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# 1967

# COUGAR
# FAIRLANE
# FALCON
# MERCURY
# INTERMEDIATE
# MUSTANG

## SHOP MANUAL

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1967 Cougar, Fairlane, Falcon, Mercury and Mustang Shop Manual
ISBN: 0-9673211-4-X
EAN: 978-0-9673211-4-1

***Forel Publishing Company, LLC***
***3999 Peregrine Ridge Ct.***
***Woodbridge, VA 22192***
***Email address: webmaster@FordManuals.com***
***Website: http://www.FordManuals.com***

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1967

# COUGAR
# FAIRLANE
# FALCON
# MERCURY-
# INTERMEDIATE
# MUSTANG

Ford SERVICE PUBLICATIONS

FIRST PRINTING—MARCH, 1967
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## GROUP INDEX


| | |
|---|---|
| VEHICLE IDENTIFICATION | 1 |
| BRAKES | 2 |
| SUSPENSION, STEERING, WHEELS AND TIRES | 3 |
| REAR AXLE | 4 |
| DRIVE SHAFT AND CLUTCH | 5 |
| MANUAL SHIFT TRANSMISSION | 6 |
| AUTOMATIC TRANSMISSION | 7 |
| ENGINE | 8 |
| IGNITION SYSTEM | 9 |
| FUEL SYSTEM | 10 |
| COOLING SYSTEM | 11 |
| EXHAUST SYSTEM | 12 |
| CHARGING SYSTEM | 13 |
| STARTING SYSTEM | 14 |
| LIGHTING SYSTEM, HORNS AND INSTRUMENTS | 15 |
| VENTILATING, HEATING AND ACCESSORIES | 16 |
| BODY, DOORS AND WINDOWS | 17 |
| TRIM, SEATS AND CONVERTIBLE TOP | 18 |
| SCHEMATICS | 19 |


SPECIFICATIONS AND SPECIAL SERVICE TOOLS AT END OF EACH GROUP

# FOREWORD

*This shop manual provides the Service Technician with information for the proper servicing of the 1967 Cougar, Fairlane, Falcon, Mercury Intermediate , Comet and Mustang cars.*

*The maintenance schedule and procedures for maintenance operations are published in the 1967 Passenger Car Maintenance and Lubrication Manual.*

*The information in this manual is grouped according to the type of work being performed, such as diagnosis and testing, frequently performed adjustments and repairs, in-vehicle adjustments, overhaul, etc. Specifications and recommended special tools are included.*

*Refer to the opposite page for important vehicle identification data.*

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

Ford SERVICE PUBLICATIONS

# Vehicle Identification

GROUP 1

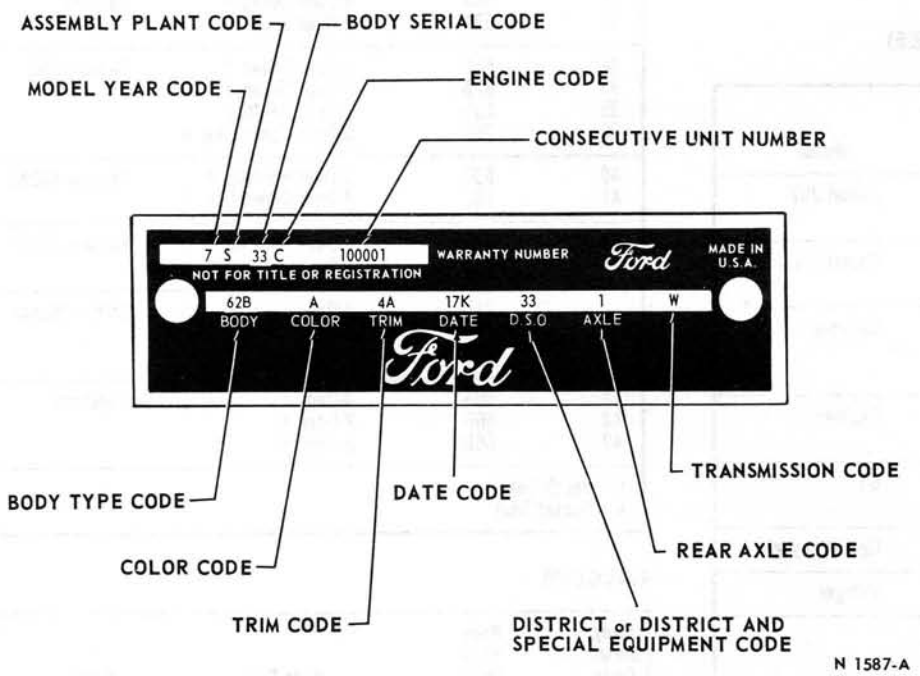



*FIG. 1*—Typical Warranty Plate—Fairlane Shown

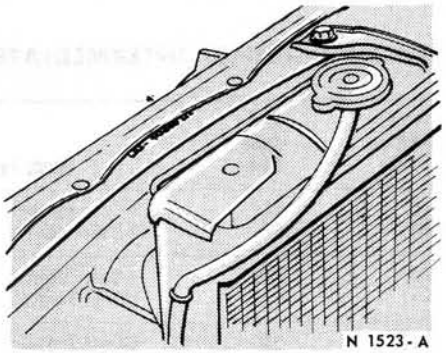



*FIG. 2*—Mercury, Comet (Intermediate- Size) Identification Number Location

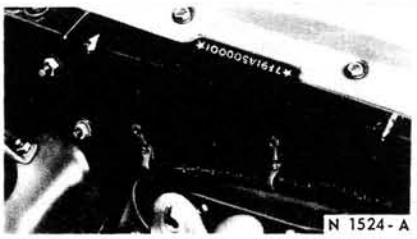



*FIG. 3*—Cougar Identification Number Location

*FIG. 4*—Mustang Identification Number Location

## VEHICLE WARRANTY NUMBER

The vehicle warranty number is the first line of numbers and letters appearing on the Warranty Plate (Fig. 1). 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 group of six digits remaining on the first line indicate the Consecutive Unit Number.

## VEHICLE DATA

The vehicle data appears on the second or lower line on the Warranty Plate. The first two numbers and a letter identify the Body Style. A letter or a number appears next indicating the Exterior Paint Color followed by a number-letter combination designating the Interior Trim. To the right of this code appears the Date Code indicating the date the car was manufactured. A two-digit number next 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. The final two spaces indicate the Rear Axle Ratio (numbers for regular axles, letters for locking-types) and the Transmission type (numbers for manual, letters for automatic).

## OFFICIAL VEHICLE IDENTIFICATION NUMBERS

The official Vehicle identification Numbers for titles and registration purposes are stamped in the following locations:

Mercury, Comet (Intermediate-size), Fairlane, Falcon – On the top surface of the radiator and front fender apron support (near the radiator fill cap) Fig. 2.

Cougar – On the top upper flange of the left front fender apron (Fig. 3).

**MUSTANG** – On the top upper flange of the left front fender apron (Fig. 4).

## MODEL YEAR CODE

| |
|---|
| The number 7 designates 1967. |

## BODY SERIAL AND STYLE CODES

The two-digit numeral which follows the assembly plant code identifies the body series. This two-digit number is used in conjunction with the Body Style Code, in the Vehicle Date, which consists of a two-digit number with a letter suffix. The following chart lists the Body Serial Codes, Body Style Codes and the model.

### MERCURY—COMET (INTERMEDIATE—SIZE)

| Body Serial Code | Body Style Code | Body Type | Model |
|---|---|---|---|
| 02 | 54A | 4-Door Sedan ① | Comet 202 |
| 01 | 62A | 2-Door Sedan ① | |
| 08 | 54B | 4-Door Sedan ① | Comet Capri |
| 07 | 63B | 2-Door Hardtop ① | |
| 10 | 54D | 4-Door Sedan ① | Caliente |
| 11 | 63D | 2-Door Hardtop ① | |
| 12 | 76D | 2-Door Convertible | |
| 15 | 63E | 2-Door Hardtop ② | Cyclone |
| 16 | 76C | 2-Door Convertible ② | |
| 17 | 63H | 2-Door Hardtop ② | GT |
| 18 | 76H | 2-Door Convertible ② | |
| 03 | 71A | 4-Door 6 Passenger | Comet Voyager |
| 08 | 71C | 4-Door 6 Passenger | Villager |

① Bench Seat
② Bucket Seat

### COUGAR

| Body Serial Code | Body Style Code | Body Type |
|---|---|---|
| 91 | 65A | 2-door Hardtop (Bucket Seat) |
| 91 | 65B | 2-Door Hardtop (Bucket Seat) ① |
| 91 | 65D | 2-Door Hardtop (Bench Seat) ① |
| 91 | 65C | 2-Door Hardtop (Bench Seat) |

① Luxury Model

### MUSTANG

| Body Serial Code | Body Style Code | Body Type |
|---|---|---|
| 02 | 63A | 2-Door Fastback ① |
| 01 | 65A | 2-Door Hardtop ① |
| 03 | 76A | 2-Door Convertible ① |
| 02 | 63B | 2-Door Fastback ① ③ |
| 01 | 65B | 2-Door Hardtop ① ③ |
| 03 | 76B | 2-Door Convertible ① ③ |
| 01 | 65C | 2-Door Hardtop ② |
| 03 | 76C | 2-Door Convertible ② |

① Bucket Seat
② Bench Seat
③ Luxury Model

## BODY SERIAL AND STYLE CODES—(continued)

### FAIRLANE

| Body Serial Code | Body Style Code | Body Type | Model |
|---|---|---|---|
| 31 | 54A | 4-Door Sedan ① | Fairlane |
| 30 | 62A | 2-Door Sedan ① | |
| 34 | 54B | 4-Door Sedan ① | Fairlane 500 |
| 33 | 62B | 2-Door Sedan ① | |
| 35 | 63B | 2-Door Hardtop ① | |
| 36 | 76B | 2-Door Convertible ① | |
| 40 | 63C | 2-Door Hardtop ② | Fairlane 500XL |
| 41 | 76C | 2-Door Convertible ② | |
| 42 | 63D | 2-Door Hardtop ② | Fairlane 500GT |
| 43 | 76D | 2-Door Convertible ② | |
| 32 | 71D | 4-Door | Station Wagon |
| 37 | 71B | 4-Door | |
| 38 | 71E | 4-Door | |
| 47 | 66A | 2-Door ① | Ranchero |
| 48 | 66B | 2-Door ① | |
| 49 | 66D | 2-Door ② | |

① Bench Seat
② Bucket Seat

### FALCON

| Body Serial Code | Body Style Code | Body Type | Model |
|---|---|---|---|
| 10 | 62A | 2-Door Club Coupe ① | Standard |
| 11 | 54A | 4-Door Sedan ① | |
| 20 | 62B | 2-Door Club Coupe ① | Futura |
| 21 | 54B | 4-Door Sedan ① | |
| 22 | 62C | 2-Door ② | Sport Coupe |
| 12 | 71A | 4-Door | Wagon (Std.) |
| 23 | 71B | 4-Door | Wagon (Deluxe) |

① Bench Seat
② Bucket Seat

### CONSECUTIVE UNIT NUMBER

Each model year, each assembly plant begins production with number 500001 (Mercury, Comet or Cougar) or 100001 (Fairlane, Falcon, Mustang) and continues on for each unit built.

### ENGINE CODES

| Code | Type |
|---|---|
| U | 6 Cyl. 170 Cu. In. (1V) |
| T | 6 Cyl. 200 Cu. In. (1V) |
| 2 | 6 Cyl. ① 200 Cu. In. (1V) |
| C | 8 Cyl. 289 Cu. In. (2V) |
| 3 | 8 Cyl. ① 289 Cu. In. (2V) |
| A | 8 Cyl. 289 Cu. In. (4V) Prem. Fuel |
| K | 8 Cyl. 289 Cu. In. (4V) Hi-Perf. |
| Y | 8 Cyl. 390 Cu. In. (2V) |
| H | 8 Cyl. 390 Cu. In. (2V) |
| S | 8 Cyl. 390 Cu. In. (4V) |
| W | 8 Cyl. 427 Cu. In. (4V) Hi-Perf. |
| R | 8 Cyl. 427 Cu. In. (8V) Hi-Perf. |

① Low Compression

## TRANSMISSION CODES

| Code | Type |
|---|---|
| 1 | 3-Speed Manual |
| 2 | Overdrive |
| 3 | 3-Speed Manual |
| 5 | 4-Speed Manual |
| W | Automatic (C4) |
| U | Automatic (C6) |

## REAR AXLE RATIO CODES

A number designates a conventional axle, while a letter designates a locking differential

| Code | Ratio |
|---|---|
| 1 | 3.00:1 |
| 2 | 2.83:1 |
| 3 | 3.20:1 |
| 4 | 3.25:1 |
| 5 | 3.50:1 |
| 6 | 2.80:1 |

| Code | Ratio |
|---|---|
| A | 3.00:1 |
| C | 3.20:1 |
| D | 3.25:1 |
| E | 3.50:1 |

## DATE CODES

A number signifying the date precedes the month code letter. A second-year code letter will be used if the model exceeds 12 months.

| Month | Code First Year | Code Second Year |
|---|---|---|
| January | A | N |
| February | B | P |
| March | C | Q |
| April | D | R |
| May | E | S |
| June | F | T |
| July | G | U |
| August | H | V |
| September | J | W |
| October | K | X |
| November | L | Y |
| December | M | Z |

## ASSEMBLY PLANT CODES

| Code Letter | | Code Letter | |
|---|---|---|---|
| A | Atlanta | L | Michigan Truck |
| B | Oakville (Canada) | N | Norfolk |
| C | Ontario Truck | P | Twin Cities |
| D | Dallas | R | San Jose |
| E | Mahwah | S | Pilot Plant |
| F | Dearborn | T | Metuchen |
| G | Chicago | U | Louisville |
| H | Lorain | W | Wayne |
| J | Los Angeles | Y | Wixom |
| K | Kansas City | Z | St. Louis |

## DISTRICT CODES (DSO)

Units built on a Domestic Special Order, Foreign Special Order, or other special orders will have the complete order number in this space. Also to appear in this space is the two-digit code number of the District which ordered the unit. If the unit is a regular production unit, only the District code number will appear.

## FORD

| Code | District |
|---|---|
| 11 | Boston |
| 13 | New York |
| 15 | Newark |
| 16 | Philadelphia |
| 17 | Washington |
| 21 | Atlanta |
| 22 | Charlotte |
| 24 | Jacksonville |
| 25 | Richmond |
| 27 | Cincinnati |
| 28 | Louisville |
| 32 | Cleveland |
| 33 | Detroit |
| 34 | Indianapolis |
| 35 | Lansing |
| 37 | Buffalo |
| 38 | Pittsburgh |
| 41 | Chicago |
| 42 | Fargo |
| 43 | Milwaukee |
| 44 | Twin Cities |
| 45 | Davenport |
| 51 | Denver |
| 52 | Des Moines |
| 53 | Kansas City |
| 54 | Omaha |
| 55 | St. Louis |
| 61 | Dallas |
| 62 | Houston |
| 63 | Memphis |
| 64 | New Orleans |
| 65 | Oklahoma City |
| 71 | Los Angeles |
| 72 | San Jose |
| 73 | Salt Lake City |
| 74 | Seattle |
| 75 | Phoenix |
| 81 | Ford of Canada |
| 83 | Government |
| 84 | Home Office Reserve |
| 85 | American Red Cross |
| 89 | Transportation Services |
| 90-99 | Export |

## MERCURY

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

## EXTERIOR PAINT COLOR CODES

| Code | M-30-J M-32-J | Color |
|---|---|---|
| A | 1724-A | Black |
| B | 1734-A | Lt. Aqua |
| E | 2045-A | Med. Beige Met. |
| I | 2041-A | Lime Met. |
| K | 1903-A | Dk. Blue Met. |
| M | 1619-A | White |
| Q | 1624-A | Med. Blue Met. |
| T | 2008-A | Red |
| V | 2066-A | Bronze Met. |
| W | 1908-A | Med. Aqua Met. |
| X | 1632-A | Maroon Met. |
| Y | 2039-A | Dk. Green Met. |
| Z | 1915-A | Med. Gold Met. |
| 2 | 1633-A | Yellow |
| 4 | 1901-A | Med. Gray Met. |
| 6 | 1631-A | Lt. Beige |
| 8 | 1955-A | Yellow |

## INTERIOR TRIM CODES

| Code | Trim Schemes |
|---|---|
| 1B | Blue Cloth and Blue Vinyl |
| 1D | Red Cloth and Red Vinyl |
| 1K | Aqua Cloth and Aqua Vinyl |
| 1U | Parchment Cloth and Parchment Vinyl W/Black |
| 2A | Black Vinyl |
| 2B | Blue Vinyl |
| 2D | Red Vinyl |
| 2F | Saddle Vinyl |
| 2G | Ivy Gold Vinyl |
| 2K | Aqua Vinyl |
| 2U | Parchment Vinyl W/Black |
| 3B | Blue Cloth and Blue Vinyl |
| 3G | Ivy Gold Cloth and Ivy Gold Vinyl |
| 3K | Aqua Cloth and Aqua Vinyl |
| 3U | Parchment Cloth and Parchment Vinyl W/Black |
| 4A | Black Vinyl |
| 4B | Blue Vinyl |
| 4D | Red Vinyl |
| 4G | Ivy Gold Vinyl |
| 4K | Aqua Vinyl |
| 4U | Parchment Vinyl |
| 5A | Black Cloth and Black Vinyl |
| 5B | Dark Blue Cloth and Blue Vinyl |
| 5K | Aqua Cloth and Aqua Vinyl |
| 5U | Parchment Cloth and Parchment Vinyl W/Saddle |
| 6A | Black Vinyl |
| 6B | Dark Blue Vinyl |
| 6D | Red Vinyl |
| 6F | Saddle Vinyl |
| 6G | Dk. Ivy Gold Vinyl |
| 6K | Aqua Vinyl |
| 6U | Parchment Vinyl |
| 7A | Black Vinyl |
| 7B | Blue Vinyl |
| 7U | Parchment Cloth and Parchment Vinyl |
| 8A | Black Vinyl |
| 8B | Blue Vinyl |
| 8D | Red Vinyl |
| 8F | Saddle Vinyl |

## INTERIOR TRIM CODES–(continued)

| Code | Trim Schemes |
|---|---|
| 8G | Ivy Gold Vinyl |
| 8K | Aqua Vinyl |
| 8U | Parchment Vinyl W/Black |
| 9A | Black Cloth and Black Vinyl |
| 9B | Dk. Blue Cloth and Dk. Blue Vinyl |
| 9D | Dk. Red Cloth and Dk. Red Vinyl |
| 9K | Aqua Cloth and Aqua Vinyl |
| 9U | Parchment Cloth and Parchment Vinyl W/Black |
| FA | Parchment Vinyl W/Black |
| FB | Parchment Vinyl W/Blue |
| FD | Parchment Vinyl W/Red |
| FG | Parchment Vinyl W/Ivy Gold |
| FK | Parchment Vinyl W/Aqua |
| GA | Black Vinyl W/Parchment |
| GB | Blue Vinyl W/Parchment |
| GD | Red Vinyl W/Parchment |
| GG | Ivy Gold Vinyl W/Parchment |
| GF | Saddle Vinyl W/Parchment |
| GK | Aqua Vinyl W/Parchment |
| LB | Red Vinyl |
| LD | Blue Vinyl |
| LU | Parchment Cloth and Parchment Vinyl W/Black |
| OU | Parchment Vinyl |
| UA | Parchment Vinyl W/Black |
| UB | Parchment Vinyl W/Blue |
| UD | Parchment Vinyl W/Red |
| UF | Parchment Vinyl W/Saddle |
| UG | Parchment Vinyl W/Ivy Gold |
| UK | Parchment Vinyl W/Aqua |

# Brakes

GROUP 2


**PART 2-1** PAGE
General Brake Service ..... 2-1
**PART 2-2**
Brake System ..... 2-9
**PART 2-3** PAGE
Specifications ..... 3-34


# PART 2-1— *General Brake Service*


Section Page
1 Diagnosis and Testing ..... 2-1
Brake System Tests ..... 2-1
Road Test ..... 2-3
2 Common Adjustments and Repairs ..... 2-3
Parking Brake Linkage Adjustment ..... 2-3
Power Brake Master Cylinder Push Rod Adjustment ..... 2-4
Hydraulic System Bleeding and Centralizing of the Differential Valve ..... 2-4
3 Cleaning and Inspection ..... 2-6
Disc (Front) Brakes ..... 2-6
Rear Brakes ..... 2-6


## 1 DIAGNOSIS AND TESTING

### BRAKE SYSTEM TESTS

#### BRAKE FLUID LEVEL AND HYDRAULIC SYSTEM

1. Always check the fluid level in the brake master cylinder reservoirs before performing the test procedures. If the fluid level is not within 1/4 to 1/2 inch of the top of the master cylinder reservoirs, add the specified brake fluid. Add Rotunda Brake Fluid — Extra Heavy Duty — Part Number C6AZ-19542-A (ESA-M6C25-A) or equivalent for all disc brake applications and Rotunda Brake Fluid — Heavy Duty — Part Number B7AZ-19542-A, R-103-A or equivalent for power drum or standard drum applications. **The disc brake extra heavy duty brake fluid is colored blue for identification purposes. Do not mix low temperature brake fluids with the specified disc brake fluid.**

#### DUAL MASTER CYLINDER BRAKE SYSTEM

1. Turn the ignition switch to the ACC or ON position. If the light on the brake warning lamp remains on, the condition may be caused by a defective switch, grounded switch wires or the differential pressure valve is not centered. Centralize the differential pressure valve as outlined under Hydraulic System Bleeding and Centralizing of the Differential Valve in this section of the manual. If the warning light remains on, check the switch connector and wire for a grounded condition and repair or replace the wire assembly. If the condition of the wire is good, replace the brake warning lamp switch.

2. Turn the ignition switch to the start position. If the brake warning lamp does not light, check the light and wiring for defects and replace or repair wiring.

3. If the brake warning lamp does not light when a pressure differential condition exists in the brake system, the warning lamp may be burned out, the warning lamp switch is inoperative or the switch to lamp wiring has an open circuit. Check the bulb and replace it, if required. Check the switch to lamp wires for an open circuit and repair or replace them, if required. If the warning lamp still does not light, replace the switch.

#### BRAKE PEDAL FREE HEIGHT AND TRAVEL MEASUREMENTS

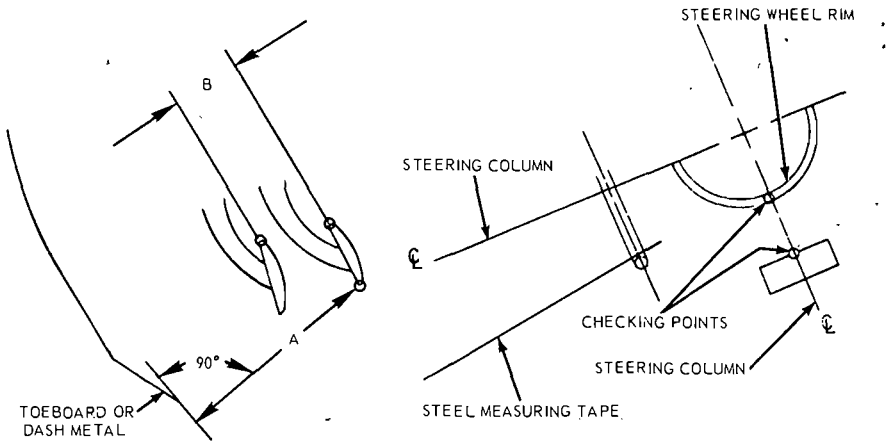
With the engine running for full power brake operation, measure the brake pedal free height, and check the brake pedal travel with the use of the Brake Pedal Pressure Gauge, Tool WRE-500-50 as follows:

**Brake Pedal Free Height Measurement**

1. Insert a slender, sharp pointed prod through the carpet and sound deadner to the dash panel metal and measure the distance to the brake pedal (Fig. 1).

2. If the position of the pedal is not within specification, check the brake pedal linkage for missing bushings or loose attaching bolts and replace them, if required.

3. If the pedal free height is still out of specification, check the brake pedal booster push rod (if so equipped) or master cylinder to be sure the correct parts are installed. Replace the defective parts as necessary.




| VEHICLE | TYPE | PEDAL FREE HEIGHT A | PEDAL TRAVEL B |
|---|---|---|---|
| FALCON–COMET–FAIRLANE | NON-POWER DRUM | 8.03 6.81 | 2.74 |
| FALCON–COMET–FAIRLANE | POWER DRUM | 5.04 3.74 | 1.82 |
| FALCON–COMET–FAIRLANE | POWER DISC | 6.39 4.90 | 2.08 |
| FALCON–COMET–FAIRLANE | NON-POWER DISC | 8.03 6.81 | 2.08 |
| MUSTANG–COUGAR | NON-POWER DRUM | 6.98 6.03 | 2.68 |
| MUSTANG–COUGAR | POWER DRUM | 5.61 4.60 | 1.82 |
| MUSTANG–COUGAR | POWER DISC | 5.61 4.60 | 1.82 |

NOTE: A DIMENSION TO BE MEASURED TO SHEET METAL

B DIMENSION TO BE MEASURED PARALLEL TO THE VERTICAL CENTERLINE OF THE STEERING COLUMN WITH A 50 POUND LOAD APPLIED TO THE CENTERLINE OF THE BRAKE PEDAL PAD. (CHECKS ON POWER BRAKE VEHICLES MADE WITH ENGINE RUNNING) H1551-A

*FIG. 1—Brake Pedal Height and Travel Measurements*

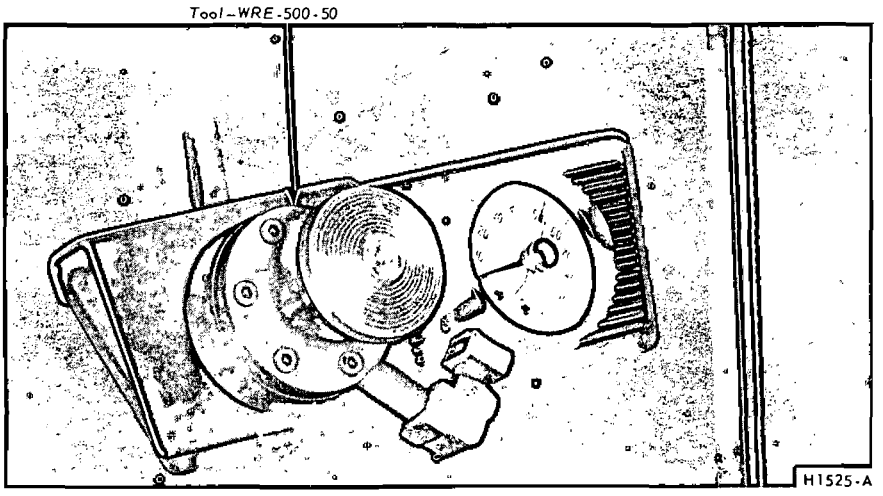



*FIG. 2—Brake Pedal Effort Gauge Installed — Typical*

### Brake Pedal Travel Measurement

**1.** Install a Brake Pedal Pressure Gauge on the brake pedal pad (Fig. 2).

**2.** Hook a steel measuring tape to the brake pedal as shown in Fig. 1. Measure and record the distance from the brake pedal free height position to the reference point, which is at the six o'clock position on the steering wheel rim.

**3.** With the steel tape still hooked to the brake pedal depress the brake by pressing downward on the brake pedal effort gauge. Apply a 50 pound load to the center of the pedal by observing the pressure gauge, and measure the distance from the brake pedal to the fixed reference point on the steering wheel rim, parallel to the centerline of the steering column.

**4.** The difference between the brake pedal free height and the depressed pedal measurement under a 50 pound load should be within the specified maximum pedal travel service specification B in Fig. 1.

**5.** If the pedal travel is more than the specified maximum shown in Fig. 1, dimension B, make several sharp reverse stops (equivalent to 50 pounds pedal pressure) with a forward stop before each. Move the car in reverse and forward for a distance of approximately ten feet; then apply the brakes sharply and hold the brake pedal down until the car is completely stopped. This will actuate the brake self-adjusters. If these stops do not bring the brake pedal travel within specification, make several additional forward and reverse stops as outlined above.

**6.** If the second series of stops do not bring the brake pedal travel within specification, remove the brake drums and check the brake adjusters to make sure they are functioning. Check the brake linings for wear or damage. Repair or replace all worn or damaged parts and non-functioning adjusters. Adjust the brake lining outside diameter to the approximate inside diameter of the brake drum with Rotunda Tool HRE 8650 (Figs. 11 and 12, Part 2-2).

**7.** If all the brake adjusters, brake drums and linings are functional and the brake pedal travel is not within specifications, check the pedal linkage for missing bushings, or loose attachments. Bleed the brake and centralize the differential valve.

### POWER BRAKE FUNCTIONAL TEST

**1.** With the transmission in neutral, stop the engine and apply the parking brake. Depress the brake pedal several times to exhaust all vacuum in the system.

**2.** With the engine shut off, depress the brake pedal and hold it in the applied position. If the pedal gradually falls away under this pressure, the hydraulic system is leaking. Check all tubing, hoses, calipers (if so equipped), wheel cylinders and connections for leaks.

If the brake pedal movement feels spongy, bleed the hydraulic system to remove air from the system. Refer to Hydraulic System Bleeding, Part 1, Section 2. Also, check for leaks or insufficient fluid.

**3.** With the engine shut off and all vacuum in the system exhausted, depress the pedal and hold it in the applied position. Start the engine. If the vacuum system is operating, the pedal will tend to fall away under foot pressure and less pressure will

be required to hold the pedal in the applied position. If no action is felt, the vacuum booster system is not functioning.

### LOCKED WHEEL BRAKE

Should one of the wheel brakes be locked and the car must be moved, open the bleeder screw long enough to let out a few drops of brake fluid. **This bleeding operation will release the brakes but will not correct the cause of trouble.**

### PARKING BRAKE

Visually check the operation of the parking brake linkage as the parking brake controls are moved to the applied position. Then, check the operation of the brake linkage when the parking brake controls are moved to the released position. These checks should indicate whether the manual parking brake control linkage is operating properly or requires repair or adjustment due to inability of the parking brake to hold against moderate vehicle movement.

### ROAD TEST

**A road test should only be conducted when the operator is sure the brakes will stop the vehicle.**

During a road test, apply the vehicles brakes at a road speed of 20 mph for all problem conditions listed in Figs. 11 and 12 with the exception of those resolved in the Brake System Tests and brake chatter. To check for brake chatter or surge, apply the brakes lightly at 50 mph. For each of the symptoms encountered, check and eliminate the causes which are listed in Figs. 11 and 12.

If the road test reveals one or more problem conditions listed in Figs. 11 and 12, correct all malfunctions of the vacuum system, brake booster and hydraulic system prior to removing brake drums, brake calipers (if so equipped), brake shoes and linings or backing plates.

## 2 COMMON ADJUSTMENTS AND REPAIRS

### PARKING BRAKE LINKAGE ADJUSTMENT

#### MUSTANG — COUGAR

Check the parking brake cables when the parking brakes are fully released. If the cables are loose, adjust them as follows:

1. Fully release the parking brake by turning the handle counterclockwise and pushing it inward.
2. Pull the parking brake handle outward to the third notch from its normal released position.
3. Raise the vehicle. Remove the wheel cover. Install Tool T66L-4204-L on the rear wheel (Fig. 3).
4. Turn the locking adjustment nut forward against the cable guide on the equalizer (Fig. 4) until there is 100 ft-lbs break-away torque at the rear wheel when turning the rear wheels in the direction of forward rotation with a torque wrench (Fig. 3). **The torque measurement must be made relative to the centerline of the wheel.**
5. Release the parking brake and make sure the brake shoes return to the fully released position and no drag is felt when turning the rear wheels.
6. Remove Tool T66L-4204-L. Install the wheel attaching bolts and torque them to specification. Install the wheel cover. Lower the vehicle.

#### COMET—FALCON—FAIRLANE

Check the parking brake cables when the brakes are fully released.

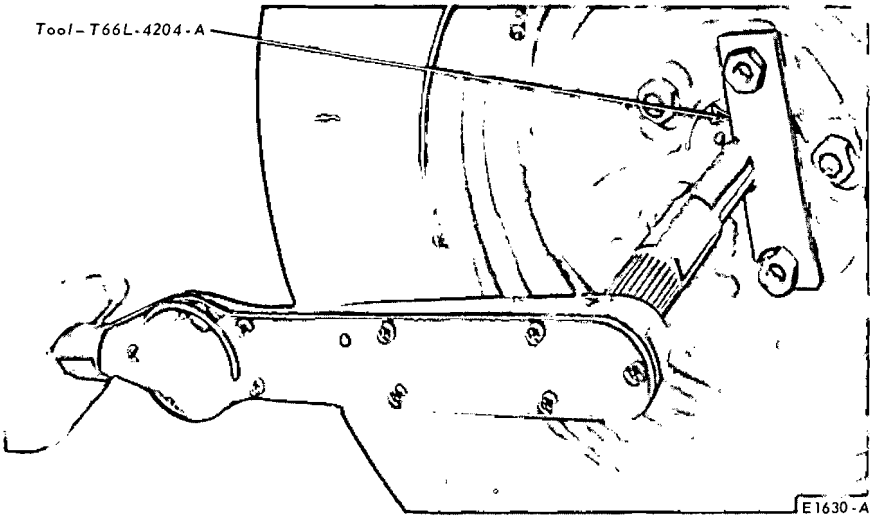



*FIG. 3*— Checking Parking Brake Break-Away Torque

If the cables are loose, adjust them as follows:

1. Fully release the parking brake pedal.
2. Raise the vehicle. Loosen the equalizer lock nut (Fig. 5) and turn the nut forward against the cable guide on the equalizer until there is 22 to 27 pounds tension on the left rear cable or there is 100 ft-lbs break-away torque when turning the rear wheels in the direction of forward rotation with a torque wrench and Tool T66L-4204-L as shown in Fig. 3. **The torque measurement must be made relative to the centerline of the wheel.** Tighten the lock nut.
3. **Make sure there is no drag when turning the rear wheels.**
4. Lower the vehicle. Remove the torque wrench and Tool T66L-4204-L, if required. Install the wheel attaching nuts and torque them to specification. Install the wheel cover.

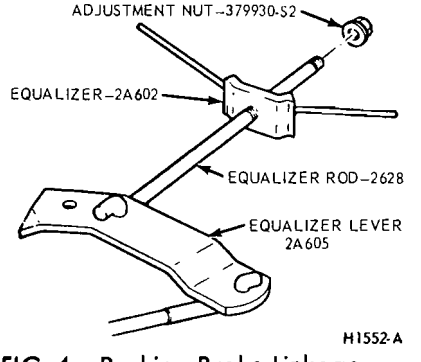



*FIG. 4*—Parking Brake Linkage Adjustment — Mustang and Cougar

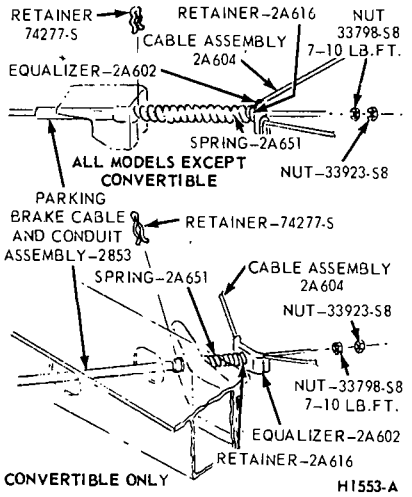



*FIG. 5*—Parking Brake Linkage Adjustment — Comet, Fairlane and Falcon

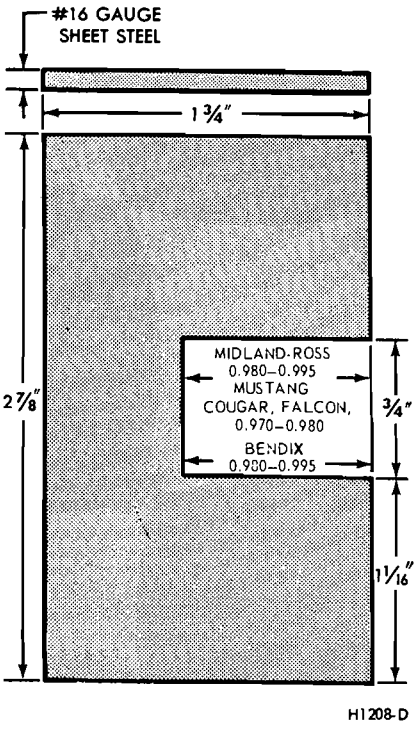



*FIG. 6*—Push Rod Gauge Dimensions

## POWER BRAKE MASTER CYLINDER PUSH ROD ADJUSTMENT

The push rod is provided with an adjustment screw to maintain the correct relationship between the booster control valve plunger and the master cylinder pistons. Failure to maintain this relationship will prevent the master cylinder piston from completely releasing hydraulic pressure and can cause the brakes to drag, or cause excessive brake pedal travel.

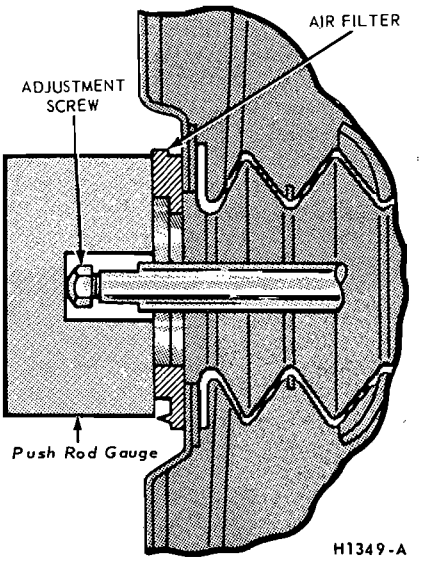



*FIG. 7*—Push Rod Adjustment — Midland-Ross

To check the adjustment of the screw, fabricate a gauge of the dimension shown in Fig. 6. Then place the gauge against the master cylinder mounting surface of the booster body as shown in Figs. 7 or 8. The push rod screw should be adjusted so that the end of the screw just touches the inner edge of the slot in the gauge. Do not set up side forces on the push rod. Side forces may break the valve plunger.

**This is an approximate adjustment only.** The push rod should not move more than 0.015 inch as it contacts the master cylinder piston. No movement (exact contact) is ideal.

## HYDRAULIC SYSTEM BLEEDING AND CENTRALIZING OF THE DIFFERENTIAL VALVE

When any part of the hydraulic system has been disconnected for repair or replacement, air may enter the system and cause spongy pedal action. Bleed the hydraulic system after it has been properly connected, to be sure that all air is expelled.

### MANUAL BLEEDING

The primary and secondary (front and rear) hydraulic brake systems are individual systems and are bled separately. Bleed the longest line first on the individual system being serviced. **During the complete bleeding operation, DO NOT allow the reservoir to run dry.** Keep the master cylinder reservoirs filled with Rotunda Fluid — Extra Heavy Duty — Part Number C6AZ-19542-A (ESA-M6C25-A). **The disc brake extra**

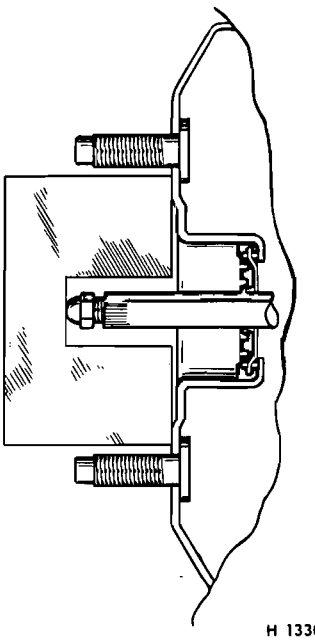



*FIG. 8*—Push-Rod Adjustment — Bendix

**heavy duty brake fluid is colored blue for identification purposes. Do not mix low temperature brake fluids with the specified fluid during the bleeding operations. Never re-use brake fluid which has been drained from the hydraulic system.**

1. Loosen the bleed screw located on the side of the master cylinder. **Do not use the secondary piston stop screw, located on the bottom of the master cylinder to bleed the brake system. Loosening or removing this screw could result in damage to the secondary piston or stop screw.**

2. To bleed the secondary (rear) brake system, position a suitable 3/8 inch box wrench (Fig. 9) on the bleeder fitting on the brake wheel cylinder. Attach a rubber drain tube to the bleeder fitting. **The end of the tube should fit snugly around the bleeder fitting.**

3. Submerge the free end of the tube in a container partially filled with clean brake fluid, and loosen the bleeder fitting approximately 3/4 turn.

4. Push the brake pedal down slowly through its full travel. Close the bleeder fitting, then return the pedal to the fully-released position. Repeat this operation until air bubbles cease to appear at the submerged end of the bleeder tube.

5. When the fluid is completely free of air bubbles, close the bleeder fitting and remove the bleeder tube.

6. Repeat this procedure at the brake wheel cylinder on the opposite side. Refill the master cylinder reservoir after each wheel cylinder is bled

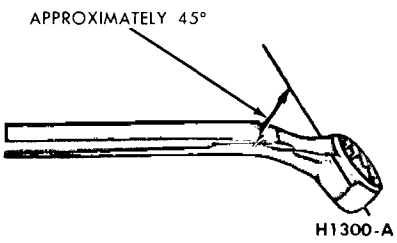



*FIG. 9— Wrench for Bleeding Brake Hydraulic System*

and install the master cylinder cover and gasket. **Be sure the diaphragm type gasket is properly positioned in the master cylinder cover. When the bleeding operation is completed, the fluid level should be filled to within 1/4 to 1/2 inch from the top of the reservoirs.**

7. If the primary (front brake) system is to be bled, remove the front wheel covers, and the front wheel and tire assemblies to gain access to the bleeder fittings on the disc brake calipers. Repeat steps 2 through 6 at the right front disc brake caliper and ending at the left front disc brake caliper.

8. Be sure that the front brake pistons are returned to their normal positions and that the shoe and lining assemblies are properly seated by depressing the brake pedal several times until normal pedal height exists. Install the front wheel and tire assemblies on the front wheels, and torque the mounting bolts to specification. Install the wheel covers.

9. Centralize the pressure differential valve. Refer to the Centralizing the Pressure Differential Valve Procedures which follow.

## PRESSURE BLEEDING

Bleed the longest lines first. The bleeder tank should contain enough new Rotunda Brake Fluid to complete the bleeding operation. Use Rotunda Brake Fluid — Extra Heavy Duty — Part Number C6AZ-19542-A (ESA-M6C25-A) or equivalent for all disc brake applications and Rotunda Brake Fluid — Heavy Duty — Part Number B7AZ-19542-A, R103-A or equivalent for power drum or standard drum applications. **The brake fluid is colored blue for identification purposes. Do not mix low temperature brake fluid with the specified disc brake fluid during the bleeding operations. Never re-use brake fluid that has been drained from the hydraulic system.** The tank should be charged with approximately 10 to 30 pounds of air pressure. **Never exceed 50 pounds pressure.**

1. Clean all dirt from the master cylinder reservoir cover.

2. Remove the master cylinder reservoir cover and rubber gasket, and fill the master cylinder reservoir with the specified brake fluid. Install the pressure bleeder adapter tool to the master cylinder, and attach the bleeder tank hose to the fitting on the adapter.

**Master cylinder pressure bleeder adapter tools can be obtained from the various manufacturers of pressure bleeding equipment.** Follow the instructions of the manufacturer when installing the adapter.

3. Loosen the primary and secondary tube nuts at the master cylinder and bleed the master cylinder until the fluid flow is free of air bubbles, then tighten the tube nuts to the specified torque. Refer to Figs. 20 and 21, Part 2-2. **Do not overtighten the nuts.**

4. If the rear wheel cylinders and the secondary brake system is to be bled, position a 3/8 inch box wrench (Fig. 9) on the bleeder fitting on the right rear brake wheel cylinder. Attach a bleeder tube to the bleeder fitting. **The end of the tube should fit snugly around the bleeder fitting.**

5. Open the valve on the bleeder tank to admit pressurized brake fluid to the master cylinder reservoir.

6. Submerge the free end of the tube in a container partially filled with clean brake fluid, and loosen the bleeder fitting.

7. When air bubbles cease to appear in the fluid at the submerged end of the bleeder tube, close the bleeder fitting and remove the tube.

8. Repeat steps 3 through 7 at the left wheel cylinder of the secondary system being bled.

9. **If the primary (front brake) system is to be bled, remove the front wheel covers, and the front wheel and tire assemblies to gain access to the bleeder fittings on the disc brake calipers.** Repeat steps 4 through 7, starting at the right front disc caliper and ending at the left front disc caliper.

10. If the vehicle contains drum-type front brakes and the primary (front) brake system is to be bled, repeat steps 4 through 7, starting at the right front wheel cylinder and ending at the left wheel cylinder.

11. When the bleeding operation is completed, close the bleeder tank valve and remove the tank hose from the adapter fitting.

12. On disc brake equipped vehicles, be sure that the front brake pistons are returned to their normal positions and that the shoe and lining assemblies are properly seated by depressing the brake pedal several times until normal pedal height is obtained. Install the front wheel and tire assemblies on the front wheels, and torque the mounting bolts to specification. Install the wheel covers.

13. Remove the Pressure Bleeder Adapter Tool. Fill the master cylinder reservoirs to within 1/4 to 1/2 inch from the top. Install the master cylinder cover and gasket. **Be sure the diaphragm-type gasket is properly positioned in the master cylinder cover.**

14. Centralize the pressure differential valve as follows:

## CENTRALIZING THE PRESSURE DIFFERENTIAL VALVE

After a failure of the primary (front brake) or secondary (rear brake) system has been repaired and bled, the dual-brake warning light will usually continue to be illuminated due to the pressure differential valve remaining in an off-center position.

To centralize the pressure differential valve and turn off the warning light after a repair operation, a pressure differential or unbalance condition must be created in the opposite brake system from the one that was repaired and bled last.

1. Turn the ignition switch to the ACC or ON position. Loosen the differential valve assembly brake tube nut at the outlet port **on the opposite side of the brake system that was repaired and/or bled last.** Depress the brake pedal **slowly** to build line pressure until the pressure differential valve is moved to a centralized position and the brake warning light goes out; then, immediately tighten the outlet port tube nut to the specified torque. Refer to Fig. 20 and 21.

2. Check the fluid level in the master cylinder reservoirs and fill them to within 1/4 to 1/2 inch of the top with the specified brake fluid, if necessary.

3. Turn the ignition switch to the OFF position.

4. Before driving the vehicle, check the operation of the brakes and be sure that a firm pedal is obtained.

## 3 CLEANING AND INSPECTION

### DISC (FRONT) BRAKES

1. Remove the wheel and tire, caliper splash shield, and the shoe and lining assemblies as outlined in Part 2-2, Section 2.

2. Make three thickness measurements with a micrometer across the middle section of the shoe and lining. Take one reading at each side and one in the center. If the assembly has worn to a thickness of 0.231 inch (shoe and lining together) or 0.066 inch (lining material only) at any one of the three measuring locations or if the brake lining shows evidence of brake fluid contamination, replace all four shoe and lining assemblies on both front wheels.

3. Check the caliper to spindle attaching bolt and caliper bridge bolt torque. Tighten them to the specified torque, if required.

4. To check rotor runout, first eliminate the wheel bearing end play by tightening the adjusting nut. After tightening the nut check to see that the rotor can still be rotated.

5. Clamp a dial indicator to the caliper housing so that the stylus contacts the rotor at a point approximately 1 inch from the outer edge. Rotate the rotor and take an indicator reading. If the reading exceeds 0.002 inch total lateral runout on the indicator, replace or resurface the disc brake rotor. **The following requirements must be met when resurfacing disc brake rotors:**

Rotunda Disc Brake Attachment FRE-2249-2 is the **only approved tool** to be used to refinish the disc brake rotors. The step-by-step resurfacing procedure provided with the tool must be adhered to.

The finished braking surfaces of the rotor must be flat and parallel within 0.0007 inch; lateral runout must not exceed 0.002 inch total indicator reading, and the surface finish of the braking surfaces are to be 85/15 micro inches. **The minimum limiting dimensions (Fig. 10) from the inboard bearing cup to the outboard rotor face (dimension A) and from the inboard bearing cup to the inboard rotor face (dimension B) must be observed when removing material from the rotor braking surfaces.**

When the runout check is finished, be sure to adjust the bearings as outlined in Group 3, in order to prevent bearing failure.

6. Check the rotor for scoring. Minor scores can be removed with a fine emery cloth. If the rotor is excessively scored, refinish it as outlined in step 5 or replace the rotor, if required.

7. Visually check the caliper. If excess leakage is evident, it should be replaced. Slight leakage around the pistons or seized pistons indicate removal and disassembly.

8. If upon disassembly the caliper is found to be distorted or damaged, or if the cylinder bores are scored or excessively worn, replace the assembly.

**The two halves of the caliper assembly should never be separated. Damage or failure of one requires replacement of both as a unit.**

### REAR BRAKES

1. Remove the wheel from the drum, then remove the drum as outlined in Part 2-2, Section 2. Wash all the parts except the brake shoes in a cleaning solvent and dry with compressed air.

2. Brush all dust from the backing plates and interior of the brake drums.

3. Inspect the brake shoes for excessive lining wear or shoe damage. If the lining is worn to within 1/32 inch of the rivet heads or if the shoes are damaged, they must be replaced. Replace any lining that has been contaminated with oil, grease or brake fluid. Replace lining, in axle sets. Prior to replacement of lining, the drum diameter should be checked to determine if oversize linings must be installed.

4. Check the condition of the brake shoes, retracting springs, and drum for signs of overheating. If the springs show any loss of load or change in free length indicating overheating,

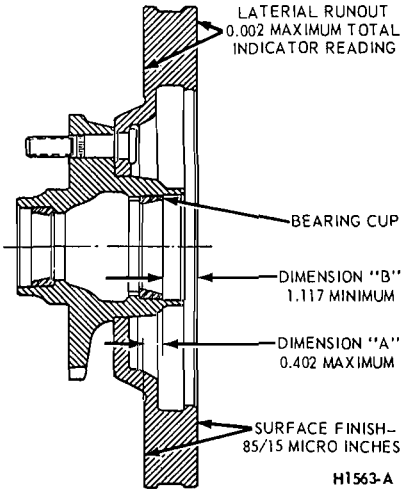



*FIG. 10*—Disc Brake Rotor Service Limits — Typical

replacement of the retracting and hold down springs and the parking brake cable is necessary. **Overheated springs lose their pull and could cause the new lining to wear prematurely if they are not replaced.**

5. If the car has 30,000 or more miles of operation, or signs of extreme overheating are present when relining brakes, the wheel cylinders should be disassembled and inspected for wear and dirt in the cylinder. The cylinder cups and other parts contained in the overhaul kit should be replaced thus avoiding future problems.

6. Inspect all other brake parts and replace any that are worn or damaged.

7. Inspect the brake drums and, if necessary, refinish. Refer to Part 2-2, Section 4 for refinishing.

### BOOSTER UNIT

Check the booster operation as noted in Part 2-1, Section 1, Power Brake Functional Test. If the brake booster is damaged or defective, replace it with a new booster. **The booster is serviced only as an assembly.**

| Possible Causes Of Trouble | Trouble Symptoms: Excessive Pedal Travel | Brake Roughness or Chatter (Pedal Pumping) | Excessive Pedal Effort | Pull | Rattle | Brakes Heat Up During Driving and Fail to Release | Leaky Wheel Cylinder | Grabbing or Uneven Braking Action | No Braking Effect When Pedal is Depressed | Brakes for the Respective System Do Not Apply | Pedal Gradually Moves Toward Floor or Dashpanel | Warning Lamp Stays Lit | Warning Lamp Does Not Light |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shoe and Lining Knock-back after Violent Cornering or Rough Road Travel | X | | | | | | | | | | | | |
| Shoe and Lining Assembly not Properly Seated or Positioned | X | | | | X | | | | X | | | | |
| Leak or Insufficient Fluid in System or Caliper | X | | X | | | | | | X | | X | | |
| Loose Wheel Bearing Adjustment | X | | | X | | | | | | | | | |
| Damaged or Worn Caliper Piston Seal | X | | | | | | X | | X | | | | |
| Improper Master Cylinder Push Rod Adjustment | X | | | | | | | | | | | | |
| Excessive Rotor Runout or Out of Parallel | | X | | | | | | | | | | | |
| Incorrect Tire Pressure | | | | X | | | | X | | | | | |
| Frozen or Seized Pistons | | | X | X | | X | | X | | | | | |
| Brake Fluid, Oil or Grease on Linings | | X | X | X | | | | X | | | | | |
| Shoe and Lining Worn Below Specifications | | | X | | | | | | | | | | |
| Proportioning Valve Malfunction | | | X | | | | | X | | | | | |
| Booster Inoperative | | | X | | | | | | | | | | |
| Caliper Out of Alignment with Rotor | | | | X | | | | X | | | | | |
| Loose Caliper Attachment | X | X | | X | X | | | X | | | | | |
| Metering Valve Seal Leaks | | | | | | | | X | | | | | |
| Excessive Clearance Between Shoe and Caliper or Between Shoe and Splash Shield | | | | | X | | | | | | | | |
| Shoe Hold Down Clips Missing or Improperly Positioned | | | | | X | | | | | | | | |
| Operator Riding Brake Pedal | | | | | | X | | | | | | | |
| Scores in the Cylinder Bore | | | | | | | X | | | | | | |
| Corrosion Build-Up in the Cylinder Bore or on the Piston Surface | | | X | X | | | X | | | | | | |
| Bleeder Screw Still Open | | | | | | | | | X | | X | | |
| Caliper Out of Parallel with Rotor | | | | X | | | | | | | | | |
| One Section of Dual Brake System is Inoperative | | | | | | | | | | X | | X | |
| Differential Pressure Valve Is Not Centered | | | | | | | | | | | | X | |
| Wiring To Warning Lamp or Switch Is Grounded | | | | | | | | | | | | X | |
| Warning Lamp Switch Is Grounded | | | | | | | | | | | | X | |
| Warning Lamp Is Burned Out | | | | | | | | | | | | | X |
| Warning Lamp or Switch Has An Open Circuit | | | | | | | | | | | | | X |
| Warning Lamp Switch Is Inoperative | | | | | | | | | | | | | X |
| Wiring To Warning Lamp Has Open Circuit | | | | | | | | | | | | | X |

*FIG. 11*—Front Wheel Disc Brake Trouble Symptoms and Possible Causes

| Possible Causes Of Trouble | Trouble Symptoms | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | One Brake Drags | All Brakes Drag | Hard Pedal | Spongy Pedal | Car Pulls to One Side | One Wheel Locks | Brakes Chatter | Excessive Pedal Travel | Pedal Gradually Goes to Floor | Brakes Uneven | Shoe Click After Release | Noisy or Grabbing Brakes | Brakes Do Not Apply | Brakes For The Respective System Do Not Apply | Warning Lamp Stays Lit | Warning Lamp Does Not Light |
| Mechanical Resistance at Pedal or Shoes | | X | X | | | | | | | | | | | | | |
| Brake Line Restricted | X | X | X | | X | | | | | | | | | | | |
| Leaks or Insufficient Fluid | | | | X | | | | X | X | | | | X | | | |
| Improper Tire Pressure | | | | | X | | | | | X | | | | | | |
| Distorted or Improperly Adjusted Brake Shoe | X | X | X | | X | X | | X | | | | X | | | | |
| Faulty Retracting Spring | X | | | | X | | | | | | | | | | | |
| Drum Out of Round | X | | | | X | | X | | | | | | | | | |
| Lining Glazed or Worn | | | X | | X | X | X | X | | | | X | X | | | |
| Oil or Grease on Lining | | | | | X | X | X | | | X | | X | X | | | |
| Loose Carrier Plate | X | | | | | X | X | | | | | | | | | |
| Loose Lining | | | | | | | X | | | | | | | | | |
| Scored Drum | | | | | | | | | | X | | X | | | | |
| Dirt on Drum-Lining Surface | | | | | | | | | | | | X | | | | |
| Faulty Brake Cylinder | X | | | | X | X | | | | | | X | | | | |
| Dirty Brake Fluid | X | X | | | | | | | | X | | | X | | | |
| Faulty Master Cylinder | | X | | | | | | X | X | | | | X | | | |
| Air in Hydraulic System | X | | | X | | | | X | | | | | X | | | |
| Self Adjusters Not Operating | | | | | X | | | X | | | | | | | | |
| Insufficient Shoe-to-Carrier Plate Lubrication | X | | | | | | | | | | X | X | | | | |
| Tire Tread Worn | | | | | | X | | | | | | | | | | |
| Poor Lining to Drum Contact | | | | | | | X | | | | | | | | | |
| Loose Front Suspension | | | | | | | X | | | | | | | | | |
| Threads Left by Drum Turning Tool Pulls Shoes Sideways | | | | | | | | | | | X | | | | | |
| Cracked Drum | | | | | | | | X | | | | | | | | |
| One Section of Dual Brake System Is Inoperative | | | | | | | | | | | | | | X | X | |
| Differential Pressure Valve Is Not Centered | | | | | | | | | | | | | | | X | |
| Wiring To Warning Lamp or Switch Is Grounded | | | | | | | | | | | | | | | X | |
| Warning Lamp Switch Is Grounded | | | | | | | | | | | | | | | X | |
| Warning Lamp Is Burned Out | | | | | | | | | | | | | | | | X |
| Warning Lamp or Switch Has An Open Circuit | | | | | | | | | | | | | | | | X |
| Wiring to Warning Lamp Has Open Circuit | | | | | | | | | | | | | | | | X |
| Warning Lamp Switch Is Inoperative | | | | | | | | | | | | | | | | X |

*FIG. 12*— Drum Brake and General System Trouble Symptoms and Possible Causes

# PART 2-2— Brake System


| Section | Page |
|---|---|
| 1 Description and Operation | 2-9 |
| Dual-Master Cylinder Brake System | 2-9 |
| Disc Brakes | 2-11 |
| Hydraulic Self-Adjusting Brake System | 2-13 |
| Booster System | 2-13 |
| Parking Brakes | 2-14 |
| 2 In-Vehicle Adjustments and Repairs | 2-14 |
| Front (Disc) Brake Shoe and Lining Replacement | 2-17 |
| Disc Brake Caliper Assembly | 2-18 |
| Front Wheel Hub and Rotor Assembly | 2-18 |
| Disc Brake Rotor Splash Shield | 2-19 |
| Proportioning Valve | 2-19 |
| Brake Shoe Adjustments—Rear Wheels | 2-16 |
| Rear Brake Drum | 2-20 |
| Rear Brake Shoe Replacement | 2-20 |
| Rear Wheel Cylinder Repair | 2-19 |
| Rear Wheel Cylinder Replacement | 2-19 |
| Rear Brake Backing Plate Replacement | 2-20 |
| Hydraulic Lines | 2-20 |
| Brake Tube Replacement | 2-20 |
| Brake Hose Replacement | 2-20 |
| 3 Removal and Installation | 2-23 |
| Dual Master Cylinder — Standard Brakes | 2-23 |
| Dual-Master Cylinder—Power Brakes | 2-24 |
| Pressure Differential Valve Assembly | 2-24 |
| Brake Booster | 2-25 |
| Brake Pedal | 2-25 |
| Parking Brake Control Assembly | 2-26 |
| Parking Brake Equalizer to Control Cable | 2-26 |
| Parking Brake Equalizer to Rear Wheel Cable | 2-27 |
| 4 Major Repair Operations | 2-28 |
| Brake Drum Refinishing | 2-28 |
| Rotor Refinishing | 2-28 |
| Brake Shoe Relining | 2-29 |
| Dual-Master Cylinder | 2-29 |
| Disc Brake Caliper | 2-30 |


## 1 DESCRIPTION AND OPERATION

Disc brakes are available as optional equipment for the front wheels on the various vehicle models listed in (Fig. 1).

The dual-master cylinder equipped hydraulic brake system employes single-anchor, internal expanding and self-adjusting drum brake assemblies on the rear wheels of vehicles with disc brakes, and on the front and rear wheels of all others (Fig. 1).

### DUAL-MASTER CYLINDER BRAKE SYSTEM

The dual-master cylinder brake system has been incorporated in all car models to provide increased vehicle safety. The system consists of a dual-master cylinder, pressure differential valve assembly and a switch. The switch on the differential valve activates a dual-brake system warning light, located on the instrument panel.

The dual-master cylinder brake system is similar to a conventional (single) brake master cylinder system. In the dual-system, two master cylinders are combined in a single cast iron casting (Fig. 2). One portion actuates the front brake system and the other actuates the rear brake system (Figs. 20 and 21). Hydraulic fluid leakage or failure of one of the systems does not impair the operation of the other portion of the dual-brake system. A dual-brake warning light signals a failure of either the front or rear brake system.

The dual-master cylinder used on Fairlane, Falcon and Comet vehicles equipped with power brakes have the master cylinder outlet ports for the rear brake system located on the bottom of the master cylinder body. Master cylinder hydraulic system bleed screws are located in the outboard side of those master cylinders having secondary (rear brake) system outlet ports in the bottom of the master cylinder castings (Fig. 29).

All Fairlane, Falcon and Comet vehicles equipped with standard drum brakes and all Mustang and Cougar vehicles equipped with power disc, power drum and standard drum brakes have both the primary (front) and secondary (rear) brake system outlet ports located on the outboard side of the dual-master cylinder body castings. These master cylinders do not require master cylinder bleed screws (Figs. 27, 28 and 30).

The external appearance of the dual master cylinders for the various vehicles also differ in configuration of the covers. All vehicles having standard drum brake systems and Mustang, Cougar vehicles equipped with power drum brakes have primary and secondary master cylinder cover domes of equal size. Dual master cylinders for all other vehicles equipped with power disc and power drum brake systems have large primary (front brake) and smaller secondary (rear brake) cover domes.

A code letter is stamped on the side or outer end of each master cylinder body casting for easy service identification. The vehicle application, type of brakes and the identification code are shown in Fig. 3.

A brake pressure differential valve assembly (Fig. 4) incorporating an hydraulically operated mechanical switch is utilized to operate a dual-brake warning light, located on the instrument panel.

Hydraulic pressure for both front wheel brakes is provided from the primary system (front) brake outlet port and line, located opposite the primary system inlet port of the differential valve.

Hydraulic pressure for both rear wheel brakes is provided from the single secondary (rear brake) outlet line, located opposite the secondary system inlet port of the differential valve. On disc brake equipped vehicles, a proportioning valve is located in the secondary (rear brake) system line that leads to the brake hose bracket on the rear axle housing. The brake hose bracket serves as a junction point for the individual brake lines that lead to the wheel cylinders of right and left rear brake components.

When the brake pedal is depressed, both the primary (front brake) and

secondary (rear brake) master cylinder pistons are moved simultaneously to exert hydraulic fluid pressure on their respective independent hydraulic system. The fluid displacement of the dual-master cylinders is proportioned to fulfill the requirements of each of the two independent hydraulic brake systems (Fig. 2).

If a failure of the rear (secondary) brake system should occur, initial brake pedal movement causes the unrestricted secondary piston to bottom in the master cylinder bore. Primary piston movement displaces hydraulic fluid in the primary section of the dual-master cylinder to actuate the front brake system.

Should the front (primary) brake system fail, initial brake pedal movement causes the unrestricted primary piston to bottom out against the secondary piston. Continued downward movement of the brake pedal moves the secondary piston to displace hydraulic fluid in the rear brake system, actuating the rear brakes.

The increased pedal travel and the increased pedal effort required to compensate for the loss of the failed portion of the brake system provides a warning that a partial brake system failure has occured. When the ignition switch is turned to the START position, a dual-brake warning light provides a visual indication the warning lamp is functional. When the ignition switch is turned to the ON or ACC position, a dual-brake warning light on the instrument panel also provides a visual indication if one portion of the dual-brake system has become inoperative.

| Car Model | Power Drum | Power Disc |
|---|---|---|
| Falcon | RPO | Not Available |
| Fairlane | RPO | RPO ① ③ |
| Mustang ② | RPO | RPO ① |
| Comet | RPO | RPO ① ③ |
| Cougar | RPO | RPO |

① Standard with Mustang GT equipment group option, Fairlane GT model.
② Mustang brake options available only on eight-cylinder models.
③ Standard for Acc. Fairlane and Comet 427 V-8 Engine.

*FIG. 1—Power Disc Brake and Power Drum Brake Options*

Should a failure of either the front or rear brake hydraulic system occur, the hydraulic fluid pressure differential resulting from the pressure loss of the failed brake system forces the valve toward the low pressure area to illuminate the brake warning light (Fig. 4).

A mechanically operated electrical switch is located on the side of the pressure differential valve assembly between the front and rear brake system inlet ports. The inner-end of the spring loaded switch plunger contacts the bottom of a tapered shoulder groove in the center of the valve (Fig. 4). O-ring seals are retained in seal ring lands near each end of the valve.

Should a failure of the rear brake system occur, hydraulic fluid pressure in the rear brake system would drop. During brake pedal operation the fluid pressure build-up of the front brake system forces the valve to move toward the low pressure area, or toward

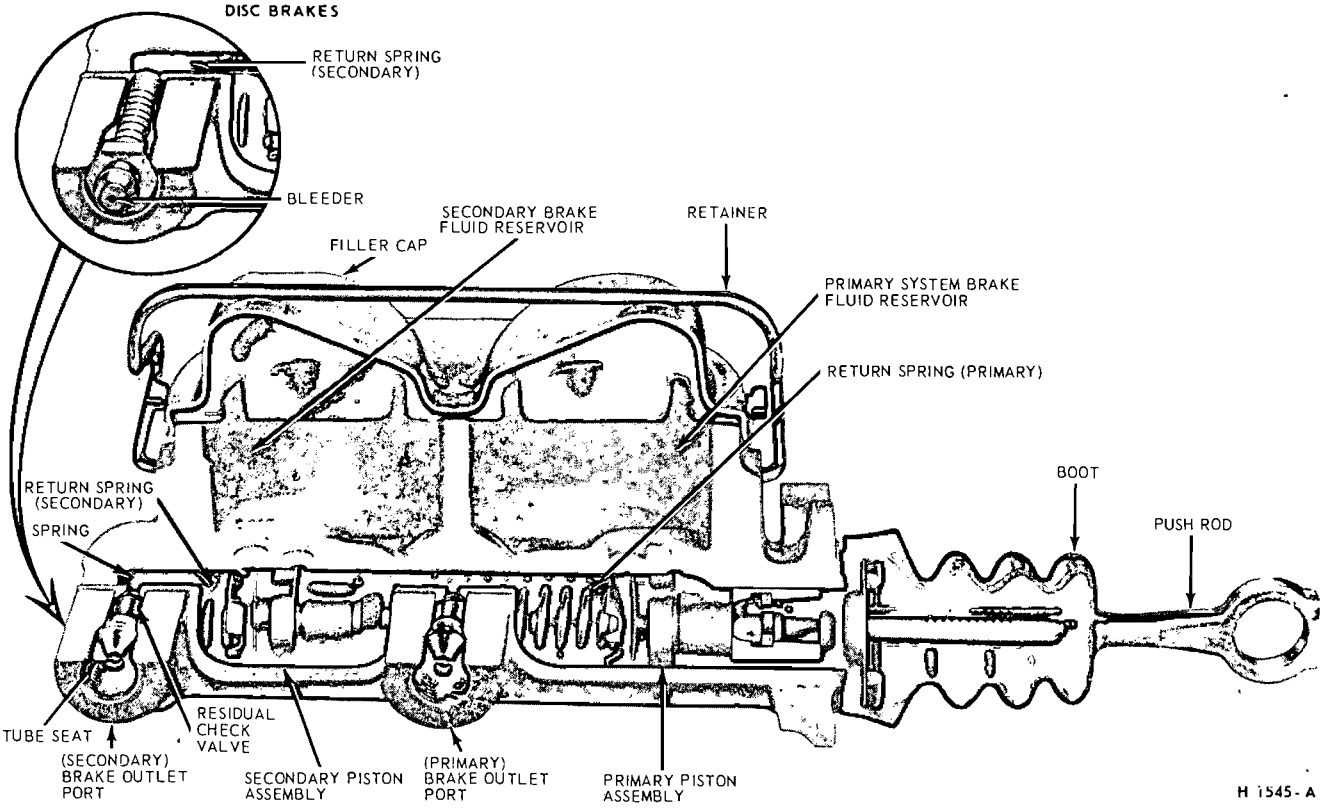



*FIG. 2— Dual-Master Cylinder*

the rear brake system outlet port (Fig. 4). Movement of the differential valve forces the switch plunger upward over the tapered shoulder of the valve to close the switch electrical contacts and light the dual brake warning lamp, signalling a brake system failure.

In the event a front brake system failure should occur, greater pressure from the rear brake system during brake pedal operation forces the valve forward, moving the switch plunger upward onto the valve ramp to light the brake system warning lamp. **However, failure of either the front or rear system does not impair operation of the other brake system.**

## DISC BRAKE ASSEMBLIES

Disc brakes are available as optional equipment for the front wheels. The hydraulic brake system employs single anchor, internal expanding and self-adjusting drum brake assemblies on the rear wheels of vehicles with disc brakes, and on the front and rear wheels of all others.

A vacuum booster is available as optional equipment.

The master cylinder converts physical force from the brake pedal (and booster if so equipped) into hydraulic pressure against the pistons in the calipers (disc brakes) or in the wheel cylinders (drum brakes). The pistons in turn convert hydraulic pressure back into physical force at the brake shoes.

| Car Model | Type Of Brake | Identification Code |
|---|---|---|
| Fairlane and Falcon | Power Disc | B |
| | Power Drum | S |
| | Standard Drum | T |
| Mustang | Power Disc | M |
| | Power Drum | X |
| | Standard Drum | T |
| Comet | Power Disc | B |
| | Power Drum | S |
| | Standard Drum | T |
| Cougar | Power Disc | M |
| | Power Drum | X |
| | Standard Drum | T |

*FIG. 3*—**Dual Master Cylinder Identification**

### RELATION AND FUNCTION OF COMPONENT PARTS

The disc brake is a fixed caliper, opposed piston, non-energized, ventilated disc type, actuated by a hydraulic system (Fig. 5). There is no lateral movement of either the disc (rotor) or the caliper. The caliper assembly consists of two caliper housings bolted together with each half containing two cylinder bores of 1 15/16 inch diameter. Each cylinder bore contains a piston with an attached molded rubber dust boot

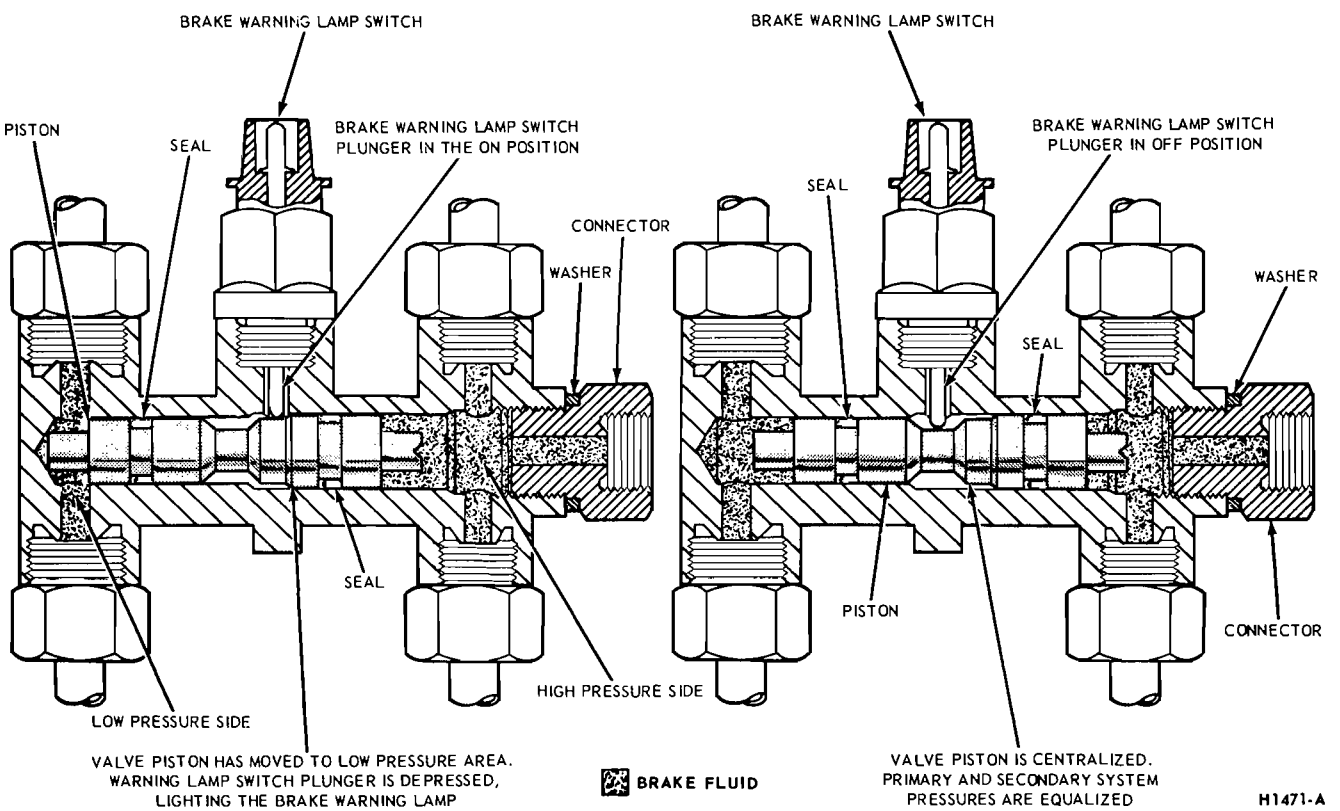



*FIG. 4*—**Pressure Differential Valve and Brake Warning Lamp Switch Operation**

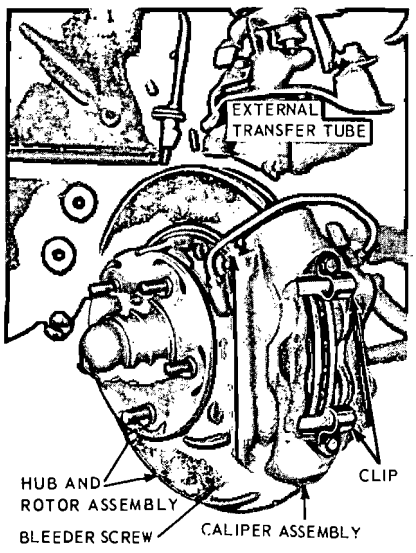



*FIG. 5—Typical Disc Brake Assembly*

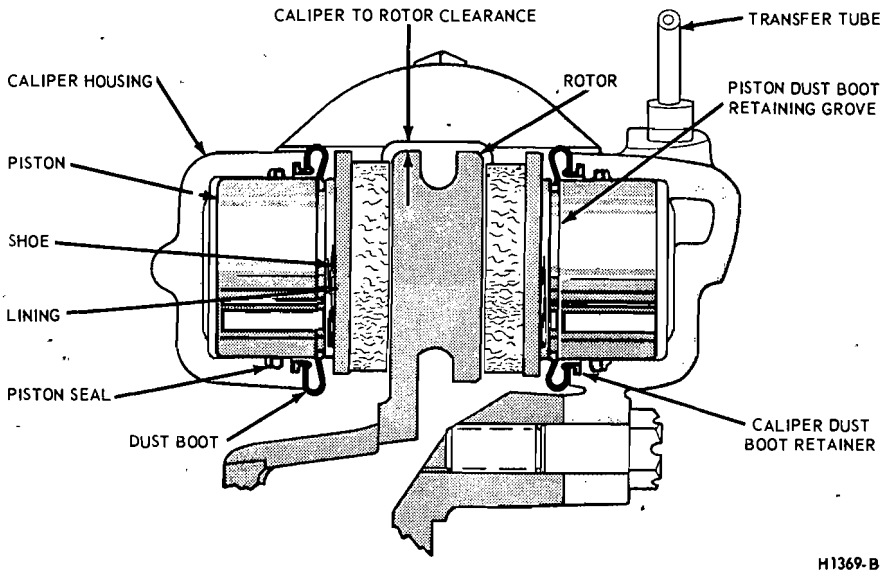



*FIG. 6—Typical Caliper Assembly—Sectional View*

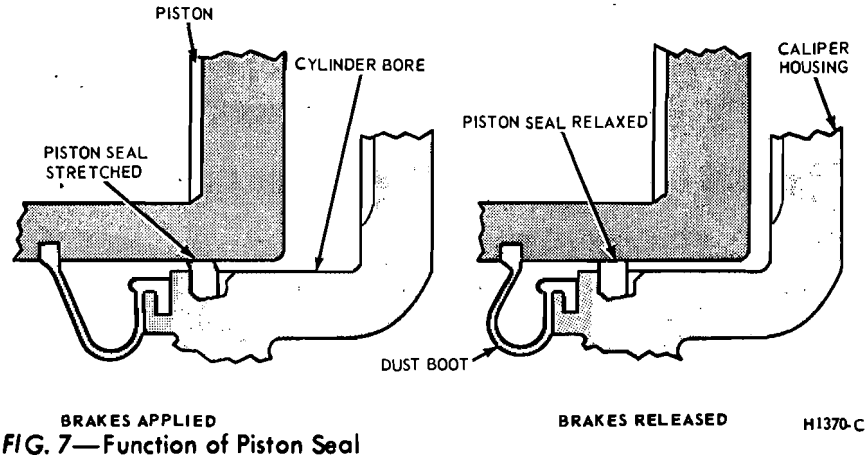



*FIG. 7—Function of Piston Seal*

to seal the cylinder bore from contamination (Fig. 6). Square-section rubber piston seals are positioned in grooves in the cylinder bores.

The piston seals perform three important tasks:

1. They provide hydraulic sealing between the cylinders and pistons.
2. They return the pistons to released position, when hydraulic pressure is released.
3. They maintain the shoes in correct adjustment at all times (comparable to the automatic adjusters in drum-type brakes).

The cylinders are connected hydraulically by means of internal passages in the caliper housing and an external transfer tube between the two halves of the caliper assembly. One bleeder screw and fluid inlet fitting is provided on each caliper assembly.

The shoe and lining assemblies are located between parallel machined abutments within the caliper, and are supported radially by tabs on the outer ends of the shoe assemblies (Fig. 25). The shoes slide axially in the caliper abutments by means of the tabs which ride on machined ledges (bridges) when hydraulic pressure is applied to the piston (Fig. 6). A shoe and lining assembly consists of friction material bonded to a metal plate called the shoe. It is replaced as a unit. Brake torque is absorbed by the mating of the shoe end against the caliper abutments (Fig. 25). Two spring clips are attached to the top of the caliper to retain the shoe and lining assemblies. The caliper assembly is mounted to a bracket located between the spindle and rotor splash shield, to the front of the wheel vertical centerline.

The cast iron disc is of the ventilated rotor type incorporating forty fins and is attached to, and rotates with, the wheel hub. The outside diameter of the rotor is 11.290 inches and the inside diameter is 7.170 inches. This type of design increases cooling area and permits circulation of air through the rotor resulting in more rapid cooling of the brake. A splash shield bolted to the spindle is used primarily to prevent road contaminants from contacting the inboard rotor and lining surfaces (Fig. 17). The wheel provides protection for the outboard surfaces of the rotor.

As the brake pedal is depressed, hydraulic pressure from the master cylinder forces the pistons out of the caliper bores against their respective shoe and lining assemblies. The force of the pistons against the shoes moves the linings against both sides of the revolving rotor to effect braking action.

During brake application, the rubber seal on each piston stretches as the piston moves against the shoe (Fig. 7). When the hydraulic pressure against the piston is released, the seal relaxes or rolls back. This roll-back action pulls the piston away from the shoe just enough to relieve the force of the lining against the rotor and, thereby, provide the required running clearance. Also, inherent rotor runout contributes to the maintenance of running clearance. Automatic adjustment is achieved by the pistons sliding in the seals outward from the cylinder bores. The piston gradually changes its position relative to the seal as the lining wears and, thus, maintains the correct adjustment location at all times.

When the brakes are in the unapplied position, there is no hydraulic pressure to the calipers because the fluid source at the master cylinder by-passes the residual check valve.

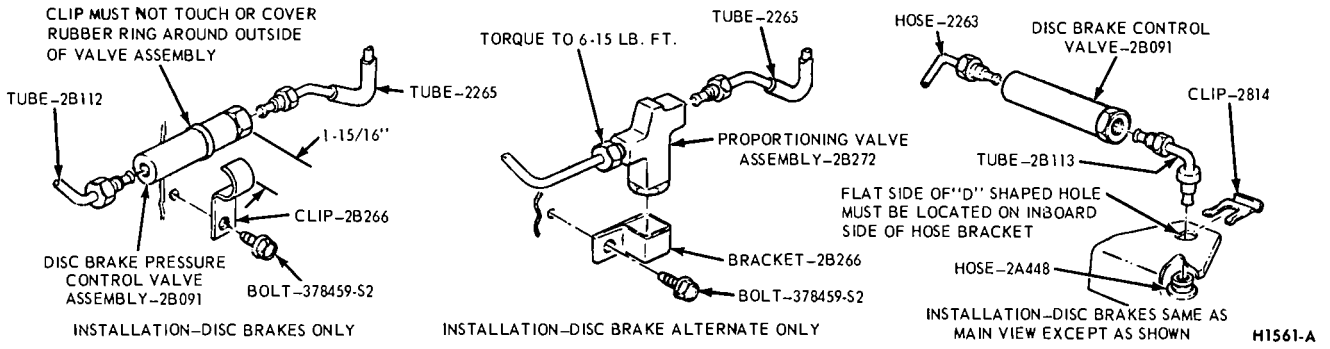



*FIG. 8*—Disc Brake Pressure Control Valve

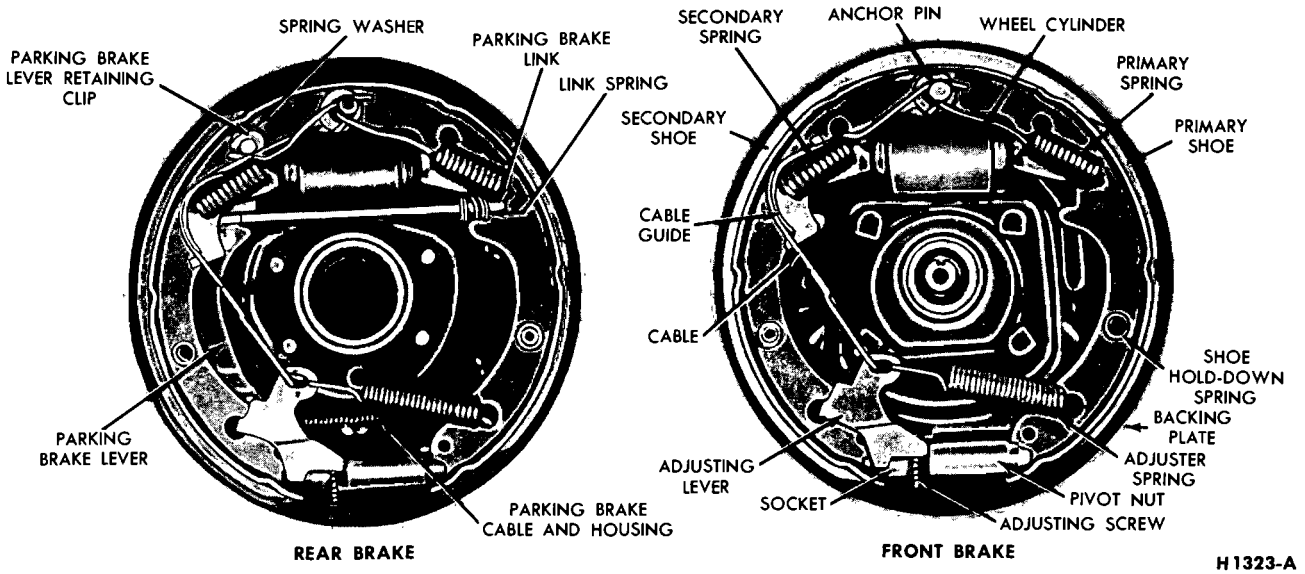



*FIG. 9*—Self-Adjusting Brake Assemblies—9 Inch Drum

A disc brake pressure control valve located between the pressure differential valve and the rear brake wheel cylinders provides balanced braking action between the front and the rear brakes under a wide range of braking conditions (Fig. 8). By regulating the hydraulic pressure applied to the rear wheel cylinders, the valve limits rear braking action when high pressures are required at the front brakes. In this manner, premature rear wheel skid is prevented. **The proportioning valve is serviced as an assembly and is never adjusted or overhauled.**

## HYDRAULIC SELF-ADJUSTING BRAKE SYSTEM

The self-adjusting brake mechanism consists of a cable, cable guide, adjusting lever, and adjuster spring (Figs. 9 and 10). The cable is hooked over the anchor pin at the top and is connected to the lever at the bottom. The cable is connected to the secondary brake shoe by means of the cable guide. The adjuster spring is hooked to the primary brake shoe and to the lever. The automatic adjuster operates only when the brakes are applied while the car is moving rearward and only when the secondary shoe is free to move toward the drum beyond a predetermined point.

With the vehicle moving rearward and the brakes applied, the wrap-around action of the shoes following the drum forces the upper end of the primary shoe against the anchor pin. The action of the wheel cylinder moves the upper end of the secondary shoe away from the anchor pin. The movement of the secondary shoe causes the cable to pull the adjusting lever upward and against the end of a tooth on the adjusting screw star-wheel. The upward travel of the lever increases as lining wear increases. When the lever can move upward far enough, it passes over the end of the tooth and engages the tooth. When the brakes are released, the adjusting spring pulls the lever downward causing the star-wheel to turn and expand the shoes. The star-wheel is turned one tooth at a time as the linings progressively wear.

With the vehicle moving forward and the brakes applied, the secondary shoe is against the anchor pin and the primary shoe is moved toward the drum. Therefore, the adjuster does not operate.

The rear brake assembly is basically the same as the front brake. The conventional parking brake lever, link, and spring are used in the rear brake.

The anchor pins on all brakes are fixed and are non-adjustable.

## BRAKE BOOSTER SYSTEM

The diaphragm-type brake booster is a self-contained vacuum-hydraulic braking unit mounted on the engine side of the dash panel. The brake booster is of the vacuum suspended type which utilizes engine intake

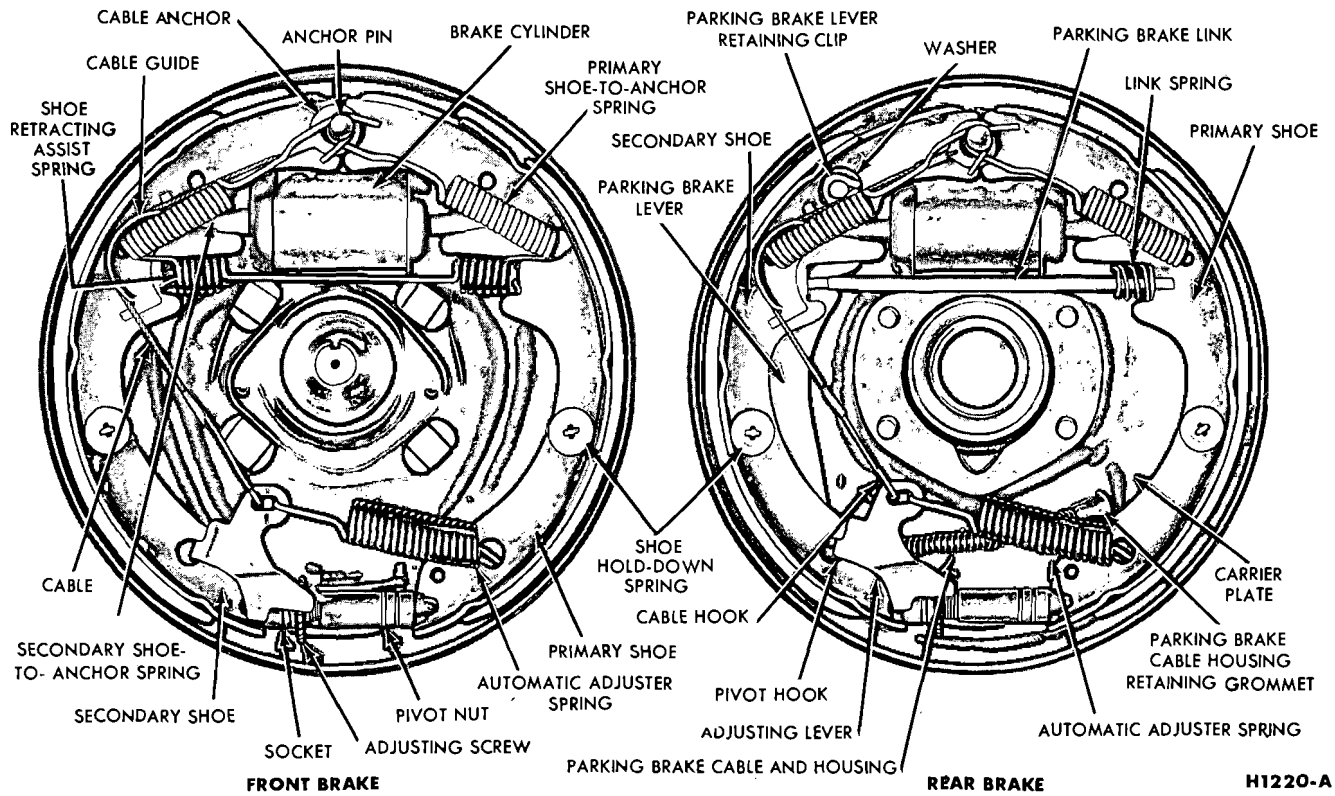



*FIG. 10*—Self Adjusting Brake Assemblies—10 Inch Drum

manifold vacuum and atmospheric pressure for its power.

**Adjustment of the push rod is the only service permitted on a brake booster. The booster unit is to be exchanged when it is inspected, checked and found to be defective.**

### PARKING BRAKES—MUSTANG AND COUGAR

An independent hand-operated parking brake control actuates the rear wheel brake shoes through a cable linkage. The operating cable is routed from the parking brake control assembly to the equalizer pivot lever which is attached to the equalizer assembly to the floor pan. The rear brake cables connect the equalizer assembly to the parking brake lever at each rear secondary shoe as shown in Figs. 9, 10 and 31.

When the handle is pulled the primary and secondary brake shoes are forced against the rear brake drums. The handle is held in the applied position by the engagement of a spring loaded pawl with a ratchet. Turning the handle counterclockwise disengages the pawl from the ratchet to release the brakes.

### PARKING BRAKES—COMET, FAIRLANE AND FALCON

An independent foot-operated parking brake control actuates the rear wheel brake shoes through a cable linkage. The operating cable is routed from the parking brake control assembly to the equalizer. The rear brake cables connect the equalizer assembly to the parking brake lever at each rear secondary shoe (Fig. 9).

When the pedal is depressed the primary and secondary brake shoes are forced against the rear brake drums. The pedal is held in the applied position by the engagement of a spring-loaded pawl with a ratchet in the control assembly (Fig. 32).

The parking brake control assembly is mounted to the cowl inner side panel. The pedal pivots on a stationary pedal mount. A spring-loaded pawl and a release lever are assembled to the pedal. A ratchet is assembled to the upper end of the pedal. The pawl contacts the ratchet at such an angle that the ratchet teeth will slide over the pawl as the pedal is depressed; however, when the applying motion stops and the pedal starts to release, the pawl engages the ratchet and thus locks the brakes in the applied position.

When the manual release lever is pulled back (Fig. 32), the cam action of the lever on the pawl cam pin will disengage the pawl from the ratchet to release the brakes.

## 2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

**After any brake service work, obtain a firm brake pedal before moving the vehicle. Riding the brake pedal (common on left foot applications) should be avoided when driving the vehicle.**

### BRAKE SHOE ADJUSTMENTS —DRUM BRAKE

The hydraulic service brakes are self-adjusting and require a manual adjustment only after the brake shoes have been relined, replaced, or when the length of the adjusting screw has been changed while performing some other service operation. **The manual adjustment is performed with the drums removed, us-**

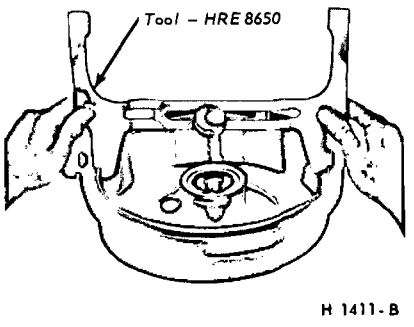



FIG. 11—Measuring Drum

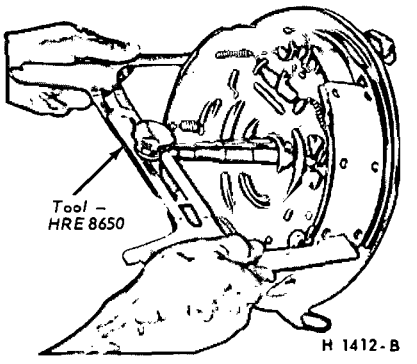



FIG. 12—Measuring Shoes

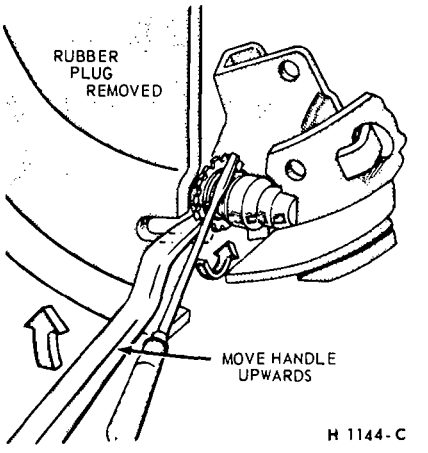



FIG. 13—Backing Off Brake Adjustment

**ing the tool and the procedure detailed below.**

When adjusting the rear brake shoes, check the parking brake cables for proper adjustment. Refer to Parking Brake Linkage Adjustment, Part 2-1, Section 2. Make sure that the equalizer operates freely.

To adjust the brake shoes:

**1.** Using Rotunda Tool HRE 8650, (Fig. 11) determine the inside diameter of the drum braking surface.

**2.** Reverse the tool as shown in Fig. 12 and adjust the brake shoe diameter to fit the gauge. Hold the automatic adjusting lever out of engagement while rotating the adjusting screw, to prevent burring the screw slots. Make sure the adjusting screw rotates freely. If necessary, lubricate the adjusting screw threads with a thin, uniform coating of C1AZ-19590-B Grease.

**3.** Rotate Tool HRE 8650 around the brake shoes to be sure of the setting.

**4.** Apply a **small** quantity of high temperature grease to the points where the shoes contact the carrier plate and anchor pin, being careful not to get the lubricant on the linings.

**5.** Install the drums. Install the Tinnerman nuts and tighten securely. Install the wheel on the drum and tighten the mounting nuts to specification.

**6.** Complete the adjustment by applying the brakes several times with a minimum of 50 lbs pressure on the pedal while backing the car. After each stop, the vehicle must be moved forward.

**7.** After the brake shoes have been properly adjusted, check the operation of the brakes by making several stops while operating in a forward direction.

## FRONT BRAKE DRUM

### REMOVAL

**1.** Raise the vehicle until the wheel and tire clear the floor. Remove the wheel cover or hub cap, and remove the wheel and tire from the drum.

**2.** Remove the grease cap from the hub. Remove the cotter pin, nut lock, adjusting nut, and flat washer from the spindle. Remove the outer bearing cone and roller assembly.

**3.** Pull the hub and drum assembly off the wheel spindle.

**4.** If the drum will not come off, remove the rubber cover from the brake backing plate. Insert a narrow screwdriver through the slot and disengage the adjusting lever from the adjusting screw. While holding the adjusting lever away from the screw, back off the adjusting screw with the brake adjusting tool (Fig. 13). **Be very careful not to burr, chip, or damage the notches in the adjusting screws; otherwise the self-adjusting mechanism will not function properly.**

### INSTALLATION

**1.** If the drum is being replaced, remove the protective coating from the new drum with carburetor degreaser; then, sand lightly and wipe with a cloth soaked with denatured alcohol. Install new bearings and grease retainer. Soak the new service-type grease retainer in light engine oil for at least 30 minutes before installation if retainer is of a leather composition. Pack the wheel bearings, install the inner bearing cone and roller assembly in the inner cup, and install the new grease retainer. See Part 3-5, Section 4 for procedure.

If the original drum is being installed, make sure that the grease in the hub is clean and adequate.

**2.** Adjust the brakes and install the drum assembly as outlined under Brake Shoe Adjustments in this section.

**3.** Install the outer wheel bearing, washer and adjusting nut.

**4.** Adjust the wheel bearing as outlined in Part 3-5, Section 2, then install the grease cap. Install the wheel and hub cap or cover.

## REAR BRAKE DRUM

### REMOVAL

**1.** Raise the vehicle so that the wheel is clear of the floor.

**2.** Remove the hub cap and wheel. Remove the three Tinnerman nuts and remove the brake drum. If the drum will not come off, remove the rubber cover from the backing plate. Insert a narrow screwdriver through the hole in the backing plate, and disengage the adjusting lever from the adjusting screws. While holding the adjusting lever away from the adjusting screw, back off the adjusting screw with the brake adjusting tool (Fig. 13). **Be very careful not to burr, chip or damage the notches in the adjusting screw; otherwise, the self-adjusting mechanism will not function properly.**

### INSTALLATION

**1.** Remove the protective coating from a new drum with carburetor degreaser; then, sand lightly and wipe with a cloth soaked in denatured alcohol.

**2.** Adjust the brakes as outlined under Brake Shoe Adjustments in this section.

**3.** Place the drum over the brake assembly and into position. Install the three Tinnerman nuts and tighten them securely. Install the wheel on the axle shaft flange studs against the drum, and tighten the attaching nuts to specifications.

## BRAKE SHOES AND ADJUSTING SCREW

### REMOVAL

1. With the wheel and drum removed, install a clamp over the ends of the wheel cylinder as shown in Fig. 14.
2. Remove the brake retracting springs using Tool 2035-N or 2086-L (Fig. 14).
3. Disconnect the brake shoe hold-down springs and remove the brake shoe assemblies along with the complete automatic adjustment mechanism.
4. Disassemble the brake shoes.
5. On rear brakes, remove the parking brake link and spring from the brake assemblies. Disconnect the parking brake cable from the parking brake lever.
6. After removing the rear brake shoes disassemble the parking brake lever from the secondary shoe by removing the retaining clip and spring washer (Figs. 9 and 10).

### INSTALLATION

1. Before installing the rear brake shoes, assemble the parking brake lever to the secondary shoe and secure it with the spring washer and retaining clip.
2. Apply a light coating of high-temperature grease at the points where the brake shoes contact the backing plate.
3. Position the brake shoes on the backing plate and secure them with the hold down springs. On the rear brake, install the parking brake link and spring. Connect the parking brake cable to the parking brake lever (Figs. 9 and 10).

Install the cable guide on the secondary shoe web with the flanged hole properly fitted into the hole in the secondary shoe web. Install the secondary spring (secondary shoe to anchor spring) (Figs. 9 and 10).

5. Place the cable eye over the anchor pin with the crimped side toward the backing plate. Install the primary shoe to anchor spring with the tool shown in Fig. 15.
6. Thread the cable around the cable guide groove.

**It is imperative that the cable be positioned in this groove and not between the guide and the shoe web. Be certain that the cable eye is not cocked or binding on the anchor pin when installed. All parts should be flat on the anchor pin.** Remove the brake cylinder clamp.

7. Apply a small amount of high-temperature grease (Part Number C1AZ-19580-B) to the threads and the socket end of the adjusting screw. Turn the adjusting screw into the adjusting pivot nut to the limit of the threads and then back off 1/2 turn.

**Interchanging the brake shoe adjusting screw assemblies from one side of the vehicle to the other would cause the brake shoes to retract rather than expand each time the automatic adjusting mechanism operated.** To prevent accidental installation of the adjusting screw on the wrong side of the vehicle the socket end of the adjusting screw is stamped with an R or L (Fig. 16). The adjusting pivot nuts can be distinguished by the number of grooves machined around the body of the nut. Two grooves indicate a right-hand nut; one groove indicates a left-hand nut.

8. Place the adjusting socket on the screw and install this assembly between the shoe ends with the adjusting screw toothed wheel nearest the secondary shoe.
9. Hook the cable hook into the hole in the adjusting lever. The adjusting levers are stamped with an R or L to indicate their installation on a right or left brake assembly (Fig. 16).
10. Position the hooked end of the adjuster spring completely into the large hole in the primary shoe web. The last coil of the spring should be at the edge of the hole. Connect the loop end of the spring to the adjuster lever hole (Figs. 9 and 10).
11. Pull the adjuster lever, cable and automatic adjuster spring down and toward the rear to engage the pivot hook in the large hole in the secondary shoe web.
12. After installation, check the action of the adjuster by pulling the section of the cable between the cable guide and the anchor pin toward the secondary shoe web far enough to lift the lever past a tooth on the adjusting screw wheel. The lever should snap into position behind the next tooth, and release of the cable should cause the adjuster spring to return the lever to its original position. This return action of the lever will turn the adjusting screw one tooth.

If pulling the cable does not produce the action described, or if the lever action is sluggish instead of positive and sharp, check the position of the lever on the adjusting screw toothed wheel. With the brake in a vertical position (anchor at the top), the lever should contact the adjusting wheel 3/16 inch (plus or minus 1/32 inch) above the centerline of the screw. If the contact point is below the centerline, the lever will not lock on the teeth in the adjusting screw wheel, and the screw will not be turned as the lever is actuated by the cable.

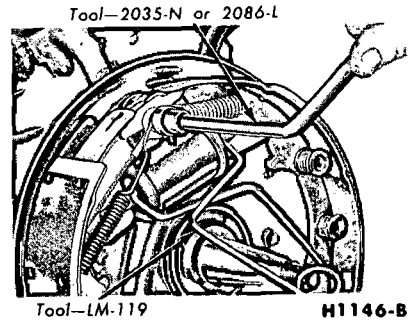



*FIG. 14*—Retracting Spring Removal —Typical

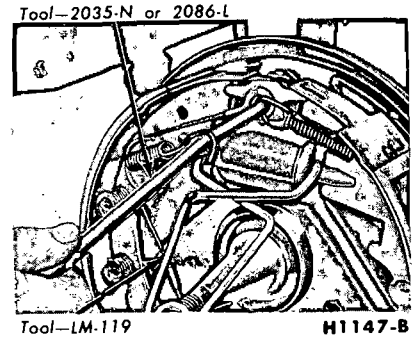



*FIG. 15*—Retracting Spring Installation —Typical

To determine the cause of this condition:

a. Check the cable end fittings. The cable should completely fill or extend slightly beyond the crimped section of the fittings. If it does not meet this specification, possible damage is indicated and the cable assembly should be replaced.

b. Check the cable length. The cable should measure 8 13/32 inches on 9 inch brakes or 9 3/4 inches on 10 inch brakes from the end of the cable anchor to the end of the cable hook.

c. Check the cable guide for damage. The cable groove should be parallel to the shoe web, and the body of the guide should lie flat against the web. Replace the guide if it shows damage.

d. Check the pivot hook on the lever. The hook surfaces should be square with the body of the lever for proper pivoting. Replace the lever if the hook shows damage.

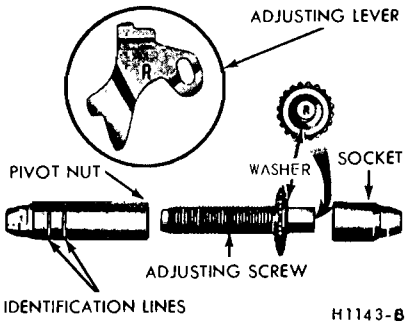



*FIG. 16*—Adjusting Screw and Lever Identification

e. See that the adjusting screw socket is properly seated in the notch in the shoe web.

## DISC BRAKE SHOE AND LINING REPLACEMENT

### DISC BRAKE SERVICE PRECAUTIONS

**1. After any brake service work, pump the brake pedal to obtain a firm pedal before moving the car. Riding the brake pedal (common on left foot applications) should be avoided when driving the car.**

2. Grease or any other foreign material must be kept off the caliper assembly, surfaces of the rotor and external surfaces of the hub during service operations. Handling of the rotor and caliper assemblies should be done in a way to avoid deformation of the brake rotor and nicking or scratching of brake linings.

3. If the square sectioned rubber piston seals are worn or damaged, they should be replaced immediately.

4. During removal and installation of a wheel assembly, exercise care not to interfere with and damage the caliper splash shield, the bleeder screw fitting or the transfer tube.

5. Front wheel bearing end play is critical and must be within specifications.

6. Be sure the vehicle is centered on the hoist before servicing any front end components, to avoid bending or damaging the rotor splash shield on full right or left wheel turns.

7. The bridge bolts joining the two caliper housings should not be removed or loosened.

8. The proportioning valve should not be disassembled or adjustments attempted on it.

9. The wheel and tire must be removed separately from the brake rotor, unlike drum brakes where the wheel, tire and drum are removed as a unit.

### REMOVAL

Refer to Fig. 17.

1. Remove the wheel and tire from the hub and rotor assembly. **Be careful to avoid damage or interference with the bleeder screw fitting or transfer tube.**

2. Remove the two bolts that attach the caliper brake shoe retaining clips, and remove the clips (Fig. 17).

3. To facilitate removal and installation of the shoe and lining assemblies, the pistons must be pushed into their bores. Apply a steady inward pressure against each shoe and lining assembly toward its respective caliper housing on each side of the rotor (Fig. 6). Maintain the pressure for at least a minute. If the pistons will not go in easily, force them in with water pump pliers.

4. Grasp the metal flange on the outer end of the shoe with two pairs of pliers and pull the shoe out of the caliper (Fig. 18).

### INSTALLATION

Refer to Fig. 17.

When new shoe and lining assemblies are being installed to replace worn linings, it will be necessary to push the pistons all the way into the caliper bore. This will displace fluid from the caliper into the master cylinder reservoir. Check the primary (front) brake system reservoir level and remove fluid to approximately half-full before replacing brake shoes. This will prevent overflow. **Do not re-use the removed fluid.**

1. Position a new shoe and lining assembly on each side of the rotor so that the lining faces the rotor.

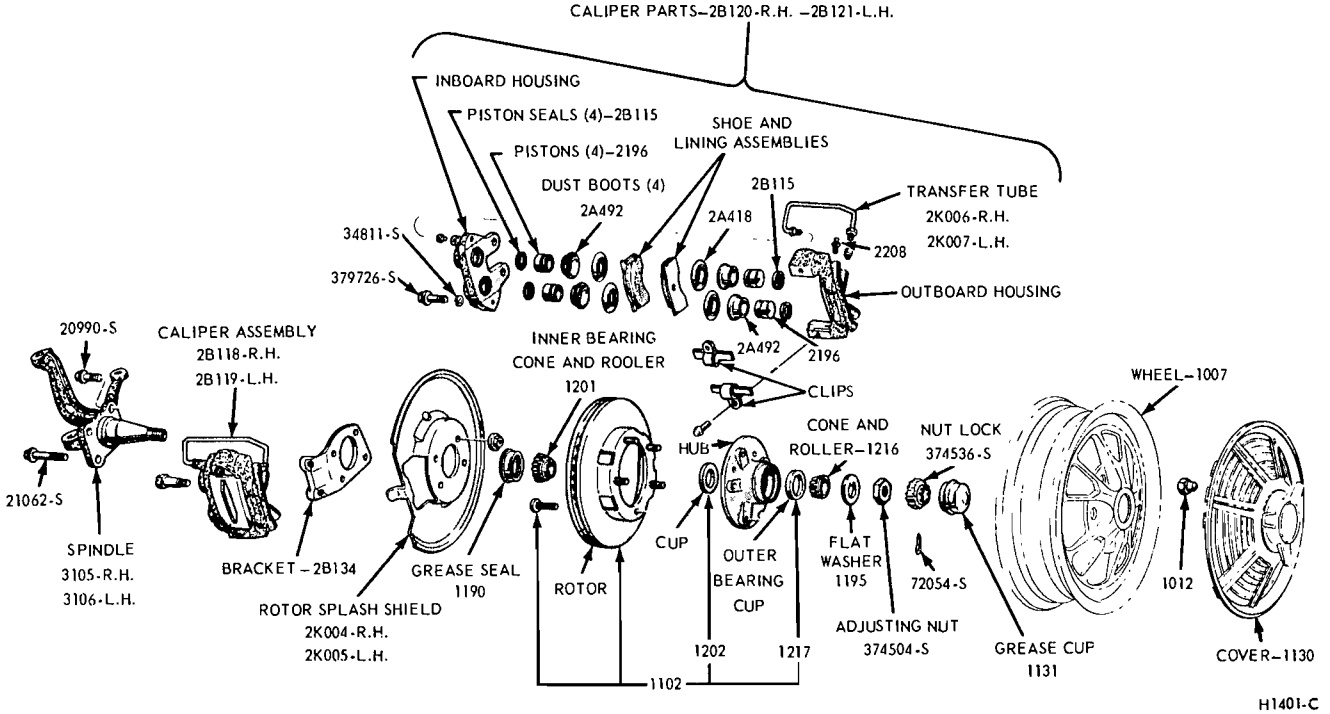



*FIG. 17*—Disc Brake Disassembled

Be sure that the tabs on the shoe flanges seat fully against the caliper bridges (Fig. 18).

2. Position the spring clips on the calipers and install the retaining bolts and washers (Fig. 17).

3. **Pump the brake pedal several times until a firm pedal is obtained and the shoe and lining assemblies are properly seated.**

4. Install the wheel and tire on the hub and rotor assembly.

5. Check and refill the master cylinder reservoir with specified brake fluid as required. **It should not be necessary to bleed the system after a shoe and lining replacement.**

6. Road test the vehicle.

## DISC BRAKE CALIPER ASSEMBLY

### REMOVAL

Refer to Figs. 17 and 25.

1. Remove the front wheel cover. Remove the wheel and tire from the hub and rotor assembly. **Be careful to avoid damage or interference with the caliper bleeder screw fitting or transfer tube.**

2. Disconnect the steel brake line transfer tube from the caliper. Disconnect the front brake tube assembly from the brake hose.

3. Remove the spring lock clip. Remove the hose from the caliper. Remove the two bolts attaching the caliper assembly to the spindle. **Take care to avoid loosening the bridge bolts that hold the two halves of the caliper together.**

4. Lift the caliper assembly off the rotor and place it on the bench.

### INSTALLATION

Refer to Figs. 17 and 25.

1. Position the caliper assembly on the rotor, and mate the mounting bolt holes on the caliper with those in the spindle. It may be necessary to push the caliper pistons into the cylinder bores to obtain clearance between the shoe and lining assembly and the rotor. The shoe and lining assemblies should be seated properly on the bridges.

2. Install the caliper to spindle attaching bolts and torque them to specification. Install the safety wire on the bolts (if so equipped). Check to insure that the rotor runs squarely and centrally between the two halves of the caliper. There should be approximately 0.090—0.120 inch clearance between the caliper and the rotor outside diameter (Fig. 6).

3. Position a new gasket between the hose fitting and caliper. Connect the hose to the caliper and torque it to specification. Refer to Figs. 20 and 21. Position the caliper assembly to the spindle. Install the retaining bolts and torque them to specification. Install the safety wire (if so equipped) on the bolts. Install the female fitting end of the hose in the side-rail bracket. **The stripe on the hose must show no evidence of twist.**

4. Install the spring lock clip. Connect the tube assembly to the hose, and torque the tube connector to specification. Refer to Figs. 20 and 21. Bleed the brake system and centralize the differential valve as outlined in Part 2-1. Check the master cylinder fluid level and add the specified fluid, as required. **Pump the brake pedal several times to actuate the piston seals and to position the shoe and lining assemblies.**

5. Install the wheel and tire and the wheel cover.

6. Road test the vehicle.

## FRONT WHEEL HUB AND ROTOR ASSEMBLY—DISC BRAKES

### REMOVAL

1. Remove the wheel and tire from the hub and rotor assembly (Fig. 17). **Be careful to avoid damage or interference with the caliper splash shield bleeder screw fitting or transfer tube.**

2. Remove the caliper assembly from the spindle and the rotor. If the caliper does not require servicing, it is not necessary to disconnect the brake hose or remove the caliper from the vehicle. Position the caliper out of the way, and support it with a wire to avoid damaging the caliper or stretching the hose. Insert a **clean** cardboard spacer between the linings to prevent the pistons from coming out of the cylinder bores while the caliper is removed.

**Handle the rotor and caliper assemblies in such a way as to avoid deformation of the rotor and nicking, scratching or contamination of the brake linings.**

3. Remove the grease cap from the hub. Remove the cotter pin, nut lock, adjusting nut, and flat washer from the spindle. Remove the outer bearing cone and roller assembly.

4. Remove the hub and rotor assembly from the spindle.

### INSTALLATION

1. If the rotor is being replaced, remove the protective coating from the new rotor with carburetor degreaser. Pack a new set of bearings with specified grease, and install the inner bearing cone and roller assembly in the inner cup. Pack grease lightly between the lips of a new grease retainer and install the retainer (Fig. 17).

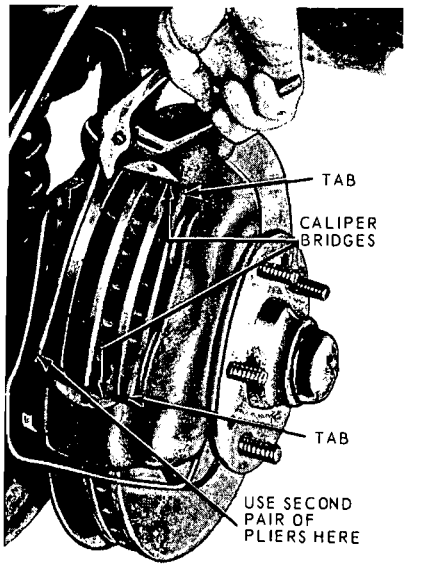



*FIG. 18*—Removing Disc Brake Shoe and Lining Assembly—Typical

If the original rotor is being installed, make sure that the grease in the hub is clean and adequate, that the inner bearing and grease retainer are lubricated and in good condition, and that the rotor braking surfaces are clean.

2. Install the hub and rotor assembly on the spindle.

3. Lubricate and install the outer wheel bearing, washer and adjusting nut.

4. Adjust the wheel bearings to specification, and then install the nut lock, cotter pin, and grease cap. **The wheel bearing adjustment is especially important with disc brakes.**

5. Mount the caliper assembly on the mounting bracket and torque the two attaching bolts to specification. If necessary, push the caliper pistons into the cylinder bores to obtain clearance between the shoe and lining assemblies and the rotor. Be sure that the shoe and lining assemblies are seated on the bridges. Check the flexible hose for correct routing.

6. Install the wheel, tire and cover on the hub and rotor assembly.

## DISC BRAKE ROTOR SPLASH SHIELD

### REMOVAL

1. Remove the caliper and the hub and rotor assembly as outlined under Removal in the foregoing procedure.
2. Remove the four nuts that attach the splash shield to the mounting bracket and remove the shield (Fig. 17).
3. Remove the gasket.

### INSTALLATION

1. Install the gasket.
2. If the shield is bent, straighten it out before installation. Position the shield to the mounting bracket, install the attaching nuts, and torque to specification (Fig. 17).
3. Install the hub and rotor assembly and the caliper as outlined under Installation in the foregoing procedure.

## DISC BRAKE PRESSURE CONTROL VALVE

**The disc brake pressure control valve is serviced as an assembly and is never adjusted or overhauled.**

Refer to View P of Fig. 20 for the Fairlane, Falcon and Comet disc brake pressure control valve installation. View R of Fig. 21 shows the installation of the Mustang and Cougar disc brake pressure control valve.

### REMOVAL

1. Disconnect the brake tubes at the disc brake pressure control valve. On a Mustang and Cougar vehicle, remove the control valve.
2. On a Fairlane, Falcon or Comet vehicle, remove the attaching bolt and clip and remove the disc brake pressure control valve.

### INSTALLATION

1. On a Fairlane, Falcon or Comet vehicle, position the disc brake pressure control valve, clip and attaching bolt as shown in Fig. 21, View P, and tighten the attaching bolt.
2. Connect the brake lines to the disc brake pressure control valve, and torque the connector nuts to specification (Figs. 20 and 21).
3. Bleed the brake system and centralize the differential pressure valve. Refer to Part 2-1, Section 2 for the correct procedure.

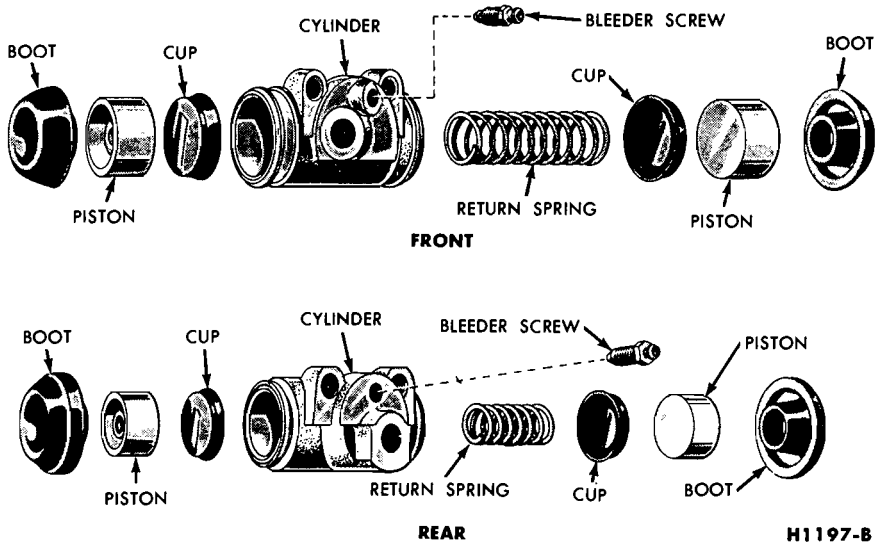



*FIG. 19*—Front and Rear Wheel Cylinders

## WHEEL CYLINDER REPAIR

Wheel cylinders should not be disassembled unless they are leaking or unless new cups and boots are to be installed.

It is not necessary to remove the wheel cylinder from the backing plate to disassemble, inspect and overhaul it. Removal is necessary only when the cylinder is damaged or scored beyond repair.

### DISASSEMBLY

1. With the wheel in a raised position, remove the wheel and the drum.
2. Place a clamp over the ends of the brake cylinder as shown in Fig. 14.
3. Remove the brake shoe assemblies following procedure outlined in this section.
4. The 6-cylinder Falcon and Mustang models are not provided with links. Remove the rubber boots from the ends of the piston.

On 8-cylinder models and on all Comets and Fairlanes, remove the links and rubber boots from the ends of the piston. Remove the pistons, cups, and return spring from the cylinder bore (Fig. 19).

5. Remove the bleeder screw from the cylinder.

### INSPECTION

1. Wash all parts in clean specified brake fluid. Dry with compressed air.
2. Check all the internal parts for excessive wear or damage. Replace scored pistons. Always replace the rubber cups and dust boots. **If any of the internal parts require replacing, all should be replaced.**
3. Inspect the cylinder bore for score marks or rust. If either condition is present, the cylinder bore must be honed. **However, the cylinder should not be honed more than 0.003 inch beyond its original diameter.** A baffle in the front wheel cylinder of the 6-cylinder Falcon and Mustang models prevents honing; therefore, the cylinder must be replaced.
4. Check the bleeder hole to be sure that it is open.

### ASSEMBLY

1. Apply a light coating of heavy-duty brake fluid to all internal parts.
2. Thread the bleeder screw into the cylinder and tighten securely.
3. Insert the return spring, cups, and pistons into their respective positions in the cylinder bore (Fig. 19). Place a boot over each end of the cylinder. On 8-cylinder model Mustangs, Cougars, Falcons and all Comets and Fairlanes, install the links in the ends of the brake cylinders.
4. Install the shoe and adjuster assemblies, then adjust the shoes as outlined in this section.
5. Install the brake drum and wheel, then bleed the brakes and centralize the differential valve (Part 2-1, Section 2).

## WHEEL CYLINDER REPLACEMENT

### REMOVAL

1. With the wheel in a raised position, remove the wheel and the drum.

2. Place a clamp over the ends of the wheel cylinder as shown in Fig. 14).

3. Remove the brake shoe assemblies; following procedures outlined in this section.

4. Disconnect the brake line from the brake cylinder.

To disconnect the hose at a front cylinder, remove the tube fitting that connects the opposite end of the hose to the brake tube at a bracket on the side rail. Remove the horseshoe-type retaining clip from the hose and bracket, disengage the hose from the bracket, then unscrew the entire hose assembly from the front wheel cylinder.

At a rear cylinder, unscrew the tube fitting that connects the tube to the cylinder. **Do not pull the metal tube away from the cylinder. Pulling the tube out of the cylinder connection will bend the metal tube and make installation difficult.** The tube will separate from the cylinder when the cylinder is removed from the backing plate.

5. Remove the wheel cylinder attaching bolts and lock washers and remove the cylinder.

### INSTALLATION

Wipe the end(s) of the hydraulic line to remove any foreign matter before making connections.

**1. To install a front cylinder:**

a. Position the cylinder in place against the backing plate. Install the two lock washers and attaching bolts. Torque them to specifications.

b. Install a new copper gasket over the hose fitting. Thread the hose assembly into the cylinder and tighten it to specified torque (Figs. 20 and 21).

c. Engage the opposite end of the hose to the bracket on the frame. **The stripe on the hose assembly must show no evidence of twist. The brake hose must not touch any other parts during a turn, jounce or rebound.** Install the horseshoe-type retaining clip, and connect the brake tube to the hose with the tube fitting nut. Tighten the nut to specifications with Tool 1112-144.

**2. To install a rear cylinder:**

a. Position the rear wheel cylinder in place against the backing plate. Enter the tubing into the cylinder, and start the tube fitting nut into the threads of the cylinder.

b. Secure the cylinder to the carrier plate with the attaching bolts and lock washers.

c. Tighten the tube fitting nut to specifications.

3. Install the links in the ends of the wheel cylinder (8-cylinder models only on Falcon, Mustang, Cougar and all Comet and Fairlane models).

4. Install the brake shoes as detailed in this section.

5. Adjust the brakes as detailed in Part 2-2, Section 2.

6. Install the brake drums and wheels.

7. Bleed the brakes and centralize the differential valve as detailed in Part 2-1, Section 2.

## BRAKE BACKING PLATE REPLACEMENT

### REMOVAL

1. Remove the wheel and brake drum. Disconnect the brake line from the brake cylinder.

2. Remove the brake shoe and adjuster assemblies and the wheel cylinder as outlined in this section. On the rear wheels, disconnect the parking brake lever from the cable.

3. If the rear backing plate is being replaced, rotate the axle shaft so that the hole in the axle shaft flange lines up with the carrier plate retaining nuts and remove the nuts. Pull the axle shaft assembly out of the housing with tool 4235-C and a slide hammer (Part 4-2), then remove the backing plate. **Use care to prevent damage to the rear axle bearing seal.**

If the front backing plate is being replaced, remove the bolts and nuts that secure the plate to the front wheel spindle and remove the plate.

### INSTALLATION

1. Position a new rear backing plate on the attaching bolts in the axle housing flange. Insert the axle shaft into the housing so that the splines engage the differential side gear with the bearing retainer sliding onto the retaining bolts and against the backing plate. **Use care to prevent damage to the rear axle bearing seal.** Install the attaching nuts through the access hole in the axle shaft flange.

Refer to Group 4, Part 4-2 for the proper installation procedure.

Position a new **front** backing plate to the wheel spindle and install the attaching bolts and nuts.

2. Install the wheel cylinder and connect the brake line as outlined in this section.

3. Install the brake shoe and adjuster assemblies as outlined in this section. On a rear brake, connect the parking brake cable to the lever.

4. Adjust the brake shoes (Section 2).

5. Install the brake drum and wheel. Bleed the brake system and centralize the differential valve as outlined in Part 2-1, Section 2.

## HYDRAULIC LINES

Steel tubing is used throughout the brake system with exception of the flexible hoses at the front wheels and at the rear axle housing brake tube connector (Figs. 20 and 21).

**Always bleed the applicable primary (front) or secondary (rear) brake system after a primary or secondary brake system hose or line replacement.** Centralize the differential valve after bleeding the brake system because vibration will cause tube failure. 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 properly double-flared at both ends to provide good leak-proof connections.** Clean the brake tubing by flushing with clean brake fluid before installation.

When connecting a tube to a hose, tube connector, disc caliper, or brake cylinder, tighten the tube fitting nut to specified torque (Figs. 20 and 21) with Milbar tool 1112-144 or equivalent.

## BRAKE HOSE REPLACEMENT

**If the vehicle is equipped with disc brakes on the front wheels, it will be necessary to remove the front wheel cover, wheel and tire to replace the brake hose.**

When installing a new front brake hose, make certain it is replaced with the proper hose assembly. Install a new gasket over the hose fitting and torque the hose assembly to the wheel cylinder or caliper connection as noted in Figs. 20 and 21. Install the hose into the bracket on the side rail. **Make sure the stripe on the hose shows no evidence of twist.** Install the retaining clip. Connect the tube assembly to the hose, and torque the connector to specification (Figs. 20 and 21).

A rear brake hose should be installed so that it does not touch the muffler outlet pipe or shock absorber.

Since the rear brake hose is integral with the rear brake tube connector, the entire hose and connector is replaced as an assembly. Mount the connector to the rear axle housing with the attaching bolt (axle vent) and lock washer. Connect the two rear wheel brake tubes to the connector. Install the hose in the D slot in the rear hose bracket. Install clip. Connect the tube assembly to the hose, and torque the connector to specification (Figs. 20 and 21).

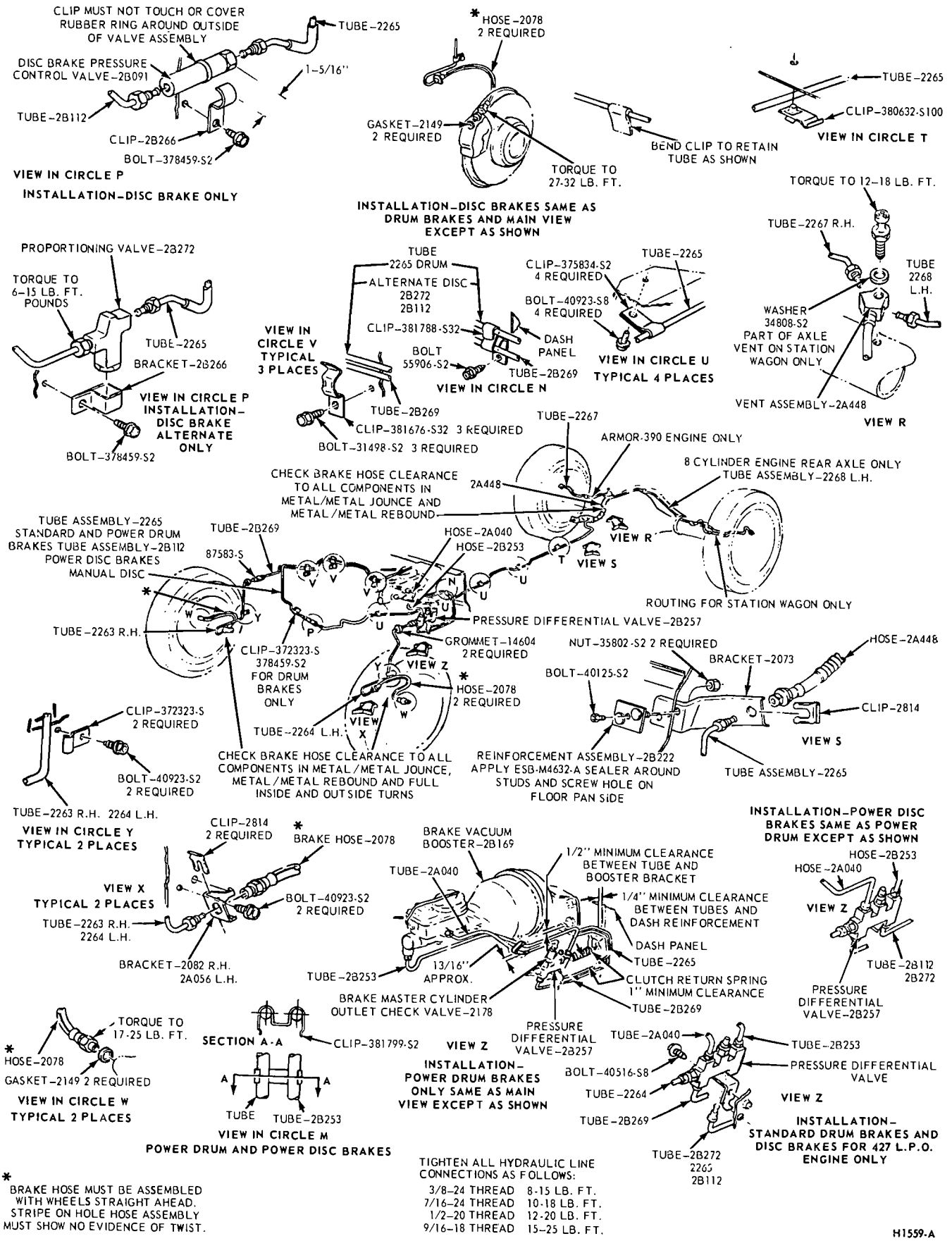



***FIG. 20*—Hydraulic Brake System—Comet—Fairlane and Falcon**

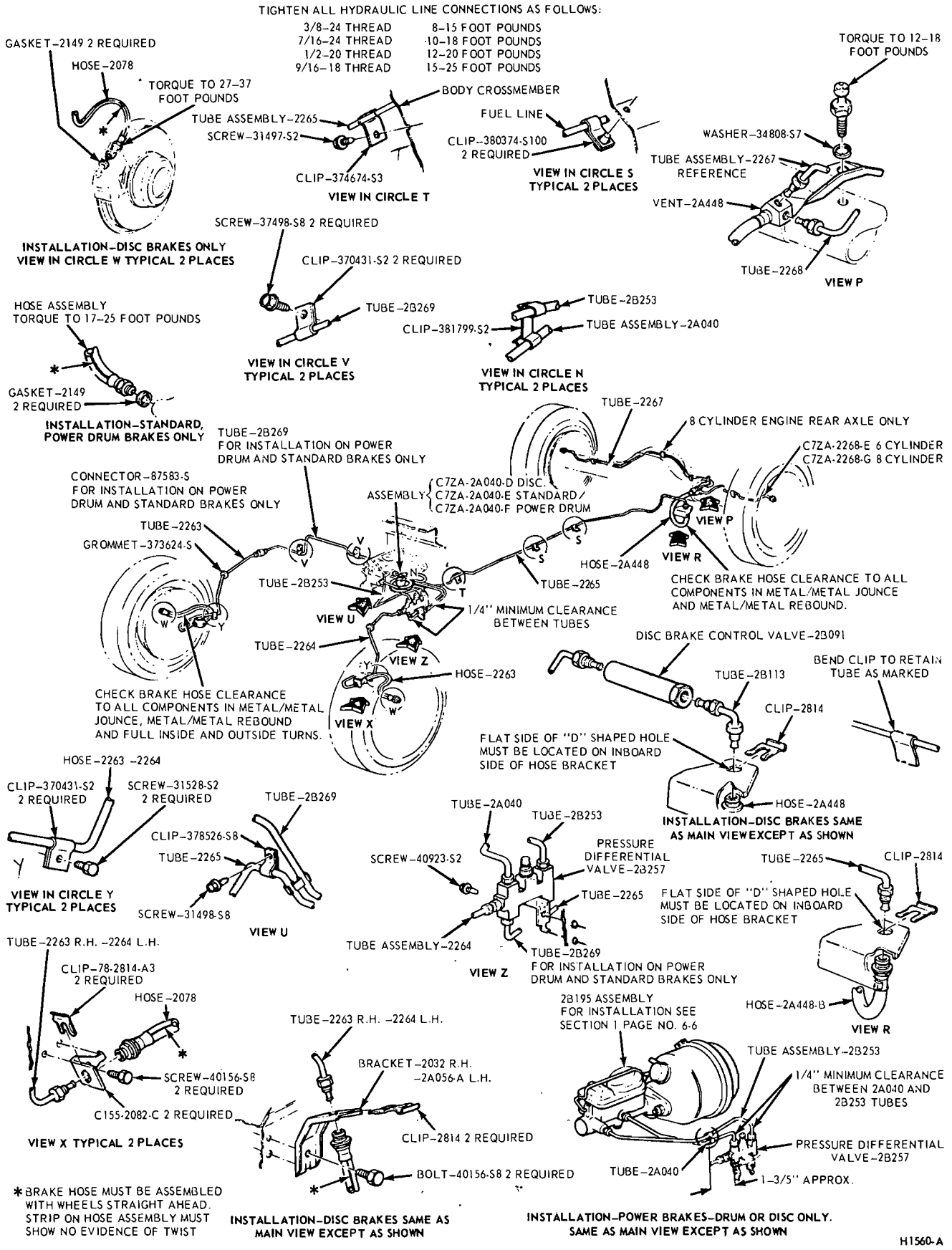



*FIG. 21*—Hydraulic Brake System—Mustang and Cougar

## 3 REMOVAL AND INSTALLATION

### DUAL MASTER CYLINDER — STANDARD BRAKES

#### REMOVAL

Refer to Figs. 22 and 23.

1. Working from inside the vehicle below the instrument panel, disconnect the master cylinder push rod from the brake pedal assembly. **The push rod cannot be removed from the master cylinder.**
2. Disconnect the stoplight switch wires at the connector. Remove the hairpin retainer. Slide the stop light switch off the brake pedal pin just far enough to clear the end of the pin, then lift the switch straight upward from the pin. **Use care to avoid switch damage during removal.**
3. Slide the master cylinder push rod and the nylon washers and bushings of the brake pedal pin.
4. Remove the brake tubes from the primary and secondary outlet ports of the master cylinder.
5. Remove the lock nuts or screws that secure the master cylinder to the dash panel and lift the cylinder forward and upward from the car.

#### INSTALLATION

Refer to Figs. 22 and 23.

1. Position the boot on the push rod and secure the boot to the master cylinder. Carefully insert the master cylinder push rod and boot through the dash panel opening.
2. On Fairlane, Falcon or Comet models, position the master cylinder on the mounting studs on the dash panel. Install the lock nuts on the studs at the dash panel and torque them to specification.
3. On Mustang or Couger models, position the master cylinder on the dash panel. Install the retaining screws and torque them to specification. Coat the nylon bushings with SAE 10W oil. Install the nylon washer and bushing on the brake pedal pin.
4. Position the stop light switch on the brake pedal pin, install the nylon bushing and washer and secure them in position with the hairpin retainer.
5. Connect the wires at the stop light switch connector.
6. Connect the brake lines to the master cylinder leaving the brake line fittings loose.
7. Fill the master cylinder with the specified brake fluid to within 1/4 to 1/2 inch of the dual reservoirs. Use Rotunda Brake Fluid — Extra Heavy Duty — Part Number C6AZ-

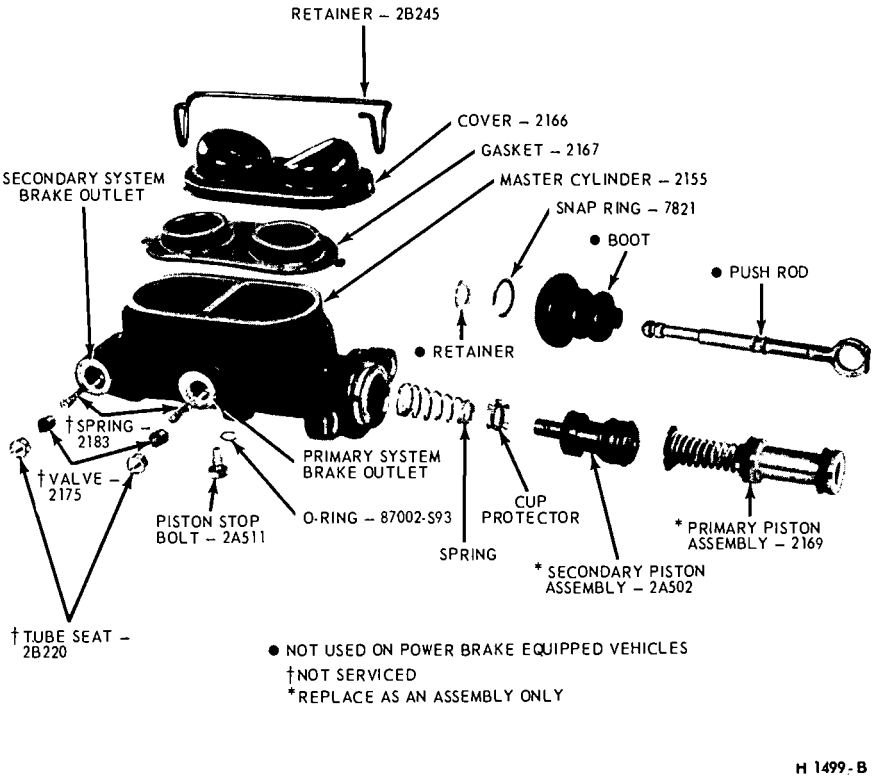



*FIG. 22*—Dual Master Cylinder Disassembled—Except Disc Brakes

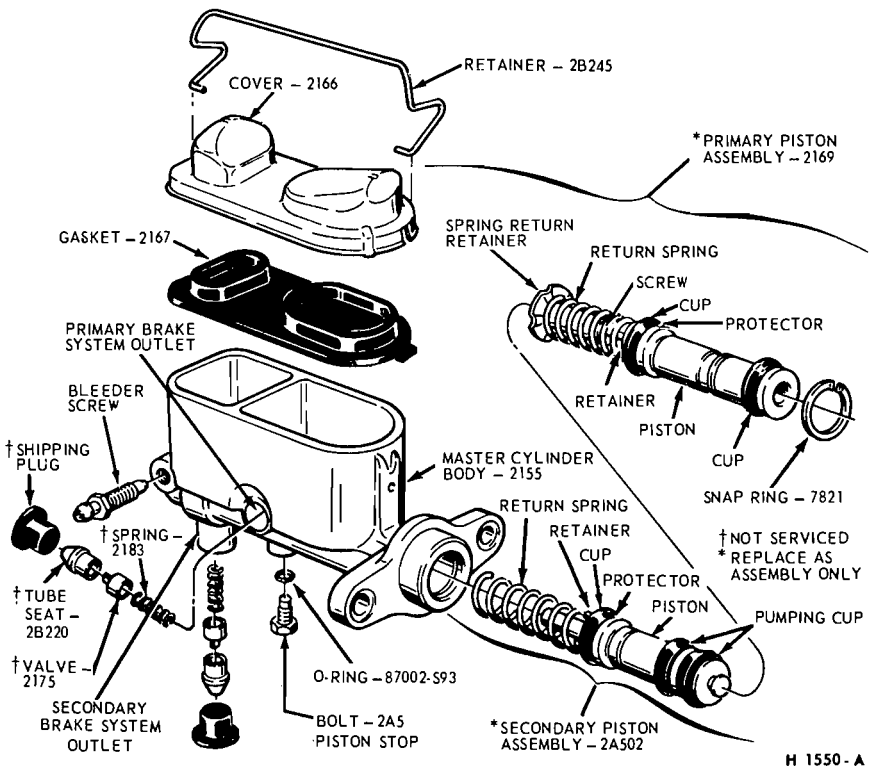



*FIG. 23*—Dual Master Cylinder Disassembled—Disc Brakes

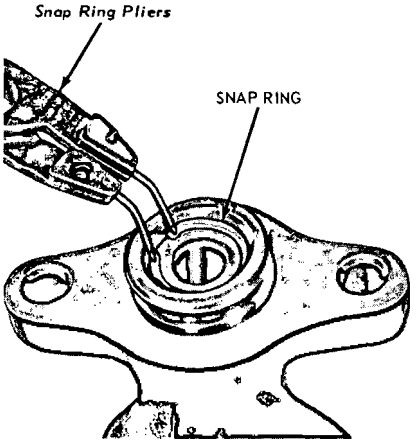



*FIG. 24—Removing Snap Ring—Typical*

19542-A (ESA-M6C25-A) for disc brake applications, and Rotunda Brake Fluid — Part Number B7AZ-19542-A, R 103-A or equivalent for power drum and standard brake applications. **The brake fluid is colored blue for identification. Do not mix low temperature brake fluids with the specified fluid for the power disc brake system.**

8. Bleed the dual-master cylinder and the primary and secondary brake systems. Centralize the pressure differential valve. Refer to Hydraulic System Bleeding and Centralizing of the Differential Valve, Part 2-1, Section 2 for the proper procedure.

9. Operate the brakes several times, then check for external hydraulic leaks.

## DUAL MASTER CYLINDER — POWER BRAKES

Refer to Figs. 24 and 25.

### REMOVAL

1. Remove the brake tubes from the primary and secondary outlet ports of the master cylinder.
2. Remove the two nuts attaching the master cylinder to the brake booster assembly.
3. Slide the master cylinder forward and upward from the vehicle.

### INSTALLATION

1. Before installing the master cylinder, check the distance from the outer end of the booster assembly push rod to the master cylinder mounting surface. Turn the push rod adjusting screw in or out as required to obtain the specified length. Refer to Part 2-1, Section 2, Power Brake Master Cylinder Push Rod Adjustment for the proper procedure.
2. Position the master cylinder assembly over the booster push rod and onto the two studs on the booster assembly.
3. Install the attaching nuts and torque them to specifications.
4. Install the primary (front) and secondary (rear) brake tubes to the master cylinder outlet fittings, and torque them to specification.
5. Fill the master cylinder with the specified brake fluid to within 1/4 to 1/2 inch of the top of the dual reservoirs. Use Rotunda Brake Fluid — Extra Heavy Duty — Part Number C6AZ-19542-A (ESA-M6C25-A) for disc brake applications, and Rotunda Brake Fluid — Part Number B7AZ-19542-A, R 103-A or equivalent for power drum and standard brake applications. **The brake fluid is colored blue for identification. Do not mix low temperature brake fluids with the specified fluid for the disc brake system.**
6. Bleed the dual-master cylinder and the primary and secondary brake systems. Centralize the pressure differential valve. Refer to Hy draulic System Bleeding and Centralizing of the Differential Valve, Part 2-1, Section 2 for the proper procedure.
7. Operate the brakes several times, then check for external hydraulic leaks.

## PRESSURE DIFFERENTIAL VALVE ASSEMBLY

Refer to Figs. 20 and 21.

### REMOVAL

1. Disconnect the brake warning light wire from the pressure differential valve assembly switch. **To prevent damage to the brake warning switch wire connector, expand the plastic lugs to allow removal of the shell-wire connector from the switch body.**
2. Loosen the tube nut connecting the primary (front brake) system inlet tube at the top of the pressure differential valve assembly and disconnect the tube.
3. Disconnect the primary system left front brake outlet tube from the top side of the pressure differential valve assembly.
4. Disconnect the primary system right front brake outlet tube from the top side of the differential valve assembly.
5. Disconnect the secondary (rear brake) system inlet tube at the lower side of the pressure differential valve assembly.

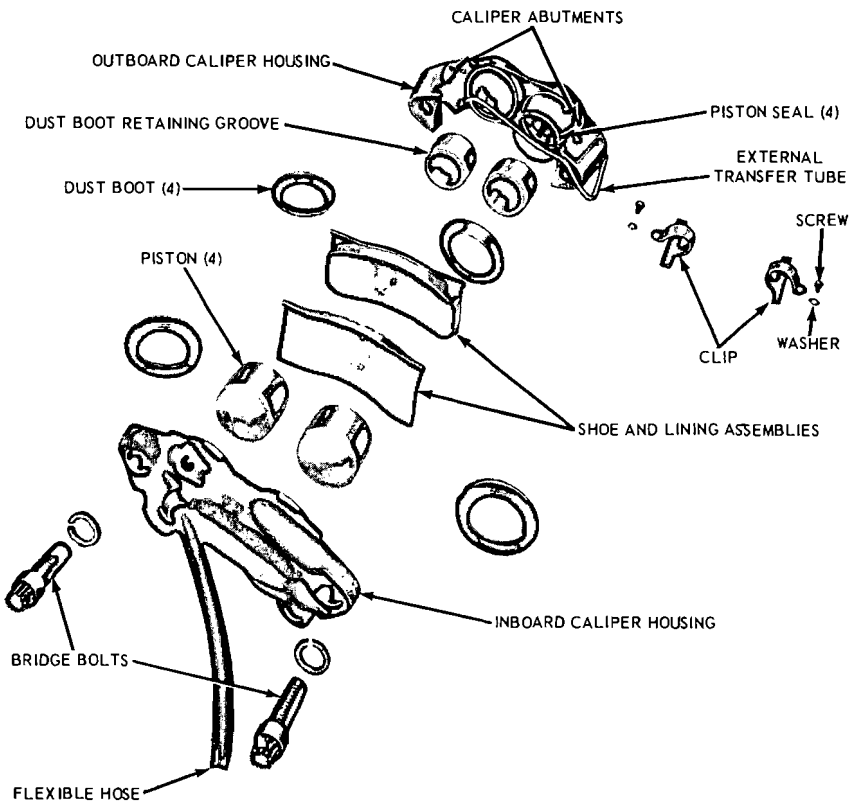



*FIG. 25—Caliper Assembly—Disassembled*

6. Disconnect the secondary system rear brake outlet tube from the lower side pressure differential valve assembly.

7. Remove the screw retaining the pressure differential valve assembly to the vehicle and remove the differential valve assembly.

8. If the differential valve is to be replaced, remove the brake warning lamp switch and install the switch in the new differential valve. **The pressure differential valve assembly and the brake warning lamp switch are separate units and each is serviced as a separate assembly only.**

9. On disc brake equipped vehicles, remove front wheel covers. Remove front wheel and tire assemblies.

### INSTALLATION

1. Mount the pressure differential valve assembly on the vehicle and tighten the attaching screw.

2. Connect the rear brake system inlet tube to the pressure differential valve assembly and tighten the tube nut to the specified torque (Refer to Part 2-3).

3. Connect the rear brake system outlet tube to the pressure differential valve assembly. Tighten the tube nut to the specified torque.

4. Connect the front brake system inlet tube to the pressure differential valve assembly and tighten the tube nut to the specified torque.

5. Connect the right front brake outlet tube to the pressure differential valve assembly. Tighten the tube nut to the specified torque.

6. Connect the left front brake outlet tube to the pressure differential valve assembly. Tighten the tube nut to the specified torque.

7. Connect the shell-wire connector to the brake warning lamp switch. **Make sure the plastic lugs on the connector hold the connector securely to the switch.**

8. Bleed the brakes and centralize the pressure differential valve (Part 2-1, Section 2).

9. On disc brake equipped cars, install front wheel and tire assemblies, and torque the retaining nuts to specification. Install wheel covers.

## BRAKE BOOSTER

Refer to Figs. 24 and 25.

### REMOVAL

1. Working from inside the vehicle below the instrument panel, disconnect the booster push rod link from the brake pedal assembly. To do this, proceed as follows:

Disconnect the stop light switch wires at the connector. Remove the hairpin retainer. Slide the stop light switch off from the brake pedal pin **just far enough for the switch outer hole to clear the pin,** and then lift the switch straight **upward** from the pin. Be careful not to damage the switch during removal. Slide the master cylinder push rod and the nylon washers and bushing off the brake pedal pin.

2. Open the hood. Disconnect the master cylinder outlet front and rear tubes from the master cylinder and the differential valve. Remove the master cylinder from the booster. Secure it to one side without disturbing the hydraulic lines.

3. Disconnect the manifold vacuum hose from the booster unit. If the vehicle is equipped with an automatic transmission disconnect the transmission vacuum unit hose.

4. Remove the four bracket-to-dash panel attaching nuts or bolts. Remove the booster and bracket assembly from the dash panel, sliding the push rod link out from the engine side of the dash panel.

5. Remove the push rod link boot from the dash panel.

### INSTALLATION

Refer to Figs. 24 and 25.

1. Install the push rod link boot in the hole in the dash panel.

2. On Falcon, Comet, Fairlane vehicles, mount the booster and bracket assembly to the dash panel by sliding the bracket onto the mounting studs and the push rod link in through the hole and boot in the dash panel. Install the bracket-to-dash panel attaching locknuts and torque them to specification.

3. On Mustang and Couger vehicles, mount the booster and bracket assembly to the dash panel by sliding the push rod link in through the hole and boot in the dash panel. Install the bracket to dash panel attaching bolts and torque them to specification. Connect the manifold vacuum hose to the booster. If the vehicle is equipped with an automatic transmission, connect the transmission vacuum unit hose.

4. Before installing the master cylinder, check the distance from the outer end of the booster assembly push rod to master cylinder surface. Turn the screw in or out to obtain the specified length. Refer to Part 2-1, Section 2, Power Brake Master Cylinder Push Rod Adjustment. Install the master cylinder and torque the retaining nuts to specifications.

5. Working from inside the vehicle below the instrument panel, connect the booster push rod link to the brake pedal assembly. To do this, proceed as follows:

Apply a coating of SAE 10 engine oil to the bushings. Install the inner nylon washer, the master cylinder push rod, and the bushing on the brake pedal pin. Position the switch so that it straddles the push rod with the switch slot on the pedal pin and the switch outer hole just clearing the pin. Slide the switch completely onto the pin, and install the nylon washer. **Be careful not to bend or deform the switch.** Secure these parts to the pin with the hairpin retainer. Connect the stop light switch wires to the connector, and install the wires in the retaining clip.

6. Connect the master cylinder outlet front and rear tubes to the master cylinder and the differential valve. Torque the brake tube fittings to specification (Figs. 20 and 21). Bleed the brake system and centralize the pressure differential valve.

7. Check the brake booster for proper operation. Check the vacuum lines for leakage.

## BRAKE PEDAL

### REMOVAL—MANUAL SHIFT TRANSMISSION

1. On a Falcon, Comet or Fairlane, remove the clutch pedal assist spring.

On a Mustang, remove the pedal bumper and bracket assembly from the pedal support bracket to relieve the tension on the assist spring, and then remove the spring.

2. Disconnect the clutch pedal-to-equalizer rod at the clutch pedal by removing the hairpin type retainer and bushing.

3. Disconnect the stop light switch wires at the connector.

4. Remove the switch retainer, and slide the stop light switch off the brake pedal pin just far enough for the switch outer hole to clear the pin. Then lower the switch away from the pin.

5. Slide the master cylinder push rod and the nylon washers and bushing off from the brake pedal pin (Figs. 22 and 23).

6. Remove the self-locking pin and washer from the clutch and brake pedal shaft, then remove the clutch pedal and shaft assembly, the brake pedal assembly, and the bushings from the pedal support bracket (Figs. 22 and 23).

### INSTALLATION

1. Apply a coating of SAE 10 en-

gine oil to the bushings and locate all bushings in their proper places on the clutch and brake pedal assemblies.

2. Position the brake pedal to the support bracket, then install the clutch pedal and shaft assembly through the support bracket and brake pedal assembly. Install the spring washer and retainer. (Fig. 22 and 23).

3. Install the split bushing in the spring groove of the clutch pedal. Hook the clutch assist spring to the groove and to the spring retainer.

4. Connect the clutch pedal to equalizer rod to the clutch pedal assembly with the bushing and the hair-pin retainer. Apply SAE 10 engine oil to the bushing.

5. Install the inner nylon washer, the master cylinder push rod, and the bushing on the brake pedal pin. Position the switch so that it straddles the push rod with the switch slot on the pedal pin and the switch outer hole just clearing the pin. Slide the switch completely onto the pin, and install the outer nylon washer as shown in Fig. 23 and 23. Secure these parts to the pin with the self-locking pin.

6. Connect the stop light switch wires to the connector, and install the wires to the retaining clip.

7. Adjust the clutch pedal free play (Group 5) to specification, if required.

8. Check the Brake Pedal Free Height and Travel Measurements (Part 2-1, Section 1).

### REMOVAL—AUTOMATIC TRANSMISSION

1. Disconnect the stop light switch wires at the connector.

2. Remove the self-locking pin and slide the stop light switch off the brake pedal pin **just far enough for the switch outer hole to clear the pin.** Then lower the switch away from the pin. Slide the master cylinder push rod and the nylon washers and bushing off from the brake pedal pin (Fig. 22 and 23).

3. Remove the self-locking pin and washer from the brake pedal shaft, then remove the shaft, the brake pedal assembly and the bushings from the pedal support bracket.

### INSTALLATION

1. Apply a coating of SAE10 engine oil to the bushings and locate all the bushings in their proper places on the pedal assembly and pedal support bracket (Fig. 22).

2. Position the brake pedal assembly to the support bracket, then install the pedal shaft through the support bracket and brake pedal assembly. Install the washer and self-locking pin.

3. Install the inner nylon washer, the master cylinder push rod, and the bushing on the brake pedal pin. Position the switch so that it straddles the push rod with the switch slot on the pedal pin, and the switch outer hole just clearing the pin. Slide the switch completely onto the pin, and install the outer nylon washer as shown in Fig. 22. Secure these parts to the pin with the self-locking pin.

4. Connect the stop light switch wires to the connector, and install the wires in the retaining clip.

Check the Brake Pedal Free Height and Travel Measurements, Part 2, Section 1.

## PARKING BRAKE CONTROL ASSEMBLY

### REMOVAL—MUSTANG AND COUGAR

Refer to Fig. 26.

1. Remove the two screws and nuts that hold the control bracket on the instrument panel.

2. Remove the two nuts that secure the control to the dash panel.

3. Remove the hairpin clip and clevis pin that secures the pulley to the control handle assembly.

4. Disengage the locking pawl. Slide the rod forward and remove the ball on the cable from the slot on the control assembly. Remove the control from the vehicle.

### INSTALLATION

1. Disengage the locking pawl. Slide the rod forward and connect the ball end of the cable to the slot in the control assembly and pull the rod rearward, engaging the pawl in the ratchet.

2. Assemble the pulley to the control handle and the clevis pin. Install the clevis retainer.

3. Position the assembly against the dash panel and instrument panel. Secure the assembly to the instrument panel with the two screws and nuts.

4. Working under the hood, install the two parking brake control to dash panel attaching nuts.

5. Check the parking brake for proper operation. Adjust the parking brake (Part 2-1, Section 2).

### REMOVAL—FAIRLANE, FALCON AND COMET

Refer to Fig. 27.

1. Make sure the parking brake is completely released.

2. Remove the left cowl side (kick) panel. Disconnect the wire lead at the parking brake light switch.

3. Remove the rubber stop and the parking brake cable ball retainer. Disconnect the cable ball from the brake assembly.

4. Remove the parking brake light switch and the attaching screw.

5. Remove the three screws that attach the control assembly to the left cowl inner side panel.

6. Pull the control away from the cowl panel. Remove the hair-pin retainer securing the cable housing to the control assembly. Remove the control assembly.

### INSTALLATION

1. Connect the ball-end of the parking brake cable to the control, and install the hair-pin retainer.

2. Position the control assembly to the cowl inner side panel and install the three attaching screws. Torque the screws to specification.

3. Position the parking brake light switch and install the attaching screw. Connect the switch wire lead.

4. Position the cable ball and install the nylon retainer and rubber stop.

5. Install the cowl side (kick) panel.

6. Check the operation of the parking brake switch and the parking brake. Adjust the parking brake, as required (Part 2-1, Section 2).

## PARKING BRAKE EQUALIZER TO CONTROL CABLE

### REMOVAL—MUSTANG AND COUGAR

1. Remove the attaching screws and insulator-bracket from the dash panel (Fig. 26).

2. Remove the parking brake control assembly and disengage the cable from the handle as outlined under Parking Brake Control in this section.

3. Pull the cable down through the hole in the dash panel.

4. Raise the vehicle on a hoist. Remove the hairpin retainer, and disengage the cable and conduit assem-

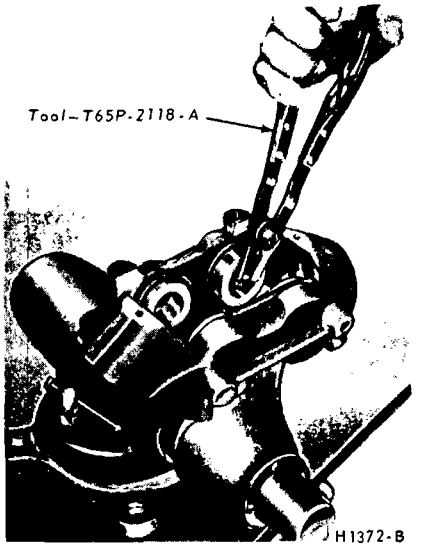



*FIG. 26*—Removing or Installing Pistons

bly from the bracket on the inner side rail.

5. Disconnect the cable stepped-rod from the equalizer lever. Pull the cable forward through the crossmember and remove the cable from the vehicle.

### INSTALLATION

1. Pass the stepped-rod rearward through the crossmember and connect it into the equalizer lever.

2. Engage the cable and conduit assembly to the bracket on the inner side rail and secure with the hairpin retainer.

3. Push the upper end of the cable up through the hole in the dash panel.

4. Connect the cable upper ball to the parking brake control assembly, and install the control assembly as outlined in this section.

5. Position the cable insulator in the dash panel cable hole and secure the insulator to the dash panel with two attaching screws.

### REMOVAL—FAIRLANE, COMET, FALCON

Refer to Fig. 27.

1. Working from inside the vehicle, position the floor cover back and remove the retaining screws securing the cable shield plate to the dash panel.

2. Position the parking brake in the ON position and remove the rubber stop and nylon cable retainer from the brake assembly.

3. Position the parking brake in the OFF position and remove the cable ball from the notch in the brake control assembly.

4. Remove the hairpin retainer and remove the cable housing from the brake assembly.

5. Raise the vehicle on a hoist. Remove the two nuts that attach the cable to the equalizer and spring. Remove the rear cable retainer, spring seat and spring.

6. Remove the hairpin retainer holding the cable housing to the body bracket and remove the cable assembly from the vehicle.

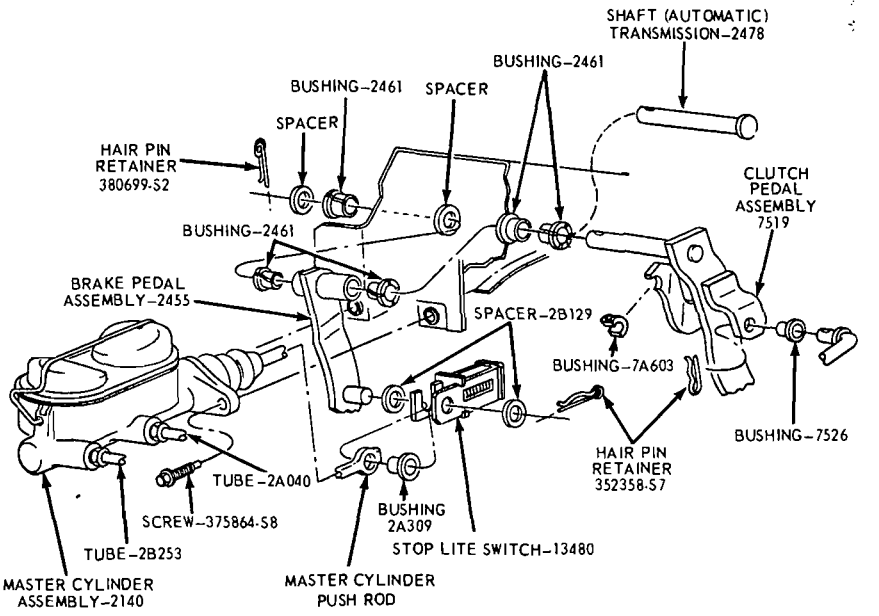



*FIG. 27*—Dual-Brake System Master Cylinder Installation — Mustang and Cougar Without Power Brakes

### INSTALLATION

1. Position the cable housing through the opening in the floor and pull the cable grommet into position from under the vehicle.

2. Position the cable on the body bracket and install the hairpin retainer.

3. Position the spring, spring seat and the rear cable retainer. Install the two retaining (adjusting) nuts.

4. Lower the vehicle.

5. Connect the cable housing to the brake control assembly and install the hairpin retainer. Position the ball-end of the cable to the brake control assembly and install the nylon retainer and rubber bumper.

6. Position the cable shield plate to the dash panel and install the retaining screws. Position the floor covering.

7. Raise the vehicle and adjust the parking brake. Refer to Parking Brake Linkage Adjustment, Part 2-1, Section 2 for the proper procedure.

8. Lower the vehicle.

## PARKING BRAKE EQUALIZER TO REAR WHEEL CABLE

**A single cable passing through the equalizer and cable guides connects both parking brake assemblies on Comet and Fairlane station wagons and on Falcon vehicles. Separate cables for each parking brake are used on Mustang, Cougar, Comet and Fairlane passenger models.**

### FAIRLANE AND COMET PASSENGER MODELS

#### Removal

1. Remove the equalizer lock nut and adjusting nut, equalizer, spring and spring seat.

2. With the cables slack, disconnect the ball-ends from the connector (Fig. 27).
3. Remove the cable from the retainer hooks (station wagon models) and the underbody guide (convertible models) if required.
4. Remove the hairpin lock retaining the cable housing to the side rail bracket.
5. Remove the wheel cover, wheel and tire and the rear brake drum as outlined in Section 2.
6. Remove self-adjuster springs to allow clearance to remove cable retainer from the backing plate. Disconnect the rear end of the cable from the parking brake lever on the brake shoe. Disengage the cable housing retaining grommet or steel-pronged Hi-Hat from the backing plate and withdraw the cable and housing from the inboard side of the backing plate.
7. Slide the cable and housing out of the side rail bracket.

#### Installation

1. Insert the rear end of the cable through the side rail bracket and pull the cable and housing into position.
2. Insert the rear end of the cable and housing through the hole in the backing plate from the inboard side.
3. Connect the cable to the parking brake lever on the brake shoe and install the cable housing retaining grommet or steel-pronged Hi-Hat in the backing plate.
4. Install the self-adjuster springs. Position the cable housing in the side rail bracket and install the hairpin type retainer.
5. Install rear hub and drum assembly, wheel and tire assemblies and wheel cover as outlined in Section 2.
6. Position the cable retainer hooks (station wagon models) in the underbody guide (convertible models) and install the connector, thus hooking the two cables together.
7. Insert the cable into the equalizer and install the equalizer, spring seat, spring, adjusting nut and lock nut to the front, parking brake control cable.
8. Adjust the parking brake as directed in Part 2-1, Section 2.

### FAIRLANE AND COMET STATION WAGONS AND FALCON PASSENGER MODELS

#### Removal And Installation

Generally follow the procedure given above, omitting separation of the cables, since the parking brake rear cable assemblies supplied for these models is in one piece. Removal and installation of both rear wheels, tires and drums will also be required.

### MUSTANG AND COUGAR

Refer to Fig. 26.

#### Removal

1. Raise the vehicle on a hoist.
2. Position the parking brake in the OFF position.
3. Loosen the adjusting nut and remove rear parking brake cable ball end from the connector.
4. Remove the adjusting nut from the equalizer rod and remove the cable from the equalizer.
5. Remove the hairpin retainer securing the rear cable to the frame bracket. Remove the cable from the bracket.
6. Remove the wheel cover, wheel and tire, and rear brake drum as outlined in Section 2.
7. Remove the self-adjuster springs to allow clearance to remove the cable retainer from the backing plate. Disconnect the rear end of the cable from the parking brake lever on the brake shoe.
8. Disengage the cable housing pronged-retainer grommet from the backing plate and withdraw the cable and housing from the inboard side of the backing plate. Remove the cable from the vehicle.

#### Installation

1. On convertible models, insert the rear end of the cable through the underbody crossmember guide holes.
2. Insert the rear end of the cable and housing through the hole in the backing plate from the inboard side.
3. Connect the cable to the parking brake lever on the brake shoe, and securely install the cable housing pronged retainer in the backing plate.
4. Install the self-adjuster springs. Position the cable housing in the side rail bracket and install the hair pin type retainer.
5. Install the rear drum assembly, wheel and tire assemblies and wheel cover as outlined in Section 2.
6. Insert the cable ball ends in the connector. Position the equalizer on the equalizer rod. Insert the cable into the equalizer, and install the adjusting lock nut.
7. Adjust the parking brake as directed in Part 2-1, Section 2.

## 4 MAJOR REPAIR OPERATIONS

### BRAKE DRUM REFINISHING

The 6-cylinder Falcon and Mustang models are equipped with 9-inch brake drums. All other models are equipped with 10-inch drums.

Minor scores on a brake drum can be removed with a fine emery cloth. A drum that is excessively scored or shows a total indicator runout of over 0.007 inch should be turned down. Remove only enough stock to eliminate the scores and true up the drum. The refinished diameter must not exceed 0.060 inch oversize.

If the drum diameter is less than 0.030 inch oversize 9.030 inches 6-cylinder Falcon or Mustang, or 10.030 inches on other models after refinishing, standard lining may be installed. If the drum diameter is more than 9.030 inches or 10.030 inches, oversize linings must be installed.

After a drum is turned down, wipe the refinished surface with a cloth soaked in clean denatured alcohol. If one drum is turned down, the opposite drum on the same axle should also be cut down to the same size.

### ROTOR REFINISHING

Rotunda Disc Brake Attachment, FRE 2249-2, is the **only approved tool** to be used to refinish disc brake rotors. The step-by-step resurfacing procedure provided with the tool must be adhered to.

The finished braking surfaces of the rotor must be flat and parallel within 0.0007 inch; lateral runout

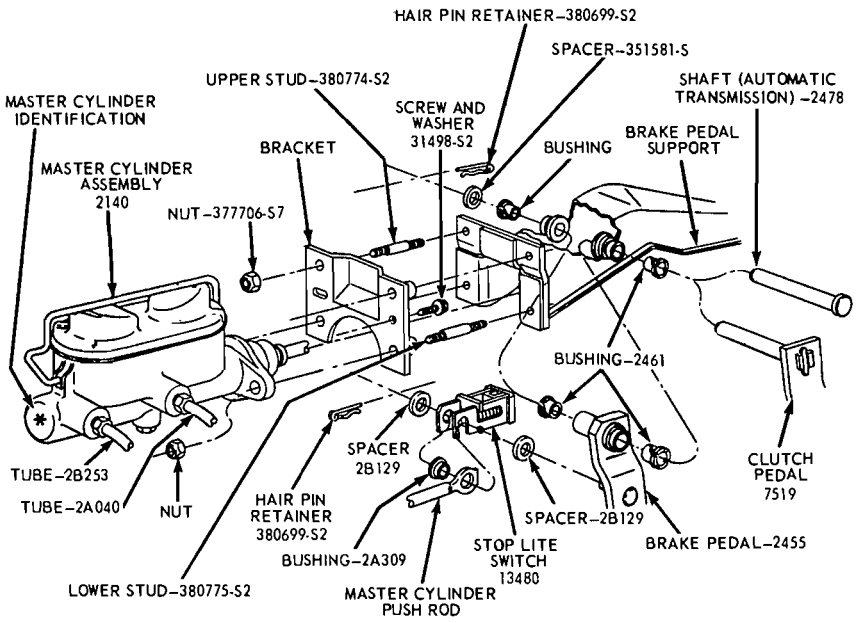



*FIG. 28*—Dual-Brake System Master Cylinder Installation — Falcon, Fairlane and Comet Without Power Brakes

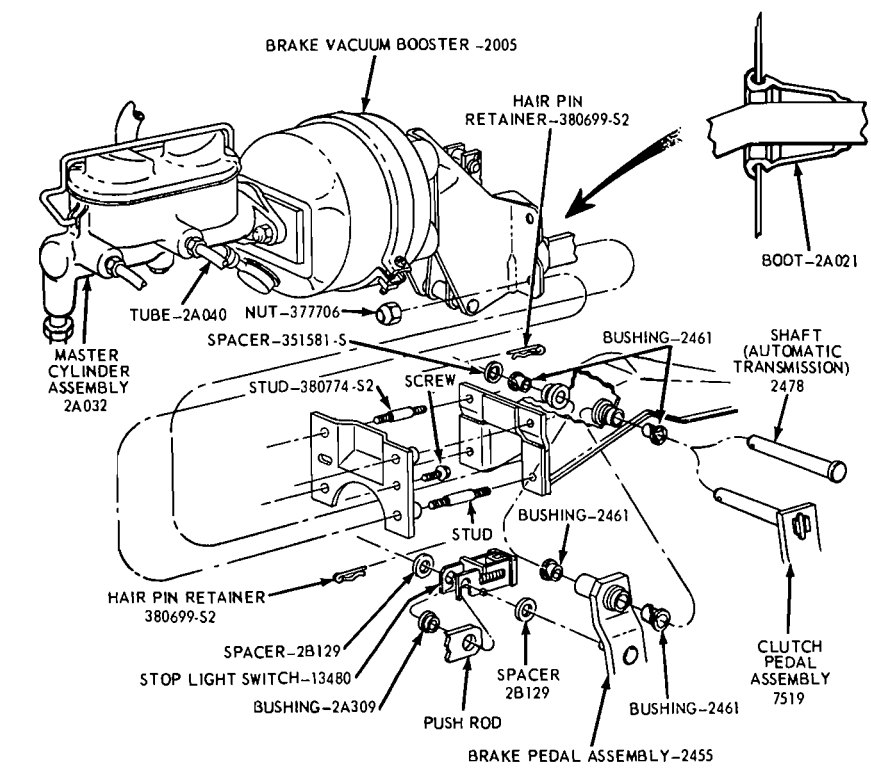



*FIG. 29*—Vacuum Brake Booster Installation — Comet, Fairlane and Falcon

must not exceed 0.002 inch total indicator reading, and the surface finish of the braking surfaces are to be 85/15 micro inches. The minimum limiting dimensions (Fig. 10, Part 2-1) from the inboard bearing cup to the outboard rotor face (dimension A) and from the inboard rotor face (dimension B) must be observed when removing material from the rotor braking surfaces.

## BRAKE SHOE RELINING

Brake linings that are worn to within 1/32 inch of any rivet or have been contaminated with brake fluid, grease or oil should be replaced. Failure to replace worn linings will result in a scored drum. **When it is necessary to replace linings on one side, they must also be replaced on the wheel on the opposite side of the vehicle.**

Inspect brake shoes for distortion, cracks, or looseness. If this condition exists, the shoe must be discarded. **Do not repair a defective brake shoe.**

## DUAL MASTER CYLINDER

### DISASSEMBLY

1. Clean the outside of the master cylinder and remove the filler cover and diaphragm. Pour out any brake fluid that remains in the cylinder.
2. Remove the secondary piston stop bolt from the bottom of the cylinder (Figs. 28 and 29).
3. Remove the bleed screw, if required.
4. Remove the snap ring from the retaining groove at the rear of the master cylinder bore (Fig. 30). Remove the push rod and the primary piston assembly from the master cylinder bore. **Do not remove the screw that retains the primary return spring retainer, return spring, primary cup retainer, primary cup and protector on the primary piston. This assembly is factory pre-adjusted and should not be disassembled.**
5. Remove the secondary piston, pumping cups and protectors, primary cup, primary cup retainer and the secondary piston return spring. **Do not remove the outlet tube seats, outlet check valves and outlet check valve springs from the master cylinder body.**

### INSPECTION AND REPAIR

1. Clean all parts in clean denatured alcohol, and inspect the parts for chipping, excessive wear or damage. Replace them as required. **When**

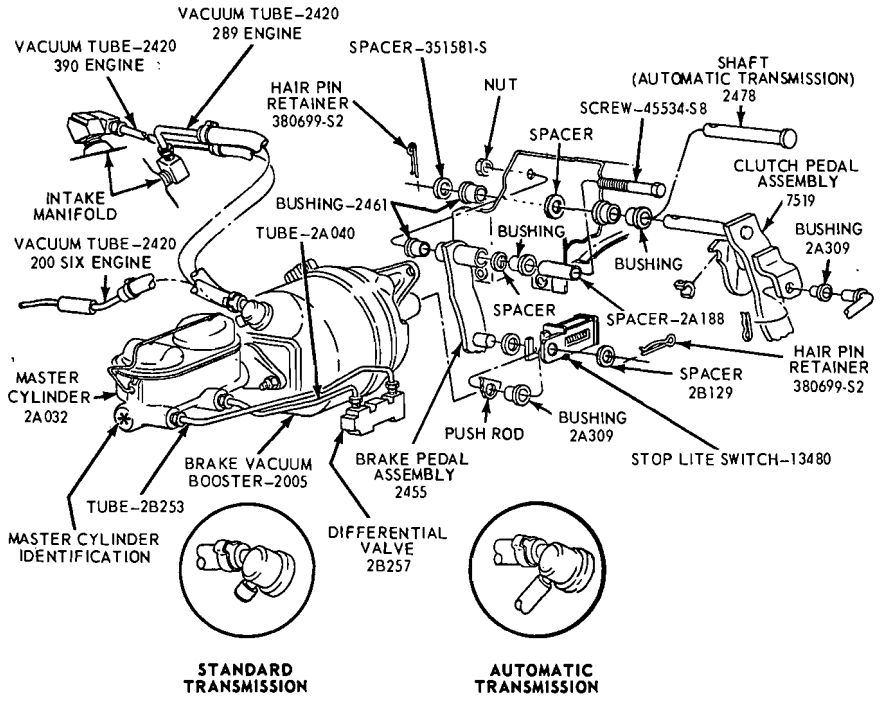



*FIG. 30*—Vacuum Brake Booster Installation — Mustang and Cougar

**using a master cylinder repair kit, install all the parts supplied.**

2. Check all recesses, openings and internal passages to be sure they are open and free of foreign matter. Use an air hose to blow out dirt and cleaning solvent. Place all parts on a clean pan or paper.

3. Inspect the master cylinder bore for signs of etching, pitting, scoring or rust. If it is necessary to hone the master cylinder bore to repair damage, do not exceed allowable hone specifications.

### ASSEMBLY

1. Dip all parts except the master cylinder body in clean Rotunda Extra Heavy Duty Brake Fluid.

2. Install the seal and pumping cup on the secondary piston (Figs. 28 and 29). Install the protector and brake master cylinder primary cup on the secondary piston, then install the primary cup retainer and secondary piston return spring on the secondary piston. **Care must be taken to assure the protector is installed.**

3. Carefully insert the complete secondary piston and return spring assembly in the master cylinder bore.

4. Install the primary piston and return spring assembly in the master cylinder bore.

5. Install the push rod retainer on the push rod, if so equipped. Install the push rod assembly in the cylinder bore. **Make sure the retainer is properly seated and holding the push rod securely.**

6. Depress the primary piston and install the snap ring in the cylinder bore groove.

7. Position the inner end of the push rod boot (if so equipped) in the master cylinder body retaining groove.

8. Install the secondary piston stop bolt and gasket in the bottom of the master cylinder.

9. Install the bleed screw (if so equipped). Install the gasket (diaphragm) in the master cylinder filler cover. Position the gasket as shown in Figs. 28 and 29. **Make sure the gasket is securely seated.**

10. Install the cover and gasket on the master cylinder and secure the cover into position with the retainer.

## DISC BRAKE CALIPER

### DISASSEMBLY

**Do not remove the bridge bolts that hold the two halves of the caliper together. The two caliper housings are shown separated in Fig. 31 for illustration purposes only.**

1. Remove the caliper assembly from the vehicle as outlined in Section 2.

2. Remove the two attaching bolts and the caliper clips (Fig. 31).

3. Remove the two shoe and lining assemblies.

4. Remove the flexible brake hose from the caliper.

5. Remove the external transfer tube.

6. Clamp the caliper in a vise and secure it by the mounting flanges on the inboard housing (Fig. 32).

7. Remove the four pistons from the cylinder bores with the special tool shown in Fig. 32. The caliper pistons must be removed prior to removal of the dust boot. As the piston is withdrawn from the caliper, spread the dust boot back over the piston. To prevent cocking with consequent damage to the piston or bore, rotate the piston with the tool while pulling it outward at the same time. **Be careful to avoid scratching or damaging the outside diameter surface or dust boot. Such damage causes poor sealing.**

If a piston is so completely seized in the cylinder bore that it can not be removed with the special tool, force the cylinder out of the bore by positioning two screwdrivers in the piston dust boot retaining groove and prying outward. To prevent cocking, tap the end of the piston lightly around the circumference with a hammer, while the prying force is being applied. Be careful to avoid damaging the dust boot retainer in the caliper housing (Fig. 32). If this method of removal is used, the pistons must be replaced.

8. Remove the dust boots from the caliper assembly.

9. Remove the rubber piston seals from the grooves in the cylinder bores by carefully inserting the point of a small knife or other pointed instrument under the seal and raising the seal up far enough to be pulled out with the fingers.

### CLEANING AND INSPECTION

Clean all metal parts with brake fluid or a suitable solvent (Fig. 32). Use clean, dry, compressed air to clean out and dry the grooves and passageways. Be sure that the caliper bore and component parts are completely free of any foreign material.

Check the cylinder bores and pistons for damage or excessive wear. Replace the piston if it is pitted, scored, or the chrome plating is worn off.

### ASSEMBLY

1. Clamp the caliper in a vise and secure it by the mounting flange on the inboard housing.

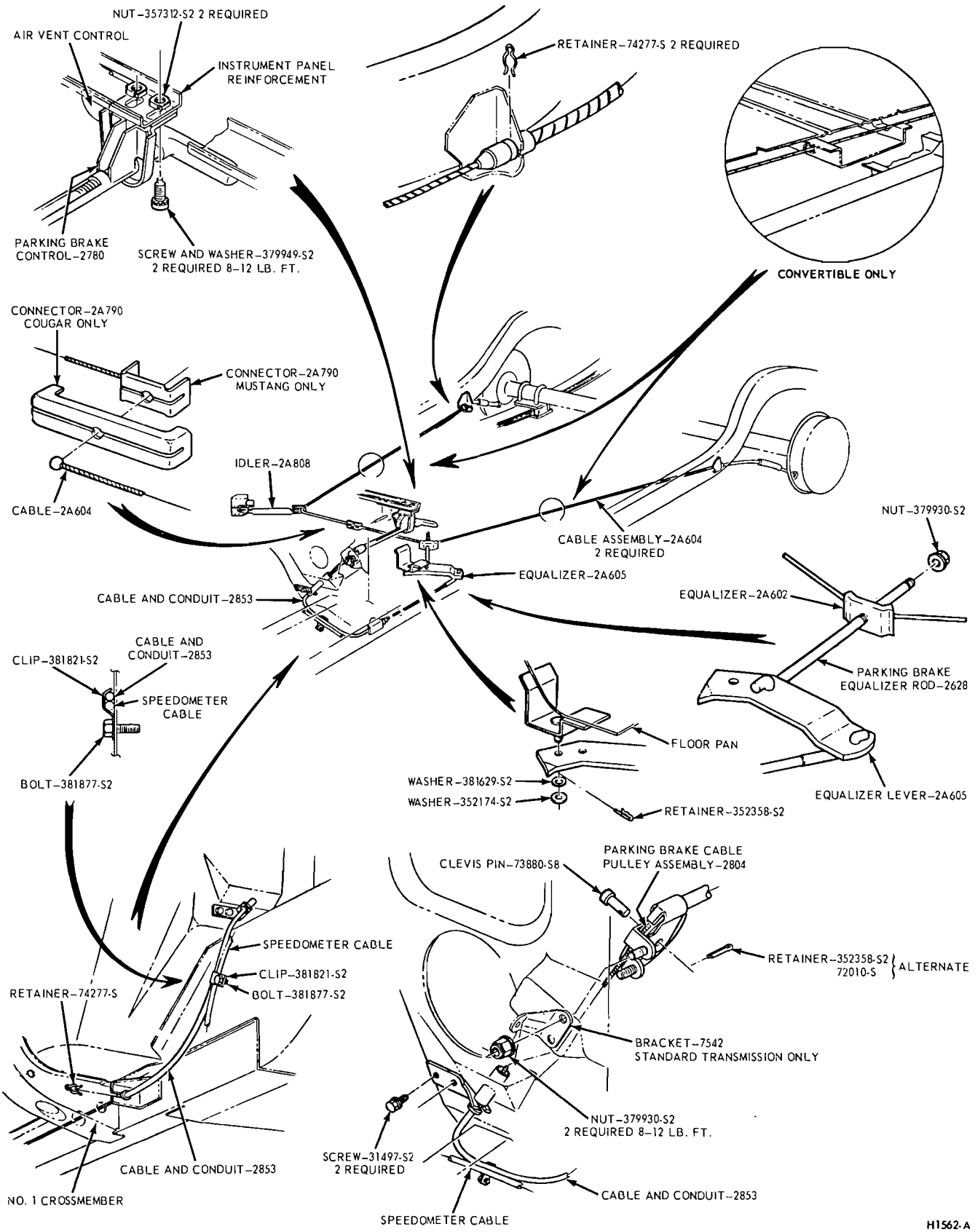



*FIG. 31*—Parking Brake Linkage — Mustang and Cougar

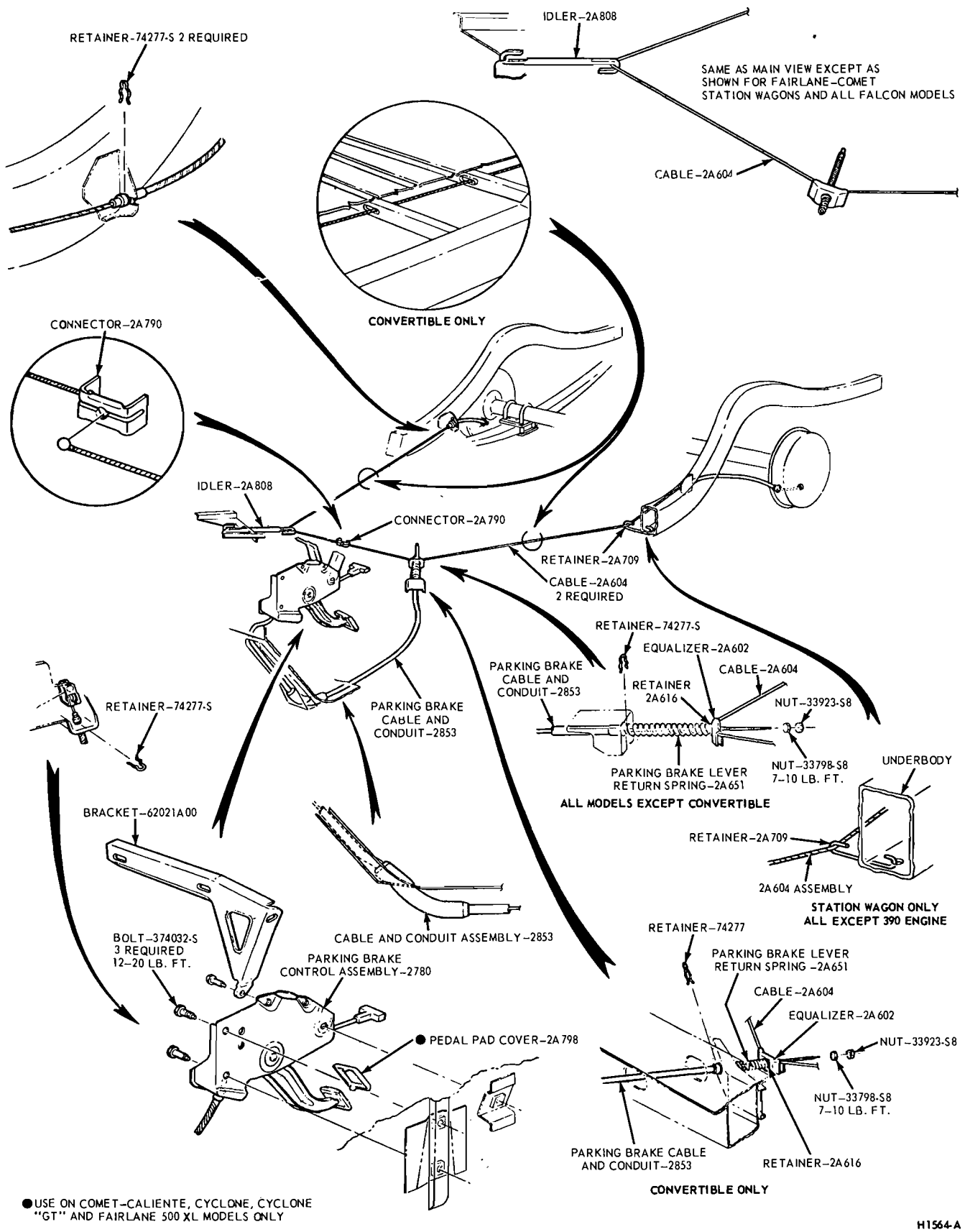



*FIG. 32*—**Parking Brake Linkage—Fairlane, Falcon and Comet**

2. The new caliper seals must be flat-round and not twisted when setting freely on a clean surface. Discard any new seals that have been deformed in shipping or storage. Installation of deformed seals may result in seal leakage.

3. Apply a film of clean brake fluid to new caliper piston seals and install them in the grooves of the cylinder bore. The seal should be positioned at one area in the groove and gently worked around. **Do not re-use the original seals.**

4. Install the new dust boots by seating the boot flange in the outer caliper bore groove. Position in one area and gently work around until fully seated. **Do not re-use the old dust boots.**

5. Coat the outside diameter of the pistons with brake fluid and install them in the cylinder bores so that the open end of the piston and the boot retaining groove face out of the bore. Spread the dust boot over the piston as the piston is being installed. To avoid cocking, locate the piston squarely in the bore and apply a slow steady pressure. If a piston will not easily go all the way into the bore, remove it and thoroughly inspect the cylinder bore, the piston seal and the installation of the seal. If the piston still will not go in with the bore in good condition and the piston seal properly installed, use the tool shown in Fig. 32. Rotate the piston with the tool while pushing it inward at the same time. Seat the dust boots carefully in the piston groove. Be sure that each boot is fully seated in their groove.

6. Install the external transfer tube.

7. Install a new gasket and the flexible brake hose to the caliper. Torque the hose connector to specification (Figs. 20 and 21).

8. Install the caliper assembly on the spindle, and install the shoe and lining assemblies and the splash shield as outlined in Section 2. Check the caliper for fluid leaks under maximum pedal pressures. **Do not move the car until a firm brake pedal is obtained.**

# PART 2-3—Specifications

## CHECKS AND ADJUSTMENT—INCHES

H1514-A

| Description | Comet, Falcon, Fairlane | Cougar, Mustang |
|---|---|---|
| Brake Pedal Height and Travel Measurements | ① | |
| Power Brake Push Rod Adjustment<br>Bendix 0.980–0.995<br>Midland Ross 0.980–0.995 | ② | ② |
| Lining Maximum Wear Limit<br>(From Top of Rivets or Shoe Rim) | 1/32 | 1/32 |
| Lining Maximum Clearance to Shoe | 0.008 | 0.008 |
| Drum Diameter | 10 | 10 |
| Self Adjustment Cable Length—<br>End Cable Anchor to End of Cable Hook | 9 3/4 ③ | 9 3/4 ③ |

① Refer to Part 2-1, Section 1, Brake Pedal Free Height and Travel Measurements for the specifications and measurement procedures.

② 0.970–0.985 – Cougar, Mustang and Falcon Only

③ 8 13/32 6-Cylinder Falcon, Mustang

## BORE DIAMETERS—BRAKE DRUM, WHEEL CYLINDER AND MASTER CYLINDER

H1512-A

| Models | | Brake Drum | | Wheel Cylinder Bore Dia. | | Master Cylinder Bore Dia. | |
|---|---|---|---|---|---|---|---|
| | | Inside Diameter | Boring Limit ① (Max.) | ② Front | ② Rear | With Power Brake ② | Less Power Brake ② |
| Comet and Fairlane | Pass. except Conv. (200 & 289 CID Engines) | 10.000 | 10.060 | 1.125 | 0.906 | ③ | 1.000 |
| | Pass. and Conv. (390 CID Engine) | 10.000 | 10.060 | 1.094 | 0.875 | ③ | 1.000 |
| | Convertible (Except 390 CID Engine) | 10.000 | 10.060 | 1.094 | 0.906 | ③ | 1.000 |
| | Station and Ranch Wagons (Except 390 CID) | 10.000 | 10.060 | 1.094 | 0.938 | ③ | 1.000 |
| Falcon | 9 Inch Brake (200 CID Engine) | 9.000 | 9.060 | 1.062 ④ | 0.844 ④ | ③ | 1.000 |
| | 10 Inch Brake – Station Wagon | 10.000 | 10.060 | 1.094 | 0.938 | ③ | 1.000 |
| | 10 Inch Brake – Passenger Car | 10.000 | 10.060 | 1.125 | 0.906 | ③ | 1.000 |
| Mustang and Cougar | 6 Cylinder – Mustang Only | 9.000 | 9.060 | 1.062 ④ | 0.844 ④ | 1.000 | 1.000 |
| | 8 Cylinder – 390 CID Engine | 10.000 | 10.060 | 1.094 | 0.813 | 1.000 | 1.000 |
| | 289 CID Engine | 10.000 | 10.060 | 1.125 | 0.875 | 1.000 | 1.000 |

① Max. Runout 0.007

② Max. Allowable Hone 0.003

③ 0.9375 for Cars With Power Disc or Power Drum

④ Falcon and Mustang Front Wheel Cylinder on 6-Cyl. Cars, or Cars with 9 inch Brake, Cannot be Honed.

## LINING DIMENSIONS—DRUM BRAKES—INCHES

H1513-A

| Falcon | Position | Front | Rear | Color Code |
|---|---|---|---|---|
| Sedan and Hardtop 6-Cyl. | Primary | 2.25 x 7.62 | 1.50 x 7.62 | Red-Blue |
| | Secondary | 2.25 x 9.77 | 1.50 x 9.77 | Green |
| Station Wagon 6-Cyl. | Primary | 2.50 x 8.43 | 2.00 x 8.43 | Yellow-Black |
| | Secondary | 2.50 x 10.82 | 2.00 x 10.82 | Blue-Blue |
| Sedan and Hardtop 8-Cyl. | Primary | 2.25 x 8.43 | 1.75 x 8.43 | Yellow-Black |
| | Secondary | 2.25 x 10.82 | 1.75 x 10.82 | Blue-Blue |
| Station Wagon 8-Cyl. | Primary | 2.50 x 8.43 | 2.50 x 8.43 | Yellow-Black |
| | Secondary | 2.50 x 10.82 | | Blue-Blue |
| **Mustang And Cougar** | | | | |
| 6-Cylinder | Primary | 2.25 x 7.62 | 1.50 x 7.62 | Red-Blue |
| | Secondary | 2.25 x 9.77 | 1.50 x 9.77 | Green |
| 8-Cylinder (Except 390 CID) | Primary | 2.25 x 8.43 | 1.75 x 8.43 | Yellow-Black |
| | Secondary | 2.25 x 10.82 | 1.75 x 10.82 | Blue-Blue |
| 8-Cylinder 390 CID | Primary | 2.50 x 8.43 | 1.75 x 8.43 | Yellow-Black |
| | Secondary | 2.50 x 10.82 | 1.75 x 10.82 | Blue-Blue |

## LINING DIMENSIONS—DRUM BRAKES—INCHES (CONTINUED) H1513-A1

| Mustang and Cougar | Position | Front | Rear | Color Code |
|---|---|---|---|---|
| Comet and Fairlane | | | | |
| Passenger Car (200 & 289 CID Engine)–Except Convertible | Primary | 2.25 x 8.43 | 1.75 x 8.43 | Yellow-Black |
| | Secondary | 2.25 x 10.82 | 1.75 x 10.82 | Blue-Blue |
| Passenger Car (390 CID Engine), Station Wagon and Convertible (200 & 289 Engines), LPO Police–Max Fade Resistance | Primary | 2.50 x 8.43 | 2.00 x 8.43 | Yellow-Black |
| | Secondary | 2.50 x 10.82 | 2.00 x 10.82 | Blue-Blue |
| Fairlane-Comet LPO Taxi–Maximum Wear Resistance (Bonded) | Primary | 2.50 x 9.18 | 2.00 x 9.18 | Red |
| | Secondary | 2.50 x 10.82 | 2.00 x 10.82 | White |
| Station Wagon (390 CID Engine) | Primary | 2.50 x 8.43 | 2.50 x 8.43 | Yellow-Black |
| | Secondary | 2.50 x 10.82 | 2.50 x 10.82 | Blue-Blue |

## SHOE AND LINING DIMENSIONS—DISC BRAKES—INCHES H1516-A

| | Fairlane Comet, Falcon | Cougar Mustang |
|---|---|---|
| Lining Material | Bonded FoMoCo | Bonded FoMoCo |
| Lining Size | 4.82 x 1.84 | 4.82 x 1.84 |
| Lining Area-Square inches per Segment | 8.500 | 8.500 |
| Lining Thickness-Nominal | 0.400 | 0.400 |
| Lining Wear Limit (Front Surface of Shoe) – Max | 0.030 | 0.030 |

## CALIPER CYLINDER BORE DIAMETER -INCHES H1517-A

| | |
|---|---|
| Mustang, Cougar, Falcon, Fairlane and Comet | 1.636 |

## ROTOR

| Car Line | Thickness | Diameter Outside | Diameter Inside | Car Line | Thickness | Diameter Outside | Diameter Inside |
|---|---|---|---|---|---|---|---|
| Mustang, Cougar, Fairlane, Falcon, Comet | | | | | 0.810 | 11.375 | 7.375 |
| Rotor Runout–Maximum Allowable–.0025 for Mustang, Cougar, Fairlane, Falcon and Comet | | | | | | | |

## TORQUE LIMITS — DISC BRAKES (FT-LBS)

| Description | Ft–Lbs | Description | Ft–Lbs |
|---|---|---|---|
| Caliper Assembly to Mounting Bracket | 45–60 (And Safety Wire) | Hub and Rotor Assembly to Front Wheel Spindle | Rotate rotor while torquing to 17-25 ft-lbs. Back off the adjusting nut 1/2 turn and retighten to 10-15 inch pounds while rotating wheel. Selectively position nut retainer on adjusting nut so that a set of slots are in line with cotter pin hole. Adjusting nut should not be rotated in this operation. Lock adjusting nut and nut retainer with cotter pin so that the cotter pin end does not interfere with seating of wheel static collector in spindle hole. |
| Mounting Bracket to Spindle | 35–45 | | |
| Caliper Bleeder Screw | 10 Max (Must be leakproof) | | |
| Caliper Brake Shoe Clips | 7–9 | | |
| Caliper Bridge Bolts | 75–105 | | |
| Rotor Splash Shield to Spindle | 9–14 | | |
| Wheel Assembly to Front Wheel Hub and Rotor Assembly | 75–110 | | |
| Brake Tube Fitting Nuts to Proportioning Valve | 70 in-lbs (Max. Must be leakproof) | | |

## TORQUE LIMITS (FT—LBS)—GENERAL

H1515-A

| Description | Comet Fairlane | Falcon | Cougar Mustang |
|---|---|---|---|
| Parking Brake Control Assembly Mounting Bolt | 15-20 | 15–20 | 15-20 |
| Master Cylinder to Dash Panel Bolts | 15-20 | 18–25 | 18-25 |
| Brake Pedal Support Bracket to Instrument Panel | 9-13 | 9–13 | 9-13 |
| Wheel to Hub and Drum Nuts – | | | |
| 4-Lug | | 55–85 | 55–85 |
| 5-Lug | 70–115 | 70–115 | 70–115 |
| Hydraulic Line Connections – Nut Sizes ① | | | |
| 3/8–24 | | 8–15 | |
| 7/16–24 | | 10–18 | |
| 1/2–20 | | 12–20 | |
| 9/16–18 | | 15–25 | |
| Brake Hose Connections | | | |
| Wheel Cylinder | | 17–25 | |
| Caliper | | 27–32 | |
| **Front Brakes—Drum Type** | | | |
| Backing Plate to Spindle Nut | 28-42 | 28–42 | 28-42 |
| Wheel, Hub and Drum Assembly to Wheel Spindle Nut | Rotate wheel and drum while torquing the wheel bearing adjusting nut to 17-25 ft-lbs torque. Back off the adjusting nut 1/2 turn and re-tighten to 10-15 inch pounds while rotating the drum and wheel Selectively position nut retainer on adjusting nut so that a set of slots are in line with cotter pin hole. Adjusting nut should not be rotated in this operation. Lock the adjusting nut and retainer with cotter pin so that cotter pin end does not interfere with seating of wheel static collector in spindle hole. | | |
| **Rear Brake—Drum Type** | | | |
| Drum to Axle Shaft Speed Nut | Hand Push Fit | | |
| Brake Cylinder to Brake Backing Plate Bolt | 10–20 | 5–7 (9 inch brake) 10–20 (10 inch brake) | |
| Brake Backing Plate to Axle Housing 6-Cyl | | 30–40 | |
| 8-Cyl | | 30–40 | |
| Brake Line Connection to Axle Housing Bolt | | 12–18 | 12–18 |
| POWER BRAKES: Master Cylinder to Booster Body | ② | ② | ② |
| Brake Booster to Pedal Support Bracket or Dash | | 18–25 | 18–25 |

① All hydraulic line connections (nuts) must be torqued to the specified value and free of fluid leakage

② Purchased as an assembly

## SERVICE TOOLS

| Ford Tool No. | Former No. | Description |
|---|---|---|
| Rotunda HRE 8650 | | Brake Adjusting Gauge |
| | LM-119 | Brake Cylinder Retaining Clamp |
| | 2018-A | Brake Adjusting Tool |
| | 2162 | Adapter Cap |
| | 2035-N | Brake Shoe R & R Spring |
| TOOL 33621 | 33621 | Internal Snap Ring Pliers |
| | Milbar 1112–144 | Inch-lb torque wrench |
| TOOL 4235-C | 4235-C | Axle Shaft Remover |
| Rotunda FRE 1431 | | Brake Drum Micrometer |

# Suspension , Steering, Wheels & Tires

GROUP 3


**PART 3-1** PAGE
Suspension, Steering, Wheels And Tires General Service ..... 3-1
**PART 3-2**
Suspension ..... 3-15
**PART 3-3**
Manual Steering ..... 3-26
**PART 3-4** PAGE
Power Steering ..... 3-43
**PART 3-5**
Wheels And Tires ..... 3-53
**PART 3-6**
Specifications ..... 3-58


## PART 3-1— *Suspension, Steering, Wheels, and Tires General Service*


Section Page
1 Diagnosis and Testing ..... 3-1
Manual Steering ..... 3-1
Power Steering ..... 3-1
Front Wheel Alignment Checks ..... 3-2
2 Common Adjustments and Repairs ..... 3-4
Caster and Camber Adjustments ..... 3-4
Toe-in and Steering Wheel Alignment Adjustments ..... 3-4
Steering Gear Lubricant Checking Procedure ..... 3-5
Section Page
3 Cleaning and Inspection ..... 3-6
Steering Gear Cleaning and Inspection ..... 3-6
Power Steering Pump ..... 3-6
Flushing the Power Steering System ..... 3-6
Front End General Inspection ..... 3-6
Wheel Inspection ..... 3-6
Wheel Balancing ..... 3-6
Upper Ball Joint Inspection ..... 3-6
Lower Ball Joint Inspection ..... 3-7
Shock Absorbers ..... 3-7


## 1 DIAGNOSIS AND TESTING

### MANUAL STEERING

Figs. 13 and 14 list various steering gear and linkage trouble symptoms and possible causes. Several of these symptoms are also common to suspension frame, and wheel and tire troubles. For this reason, be sure that the cause of the trouble is in the steering gear or linkage before adjusting, repairing, or replacing any of the steering parts.

When diagnosing tilt-away steering columns, refer to the diagnosis guide (Fig. 15) for the detailed information.

### POWER STEERING

#### PRELIMINARY TESTS

The following preliminary checks should always be made before performing any trouble diagnosis operations.

#### Check Pump Belt

If the pump belt is broken, glazed, or worn, replace with a new belt. **Use only the specified type of belt.**

#### Check The Belt Tension

If the belt is too loose or too tight, it should be adjusted to the proper tension as outlined in Part 3-4.

**A used belt is one that has run 15 minutes or longer.**

#### Check Fluid Level

Start the engine, 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 reservoir. If the level is low, add enough fluid to raise the level to the full mark on the dipstick. **Do not overfill the reservoir.**

#### Check For Fluid Leaks

1. If the power steering fluid does not already include yellowish green dye, pre-mix one teaspoonful of oil-soluble aniline dye with 2 pints of automatic transmission fluid CIAZ-19582-A. Then refill the reservoir with the dye solution.
2. With the engine running at idle speed, turn the steering wheel all the way to the right stop and to the left stop several times to distribute the dye solution throughout the hydraulic system. Do not hold the wheel against each wheel stop for more than 3 to 5 seconds.
3. Shut off the engine, and check for leaks.

#### Fitting and Tube Seat Leak

Since most fluid leaks occur at the fittings and connections in a power steering hydraulic system, these parts should be checked before any other part is replaced.

1. With the engine running at idle speed, raise the vehicle on a hoist.
2. Clean the outside of the control valve and the power cylinder, the bottom surfaces of the pump, and all lines and fittings. Dirt, oil, and grease should be removed from all areas where leaks may exist.
3. Tighten all fittings, using a special 5-flat tube wrench. **Do not tighten the fitting with a standard open end wrench.** If a properly tightened fitting leaks, replace the seat.

### Pump, Control Valve, and Power Cylinder Leak

If the fittings and connections do not leak, check the other parts of the system.

Check the hose connection at the pump for leaks, and tighten the hose clamp if necessary.

### Pump Leaks

If leakage occurs at the pump reservoir seal, or pump outlet fitting seal, check the torque of the outlet valve nut. If torque is within specifications, replace the reservoir seal, and/or outlet valve seal, whichever is required if leaks are evident other than the lines.

### Control Valve Leaks

If the control valve is leaking (somewhere other than the tube seats), replace all the seals, using a control valve seal kit. Use all the parts in the kit, and be sure they are correctly installed. When assembling the new seals in the valve, an application of silicone grease to the internal parts will help to provide a better seal against future leakage. Apply grease to the centering spring area, especially on the cap and spacer mating surfaces. Coat the threads of the cap retaining bolts with grease. The rubber boot seals, the actuator assembly, and the metal cup seals in the control valve should also be coated with silicone grease.

Some oil remaining from the manufacturing processes may be found in the sleeve near the ball stud. Do not confuse this oil with leaking fluid from the hydraulic system.

### Power Cylinder Leaks

The power cylinder may leak at the piston rod seals. A power cylinder seal kit should be used to correct leakage. **Do not replace the power cylinder assembly unless the piston rod is scored or has a dull gray finish instead of a high luster chrome finish.**

### Pump-Fluid Pressure Test

A fluid pressure test will show whether the pump or some other unit in the power steering system is causing trouble in the system. Steps outlined below should be followed to determine the cause of the trouble.

1. Measure the pump belt tension. **When adjusting the belt tension on the power steering pump, do not pry against the pump to obtain the proper belt load.**

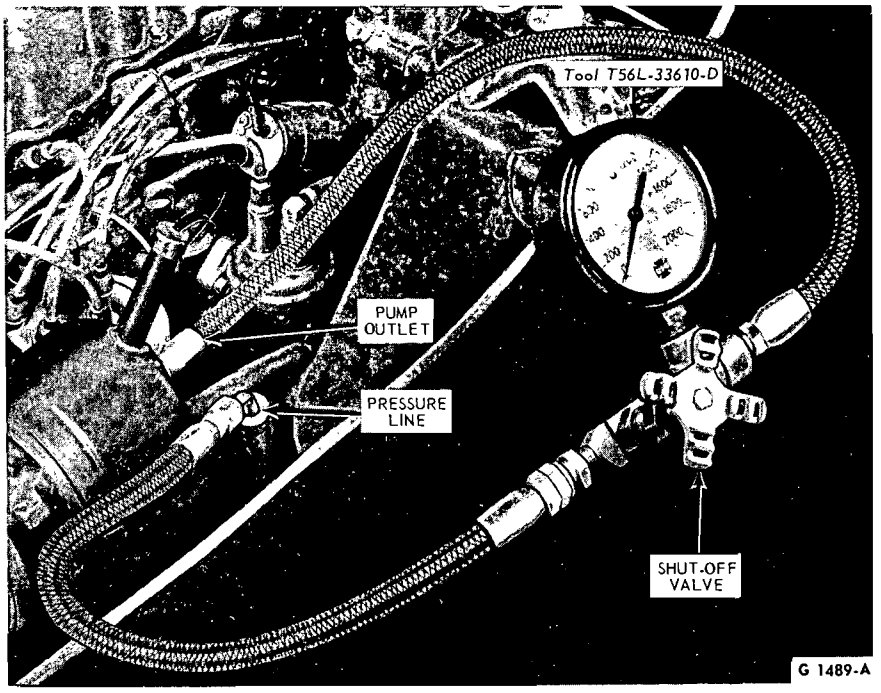



*FIG. 1*—Pressure Testing Tool Installed—Typical

**On pumps used with a 6-cylinder engine, a half-inch cast boss has been incorporated on the front face of the pump cover plate onto which a 9/16 inch open end wrench can be fitted to pry the pump and obtain the proper belt tension. On pumps used with an 8-cylinder engine, apply leverage between the boss on the pump mounting bracket and the front face of the pump cover plate.**

2. Disconnect the pressure line hose from the pump outlet, and install a 0-2000 psi pressure gauge and shut off valve between the end of the hose and the pump outlet (Fig. 1).

**Be sure that the pressure gauge is between the pump and the shut off valve, all connections are tight, and the shut off valve is fully open.**

3. Connect a tachometer.

4. Start the engine and operate it at idle speed for at least two minutes to warm up the fluid.

5. Cycle the steering wheel from stop-to-stop several times to expel any air from the system; stop the engine. Remove the reservoir filler cap and check the fluid level in the reservoir. If necessary, add fluid C1AZ-19582-A to the proper level.

6. With the engine running at **approximately** 500 rpm and no steering effort applied, and the fluid at normal operating temperature (160° - 180° F), the pressure gauge should show a pressure of less than **50** psi. If the pressure is higher, inspect the hoses for kinks and obstructions.

7. Increase the engine speed to 1000 rpm; then, slowly close the gauge shut-off valve. With the valve fully closed, the pump pressure should be 750 to 900 psi.

**Do not close the valve for more than a few seconds (maximum 5 seconds), as this would abnormally increase the lubricant (fluid) temperature and cause undue pump and/or control valve wear. Engine rpm should not exceed fast idle during this test.**

8. Remove the tachometer and the pressure testing gauge.

**If pressure is more or less than specification, replace the pump assembly. If pressure is as specified and steering efforts are heavy, the gear and/or control valve could be at fault.**

## FRONT WHEEL ALIGNMENT CHECKS

**Do not attempt to check and adjust front wheel alignment without first making a preliminary inspection of the front-end parts.**

Check all the factors of front wheel alignment except the turning angle before making any adjustments. The turning angle should be checked only after caster, camber, and toe-in have been adjusted to specification.

The front wheel alignment specifications, given in Part 3-6 are correct only when the vehicle is at curb height. Before checking or adjust-

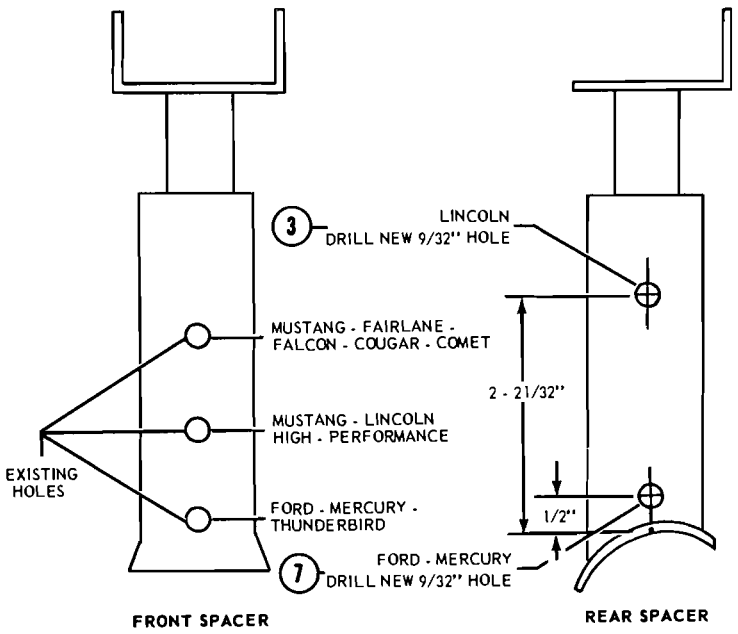



*FIG. 2*—Alignment Spacers Modification

ing the caster and camber, the suspension alignment spacers must be installed to obtain the curb heights.

### FRONT SPACER

**1.** Mustang H.P., insert pin in second hole 1 13/16 inches from base (Fig. 2).

**2.** Falcon, Fairlane, Mustang, Cougar use pin in third hole, 2 1/2 inches from base.

### REAR SPACERS

**1.** Falcon, Fairlane, Comet use hole 1 1/8 inches up from base.

**2.** Mustang and Cougar, do not use pin (Fig. 4).

### EQUIPMENT INSTALLATION

Equipment used for front wheel alignment inspection must be accurate. Alignment height spacers (Figs. 3 and 4) are used to check caster, camber. The spacers should be omitted when checking toe-in.

**1.** Drive the vehicle in a straight line far enough to establish the straight-ahead position of the front wheels, and mark the steering wheel hub and the steering column collar (Fig. 5). **Do not adjust the steering wheel spoke position at this time.** If the front wheels are turned at any time during the inspection, align the marks to bring the wheels back to the straight-ahead position.

**2.** With the vehicle in position for the front end alignment inspection and adjustment, install the alignment spacers as follows to establish the curb height.

Insert the pin in the spacer hole marked for the model being checked (Mustang or Cougar rear does not use the pin).

Raise the front of the vehicle and position the alignment spacers between the suspension upper arm and the spring tower as shown in Fig. 3. The lower end of the spacer should be placed over the head of the ball joint front outside attaching rivet. Position the alignment spacers for the rear of the vehicle between the rear axle and the side rail as shown in (Fig. 4).

**3.** Install the wheel alignment equipment on the vehicle. Whichever type of equipment is used, follow the installation and inspection instructions provided by the equipment manufacturer.

### CASTER

Check the caster angle at each front wheel.

Caster is the forward or rearward tilt of the top of the wheel spindle (Fig. 7). If the spindle tilts to the rear, caster is positive. If the spindle tilts to the front, caster is negative. The correct caster angle, or tilt, is specified in Part 3-6. The maximum difference between both front wheel caster angles should not exceed 1/2 However, a difference of not more than 1/4 ° is preferred.

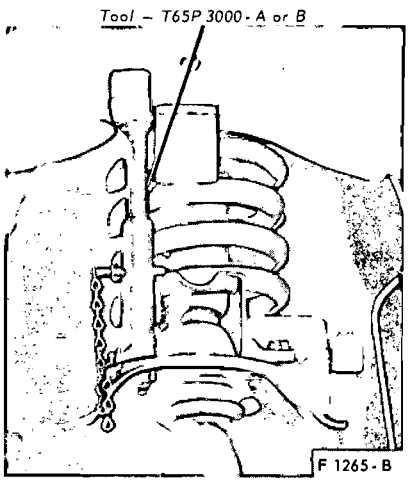



*FIG. 3*—Typical Front Alignment Spacer Installation

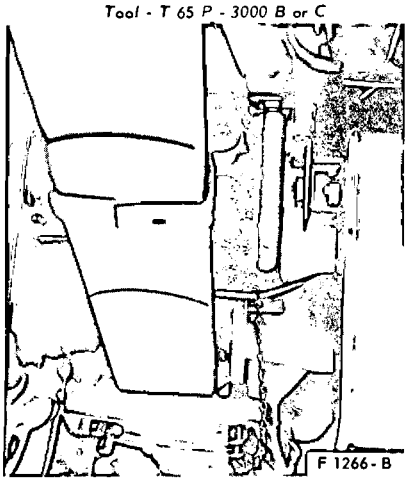



*FIG. 4*—Typical Rear Alignment Spacer Installation

### CAMBER

Check the camber angle at each front wheel.

Camber is the amount the front wheels are tilted at the top (Fig. 6). If a wheel tilts outward, camber is positive. If a wheel tilts inward, camber is negative. The correct camber angle, or outward (positive) tilt, is specified in Part 3-6. The maximum difference between both front wheel camber angles should not exceed 1/2 However, a difference of not more than 1/4° is preferred.

### TOE-IN

Alignment height spacers are not used to check and adjust toe-in. Toe-in should only be checked and adjusted after the caster and camber has been adjusted to specification.

Check the toe-in with the front

wheels in the straight-ahead position. **Run the engine so that the power steering control valve will be in the center (neutral) position (if so equipped).** Measure the distance between the extreme front and also between the extreme rear of both front wheels. The difference between these two distances is the toe-in.

Correct toe-in, or inward pointing of both front wheels at the front, is specified in Part 3-6.

### FRONT WHEEL TURNING ANGLE

When the inside wheel is turned 20°, the turning angle of the outside wheel should be as specified in Part 3-6. The turning angle cannot be adjusted directly, because it is a result of the combination of caster, camber, and toe-in adjustments and should, therefore, be measured only after these adjustments have been made. If the turning angle does not measure to specifications, check the spindle or other suspension parts for a bent condition.

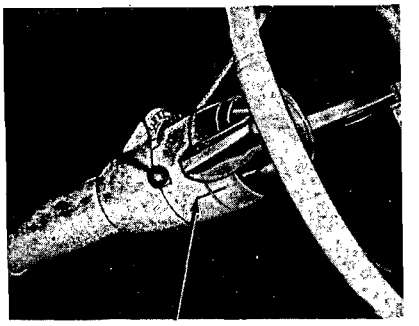



*FIG. 5—Straight Ahead Position Marks— Typical*

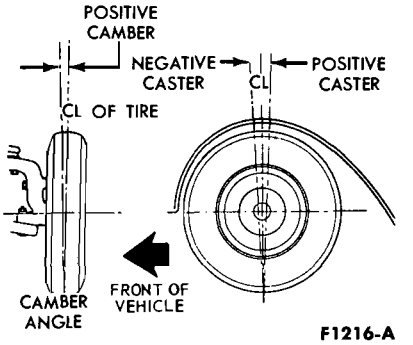



*FIG. 6—Caster and Camber Angles*

## 2 COMMON ADJUSTMENTS AND REPAIRS

After front wheel alignment factors have been checked, make the necessary adjustments. **Do not attempt to adjust the front wheel alignment by bending the suspension or steering parts.**

### CASTER AND CAMBER ADJUSTMENTS

Be sure **all** the equipment listed in Equipment Installation is installed before adjusting the caster and camber.

Caster is controlled by the front suspension strut (Fig. 7). To obtain positive caster, loosen the strut rear nut and tighten the strut front nut against the bushing. To obtain negative caster, loosen the strut front nut and tighten the strut rear nut against the bushing.

Camber is controlled by the eccentric cam located at the lower arm attachment to the side rail (Fig. 7).

To adjust the camber, loosen the camber adjustment bolt nut at the rear of the body bracket (Fig. 7). Spread the body bracket at the camber adjustment bolt area just enough to permit lateral travel of the arm when the adjustment bolt is turned. Rotate the bolt and eccentric clockwise from the high position to increase camber or counterclockwise to decrease camber.

After the caster and camber has been adjusted to specification, torque the lower arm eccentric bolt nut and the strut front nut to specification.

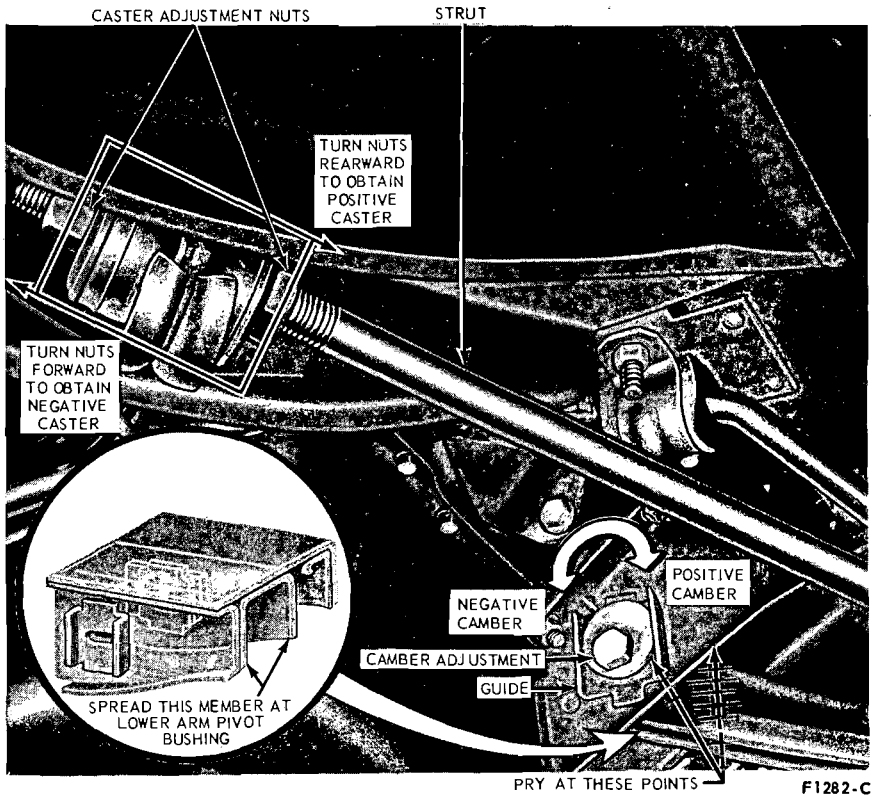



*FIG. 7—Caster and Camber Adjustments— Comet, Falcon, and Fairlane*

### TOE-IN AND STEERING WHEEL ALIGNMENT ADJUSTMENTS

Check the steering wheel spoke position when the front wheels are in the straight-ahead position. If the spokes are not in their normal position, they can be properly adjusted while toe-in is being adjusted.

1. Loosen the two clamp bolts on each spindle connecting rod sleeve (Fig. 8).

2. Adjust toe-in. If the steering wheel spokes are in their normal po-

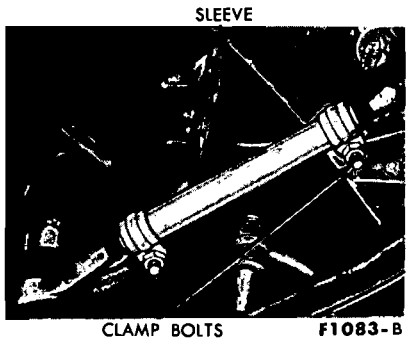



*FIG. 8*—Spindle Connecting Rod Sleeve— Typical

sition, lengthen or shorten both rods equally to obtain correct toe-in (Fig. 9). If the steering wheel spokes are not in their normal position, make the necessary rod adjustments to obtain correct toe-in and steering wheel spoke alignment (Figs. 10 and 11).

3. Recheck toe-in and steering wheel spoke alignment. If toe-in is correct and the steering wheel spokes are still not in their normal position, turn both connecting rod sleeves upward or downward the same number of turns to move the steering wheel spokes (Figs. 10 and 11).

4. When toe-in and steering wheel spoke alignment are both correct, oil the clamp bolts on both connecting rod sleeves and torque them to specification.

The sleeve clamp bolts should be facing forward.

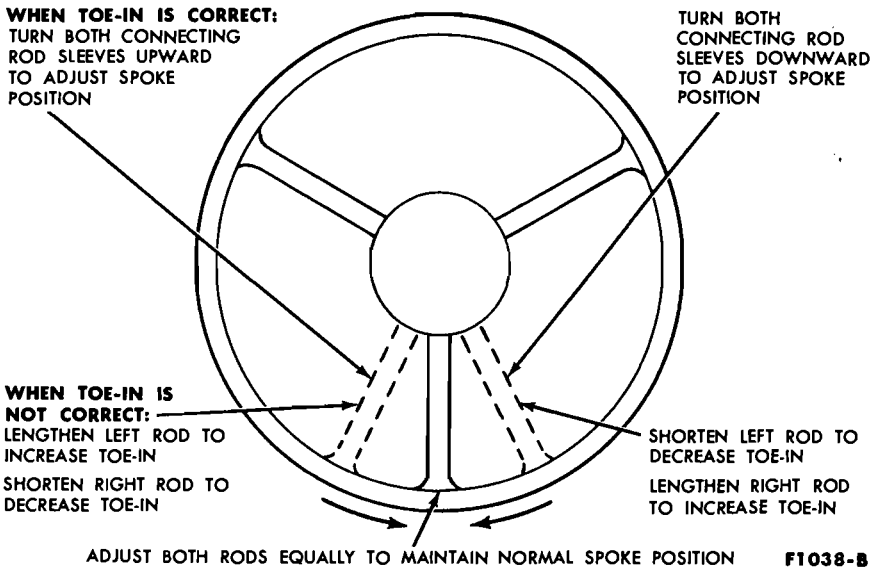



*FIG. 11*—Toe-In and Steering Wheel Spoke Adjustments—Mustang

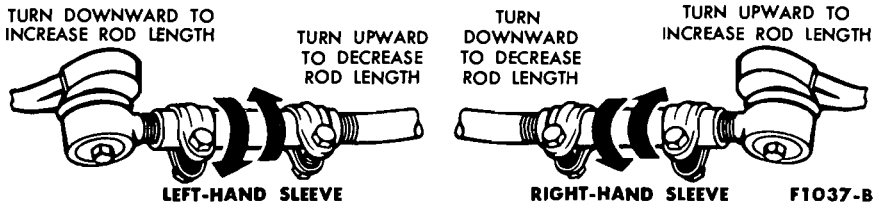



*FIG. 9*—Spindle Connecting Rod Adjustment

## STEERING GEAR LUBRICANT CHECKING PROCEDURE

### MUSTANG AND COUGAR

1. Center the steering wheel.
2. Remove the steering gear housing filler plug.
3. Remove the **upper** cover-to-housing attaching bolt.
4. With a **clean** punch or like instrument, clean out or push inward the loose lubricant in the filler plug hole and cover to housing attaching bolt hole.
5. Slowly turn the steering wheel to the **right** stop, lubricant should

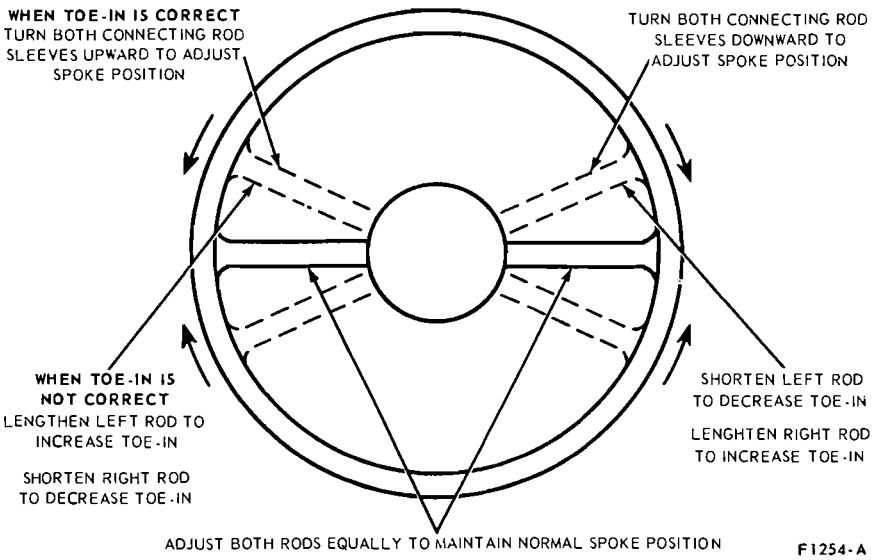



*FIG. 10*—Toe-In and Steering Wheel Spoke Adjustments—Comet, Falcon, and Fairlane

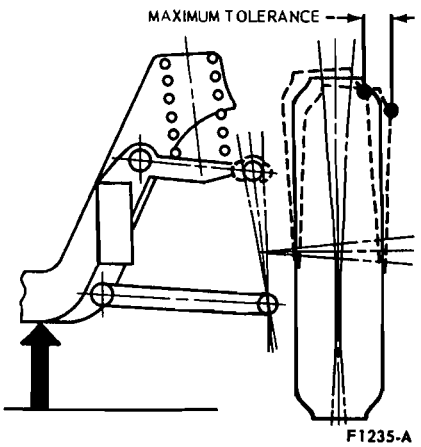



*FIG. 12*—Measuring Upper Ball Joint Radial Play

rise within the **upper** cover bolt hole; then slowly turn the steering wheel to the **left** 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 until it comes out both holes during this check.

6. Install the upper cover-to-housing attaching bolt.

**COMET, FALCON, AND FAIRLANE**

1. Center the steering wheel.
2. Remove the steering gear housing filler plug for ventilation purposes.
3. Remove the lower cover-to-housing attaching bolt.
4. With a **clean** punch or like instrument, clean out or push inward the loose lubricant in the filler plug hole and cover to housing attaching bolt hole.
5. 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 until it comes out both holes during this check. **On vehicles equipped with power brakes, the steering gear may be filled through the lower or upper cover bolt hole depending on vehicle usage. Steering wheel must be centered when filling gear with lubricant.**
6. Install the lower cover-to-housing attaching bolt and the filler plug.

## 3 CLEANING AND INSPECTION

### STEERING GEAR CLEANING AND INSPECTION

Wash all parts except seals in a cleaning solvent and dry with a lint-free cloth. Seals must not be washed or soaked in cleaning solvent. **The bearing should not be spun dry with compressed air.** Inspect the shaft and worm for scoring, cracks or checks, and for straightness of the shaft. Check the splines and the threads on the sector shaft for wear and burrs. Inspect the gear teeth for scoring, pitting and other wear. Inspect the ball bearings for free movement, and the cups for wear or irregular surfaces. Check the housing for cracks and the sector shaft needle bearing for free movement or other wear.

### POWER STEERING PUMP

If the pump has a visible leak, replace the reservoir seal, and/or outlet valve seal, whichever is required.

### FLUSHING THE POWER STEERING SYSTEM

Should a power steering pump become inoperative, the shaft and pulley should be checked for freedom of rotation. If the pump shaft does not turn freely (binding), it is an indication that there is wear on the pump internal components and the need for flushing the steering system, when installing a **new** pump.

1. Remove the power steering pump and pulley as outlined in Part 3-4.
2. Install a new pump and connect only the pressure hose to the pump (Part 3-4).
3. Place the fluid return line in a suitable container and plug the resevoir return pipe.
4. Fill the reservoir with lubricant CIAZ-19582-A.
5. Disconnect the coil wire to prevent the engine from starting and raise the front wheels off the ground.
6. While approximately two quarts of fluid are being poured into the reservoir, turn the engine over using the ignition key, at the same time cycle the steering wheel from stop to stop.
7. As soon as all of the fluid has been poured in, turn off the ignition key, and attach the coil wire.
8. Remove the plug from the reservoir return pipe, and attach the return hose to the reservoir.
9. Check the reservoir fluid level; if low add fluid to the proper level. **Do not overfill.**
10. Lower the vehicle.
11. Start the engine and cycle the steering wheel from stop to stop to expel any trapped air from the system.

### FRONT END GENERAL INSPECTION

**Do not check and adjust front wheel alignment without first making the following inspection for front-end maladjustment, damage, or wear.**

1. Check for specified air pressures in all four tires.
2. Raise the front of the vehicle off the floor. Shake each front wheel grasping the upper and lower surfaces of the tire to check the front suspension ball joints and mountings for looseness, wear, and damage. Check the brake backing plate mountings. Torque all loose nuts and bolts to specifications. Replace all worn parts as outlined in Part 3-2.
3. Check the steering gear mountings and all steering linkage connections for looseness. Torque all mountings to specifications. If any of the linkage is worn or bent, replace the parts as outlined in Part 3-3.
4. Check the front wheel bearings. If any in-and-out free play is noticed, adjust the bearing to specification (Part 3-5). Replace worn or damaged bearings as outlined in Part 3-5.
5. Spin each front wheel with a wheel spinner, and check and balance each wheel as required.
6. Check the action of the shock absorbers. If the shock absorbers are not in good condition, the vehicle may not settle in a normal, level position, and front wheel alignment may be affected.

### WHEEL INSPECTION

Wheel lug nuts should be tightened to specification at the predelivery inspection. Loose wheel lug nuts may cause shimmy and vibration. Elongated stud holes in the wheels may also result from loose lug nuts.

Keep the wheels and hubs clean. Stones wedged between the wheel and drum and lumps of mud or grease can unbalance a wheel and tire.

Check for damage that would affect the runout of the wheels. Wobble or shimmy caused by a damaged wheel will cause permature tire wear and eventually damage the wheel bearings. Inspect the wheel rims for dents that could permit air to leak from the tires.

### WHEEL BALANCING

See the instructions provided with the Rotunda Wheel Balancer.

### UPPER BALL JOINT INSPECTION

1. Raise the vehicle on a frame contact hoist or by floor jacks placed beneath the underbody until the wheel

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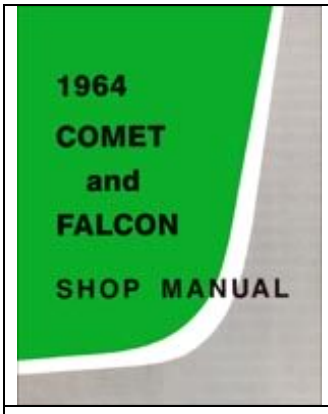


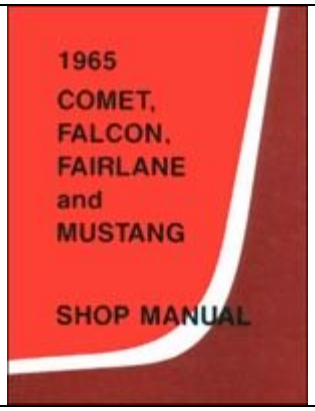


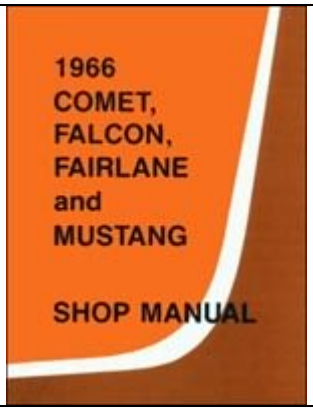


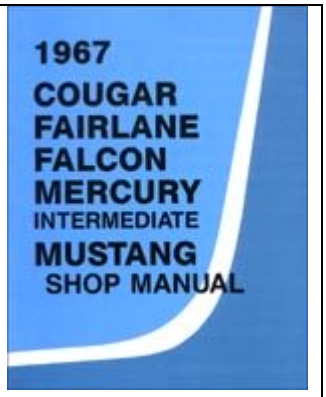

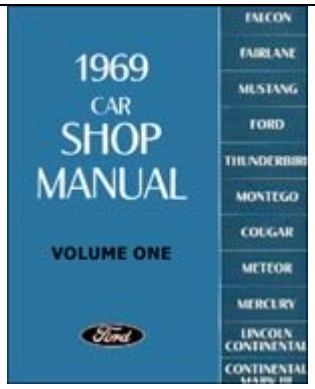


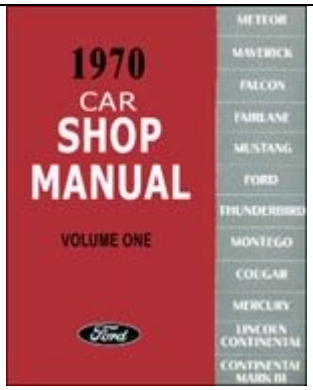


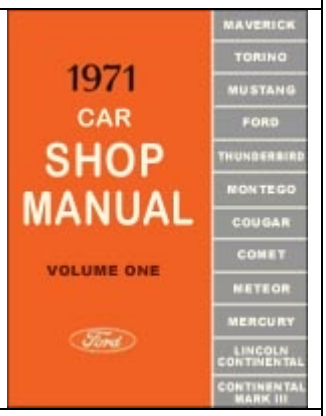


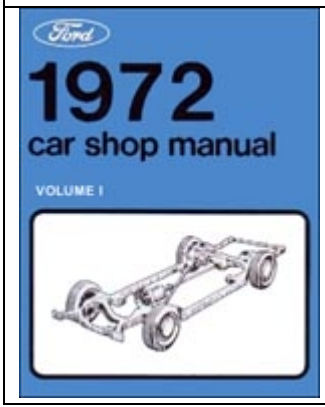


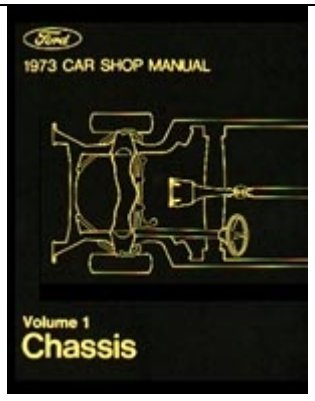

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