

# 1965 COMET, FALCON, FAIRLANE and MUSTANG SHOP MANUAL

## DEMO

This DEMO contains only a few pages of the entire manual/product.

Not all Bookmarks work on the Demo, but they do on the full version.

### Features:

- Searchable text
- Printable pages
- Bookmarked for easy navigation
- High Resolution images
- Zoom to see exact details
- Money back Guarantee
- Transfer to USB flash drive support



Official  
Licensed  
Product

License #84356800

Copyright © 2021, Forel Publishing Company, LLC, Woodbridge, Virginia

All Rights Reserved. No part of this book may be used or reproduced in any manner whatsoever without written permission of Forel Publishing Company, LLC. For information write to Forel Publishing Company, LLC, 3999 Peregrine Ridge Ct., Woodbridge, VA 22192

## **1965 Comet Falcon Fairlane and Mustang Shop Manual (USB)**

**EAN: 978-1-60371-221-7**

**ISBN: 1-60371-221-6**

Forel Publishing Company, LLC

3999 Peregrine Ridge Ct.

Woodbridge, VA 22192

Email address: [sales@ForelPublishing.com](mailto:sales@ForelPublishing.com)

Website: <https://www.ForelPublishing.com>



License #84356800

This publication contains material that is reproduced and distributed under a license from Ford Motor Company. No further reproduction or distribution of the Ford Motor Company material is allowed without the express written permission of Ford Motor Company.

---

## **Note from the Publisher**

This product was created from the original Ford Motor Company's publication. Every effort has been made to use the original scanned images, however, due to the condition of the material; some pages have been modified to remove imperfections.

---

## **Disclaimer**

Although every effort was made to ensure the accuracy of this book, no representations or warranties of any kind are made concerning the accuracy, completeness or suitability of the information, either expressed or implied. As a result, the information contained within this book should be used as general information only. The author and Forel Publishing Company, LLC shall have neither liability nor responsibility to any person or entity with respect to any loss or damage caused, or alleged to be caused, directly or indirectly by the information contained in this book. Further, the publisher and author are not engaged in rendering legal or other professional services. If legal, mechanical, electrical, or other expert assistance is required, the services of a competent professional should be sought.

---

# 1965

# COMET, FALCON, FAIRLANE and MUSTANG

# SHOP MANUAL

SERVICE DEPARTMENT  
FORD DIVISION  
 MOTOR COMPANY

FIRST PRINTING—SEPTEMBER, 1964  
©1964 FORD MOTOR COMPANY, DEARBORN, MICHIGAN

## GROUP INDEX

VEHICLE IDENTIFICATION	1
BRAKES	2
SUSPENSION—STEERING—WHEELS & TIRES	3
REAR AXLE	4
CLUTCH—DRIVELINE	5
MANUAL 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
LIGHTS, WIRING, ETC.	15
VENTILATING—HEATING—AIR/COND.—RADIO	16
BODY—FITS, SEATS ETC.	17
SOFT TRIM—CONVERTIBLE TOP	18
MAINTENANCE SCHEDULE	19
MAINTENANCE OPERATIONS	20
LUBRICATION CHARTS	21
INDEX	22

**SPECIFICATIONS AND SPECIAL SERVICE TOOLS  
AT END OF EACH GROUP**

## **FOREWORD**

*This shop manual provides the Service Technician with complete information for the proper servicing of the 1965 Comet, Falcon, Fairlane and Mustang cars.*

*The information 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.*

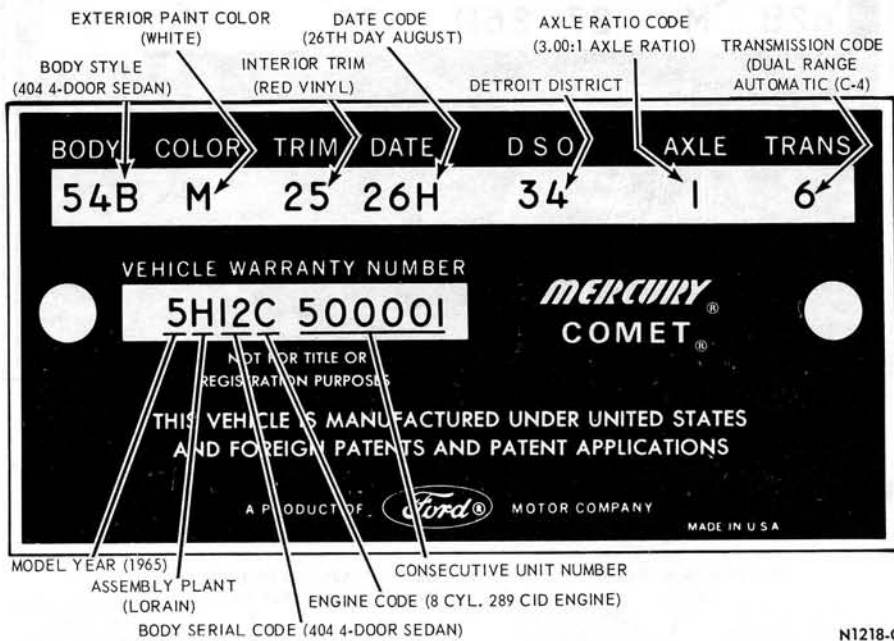
*The descriptions and specifications in this manual were in effect at the time this manual was approved for printing. The Ford Motor Company reserves the right to discontinue models at any time, or change specifications or design, without notice and without incurring obligation.*

**SERVICE DEPARTMENT**

**FORD MOTOR COMPANY**

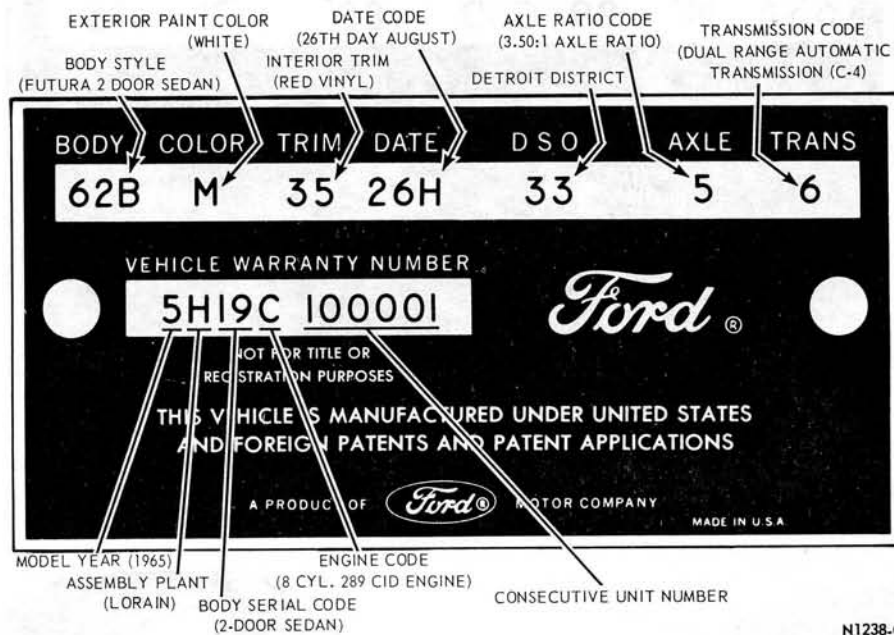
# VEHICLE IDENTIFICATION

# GROUP 1



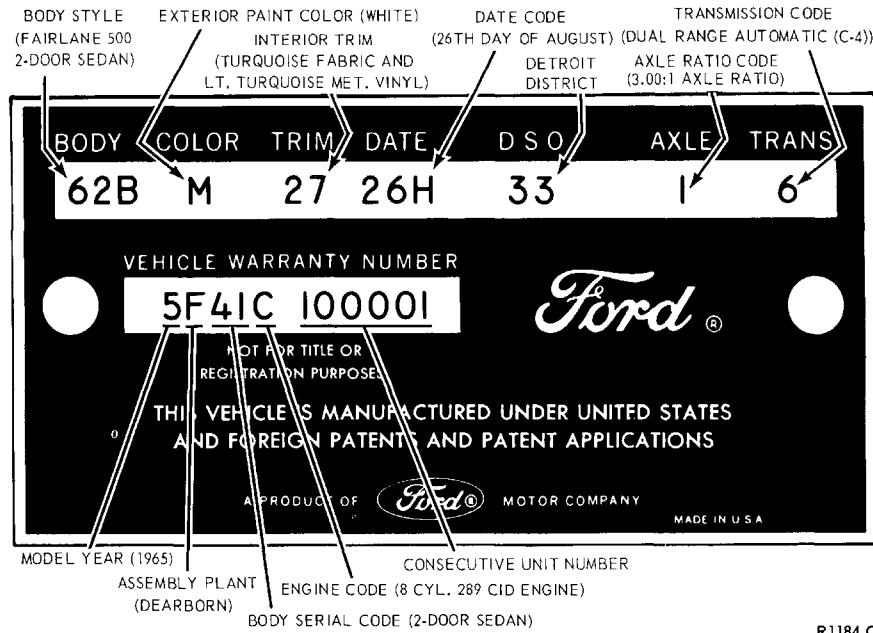
N1218-C

FIG. 1—Comet Warranty Plate



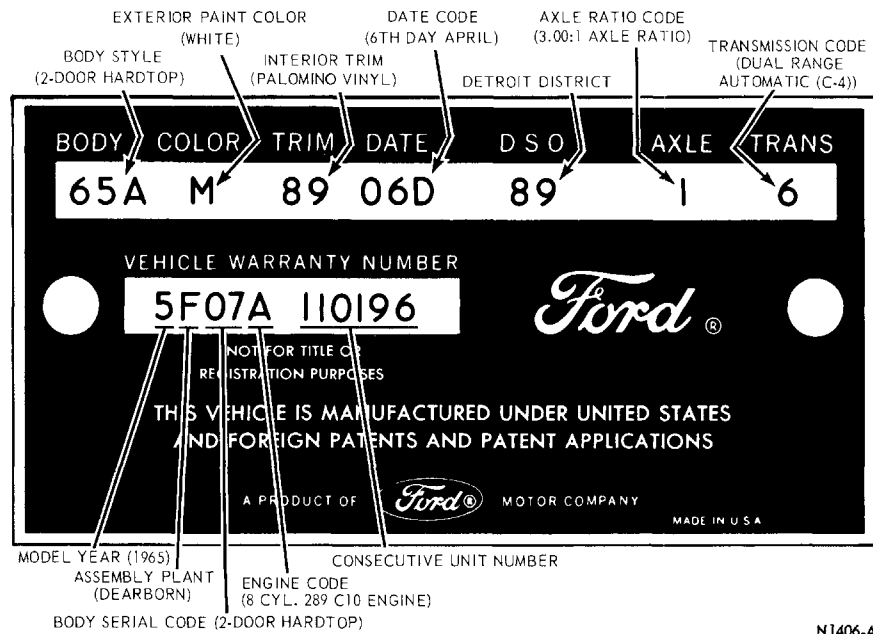
N1238-C

FIG. 2—Falcon Warranty Plate



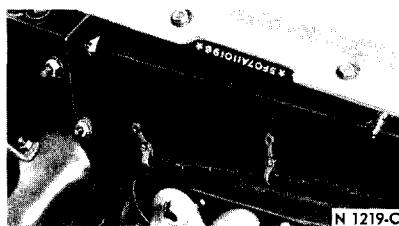
R1184-C

FIG. 3—Fairlane Warranty Plate



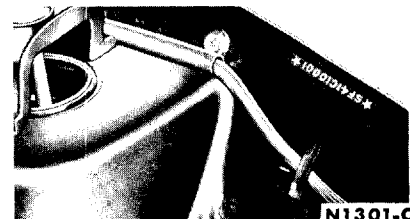
N1406-A

FIG. 4—Mustang Warranty Plate



N 1219-C

FIG. 5—Vehicle Identification Number Location—Comet, Falcon and Mustang



N1301-C

FIG. 6—Vehicle Identification Number Location—Fairlane

Figures 1, 2, 3 and 4 illustrate the Comet, Falcon, Fairlane and Mustang Warranty Plates. The warranty plate is located on the rear face (lock face) of the left front door.

The official Vehicle Identification Number, for title and registration purposes, is stamped on the top upper flange of the left front fender apron for Falcon, Comet and Mustang (Fig. 5C) and on the vertical face of the left front fender apron near the top for the Fairlane (Fig. 6C). Do not use the Vehicle Warranty Number, which appears on the warranty plate, for title or registration purposes.

## VEHICLE DATA

The vehicle data appears in a line across the top of the warranty plate (Figs. 1, 2, 3 and 4). The first two letters and a number identify the Body Style. The following one or two letters identify the Exterior Paint Color. The next code consisting of two numbers, or a letter and a number, identifies the Interior Trim. The Date Code showing the date the car was manufactured, follows the Trim Code and consists of two numbers and a letter. The next code gives the district in which the car was ordered and consists of two numbers. The next to the last code is the Axle Ratio Code and is designated by a number for a conventional axle or a letter for an Equa-Lock axle. The last code in the vehicle data is the Transmission Code and consists of one number. The charts that follow, list in detail the various vehicle data codes.

## VEHICLE WARRANTY NUMBER

The vehicle warranty number is the second line of numbers and letters appearing on the Warranty Plate (Figs. 1, 2, 3 and 4). The first number indicates the model year. The letter following the model year indicates the assembly plant at which the car was manufactured. The next two numbers designate the Body Serial Code. The letter following the Body Serial Code designates the Engine Code. The remaining numbers indicate the Consecutive Unit Number. The charts that follow, list the various Vehicle Warranty Number codes.

## 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 Data, 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.

### COMET

Body Serial Code	Body Style Code	Body Type	Series
02	54A	4-Door Sedan*	Comet 202
01	62A	2-Door Sedan*	
32	71A	4-Door Wagon*	
12	54B	4-Door Sedan*	Comet 404
11	62B	2-Door Sedan*	
11	62C	2-Door Sedan†	
34	71B	4-Door Wagon*	
36	71C	4-Door (Villager) Wagon*	Comet Caliente
22	54C	4-Door Sedan†	
22	54D	4-Door Sedan*	
23	63C	2-Door Hardtop† (Fastback)	
23	63D	2-Door Hardtop* (Fastback)	
25	76B	2-Door Convertible†	
25	76D	2-Door Convertible*	
23	63E	2-Door Hardtop† (Fastback)	

\*Bench Seat  
†Bucket Seats

### FALCON

Body Serial Code	Body Style Code	Body Type	Model
02	54A	4-Door Sedan	Standard Sedan
02	54D	4-Door Sedan (RPO)	
01	62A	2-Door Sedan	
01	62D	2-Door Sedan (RPO)	Futura
16	54B	4-Door Sedan (Bench)	
19	62B	2-Door Sedan (Bench)	
17	63B	2-Door Hardtop (Bench)	
11	63C	2-Door Hardtop (RPO Bucket)	
17	63H	2-Door Hardtop Bucket (Less Console)	Station Wagons
15	76A	Convertible (Bench)	
12	76B	Convertible (RPO Bucket)	Ranchero
21	59A	2-Door Wagon	
22	71A	4-Door Wagon	Ranchero
24	71B	4-Door Wagon Deluxe	
26	71C	4-Door Squire	Sedan Delivery
27	66A	2-Door Standard Ranchero	
27	66B	2-Door Deluxe Ranchero	
27	66G	2-Door Standard (RPO Bucket W/Console)	
27	66H	2-Door Standard (RPO Bucket W/Console)	Sedan Delivery
29	78A	Standard Sedan Delivery	
29	78B	Deluxe Sedan Delivery	

### FAIRLANE

Body Serial Code	Body Style Code	Body Type	Model
31	62A	2-Door Sedan	Fairlane
32	54A	4-Door Sedan	
41	62B	2-Door Sedan	Fairlane 500
42	54B	4-Door Sedan	
43	65A	2-Door Hardtop	Sport Coupe
47	65B	2-Door Hardtop*	
38	71D	4-Door Ranch Wagon	Station Wagons
48	71B	4-Door Custom Ranch Wagon	

\*Bucket Seats

### MUSTANG

Body Serial Code	Body Style Code	Body Type	Model
09	63A	2-Door Fastback	Mustang
07	65A	2-Door Hardtop	
08	76A	2-Door Convertible	

## EXTERIOR PAINT COLOR CODES

A single letter code designates a solid body color and two letters denote a two-tone—the first letter, the lower color and the second letter, the upper color

Code	M-30J/ M-32-J#	Color
A	1724-A	Black
C	1736-A	Med. Ivy Gold Met.
D	1625-A	Med. Turq. Met.
H	1544-A	Dk. Blue Met.
I	1737-A	Lt. Beige Met.
J	1515-A	Red
K	1621-A	Med. Gray Met.
M	1619-A	White
O	1732-A	Lt. Peacock
P	1738-A	Palomino Met.
R	1879-A	Dk. Ivy Green Met.
V	1729-A	Yellow
X	1632-A	Maroon Met.
Y	1269-A	Med. Blue Met.
5	1731-A	Dk. Turq. Met.

**INTERIOR TRIM CODES**

Code	Trim Codes
04	Beige Vinyl
12	Med. Blue and Lt. Blue Met. Fabric and Vinyl
15	Red Fabric and Vinyl
16	Black Fabric and Vinyl
17	Med. Turq. and Lt. Turq. Met. Fabric and Vinyl
19	Palomino and Med. Palomino Fabric and Vinyl
22	Med. and Lt. Blue Met. Vinyl (Comet), Fabric and Vinyl (Except Comet)
25	Red Vinyl (Comet), Fabric and Vinyl (Except Comet)
26	Black Vinyl
27	Med. and Lt. Turquoise Met. Vinyl (Comet), Fabric and Vinyl (Except Comet)
28	Ivy Gold and Lt. Ivy Gold D/L Fabric and Vinyl
29	Palomino Vinyl (Comet), Fabric and Vinyl (Except Comet)
32	Med. Blue and Lt. Blue Met. Fabric and Vinyl (Comet) Vinyl (Except Comet)
35	Red Fabric and Vinyl (Comet) Vinyl (Except Comet)
36	Black Fabric and Vinyl (Comet) Vinyl (Except Comet)
37	Med. Turquoise and Lt. Turq. Met. Fabric and Vinyl (Comet) Vinyl (Except Comet)
38	Ivy Gold Fabric and Vinyl (Comet) Vinyl (Except Comet)
39	Palomino and Med. Palomino Fabric and Vinyl (Comet) Vinyl (Except Comet)
42	White and Blue Vinyl
45	White and Red Vinyl
46	White and Black Vinyl
48	White and Ivy Gold Vinyl
49	Med. Palomino Vinyl
52	Med. Blue and Lt. Blue Met. Fabric and Vinyl (Comet), Vinyl (Except Comet)
55	Red Fabric and Vinyl (Comet), Vinyl (Except Comet)
56	Black Fabric and Vinyl (Comet), Vinyl (Except Comet)
59	Palomino and Med. Palomino Fabric and Vinyl (Comet), Vinyl (Except Comet)
F2	White Pearl (W/Red) Fabric and Vinyl
F5	White Pearl (W/Black) Fabric and Vinyl
F6	White Pearl (W/Turquoise) Fabric and Vinyl
F8	White Pearl (W/Gold) Fabric and Vinyl
F9	White Pearl (W/Palomino) Fabric and Vinyl
62	Lt. Blue Met. Vinyl
65	Red Vinyl
66	Black Vinyl
67	Turquoise Vinyl
68	Ivy Gold Met. and D/L Vinyl
69	Med. Palomino Vinyl
G2	White Pearl (W/Blue) Vinyl
G5	White Pearl (W/Red) Vinyl
G6	White Pearl (W/Black) Vinyl
G7	White Pearl (W/Turquoise) Vinyl
G8	White Pearl (W/Gold) Vinyl
G9	White Pearl (W/Palomino) Vinyl
72	Lt. Blue Met. Vinyl
75	Red Vinyl
76	Black Vinyl
77	Lt. Turq. Met. Vinyl
78	Ivy Gold D/L Vinyl
79	Med. Palomino Vinyl
H2	White (W/Blue) Vinyl
H5	White (W/Red) Vinyl
H6	White (W/Black) Vinyl
H7	White (W/Turquoise) Vinyl
H8	White (W/Gold) Vinyl
H9	White (W/Palomino) Vinyl
82	Lt. and Med. Blue Met. Vinyl
85	Red Vinyl
86	Black Vinyl
87	Lt. Turq. Met. Vinyl
88	Lt. Ivy Gold Met. Vinyl
89	Med. Palomino Vinyl
92	Blue Vinyl
95	Red Vinyl
96	Black Vinyl (Except Fairlane) Fabric and Vinyl (Fairlane)
99	Palomino Vinyl (Except Fairlane) Fabric and Vinyl (Fairlane)

**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	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

**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.

**COMET**

Code	District	Code	District
11	Boston	34	Detroit
16	Philadelphia	41	Chicago
15	New York	42	St. Louis
14	Washington	45	Twin Cities
21	Atlanta	51	Denver
22	Dallas	52	Los Angeles
23	Jacksonville	53	Oakland
26	Memphis	54	Seattle
31	Buffalo	81	Ford of Canada
32	Cincinnati	84	Home Office Reserve
33	Cleveland	90-99	Export

**FALCON, FAIRLANE AND MUSTANG**

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

## REAR AXLE RATIO CODES

A number designates a conventional axle, while a letter designates an Equi-Lock differential.

Code	Ratio	Code	Ratio
1.....	3.00:1	A.....	3.00:1
3.....	3.20:1	C.....	3.20:1
4.....	3.25:1	D.....	3.25:1
5.....	3.50:1	E.....	3.50:1
6.....	2.80:1	F.....	2.80:1
7.....	3.80:1	G.....	3.80:1
8.....	3.89:1	H.....	3.89:1
9.....	4.11:1	I.....	4.11:1

## TRANSMISSION CODES

Code	Type
1.....	3-Speed Manual
2.....	3-Speed Manual W/Overdrive
5.....	4-Speed Manual
6.....	Dual Range Automatic (C-4)

## MODEL YEAR CODE

The number 5 designates 1965.

## ASSEMBLY PLANT CODES

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

## ENGINE CODES

A.....	8 Cyl. 289 Cu. In. (4V Prem.)
C.....	8 Cyl. 289 Cu. In. (2V)
K.....	8 Cyl. 289 Cu. In. (4V Hi-Perf.)
T.....	6 Cyl. 200 Cu. In. (1V)
U.....	6 Cyl. 170 Cu. In. (1V)
2.....	6 Cyl. *200 Cu. In. (1V)
3.....	8 Cyl. *289 Cu. In. (2V)
4.....	6 Cyl. *170 Cu. In. (1V)

## CONSECUTIVE UNIT NUMBER

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

# BRAKES

# GROUP 2

<b>PART 2-1</b>	<b>PAGE</b>	<b>PART 2-3</b>	<b>PAGE</b>
GENERAL BRAKE SERVICE .....	<b>2-1</b>	SPECIFICATIONS .....	<b>2-39</b>
<b>PART 2-2</b>			
BRAKE SYSTEM .....	<b>2-8</b>		

## PART 2-1

### GENERAL BRAKE SERVICE

Section	Page	Section	Page
1 Diagnosis and Testing .....	2-1	3 Cleaning and Inspection .....	2-6
2 Common Adjustments and Repairs .....	2-4		

## 1 DIAGNOSIS AND TESTING

### PRELIMINARY TESTS

#### FLUID LEVEL

Check the fluid in the master cylinder, and add FoMoCo heavy-duty brake fluid.

#### AUTOMATIC ADJUSTERS

Push the brake pedal down as far as it will go while the car is standing. If the car is equipped with power brakes, the engine should be running while making this test. If the brake pedal travels more than half-way between the released position and the floor, check the automatic adjusters for being inoperative. To check adjuster operation, inspect the brake shoes and the adjuster components for binding or improper installation and follow the procedure described under "Brake Shoe Adjustments" in Part 2-2, Section 2.

Make several reverse stops to ensure uniform adjustment at all wheels.

#### HYDRAULIC SYSTEM

If the car is equipped with power brakes, shut off the engine and ex-

haust all vacuum from the booster system before performing this test.

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, and connections for leaks.

If the brake pedal movement feels spongy, bleed the hydraulic system to remove air from the lines and cylinder. See "Hydraulic System Bleeding", Section 2. Also, check for leaks or insufficient fluid.

#### BOOSTER

With the transmission in neutral, stop the engine and apply the parking brake. Depress the service brake pedal several times to exhaust all vacuum in the system. Then, 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. Follow the procedures in the "Booster Diagnosis Guide."

For booster removal and installation procedures, refer to Part 2-2, Section 3. For disassembly and assembly procedures, refer to Part 2-2, Section 4. For cleaning and inspection refer to Part 2-1, Section 3.

#### LOCKED BRAKES

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

#### ROAD TEST

**The car should be road tested only if the brakes will safely stop the car.** Apply the brakes at a speed of 25-30 mph to check for the existence of the trouble symptoms listed in Table 1, with the exception of those resolved in the preliminary tests and brake chatter. For each of the symptoms encountered, check and eliminate the causes which are also listed in Table 1. To check for brake chatter or surge, apply the brakes lightly from approximately 50 mph.

TABLE 1—Disc Brake Trouble Symptoms and Possible Causes—Mustang 8 Cyl.

Possible Causes of Trouble Symptoms	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
Shoe and Lining Knock-back after violent cornering or rough road travel	X								
Piston and Shoe and Lining Assembly Not Properly Seated or Positioned	X								X
Air Leak or Insufficient Fluid in System or Caliper	X								X
Loose Wheel Bearing Adjustment	X								
Damaged or Worn Caliper Piston Seal	X						X		X
Excessive Lateral Run-out of Rotor		X							
Rotor Excessively Out of Parallel		X							
Frozen or Seized Pistons			X	X		X		X	
Brake Fluid, Oil or Grease on Linings			X	X				X	
Shoe and Lining Worn Below Specifications			X						
Proportioning Valve Malfunction			X					X	
Caliper Out of Alignment with Rotor				X				X	
Loose Caliper Attachment				X				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		
Bleeder Screw Still Open									X
Caliper Out of Parallel with Rotor				X					

## BOOSTER DIAGNOSIS GUIDE—FALCON, COMET, MUSTANG

<p><b>BOOSTER INOPERATIVE— HARD PEDAL</b></p>	<p>If the preliminary tests show that the booster is inoperative or if a hard pedal condition still exists after eliminating the causes of "Excessive Pedal Effort" or "Hard Pedal" listed in Tables 1 and 2, the trouble may be caused by vacuum leakage. Disconnect the vacuum line at the booster, remove the vacuum manifold and check valve assembly, and look for a sticking or faulty check valve. Check all vacuum connections for leakage or obstruction. Check all hoses for a leaking or collapsed con-</p>	<p>dition. Repair or replace parts as necessary.</p> <p>If the foregoing procedure does not eliminate the trouble, remove the booster from the car. Separate the front shell from the rear shell, and check the valve and rod assembly reaction disc, diaphragm plate, and diaphragm assembly for damage that would cause leaks. When assembling, be sure that the diaphragm assembly is properly positioned. Improper location could cause leakage between the vacuum and atmospheric sides of the diaphragm.</p>
---	--	--

TABLE 2—Drum Brake Trouble Symptoms and Possible Causes

Possible Causes of Trouble Symptoms	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 Release	Noisy or Grabbing Brakes	Brakes Do Not Apply
Mechanical Resistance at Pedal or Shoes Damaged Linkage		X	X										
Brake Line Restricted	X	X	X		X								
Leaks or Insufficient Fluid				X				X	X				X
Improper Tire Pressure					X					X			
Improperly Adjusted or Worn Wheel Bearing	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						
Linings Glazed or Worn			X		X	X	X	X				X	X
Oil or Grease In Lining			X		X	X	X			X		X	X
Loose Carrier Plate	X					X	X						
Loose Lining					X		X						
Scored Drum										X		X	
Dirt on Drum-Lining Surface												X	
Faulty Wheel 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			X		
Insufficient Shoe-to-Carrier Plate Lubrication	X										X		
Tire Tread Worn						X							
Poor Lining to Drum Contact							X						
Loose Front Suspension							X						
"Threads" Left by Drum Turning Tool Pull Shoes Sideways											X		
Cracked Drum								X					
Sticking Booster Control Valve		X										X	

## BOOSTER DIAGNOSIS GUIDE—FALCON, COMET, MUSTANG (Continued)

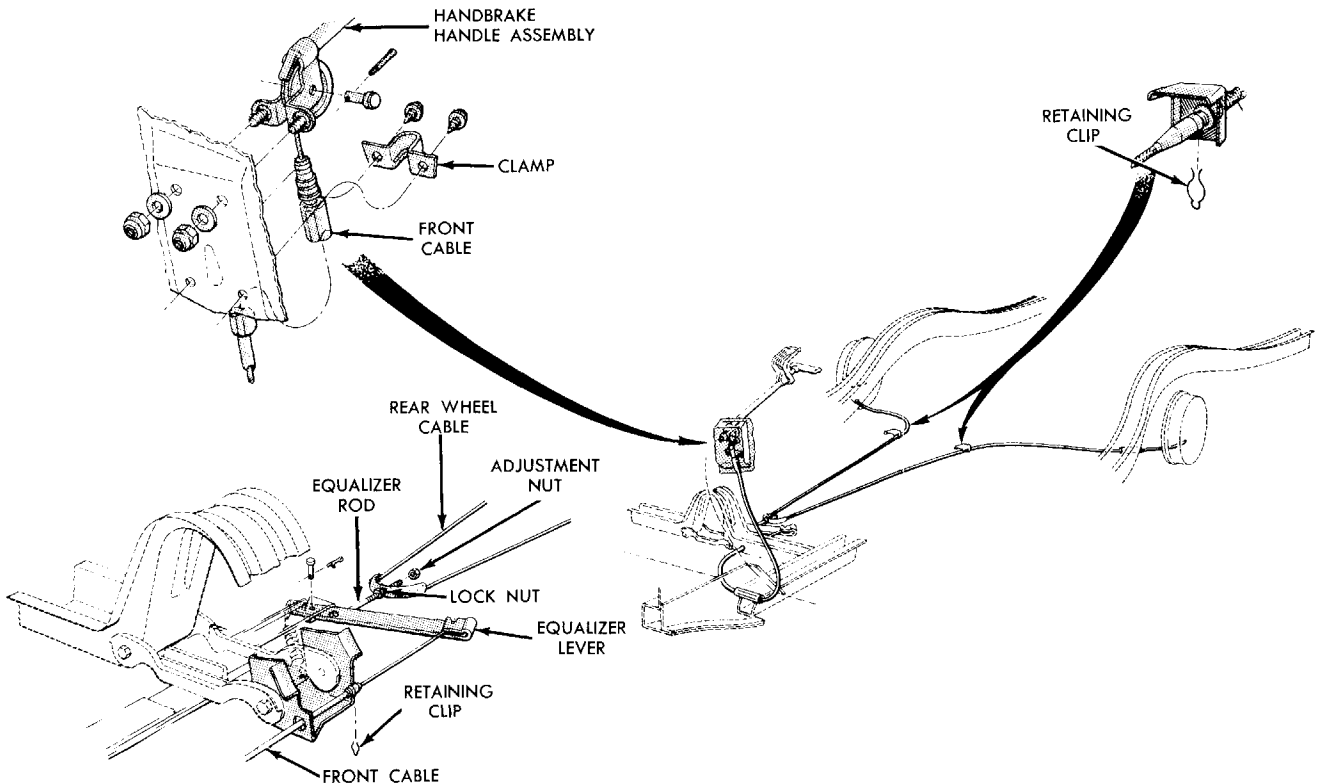
<b>BRAKES DRAG OR GRAB</b>	If the brakes still drag or grab after eliminating the causes listed in Tables 1 and 2, the condition is probably caused by a sticking valve	plunger assembly. Remove and disassemble the booster. Clean, inspect, and replace parts as necessary.
<b>SELF APPLICATION OF BRAKES WHEN ENGINE STARTS</b>	Remove and disassemble the booster. Check for a leak in the rear shell. Check the diaphragm for being out of locating radii in the housing. Check for a sticking or unseated	valve poppet. Clean, inspect, and replace parts as necessary. Be sure that the diaphragm is properly located when assembling.

CONTINUED ON NEXT PAGE

**BRAKE BOOSTER TROUBLE DIAGNOSIS GUIDE—FAIRLANE**

<p><b>BOOSTER INOPERATIVE— HARD PEDAL</b></p>	<p>If the preliminary tests show that the booster is inoperative or if a hard pedal condition still exists after eliminating the causes of "Hard Pedal" listed in Table 2, the trouble may be caused by vacuum leakage. Disconnect the vacuum line (two lines if equipped with an automatic transmission) at the booster, remove the vacuum manifold and check valve assembly, and look for a sticking or faulty check valve. Check all vacuum connections for leakage or obstruction. Check all hoses for a</p>	<p>leaking or collapsed condition. Repair or replace parts as necessary. If the foregoing procedure does not eliminate the trouble, remove the booster from the car. Separate the booster body from the end plate, and check the bellows, booster body, and diaphragm assembly for damage that would cause leaks. When assembling, be sure that the diaphragm assembly is properly positioned. Improper location could cause leakage between the vacuum and atmospheric sides of the diaphragm.</p>
<p><b>BRAKES DRAG OR GRAB</b></p>	<p>If the brakes still drag or grab after eliminating the causes listed in Table 1, the condition is probably caused by a sticking valve plunger</p>	<p>assembly. Remove and disassemble the booster. Clean, inspect, and replace parts as necessary.</p>
<p><b>SELF APPLICATION OF BRAKES WHEN ENGINE STARTS</b></p>	<p>Remove and disassemble the booster. Check the diaphragm for being out of locating radii in the housing. Check for a sticking or un-</p>	<p>seated atmospheric valve. Clean, inspect, and replace parts as necessary. Be sure that the diaphragm is properly located when assembling.</p>

**2 COMMON ADJUSTMENTS AND REPAIRS**



**FIG. 1—Parking Brake Linkage**

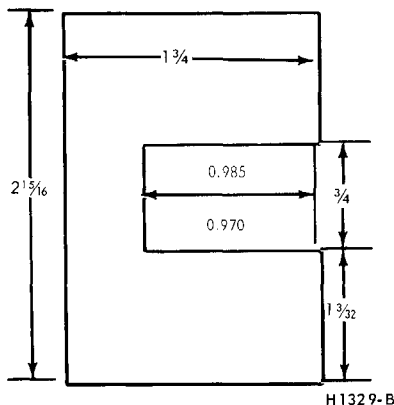
**PARKING BRAKE LINKAGE ADJUSTMENT**

Check the parking brake cables when the 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 car.
4. On a Falcon, Comet or Fairlane, turn the lock nut in front of the equalizer (Fig. 1) several turns forward.
5. On all cars, turn the adjustment nut forward against the equalizer until a moderate drag is felt when turning the rear wheels in the direction of forward rotation.
6. When the cables are properly adjusted on a Falcon, Comet or Fairlane, tighten the lock nut against the equalizer.
7. Release the parking brake, and make sure that the brake shoes return to the fully released position and no drag is felt when turning the rear wheels.

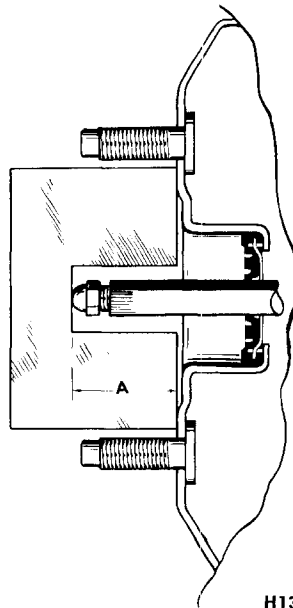
**POWER BRAKE MASTER CYLINDER PUSH ROD ADJUSTMENT—COMET AND MUSTANG**

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



H1329-B

**FIG. 2—Push Rod Gauge Dimensions**

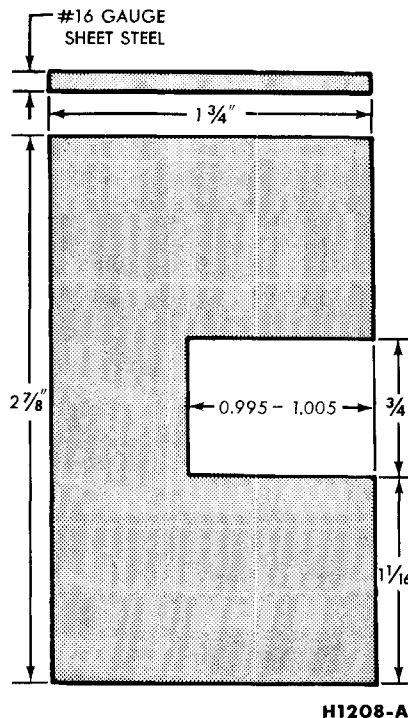


H1330-A

**FIG. 3—Push Rod Adjustment**

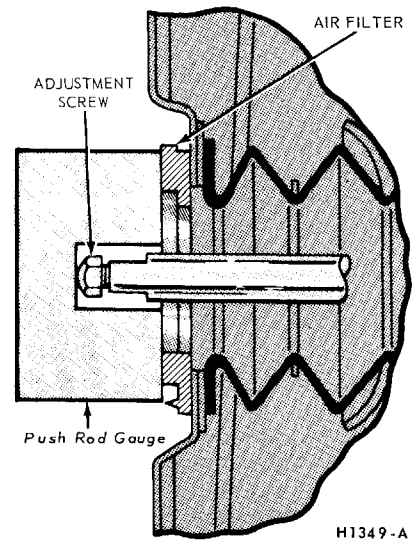
drag, or cause excessive brake pedal travel.

To check the adjustment of the screw, fabricate a gauge of the dimension shown in Fig. 2. Then place the gauge against the master cylinder mounting surface of the booster body as shown in Fig. 3. The push rod screw should be adjusted so that the end of the screw just touches



H1208-A

**FIG. 4—Push Rod Gauge Dimensions—Fairlane**



H1349-A

**FIG. 5—Push Rod Adjustment—Fairlane**

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 master cylinder piston should not move more than 0.015 inch as it contacts the push rod. No movement (exact contact) is ideal.

**POWER BRAKE MASTER CYLINDER PUSH ROD ADJUSTMENT—FAIRLANE**

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

To check the adjustment of the screw, fabricate a gauge of the dimensions shown in Fig. 4. Remove the air filter assembly and push the bellows back into the booster body. Re-install the air filter directly against the booster body, and then place the gauge against the master cylinder mounting surface of the air filter assembly as shown in Fig. 5. 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 as it may break the valve plunger.

**This is an approximate adjustment only.** To verify the adjustment, look

through the make-up (rear) port when installing the master cylinder to the booster. The master cylinder piston should not move more than 0.015 inch as it contacts the push rod. No movement (exact contact) is ideal.

### HYDRAULIC SYSTEM BLEEDING

When any part of the hydraulic system has been disconnected for repair or replacement, air may get into the lines and cause spongy pedal action. Bleed the hydraulic system after it has been properly connected to be sure that all air is expelled from the brake cylinders or disc brake calipers, and lines.

The hydraulic system can be bled manually or with pressure bleeding equipment.

With disc brakes, more pumping of the pedal is required and more frequent checking of the master cylinder may be necessary while bleeding.

On a Mustang with disc brakes, remove the front wheel and tire assemblies in order to gain access to the bleeder fitting on the disc brake calipers.

### MANUAL BLEEDING

Bleed the longest lines first. Keep the master cylinder reservoir filled with new SAE 70R3-Wagner 21B (301) brake fluid during the bleeding operation.

**Never use brake fluid which has been drained from the hydraulic system.**

1. Position a bent  $\frac{3}{8}$ -inch box wrench on the bleeder fitting on the

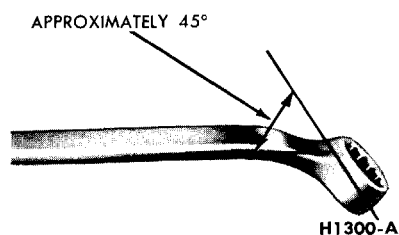


FIG. 6—Brake Bleeder Wrench

right rear brake wheel cylinder (Fig. 6). Attach a rubber drain tube to the bleeder fitting. **The end of the tube should fit snugly around the bleeder fitting.**

2. Submerge the free end of the tube in a container partially filled with clean brake fluid, and loosen the bleeder fitting approximately  $\frac{3}{4}$  turn.

3. 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 tube.

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

5. Repeat this procedure on the brake cylinders or disc calipers at each wheel in order: left rear, right front, and left front. Refill the master cylinder reservoir after each brake cylinder is bled and when the bleeding operation is completed. The fluid level should be within  $\frac{3}{8}$  inch of the top of the reservoir. The diaphragm-type gasket should be properly positioned in the reservoir cap before the cap is installed.

6. On a Mustang with disc brakes, be sure that the front brake pistons are returned to their normal positions and that the shoe and lining assemblies are properly seated.

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

### PRESSURE BLEEDING

Bleed the longest lines first. **Never use brake fluid which has been drained from the hydraulic system.**

The bleeder tank should contain enough new heavy-duty brake fluid to complete the bleeding operation, and it should be charged with 10-30 pounds of air pressure.

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

2. Remove the master cylinder reservoir cap, install an adapter

cap to the reservoir, and attach the bleeder tank hose to the fitting on the adapter cap.

An adapter cap can be fabricated by cutting a hole in the center of a reservoir cap and soldering a fitting at the hole. The adapter cap must be securely seated and completely sealed on the master cylinder or leakage will occur.

3. Position a  $\frac{3}{8}$ -inch box wrench on the bleeder fitting on the right rear brake wheel cylinder (Fig. 6). Attach a rubber drain tube to the bleeder fitting. **The end of the tube should fit snugly around the bleeder fitting.**

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

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

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

7. Repeat this procedure on the brake cylinder or disc caliper at each wheel in order: left rear, right front, and left front. Refill the master cylinder reservoir after each brake cylinder is bled.

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

9. Remove the adapter cap, refill the master cylinder reservoir to within  $\frac{3}{8}$ -inch from the top of the reservoir. Be sure that the diaphragm-type gasket is properly positioned in the reservoir cap, and then install the cap.

10. On a Mustang with disc brakes, be sure that the front brake pistons are returned to their normal positions and that the shoe and lining assemblies are properly seated.

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

## 3 CLEANING AND INSPECTION

### DISC BRAKES

1. Remove the wheel and tire assembly, 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 0.195-

inch (shoe and lining together) or 0.030 -inch (lining material only) at any one of the three measuring locations, replace all (4) shoe and lining assemblies on both front wheels.

3. With the shoe and lining assem-

blies installed, insert a feeler gauge between the lining and rotor. If the clearance is not within 0.002-0.010-inch, check for shoe and lining assemblies not being properly seated on the caliper bridges, for a piston pushed back in the cylinder bore, for a seized piston, or for malfunction of a piston seal.

Ordinarily, the clearance should be 0.002-0.010-inch. However, if the vehicle was stopped by a brake application just prior to checking the clearance, the brakes may drag slightly.

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 indicator runout, replace the rotor. **Do not attempt to refinish a rotor that indicates runout in excess of specification.** 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, replace it.

7. Visually check the caliper. If it is cracked or if excess leakage is evident, it should be replaced. Slight leakage 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.**

### DRUM BRAKES

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

2. Brush all dust from the carrier plate and interior of the brake drum.

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 oil saturated. Replace the lining in axle sets. Prior to replacement of the 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 shoes have a slight blue coloring, or if the springs show a change in free length, indicating overheating, replacement of the retracting and hold down springs 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 on the brake linings, or signs of 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—COMET

A disassembled view of the brake booster is shown in Fig. 41, Part 2-2.

After disassembly, immerse all metal parts in cleaning solvent. Clean the plastic parts in alcohol **only**, taking care to avoid chipping or damage. Replace all rubber parts. Use an air hose to blow out dirt and cleaning solvent from recesses and internal passages. When overhauling a vacuum booster, use all parts furnished in the repair kit.

### BOOSTER UNIT—FAIRLANE

A disassembled view of the brake booster is shown in Fig. 50, Part 2-2.

After disassembly, immerse all metal parts in a suitable solvent. Use only alcohol on rubber parts or parts containing rubber. After the parts have been thoroughly cleaned and rinsed in cleaning solvent, the metal parts which come in contact with hydraulic brake fluid or rubber parts should be rewashed in clean alcohol before assembly. Use an air hose to blow dirt and cleaning fluid from the recesses and internal passages. When overhauling a power booster, use all parts furnished in the repair kit. **Discard all old rubber parts.**

Inspect all other parts for damage or excessive wear. Replace damaged or excessively worn parts. If the inside of the booster body is rusted or corroded, polish it with steel wool or fine emery cloth.

# PART 2-2 BRAKE SYSTEM

Section	Page	Section	Page
1 Description and Operation.....	2- 8	3 Removal and Installation.....	2-23
2 In-Car Adjustments and Repairs .....	2-16	4 Major Repair Operations.....	2-31

## 1 DESCRIPTION AND OPERATION

Disc brakes are available as optional equipment for the front wheels on Mustang 8-cylinder cars. The hydraulic brake system employs single anchor, internal expanding and self-adjusting drum brake assemblies on the rear wheels of cars with disc brakes, and of front and rear wheels of all others.

A vacuum booster is available as optional equipment on Comet and Mustang models with an automatic transmission and on all Fairlane models.

A booster unit is not available on Mustang models equipped with disc brakes.

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.

### SELF ADJUSTING DRUM BRAKE ASSEMBLIES

The self-adjusting brake mechanism consists of a cable, cable guide, adjusting lever, and adjuster spring (Fig. 1 and 2). 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.

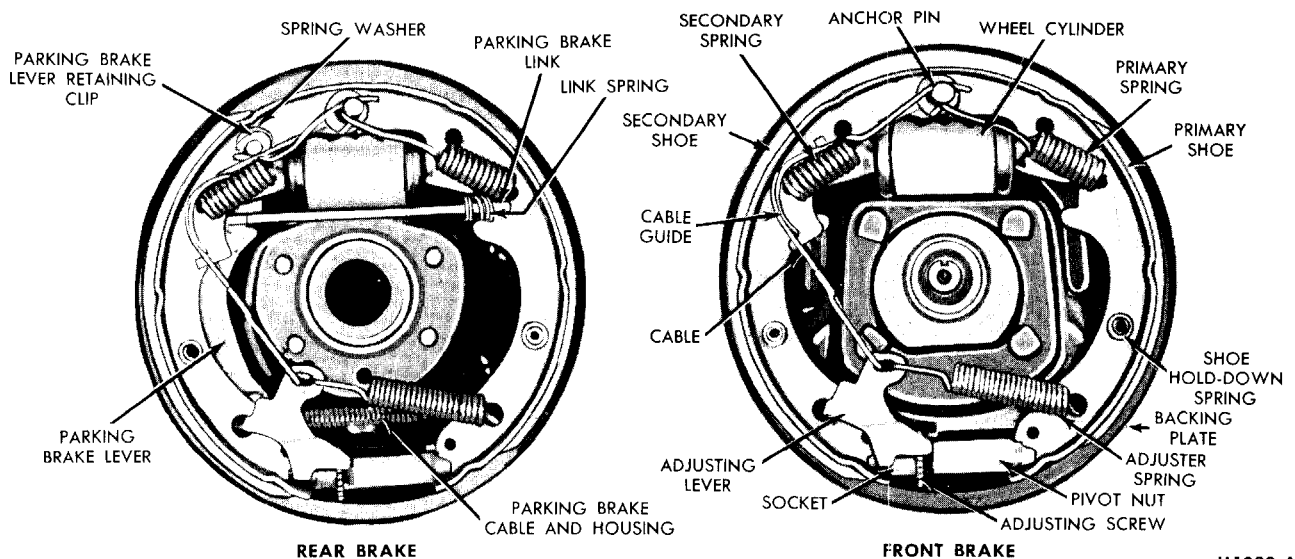
With the car moving rearward and the brakes applied, the "wrap-around" action of the shoes following the drum forces the upper end of the primary shoe against the anchor pin. The action of the wheel cylinder moves the upper end of the secondary shoe away from the anchor pin. The movement of the sec-

ondary 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 car 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.

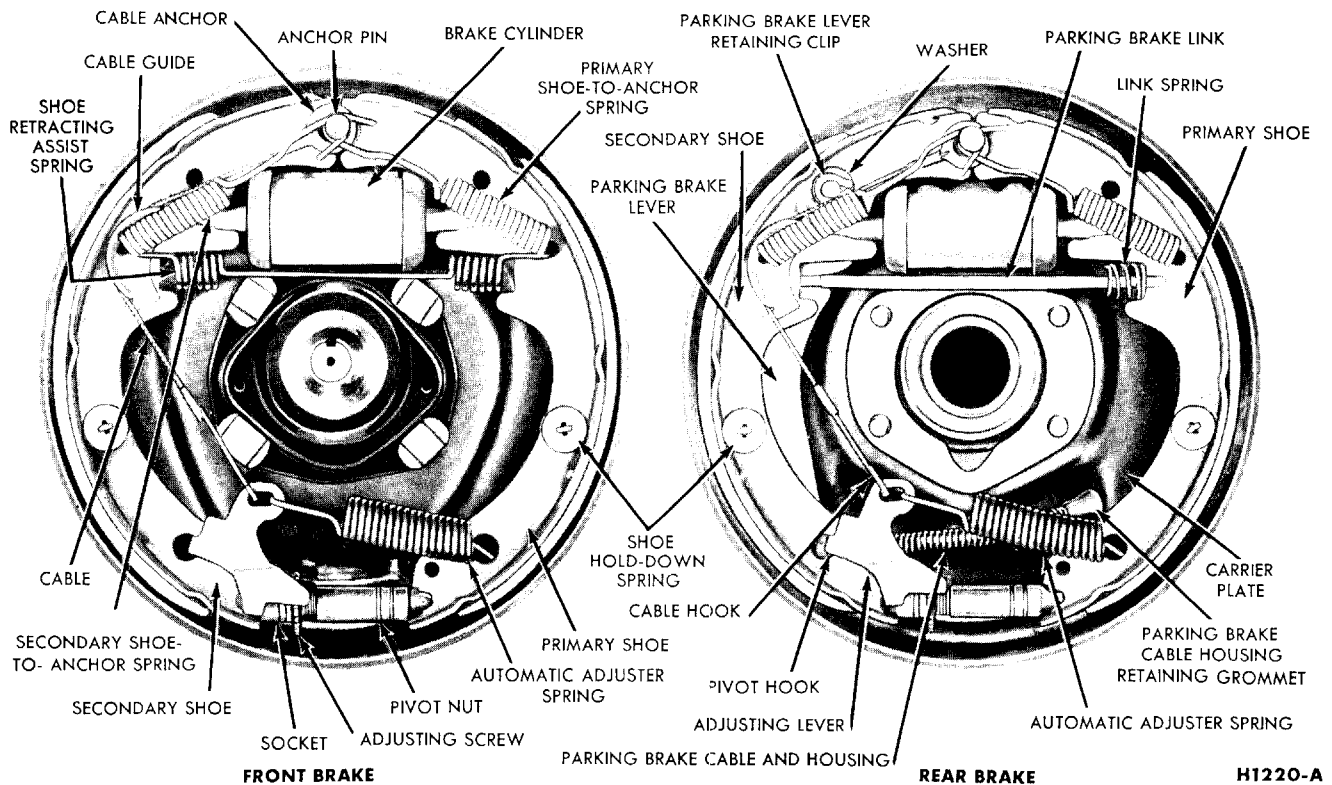
The rear brake assembly is basically the same as the front brake. The conventional parking brake lever, link, and spring are used in the rear brake.

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



H1323-A

FIG. 1—Self Adjusting Brake Assemblies—Comet, Falcon, and Mustang 6-Cylinder Cars



**FIG. 2—Self Adjusting Brake Assemblies—All Fairlane & Falcon, Comet & Mustang—8-Cylinder Cars**

## DISC BRAKE ASSEMBLIES

### 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. 3). 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" diameter. Each cylinder bore contains a piston with an attached molded rubber dust boot to seal the cylinder bore from contamination. (Fig. 4). 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).

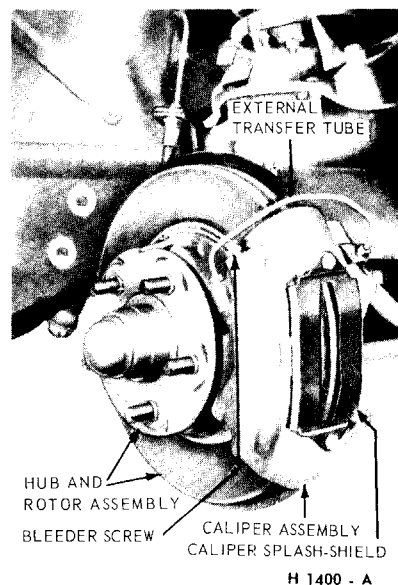
The cylinders are connected hydraulically by means of internal pas-

sages 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.

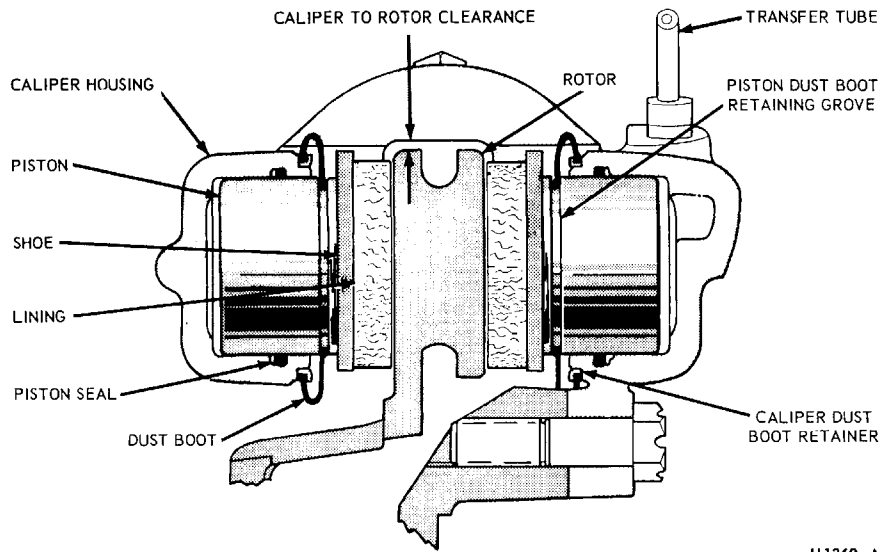
The shoe and lining assemblies are located in between parallel machined

abutments within the caliper, and are supported radially by tabs on the outer ends of the shoe assemblies (Fig. 36). 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. 18). 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. 36). A splash shield is attached to the top of the caliper to retain the shoe and lining assemblies and reduce contamination. 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 staked to, and rotates with, the wheel hub. The outside diameter of the rotor is 11.375 inches and the inside diameter is 7.375 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 pre-



**FIG. 3—Mustang Disc Brake Assembly**



**FIG. 4—Typical Caliper Assembly—Sectional View**

vent road contaminants from contacting the inboard rotor and lining surfaces (Fig. 19). The wheel provides protection for the outboard surface of the rotor.

#### OPERATION

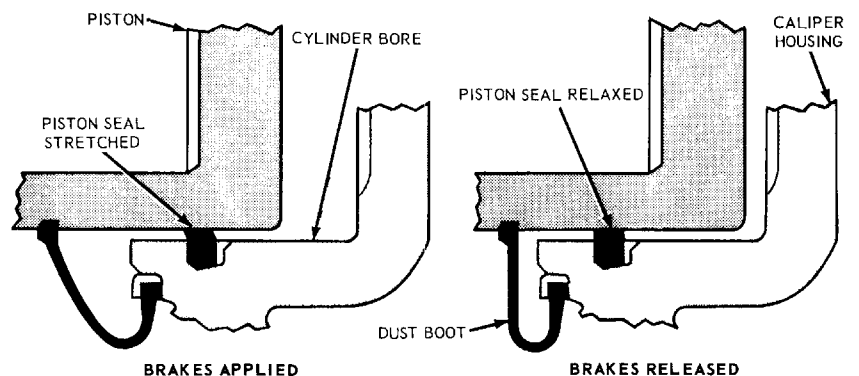
As the brake pedal is depressed, hydraulic pressure from the master cylinder forces the pistons out of the caliper bores against their respective shoe and lining assemblies. The force of the pistons against the shoes moves the linings against both sides of the revolving rotor to effect braking action.

During brake application, the rubber seal on each piston stretches as the piston moves against the shoe (Fig. 5). 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 approximately 0.005-inch 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 un-applied position, there is no hydraulic pressure to the calipers because the fluid source at the master cylinder by-passes the residual check valve.

A warning sound feature is incorporated in the design of the brake shoes. Metal tabs on the ends of the shoes create an audible metallic, scraping noise, when the linings become worn enough to allow the tabs to contact the rotor. This metal-to-metal contact warns the driver that the shoes need replacing and is not detrimental to the function of the disc brake.

A proportioning valve located between the master cylinder 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. 22). 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.



**FIG. 5—Function of Piston Seal**

#### BOOSTER SYSTEM—COMET

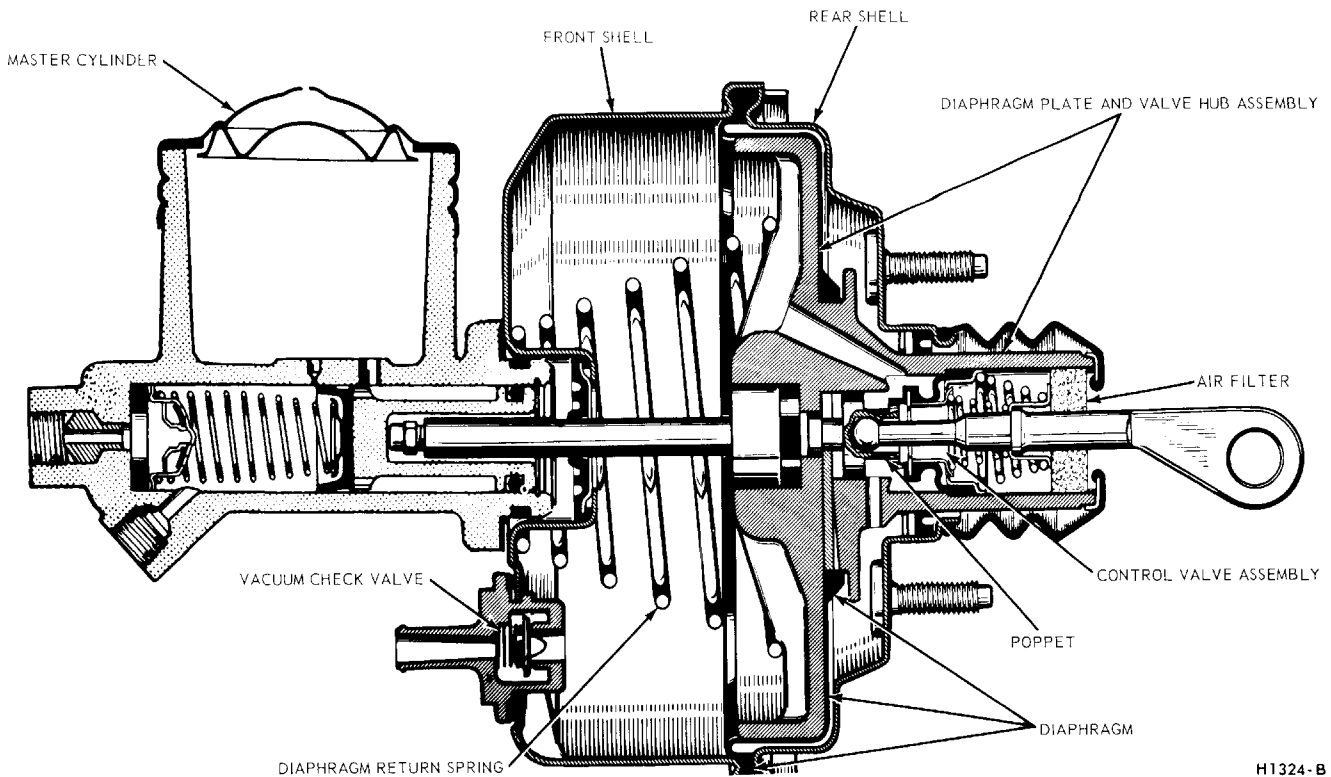
The diaphragm type brake booster (optional on Comet and Mustang models) is a self contained vacuum-hydraulic braking unit mounted on the engine side of the dash panel.

The vacuum power chamber consists of a front and rear shell locked together. Within the vacuum chamber are the rubber diaphragm and the integral valve hub and diaphragm plate. The rubber diaphragm fits over the plate, and the outer bead of the diaphragm is locked between the front and rear shells (Fig. 6). The diaphragm return spring is located between the diaphragm plate and the front shell.

The valve hub section of the diaphragm plate protrudes from the rear shell. A synthetic rubber seal is used between the valve hub and the rear shell. The seal and the valve hub are protected from dirt by a rubber guard connected between the air filter at the end of the hub and a flange on the rear shell. The control valve assembly fits into the hub and is connected to the brake pedal by the valve operating rod. The control valve assembly consists of a plunger, a valve body which supports a single poppet of flexible rubber, and two return springs. When the brake pedal is in the released position the valve return spring holds the valve assembly and operating rod away from the diaphragm plate. In this position, the poppet on the valve body is off the vacuum port seat which is a part of the diaphragm plate. The poppet return spring likewise holds the poppet against the atmospheric port seat which is a part of the plunger.

The hydraulic master cylinder which contains all of the components of the conventional master cylinder is bolted to the booster front shell.

H1370-A



H1324-B

**FIG. 6—Cutaway View of Vacuum Booster**

The hydraulic push rod forms the link between the master cylinder piston and the vacuum power diaphragm assembly. The end of the push rod, that enters the master cylinder piston, is equipped with a self-locking adjusting screw. The opposite end has a piston head which enters the diaphragm plate. A seal, located in the front shell, seals the opening between the hydraulic push rod and the shell.

Engine manifold vacuum is supplied to the booster through a vacuum check valve located in the front shell. Air is admitted through the air filter located at the end of the valve hub. The hydraulic push rod is actuated by pedal pressure assisted by the diaphragm, which derives power from the pressure differential existing between the vacuum on its front side and atmospheric pressure on its rear side. A passage in the diaphragm plate permits vacuum to pass from the front to the rear side of the diaphragm when the vacuum port opens as the brakes are released.

#### RELEASED POSITION

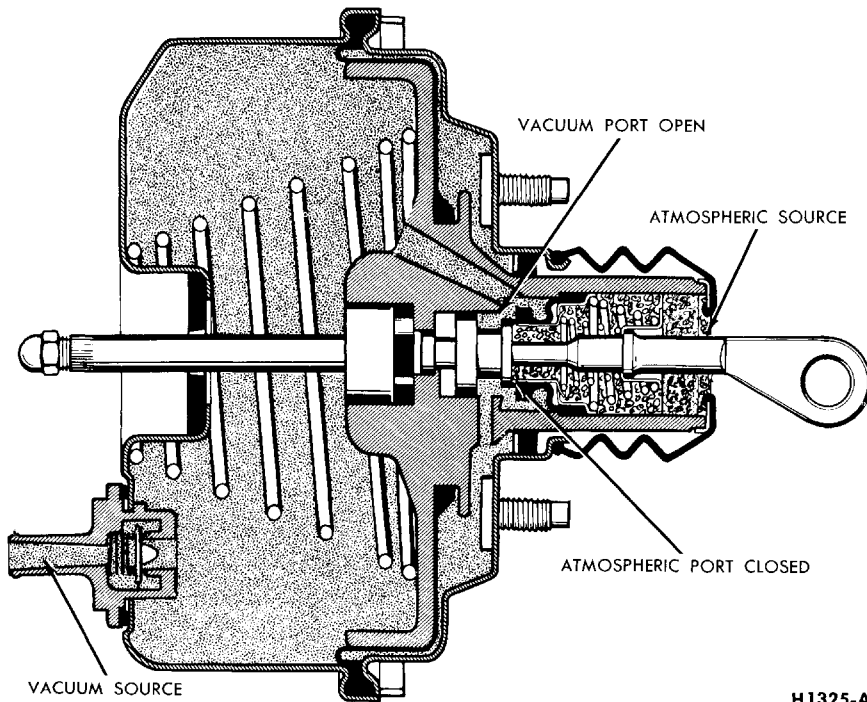
With the engine running and the brakes released (Fig. 7), vacuum from the intake manifold is admitted through the check valve to the

front (constant vacuum) chamber of the power unit. In the released position (no pressure applied to the brake pedal), the valve operating rod and valve plunger are held to the rear in the valve hub by the valve return spring to CLOSE the atmospheric port and OPEN the vacuum port. With the valve in this position, the rear (control vacuum) chamber is also open to vacuum through the porting in the diaphragm and valve hub assembly. The diaphragm is then "balanced" or suspended in vacuum, since vacuum is present on both sides of the power diaphragm. With the power diaphragm balanced in vacuum, the diaphragm return spring holds the diaphragm and hydraulic push rod in the fully released position. With the hydraulic push rod in this position, the hydraulic compensating port in the hydraulic master cylinder is OPEN. The open port permits brake fluid to either return from the brake system to the fluid reservoir or enter the brake system from the fluid reservoir to compensate for any gain or loss in fluid volume.

#### APPLIED POSITION

When the brakes are applied (Fig. 8), the valve operating rod and valve plunger move forward in the valve

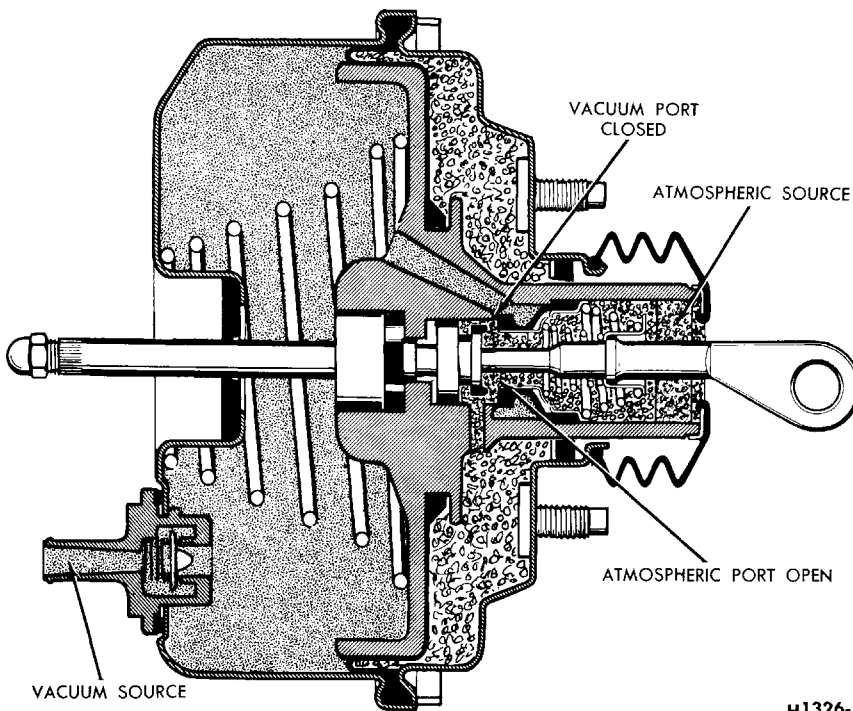
hub section of the diaphragm plate to compress the valve return spring and force the poppet against the vacuum valve seat in the diaphragm plate to "CLOSE" the vacuum port. Any additional movement of the valve operating rod in the applied direction moves the valve plunger away from the poppet valve to "OPEN" the atmospheric port and admit atmosphere through the air cleaner and passages in the diaphragm plate to the rear side of the power chamber. With vacuum present on the front side of the diaphragm and valve housing and atmospheric pressure present on the rear side of the diaphragm, a force is developed to move the vacuum power diaphragm assembly, hydraulic push rod and master cylinder piston forward to close the compensating port and force hydraulic fluid under pressure through the residual check valve and brake tubes into the brake wheel cylinders. As hydraulic pressure is developed in the brake master cylinder, a counter force (to the rear) acting through the hydraulic push rod, sets up a reaction force against the power diaphragm assembly and valve plunger through the rubber reaction disc (located at the end of the hydraulic push rod). The rubber reaction disc acts similar to a column of fluid to



**FIG. 7—Booster in Released Position**

distribute the pressure between the vacuum power diaphragm assembly and the valve plunger in proportion to their respective contact areas. The pressure acting against the valve plunger and valve operating rod tends to move the valve plunger slightly to the rear in relation to the diaphragm and valve hub assem-

bly to close off the atmospheric port. The driver is thus assured a "feel" of the brake, since part of the counter force reacts through the valve plunger, valve operating rod, and pedal linkage against the driver's foot. This reaction force is in direct proportion to the hydraulic pressure developed within the brake system.



**FIG. 8—Booster in Applied Position**

### HOLDING POSITION

During brake application, the "reaction" force which opposes the force applied by the driver, tends to close the atmospheric port. When both atmospheric and vacuum ports are **CLOSED**, the booster is said to be in the holding position (Fig. 9). With both valves closed, any degree of brake application attained will be held until either the atmospheric port is **reopened** by an increase in pedal pressure to further increase the brake application or by a decrease in pedal pressure to **reopen** the vacuum port to decrease the brake application. Whenever the pressure applied to the brake pedal is held constant for a moment, the valve returns to its holding position. However, upon reaching the fully applied position the force applied to the brake pedal overrules the reaction force. In this position the valve plunger and atmospheric valve seat are held away from the valve poppet to admit maximum atmospheric pressure to the rear chamber. With the front chamber open to manifold vacuum, full power application is attained which is referred to as the "run-out" of the power unit. Any increase in hydraulic pressure beyond this point must be supplied by physical effort of the driver.

### NO POWER CONDITION

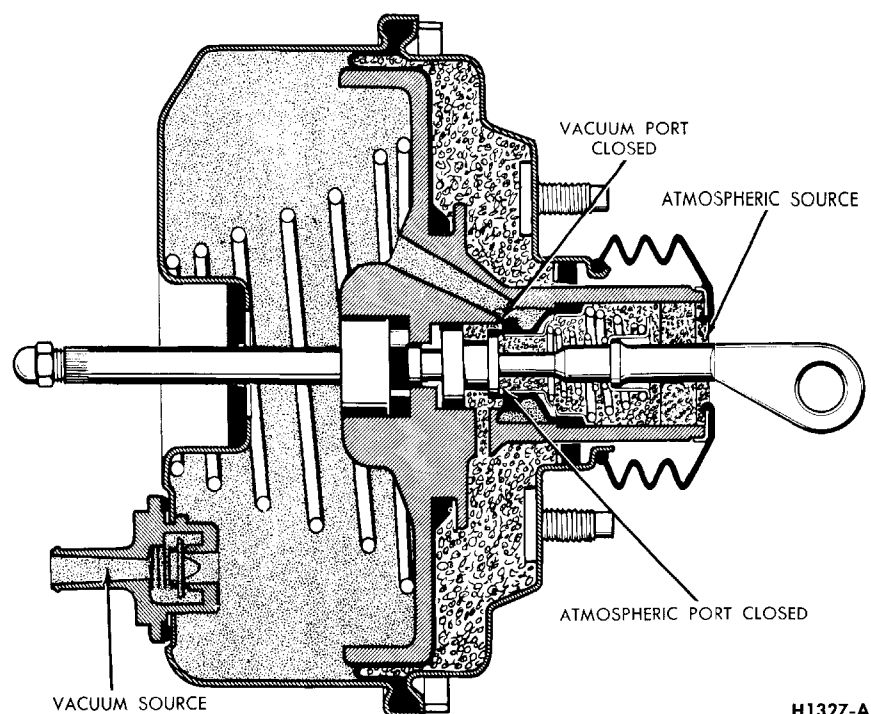
It should be noted that in case of engine failure and consequent loss of engine vacuum, at least one full power brake application may be made from the vacuum in the booster. With the engine off and no vacuum in the power system, the brakes can be applied in the conventional manner by applying more physical effort to the brake pedal.

### BOOSTER SYSTEM—FAIRLANE

The optional power brake booster is installed on the engine side of the dash panel and is connected to the brake pedal through a lever assembly and push rod link.

The booster consists of a vacuum chamber, atmospheric valve, control valve plunger assembly, diaphragm, and an atmospheric chamber (Figs. 10, 11 and 12).

Atmospheric pressure is present at all times in the atmospheric chamber at the front side of the atmospheric valve. The air intake to the atmospheric chamber is protected by an air filter. The atmospheric chamber is separated from the vacuum



**FIG. 9—Booster in Holding Position**

chamber by the bellows assembly within the vacuum chamber.

Vacuum is present at all times in that area of the vacuum chamber forward of the diaphragm. Vacuum is supplied through a hose from the intake manifold to the vacuum manifold and check valve on the booster body. With this integral check valve and vacuum chamber, it is possible to obtain several power assisted brake applications with the engine shut off. This arrangement makes a vacuum reservoir unnecessary.

Either vacuum from the forward side of the diaphragm or air from the bellows (atmospheric chamber) can be connected to the rear side of the diaphragm through porting in the control valve hub and the plunger assembly.

#### APPLYING POSITION

As the brake pedal is depressed, the valve operating rod and valve plunger assembly move forward compressing the plunger return spring (Fig. 10). The initial movement of the plunger closes the porting from the vacuum chamber preventing further evacuation of the area back of the diaphragm. Fur-

ther movement of the plunger forces the atmospheric valve off its seat so that atmospheric pressure from the bellows can enter the hub porting that leads to the rear side of the diaphragm.

With vacuum on the front side of the diaphragm and atmospheric pressure on the back side of the diaphragm, a force is developed to move the diaphragm, push rod and master cylinder piston forward to close the compensating port and force hydraulic fluid under pressure through the residual pressure check valve and brake tubes to the wheel brakes. As hydraulic pressure is developed in the hydraulic system, a reaction counter-force acts against the reaction lever and ring assembly. This reaction lever and ring assembly is designed to transmit the reaction forces back through the actuating control valve assembly to the brake pedal and provide the driver with a resistance that is in proportion to the brake hydraulic apply forces. This is the means of providing the proper "driver feel" to the power brake unit.

#### HOLDING POSITION

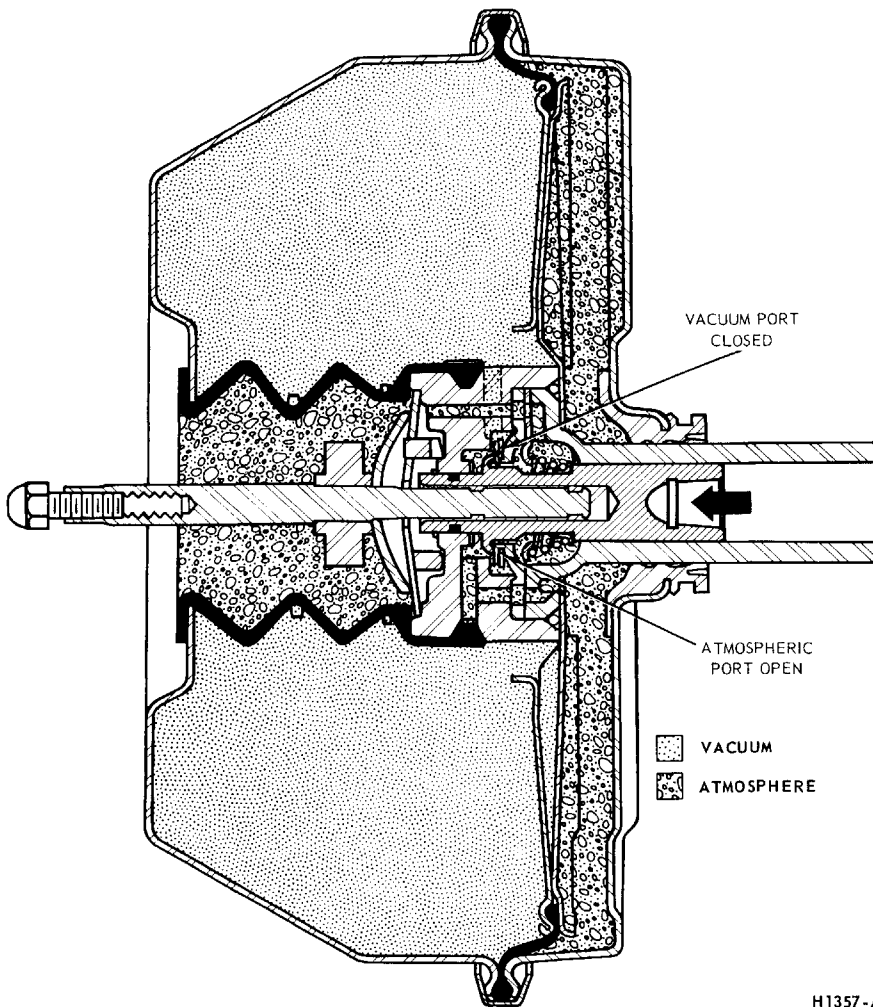
When the forward motion of the brake pedal is stopped and held, the

valve operating rod ceases to move the control valve plunger forward. However, the unbalanced forces of atmospheric pressure and vacuum on each side of the diaphragm will continue to move the outer sleeve of the control valve plunger forward keeping the vacuum porting closed. At the same time, the reaction force acting through the reaction ring and lever assembly will tend to move the atmospheric valve to the closed position (Fig. 11). When these combined forces balance, the porting to the vacuum supply will remain closed and the atmospheric valve will cut off any further passage of atmospheric pressure to the area behind the diaphragm. Therefore, the power assist force acting on the master cylinder piston will stabilize and the hydraulic force applying the brakes will be maintained at a constant level.

#### RELEASED POSITION

When the pedal pressure is released from the valve operating rod and plunger assembly, the plunger return spring moves the plunger away from the atmospheric valve allowing the valve to seat against the hub (Fig. 12). This seating of the valve closes off the bellows chamber from the hub porting that connects to the rear side of the diaphragm. At the same time, the rearward movement of the plunger opens the porting from the vacuum chamber and draws out the air from the rear side of the power diaphragm. With vacuum on both sides of the diaphragm, the assist force against the master cylinder push rod is eliminated.

Also, a pressure differential is created by the presence of vacuum on the rear (small diameter) side of the valve hub and atmospheric (bellows) pressure on the front (large diameter) side. This pressure differential moves the valve hub and, with it, the valve plunger and diaphragm assembly back to the released position. This releasing action permits the brake shoe retracting springs, acting



**FIG. 10—Booster in Applying Position**

through the wheel cylinder pistons and the hydraulic fluid, to return the master cylinder piston and push rod to the released position.

With the piston and push rod in the released position, the hydraulic compensating port in the master cylinder is open. The open port permits fluid to either return from the brake system to the fluid reservoir, or enter the brake system from the reservoir.

### PARKING BRAKES

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 lever which is attached to the equalizer assembly. The rear brake cables connect the equalizer assembly to the parking brake lever at each rear secondary shoe as shown in Figs. 1 and 2.

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.

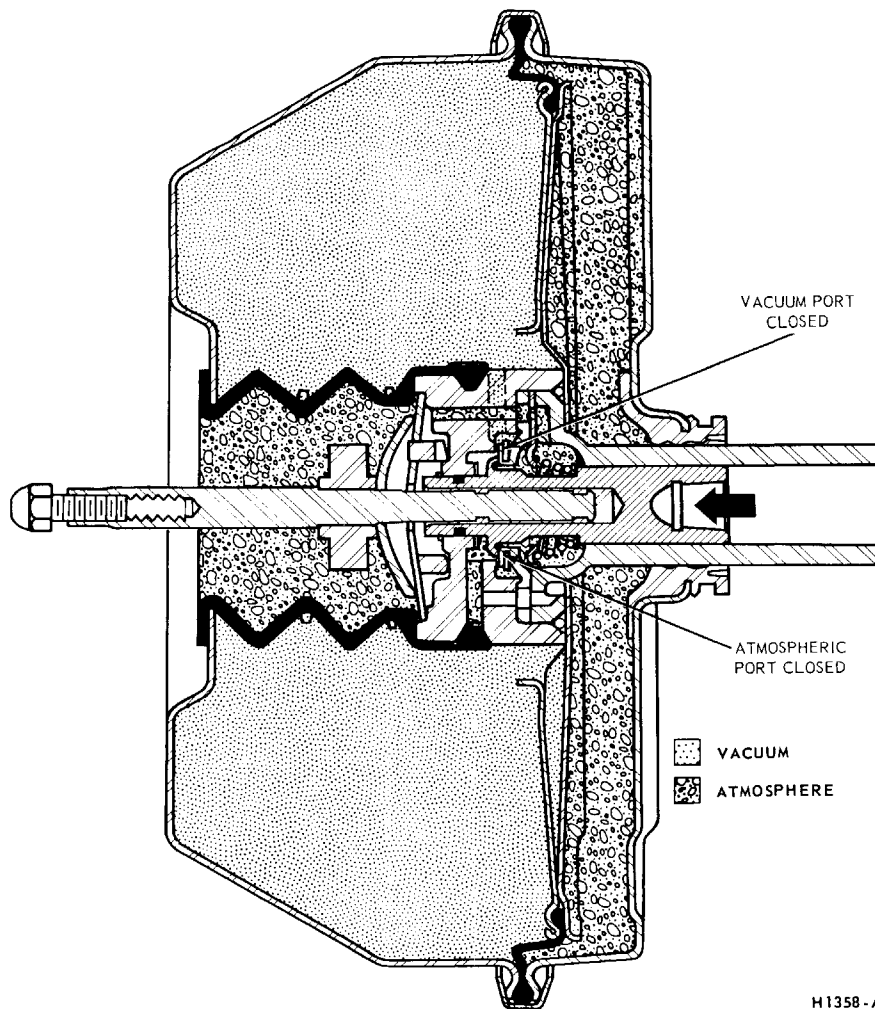


FIG. 11—Booster in Holding Position

H1358 - A

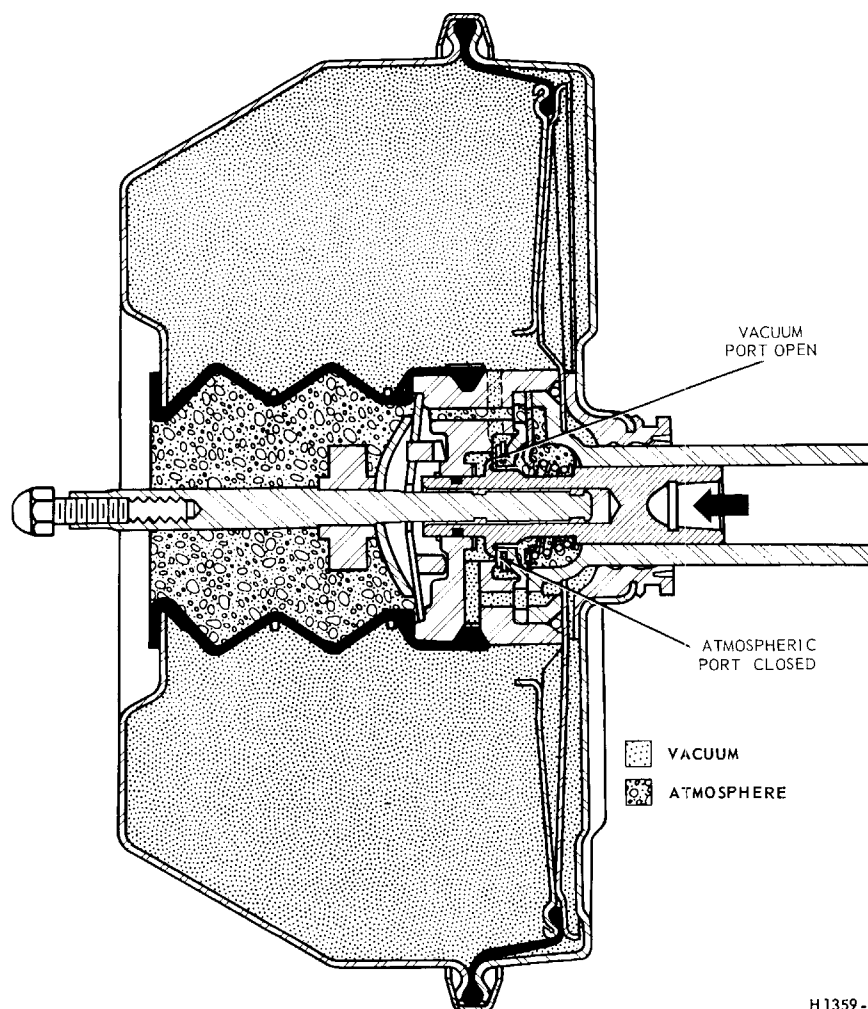


FIG. 12—Booster in Released Position

H1359-A

## 2 IN-CAR ADJUSTMENTS AND REPAIRS

### BRAKE SHOE ADJUSTMENTS

The car should be in a raised position with the wheels off the floor.

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.

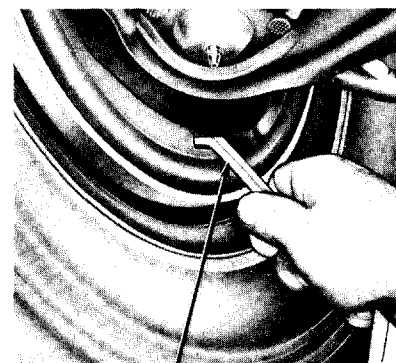
The brake drums should be at normal room temperature when adjusting the brake shoes. If the shoes are adjusted when the drums are hot and expanded, the shoes may drag when the drums are cool and contracted.

1. After the shoes have been installed or the adjusting screw has been turned, install the drum. Be sure that all excess grease, oil, and other foreign material are wiped off the backing plate and drum.

Before installing the brake drum on the front wheel spindle, wipe the spindle completely free of grease. Install the drum carefully so that the grease seal retainers within the hub will not be damaged.

2. Remove the adjusting hole cover from the backing plate. Working from the backing plate side, turn the adjusting screw upward to expand the shoes (Fig. 13). Expand the shoes until a drag is felt when the drum is rotated.

3. Remove the drum. Mark the tooth on the star-wheel where the adjusting lever contacts it. While



Brake Shoe Adjusting Tool H1122-A

FIG. 13—Expanding Brake Shoes