
2. Loosen the servo cover attaching bolts and remove cover (Fig. 11).
3. Loosen the intermediate band adjusting screw lock nut and tighten the adjusting screw to 10 ft-lb torque.
4. Back off the adjusting screw two turns. Hold the adjusting screw stationary and tighten the lock nut to 22-29 ft-lb.
5. Place a new gasket on the servo cover and install the cover. Torque bolts 3.6-5.1 ft-lb.
6. Lower vehicle and check transmission fluid level.

ADJUST NEUTRAL START SWITCH (CONSOLE OR FLOOR SHIFT)

Check ability to start engine with shift lever in both **NEUTRAL** and **PARK** position **only.** Adjust switch, if necessary, as follows:

Cougar, LTD II, Ranchero and Thunderbird with C4 or C6 Transmission

1. With the manual linkage properly adjusted and the engine turned off, place the selector lever in **neutral.**
2. Remove the selector lever handle attaching screw and remove the handle (Fig. 12).
3. Remove the dial housing attaching screws and remove the housing.
4. Remove the two pointer back-up shield attaching screws and remove the shield.
5. Loosen the two screws securing the neutral start switch to the selector lever housing (Fig. 13).
6. Place the selector lever in **PARK** position and hold it against the forward stop.
7. Move the neutral switch rearward to the end of its travel.

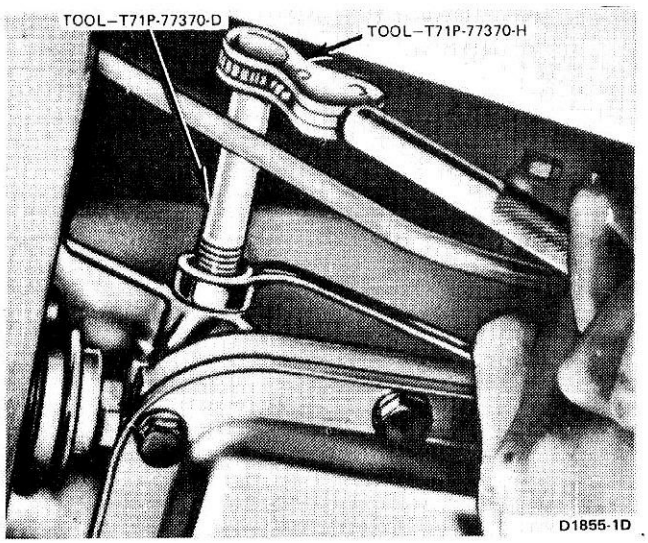


FIG. 9 Rear Band Adjustment—C4 Transmission

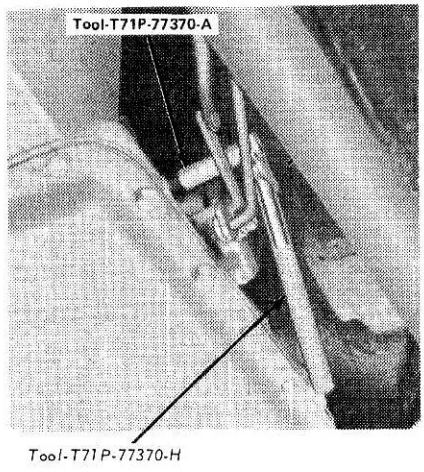


FIG. 10 Intermediate Band Adjustment—C-6 Transmission

8. Hold the switch in the rearward position and tighten the attaching screws.
9. Start engine with selector lever in **PARK,** then in **NEUTRAL.** If engine does not start, replace switch.
10. Install the pointer back-up shield on the housing and lever assembly.
11. Install the dial housing on the selector lever housing assembly.
12. Install the selector lever handle.

MUSTANG II, GRANADA, MONARCH, VERSAILLES, PINTO, BOBCAT, FAIRMONT AND ZEPHYR (C4 TRANSMISSION)

1. With the manual lever properly adjusted, loosen the two switch attaching bolts (Fig. 14).
2. With the transmission manual lever in **NEUTRAL,** rotate the switch and insert the gauge pin (No. 43

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drill shank end) into the gauge pin holes of the switch. **The gauge pin has to be inserted to a full 31/64 inch into the three holes of the switch (Fig. 14).**

3. Tighten the two switch attaching bolts to 55 to 75 in-lbs. torque. Remove the gauge pin from the switch.
4. Check the operation of the switch. The engine should start only with the transmission selector lever in **NEUTRAL** and **PARK.**

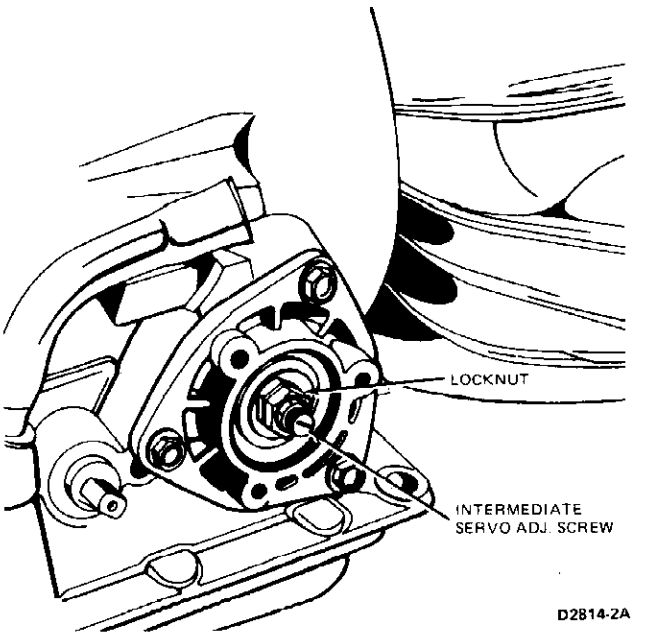


FIG. 11 Intermediate Band Adjustemnt—JATCO Transmission

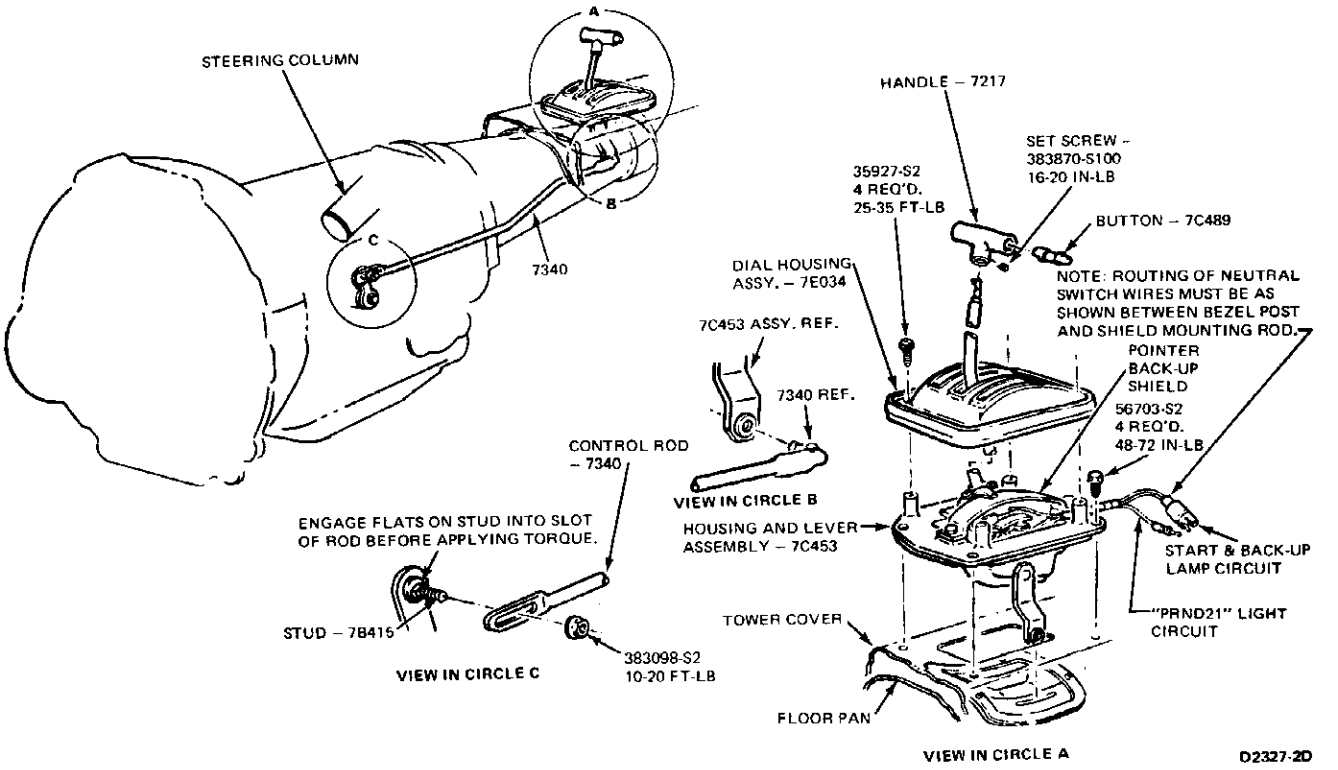


FIG. 12 Typical Linkage—Console or Floor Shift Automatic Transmission—LTD II, Ranchero, Cougar and Thunderbird

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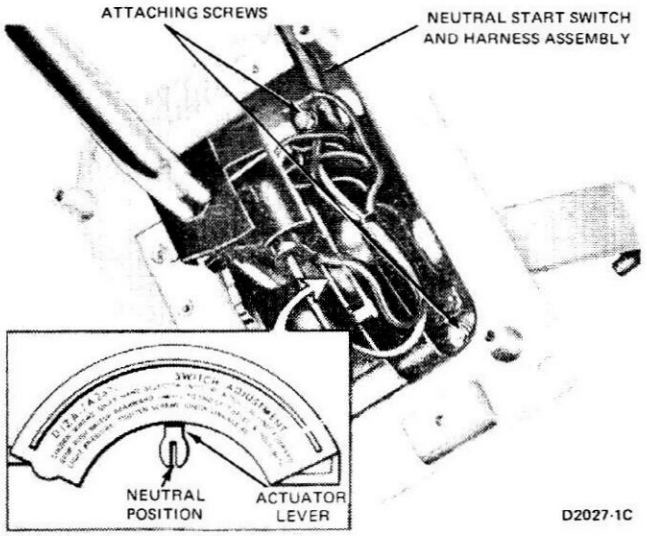


FIG. 13 Typical Neutral Start Switch—Console Shift—Cougar, LTD II, Ranchero and Thunderbird with C4 or C6 Transmission

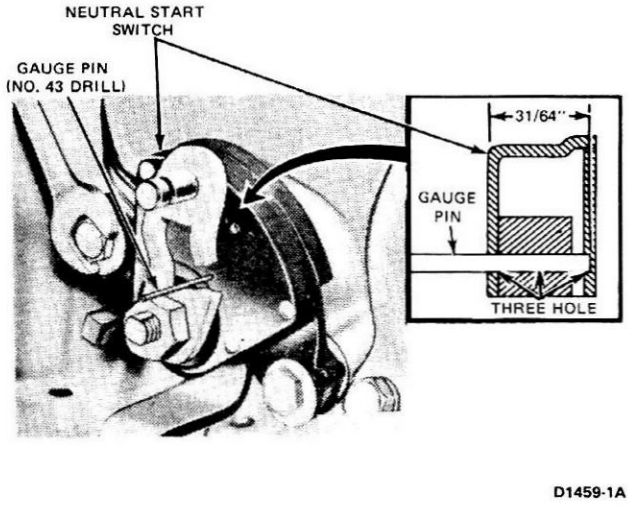


FIG. 14 Neutral Start Switch Adjustment—Pinto, Bobcat, Versailles, Fairmont, Zephyr, Granada, Monarch and Mustang II with C4 Transmission

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DETROIT IRON

SPECIFICATIONS

Refer to the Car Specifications Book or Car Shop Manual Volume 1 for any Specifications or Special Tools not contained in this Part.

FLUID CAPACITY

Vehicle	Transmission Type	Engine	CAPACITY (Qts.) U.S. Measure	CAPACITY (Qts.) Imperial Measure
Granada/Monarch	JATCO	4.1L (250 CID)	8½	7
Fairmont/Zephyr	C3	2.3L, 3.3L (200 CID)	8	6½
Fairmont/Zephyr	C4	3.3L (200 CID)	7¼	6
Granada/Monarch	C4	4.1L (250 CID)	8¼	6¾
Granada/Monarch/Versailles	C4	5.0L (302 CID)	10¼	8½
Fairmont/Zephyr	C4	5.0L (302 CID)	10¼	8½
Fairmont/Zephyr	C4	4.1L (250 CID)	8¼	6¾
LTD II/Cougar	C4	5.8L, 5.0L (351/302 CID)	10¼	8½
Thunderbird/Ford/ Mercury	FMX	5.8L, 6.6L (351/400 CID)	11	9
	C6	5.8L, 6.6L, 7.5L (351/400/460 CID)	12¼	10¼
Pinto/Bobcat	C3	2.3L, 2.8L	8	6½
Mustang II	C4	2.3L, 2.8L, 5.0L (302 CID)	7	5¾
Lincoln Continental/ Continental Mark V	C6	6.6L, 7.5L (400/460 CID)	12¼	10¼

*Approximate dry capacity, includes cooler and lines. Fluid level indicator should be used to determine **actual** fluid requirements and fluid specification. Check level at normal operating temperature. **DO NOT OVERFILL.**

① If it is necessary to add or replace fluids, use only fluids which have been certified by the supplier as meeting one of the Ford Motor Company specifications shown below:

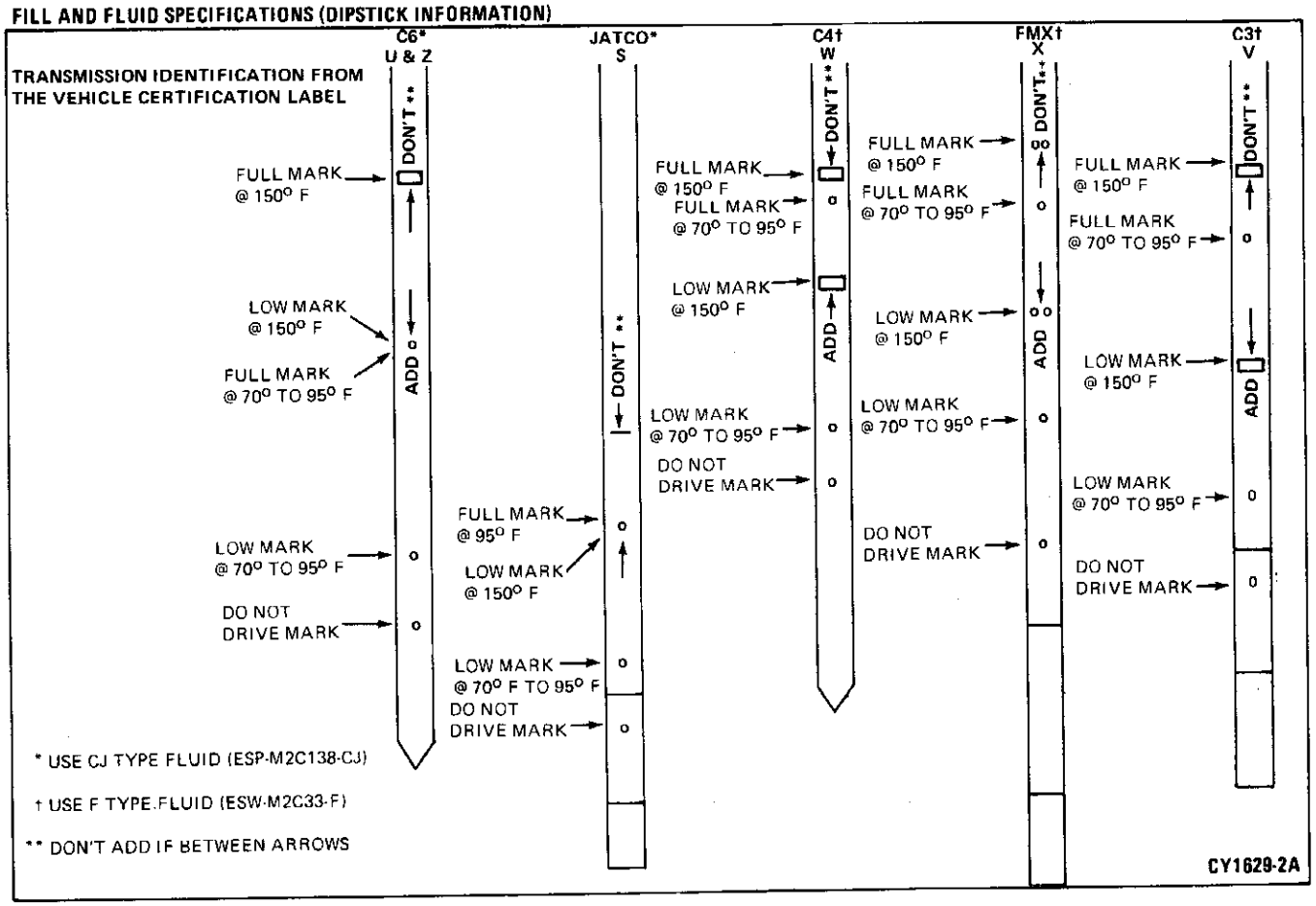
② C3, C4 and FMX transmissions – Use fluids meeting specification ESW-M2C33-F (Type F): Ford Qualification No. 2P-6XXXXX ESW-M2C33-F (Type F)

③ JATCO C6, (Type CJ) transmissions – Use fluid meeting specification ESP-M2C138-CJ.

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FILL AND FLUID SPECIFICATIONS

FILL AND FLUID SPECIFICATIONS (DIPSTICK INFORMATION)



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Gasoline Engines

PART 50-21

CN4062-2A

LUBRICATION

ENGINE OIL AND FILTER

To maintain effective operation of the emission control systems and to properly protect the engine, use of a high grade motor oil is essential. Use Ford Long Life motor oil or a brand that meets Ford Motor Company performance specification ESE-M2C144-A.

These oils neutralize corrosive acids, and keep the crankcase emission control (PCV) valve clean and fully operative.

Proper oil filtration is also necessary. Use a Motorcraft Long Life oil filter or one that meets the Ford specification ES-C8AF-6714-A or -C.

Oil Viscosity

From Specifications Chart, select the viscosity that most nearly matches the temperature range that is expected for the next maintenance interval.

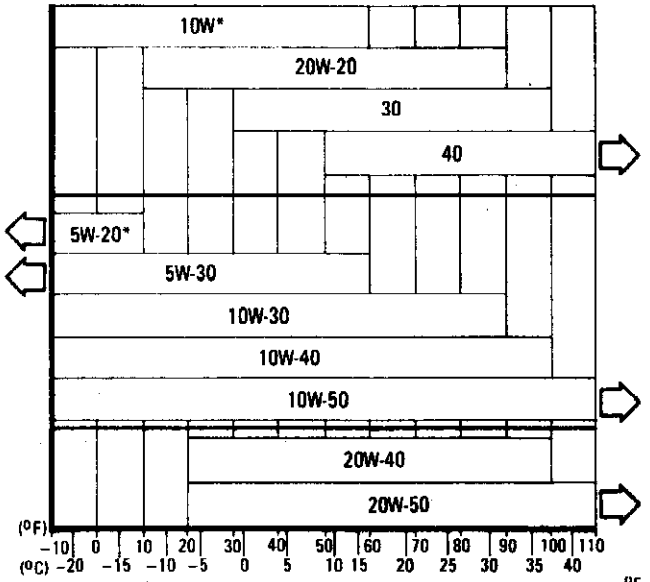
MAINTENANCE

All engine maintenance items are covered in Part 50-29; Emission Systems. Refer to Part 29-02 for all engine diagnosis.

SPECIFICATIONS

Refer to the Car Specifications Book or Car Shop Manual Volume 2 for any Procedures, Specifications or Special Tools not contained in this section.

OIL VISCOSITY RECOMMENDATIONS
All 1978 Passenger Car Engines



*Not recommended for sustained high speed driving or heavy duty operations such as trailer towing.

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Cooling System

PART 50-27

SUBJECT	PAGE
MAINTENANCE	
Anti-Freeze Level Adjustment	27-1
Coolant Level Adjustment	27-1
SPECIFICATIONS	27-1

MAINTENANCE

ADJUST ANTI-FREEZE (COOLANT PROTECTION) LEVEL

Be sure the engine is at operating temperature. Check the anti-freeze in the cooling system by using a permanent anti-freeze test hydrometer.

WARNING—Do not attempt to remove the radiator cap under any circumstances while the engine is operating. To do so might lead to damage to the cooling system and the engine and could result in serious personal injury from hot coolant or steam blow-out. Switch off the engine and wait until it has cooled. Even then, use extreme care when removing the cap from a hot radiator. Wrap a thick cloth around the cap and turn it slowly to the first stop. Step back while the pressure is released from the cooling system. When you are sure all the pressure has been released, press down on the cap—still with a cloth—turn and remove it.

Use the recommended mixture of permanent anti-freeze and water to maintain adequate protection against the temperatures to be encountered in area of car operation. To provide sufficient protection against corrosion and boiling, this level should be at least 0°F.

To avoid possible chemical damage to the cooling system, do not mix different brands of anti-freeze. Use only those permanent anti-freeze brands which meet Ford specification M97B18-C. **If equipped with a constant full (coolant recovery) system, it should not be necessary to add coolant to the radiator filler neck, unless the system has become inoperative due to radiator overheating or leakage. Add only to the plastic bottle. Do not check cross-flow radiator coolant level while coolant is at operating temperature or while engine is running.**

ADJUSTING COOLANT LEVEL

If the coolant level is not to specification, add the recommended mixture of water and permanent anti-freeze (or anti-freeze alone) to maintain the proper coolant level and anti-freeze protection.

Standard and Expansion Bottle Cooling Systems

If the cooling system is not equipped with a coolant recovery reservoir, add coolant through the radiator filler neck to the following level with the engine cold (at ambient temperature): For cross-flow radiators—2-1/2 inches below the pressure cap seat in the filler neck. For down-flow radiators—1-1/2 inches below the pressure cap seat in the filler neck.

After operating engine until the top radiator hose is warm, recheck coolant level. Cross-flow radiators—1-1/2 inches below the pressure cap seat in the filler neck. Down-flow radiators—1/4 inch below the pressure cap seat in the filler neck. If coolant is not at this level with engine warm, add sufficient coolant to adjust level. Do not attempt to add coolant to expansion bottle.

Coolant Recovery Systems

If the cooling system is equipped with a coolant recovery reservoir, add coolant through the **reservoir cap only** to the COLD or HOT mark on the plastic reservoir bottle, depending on the temperature of the engine.

SPECIFICATIONS

Refer to the Car Shop Manual Volume 2, Group 27 for any Specifications or Special Tools not contained in this Section. Also refer to Part 50-29 for specifications on maintenance procedures related to emission systems.

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Engine Emission Control Systems

PART 50-29

All Models

SUBJECT	PAGE
EMISSION SYSTEMS – Scheduled Maintenance	29-1
MAINTENANCE PROCEDURES Index	29-1
SPECIFICATIONS	29-18
SPECIAL TOOLS	29-18

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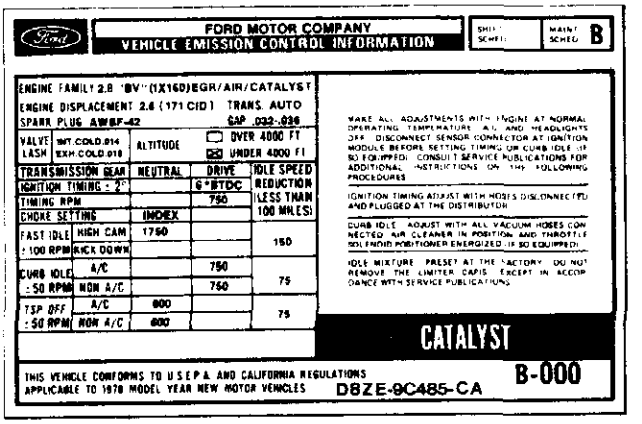
EMISSION SYSTEMS—SCHEDULED MAINTENANCE

GENERAL INFORMATION

This Part contains scheduled maintenance as it applies to emission systems. The Emission Systems Required Maintenance schedule lists the items required to maintain the vehicle emission systems at levels determined by the federal government (Environmental Protection Agency). Directly following the schedules are a number of Maintenance Procedures, each of which is related to an item listed on the maintenance schedule. Use these procedures to perform the required emission system maintenance items listed on the maintenance schedules.

Maintenance service adjustments must conform to specifications contained herein, listed in the Specifications Book, or shown on the vehicle engine Emissions Decal, or the emissions systems *may become inoperative.* These services are not covered by warranty, and the customer will be charged for labor, parts and lubricants used.

Four maintenance schedules are used: Three for vehicles built for sale in the U.S., and one for vehicles built for sale in Canada. To determine which to follow, refer to the Vehicle Emission Control Information decal (Fig. 1).



A4056-1C

FIG. 1 Typical Emission Certification Label

MAINTENANCE PROCEDURES INDEX

Procedure	Procedure No.	Page
A. Engine Mechanical Subsystems		
Engine Oil Change and Oil Filter Replacement	A-1	29-3
Engine Valve Clearance Check – 2.8L V-6	A-2	29-3
Coolant Condition and Protection	A-3	29-4
Cooling System, Hoses and Clamps Check	A-4	29-4
Coolant Replacement	A-4	29-4
Drive Belt Condition and Tension	A-5	29-5
B. Emission Subsystems		
PCV Valve Replacement	B-1	29-7
Thermactor Idle Dump Delay Valve	B-2	29-7
C. Ignition Subsystems		
Spark Plug Replacement	C-1	29-7
D. Fuel Subsystems		
Idle Fuel Mixture (Artificial Enrichment)	D-1	29-8
Engine Idle Speeds	D-2	29-9
Choke System	D-3	29-13
Carburetor Air Cleaner Element and Crankcase Emission Filter	D-4	29-18

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DETROIT IRON

MAINTENANCE SCHEDULE – VEHICLES BUILT FOR SALE IN U.S. AND CANADA

(Vehicles Designated "A" or "B" on Emission Control Decal)

SERVICE INTERVAL: Time in Months, or Miles (or Kilometres) in Thousands, Whichever Occurs First, Unless Otherwise Specified

MAINTENANCE OPERATION — Months / Miles (in Thousands) / Kilometres (in Thousands)	2.3L/2.8L/3.3L/4.1L (200/250 CID) (Foot Note)	5 / 5 / 8	10 / 10 / 16	20 / 20 / 32	30 / 30 / 48	40 / 40 / 64	50 / 50 / 80	All V-8 Engines Foot Note	7.5 / 7.5 / 12	15 / 15 / 24	22.5 / 22.5 / 36	30 / 30 / 48	37.5 / 37.5 / 60	45 / 45 / 72	52.5 / 52.5 / 84
Change Engine Oil	X,1		AB	AB	AB	AB	AB	Y,1	AB	AB	AB	AB	AB	AB	AB
Replace Oil Filter	X,1		AB	AB	AB	AB	AB	Y,1	AB		AB		AB		AB
Check Cooling System Hoses & Clamps	2						AB	2							AB
Check Coolant Condition & Protection	3	ANNUALLY						3	ANNUALLY						
Replace Coolant	2						AB	2							AB
Check Drive Belt Condition & Tension			B	A	B	A			B		A	B		A	
Replace Carburetor Air Cleaner Element	4				AB			4				AB			
Replace Crankcase Emission Filter:															
a. 2.3L, 2.8L, 3.3L/4.1L (200/250 CID) Engines; 7.5L (460 CID)	4				AB			4				AB			
b. All V-8 Engines Except 7.5L (460 CID)								4							AB
Replace Spark Plugs:															
a. All Except 3.3L (200 CID) Engine in California	Z			A	B	A		Z			A	B		A	
b. 3.3L (200 CID) Engine in California	Z	Each 50,000 Miles or 30 Months, Whichever Occurs First													
Replace PCV Valve:															
a. All 2.3L Engines				A	B										
b. All Other Engines if PCV Valve (High Flow) Part Number is Specified on Engine Emission Decal	Z			A	B			Z			A	B			
Check Idle Fuel Mixture (After PCV Valve Replacement) if Artificial Enrichment Specifications are given on Engine Emission Decal	Z			A	B			Z			A	B			
Check Thermactor Delay Valve				A	B	A					A	B		A	
Check Choke System				A	B	A					A	B		A	
Check Engine Valve Clearance (2.8L Engines Only)		A	B	A	B	A									
Check Engine Idle Speeds:															
a. All Engines Except 2.3L w/Feedback Carburetor (California Only)	Z	A	B					A	AB						
b. 2.3L Engine w/Feedback Carburetor (California Only)	Z	B													

FOOTNOTES:

X – Change engine oil and replace oil filter every 10,000 miles or twelve (12) months, whichever occurs first.

Y – Change engine oil every 7,500 miles or twelve (12) months, whichever occurs first.

Replace engine oil filter at first oil change, followed by replacement at alternate oil changes. If vehicle mileage is less than 15,000 miles each twelve (12) months, replace oil filter at every oil change.

Z – Consult the Vehicle Emission Control Information Decal for specifications pertinent to this maintenance operation.

1. **Severe Service Operation:** When operating your vehicle under any of the following conditions, change engine oil every 3,000 miles or three (3) months, whichever occurs first, and replace the oil filter at alternate oil changes; check, clean and regap spark plugs every 6,000 miles:
   - Extended periods of idling or low speed operation such as police, taxi or door-to-door delivery.
   - Towing trailers over 2,000 lbs. gross trailer weight for long distances, except as follows:
     - Pinto/Bobcat/Mustang II: Towing any trailer up to 1,000 lbs. gross trailer weight for long distances.
     - Fairmont/Zephyr/Granada/Monarch/Versailles: Towing trailers over 1,000 lbs. gross trailer weight for long distances.
   - Operation when outside temperature remains below 10°F. for 60 days or more and most trips are less than 10 miles.
   - Operation in severe dust conditions.
2. Check the cooling system hoses and clamps and replace coolant at the recommended service interval or every three (3) years, whichever occurs first.
3. If coolant is dirty or rusty in appearance, the system should be drained, cleaned and refilled with the prescribed solution of cooling system fluid and water. Use only a permanent type coolant that meets Ford Specification ESE-M97B18-C.
4. More often if operated in severe dust conditions

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A-1: ENGINE OIL CHANGE AND OIL FILTER REPLACEMENT

1. Apply parking brake and block wheels.
2. Bring engine to normal operating temperature and *turn off.*
3. Remove oil drain plug and drain engine oil.
4. Clean oil drain plug and inspect gasket. Replace gasket if damaged.
5. *Re-install oil drain plug and torque to specification.*
6. If the engine oil filter is scheduled for replacement, perform the following:
   a. Remove oil filter and discard.
   b. *Clean the gasket sealing surface at the cylinder* block or adapter.
   c. Coat the gasket on the filter with a light film of oil; screw the filter onto the adaptor or cylinder block until the gasket contacts the sealing surface; then, advance it an additional 1/2 turn.
7. Remove the oil filler cap and fill the crankcase with the specified amount (Fig. 2), type and grade of oil.
8. Re-install the oil filler cap; start the engine and inspect for oil leak(s). *Correct as required.*

Engine Displacement	Quantity* (In U.S. Quarts) With Filter Change	Without Filter Change
2.3L I-4	5	4
2.8L V-6	5	4½
3.3L (200 CID) I-6	5	4
4.1L (250 CID) I-6	5	4
5.0L (302 CID) V-8	5	4
5.8L (351W CID) V-8	5	4
5.8L (351M CID) V-8	5	4
6.6L (400 CID) V-8	5	4
7.5L (460 CID) Passenger V-8	5	4
7.5L (460 CID) Police Interceptor V-8	7½**	6

* To convert to imperial measure, multiply the quantity shown by 0.83.

** Includes one quart for filter change and 1/2 quart for cooler.

CA1427-1F

FIG. 2 Engine Oil Capacity

A-2: ENGINE VALVE CLEARANCE CHECK — V-6

1. As a safety precaution, remove battery negative cable from battery during removal and installation of right hand rocker arm cover. In addition, make sure that the transmission is in Neutral (M/T) or in Park (A/T) and parking brake is applied.
2. Remove and/or reposition components as necessary to allow removal of rocker arm covers.
3. If lifting eyes have not been previously removed, remove and discard both lifting eyes.
4. Remove rocker arm covers.
5. *Torque rocker arm support bolts to 43-49 ft-lbs.*
6. Check valve clearance as follows:
   A. Check intake and exhaust valves for cylinder No. 1.
      (1) Place a finger on adjusting screw of intake rocker arm for cylinder No. 5. The slightest motion of the rocker arm can now be easily *detected.*
      (2) Using a remote starter button or equivalent, "bump" the engine over until intake valve for cylinder No. 5 just barely begins to open. Camshaft is now properly positioned for checking both intake and exhaust valve for cylinder No. 1.
      (3) For the intake valve a 0.014 feeler should have a light to moderate drag and a 0.015 feeler should be **very tight.** If adjustment is *necessary, turn* adjusting screw clockwise to decrease lash and counterclockwise to increase it. Adjusting screws are self-locking and will remain in the set position.

NOTE: Do not use go, no-go feeler gauges.

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CAUTION: When checking valve clearance insert feeler gauge between rocker arm and valve tip at front (or rear) edge of valve tip and move toward opposite edge with a rearward (or forward) motion that is parallel to centerline of crank. **Do not** insert feeler gauge at outboard edge and move inward toward carburetor (perpendicular to centerline of crank)—this method will result in an erroneous "feel" that will produce excessively tight valves.

(4) Use a similar procedure on the exhaust valve. A 0.016 feeler should have a light to moderate drag and a 0.017 feeler should be **very tight.**

B. Check valve clearance of remaining valves by applying the procedures in Step 6A to successive cylinders in firing order (which is 1-4-2-5-3-6) as shown in the following table:

To adjust both valves for cylinder #	1	4	2	5	3	6
The intake valve must be opening for cylinder #	5	3	6	1	4	2

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7. Clean all gasket material from cylinder heads and rocker arm covers.
8. Reinstall rocker arm covers using new gaskets and torque attaching screws to 3-5 ft-lbs.
9. Reinstall all components that were removed or repositioned in Step 2 to their original location. Torque components to specification.

   Note: If the engine is equipped with a "Dura Spark" ignition system and **any** high tension ignition wire was detached from a spark plug, the distributor cap, or the coil to perform this maintenance operation, silicone grease (D7AE-19A331-AA or equivalent) must be applied to the boot before reconnection. Using a small clean screwdriver, apply a thin layer of silicone grease on the entire interior surface of the boot.
10. Start the engine and check for oil and vacuum leaks.

A-3: COOLANT CONDITION AND PROTECTION

1. Remove radiator cap as follows:

   A. NEVER remove the radiator cap under any conditions while the engine is operating. Failure to follow these instructions could result in damage to the cooling system or engine and/or personal injury.

   B. To avoid having scalding hot coolant or steam blow out of the radiator, use extreme care when removing the cap from a hot radiator. If possible, wait until the engine has cooled, then wrap a thick cloth around the radiator cap and turn it slowly to the first stop. Step back while the pressure is released from the cooling system. When you are sure all the pressure has been released, press down on the cap (still with a cloth), turn and remove it.
2. Check coolant for dirty or rusty appearance. If dirty or rusty, replace the coolant according to Procedure A-4 (Coolant Replacement).

   NOTE: If the coolant is to be replaced, the remainder of this procedure may be omitted.
3. If coolant condition is satisfactory, check coolant concentration for proper protection level. Maintain a protection level of at least -20°F (-30°C) to preserve anti-rust protection and assure proper engine operating temperature. If concentration level is low, open the radiator petcock, drain the radiator partially, and add 100 percent concentration of Ford Cooling System Fluid, or equivalent, to obtain the recommended protection level.

   COOLANT SPECIFICATION —Use only a permanent-type coolant that meets Ford Specification ESE-M97B18-C, such as Ford Cooling System Fluid. Do not use alcohol or mix them with the specified coolant.
4. Coolant level should be maintained as follows:

   A. **Standard Cooling System and Expansion Bottle System**

   (1) Check coolant level and if required, fill with recommended coolant mixture to approximately 3/4 to 1-1/2 inches below the filler neck seat on a downflow radiator (vertical tubes) or to approximately 2-1/2 to 4.0 inches below the filler neck seat on a crossflow radiator (horizontal tubes).

   (2) Do not add coolant to expansion bottle (no filler neck) if so equipped. Expansion bottle should be nearly empty. If not, check radiator cap, radiator filler neck, and overflow hose for proper operation.

   (3) Reinstall radiator cap.

A-4: COOLING SYSTEM CHECK AND COOLANT REPLACEMENT

1. Bring the engine to normal operating temperature and turn the engine off. With cooling system under pressure, inspect cooling system hoses and clamped hose connections for leaks, excessive deterioration, or contact wear. Inspect radiator assembly retention. Note any discrepencies and proceed to Step 2.
2. Remove the radiator cap, as follows:

   (A) **NEVER** remove the radiator cap under any conditions while the engine is operating. Failure to follow these instructions could result in damage to the cooling system or engine and/or personal injury.

   (B) To avoid having scalding hot coolant or steam blow out of the radiator, use extreme care when removing the cap from a hot radiator. If possible, wait until the engine has cooled, then wrap a thick cloth around the radiator cap and turn it slowly to the first stop. Step back while the pressure has been released, press down on the cap (still with a cloth), turn and remove it.

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3. Place the heater temperature control at the maximum heat position.
4. Open radiator petcock and remove the cylinder block drain plug(s) to drain the coolant system.
   NOTE: For all 2.8L applications, open radiator petcock and remove heater hose from thermostat housing (located at lower left front of engine) to drain the coolant system.
5. Correct/Repair/Replace any components found leaking, deteriorated or worn in Step 1.
6. Flush with clear water. If excessively dirty or *rusty, the use of Ford radiator flush and/or* reverse pressure flushing is recommended. Drain and flush reservoir on coolant recovery and expansion bottle systems if so equipped.
7. Close radiator petcock and install cylinder block drain plug(s) or heater hose (2.8L only).
8. When refilling the cooling system, use equal parts of water and Ford Cooling System Fluid or equivalent.
   COOLANT SPECIFICATION —Use only a permanent-type coolant that meets Ford Specification ESE-M97B18-C, such as Ford Cooling System Fluid or equivalent. Do not use alcohol or methanol antifreeze or mix them with the specified coolant.
   To refill the cooling system, proceed as follows:

(A) **Standard Cooling System and Expansion Bottle System Refill**

1. Refill the radiator to approximately 2 1/2 *inches below the filler neck seat on a* crossflow radiator (horizontal tubes) and to approximately 3/4 inch below the filler neck seat on a downflow radiator (vertical tubes) with the recommended coolant mixture.
2. Operate engine until thermostat opens and the radiator upper hose becomes hot.
3. Stop the engine and add coolant to approximately 1 1/2 inches below the filler neck seat on a crossflow radiator, and to approximately 1/4 inch below the filler neck seat on a downflow radiator. Do not add coolant to expansion bottle (no filler neck) if so equipped.
4. Reinstall radiator cap.

A-5: DRIVE BELT CONDITION AND TENSION

NOTE: Due to space limitations, it may be necessary *to remove components* to gain access for inspecting, checking, or replacing accessory drive belts.

If the engine is equipped with a "Dura Spark" ignition system and **any** high tension ignition wire was detached from a spark plug, the distributor cap, or the coil to perform this maintenance operation, silicone grease (Ford D7AE-19A331-AA or equivalent) must be applied to the boot before reconnection. Using a small clean screwdriver, apply a thin layer of silicone grease on the entire interior surface of the boot.

1. Apply the parking brake and block the wheels.
2. Inspect all accessory drive belts for excessive wear, cracks, glazed condition, and frayed or broken cords. Replace any drive belt exhibiting these conditions and adjust to **new** belt tension specification.

   CAUTION: On dual belt accessory drive, the belts **must** be replaced in matched sets.
3. Bring the engine to normal operating temperature and turn the engine off. Using a belt tension gauge (T63L-8620-A or equivalent), check the tension of all drive belts; on dual drive belts, check only one belt. Compare measured tension to specification.

   NOTE: A belt tension gauge offers the most accurate means of checking belt tension. *Accordingly, a belt tension gauge should be used* whenever possible; removal of fan shroud, air induction hardware, etc., may be necessary. If space limitations, however, make it **absolutely impossible** to use a tension gauge, the following procedure may be substituted:
   a. Press firmly on the belt (approximately at the middle of the free span between pulleys).
   b. Belt deflection should be as follows:
      —For all belts with a free span **less** than 12", deflection should be between 1/8" and 1/4".
      —For all belts with a free span **greater** than 12", deflection should be between 1/8" and 3/8".
4. If any belt is not to tension specification, adjust the drive belt as follows:
   A. Loosen the accessory pivot bolt and/or adjustment slot fastener(s).
   B. *If accessible, install a belt tension gauge on the* drive belt.
   C. Without damaging the accessory, move the accessory toward or away from the engine until the correct belt tension specification is registered.

      NOTE: New and used belt tension specifications differ when using the belt tension gauge. Refer to belt tension specifications. When the deflection method is used, use the deflection specifications in Step 3.
   D. Tighten the accessory adjustment slot fastener(s) to the specified torque(s).
   E. Tighten the accessory pivot bolt to the specified torque.
   F. Recheck belt tension. Repeat adjustment process if necessary.

A. New and Used Drive Belt Tension Specifications

(1) All 1/4" wide drive belts that are **newly installed*** should read 50-80 lbs.

(2) All 1/4" wide drive belts, **not newly installed*** at the time of inspection, and **having less than ten (10) minutes of engine operation** on them, should read between 40-80 lbs. If a belt tension is not within specified tension range, re-adjust the belt tension to 40-60 lbs.

(3) All 1/4" wide drive belts **with more than ten (10) minutes of engine operation** on them should read between 40-60 lbs. If a belt tension is not within the specified tension range, re-adjust the belt tension to 40-60 lbs.

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DETROIT IRON OFFICIAL LICENSED PRODUCT

COOLING SYSTEM CAPACITIES

VEHICLE	ENGINE	OPTIONS	CAPACITY (QTS.) U.S.	IMP.
Pinto/Bobcat	2.3L	S/C	8.6	7.1
	2.3L	A/C	9.0	7.5
	2.8L	S/C	8.5	7.0
	2.8L	A/C	9.1	7.6
Mustang II	2.3L	S/C	8.8	7.1
	2.3L	A/C	9.1	7.6
	2.8L (M/T)	S/C	8.4	7.0
	2.8L (A/T)	S/C	8.6	7.1
	2.8L (M/T)	A/C	8.6	7.1
	2.8L (A/T)	A/C	9.1	7.6
	5.0L (302 CID)	S/C & A/C	14.6	12.1
Fairmont/Zephyr	2.3L	S/C	8.6	7.1
	2.3L	A/C	10.3	8.6
	3.3L (200 CID)	S/C, A/C	9.0	7.5
	5.0L (302 CID)	S/C	13.9	11,5
	5.0L (302 CID)	A/C	14.0	11.6
Granada/Monarch	4.1L (250 CID)	S/C, X/C	10.5	8.7
	4.1L (250 CID)	A/C	10.6	8.8
	5.0L (302 CID)	S/C	14.2	11.8
	5.0L (302 CID)	A/C	14.3	11.9
Versailles	5.0L (302 CID)	S/C	14.2	11.8
	5.0L (302 CID)	A/C	14.3	11.9
LTD II/Cougar/Ranchero	5.0L (302 CID)	S/C	14.3	11.9
	5.0L (302 CID)	A/C	14.6	12.1
	5.0L (302 CID)	Police Interceptor & Taxi	15.9	13.2
LTD II/Cougar/Thunderbird	5.8L (351W CID)	S/C	15.4	12.8
	5.8L (351W CID)	A/C	15.7	13.0
	5.8L (351M CID)	S/C, A/C, T.T.	16.5	13.7
	5.8L (351M CID)	Police Interceptor & Taxi	17.0	14.1
	6.6L (400 CID)	S/C, A/C	16.5	13.7
	6.6L (400 CID)	T.T., Police Interceptor	17.0	14.1
Ford/Mercury	5.0L (302 CID)	S/C, A/C	15.2	12.6
	5.0L (302 CID)	Police Interceptor	17.1	14.2
	5.8L (351W CID)	S/C, A/C	16.3	13.5
	5.8L (351W CID)	Police Interceptor	18.2	15.1
	5.8L (351M CID)	S/C, A/C	17.0	14.2
	6.6L (400 CID)	S/C, A/C	17.0	14.2
	6.6L (400 CID)	Police Interceptor & T.T.	17.46	14.5
	7.5L (460 CID)	S/C, A/C	18.6	15.4
	7.5L (460 CID)	T.T. & Police Interceptor	19.7	16.3
Continental Mark V	6.6L (400 CID)	S/C, A/C	16.9	14.06
	7.5L (460 CID)	S/C, A/C	18.6	15.4
	7.5L (460 CID)	T.T.	18.8	15.6
Lincoln Continental	6.6L (400 CID)	A/C	16.9	14.06
	7.5L (460 CID)	A/C	18.7	15.5
	7.5L (460 CID)	T.T.	19.0	15.8

To convert to imperial measure, multiply U.S. quarts shown by .83.

7.5L (460 CID) Police Interceptor includes engine oil cooler.

Capacities shown include heater.

Service refill recommendations are 50/50 mix of water and Ford Long Life Coolant ESE-M97B18-C.

Expansion reservoirs do not use coolant in bottle except during extreme operation.

All figures shown are actual but may vary ± 15% due to system variations.

S/C – no air conditioning (standard cooling).
A/C – air conditioning.

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(4) All 3/8", 15/32", 1/2" and 5/8" wide drive belts that are **newly installed*** should read 120-160 lbs.

(5) All 3/8", 15/32", 1/2" and 5/8" wide drive belts **not newly installed*** at the time of inspection, and **having less than ten (10) minutes of engine operation on them,** should read betwen 90-160 lbs. If a belt tension is not within the specified tension range, re-adjust the belt tension to 90-120 lbs.

(6) All 3/8", 15/32", 1/2" and 5/8" wide drive belts **with more than ten (10) minutes of engine operation on them,** should read between 75-120 lbs. If a belt tension is not within the specified tension range, re-adjust the belt tension to 90-120 lbs.

***Newly installed** means installation of the drive belt before the engine has made no more than one rotation and the belt has had a chance to stretch or seat into the pulley grooves.

B. The following is a list of fastener torque values for attachment of alternators, air pumps and related components.

1. Alternator and air pump to adjusting arm (thru slot): 24-40 ft-lb.
2. Alternator pivot bolt: 45-57 ft-lb.
3. Air pump pivot bolt: 22-32 ft-lb.
4. Mount bracket fasteners according to the following specifications:

A. Standard screw and washer assy., bolts and nuts.

Size	Grade@	Torque
1/4" – 20	5	70-105 in-lb.
1/4" – 20	8	105-155 in-lb.
5/16" – 18	5	12-18 ft-lb.
5/16" – 18	8	17-25 ft-lb.
3/8" – 16	5	22-32 ft-lb.
3/8" – 16	8	30-45 ft-lb.
7/16" – 14	5	40-55 ft-lb.
7/16" – 14	8	50-70 ft-lb.
M 8	5	14-21 ft-lb.
M 8	8	20-28 ft-lb.
M 10	5	28-40 ft-lb.
M 10	8	40-57 ft-lb.

C. Flange bolts with serrations under head of bolt (i.e., spin-lock type)

Size	Grade@	Torque
1/4" – 20	5	80-115 in-lb.
5/16" – 18	5	16-22 ft-lb.
3/8" – 16	5	27-37 ft-lb.
7/16" – 14	5	45-60 ft-lb.
M 8	5	18-25 ft-lb.
M 10	5	32-44 ft-lb.

@ Identification of grades 5 and 8 — Grade 5 or Grade 8

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B-1: PCV VALVE REPLACEMENT

1. Remove the PCV valve from the PCV hose.
2. Install a new PCV valve in the hose.
   Note: If a high flow PCV valve is scheduled for installation, consult the Vehicle Emission Control Information Decal for the **correct** high flow PCV valve part number.
3. Check curb idle speed in accordance with Procedure D-2.

B-2: THERMACTOR IDLE DUMP DELAY VALVE

1. If necessary, remove the air cleaner assembly.
2. Remove the thermactor delay valve from the thermactor dump valve vacuum line.
3. Perform the following delay valve functional test:
   a. **Equipment Required:**
      (1) Vacuum gauge—USG Model 12121-1, 2" dia., 0-30" Hg vacuum gauge with 0.20" OD vacuum hose nipple adaptor and 24" of 5/32" ID distributor vacuum hose or equivalent.
      (2) Stop watch or wristwatch with a sweep second hand.
      (3) External vacuum source capable of maintaining a constant vacuum (10" Hg minimum).
   b. Set external vacuum source to 10" Hg.
   c. Connect colored side of delay valve to vacuum source.
      Note: 0.20" OD to 0.27" OD adaptor may be required to connect colored side of valve to vacuum source.
   d. Connect the 24" section of vacuum hose to gauge and to white side of delay valve.
   e. Apply vacuum and observe time in seconds for gauge to rise from 0 to 8" Hg with a constant 10" Hg vacuum source.
   f. The minimum and maximum time for the delay valve to reach 8" Hg should be as follows:

		Time in Seconds	
Color Code	I.D. No.	Minimum	Maximum
White/Red	40	14.0	47.2
White/Blue	20	8.0	26.0

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CAUTION: When checking the delay valve, do not allow oil or dirt to get into the valve as this will impair its function.

4. Replace the delay valve if it fails to meet specification or reinstall the delay valve if it meets specification. The white side of the delay valve should face **away** from the thermactor dump valve.
5. Reinstall air cleaner assembly, if removed, and torque air cleaner nut(s) to specification.

C-1: SPARK PLUG REPLACEMENT

NOTE: If the engine is equipped with a "Dura Spark" ignition system and any high tension ignition wire is detached from a spark plug, the distributor cap, or the coil to perform this maintenance operation, silicone grease (Ford D7AE-19A331-AA or equivalent) must be applied to the boot before reconnection. Using a small clean screwdriver, apply a thin layer of silicone grease on the entire interior surface of the boot.

1. Remove required components to provide access to spark plugs.

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2. When clearance permits, use the spark plug wire installation and removal Tool (T74P-6666-A or equivalent). Otherwise, use your hand(s). In either situation, proceed as follows:
   Remove the spark plug wire from each spark plug by grasping the molded boot, twisting the boot until it loosens and then pulling it off the spark plug. Do not pull on the wire as the connection will be damaged; any spark plug wire and/or boot damaged must be replaced (see caution below).
3. Each original spark plug wire is numbered as to the plug it would be connected to. If spark plug wires are not numbered, each wire should be marked as to the plug number from which it was removed.
4. Clean the area around each spark plug port with compressed air.
5. Using the proper size spark plug socket, remove each spark plug.
6. Check the gap on each new spark plug and set to specification if necessary.
7. Install each spark plug and torque to specifications.
8. Re-grease the spark plug boots (see NOTE) and reinstall the spark plug wires.
9. Reinstall all components which were removed to provide access to the spark plugs.

D-1: IDLE FUEL MIXTURE

A. Propane Enrichment Method

NOTE: —Leave all vacuum signal hoses attached to the air cleaner assembly when relocating the assembly to perform carburetor adjustments. **The air cleaner assembly must be installed, however, when measuring engine speeds.**

—Some engines may experience normal oscillations in idle speeds which could cause variations in engine speed measurement. If this condition is encountered, use the **average** engine speed.

1. Apply the parking brake and block the wheels. Then, start the engine, bring to normal operating temperature, and turn off.
2. Connect a tachometer.
   NOTE: If the engine has a "Dura-Spark I" ignition system (blue coil tower), use tachometer 02-0362 or equivalent.
3. If so equipped, disconnect the fuel evaporative purge valve signal vacuum hose as follows:
   Trace the purge valve vacuum hose from the purge valve (located on the canister) to the first point where the vacuum hose can be detached from the underhood hose routing, (vacuum tee connection, PVS, etc.). Disconnect the vacuum hose at **that** point, cap the open port and plug the vacuum hose.
   CAUTION: To prevent possible damage to the purge valve, **do not** disconnect the vacuum hose **at the purge valve.**
4. If so equipped, disconnect the evaporative emission purge hose at the air cleaner and plug the nipple.
5. Disconnect the crankcase ventilation closure hose from the air cleaner and plug the nipple.
6. Disconnect the flexible fresh air tube from the air cleaner duct or adaptor. Using a propane enrichment Tool (T75L-9600-A or equivalent), insert the tool hose approximately 3/4 of the way into the duct or fresh air tube. If necessary, secure the hose with tape.
7. Verify that the idle mixture limiter(s) is set to maximum rich position (counterclockwise against the stop); correct if required.
8. Check engine curb idle rpm (or A/C—off rpm) in accordance with Procedure D-2; if necessary, reset to specification.
   With the engine idling, place the transmission selector in the mode specified for idle fuel mixture check (see engine emission decal and the note below). **Gradually** open the propane tool valve and watch for engine speed gain, if any, on the tachometer. When the engine speed reaches a maximum and then begins to drop off, note the amount of speed gain.
9. **NOTE:** —On vehicles equipped with automatic transmission, the transmission position in which curb idle speed is set **may differ** from the position in which the idle fuel mixture check is performed. Be sure the correct transmission position is employed in both cases.
   —With the transmission in neutral, run the engine at approximately 2500 rpm for 15 seconds before each mixture check.
   —If the engine speed will not drop off, check the bottle gas supply. If necessary, repeat Step 9 with a new bottle gas supply.
10. Compare measured speed gain to specified speed gain:
    NOTE: If it is determined that idle fuel mixture adjustment will be necessary, adjust the mixture according to the **reset** rpm specification.
    a. If the measured speed gain is within specification, except as noted below, proceed to Step 11.
       NOTE: If the measured speed gain is "0" rpm (no rpm rise) and the **minimum** speed gain specification is "0" rpm, proceed to Step 10d.
    b. If the measured speed gain is **higher** than the speed gain specification:
       —Turn the mixture screw(s)/limiter(s)* **counterclockwise** (rich) in equal amounts *and simultaneously repeat* Steps 8-9 until the measured speed rise meets the **reset** rpm specification. After final adjustment, proceed to Step 11.
    c. If the measured speed gain is **lower** than the speed gain specification:
       —Turn the mixture screw(s)/limiter(s)* **clockwise** (lean) in equal amounts and simultaneously repeat Steps 8-9 until the measured speed rise meets the **reset** rpm specification. After final adjustment, proceed to Step 11.

*If the mixture limiter(s) must be removed for further adjustment, use Tool T-75L-9500-A to simplify removal and prevent damage to screw.

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d. If there is no rpm rise and the **minimum** speed gain specification is "0" rpm, perform the following speed drop test:

NOTE: Speed drop test information is specified with the artificial enrichment requirements on the engine emission decal whenever the minimum speed gain specification is "0" rpm.

(1) While watching the tachometer, adjust the mixture screw(s)/limiter(s) clockwise (lean) by the number of turns specified for the speed drop test. Note the drop in engine speed.

—If the measured speed drop is **equal to** or drops off by **more than** (including stall) the speed drop specification, return the mixture limiter(s) to the maximum rich position, or the mixture screw(s) to the position before adjustment. Proceed to Step 11.

—If the measured speed drop is **less than** the specified **minimum** speed drop specification, leave the mixture limiter(s) in the adjusted position and repeat Steps 8-10.

'11. Turn engine off. Install new service limiter(s) against the maximum rich stop if the mixture limiter(s) were removed. If the mixture limiter(s) was **not** removed but the mixture limiter(s) is **not** against the maximum rich stop, remove the limiter(s) and install new service limiter(s) against the stop.

NOTE: Re-check engine rpm and idle fuel mixture if the mixture screw is disturbed during limiter installation.

Pre-soaking the limiter cap in hot water will soften the material and reduce the installation effort.

12. Remove test equipment and secure air cleaner wing nut(s) to specification.

B. **Optimum Idle Method** (California Only—To be used **only** when propane enrichment equipment is not available)

NOTE: —Leave all vacuum signal hoses attached to the air cleaner assembly when relocating the assembly to perform carburetor adjustments. **The air cleaner assembly must be installed, however, when measuring engine speeds.**

—Some engines may experience normal oscillations in idle speeds which could cause variations in engine speed measurement. If this condition is encountered, use the **average** engine speed.

1. Apply the parking brake and block the wheels. Then, start the engine, bring to normal operating temperature, and turn off.
2. Connect a tachometer.

NOTE: If the engine has a "Dura-Spark I" ignition system (blue coil tower), use tachometer 02-0362 or equivalent.

3. If so equipped, disconnect the fuel evaporative purge valve signal vacuum hose as follows:

Trace the purge valve vacuum hose from the purge valve (located on the canister) to the first point where the vacuum hose can be detached from the underhood hose routing, (vacuum tee connection, PVS, etc.). Disconnect the vacuum hose at **that** point, cap the open port and plug the vacuum hose.

CAUTION: To prevent possible damage to the purge valve, **do not** disconnect the vacuum hose **at the purge valve.**

4. If so equipped, disconnect the evaporative emission purge hose at the air cleaner and plug the nipple.
5. Disconnect the crankcase ventilation closure hose from the air cleaner and plug the nipple.
6. Remove the idle mixture limiter(s) with Tool T75L-9500-A or equivalent.
7. Check curb idle rpm (or A/C—OFF rpm) in accordance with Procedure D-2; if necessary, reset to specification.
8. With the engine idling, place the transmission selector in the position specified for the propane enrichment check (see engine emission decal). Adjust the engine rpm to the "alternate idle speed change" rpm. (See engine emission decal.) Note the **new** idle speed rpm on the tachometer.

NOTE: —If the "alternate idle speed change" rpm is specified as "0", the above idle speed adjustment is not necessary.

—On vehicles equipped with automatic transmission, the transmission position in which curb idle rpm is set **may differ** from the position in which the idle fuel mixture check is performed. Be sure the correct transmission position is employed in both cases.

9. Adjust the idle mixture screw(s) (rich or lean) and idle speed to achieve best idle at the **new** idle speed rpm.
10. If the "alternate idle speed change" rpm is "0", proceed to Step 12; otherwise, proceed to Step 11.
11. Turn the idle mixture screw(s) clockwise (lean) in equal amounts until the engine speed drops by the specified "alternate idle speed change" rpm.
12. Turn the engine off. Install new service limiter(s) at the maximum rich stop.

NOTE: —If the mixture screw setting is disturbed during limiter installation, repeat Steps 7-11.

—Pre-soaking the limiter cap in hot water will soften the material and reduce the installation effort.

13. Reconnect pertinent hoses removed in Steps 3, 4 and 5.
14. Remove test equipment and tighten the air cleaner wing nut(s) to specification.

D-2: ENGINE IDLE SPEEDS

A. **Pre-Adjustment Instructions (All Engine Speeds)**

NOTE: —Leave all vacuum signal hoses attached to the air cleaner assembly when relocating the assembly to perform carburetor adjustments. **The**

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air cleaner assembly must be installed, however, when measuring engine speeds.

—Some engines may experience normal oscillations in idle speeds which could cause variations in engine speed measurement. If this condition is encountered, use the **average** engine speed.

—When performing engine rpm adjustments on vehicles equipped with the hydro-boost brake system, make certain the main brake foot pedal is **not** depressed—since engine rpm is affected by foot pedal pressure.

1. Apply the parking brake and block the wheels.
   NOTE: If vehicle is equipped with automatic parking brake release, disconnect the vacuum line at the parking brake and plug the vacuum line.
2. Turn off all accessories. Start the engine, bring to normal operating temperature, and turn engine off.
3. On 2.3L engine applications equipped with thermactor systems, revise the dump valve vacuum hoses as follows:
   a. For dump valves with one or two vacuum hoses at the **side,** disconnect and plug the hose(s).
   b. For dump valves with one vacuum hose at the **top** only connected to the spark port in the carburetor, remove the hose at the dump valve and plug it. Connect a slave hose from *the dump valve vacuum fitting to an intake* manifold vacuum fitting.
4. Disconnect the fuel evaporative purge valve signal vacuum hose as follows: Trace the purge valve vacuum hose from the purge valve (located on the canister) to the first point where the vacuum hose can be detached from the underhood hose routing, (vacuum tee connection, etc.). Disconnect the vacuum hose at **that** point, cap the open port, and plug the vacuum hose.

   CAUTION: To prevent damage to the purge valve, do not disconnect the vacuum hose at the purge valve.
5. Check throttle and choke linkages for freedom of movement. Correct as required.
6. Connect a tachometer.
   NOTE: If the engine has the "Dura Spark I" ignition system (blue coil tower), use tachometer 02-0362 or equivalent.

B. **Fast Idle rpm**

1. Revise the distributor vacuum advance hose as follows:
   a. On all engines **except** 2.8L/5.0L (302 CID) engines with Model 2700 carburetor, remove the spark delay valve, if so equipped, and route the distributor vacuum advance hose directly to the advance side of the distributor.
   b. On 2.8L/5.0L (302 CID) engines with Model 2700 carburetor, remove and plug the distributor vacuum advance hose.
2. Trace the EGR signal vacuum hose from the EGR valve to the carburetor:
   a. If an EGR/PVS valve or cold weather modulator is located in the vacuum hose routing, disconnect the EGR vacuum hose at the EGR valve and plug the hose.
   b. If not equipped with an EGR/PVS valve or cold weather modulator, **do not detach** the EGR vacuum hose.
3. On 2.3L engines with Model 6500 carburetor:
   a. Remove vacuum hose from cold start vacuum switch.
   b. Apply vacuum signal to cold start vacuum switch (5" Hg minimum). Use manifold vacuum or external source.
4. With the engine running at normal operating temperature, the choke plate fully opened, and the transmission in Neutral (M/T) or Park (A/T), place the fast idle lever on the specified step of the fast idle cam. Allow engine speed to stabilize and measure the fast idle rpm. Adjust if not within ±100 rpm of specification.
5. Run engine at approximately 2500 rpm for 15 seconds and recheck fast idle rpm.
6. On 5.0L (302 CID) engine with Model 2700 carburetor, check the auxiliary fast idle rpm as follows:
   a. Turn the engine off. Disconnect the vacuum hose from the vacuum-operated throttle modulator and plug the hose.
   b. Connect a slave vacuum hose from an engine manifold vacuum source to the throttle *modulator.*
   c. Start the engine and depress the throttle until vacuum modulator plunger extends fully. Then, release the throttle.
   d. Check the auxiliary fast idle rpm. If adjustment is necessary, loosen the locknut securing the modulator. Turn the modulator until the specified auxiliary fast idle rpm is obtained; then, tighten the locknut.
   e. Remove the slave vacuum hose and reconnect the system vacuum hoses.
7. Repeat Steps 4 thru 6 until the required fast idle rpm can be repeated.
8. Turn the engine off. Reconnect the vacuum line(s)/spark delay valve (if so equipped) removed in Steps 1 thru 3.

C. **Curb Idle Speed (Also Includes "A/C-Off", "A/C-On", and "TSP-OFF" Speeds, If so Specified**

1. Before each speed check (includes re-check), run the engine at approximately 2500 rpm for 15 seconds in neutral or park. Allow engine to return to curb idle.
2. With the air conditioning selector in the "OFF" position (unless otherwise specified), the engine at normal operating temperature, the choke plate fully opened, and the transmission selector in the specified gear (see engine emission decal), measure each required engine speed as defined and specified on the engine emission decal. If not within ±50 rpm of specification, adjust the respective engine speed as follows:

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NOTE: —The method of adjusting each engine speed depends upon the spped-controlling device(s) employed. Therefore, examine the carburetor, determine the device(s) used, if they are functional, and then perform the adjustment procedure.

—Repeat Steps 1 and 2 until each engine speed is repeatable.

—On carburetors equipped with a dashpot, the dashpot clearance must be adjusted each time the curb idle speed is adjusted.

2.3L ENGINE WITH MODELS 5200 AND 6500 CARBURETORS

a. **No Solenoid Device**

(1) Curb Idle rpm
Turn the throttle stop adjusting screw until the specified curb idle rpm is obtained. (Insure adjusting screw is against stop).

(2) Dashpot Clearance (if equipped)
With the engine off, collapse the dashpot plunger and check the clearance between the plunger and throttle lever pad. Adjust if not in specified limits.

b. **Anti-Diesel TSP or Anti-Diesel TSP with Vacuum-Operated Throttle Modulator (A/C Only)**

(1) Curb Idle rpm
Turn the TSP-ON idle adjusting screw until the specified curb idle rpm is obtained.

(2) TSP-OFF rpm
With the engine running, collapse the TSP plunger by forcing the throttle lever pad against the plunger. Turn the throttle stop adjusting screw until the specified TSP-OFF rpm is obtained.

c. **Solenoid-Dashpot**

(1) Curb Idle rpm
Adjust the curb idle rpm by turning the TSP-ON adjusting screw until the specified curb idle rpm is obtained.

(2) Dashpot Clearance
Dashpot clearance adjustment is not required. Clearance is controlled by the TSP.

(3) TSP-OFF rpm
With the engine running, collapse the solenoid-dashpot plunger by forcing the throttle lever pad against the TSP plunger. Turn the throttle stop adjusting screw until the specified TSP-OFF rpm is obtained.

d. **Vacuum-Operated Throttle Modulator (A/C Only)**

(1) Curb Idle rpm
Loosen the locknut securing the vacuum-operated throttle modulator and rotate the modulator until there is clearance between the modulator stem and the throttle lever pad. Adjust curb idle rpm by turning the throttle stop adjusting screw until the specified curb idle rpm is obtained.
Adjust the vacuum-operated throttle modulator by turning the modulator (locknut loosened) until the modulator stem contacts the throttle lever pad. Then, tighten the locknut.

e. **Vacuum-Operated Throttle Modulator with Dashpot (A/C Only)**

(1) Curb Idle rpm
Adjust the curb idle rpm by turning the throttle stop adjusting screw until the specified curb idle rpm is obtained.
NOTE: If the curb idle rpm cannot be adjusted low enough, loosen the TSP-ON adjusting screw on the throttle lever pad until sufficient clearance is present.

(2) Dashpot Clearance
Collapse the throttle modulator plunger and check the clearance between the stem pad and the TSP-ON adjusting screw on the throttle lever pad. If adjustment is necessary, turn the TSP-ON adjusting screw until the specified clearance is obtained between the screw and the modulator pad.

3.3L (200 CID) ENGINE WITH MODEL 1946 CARBURETOR

a. **No Solenoid Device**

(1) Curb Idle rpm
Turn the throttle stop screw until the specified curb idle rpm is obtained.

(2) Dashpot Clearance (if equipped)
With the engine off, collapse the dashpot plunger and check the clearance bwtween the plunger and throttle lever pad. Adjust if not in specified limits.

b. **Anti-Diesel TSP**

(1) Curb Idle rpm
Turn the TSP-ON adjusting screw until the specified curb idle rpm is obtained.

(2) TSP-OFF rpm
With the engine running, collapse the TSP plunger by forcing the throttle lever pad against the plunger. Turn the throttle stop adjusting screw until the specified TSP-OFF rpm is obtained.

3.3L/4.1L (200/250 CID) ENGINES WITH MODEL YFA CARBURETOR

a. **No Solenoid Device**

(1) Curb Idle rpm
Turn the throttle stop adjusting screw until the specified curb idle rpm is obtained.

(2) Dashpot Clearance (if equipped)
With the engine off, collapse the dashpot plunger and check the clearance between the plunger and throttle lever pad. Adjust if not to specified limits.

b. **Anti-Diesel TSP**

(1) Curb Idle rpm
Turn the throttle stop adjusting screw until the specified curb idle rpm is obtained.

(2) TSP-OFF rpm
With the engine running, collapse the TSP plunger by forcing the throttle lever pad against the plunger. Turn the throttle stop adjusting screw until the specified TSP-OFF rpm is obtained.

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c. **Anti-Diesel TSP and A/C TSP**

(1) **A/C-On rpm**

—Move the climate control selector on the instrument panel to "A/C-On" to energize the **front** TSP.

—Open the throttle to allow the TSP plunger to extend fully. Then, release the throttle.

—Disconnect the A/C compressor clutch wire at the compressor.

—Check A/C-On rpm. If adjustment is required, loosen the locknut securing the front TSP and turn the TSP until the specified A/C-ON rpm is obtained. Then, tighten the locknut.

—After completion, move the climate control selector to the "off" position. Reconnect the A/C compressor clutch wire.

(2) **A/C-Off rpm**

Adjust the TSP—located at the back of the carburetor—by turning the hex head on the rear of the solenoid until the specified A/C-Off rpm is obtained.

(3) **TSP-OFF rmp**

With the engine running, collapse the back TSP plunger by forcing the throttle lever pad against the plunger. Turn the throttle stop adjusting screw until the specified TSP-OFF rpm is obtained.

2.8L/5.0/5.8/6.6L (302/351W/351M/400 CID) ENGINES WITH MODEL 2150 CARBURETOR

2.8L/5.0L (302 CID) ENGINES WITH MODEL 2700 CARBURETOR

NOTE: On engines equipped with the Model 2700 carburetor, the accelerator pump lever lash must be checked and adjusted (if necessary) each time the A/C-Off rpm or curb idle rpm is adjusted. Perform the following procedure:

—Apply a slight pressure downward on the top of the nylon nut located on the accelerator pump to take up the linkage clearances.

—Check the accelerator pump lever lash, between the top of the accelerator pump stem and the accelerator pump lever. Compare to specified clearance.

—If necessary, adjust the accelerator pump lash using the nylon nut on the accelerator pump rod to obtain the specified clearance.

a. **No Solenoid Device**

(1) Curb Idle rpm

Turn the throttle stop adjusting screw until the specified curb idle rpm is obtained.

(2) Dashpot Clearance (if equipped)

With the engine off, collapse the dashpot plunger and check the clearance between the plunger and the throttle lever pad. Adjust if not to specification.

b. **Anti-Diesel TSP (Non-A/C Only)**

(1) Curb Idle rpm

V-8 Engines: Adjust the solenoid positioner by rotating the long screw (part of the TSP mounting bracket) until the specified curb idle rpm is obtained.

2.8L Engines: Adjust the solenoid positioner by turning the hex head, located on the rear of the solenoid, until the specified curb idle rpm is obtained.

(2) TSP-OFF rpm

With the engine running, collapse the TSP plunger by forcing the throttle lever pad against the plunger. Turn the throttle stop adjusting screw until the specified TSP-OFF rpm is obtained.

c. **A/C TSP (A/C Only)**

(1) **A/C-On Speed**

—Move the climate control selector on the instrument panel to "A/C-On".

—Open the throttle to allow the TSP plunger to extend fully. Then, release the throttle.

—Disconnect the A/C compressor clutch wire at the compressor.

—Check A/C-On rpm and, if necessary, adjust as follows:

— **V-8 Engines:** Turn the long screw (part of the TSP mounting bracket) until the specified A/C-On rpm is obtained.

— **2.8L Engines:** Adjust the solenoid positioner by turning the hex head, located on the rear of the solenoid, until the specified A/C-On rpm is obtained.

—After completion, move the climate control selector to the "Off" position. Reconnect the A/C compressor clutch wire.

(2) **A/C-Off rpm**

Turn the throttle stop adjusting screw until the specified A/C-OFF rpm is obtained.

7.5L (460 CID) ENGINE WITH MODEL 4350 CARBURETOR

a. **Non-A/C (Except Police Interceptor)** (The TSP is non-functional)

(1) Curb Idle rpm

Turn the throttle stop adjusting screw until the specified curb idle rpm is obtained.

b. **A/C TSP (Except Police Interceptor)**

(1) **A/C-ON Speed**

—Move the climate control selector on the instrument panel to "A/C-ON".

Open the throttle to allow the TSP plunger to extend fully. Then, release the throttle.

—Disconnect the A/C compressor clutch wire at the compressor.

—Check A/C-ON rpm and, if necessary, adjust as follows:

—Turn the long screw (part of the TSP mounting bracket) until the specified A/C-ON rpm is obtained.

—After completion, move the climate control selector to the "OFF" position. Reconnect the A/C compressor clutch wire.

(2) **A/C-OFF rpm**

Turn the throttle stop adjusting screw until the specified A/C-OFF rpm is obtained.

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c. **Anti-Diesel TSP: Police Interceptor A/C and Non-A/C Only**

(1) Curb Idle rpm

Adjust the solenoid positioner by rotating the long screw (part of the TSP mounting bracket) until the specified curb idle rpm is obtained.

(2) TSP-OFF rpm

With the engine running, collapse the TSP plunger by forcing the throttle lever pad against the plunger. Turn the throttle stop adjusting screw until the specified TSP-OFF rpm is obtained.

D. **Post-Adjustment Instructions (All Engine Speeds)**

1. On 2.3L engines equipped with Thermactor systems, correct the dump valve vacuum hose routing (see Step 4 in Pre-Adjustment Instructions).
2. Reconnect the fuel evaporative purge valve signal vacuum hose (see Step 5 in Pre-Adjustment Instructions).
3. Stop engine. Remove all test equipment, reconnect automatic parking brake release (if disconnected), and torque the air cleaner wing nut(s) to specification.

D-3: AUTOMATIC CHOKE SYSTEM

I. APPLICATION:

A. **Pre-Check Instructions**

1. Apply parking brake and block the wheels.
2. Start the engine, bring to normal operating temperature, and turn off.
3. Remove the air cleaner assembly and plug the vacuum hose(s) to the air cleaner.

B. **Freedom of Linkage and System Integrity Check**

1. Verify that vacuum hoses, solenoid, and electric choke wires are properly connected and intact; correct as required. Check torque of carburetor hold-down nuts; retorque to specification, if necessary.
2. Verify that the choke cap index mark points to the specified mark on the choke housing; correct if required.
3. Check all carburetor linkages for freedom of operation as follows:
   a. Manually depress the throttle lever to 1/4 open position and rotate the choke plate to the closed position. Release the choke plate; the choke plate should rotate smoothly to the open position. If sticking or binding is exhibited, clean/repair/replace/adjust the choke linkage, as required, to restore freedom of choke plate movement. If necessary, bring engine to normal operating temperature and recheck linkage freedom.

   CAUTION: On Models 5200 and 6500 carburetors: if the bimetal assist spring is to be removed during repair work, be careful not to deform the spring during removal and reinstallation.
4. If the carburetor is not equipped with an electric assist or full electric choke, proceed to Part D. Otherwise, proceed to Part C.

C. **Electric Choke Functional Check**

1. **Model 5200 and 6500 Carburetors**
   a. To set the choke on high cam, degress the throttle lever to the 1/4 open position and then push the choke plate completely closed. While holding the choke plate closed, release the throttle lever; then release the choke plate.
   b. Use a choke tester (14-0206 or equivalent) and direct the air flow at the choke bimetal housing cover.
   c. Cool the choke housing following the choke tester manufacturer's instructions, **except** as follows:

   —Do not use the manufacturer's choke come-off time specifications if supplied with tester kit.

   —Direct a continuous volume of air onto the choke bimetal housing cover until the bimetal closes and seats the choke plate lightly in the air horn.
   d. Move the fast idle speed cam to the kickdown step to avoid excessive engine speed.
   e. Without touching the throttle, start the engine. Using a stopwatch, measure the choke plate opening time from engine start-up until the choke plate reaches the stop in the vertical position.
   f. Compare measured choke come-off time to specification:

   —If the choke come-off time meets specification, allow the engine to return to curb idle speed. Turn the engine off, and proceed to Part D (if applicable) and, then, Part E.

   —If the choke come-off time does not meet specification, allow the engine to return to curb idle speed. Turn the engine off, and proceed to Appendix "A" (see Section III).

2. **Model 2150 Carburetor**
   a. To set the choke on high cam, depress the throttle lever to the 1/4 open position and then push the choke plate completely closed. While holding the choke plate closed, release the throttle lever; then, release the choke plate.
   b. Remove the hot air supply tube at the choke housing. Connect a choke port adaptor and choke tester (14-0206 or equivalent) to the choke hot air inlet port. Follow the choke tester manufacturer's instructions for connecting the tester.

   CAUTION: Use extreme care when removing and reinstalling the choke hot air supply tube to prevent cross-threading and thread damage.

   c. Cool the choke housing following the choke tester manufacturer's instructions, **except** as follows:

   —Do not use the manufacturer's choke come-off time specifications if supplied with tester kit.

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—Before activating the choke tester, manually retract the positive choke closure spring (external spring on pulldown motor) and secure it in the retracted position with an alligator clip. After the choke plate closes, remove the alligator clip and proceed to Step d.

—Turn off choke tester or inlet valve momentarily at 15-second intervals until the bimetal closes and seats the choke plate lightly in the air horn.

d. Remove the choke tester from the choke hot air inlet port adaptor and install a plug or cap on the adaptor.

e. Move the fast idle cam to the kickdown step to avoid excessive engine speed.

f. Without toucing the throttle, start the engine. Using a stopwatch, measure the choke plate opening time from engine start-up until the choke plate reaches the stop in the vertical position.

g. Compare measured choke come-off time to specification:

—If the choke come-off time meets specification, allow the engine to return to curb idle speed. Turn the engine off, and proceed to Step h.

—If the choke come-off time does not **meet** specification, allow the engine to return to curb idle speed. Turn the engine off, and proceed to Appendix "A" (See Section III).

h. Remove the choke tester adaptor and reinstall the choke hot air supply tube **(see Caution note under Step B).** Proceed to Part D (if applicable) and, then, Part E.

3. **Models 4350 and YFA Carburetors**

a. To set the choke on high cam, depress the throttle lever to the 1/4 open position and then push the choke plate completely closed. While holding the choke plate closed, release the throttle lever; then, release the choke plate.

b. Remove the hot air supply tube at the choke housing. Connect a choke port adaptor and choke tester (14-0206 or equivalent) to the choke hot air inlet port. Follow the choke tester manufacturer's instructions for connecting the tester.

CAUTION: Use extreme care when removing and reinstalling the choke hot air supply tube to prevent cross-threading and thread damage.

c. Cool the choke housing following the choke tester manufacturer's instructions, except as follows:

—Do not use the manufacturer's choke come-off time specifications if supplied with tester kit.

—Turn off choke tester or inlet valve momentarily at 10 second intervals until the bimetal closes and seats the choke plate lightly in the air horn.

d. Remove the choke tester from the choke hot air inlet port adaptor. Leave the adaptor open (unplugged).

e. Move the fast idle cam to the kickdown step to avoid excessive engine speed.

f. Without touching the throttle, start the engine. Using a stopwatch, measure the choke plate opening time to the following position:

— **Model YFA Carburetor:** choke plate rotation time is measured from engine start-up until the choke plate reaches the stop in the vertical position.

— **Model 4350 Carburetor:** choke plate rotation time is measured from engine start-up until the choke linkage moves the secondary throttle lockout lever **just clear** of the secondary throttle shaft lever.

g. Compare measured choke come-off time to specification:

—If the choke come-off time meets specification, allow the engine to return to curb idle speed. Turn the engine off, and proceed to Step h.

—If the choke come-off time does not meet specification, allow the engine to return to curb idle speed. Turn the engine off, and proceed to Appendex "A" (see Section III).

h. Remove the choke tester adaptor and reinstall the choke hot air supply tube **(see Caution note under Step b).** Proceed to Part D (if applicable) and then Part E.

4. **Model 1946 Carburetor**

a. With the engine at curb idle speed, disconnect the stator lead at the choke cap terminal and connect a test light in series with the stator lead and ground; the test light should glow at all times while the engine is running. If the test light does **not** glow, either the alternator or the stator lead is defective. Repair or replace as required.

b. Turn the engine off. To set the choke on high cam, depress the throttle lever to the 1/4 open position and then push the choke plate completely closed. While holding the choke plate closed, release the throttle lever; then, release the choke plate.

c. Remove the hot air supply tube at the choke housing. Connect a choke port adaptor and choke tester (14-0206 or equivalent) to the choke hot air inlet port. Follow the choke tester manufacturer's instructions for connecting the tester.

CAUTION: Use extreme care when removing and reinstalling the choke hot air supply tube to prevent cross-threading and thread damage.

d. Cool the choke housing following the choke tester manufacturer's instructions, **except** as follows:

—Do not use the manufacturer's choke come-off time specifications if supplied with tester kit.

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—Turn off choke tester or inlet valve momentarily at 15 second intervals until the bimetal closes and seats the choke plate lightly in the air horn.

e. Remove the choke tester from the choke hot air inlet port adaptor and install a plug or cap on the choke port adaptor.

f. With the engine **off** and the fast idle screw positioned on the high step of the cam, disconnect the stator lead from the choke cap terminal and connect a jumper wire from the positive terminal of the battery of the terminal on the choke cap. Using a stopwatch, measure choke plate rotation time from the point of completing the circuit until the choke plate reaches the stop in the vertical position.

g. Compare measured choke come-off time to specification:

—If the choke come-off time meets specification, proceed to Step h.

—If the choke come-off time does not **meet** specification, proceed to Appendix "A" (see Section III).

h. Remove the choke tester adaptor and reinstall the choke hot air supply tube **(see Caution note under Step c).** Remove the jumper wire and reconnect the stator lead to the choke cap. Proceed to Part D (if applicable) and, then, Part E.

D. **Altitude Compensation Assembly** (if so equipped)

1. Remove the aneroid housing (outer most housing) and gasket by removing the three machine screws. This exposes the poppet valve assembly.
2. Check the poppet valve for freedom of operation. If poppet valve is free, proceed to Step 4.
3. If poppet valve is sticky or binds, spray choke cleaner (C9AZ-19A501-B or equivalent) on the poppet valve and guide are to remove any deposits. Make sure that valve is completely free by depressing the valve. If unable to free up the valve, replace the altitude compensator assembly.
4. Reinstall the aneroid housing and gasket onto the valve housing (three machine screws).

E. **Post-Check Instructions**

1. Reinstall air cleaner assembly and reconnect pertinent vacuum lines. Torque air cleaner wing nut(s) to specification.

II. APPLICATION: MODEL 2700 (VARIABLE VENTURI)

A. **Pre-Check Instructions**

1. Apply parking brake and block wheels.
2. Start the engine, bring to normal operating temperature, and turn off.
3. Remove air cleaner assembly and plug vacuum line(s) to air cleaner.

B. **Freedom of Linkage and System Integrity Check**

1. Verify that vacuum hoses, solenoid and electric choke wires are properly connected and intact, check that all carburetor hold down nuts are torqued to specification. Correct as required.
2. Check all carburetor linkages for freedom of operation. Correct as required.

C. **Electric Choke Functional Check**

1. Remove the hot air supply tube at the choke housing. Connect a choke port adaptor and choke tester (14-0206 or equivalent) to the choke hot air inlet port. Follow the choke tester manufacturer's instructions for connecting the tester.

   CAUTION: Use extreme care when removing and reinstalling the choke hot air supply tube to prevent cross-threading and thread damage.
2. To set the choke, manually depress the throttle lever to the 1/2 open position and push the choke control rod **down** until the high cam choke lever pad aligns with the third from the highest step of the fast idle cam, counting the highest step as the first (see Fig. 3).
3. Cool choke housing following the choke tester manufacturer's instructions, **except** as follows:
   a. Do not use manufacturer's choke come-off time specification if supplied with tester kit.
   b. Turn off the choke tester air inlet valve momentarily at 15 second intervals until the cam lever just touches the cam adjusting screw.
4. Remove choke tester from adaptor.
5. Without touching the throttle, start the engine and verify the following:
   a. That the choke metering rod moves downward to the seated position within the specified time.
   b. Open the throttle and observe that the choke high cam lever diaphragm retracts (see Fig. 3).
6. If any of the conditions in Step 5 are not met, refer to the appropriate section of Appendix "A".
7. Turn off the engine.
8. Remove choke tester adaptor and reinstall hot air supply tube.

D. **Post-Check Instructions**

1. Reinstall the air cleaner assembly and reconnect pertinent vacuum lines. Torque air cleaner wing nuts to specification.

III. APPENDIX "A": DIAGNOSIS OF CHOKE SYSTEM

A. **All Carburetors except Model 2700: Choke plate does not rotate to the specified position within the specified time.**

1. Repeat the electric choke functional check (Section I, Part C) to verify the choke plate rotation time:
   a. If choke come-off time meets specification, discontinue Appendix "A" and proceed with the remaining steps in Section I, Part C.
   b. If choke come-off time again does not meet specification, continue with Appendix "A".

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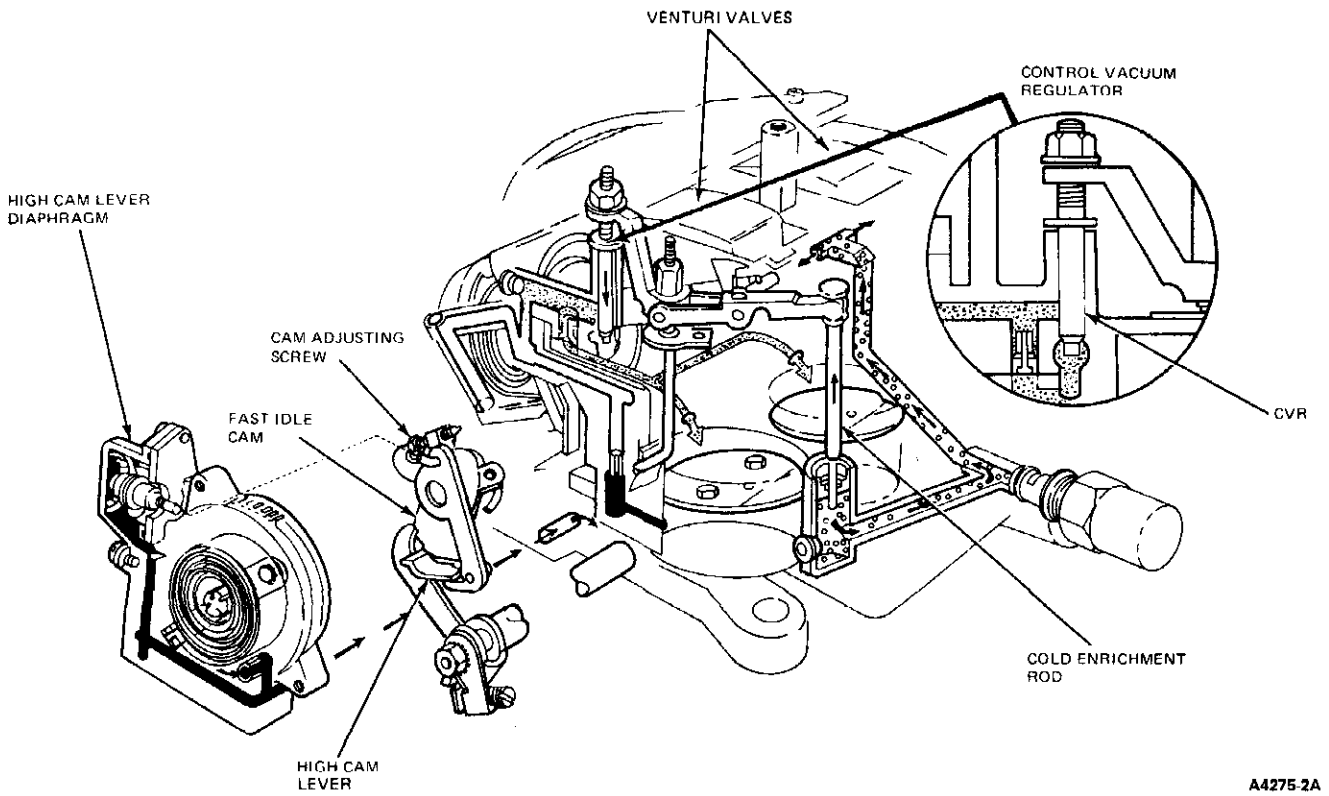


FIG. 3 Motorcraft Model 2700 VV Carburetor

2. Check all choke linkage for binding; correct as required.
3. For the Model 1946 carburetor **only:** if choke linkage repairs were made, repeat Section I, Part C. If the choke linkage freedom is verified, **replace the choke cap** and repeat Section I, Part C.
4. Remove the choke tester adaptor and reinstall the hot air supply tube.
5. Start the engine and bring to normal operating temperature.
6. With the engine at curb idle speed, disconnect the stator lead at the choke cap terminal and connect a test light in series with the stator lead and ground; the light should glow at all times while the engine is running. If the test light does **not** glow, either the alternator or the stator lead is damaged. Repair or replace as required.
7. If Step 6 did **not** reveal any discrepancy, replace the choke cap.
8. After repairs are completed, repeat the electric choke functional check (Section I, Part C).

B. Model 2700 (Variable Venturi) Carburetor

1. Choke High Cam Lever Fails to Retract

a. Check for binding, misaligned linkages, broken parts, contamination and/or loose parts.

b. If repairs were made in Step a, repeat Part C of Section II to see if the choke high cam lever retracts.

—If diaphragm retracts, discontinue Appendix "A" and proceed with remaining steps in Section I, Part C.

—If diaphragm does not retract, continue with Appendix "A".

c. Remove carburetor and place on a carburetor work stand or equivalent so that throttle can be fully opened.

d. Remove high cam pulldown diaphragm cover and check the sealing surface of cover and diaphragm for cracks, bends, distortion, chips, or contamination. Also, make sure vacuum passage in diaphragm cover is open. Repair or replace as required.

e. Cap choke hot air inlet; then, using a 21-0014 hand vacuum pump or equivalent, apply a vacuum to the vacuum passage in the high cam pulldown diaphragm flange. If a vacuum reading is maintained, the system is plugged. Clean as required.

f. Pull the high cam pulldown diaphragm back from its base (the casting) being careful not to tear or distort it. Inspect it for pinholes, cracks, or decomposed diaphragm material, then proceed as follows:

CAUTION: Rotating pulldown diaphragm changes pulldown setting; therefore, be sure to rotate diaphragm **back** to its original position after inspection.

—If the high cam pulldown diaphragm is satisfactory, reinstall the diaphragm cover taking care to align all vacuum passages. Check linkage and diaphragm for freedom of movement. Install carburetor on vehicle making all necessary connections and return to Step 7 of Section II, Part C.

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—If the high cam pulldown diaphragm needs replacement, proceed as follows:

g. Unscrew diaphragm assembly.

h. While holding the throttle lightly in the closed throttle position, rotate the fast idle cam so that the fast idle lever and the high cam choke lever rest on a cam step. The fast idle lever should now be resting at the bend in the high cam choke lever as shown in Reference I.

i. Still holding the throttle in the closed position, gently screw diaphragm assembly onto shaft until it bottoms. Then, rotate the diaphragm *counterclockwise until the hole in the* diaphragm is aligned with the vacuum passage.

NOTE: The high cam pulldown diaphragm can only be adjusted in increments of one full turn. The vacuum passage in the diaphragm must be aligned with the vacuum passage on the flange.

j. Install diaphragm spring and cover assuring that the vacuum passages are aligned and that the mechanism works freely.

k. Using a 21-0014 hand vacuum pump or equivalent, apply a vacuum to the choke hot air inlet while blocking vacuum passage which enters choke housing from the underside of throttle body. The diaphragm should retract.

l. If the pulldown diaphragm fails to retract, plug the vacuum passage in the underside of throttle body near the choke housing, remove the choke cap, and apply a vacuum to the heat restrictor vacuum passage (raised boss) using the 21-0014 hand vacuum pump or equivalent. If the pulldown diaphragm retracts, inspect gasket and cap. Replace as required, then reassemble choke parts. If the diaphragm still fails to retract, repair or replace as required.

m. Reinstall carburetor on vehicle making necessary connections and check to make sure the repaired mechanism is functional on running vehicle by repeating Part C of Section II.

2. **Choke Metering Rod Mechanism Fails to Move Downward Within the Specified Time**

a. Disconnect the stator lead at choke cap terminal and connect a test light in series between the stator lead and ground.

b. The light should glow at all times while the engine is running.

c. If the light does not glow either alternator or choke wire is defective and should be repaired as necessary.

d. Place test light in series with choke terminal and stator lead. If light does not glow, replace choke cap assembly. If light glows, turn off engine.

e. Check for damaged, missing, and/or misaligned parts. Check for dirt, grease, or any foreign material on moving parts. Repair or replace as required. If any linkage is repaired or replaced, check choke set and cam set per procedures attached. Reset if necessary.

f. If any corrective action is taken in Steps a-e above, perform Electric Choke Functional Check (Section II, Part C, Steps 1-5). If choke metering rod moves downward within the specified time, return to Step 7 of Section II, Part C; otherwise, proceed as follows.

g. If no corrective action is taken in Steps a-e, remove carburetor from vehicle.

h. Remove the retaining "E" ring which holds the choke operating rod to the cam lever and *remove the linkage from the cam lever (see* Fig. 3).

i. Open the throttle slightly and check cam lever for freedom of movement. The choke cap spring should provide the only resistance and the cam lever should spring back to the original position (see Fig. 3).

j. If cam movement is still not free, remove the throttle body from the carburetor. Remove the choke cap and disassemble the choke shaft, the cam lever, and the fast idle cam. Check the surfaces of all parts for grease, foreign material, bends, cracks, or distortion. Clean or replace parts as required. If a new fast idle cam is installed, adjust cam set per procedure attached. Install throttle body on carburetor and torque to specification.

k. If cam movement is OK, check remaining parts of choke system for freedom of movement by manually moving choke operating rod up and down. The movement should be free. If movement is not free, remove the retaining "E" rings from the choke metering rod lever and the choke operating rod. Then remove the pin from choke metering rod lever. (See Fig. 3.) Carefully lift the choke metering rod lever up and out of the air horn as far as the choke operating rod will allow. Inspect the parts for foreign material, bends, distortion or breakage. Clean and/or repair as required. Reinstall parts in air horn making sure movement is free. If any repair was made, adjust choke set per procedure attached.

l. If movement is OK, make sure the choke operating rod is connected to the cam lever with the retaining "E" ring.

m. Install carburetor on vehicle making sure all parts operate freely. Connect all vacuum hoses and electrical wires.

2700 CARBURETOR CAM SET PROCEDURE

Special Tool: 120 degree Index Stator Choke Cap, No. T77L-9848-A

Specifications: See 1978 Ford Car Performance Specifications Book

1. Remove choke cap.
2. Hold throttle lightly closed with a rubber band to maintain cam position.
3. Place fast idle lever in the corner of the specified step on the fast idle cam with the high cam diaphragm in its retracted position.

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4. Install 120 degree stator cap.
5. Turn the cam adjusting screw until the index mark on the stator cap lines up with the specified mark on the choke casting. Make sure the fast idle cam lever remains in position on the fast idle cam.
6. Remove the stator cap and re-install the choke cap at the specified setting on the choke housing. Make sure the tang is engaged in the choke bimetal lever.

MODEL 2700 CARBURETOR CHOKE SET PROCEDURE

Special Tools:

- Dial Indicator
- 120 degree Index Choke Cap, T77L-9848-A

1. Remove choke cap.
2. Install choke weight on the bimetal lever.
3. Install dial indicator with the tip on the top surface of the choke metering rod. With choke weight in place, adjust dial indicator to read zero. Move weight slightly then release—make sure the zero repeats.
4. Remove choke weight.
5. Install 120 degree index stator cap at index.
6. Turn the choke rod indexing nut to achieve a reading of .125 inch travel on the dial indicator.
7. Repeat Steps 2 through 6 to establish repeatability. Adjust if necessary.
8. Remove the stator cap and dial indicator.
9. Reinstall the choke cap assuring that the bimetal tang is properly inserted in the cam bimetal lever.

D-4: CARBURETOR AIR CLEANER ELEMENT AND CRANKCASE EMISSION FILTER

A. **Carburetor Air Cleaner Element**

1. Remove air cleaner assembly from engine before removing the filter element to prevent inadvertently dropping dirt into the carburetor. Remove any dust or dirt from carburetor flange area.
2. Inspect inside surfaces of cover and tray for traces of dirt leakage past element as a result of damaged element seals, wrong element usage, or inadequate torque on the wing nut or wing screw.
3. Inspect carburetor mounting gasket and replace if deformed or missing. Be sure red side (adhesive) is on carburetor flange.
4. Remove element and clean sealing surfaces on tray and cover. Install a new element after visual inspection for possible damage in handling (deformed seals or holes in paper).
5. Install air cleaner body on carburetor flange. The air cleaner should seat freely on the carburetor gasket. Visual observation will show if heater hoses or attaching components restrict a good seal to the gasket.
6. Install cover on element and air cleaner body and, when applicable, reinstall the rubber-backed wing nut washer.
7. Reconnect all vacuum or electrical lines. When reconnecting the crankcase closure lines on the air cleaner, be sure the joint between the elbow and filter pack is secure and fully engaged. The clip should engage the inner ring on the elbow and not be engaged between the rings.
8. Install wing nut or wing screw and tighten to specifications. On air cleaners using support brackets, always tighten carburetor wing nut before securing support bracket. This will assure air cleaner seal to carburetor and maximum protection against dust leakage to the engine.

B. **Crankcase Emission Filter**

1. Remove air cleaner cover.
2. Detach the retaining clip from the crankcase filter pack assembly and remove the filter pack assembly from the air cleaner tray.
3. Remove the filter media pad from the container and discard the pad. Wash the container with suitable solvent. Lightly oil a new filter media pad and install the pad in the container.
4. Reinstall the filter pack assembly in the air cleaner tray and secure the assembly with the retaining clip.
5. Reinstall the air cleaner cover and, when applicable, the rubber-backed wing nut washer. Install wing nut/screw and tighten to specification.

SPECIFICATIONS

Specifications not found in this Part can be found in the 1978 Ford Car Performance Specification book, or on the vehicle Engine Emission Control decal.

SPECIAL TOOLS

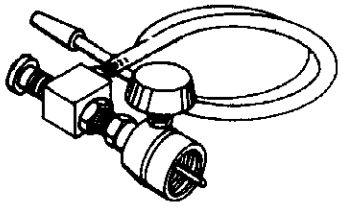
The tools illustrated here are required to perform the various tests and adjustments concerning emission systems components installed in 1978 vehicles. Emission system special service tools are available from:

Owatonna Tools, Inc.

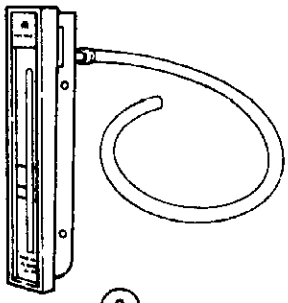
Owatonna, Minnesota 55060

Attention: Ford Order Desk or call (507) 451-5310 and ask for the Ford Special Tool Coordinator.

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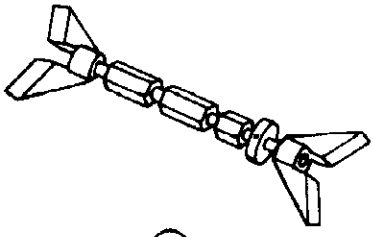
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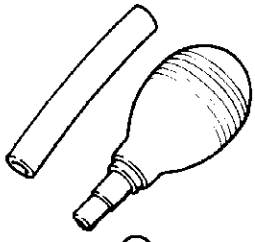
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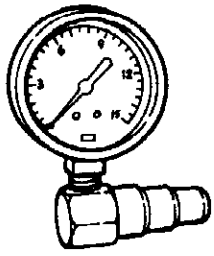
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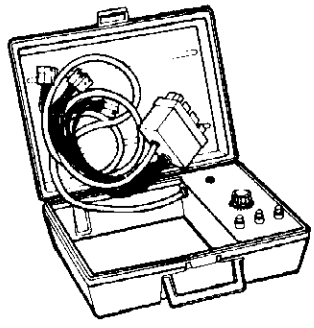
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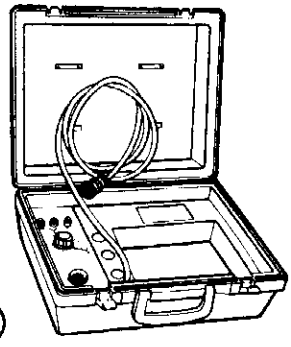
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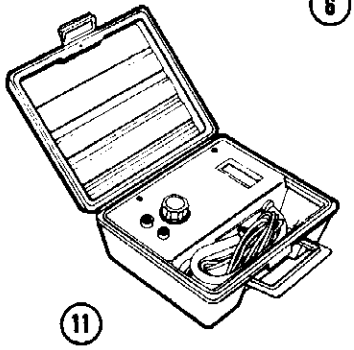
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ESSENTIAL TOOLS	PART NO.
1. PROPANE IDLE TESTER	T75L-9600-A
2. CHOKE FLOW METER	T75L-9850-A
3. MAGNETIC BASE THERMOMETER	T75L-9601-A
4. THERMACTOR PUMP BELT TENSION TOOL	T75L-9480-A
5. THERMACTOR CHECK VALVE TESTER	T75L-9487-A
6. THERMACTOR PUMP PRESSURE GAUGE	T75L-9486-A
7. SPARK PLUG BOOT ASSEMBLY TOOL	T75L-6666-A

ESSENTIAL TOOLS	PART NO.
8. LIMITER CAP REMOVAL TOOL	T75L-9500-A
9. FEEDBACK CARBURETOR TESTER	T78L-50-FBC-1
10. ELECTRONIC ENGINE CONTROL (EEC) TESTER	T78L-50-EEC-1
11. DIGITAL VOLT OHM METER (DVOM)	T78L-50-DVOM

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Charging System

PART 50-31

MAINTENANCE

EXCEPT MAINTENANCE—FREE BATTERY

CHECK BATTERY FLUID LEVEL

WARNING—Keep out of reach of children. Batteries contain SULFURIC ACID. Avoid contact with skin, eyes or clothing. Also, shield your eyes when working near the battery to protect against possible splashing of the acid solution. In case of acid contact with skin, eyes, or clothing, FLUSH IMMEDIATELY WITH WATER FOR A MINIMUM OF 15 MINUTES. If acid is swallowed, drink large quantities of milk or water, followed by milk of magnesia, a beaten egg or vegetable oil. CALL A PHYSICIAN IMMEDIATELY.

Hydrogen and oxygen gases are produced during normal battery operation. This gas mixture can explode if flames, sparks or lighted tobacco are brought near the battery. When charging or using a battery in an enclosed space, always provide ventilation and shield your eyes.

Keep the fluid in each battery cell up to the level of the ring in the bottom of the filler well. Generally, tap water may be added unless it has a high mineral content or has been stored in a metal container. If the tap water is unsuitable for these reasons, distilled water should be used.

CHECK AND ADJUST DRIVE BELT TENSION

Refer to the Maintenance Section of Part 50-29.

SPECIFICATIONS

Refer to the Car Shop Manual Volume 3 for all Specifications not contained in this Section.

BATTERY CHARGE RATES (EXCEPT MAINTENANCE-FREE BATTERY)

Allowable Battery High Rate Charge Time Schedule ③						
Specific Gravity Reading	Charge Rate Amperes	Battery Capacity – Ampere Hours				
		36	41 & 45	53 & 54	77	80
1.125-1.150 ①	35	50 min.	65 min.	80 min.	115 min.	115 min.
1.150-1.175	35	40 min.	50 min.	65 min.	95 min.	95 min.
1.175-1.200	35	30 min.	40 min.	50 min.	70 min.	70 min.
1.200-1.225	35	25 min.	30 min.	35 min.	50 min.	50 min.
Above 1.225	5	②	②	②	②	②

① If the specific gravity is below 1.125, use the time indicated for the 1.125 specific gravity, then charge at 5 amperes until the specific gravity reaches 1.250 at 80°F.

② Charge at 5 ampere rate only until the specific gravity reaches 1.250 at 80°F.

③ At no time during the charging operation should the electrolyte temperature exceed 130°F.

BATTERY DISCHARGE RATES

Except Maintenance-Free Battery		Maintenance-Free Battery	
Battery Capacity (Ampere Hours)	Discharge Rate (Amperes)	Battery Capacity (Ampere Hours)	Discharge Rate (Amperes)
36	155	53	200
41	145	63	215
45	190	68	235
53	175		
54	225		
68	220		
77	228		

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Lamps, Instruments, Controls, Heating, A/C and Accessories

PART 50-32

All Models So Equipped

SUBJECT	PAGE
PRE-DELIVERY	
Heater, Air Vents and Air Conditioner Operation	32-1
Storage of Vehicles Equipped with Six Cylinder Compressor Systems	32-1
MAINTENANCE	
Illuminated Door Lock	32-2
Windshield Wipers	32-2
SPECIFICATIONS	32-3

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PRE-DELIVERY

HEATER, AIR VENTS AND AIR CONDITIONER OPERATION

Check for the following items: air leaks at vent openings, around door seals and windows, sufficient heat from floor outlets (approximately 140 degrees F at 32 degrees outside temperature and 50 percent relative humidity), blower operation in each switch position, temperature control and water valve operation, operation of open air ducts and vents, operation of air conditioner function controls for proper air discharge and air conditioning discharge temperatures at the center panel (A/C) register (approximately 68 degrees F at 100 degrees outside temperature and 50 percent relative humidity). Visually check for refrigerant leaks. **NOTE: Ambient temperature must be above 60°F for A/C operation.**

A refrigerant leak will usually appear as an oily residue at the leakage point in the system. The oily residue soon picks up dust or dirt particles from the surrounding air and appears greasy. Through time, this will build up and appear to be a heavy dirt impregnated grease.

Most common leaks are caused by damaged or missing O-ring seals at the various hose and component connections. When these O-rings are replaced, the new O-rings should be well lubricated with refrigerant oil and care should be taken to keep lint from shop towels or rags from contaminating the internal surfaces of the connection.

Missing Service Access Valve Caps (-19D702-) can also cause a refrigerant leak. If this important primary seal (the valve cap) is missing, dirt will enter the area of the A/C charging valve core. When the service hose is attached, the valve depressor in the end of the service hose forces the dirt into the valve seat area and the dirt will destroy the sealing surface of the A/C Charging Valve Core. If tightening the valve core doesn't stop the leak, it should be replaced with a new -19D701- A/C Charging Valve Core. When a Service Access Valve Cap is missing, the protected area of the A/C Charging Valve Core should be cleaned and a new -19D702- Service Access Valve Cap should be installed.

CAUTION: Service access valve caps must be installed finger tight. If tightened with pliers, the sealing surface of the service access valve may be damaged.

STORAGE OF VEHICLES EQUIPPED WITH SIX CYLINDER COMPRESSOR SYSTEMS

A prolonged period (more than two weeks) of storage of vehicles equipped with a six cylinder A/C compressor may, in some instances, cause the compressor to seize and fail to rotate when the compressor clutch is engaged. It is recommended that all vehicles equipped with a six cylinder compressor be checked carefully during pre-delivery to insure the compressor is operating properly.

The compressor clutch rotates clockwise when viewed from the clutch end of the compressor. If the compressor clutch indicates evidence of compressor seizure, perform the following steps to free the seized condition:

1. Turn off the engine and disengage the clutch electrical connector.
2. Inspect the compressor drive belt(s) for damage. Replace if required.
3. Check for proper drive belt tension (110 to 140 ft-lbs).
4. Rotate the clutch counterclockwise three complete revolutions with a clutch spanner wrench (T70P-4067-A) to lubricate the surfaces between the pistons and the swash plate and free up the compressor.
5. Start the engine and turn ON A/C system (ambient temperature must be above 60°F). Connect the clutch electrical connector and check operation of compressor.

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If the compressor does not operate properly, disengage the clutch electrical connector, turn off the engine and repeat step # 4. Restart the engine.

6. Increase engine speed to approximately 2000 rpm; connect the clutch electrical connector and check for proper compressor operation.

If the compressor still does not operate properly, replace the compressor.

MAINTENANCE

WINDSHIELD WIPER ARM AND BLADE ASSEMBLY ADJUSTMENT

Refer to Part 35-60 for adjustment procedures.

WINDSHIELD WIPER BLADE

For maximum wiper effectiveness the windshield and wiper blades must be kept clean. Foreign matter on the windshield or wiper blades may cause streaking or *smearing. If blades do not clean properly, wash the* windshield and wiper blades with undiluted Ford Ultra Clear or mild detergent. Rinse with water while rubbing with a clean cloth. For access to the blades, turn ignition to ACCESSORY with the wipers on. When wiper blades *are approximately vertical, turn ignition OFF.*

If you find cracks or breaks in the rubber, replace wiper blades with new elements.

Caution: Do not allow wiper blades to come in *contact with gasoline, kerosene, paint thinner or* similar solvents.

WINDSHIELD WIPER BLADE REPLACEMENT

Wiper blade replacement intervals will vary with the *amount of use, type of weather, chemical reaction from* road tars or salts and the age of the blades. Be sure that the windshield glass surface is not contaminated with oil, tree sap or other substance which cannot be easily rubbed off.

Generally, if the wiper pattern across the glass is uneven and streaks over clean glass, the blades should be replaced.

Refer to Volume 3 of the Manual for blade *replacement.*

RUBBER BLADE ELEMENT REFILL "T" TYPE

To remove, squeeze latch lock release and pull the blade *element out of the lever jaws (Fig. 1).*

To install, insert the new element through each of the lever jaws. Be sure the element is engaged in all lever jaws.

"A" Type

To remove, depress the latch pin and slide the element out of the yoke jaws (Fig. 1).

To install, slide the element through the yoke jaws and insert the blade frame assembly into the *slots of* the yoke jaws.

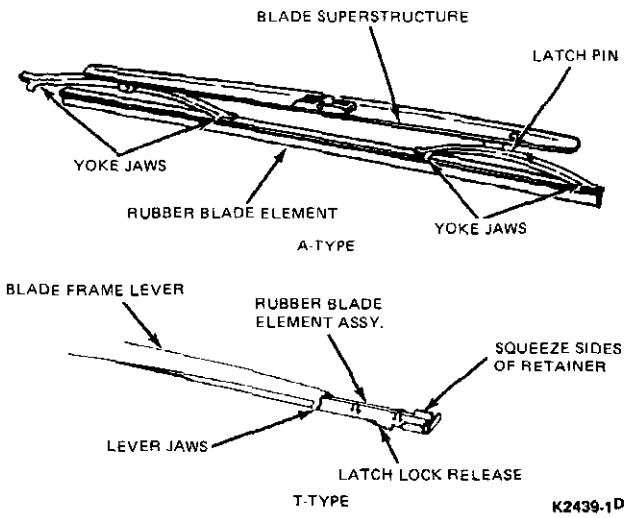


FIG. 1 Windshield Wiper Blade Element Refill

NOTE: If the arm or blade assembly is bent or *distorted, replace the complete blade assembly.*

ILLUMINATED DOOR LOCK

Lubrication:

To lubricate the lock cylinder, use Ford Lock Lubricant D2AZ-19587-A or similar lock lubricants.

Caution: Do not use reduced polyethylene or chloroform base lubricants.

Cleaning:

To clean the plastic lens, use Ford Multi-Purpose Cleaner Concentrate B8A-19523-A or mild soap or household ammonia and water solution. Should the lens become contaminated with oil or grease, clean with *Ford Tar and Road Oil Remover B7A-19520-A or* approved solvents such as Hexane, Dry-Cleaning Naptha, Kerosene or Methanol. Apply all solvents and solution sparingly with a soft absorbent cloth or cotton swab, followed by a clear water rinse. These solvents *are toxic and flammable. Use with adequate ventilation* and away from open flames.

Caution: Do not use abrasive cleaning preparations and other solvents such as benzene, *gasoline, acetone, tetracholoride or denatured* alcohol.

SPECIFICATIONS

Refer to Volume 3 of the Car Shop Manual for all Specifications not contained in this Section.

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Body

PART 50-41

LUBRICATION

To eliminate any binding conditions on pivot and friction points, spray lubricant on luggage compartment hinge pivots, fuel filler door hinges, and on station wagon tailgates and Pinto, Bobcat and Mustang rear door support.

Lubricate lock cylinders, including the ignition lock, by applying lubricant sparingly in key slot and working key in lock.

Spray C4AZ-19584-B or equivalent polyethylene grease on hood and door hinges and hinge checks, and auxiliary hood catch.

To eliminate binding or sluggish mini-vent systems, make sure D3AZ-19553-A lubricant or equivalent is applied before delivery. (See "Windows, Vents and Mini-Vents.")

Work all pivot points several times to be certain lubricant has been worked in.

MAINTENANCE

BODY DRAIN HOLES INSPECTION

Make sure that the drain holes in the doors, rocker panels, and quarter panels are free from obstruction. A small screwdriver can be used to open plugged or partially plugged drain holes.

SPECIFICATIONS

Refer to the Car Shop Manual, Volume 4, for the Body Specifications.

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