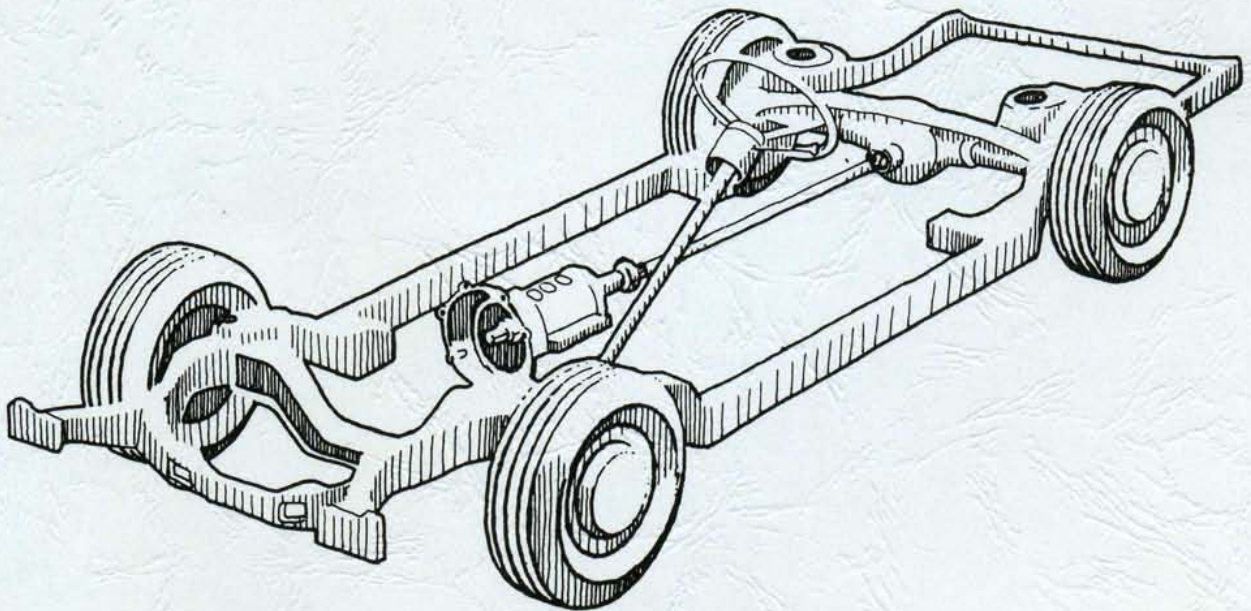




# 1972

# car shop manual

volume I chassis



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# 1972 car shop manual

## volume 1 chassis

### group index

Identification Codes

10

Wheels and Tires

11

Brakes

12

Steering

13

Suspension

14

Driving Axles and Drive Shafts

15

Clutch and Manual Transmission

16

Automatic Transmissions

17

**Ford Marketing Corporation**  
Ford Customer Service Division  
Service Technical Communications Department  
Publications Section

## FOREWORD

This manual is divided into five volumes: 1. Chassis; 2. Engine; 3. Electrical; 4. Body; 5. Maintenance and Lubrication. These volumes should provide Service Technicians with complete information covering normal service repairs on all 1972 model passenger cars built by the Ford Companies in the U.S. and Canada. As changes in the product occur, this information will be updated by Service Bulletins that will supersede the information in the manual.

Information in each volume is grouped by system or component plus "General Service" part which contains information common to several similar components.

The table of contents on the first page of each volume indicates the general content of the book and provides a handy tab locator to make it easy to find the first page of each "Group." That page will contain an index to "Parts" and the first page of each "Part" contains a detailed index which gives page location for each service operation covered. Page numbers are consecutive in each "Part."

To make reference easier, information has been broken down into smaller units so that essentially there is now one "Part" for each component or system. Group numbers indicate the volume in which the group may be found.

EXAMPLE: 11-02-21

Volume 1 – Group 11; Part 02; Page 21

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



Service Publications

# Identification Codes

**GROUP**  
10

### OFFICIAL VEHICLE IDENTIFICATION NUMBER

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

### VEHICLE CERTIFICATION LABEL

The Vehicle Certification Label (V.C. Label) (Fig. 1) is attached to the rear face of the left front door on all 4-door models and Mustangs and Cougars, and to the left door lock pillar on all other 2-door models. The upper half

of the label contains the name of the manufacturer, the month and year of manufacture and the certification statement.

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

The last six digits of the Vehicle Identification Number indicate the Consecutive Unit Number of each unit built at each assembly plant. The Consecutive

Unit Numbers begin as follows:

- 100,001—Ford, Torino, Mustang, Thunderbird, Maverick and Pinto.
- 500,001—Mercury, Meteor, Montego, Cougar, Comet.
- 800,001—Lincoln Continental and Continental Mark IV.

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

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

The COL (color) code is a number and letter indicating the exterior paint color code.

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

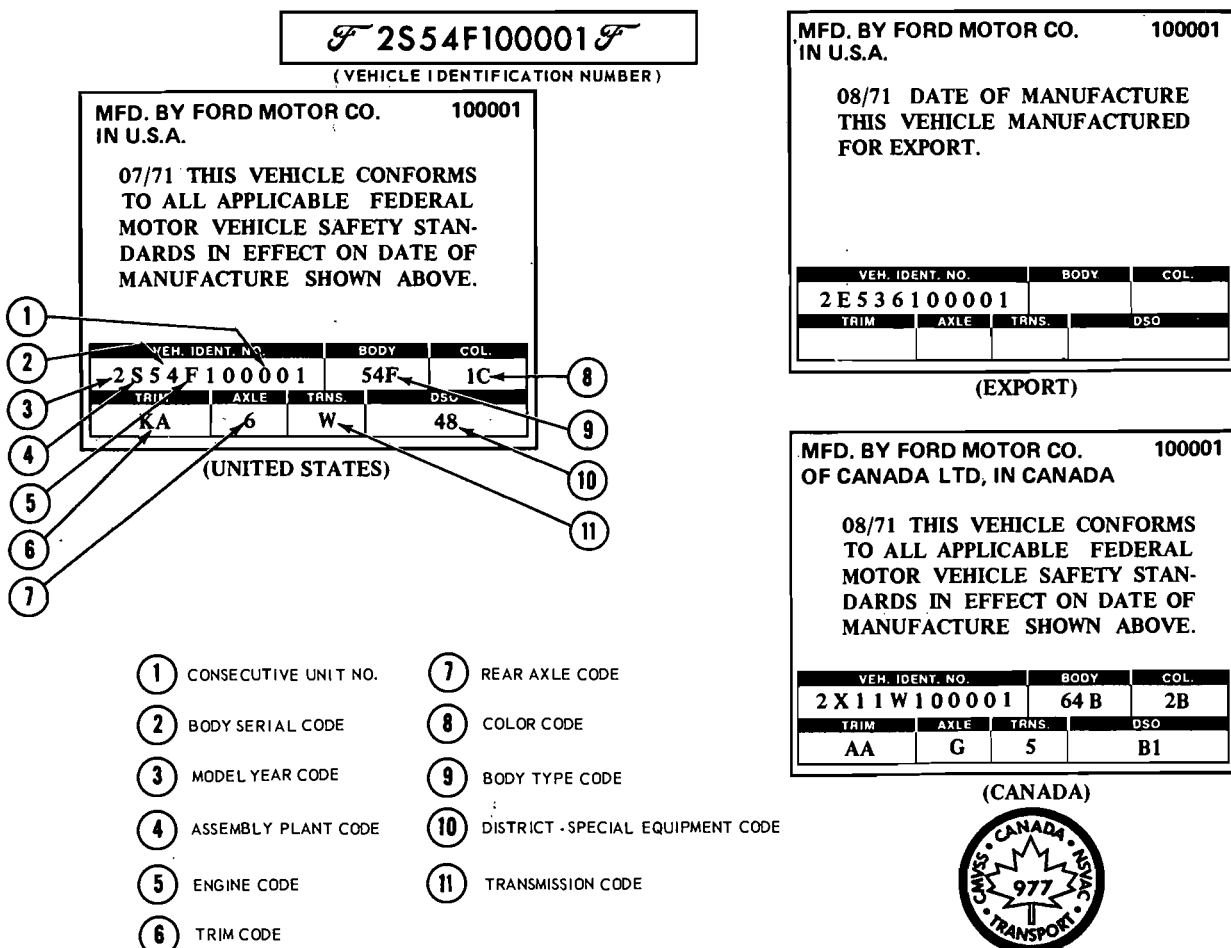


FIG. 1 Vehicle Identification and Certification Labels

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

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

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

da DSO codes consist of a letter and a number.

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

**ASSEMBLY PLANT CODES**

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

**ENGINE CODES**

Codes	No. of Cyls.	Displacement
U	6	170 CID
T	6	200 CID-1V
2Ⓛ	6	200 CID-1V
L	6	250 CID-1V
3Ⓛ	6	250 CID-1V
V	6	240 CID-1V
E	6	240 CID-1V (Taxi)
F	8	302 CID-2V
6Ⓛ	8	302 CID-2V
D	8	302 CID-2V (Taxi)
H	8	351 CID-2V
O	8	351 CID-4V
R	8	351-4V HO
S	8	400 CID-2V
N	8	429 CID-4V
P	8	429 CID-4V Police
A	8	460 CID-4V
W	4	98-IV - 1600cc
X	4	122-2V - 2000cc

Ⓛ Low Compression Export

**TRANSMISSION CODES**

Codes	Type
1	3-Speed Manual
5	4-Speed Manual
E	4-Speed Manual
W	Automatic (C4)
U	Automatic (C6)
X	Automatic (FMX)
Z	Automatic (C6 Special)

**REAR AXLE RATIO CODES**

Conventional	Lock	Ratio
2	K	2.75:1
3	-	2.79:1
4	M	2.80:1
6	O	3.00:1
7	-	3.18:1
9	R	3.25:1
A	S	3.50:1
B	-	3.07:1
G	-	3.55:1
H	-	3.78:1
-	V	3.91:1

**DISTRICT CODES**

**LINCOLN-MERCURY**

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

**FORD OF CANADA**

Mercury Code	Region	Ford Code
A1	Central	B1
A2	Eastern	B2
A3	Atlantic	B3
A4	Midwestern	B4
A6	Western	B6
A7	Pacific	B7
I2	Export	I2

**DISTRICT CODES**

**FORD**

Code	District
11	Boston
12	Buffalo
13	New York
14	Pittsburgh
15	Newark
16	Philadelphia
17	Washington
21	Atlanta
22	Charlotte
23	Memphis
24	Jacksonville
25	Richmond
26	New Orleans
28	Louisville
41	Chicago
42	Cleveland
43	Milwaukee
45	Lansing
46	Indianapolis
47	Cincinnati
48	Detroit
52	Dallas
53	Kansas City
54	Omaha
55	St. Louis
56	Davenport
57	Houston
58	Twin City
71	Los Angeles
72	San Jose
73	Salt Lake City
74	Seattle
75	Phoenix
76	Denver
83	Government
84	Home Office Reserve
85	American Red Cross
87	Body Company
89	Transportation Services
90-99	Export

**EXTERIOR PAINT COLOR CODES**

Code	M-32-J Number	Color	Code	M-32-J Number	Color
1A	5100-A	Lt. Gray Met.	4G	5103-A	Med. Ivy Bronze Met.
1C	1724-A	Black	4P	3462-A	Med. Green Met.
1D	5106-A	Silver Met.	40	3542-A	Dk. Green Met.
2A	1730-A	Calypso Blue	5A	3314-A	Lt. Pewter Met.
2B	3560-A	Bright Red	5C	5008-A	Ginger Bronze Met.
2E	2008-A	Red	5D	5102-A	Ginger Bronze Met.
2G	5070-A	Med. Red Met.	5F	5099-A	Dk. Brown Met.
2J	3059-A	Maroon	5G	5105-A	Lt. Copper Met.
3B	3429-A	Lt. Blue	5H	3564-A	Ginger Met.
3C	5007-A	Med. Blue Met.	5J	5071-A	Med. Ginger Bronze Met.
3D	5087-A	Med. Blue Met.	5L	5003-A	Tan
3F	3657-A	Grabber Blue	6B	3565-A	Lt. Goldenrod
3H	5088-A	Dk. Blue Met.	6C	3492-A	Med. Goldenrod
3J	3077-A	Bright Blue Met.	6D	3341-A	Yellow
4A	5023-A	Pastel Lime	6E	5080-A	Med Brt. Yellow
4B	5025-A	Bright Green Gold Met.	6F	5079-A	Brt. Yellow Gold Met.
4C	5072-A	Ivy Bronze Met.	6G	5105-A	Lt. Copper Met.
4D	5069-A	Med. Ivy Bronze Met.	6J	1736-A	Gray Gold Met.
4F	5021-A	Med. Lime Met.	9A	1619-A	White

Identification Data—Body Serial and Style Codes

**BODY SERIAL AND STYLE CODES**

Vehicle	Body Serial Code	Body Style Code	Body Type	Model	Vehicle	Body Serial Code	Body Style Code	Body Type	Model	
TORINO	27	53B	4-Dr. Sedan Hardtop	Torino	MERCURY	48	57B	4-Dr. Hardtop	Monterey— Custom	
	25	65B	2-Dr. Hardtop			54	53F	4-Dr. Sedan Hardtop		
	30	65D	2-Dr. Hardtop	56		65F	2-Dr. Hardtop			
	31	53D	4-Dr. Sedan Hardtop	58		57F	4-Dr. Hardtop			
	35	63R	2-Dr. Fastback	63		53H	4-Dr. Sedan Hardtop	Marquis		
	38	65R	2-Dr. Hardtop	66		65H	2-Dr. Hardtop			
	40	71B	Torino	68		57H	4-Dr. Hardtop			
	42	71D	Gran. Torino	Wagons 4-Dr.		62	53K	4-Dr. Sedan Hardtop	Brougham	
	43	71K	Torino Squire			64	65K	2-Dr. Hardtop		
	47	97D	Ranchero 500	Ranchero		67	57K	4-Dr. Hardtop	Monterey Wagon	
	48	97R	Ranchero GT			72	71B	4-Dr. 6 Pass. ②		
49	97K	Ranchero Squire	74		71H	4-Dr. 6 Pass. ②	Marquis Wagon			
COMET	30	54B	4-Dr. Sedan	Standard	MERCURY (CANADA ONLY)	40	53X	4-Dr. Sedan Hardtop	Marquis	
	31	62B	2-Dr. Sedan ①			41	65X	2-Dr. Hardtop		
COUGAR	91	65D	2-Dr. Hardtop ①	Standard		42	57X	4-Dr. Hardtop		
	92	76D	Convertible			METEDR (CANADA)	20	53B	4-Dr. Sedan Hardtop	Rideau
	93	65F	2-Dr. Hardtop				22	53D	4-Dr. Sedan Hardtop	Rideau 500
94	76F	Convertible	23	65D			2-Dr. Hardtop			
FORD	51	54B	4-Dr. Sedan	Custom			25	53F	4-Dr. Sedan Hardtop	Montcalm
	52	65D	2-Dr. Hardtop (Canada Only)				26	65F	2-Dr. Hardtop	
	53	54D	4-Dr. Sedan				27	57F	4-Dr. Hardtop	
	54	54F	4-Dr. Sedan	Galaxie 500			36	71D	Rideau 500-6 Pass. ②	Station Wagons-4 Dr.
	56	57F	4-Dr. Hardtop				38	71F	Montcalm-6 Pass. ②	
	58	65F	2-Dr. Hardtop		MONTEGO		02	53B	4-Dr. Sedan Hardtop	Montego
	61	76H	Convertible	LTD			03	65B	2-Dr. Hardtop	
	62	65H	2-Dr. Hardtop				04	53D	4-Dr. Sedan Hardtop	Montego MX
	63	53H	4-Dr. Sedan Hardtop			05	63D	2-Dr. Fastback		
	64	57H	4-Dr. Hardtop	66		53K	4-Dr. Sedan Hardtop	Montego MX Brougham		
	66	53K	4-Dr. Sedan Hardtop	LTD Brougham		07	65D		2-Dr. Hardtop	
	67	57K	4-Dr. Hardtop			10	53K	4-Dr. Sedan Hardtop	Montego MX Brougham	
	68	65K	2-Dr. Hardtop			11	65K	2-Dr. Hardtop		
	70	71B	4-Dr. Wagon	Custom Ranch		16	63R	2-Dr. Fastback	Montego GT	
	72	71D	4-Dr. Wagon	Custom 500 Ranch ②		08	71D	Montego MX	Station Wagons-4 Dr.	
74	71F	4-Dr. Wagon	Country Sedan ②	18		71K	Montego MX Villager			
76	71H	4-Dr. Wagon	Country Squire ②	MUSTANG	01	65D	2-Dr. Hardtop	Standard		
LINCOLN CONTINENTAL	81	65A	2-Dr. Hardtop		02	63D	2-Dr. Sportsroof ③			
	82	53A	4-Dr. Sedan Hardtop		03	76D	Convertible			
MARK IV	89	65D	2-Dr. Hardtop		04	65F	2-Dr. Hardtop		Grande	
MAVERICK	91	62A	2-Dr. Sedan		Standard	05	63R		2-Dr. Sportsroof	Mach 1
	92	54A	4-Dr. Sedan	PINTO		10	62B	2-Dr. Sedan	Standard	
93	62D	2-Dr. Sport Sedan	11		64B	3-Dr. Model				
MERCURY	44	53B	4-Dr. Sedan Hardtop		Monterey	12	73B	2-Dr. Wagon		
	46	65B	2-Dr. Hardtop	THUNDERBIRD		87	65K	2-Dr. Hardtop		

① Also "GT"    ② Also available w/Dual Face Rear Seats    ③ Also "BOSS"

Identification Data—Trim Codes

INTERIOR TRIM CODES

Code	Trim Scheme	Code	Trim Scheme	Code	Trim Scheme	Code	Trim Scheme
<b>PINTO</b>		LS	White w/Ginger	Sebring Knit/Corinth. Vinyl		KF	Ginger
AA	Akron/Corinth. Vinyl	LB	White w/Beige	GA	Black	KR	Med. Green
AB	Black	Manston B/Cloth and Corinth. Vinyl		GB	Med. Blue	KW	White w/Black
AR	Med. Green	MW	White & Black w/White	GE	Vermilion	KL	White w/Blue
AT	Med. Beige	<b>COMET</b>		GF	Med. Ginger	K9	White w/Tobacco
AW	White w/Black	Melrose/Corinth. Vinyl		GR	Med. Green	K5	White w/Green
AL	White w/Blue	AA	Black	GW	White	MA	Black
AS	White w/Ginger	AY	Lt. Gray Gold	<b>COUGAR</b>		MB	Med. Blue
A5	White w/Green	Check B/Cloth and Corinth. Vinyl		AA	Black	MF	Ginger
Manston B/Cloth & Corinth. Vinyl		BA	Black	AB	Med. Blue	MR	Med. Green
BA	Black	BB	Med. Blue	AD	Dk. Red	MW	White w/Black
BB	Med. Blue	BF	Med. Ginger	AF	Med. Ginger	ML	White w/Blue
BF	Med. Ginger	BT	Med. Beige	AR	Med. Green	M9	White w/Tobacco
BR	Med. Green	BY	Lt. Gray Gold	AW	White	M5	White w/Green
BT	Med. Beige	Province B/Cloth and Corinth. Vinyl		Random Stripe B/Cloth and Corinth. Vinyl		Inverness B/Cloth and Corinth. Vinyl	
BW	White w/Black	CA	Black	BA	Black	NA	Black
BL	White w/Blue	CB	Med. Blue	BB	Med. Blue	NB	Med. Blue
BS	White w/ Ginger	CE	Vermilion	BF	Med. Ginger	NR	Med. Green
B5	White w/ Green	CY	Lt. Gray Gold	BR	Med. Green	NY	Lt. Gray Gold
Sebring Knit/Corinth. Vinyl		Sebring Knit/Corinth. Vinyl		Sebring Knit/Corinth. Vinyl		NZ	Tobacco
CA	Black	EA	Black	CA	Black	Sphere B/Cloth and Corinth. Vinyl	
CB	Med. Blue	EB	Med. Blue	CB	Med. Blue	QA	Black
CF	Med. Ginger	EE	Vermilion	CD	Dk. Red	QB	Med. Blue
CR	Med. Green	EY	Lt. Gold	CF	Med. Ginger	QR	Med. Green
CT	Med. Beige	FA	Black	CR	Med. Green	QY	Lt. Gray Gold
CW	White w/ Black	FB	Med. Blue	CW	White	OZ	Tobacco
CL	White w/ Blue	FE	Vermilion	Leather/Mateo. Vinyl		Ruffino/Corinth. Vinyl	
CS	White w/ Ginger	FY	Lt. Gray Gold	DA	Black	RA	Black
C5	White w/ Green	Province B/Cloth and Corinth. Vinyl		DB	Med. Blue	RB	Med. Blue
<b>MAVERICK</b>		GE	Vermilion	DD	Dk. Red	RF	Ginger
Melrose/Corinth. Vinyl		GY	Lt. Gray Gold	DF	Med. Ginger	RR	Med. Green
AA	Black	Ruffino/Corinth. Vinyl		DR	Med. Green	RW	White w/Black
AY	Lt. Gray Gold	HA	Black	ER	White	RL	White w/Blue
Check B/Cloth and Corinth. Vinyl		HB	Med. Blue	Random Stripe B/Cloth and Corinth. Vinyl		R9	White w/Tobacco
BA	Black	HT	Med. Beige	EA	Black	R5	White w/Green
BB	Med. Blue	Manston B/Cloth and Corinth. Vinyl		EB	Med. Blue	UA	Black
BF	Med. Ginger	JA	Black & White w/Black	EF	Med. Ginger	UB	Med. Blue
BT	Med. Beige	JB	Blue & Black w/Med. Blue	ER	Med. Green	UF	Ginger
BY	Lt. Gray Gold	JF	Ginger & Black w/Med. Ginger	<b>TORINO-RANCHERO</b>		UR	Med. Green
Province B/Cloth and Corinth. Vinyl		JT	Beige & Black w/Med. Beige	Melrose/Corinth. Vinyl		UW	White w/Black
CA	Black	JW	White & Black w/White	AA	Black	UL	White w/Blue
CB	Med. Blue	Ruffino/Corinth. Vinyl		AB	Med. Blue	U9	White w/Tobacco
CE	Vermilion	KA	Black	AR	Med. Green	U5	White w/Green
CY	Lt. Gray Gold	KB	Med. Blue	Sphere B/Cloth and Corinth. Vinyl		<b>MONTEGO</b>	
Sebring Knit/Corinth. Vinyl		KF	Med. Ginger	BA	Black	Selkirk B/Clock and Corinth. Vinyl	
EA	Black	KT	Med. Beige	BB	Med. Blue	AA	Black
EB	Med. Blue	KW	White w/Black	BR	Med. Green	AB	Med. Blue
EE	Vermilion	KL	White w/Blue	BY	Lt. Gray Gold	AR	Med. Green
EY	Lt. Gray Gold	KS	White w/Ginger	BZ	Tobacco	Tahiti/Corinth. Vinyl	
Sebring Knit/Corinth. Vinyl		K6	White w/Beige	Ruffino/Corinth. Vinyl		BA	Black
FA	Black	LA	Black	CA	Black	BB	Med. Blue
FB	Med. Blue	LW	White w/Black	CB	Med. Blue	BR	Med. Green
FE	Vermilion	LL	White w/Blue	CF	Ginger	Sphere B/Cloth and Corinth. Vinyl	
FY	Lt. Gray Gold	LS	White w/Ginger	CR	Med. Green	CA	Black
Province B/Cloth and Corinth. Vinyl		L6	White w/Beige	CW	White w/Black	CB	Med. Blue
GE	Vermilion	Manston B/Cloth and Corinth. Vinyl		CL	White w/Blue	CR	Med. Green
GY	Lt. Gray Gold	MW	White & Black w/White	C9	White w/Tobacco	CY	Lt. Gray Gold
Ruffino/Corinth. Vinyl		<b>MUSTANG</b>		C5	White w/Green	CZ	Tobacco
HA	Black	Ruffino/Corinth. Vinyl		Balmoral B/Cloth and Corinth. Vinyl		Ruffino/Corinth. Vinyl	
HB	Med. Blue	AA	Black	DA	Black	DA	Black
HF	Med. Ginger	AB	Med. Blue	DF	Ginger	DB	Med. Blue
HT	Med. Beige	AE	Vermilion	EA	Black	DF	Ginger
Manston B/Cloth and Corinth. Vinyl		AF	Med. Ginger	EF	Ginger	DR	Med. Green
JA	Black & White w/Black	AR	Med. Green	VA	Black	DW	White w/Black
JB	Blue & Black w/Med. Blue	AW	White	VF	Ginger	DL	White w/Blue
JF	Ginger & Black w/Med. Ginger	Sebring Knit/Corinth. Vinyl		Ruffino/Corinth. Vinyl		D9	White w/Tobacco
JT	Beige & Black w/Med. Beige	CA	Black	FA	Black	O5	White w/Green
JW	White & Black w/White	CB	Med. Blue	FB	Med. Blue	Sebring Knit/Corinth. Vinyl	
Ruffino/Corinth. Vinyl		CE	Vermilion	FF	Ginger	EA	Black
KA	Black	CF	Med. Ginger	FR	Med. Green	EB	Med. Blue
KB	Med. Blue	CW	White	FW	White w/Black	EF	Ginger
KF	Med. Ginger	Lambeth B/Cloth and Corinth. Vinyl		FL	White w/Blue	ER	Med. Green
KT	Med. Beige	FA	Black	F9	White w/Tobacco	EW	White w/Black
KW	White w/Black	FB	Med. Blue	F5	White w/Green	EL	White w/Blue
KL	White w/Blue	FE	Vermilion	GA	Black	E9	White w/Tobacco
KS	White w/Ginger	FF	Med. Ginger	GB	Med. Blue	E5	White w/Green
K6	White w/Beige	FR	Med. Green	GF	Ginger	FA	Black
Ruffino/Corinth. Vinyl		Ruffino/Corinth. Vinyl		GR	Med. Green	FB	Med. Blue
LA	Black	AA	Black	Sebring Knit/Corinth. Vinyl		FF	Ginger
LW	White w/Black	AB	Med. Blue	HA	Black	FR	Med. Green
LL	White w/Blue	AE	Vermilion	HF	Ginger	FW	White w/Black
		AF	Med. Ginger	JA	Black	FL	White w/Blue
		AR	Med. Green	JF	Ginger	F9	White w/Tobacco
		AW	White	KA	Black	F5	White w/Green
		CA	Black	KB	Med. Blue	EA	Black
		CB	Med. Blue			FB	Med. Blue
		CE	Vermilion			FR	Ginger
		CF	Med. Ginger			FR	Med. Green
		CR	Med. Green			FW	White w/Black
		CW	White			FL	White w/Blue
		Lambeth B/Cloth and Corinth. Vinyl				F9	White w/Tobacco
		FA	Black			F5	White w/Green
		FB	Med. Blue			FA	Black
		FE	Vermilion			FB	Med. Blue
		FF	Med. Ginger			FR	Ginger
		FR	Med. Green			FR	Med. Green
						FW	White w/Black
						FL	White w/Blue
						F9	White w/Tobacco
						F5	White w/Green
						FA	Black
						FB	Med. Blue
						FR	Ginger
						FR	Med. Green
						FW	White w/Black
						FL	White w/Blue
						F9	White w/Tobacco
						F5	White w/Green
						FA	Black
						FB	Med. Blue
						FR	Ginger
						FR	Med. Green
						FW	White w/Black
						FL	White w/Blue
						F9	White w/Tobacco
						F5	White w/Green
						FA	Black
						FB	Med. Blue
						FR	Ginger
						FR	Med. Green
						FW	White w/Black
						FL	White w/Blue
						F9	White w/Tobacco
						F5	White w/Green
						FA	Black
						FB	Med. Blue
						FR	Ginger
						FR	Med. Green
						FW	White w/Black
						FL	White w/Blue
						F9	White w/Tobacco
						F5	White w/Green
						FA	Black
						FB	Med. Blue
						FR	Ginger
						FR	Med. Green
						FW	White w/Black
						FL	White w/Blue
						F9	White w/Tobacco
						F5	White w/Green
						FA	Black
						FB	Med. Blue
						FR	Ginger
						FR	Med. Green
						FW	White w/Black
						FL	White w/Blue
						F9	White w/Tobacco
						F5	White w/Green
						FA	Black
						FB	Med. Blue
						FR	Ginger
						FR	Med. Green
						FW	White w/Black
						FL	White w/Blue
						F9	White w/Tobacco
						F5	White w/Green
						FA	Black
						FB	Med. Blue
						FR	Ginger
						FR	Med. Green
						FW	White w/Black
						FL	White w/Blue
						F9	White w/Tobacco
						F5	White w/Green
						FA	Black
						FB	Med. Blue
						FR	Ginger
						FR	Med. Green
						FW	White w/Black
						FL	White w/Blue
						F9	White w/Tobacco
						F5	White w/Green
						FA	Black
						FB	Med. Blue
						FR	Ginger
						FR	Med. Green
						FW	White w/Black
						FL	White w/Blue
						F9	White w/Tobacco
						F5	White w/Green
						FA	Black
						FB	Med. Blue
						FR	Ginger
						FR	Med. Green
						FW	White w/Black
						FL	White w/Blue
						F9	White w/Tobacco
						F5	White w/Green
						FA	Black
						FB	Med. Blue
						FR	Ginger
						FR	Med. Green
						FW	White w/Black
						FL	White w/Blue
						F9	White w/Tobacco
						F5	White w/Green

INTERIOR TRIM CODES

Code	Trim Scheme	Code	Trim Scheme	Code	Trim Scheme	Code	Trim Scheme
GR	Med. Green		Watchplaid B/Cloth and Corinth. Vinyl	VA	Black	K5	White w/Green
GY	Lt. Gray Gold	RA	Black	VB	Med. Blue	K9	White w/Tobacco
GZ	Tobacco	VA	Black	VD	Dk. Red	<b>LINCOLN CONTINENTAL</b>	
	Valino Grain w/Corinth. Vinyl	<b>MERCURY</b>		VF	Med. Ginger	Nottingham B/Cloth and Corinth. Vinyl - Wide Pleat	
HA	Black	AA	Covert B/Cloth and Corinth. Vinyl	VR	Med. Green	AA	Black
HB	Med. Blue	AB	Black	VY	Lt. Gray Gold	AF	Ginger w/Tobacco
HF	Ginger	AF	Med. Blue	VZ	Dk. Tobacco	AY	Lt. Gray Gold
HR	Med. Green	AR	Med. Ginger	<b>METEOR</b>		Beford Knit/B/Cloth and Corinth. Vinyl - Narrow Pleat	
HW	White w/Black	AY	Med. Green	AA	Black	BA	Black
HL	White w/Blue	BA	Lt. Gray Gold	AB	Med. Blue	BB	Dk. Blue
H9	White w/Tobacco	BD	Ruffino/Corinth. Vinyl	AY	Lt. Gray Gold	BD	Dk. Red
H5	White w/Green	BE	Black	Lobel B/Cloth and Corinth. Vinyl		BR	Dk. Green
<b>FORD</b>		BF	Med. Blue	BA	Black	BZ	Tobacco
Lobel B/Cloth and Ruffino/Corinth. Vinyl		BD	Dk. Red	BB	Med. Blue	Lamont B/Cloth and Corinth. Vinyl - Narrow Pleat	
AA	Black	BE	Med. Ginger	BY	Lt. Gray Gold	CA	Black
AB	Med. Blue	BF	Med. Green	CA	Black	CY	Lt. Gray Gold
AY	Lt. Gray Gold	BW	White w/Black	CB	Med. Blue	Natural Grain Leather/Mateao Vinyl	
	Sebring Knit/Valino/Corinth. Vinyl	BY	Lt. Gray Gold	CR	Med. Green	DA	Black
		CA	Hopsack B/Cloth and Corinth. Vinyl	CY	Lt. Gray Gold	DB	Dk. Blue
BA	Black	CA	Black	Ruffino/Corinth. Vinyl		DD	Dk. Red
BB	Med. Blue	CB	Med. Blue	DA	Black	DF	Ginger w/Tobacco
BF	Med. Ginger	CD	Dk. Red	DB	Med. Blue	DR	Dk. Green
BR	Med. Green	CF	Med. Ginger	DD	Dk. Red	DW	White w/Black
	Heidelberg B/Cloth and Corinth. Vinyl	CF	Med. Green	DF	Med. Blue	DY	Lt. Gray Gold
DA	Black	CR	Med. Green	DD	Dk. Red	DZ	Tobacco
DB	Med. Blue	DA	Sierra/Corinth. Vinyl	DF	Ginger	DL	White w/Blue
DD	Dk. Red	DB	Black	DR	Med. Green	D5	White w/Green
DF	Med. Ginger	DD	Med. Blue	DY	Lt. Gray Gold	D9	White w/Tobacco
DR	Med. Green	DF	Dk. Red	FA	Black	EA	Black
DY	Lt. Gray Gold	DR	Med. Ginger	FB	Med. Blue	EB	Dk. Blue
	Chateau/Lamont B/Cloth and Corinth. Vinyl	DW	White w/Black	FD	Dk. Red	ED	Dk. Red
EA	Black	DY	Lt. Gray Gold	FF	Med. Ginger	ER	Dk. Green
EB	Med. Blue	FA	Black	FR	Med. Green	EW	White w/Black
ED	Dk. Red	FB	Med. Blue	FR	Med. Green	E5	White w/Blue
ER	Med. Green	FD	Dk. Red	FW	White w/Black	E9	White w/Green
EY	Lt. Gray Gold	FF	Med. Ginger	FY	Lt. Gray Gold	FA	Black
EZ	Dk. Tobacco	FR	Med. Green	JA	Black	FB	Dk. Blue
ZA	Black	FW	White w/Black	JB	Med. Blue	FD	Dk. Red
ZB	Med. Blue	FY	Lt. Gray Gold	JD	Dk. Red	FF	Med. Ginger
ZD	Dk. Red	Empress/Bangor B/Cloth and Corinth. Vinyl		JF	Med. Ginger	FR	w/Tobacco
ZR	Med. Green	GA	Black	JR	Med. Green	FW	Lt. Gray Gold
ZY	Lt. Gray Gold	GB	Med. Blue	KA	Black	FZ	White w/Black
ZZ	Dk. Tobacco	GD	Dk. Red	KB	Med. Blue	FL	Dk. Tobacco
	Ruffino/Corinth. Vinyl	GR	Med. Green	KD	Dk. Red	F5	White w/Blue
FA	Black	GY	Lt. Gray Gold	KE	Med. Ginger	F9	White w/Green
FB	Med. Blue	GZ	Lt. Gray Gold	KF	Med. Green	White w/Tobacco	
FD	Dk. Red	KA	Dk. Tobacco	KR	Med. Green	Lamont B/Cloth and Corinth. Vinyl	
FF	Med. Ginger	KB	Black	Covert B/Cloth and Corinth. Vinyl		GA	Black
FR	Med. Green	KD	Med. Blue	EA	Black	GT	Lt. Beige
FW	White w/Black	KR	Dk. Red	EB	Med. Blue	Natural Grain Leather/Mateao Vinyl	
FY	Lt. Gray Gold	KY	Med. Green	EF	Med. Ginger	HA	Black
MA	Black	KZ	Med. Green	ER	Med. Green	HT	Beige
MB	Med. Blue	LA	Lt. Gray Gold	EY	Lt. Gray Gold	<b>CONTINENTAL MARK IV</b>	
MR	Med. Green	LB	Dk. Tobacco	Alpha/Corinth. Vinyl		Lamont B/Cloth and Corinth. Vinyl	
MY	Lt. Gray Gold	LD	Black	HA	Black	AA	Black
WA	Black	LE	Med. Blue	HB	Med. Blue	AB	Dk. Blue
WB	Med. Blue	LF	Med. Blue	HF	Med. Ginger	AD	Dk. Red
WD	Dk. Red	LG	Dk. Red	HR	Med. Green	AH	Cranberry
WF	Med. Ginger	LH	Med. Green	Watchplaid B/Cloth and Corinth. Vinyl		AR	Dk. Green
WR	Med. Green	LI	Lt. Gray Gold	MA	Black	AY	Lt. Gray Gold
WY	Lt. Gray Gold	LJ	Dk. Tobacco	Sebring Knit/Corinth. Vinyl		Natural Grain Leather/Corinth. Vinyl	
WW	White w/Black	MA	Black	PA	Black	BA	Black
	Samar B/Cloth and Corinth. Vinyl	MB	Med. Blue	PB	Med. Blue	BB	Dk. Blue
HA	Black	MD	Dk. Red	PF	Med. Ginger	BD	Dk. Red
HB	Med. Blue	MR	Med. Green	PR	Med. Green	BF	Med. Ginger
HR	Med. Green	MY	Lt. Gray Gold	<b>THUNDERBIRD</b>		BR	Dk. Green
HY	Lt. Gray Gold	MZ	Dk. Tobacco	Hopsack/Bangor B/Cloth and Corinth. Vinyl		BY	Lt. Gray Gold
	Alpha/Corinth. Vinyl	ZA	Black	GA	Black	BZ	Dk. Tobacco
JA	Black	ZB	Med. Blue	GB	Dk. Blue	BW	White w/Black
JB	Med. Blue	ZD	Dk. Red	GD	Dk. Red	BL	White w/Blue
JF	Med. Ginger	ZR	Med. Green	GF	Ginger w/Tobacco	B5	White w/Green
JR	Med. Green	ZY	Lt. Gray Gold	GR	Dk. Green	B9	White w/Tobacco
	Covert/Cloth and Corinth. Vinyl	ZZ	Dk. Tobacco	Lamont B/Cloth and Corinth. Vinyl			
KA	Black		Corinth. Vinyl	HA	Black		
KB	Med. Blue	JA	Black	HB	Dk. Blue		
KF	Med. Ginger	JB	Med. Blue	HD	Dk. Red		
KR	Med. Green	JD	Dk. Red	HR	Dk. Green		
KY	Lt. Gray Gold	JF	Ginger	HZ	Tobacco		
	Morocco/Corinth. Vinyl	JR	Med. Green	Natural Grain Leather/Mateao Vinyl			
LU	Beige	JY	Lt. Gray Gold	KA	Black		
	Akron/Ruffino/Corinth. Vinyl	JZ	Dk. Tobacco	KB	Dk. Blue		
NA	Black	NA	Black	KD	Dk. Red		
NB	Med. Blue	NB	Med. Blue	KE	Ginger w/Tobacco		
NR	Med. Green	ND	Dk. Red	KF	Dk. Green		
NY	Lt. Gray Gold	NF	Med. Ginger	KR	Tobacco		
		NR	Med. Green	KW	White w/Black		
		NY	Lt. Gray Gold	KL	White w/Blue		
		NZ	Dk. Tobacco				

<h1 style="margin: 0;">Wheels and Tires</h1>	<p><b>GROUP</b> <b>11</b></p>
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<b>PART 11-01</b>	<b>PAGE</b>	<b>PART 11-10</b>	<b>PAGE</b>
General Wheel and Tire Service .....	11-01-01	Wheel Hubs and Bearings—Front .....	11-10-01
<b>PART 11-02</b>		<b>PART 11-11</b>	
Wheels and Tires—Drop Center Rim .....	11-02-01	Wheel Hubs and Bearings—Rear .....	11-11-01

## PART 11-01 General Wheel and Tire Service

Applies to All Models			
COMPONENT INDEX	Page	COMPONENT INDEX	Page
FRONT WHEEL BEARING MAINTENANCE .....	01-01	TIRE SIZES .....	01-01
TIRE INSPECTION .....	01-02	WHEEL BALANCING .....	01-01
		WHEEL INSPECTION .....	01-02

### 3 ADJUSTMENTS

#### WHEEL BALANCING

See the instructions provided with the Rotunda Wheel Balancer.

Make certain that the brakes are not dragging before attempting to spin the wheels. On vehicles equipped with disc brakes, push the brake shoes into the caliper to free the rotor.

#### FRONT WHEEL BEARING MAINTENANCE

Wheel bearings are adjustable to correct for bearing and spindle shoulder wear. Satisfactory operation and long life of bearings depend on proper adjustment and correct lubrication. **If bearings are adjusted too tightly, they will**

**overheat and wear rapidly. An adjustment that is excessively loose will cause pounding and contribute to uneven tire wear, steering difficulties and inefficient brakes.** The bearing adjustment should be checked at regular inspection intervals.

#### TIRE SIZES

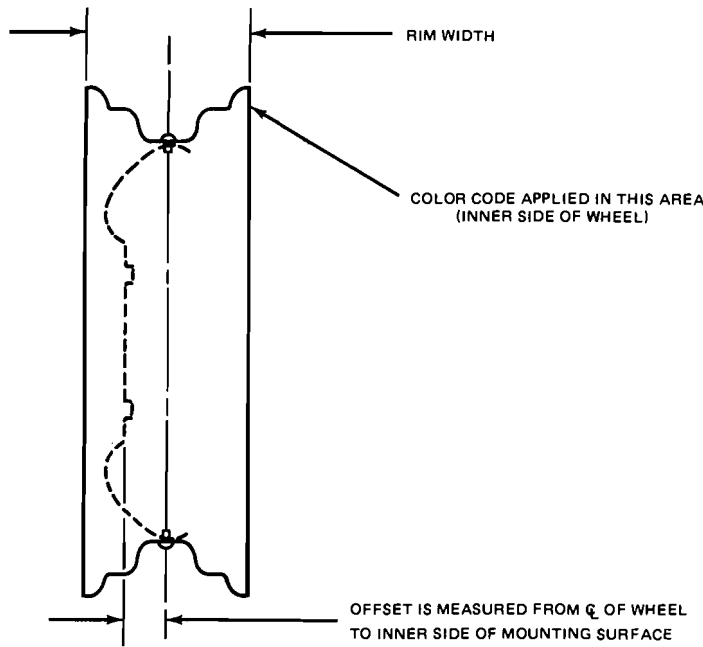
When replacing tires or wheels, it is **MANDATORY** to use only the standard or optional tire sizes and types recommended on the tire chart attached to the vehicle. Wheel rim widths and offsets must be those recommended by the car manufacturer for that tire size (see Fig. 1).

Tires and wheels other than those recommended above can adversely affect the safety and durability of your vehicle; and, therefore, **MUST NOT BE USED.**

All tires and wheels on the vehicle should be of the same size, type, and load carrying capacity. Never mix radial, belted, and/or conventional-type tires.

Snow tires should be of size and type equivalent to the other tires on the vehicle as recommended above.

Tires larger or smaller than originally installed may affect the accuracy of the speedometer, and require a change of speedometer drive gears.



VEHICLE	TIRE SIZE RELEASED FOR USAGE	WHEEL SIZE	OFFSET	COLOR CODE
PINTO	6.00-13, A78-13	13 x 4	1.0	PINK
	A70-13, 175R13, 175-13	13 x 5	1.0	GREEN
MAVERICK/COMET	6.45-14, C78-14	14 x 4.5	0.0	YELLOW/ORANGE OR WHITE/ORANGE
	D70-14, DR78-14	14 x 6	0.0	BROWN/GREEN OR BROWN/VIOLET
MUSTANG/COUGAR	F60-15 (MUSTANG ONLY)	15 x 7	0.0	GREEN OR ORANGE
	E78-14, E70-14, F70-14	14 x 6	0.0	BROWN/VIOLET
	E78-14, F70-14 (COUGAR ONLY)	14 x 7	0.0	WHITE/YELLOW
TORINO/MONTEGO/RANCHERO	E78-14, F78-14, G78-14	14 x 5	0.55	RED/GREEN
	H78-14, E70-14, F70-14, G70-14	14 x 6	0.25	
	8.25-15 (TORINO/MONTEGO POLICE)	15 x 6	0.45	PINK
	E78-15, F78-15, G78-15, R70-15, F70-15, G70-15 (TORINO/RANCHERO ONLY)	14 x 7	0.25	RED
FORD/MERCURY/METEOR	F78-15, G78-15	15 x 5	0.45	WHITE/PINK
	H78-15	15 x 5.5	0.62	YELLOW
	HR78-15 (8.25-15 FORD POLICE)	15 x 6	0.45	PINK
	H78-15, HR78-15 (8.55-15 POLICE)	15 x 6.5	0.45	BROWN
THUNDERBIRD/CONTINENTAL/MARK IV/LINCOLN/CONTINENTAL	215-15, 225-15	15 x 6	0.45	PINK

F1820-A

FIG. 1 Car Tire Wheel Combinations

## 5 CLEANING AND INSPECTION

### WHEEL INSPECTION

Wheel hub nuts should be inspected and tightened to specification at predelivery. Loose wheel hub nuts may cause shimmy and vibration. Elongated stud holes in the wheels may also result from loose hub nuts. Hub nuts should be torqued to 70-115 ft-lbs.

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 af-

fect the runout of the wheels. Wobble or shimmy caused by a damaged wheel will eventually damage the wheel bearings. Inspect the wheel rims for dents that could permit air to leak from the tires.

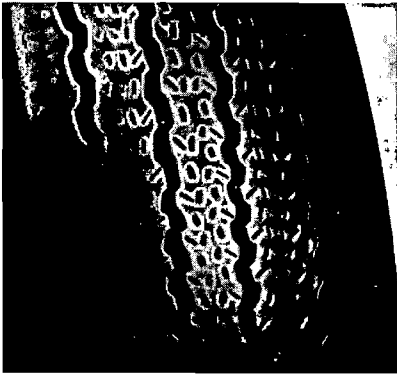
Front hubs and bearings should be cleaned, inspected and lubricated whenever the hubs are removed or at the mileage/time periods indicated in the maintenance schedule.

New hub grease seals should be installed when the hub is removed. An imperfect seal may permit bearing lubricant to reach the brake linings resulting

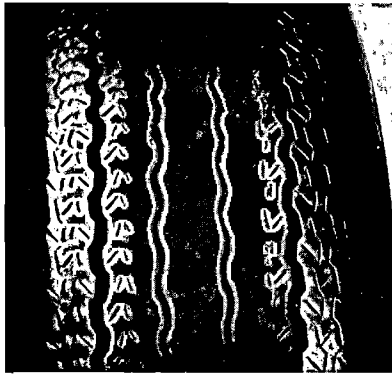
in faulty brake operation and necessitating premature cleaning or replacement of linings.

### TIRE INSPECTION

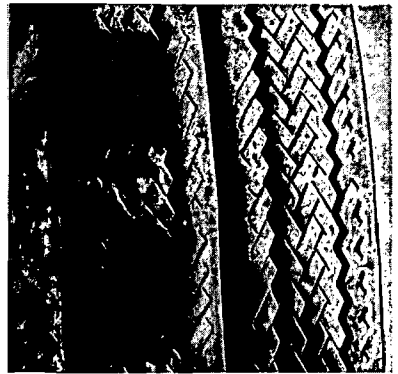
Incorrect wheel alignment can cause tire wear. Abnormal or excessive tire wear can also be caused by wheel/tire unbalance or incorrect tire pressure. Typical tire wear patterns are shown in Fig. 2.



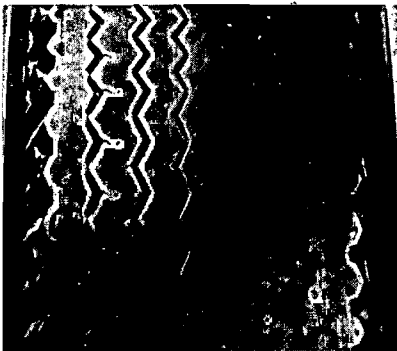
UNDERINFLATION



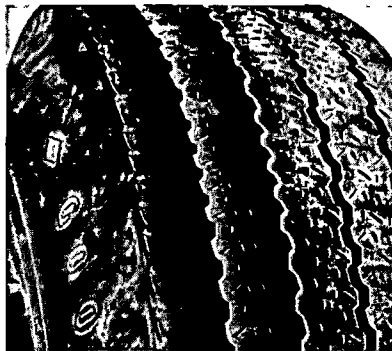
OVERINFLATION



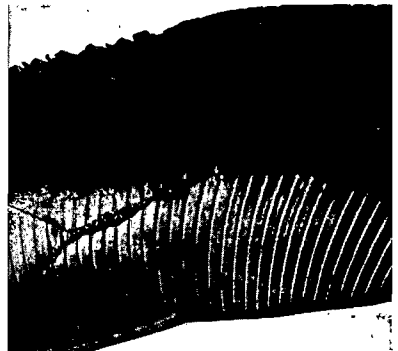
CUPPING—UNDERINFLATION AND/OR MECHANICAL IRREGULARITIES



INCORRECT TOE-IN OR EXTREME CAMBER



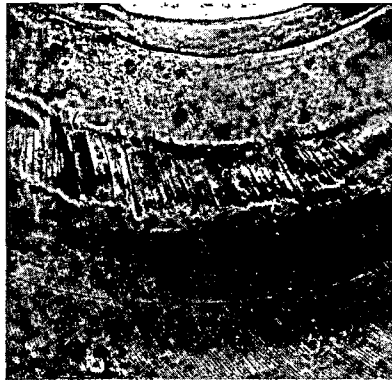
FEATHERING DUE TO MISALIGNMENT OR SEVERE CORNERING



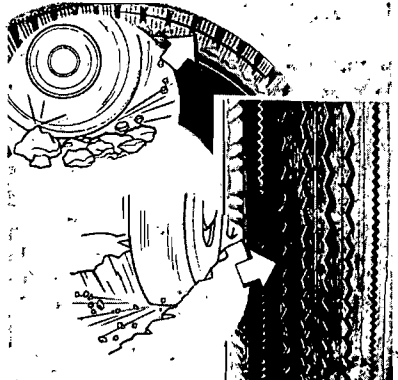
STONE BRUISE



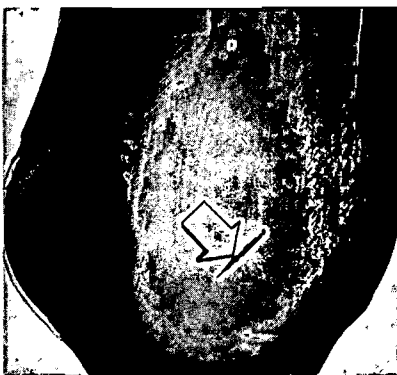
STONE BRUISE



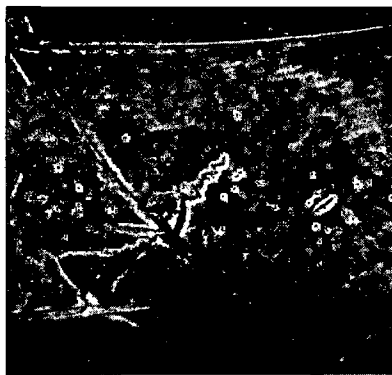
UNDERINFLATION



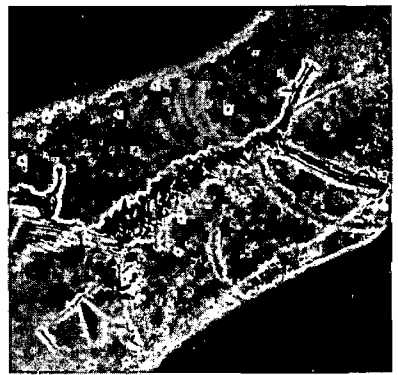
ROCK CUT



BRUISE



HEAT BRUISE



DOUBLE BRUISE—SHARP OBJECT AND RESULTING FATIGUE

F1467-D

FIG. 2 Tire Wear Conditions

# PART 11-02 Wheels and Tires— Drop Center Rim

COMPONENT INDEX	Page	COMPONENT INDEX	Page
FRONT WHEEL ASSEMBLY		SPACE SAVER SPARE TIRE	
Description .....	02-02	Description .....	02-01
HOISTING INSTRUCTIONS .....	02-02	WHEELS AND TIRES	
REAR WHEEL ASSEMBLY		Removal and Installation .....	02-02
Description .....	02-02		

## 1 DESCRIPTION

### SPACE SAVER SPARE TIRE

A space saver spare tire is available as a regular production option on Mustang vehicles.

The Space Saver Spare is designed primarily to provide more room in the luggage compartment. The tire is installed on the wheel in a deflated condition and protrudes barely beyond the periphery of the wheel; thereby, leaving extra storage space. Although more storage space is available, the vehicle full rated load specification must not be exceeded. This tire is not designed for extended mileage; therefore, it should not be used as a permanent substitute for conventional tires. The Space Saver Spare will enable the driver to drive at normal speed and load to the nearest service facility for repairs to a flat tire.

To inflate, carefully follow the instructions shown on the tire inflator can which is stowed under the tire and wheel assembly in the trunk. Use Inflater D1ZA-19F514-AA or Equivalent. Tire warranty for the Space Saver Spare is the same as original equipment tires. This warranty is void if inflators with sealants are used.

**While inflating, keep hands off of metal parts of the inflator since the bottle becomes extremely cold during discharge. Read the instructions on the bottle label. Always dispose of the empty bottle. Do not puncture or incinerate.**

The inflator, when completely used, will inflate the tire within specifications.

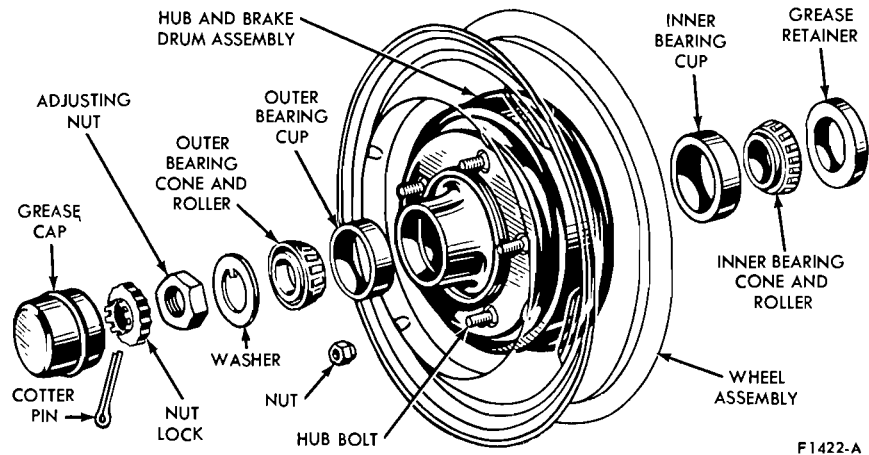


FIG. 1 Front Hub, Bearing and Grease Retainer Drum Brakes

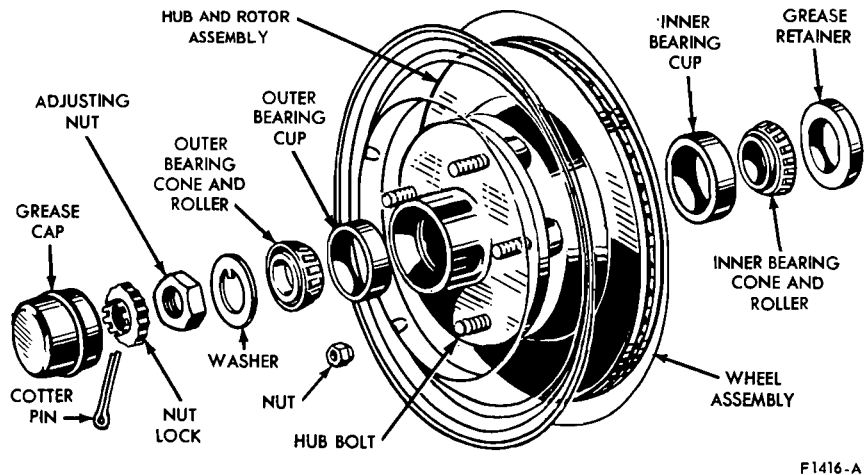


FIG. 2 Front Hub and Rotor Bearing and Grease Retainer Disc Brakes—Typical

The Space Saver Spare can, in case of a puncture, be repaired the same as an original equipment tire.

#### FRONT WHEEL ASSEMBLY

Each front wheel and tire is bolted to its respective front hub and brake drum or rotor assembly. Two opposed tapered roller bearings are installed in each hub. A grease retainer is installed

at the inner end of the hub to prevent lubricant from leaking into the drum or on the rotor. The entire assembly is retained to its spindle by the adjusting nut, nut lock and cotter pin (Figs. 1 and 2).

#### REAR WHEEL ASSEMBLY

The rear wheel hub and brake drum assembly is attached to studs on

the rear axle shaft flange by three speed nuts. The wheel and tire mounts on the same rear axle shaft flange studs and is held against the hub and drum by the wheel nuts. The rear wheel bearing is pressed onto the axle shaft just inside the shaft flange, and the entire assembly is retained to the rear axle housing by the bearing retainer plate which is bolted to the housing flange.

## 4 REMOVAL AND INSTALLATION

### HOISTING INSTRUCTIONS

Damage to steering linkage components and front suspension struts may occur if care is not exercised when positioning the hoist adapters of 2 post hoists prior to lifting the vehicle.

If a 2 post hoist is used to lift the vehicle, place the adapters under the lower arms or (except for Pinto) the No. 1 crossmember. Do not allow the adapters to contact the steering linkage. If the adapters are placed under the crossmember, a piece of wood (2x4x16 inches) should be placed on the hoist channel between the adapters. This will prevent the adapters from damaging the front suspension struts.

### WHEELS AND TIRES

#### Wheel and Tire Removal

1. Pry off the wheel hub cap or wheel cover. Loosen but do not remove the wheel hub nuts.
2. Raise the vehicle until the wheel and tire clear the floor.
3. Remove the wheel hub nuts from the bolts, and pull the wheel and tire from hub and drum.

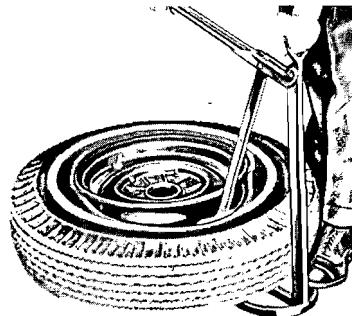
#### Wheel and Tire Installation

1. Clean all dirt from the hub and drum.
2. Position the wheel and tire on the hub and drum. Install the wheel hub nuts and tighten them alternately to draw the wheel evenly against the hub and drum.
3. Lower the vehicle to the floor, and torque the hub nuts to specification.

#### Removing Conventional Tire From Wheel

The tire can be demounted on a mounting machine. Be sure that the outer side of the wheel is positioned downward. If tire irons are used, follow the procedure given here.

1. Remove the valve cap and core, and deflate the tire completely.
2. With a bead loosening tool, break loose the tire side walls from the wheel (Fig. 3).



F1424 A

FIG. 3 Loosening Tire Bead

3. Position the outer side of the wheel downward, and insert two tire irons about eight inches apart between the tire inner bead and the back side of the wheel rim. Use only tire irons with rounded edges or irons designed for removing tubeless tires.
4. Leave one tire iron in position, and pry the rest of the bead over the rim with the other iron. Take small bites with the iron around the tire in order to avoid damaging the sealing surface of the tire bead.
5. Stand the wheel and tire upright with the tire outer bead in the drop center well at the bottom of the wheel. Insert the tire iron between the bead and the edge of the wheel rim and pry the wheel out of the tire.

#### Mounting Conventional Tire To Wheel

1. If a used tire is being installed remove all dirt from the tire.
- If a tire is being mounted to the original wheel, clean the rim with emery cloth or fine steel wool. Check the rim for dents.

If a new wheel is being installed, coat a new valve with RUGLYDE or similar rubber lubricant and position the valve to the new wheel. Use a rubber hammer or a valve replacing tool to seat the valve firmly against the inside of the rim.

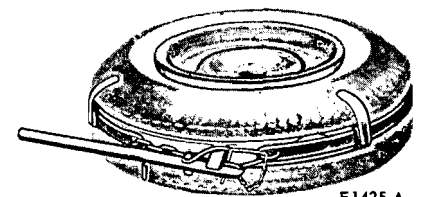
2. Apply RUGLYDE or a similar rubber lubricant to the sealing surface on both tire beads. With the outer side of the wheel down, pry the beads over the wheel rim with two tire irons. Do not use a hammer or mallet to force the beads over the rim.

3. Align the balance mark on the tire with the valve on the wheel.

4. Hold the beads against the rim flanges by positioning a tire mounting band over the tire (Fig. 4). If a mounting band is not available, tie a tourniquet of heavy cord around the circumference and in the center of the tire. Tighten the cord with a tire iron. Center the tire on the wheel with a rubber mallet.

5. Give the tire a few quick bursts of air to seat the beads properly, then inflate the tire to 40 psi pressure. Check to see that the bead positioning rings (outer rings near the side walls) are evenly visible just above the rim flanges all the way around the tire. If the rings are not even, deflate the tire completely and inflate it again.

6. When the rings are properly positioned, deflate the tire to the recommended pressure.



F1425-A

FIG. 4 Tubeless Tire Mounting Band

# PART 11-10 Wheel Hubs and Bearings—Front

Applies to All Models			
COMPONENT INDEX	Page	COMPONENT INDEX	Page
FRONT HUB AND DRUM ASSEMBLY Removal and Installation .....	10-04	FRONT WHEEL GREASE SEAL Removal and Installation .....	10-02
FRONT HUB AND ROTOR ASSEMBLY Removal and Installation .....	10-04	HOISTING INSTRUCTIONS .....	10-01
FRONT WHEEL ASSEMBLY Description .....	10-01	SPECIAL TOOLS .....	10-04
		FRONT WHEEL BEARINGS Adjustment .....	10-01

## 1 DESCRIPTION

### FRONT WHEEL ASSEMBLY

Each front wheel and tire is bolt-

ed to its respective front hub and brake drum or rotor assembly. Two opposed tapered roller bearings are installed in each hub. A grease retainer is installed at the inner end of the hub to prevent

lubricant from leaking into the drum or on the rotor. The entire assembly is retained to its spindle by the adjusting nut, nut lock and cotter pin (Figs. 1 and 2, Part 11-02, Section 1).

## 3 ADJUSTMENTS

### HOISTING INSTRUCTIONS

Damage to steering linkage components and front suspension struts may occur if care is not exercised when positioning the hoist adapters of 2 post hoists prior to lifting the vehicle.

If a 2 post hoist is used to lift the vehicle, place the adapters under the lower arms or (except Pinto) the No. 1 crossmember. Do not allow the adapters to contact steering linkage. If the adapters are placed under the crossmember, a piece of wood (2 x 4 x 16 inches) should be placed on the hoist channel between the adapters. This will prevent the adapters from damaging the front suspension struts.

### FRONT WHEEL BEARING ADJUSTMENT

The front wheel bearings should be adjusted if the wheel is loose on the spindle or if the wheel does not rotate freely. The following procedures will bring the bearing adjustment to specification.

#### Drum Brakes

1. Raise the vehicle until the wheel and tire clear the floor.
2. Pry off the hub cap or wheel cover and remove the grease cap from the hub.

3. Wipe the excess grease from the end of the spindle, and remove the cotter pin and nut lock.

4. While rotating the wheel, hub, and drum assembly, torque the adjusting nut to 17-25 ft-lbs to seat the bearings (Fig. 1).

5. Back off the adjusting nut one half turn. Retighten the adjusting nut to 10-15 in.-lbs with a torque wrench or finger tight.

6. Position the nut lock on the adjusting nut so that the castellations on the lock are aligned with the cotter pin hole in the spindle, and install a new cotter pin. Bend the ends of the cotter pin around the castellated flange of the nut lock.

7. Check the front wheel rotation. If the wheel rotates properly, install the grease cap and the hub cap or wheel cover. If the wheel still rotates roughly or noisily, clean, inspect or replace the bearings and cups as required.

#### Disc Brakes

1. Raise the vehicle until the wheel and tire clear the floor.
2. Pry off the wheel cover and remove the grease cap from the hub.
3. Wipe the excess grease from the end of the spindle, and remove the adjusting nut cotter pin and nut lock.
4. Loosen the bearing adjusting nut three turns. Then, rock the wheel, hub, and rotor assembly in and out sev-

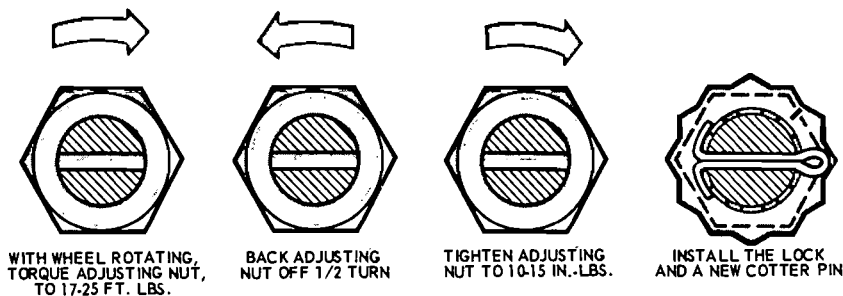


FIG. 1 Front Wheel Bearing Adjustment

eral times to push the shoe and linings away from the rotor.

5. While rotating the wheel, hub, and rotor assembly, torque the adjusting nut to 17-25 ft-lbs to seat the bearings (Fig. 1).

6. Back the adjusting nut off one half turn. Retighten the adjusting nut to 10-15 in-lbs with a torque wrench or finger tight.

7. Locate the nut lock on the adjusting nut so that the castellations on the lock are aligned with the cotter pin hole in the spindle.

8. Install a new cotter pin, and bend the ends of the cotter pin around the castellated flange of the nut lock.

9. Check the front wheel rotation. If the wheel rotates properly, install the grease cap and the hub cap or wheel

cover. If the wheel still rotates roughly or noisily, clean or replace the bearings and cups as required.

10. Before driving the vehicle, pump the brake pedal several times to obtain normal brake lining to rotor clearance and restore normal brake pedal travel.

## 4 REMOVAL AND INSTALLATION

### HOISTING INSTRUCTIONS

Damage to steering linkage components and front suspension struts may occur if care is not exercised when positioning the hoist adapters of 2 post hoists prior to lifting the vehicle.

If a 2 post hoist is used to lift the vehicle, place the adapters under the lower arms or (except for Pinto), the No. 1 crossmember. Do not allow the adapters to contact the steering linkage. If the adapters are placed under the crossmember, a piece of wood (2x4x16 inches) should be placed on the hoist channel between the adapters. This will prevent the adapters from damaging the front suspension struts.

### FRONT WHEEL GREASE SEAL AND BEARING REMOVAL, INSTALLATION AND/OR REPACKING

If bearing adjustment will not eliminate looseness or rough and noisy operation, the hub and bearings should be cleaned, inspected, and repacked with specified wheel grease. If the bearing cups or the cone and roller assemblies are worn or damaged, they should be replaced.

#### Drum Brakes

1. Raise the vehicle until the wheel and tire clear the floor.

2. Remove the wheel cover or hub cap. 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 (Fig. 1, and 2 Part 11-02, Section 1).

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

4. Remove the grease retainer with Tool 1175AB and discard. Remove the inner bearing cone and roller assembly from the hub.

5. Clean the lubricant off the inner and outer bearing cups with solvent and inspect the cups for scratches, pits,

excessive wear, and other damage. If the cups are worn or damaged, remove them with Tool T69L-1102-A (Fig. 2).

6. Thoroughly clean the inner and outer bearing cone and roller assemblies with solvent and dry them thoroughly. Do not spin the bearings with compressed air.

Inspect the cone and roller assemblies for wear or damage, and replace them if necessary. The cone and roller assemblies and the bearing cups should be replaced as a unit if damage to either is encountered.

7. Thoroughly clean the spindle and the inside of the hub with solvent to remove all old lubricant.

Cover the spindle with a clean cloth, and brush all loose dust and dirt from the brake assembly. To prevent

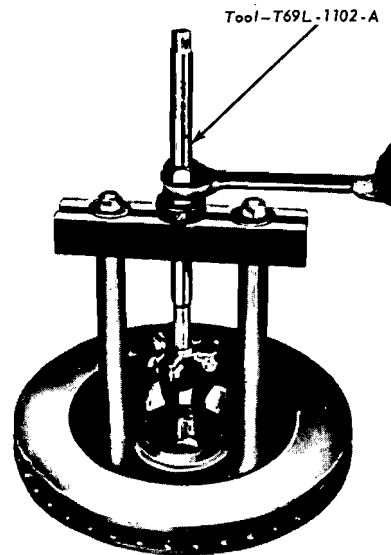
getting dirt on the spindle, carefully remove the cloth from the spindle.

8. If the inner and/or outer bearing cup(s) were removed, install the replacement cup(s) in the hub with the tool shown in Fig. 3. Be sure to seat the cups properly in the hub.

9. Pack the inside of the hub with specified wheel bearing grease. Add lubricant to the hub only until the grease is flush with the inside diameter of both bearing cups (Fig. 4).

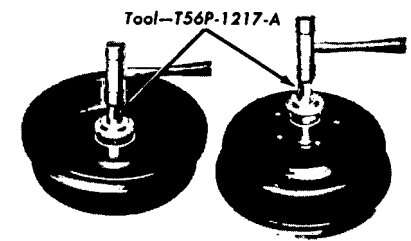
10. All old grease should be completely cleaned from the bearings and surrounding surfaces before repacking them with new grease (CIAZ-19590-B). The new lithium base grease is not compatible with sodium base grease which may have been present on the bearing surfaces. Pack the bearing cone and roller assemblies with wheel bearing grease. A bearing packer is desirable for this operation. If a packer is not available, work as much lubricant as possible between the rollers and cages. Lubricate the cone surfaces with grease.

11. Place the inner bearing cone and roller assembly in the inner cup. Apply a light film of grease to the lip(s) of the grease retainer and install the new grease retainer with the reverse end of the tool shown in Fig. 3. Be sure that the retainer is properly seated.



F1476-A

FIG. 2 Removing Front Wheel Bearing Cups—Disc (Drum-Type Similar)

INNER CUP  
INSTALLATIONOUTER CUP  
INSTALLATION

F1464-A

FIG. 3 Installing Front Wheel Bearing Cups—Drum

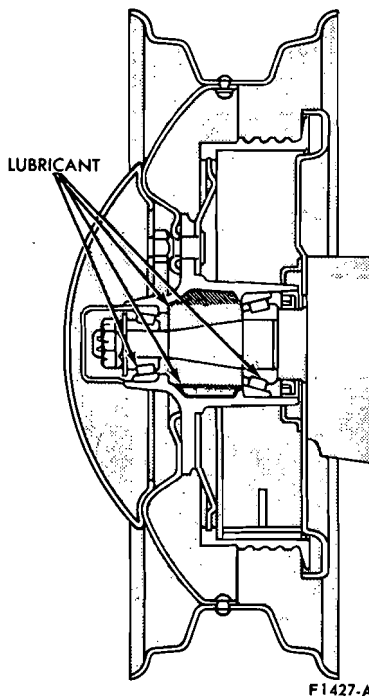
12. Adjust the brake shoes as outlined in Group 12.

13. Install the wheel, hub, and drum assembly on the wheel spindle. **Keep the hub centered on the spindle to prevent damage to the grease retainer or the spindle threads.**

14. Install the outer bearing cone and roller assembly and the flat washer on the spindle, then install the adjusting nut (Fig. 1, Part 11-02, Section 1).

15. Adjust the wheel bearings as outlined in this Section.

16. Install the hub cap or wheel cover.



F1427-A

FIG. 4 Front Wheel Hub Lubrication

### Disc Brakes

1. Raise the vehicle until the wheel and tire clear the floor.

2. Remove the wheel cover or hub cap from the wheel.

3. Remove the wheel and tire from the hub and rotor.

4. Remove 2 bolts and washers that attach the caliper to the spindle. Remove the caliper from the rotor and wire it to the underbody to prevent damage to the brake hose.

5. 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 (Fig. 2, Part 11-02, Section 1).

6. Pull the hub and rotor assembly off the wheel spindle.

7. Remove and discard the old grease retainer. Remove the inner bearing cone and roller assembly from the hub.

8. Clean the lubricant off the inner and outer bearing cups with solvent and inspect the cups for scratches, pits, excessive wear, and other damage. If the cups are worn or damaged, remove them with Tool T69L-1102-A (Fig. 2).

9. Thoroughly clean the inner and outer bearing cones and rollers with cleaning solvent, and dry them thoroughly. **Do not spin the bearings dry with compressed air.**

**Inspect the cones and rollers for wear or damage, and replace them if necessary. The cone and roller assemblies and the bearing cups should be replaced as a set if damage to either is encountered.**

10. Thoroughly clean the spindle and the inside of the hub with solvent to remove all old lubricant.

Cover the spindle with a clean

cloth, and brush all loose dust and dirt from the dust shield. **To prevent getting dirt on the spindle carefully remove the cloth from the spindle.**

11. If the inner and/or outer bearing cup(s) were removed, install the replacement cup(s) in the hub with the tools shown in Fig. 5. **Be sure to seat the cups properly in the hub.**

12. Pack the inside of the hub with the specified wheel bearing grease. Add lubricant to the hub only until the grease is flush with the inside diameter of both bearing cups.

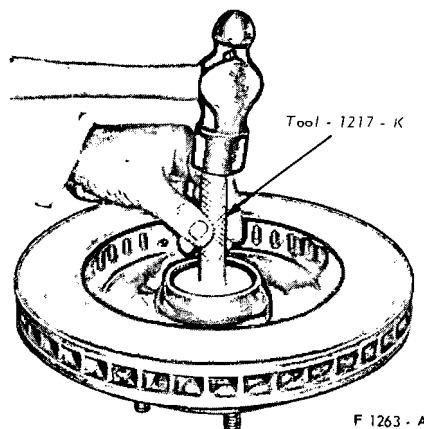
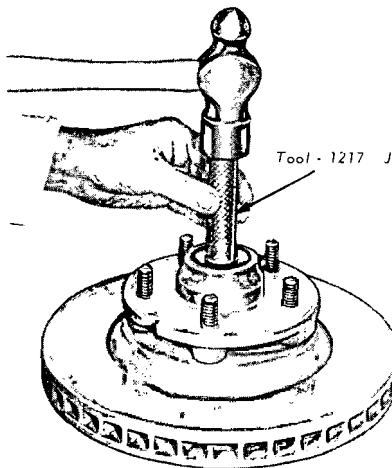
**It is important that all old grease be removed from the wheel bearings and surrounding surfaces because the new Lithium base grease C1AZ19590-B is not compatible with Sodium base grease which may already be present on the bearing surfaces.**

13. Pack the bearing cone and roller assemblies with wheel bearing grease. A bearing packer is desirable for this operation. If a packer is not available, work as much lubricant as possible between the rollers and cages. Lubricate the cone surfaces with grease.

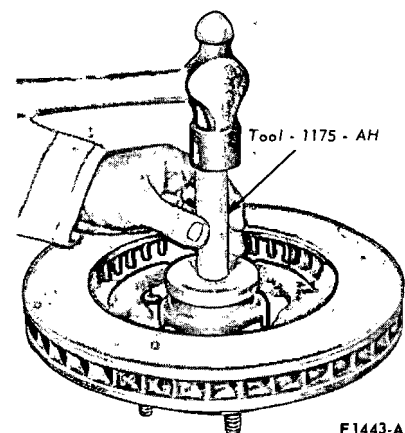
14. Place the inner bearing cone and roller assembly in the inner cup. Apply a light film of grease to the lips of the grease retainer and install the new grease retainer with the tool shown in Fig. 6. **Be sure the retainer is properly seated.**

15. Install the hub and rotor assembly on the wheel spindle. **Keep the hub centered on the spindle to prevent damage to the grease retainer or the spindle threads.**

16. Install the outer bearing cone and roller assembly and the flat washer on the spindle, then install the adjusting nut finger tight. **Do not attempt to adjust the wheel bearings at this time.**



F 1263 - A



F1443-A

FIG. 5 Installing Front Wheel Bearing Cup—Disc Type

FIG. 6 Installing Grease Retainer—Disc

17. Install the caliper to the spindle and torque the attaching bolts to specifications as detailed in Group 12.

18. Install the wheel and tire on the hub.

19. Adjust the wheel bearings as outlined in this Part, Section 3.

20. After lowering the vehicle torque the lug nuts to specification (70-115 ft-lbs). Install the hub cap or wheel cover.

21. Before driving the vehicle, pump the brake pedal several times to obtain normal brake lining to rotor clearance and restore normal brake pedal travel.

### FRONT HUB AND DRUM ASSEMBLY REMOVAL AND INSTALLATION

When the hub and drum assembly is replaced, new bearings and a grease retainer must be installed in the new assembly. Coat the new grease retainer with a light film of wheel bearing grease.

1. Raise the vehicle until the wheel and tire clears the floor. Pry off the hub cap or wheel cover, and remove the wheel and tire from the hub and drum assembly.

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 (Fig. 1, Part 11-02, Section 1).

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

4. Remove the grease retainer and the inner bearing cone and roller assembly from the hub with Tool 1175AB.

5. Remove the protective coating from the new hub and drum with carburetor degreaser.

6. Pack the inside of the hub with specified wheel bearing grease. Add lu-

bricant to the hub only until the grease is flush with the inside diameter of both bearing cups (Fig. 4).

7. All old grease should be completely cleaned from the bearings before repacking them with new grease. Pack the bearing cone and roller assemblies with wheel bearing grease. A bearing packer is desirable for this operation. If a packer is not available, work as much lubricant as possible between the rollers and cages. Lubricate the cone surfaces with grease.

8. Place the inner bearing cone and roller assembly in the inner cup, and install the new grease retainer with the reverse end of the tool shown in Fig. 3. **Be sure that the retainer is properly seated.**

9. Adjust the brake shoes as outlined in Group 12.

10. Install the new hub and drum assembly on the wheel spindle. **Keep the hub centered on the spindle to prevent damage to the grease retainer.**

11. Install the outer bearing cone and roller assembly and the flat washer on the spindle; then, install the adjusting nut (Fig. 1, Part 11-02, Section 1).

12. Position the wheel and tire on the new hub and drum assembly. Install the wheel hub nuts and tighten them alternately in order to draw the wheel evenly against the hub and drum.

13. Adjust the wheel bearings as outlined in this Part, Section 3.

### FRONT HUB AND ROTOR ASSEMBLY REMOVAL AND INSTALLATION

When the hub and rotor assembly is replaced, new bearings and a grease retainer must be installed in the new assembly.

1. Raise the vehicle until the wheel and tire clear the floor. Pry off the

hub cap or wheel cover, and remove the wheel and tire from the hub and rotor assembly.

2. Remove 2 bolts and washers that attach the caliper to the spindle. Remove the caliper from the rotor and wire it to the underbody to prevent damage to the brake hose.

3. Remove the grease cap from the hub. Remove the cotter pin, nut lock, adjusting nut, and flat washer from the spindle; then, remove the outer bearing cone and roller assembly, (Fig. 2, Part 11-02, Section 1).

4. Pull the hub and rotor off the spindle.

5. Remove the protective coating from the new hub and rotor with carburetor degreaser.

6. Grease and install the inner bearing cone and roller assembly in the inner bearing cup. Apply a light film of grease on the grease retainer and install the grease retainer.

7. Install the new hub and rotor assembly to the wheel spindle. **Keep the hub centered on the spindle to prevent damage to the grease retainer.**

8. Install the outer bearing cone and roller assembly and the flat washer on the spindle; then, install the adjusting nut.

9. Install the caliper to the spindle and tighten the attaching bolts to specifications as detailed in Group 12.

10. Position the wheel and tire on the new hub and rotor. Install the wheel hub nuts and tighten them alternately in order to draw the wheel evenly against the hub and rotor.

11. Adjust the wheel bearings as outlined in this Part, Section 3.

12. Before driving the vehicle, pump the brake pedal several times to obtain normal brake lining to rotor clearance and restore normal brake pedal travel.

## 9 SPECIAL SERVICE TOOLS

### SPECIAL TOOLS

Tool No.	Description	Tool No.	Description
Tool-1175-AB	Grease Seal Remover	T56P-1217-A	Front Wheel Bearing Cup (Inner and Outer) Installer-Drum
T69L-1102-A	Front Wheel Bearing Remover	Tool-1175-AH	Grease Seal Installer-Disc
Tool-1217-J	Front Wheel Bearing Cup (Outer) Installer-Disc		
Tool-1217-K	Front Wheel Bearing Cup (Inner) Installer-Disc		

# PART 11-11 Wheel Hubs and Bearings—Rear

Applies To All Models			
COMPONENT INDEX	Page	COMPONENT INDEX	Page
BEARING AND SEAL-INTEGRAL CARRIER AXLE		HOISTING INSTRUCTIONS .....	11-01
Removal and Installation .....	11-02	REAR WHEEL ASSEMBLY	
BEARING AND SEAL-REMOVABLE CARRIER AXLE		Description .....	11-01
Removal and Installation .....	11-01	SPECIAL TOOLS .....	11-03

## 1 DESCRIPTION

### REAR WHEEL ASSEMBLY

The rear wheel hub and brake drum assembly is attached to studs on the rear axle shaft flange by three shake-proof retainers. The wheel and tire mounts on the same rear axle shaft flange studs and is held against the hub and drum by the wheel nuts. Except for

integral carrier—Ford (WER) axle equipped vehicles, the rear wheel bearing is pressed onto the axle shaft just inside the shaft flange and the entire assembly is retained to the rear axle housing by the bearing retainer plate which is bolted to the housing flange.

On integral carrier (WER) axle equipped vehicles (Ford and Meteor

with 240-1V and 302-2V, and on Mercury with 351-2V engines), the roller-type wheel bearings have no inner race, and contact the bearing journals of the axle shafts.

The axle shafts do not use an inner or outer bearing retainer. They are held in the axle by means of C-locks, positioned in a slot on the splined end.

## 4 REMOVAL AND INSTALLATION

### HOISTING INSTRUCTIONS

Damage to steering linkage components and front suspension struts may occur if care is not exercised when positioning the hoist adapters of 2 post hoists prior to lifting the vehicle.

If a 2 post hoist is used to lift the vehicle, place the adapters under the lower arms or (except Pinto), the No. 1 crossmember. Do not allow the adapters to contact the steering linkage. If the adapters are placed under the crossmember, a piece of wood (2 x 4 x 16 inches) should be placed on the hoist channel between the adapters. This will prevent the adapters from damaging the front suspension struts.

Procedures differ for wheel bearing and seal removal and installation between removable carrier, and integral carrier (WER) type axles.

### REMOVABLE AND INTEGRAL CARRIER TYPE AXLES (EXCEPT WER)

The rear axle shafts, wheel bearings, and oil seal can be replaced with-

out removing the differential assembly from the axle housing.

#### Removal of Axle Shaft

Synthetic wheel bearing seals are used. Removal and insertion of rear axle shafts must be performed with caution. The entire length of the shaft (including spline) up to the seal journal must pass through the seal without contact. Any roughening or cutting of the seal element during axle removal or installation will result in early seal failure.

1. Remove the wheel cover, wheel and tire from the brake drum.

2. Remove the nuts that secure the brake drum to the axle shaft flange, then remove the drum from flange.

3. Working through the hole provided in each axle shaft flange, remove the nuts that secure the wheel bearing retainer plate. Then pull the axle shaft assembly out of the axle housing (Fig. 1). The brake backing plate must not be dislodged. Install one nut to hold the plate in place after the axle shaft is removed.

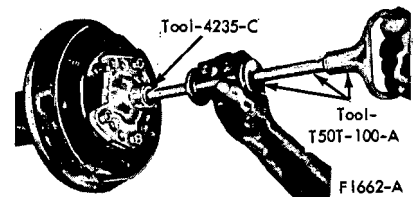


FIG. 1 Removing Axle Shaft

#### Removal of Rear Wheel Bearing and Seal

Synthetic seals must not be cleaned, soaked or washed in cleaning solvents.

Removal of the wheel bearings from the axle shaft makes them unfit for further use.

1. On all models except Ford, Mercury or Meteor, if the rear wheel bearing is to be replaced, loosen the inner retainer ring by nicking it deeply with a cold chisel in several places (Fig. 2). It will then slide off easily.

On Ford, Mercury and Meteor models, it is necessary to first drill a 1/4 inch hole not more than 5/16 inch deep

in the retainer ring surface before using the cold chisel.

2. Remove the bearing from the axle shaft with tool T60K-1225-A.

3. Whenever a rear axle shaft is replaced, the oil seal must be replaced. Remove the seal with Tool 1175-AB and a slide hammer.

#### Installation of Rear Wheel Bearing and Seal

1. Inspect the machined surface of the axle shaft and the axle housing for rough spots or other irregularities which would affect the sealing action of the oil seal. Check the axle shaft splines for burrs, wear or twist. Carefully remove any burrs or rough spots. Replace worn or damaged parts.

2. Lightly coat wheel bearing bores with axle lubricant.

3. Place the bearing retainer plate on the axle shaft, and press the new wheel bearing on the shaft with the tool shown in Fig. 3. Do not attempt to press on both the bearing and the inner retainer ring at the same time.

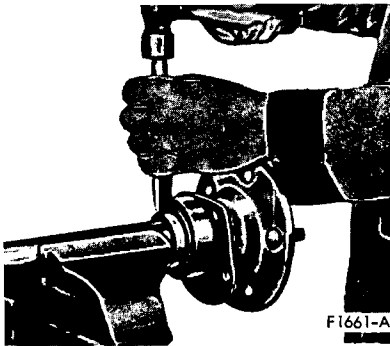


FIG. 2 Removing Rear Wheel Bearing Retainer Ring

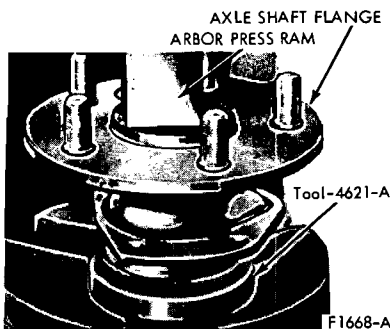


FIG. 3 Installing Rear Wheel Bearing

4. Using the bearing installation tool (Tool 4621-A), press the bearing inner retainer ring on the shaft until the retainer seats firmly against the bearing. On Ford, Mercury, or Meteor models,

before assembling the retainer onto the axle shaft, the shaft journal and the inside diameter of the retainer should be wiped clean with a dry cloth. These parts must not be degreased or lubricated.

5. Install the new oil seal with the tools shown in Fig. 4. Wipe a small amount of oil resistant sealer on the outer edge of the seal before it is installed. Do not put sealer on the sealing lip.

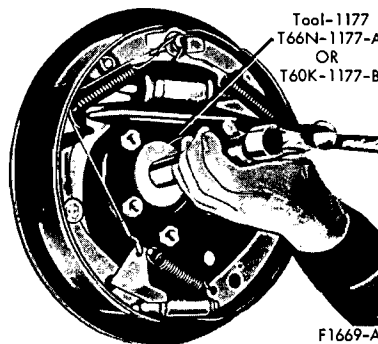


FIG. 4 Installing Rear Wheel Bearing Oil Seal

#### Installation of Axle Shaft

1. Carefully slide the axle shaft into the housing so that the rough forging of the shaft will not damage the oil seal. Start the axle splines into the side gear, and push the shaft in until the bearing bottoms in the housing.

2. Install the bearing retainer plate and the nuts that secure it. Torque the nuts to specifications.

3. Install the brake drum, and the shakeproof retainers.

4. Install the wheel and tire on the drum. Install the wheel cover.

#### INTEGRAL CARRIER (WER) TYPE AXLE

##### Removal

Synthetic wheel bearing seals are used for production and as service replacements. Removal and insertion of rear axle shafts must be performed with caution. This entire length of the shaft (including spline) up to the seal journal must pass through the seal without contact. Any roughing or cutting of the seal element during axle removal or installation will result in early seal failure.

1. Raise the vehicle on a hoist.
2. Remove the wheel(s) and tire(s) from the brake drum(s).
3. Position a drain pan and loosen the cover to differential housing retaining bolts. Drain the housing.
4. Remove the attaching shakeproof retainers that secure the brake

drum(s) to the axle shaft flange(s), and then remove the drum(s).

5. Remove the differential housing cover bolts, cover and gasket. Discard the gasket. Remove the drain pan.

6. Position safety stands under the rear frame member. Lower the hoist and allow the axle to lower as far as possible.

7. Working through the differential case opening, remove the pinion shaft lock bolt and the pinion shaft (Fig. 5).

8. Push the axle shaft(s) inward toward the center of the axle housing. Remove the C-lock(s) (Fig. 6) from the inner end of the axle(s). Remove the axle shaft(s) from the housing. Extreme care must be used to avoid contact of the axle shaft seal lip with any portion of the axle shaft except the seal journal.

9. Remove the bearing and oil seal from the housing as shown in Fig. 7.

10. Inspect the machined surface of the axle shaft and the axle housing for rough spots or other irregularities which would affect the sealing action of the oil seal. Check the axle shaft splines for



FIG. 5 Differential Pinion Shaft and Lock Bolt

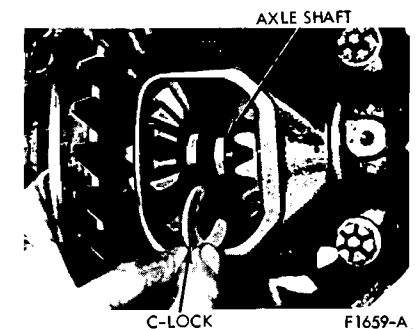


FIG. 6 Removal and Installation of C-Locks and Axle Shaft

burrs, wear or damage. Carefully remove any burrs or rough spots. Replace worn or damaged parts. A brownish yellow color on the bearing journal of the shaft is normal and the shaft need not be replaced. Slight pitting and wear is also normal.

#### Installation

1. Lightly coat the wheel bearing rollers with axle lubricant. Install the bearings in the axle housing with the tool shown in Fig. 8. The bearing should seat firmly against the shoulder.

2. Wipe all lubricant from the oil seal bore before installing the seal.

3. Inspect the original seal for nicks, scuffs or abnormal wear, and replace it if necessary. **The new seals are pre-packed with lubricant and do not require an oil soak before installation.**

4. Install the oil seal with the tool shown in Fig. 9. Installation without the use of the proper tool will distort the seal and cause leakage.

5. Place the O-ring in the C-lock groove on the axle shaft.

6. Slide the axle shaft(s) into place in the axle housing. Exercise care that splines or any portion of the axle shaft(s) do not damage the oil seal(s) and that they engage with the splines of the differential side gear(s).

7. Install the axle shaft C-lock(s) on the inner end of the shaft(s) (Fig. 6) and push the shaft(s) outward so that the shaft locks seat in the counterbore(s) of the differential side gear(s).

8. Position the differential pinion gears and thrust washers 180 degrees apart to the differential side gears. Revolve the gear assembly until the holes in the differential case are aligned with the pinion gears.

9. Position the differential pinion shaft through the case and pinions, aligning the hole in the shaft with the lock bolt hole. Install the lock bolt and torque it to specification.

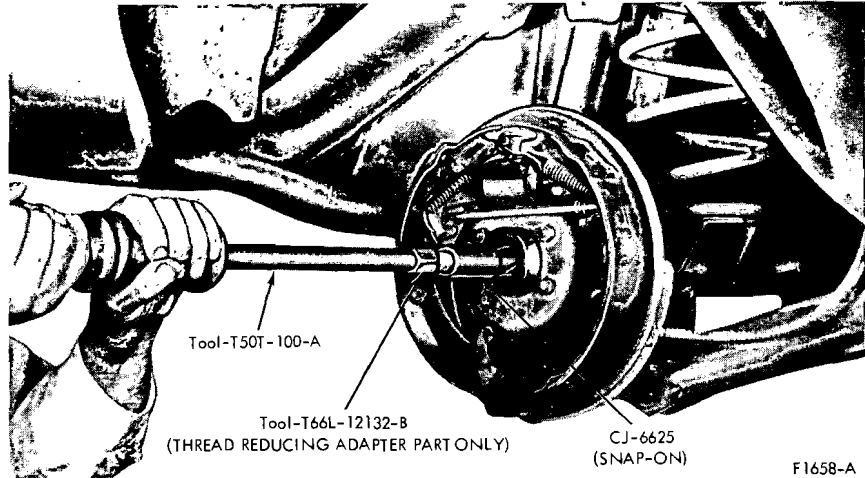


FIG. 7 Removal of Axle Seal or Axle Bearing

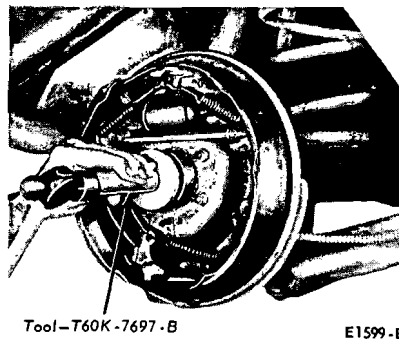


FIG. 8 Installation of Axle Shaft Bearing

10. Install the brake drum and tighten the attaching shakeproof retainers.

11. Install the wheel and tire on the brake drum.

12. Clean the gasket mounting surfaces of the rear axle differential housing and the cover. Install a new cover gasket, cover and the attaching bolts.

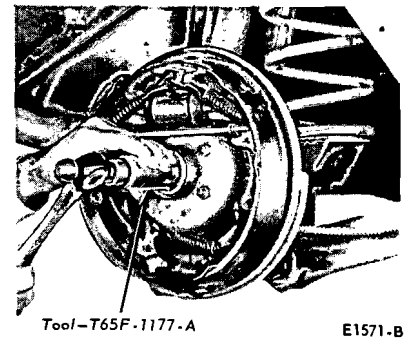


FIG. 9 Rear Axle Shaft Bearing Seal Installation

Torque the bolts to specification.

13. Raise the rear axle. **Make sure the rear axle is in running position.** Add the amount of specified lubricant required to reach 1/2 inch below the bottom of the filler plug hole. Install the filler plug and torque it to specification.

14. Remove the safety support stands and lower the vehicle.

## 9 SPECIAL SERVICE TOOLS

### SPECIAL TOOLS

Tool No.	Description	Tool No.	Description
Tool-4235-C Use With T50T-100-A	Axle Shaft Remover	Tool-66L-12132-B Use With T50T-100-A and CJ-6625 (Snap On)	Axle Seal or Wheel Bearing Remover
T60K-1225-A	Rear Wheel Bearing Remover	T60K-7697-B	Bearing Installer
Tool-4621-A	Rear Wheel Bearing Installer	T65F-1177-A	Oil Seal Installer
Tool-1175-AB	Oil Seal Remover		
T66N-1177-A or T60K-1177-B	Oil Seal Installer		

Brakes	GROUP 12
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<b>PART 12-01</b>	<b>PAGE</b>	<b>PART 12-50</b>	<b>PAGE</b>
General Hydraulic Brake Service . . . . .	12-01-01	Vacuum Brake Booster—Single Diaphragm, Dash Mounted . . . . .	12-50-01
<b>PART 12-02</b>		<b>PART 12-70</b>	
Drum Brakes—Single Cylinder, Dual Piston . . . . .	12-02-01	Parking Brakes—Cable Actuated, Rear Wheels . . . . .	12-70-01
<b>PART 12-20</b>			
Disc Brakes—Single Piston, Sliding and Floating Caliper . . . . .	12-20-01		

## PART 12-01 General Hydraulic Brake Service

COMPONENT INDEX Applies to Models As Indicated	All Models	Ford	Mercury	Meteor	Cougar	Torino	Maverick, Comet	Pinto	Montego	Mustang	Lincoln- Continental	Thunderbird	Continental- Mark IV
<b>BRAKE BOOSTER</b>													
Adjustments		01-04	01-04	01-04	01-04	01-04	N/A	N/A	01-04	01-04	01-04	01-04	01-04
Cleaning and Inspection		01-07	01-07	01-07	01-07	01-07	N/A	N/A	01-07	01-07	01-07	01-07	01-07
Tests		01-02	01-02	01-02	01-02	01-02	N/A	N/A	01-02	01-02	01-02	01-02	01-02
<b>BRAKE PEDAL</b>													
Free Height Test	01-02												
Total Travel Test	01-02												
<b>BRAKE PRESSURE DIFFERENTIAL VALVE</b>													
Centralizing	01-06												
<b>DISC BRAKES</b>													
Cleaning and Inspection		01-06	01-06	01-06	01-06	01-06	N/A	N/A	01-06	01-06	01-06	01-06	01-06
Service Precautions		01-07	01-07	01-07	01-07	01-07	N/A	N/A	01-07	01-07	01-07	01-07	01-07
<b>DRUM BRAKES</b>													
Cleaning and Inspection	01-07												
<b>HYDRAULIC LINES</b>													
Inspection	01-07												
Repair	01-07												
<b>HYDRAULIC SYSTEM BLEEDING</b>	01-04												
<b>PARKING BRAKE CONTROL</b>													
Vacuum Release Test		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	01-02	01-02	01-02
<b>SPECIAL SERVICE TOOLS</b>	01-08												

A page number indicates that the item is for the vehicle(s) listed at the head of the column.  
N/A indicates that the item is not applicable to the vehicle(s) listed.

## 2 DIAGNOSIS AND TESTING

Always check the fluid level in the master cylinder before performing the test procedures. If the fluid level is not within 1/4 inch of the top of the master cylinder reservoirs, add Brake Fluid — Extra Heavy Duty (ESA-M6C25-A or equivalent for all brake applications. The extra heavy duty brake fluid is colored blue for identification purposes. Do not mix low temperature brake fluids with the specified brake fluid.

Should one of the wheel brakes be locked and the vehicle 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.

### BRAKE PEDAL FREE HEIGHT MEASUREMENTS

With the engine running for full power brake operation and the parking brake fully released, 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:

1. Insert a slender, sharp pointed prod through the carpet and sound deadener 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, worn, or damaged 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 or master cylinder to be sure the correct parts are installed. Replace the worn or damaged parts as necessary.

### BRAKE PEDAL TRAVEL MEASUREMENT

1. Install a Brake Pedal Effort 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 pedal by pressing downward on the brake pedal effort gauge. Apply a 50 pound load (non-power brakes), or a 25 pound load (power brakes) 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 (non-power brakes), or a 25 pound load (power brakes) 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 with a forward stop before each. Move the vehicle in reverse and forward for a distance of approximately ten feet; then, apply the brakes sharply and hold the brake pedal down until the vehicle 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 described in Part 12-02.

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

### POWER BRAKE FUNCTIONAL TEST

1. Check the hydraulic brake system for leaks or insufficient fluid.

2. 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.

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.

If the brake pedal movement feels spongy, bleed the hydraulic system to remove air from the system. Refer to Hydraulic System Bleeding, in this Part.

### VACUUM TESTS-VACUUM RELEASE PARKING BRAKES

Visually check the operation of the brake linkage as the brake pedal is depressed. Then, check the operation of the brake linkage when the manual release lever is activated. 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. Perform tests of the parking brake system and controls after making certain the linkage, and manual controls operate properly.

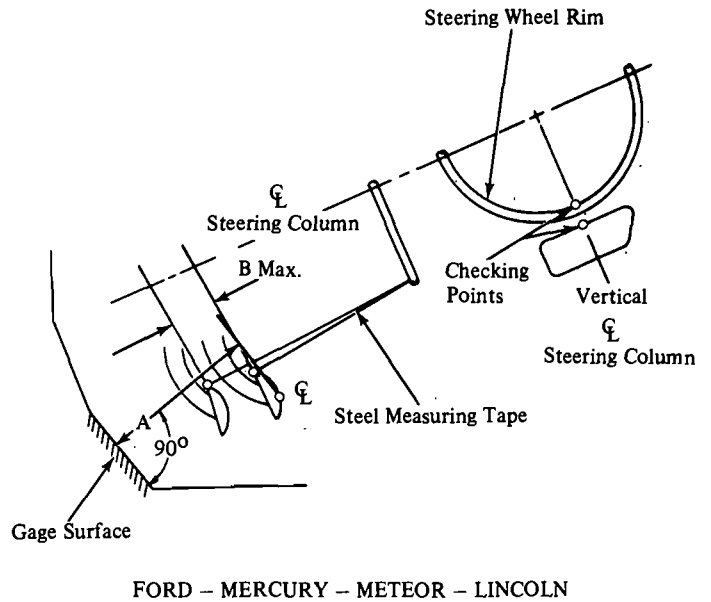
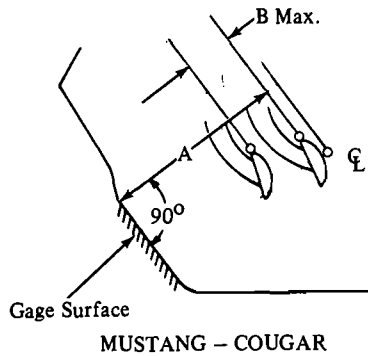
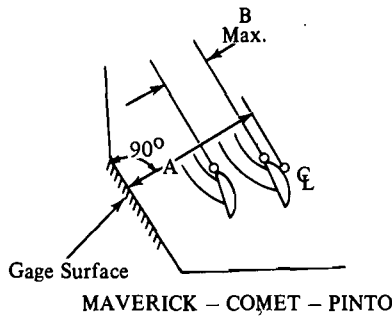
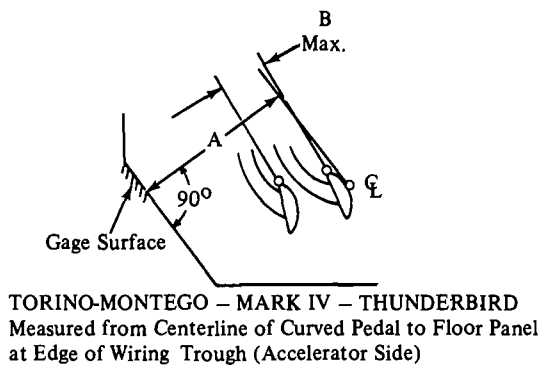
When testing a parking brake vacuum release system, a minimum of 10 inches of vacuum (Hg.) should be available at all points where vacuum is applied. This can be checked with a Rotunda Fuel Pump Tester Gauge (A-RE345) and two Distributor Tester hose adapters (Marked Q) connected together with a coupling. This allows the Fuel Pump Tester Gauge hose to be adapted to any other vacuum hose or rubber connector in the vacuum systems.

Failure to maintain 10 inches of vacuum (Hg.) during vacuum system tests could be caused by a loose hose connection, resulting in a vacuum leak. When checking for vacuum between two points, trace the hose along the entire routing to be sure it is not crossed with another hose and connected to the wrong connection.

All of the vacuum parking brake control checks are to be performed with the engine running at idle speed.

Leaks in the parking brake hoses or a disconnected or improperly connected hose can usually be found by listening for a hissing sound along the hose routings. Under no circumstances should air pressure be applied to the vacuum system as the actuator diaphragm in the parking brake vacuum motor may be damaged.

1. Start the engine and run it at idle speed. With the transmission shift control in neutral, depress the parking brake pedal to apply the parking brake. Move the transmission shift control to D range and observe the parking brake pedal to see that the pedal moves upward and the parking brake releases. If the parking brake releases, the parking brake vacuum control is working properly.



NOTE: "A" Dimension to be measured to sheet metal from Top Center of Pad.

"B" Dimension to be Measured Parallel to the Vertical Centerline of the Steering Column with a 50# Load for Non-Power Brakes and 25# Load for Power Brakes Applied to the Centerline of the Brake Pedal Pad. (Checks on Power Brake Vehicles Made with Engine Running).

VEHICLE	TYPE	PEDAL FREE HEIGHT A		PEDAL TRAVEL B
		MAX.	MIN.	
Pinto	Non-Power Drum	8.10	7.00	2.60
Pinto	Non-Power Disc	8.10	7.00	2.90
Maverick, Comet	Non-Power Drum	8.34	7.12	2.90
Mustang, Cougar	Non-Power Drum	9.02	7.72	2.58
Mustang, Cougar	Power Disc	7.30	6.42	2.00
Torino, Montego	Non-Power Disc-Auto. Trans.	9.74	8.58	2.90
Torino, Montego	Non-Power Disc-Std. Trans.	9.42	8.28	2.90
Torino, Montego Sta. Wag.	Power Disc-Auto. Trans.	7.12	6.36	1.90
Torino, Montego Sta. Wag.	Power Disc-Std. Trans.	6.47	5.72	2.10
Torino, Montego	Power Disc-Auto. Trans.	7.24	6.48	1.90
Torino, Montego	Power Disc-Std. Trans.	6.67	5.87	2.10
Ford, Mercury, Meteor	Non-Power Drum	9.16	7.74	3.10
Ford, Mercury, Meteor	Power Disc.	7.70	6.83	2.10
Ford, Mercury, Meteor	Power Disc (U.S. Police & Taxi)	8.30	7.41	2.10
Ford, Mercury, Meteor	Power Drum	7.70	6.83	2.10
Thunderbird	Power Disc	7.12	6.36	2.30
Continental Mark IV	Power Disc	7.12	6.36	2.30
Lincoln Continental	Power Disc	8.36	7.58	2.10

FIG. 1 Brake Pedal Height and Travel Measurements

2. If the parking brake does not release, test for vacuum at the vacuum lines to the parking brake release vacuum motor. Use the Rotunda Vacuum and Fuel Pump Tester (ARE 345). This can be accomplished by removing the hose from each component and attaching it to the vacuum gauge. Connect two distributor tester vacuum hose adapters together with a coupling as a connector to attach the gauge. A minimum of ten inches of vacuum is required to actuate the parking brake vacuum motor. If a minimum reading is not present when checking each of the aforementioned components, they must be replaced.

### PARKING BRAKE OPERATION

Check the operation of the parking brake. With the vehicle on a hoist and the parking brake fully released, the cables should not have any slack. Also, the rear brakes should not drag when the wheels are turned. If either of the above conditions exist, adjust as required.

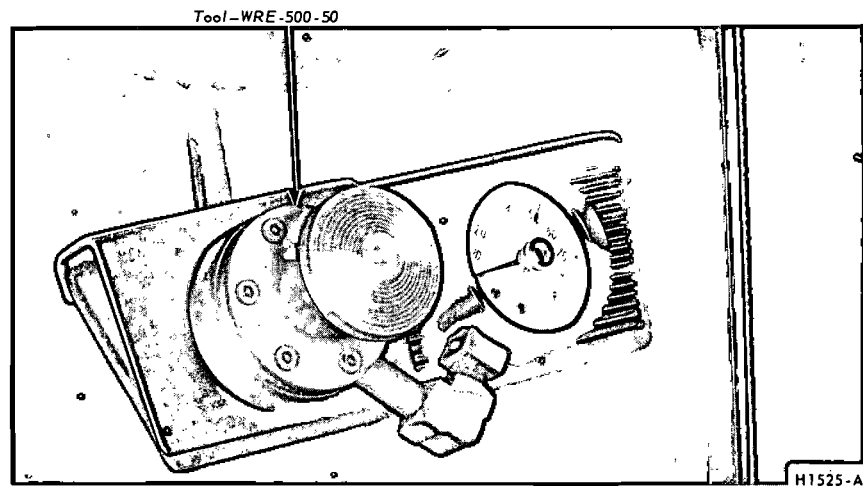


FIG. 2 Brake Pedal Effort Gauge Installed

### ROAD TEST

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

If the road test reveals one or

more problem conditions, correct all malfunctions of the vacuum system, brake booster and hydraulic system prior to removing brake drums, brake calipers, brake shoes and linings or backing plates.

## 3 ADJUSTMENTS

### 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. If the plunger is too long it will prevent the master cylinder piston from completely releasing hydraulic pressure and can cause the brakes to drag. If the plunger is too short it will result in excess pedal travel and an undesirable clunk in the booster area.

The adjustment screw is set to the correct height at the time of original assembly of the power unit. Under normal service, the adjustment screw does not require any further attention providing the original push rod assembly remains in the original unit.

If a check of the push rod adjustment is necessary, the push rod length may be verified with a push rod length gauge and measured with the engine running to apply vacuum to the booster (Fig. 3).

The push rod length verification of the power brake booster assemblies is accomplished as follows:

1. Disconnect the master cylinder from the booster assembly and secure away from the booster without disconnecting the brake tubes.

2. Adjust the push rod screw to provide a slight tension against the inner edge of the adjustment gauge slot. (Approximately 5 pounds of tension against the push rod is required to assure that the push rod is firmly seated in the booster assembly). See Figure 4.

3. Install the master cylinder on the brake booster and tighten the retaining nuts to the specified torque.

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 of the master cylinder 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 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

Models equipped with disc brakes must be bled with pressure bleeding equipment.

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 Fluid-Extra Heavy Duty (ESA-M6C 25-A). The extra 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 systems.

1. If the master cylinder is equipped with a bleed screw, loosen the bleed screw. Push the brake pedal down slowly through its full travel. Close the bleeder fitting and return the pedal to the fully released position. Repeat this operation until fluid is free of air bubbles, then tighten the bleeder screw. 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. 5) 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 full-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 and install the master cylinder cover and gasket. **Be sure the diaphragm type gasket is properly positioned in the master cyl-**

**inder cover. When the bleeding operation is completed, the fluid level should be filled to within 1/4 inch of the top of the reservoirs.**

7. If the primary (front brake) system is to be bled. Repeat steps 2 through 6 at the right front brake caliper or cylinder and ending at the left front brake caliper or cylinder.

8. On disc brake equipped models 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 travel is established.

9. Centralize the pressure differential valve. Refer to centralizing the Pressure Differential Valve procedures.

### Pressure Bleeding—All Models

Bleed the longest lines first. The bleeder tank should contain enough new Ford Brake Fluid to complete the bleeding operation. Use Brake Fluid - Extra Heavy Duty - (ESAM6C25-A) or equivalent for all brake applications. **The brake fluid is colored blue for identification purposes. Do not mix low temperature brake fluid with the specified 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. If the master cylinder is

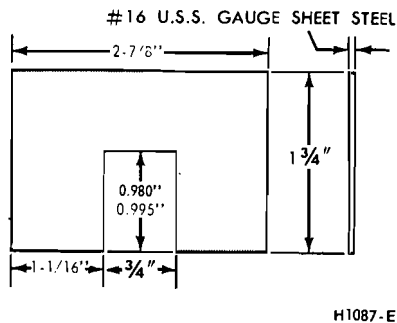


FIG. 3 Push Rod Gauge Dimensions

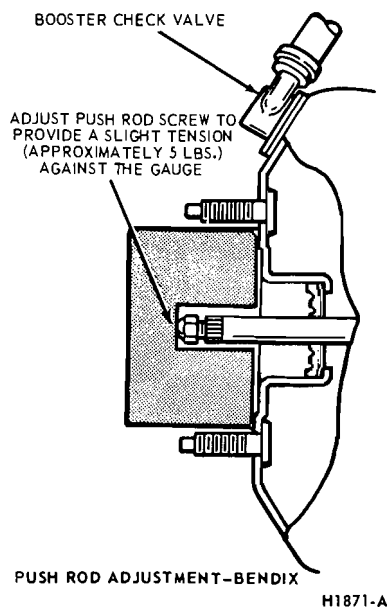


FIG. 4 Brake Booster Push Rod Measurement

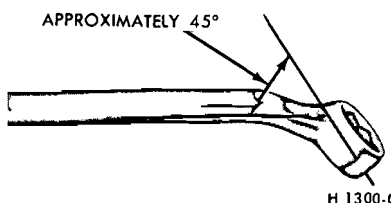


FIG. 5 Wrench for Bleeding Brake Hydraulic System

equipped with a bleed screw, loosen the bleed screw and bleed the master cylinder until the fluid is free of air bubbles; then, tighten the bleed screw. **Do not use the secondary piston stop screw, located on the bottom of the master cylinder, to bleed the master cylinder.**

4. If the rear wheel cylinders, the secondary brake system, are to be bled, position a 3/8 inch box wrench (Fig. 5) 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 rear wheel cylinder.

9. **If the vehicle is equipped with disc brakes, repeat steps 4 through 7, starting at the right front disc caliper and ending at the left front disc caliper. On all models, except Pinto, equipped with disc brakes, the metering valve release rod must be pulled outward and held a minimum of 1/16 inch (Fig. 6) while bleeding the primary brake system.**

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 ending at the left front wheel cylinder.

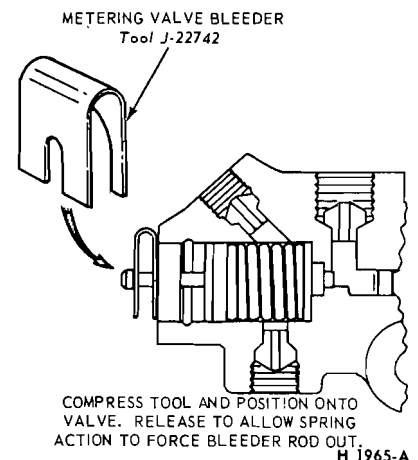


FIG. 6 Disc Brake Metering Valve Bleeding Tool

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 travel is established.

13. Remove the Pressure Bleeder Adapter Tool. Fill the master cylinder reservoirs to within 1/4 inch of the top. Install the master cylinder cover and gasket. Be sure the diaphragm type gas-

ket is properly positioned in the master cylinder cover.

14. Centralize the pressure differential valve. Refer to Centralizing the Pressure Differential Valve procedures.

**CENTRALIZING THE PRESSURE DIFFERENTIAL VALVE**

After any repair or bleeding of the primary (front brake) or secondary (rear brake) system, the dual-brake warning light will usually continue to be illuminated due to the pressure differential valve remaining in the off center position.

To centralize the pressure differ-

ential valve and turn off the warning light after a repair operation:

1. Turn the ignition switch to the ACC or ON position.

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

3. Depress the brake pedal and the piston will center itself causing the brake warning light to go out.

4. Turn the ignition switch to the OFF position.

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

**5 CLEANING AND INSPECTION**

**DISC BRAKES**

1. Remove the wheel and tire and the shoe and lining assemblies as outlined in Part 12-20.

2. Inspect the brake shoes and lining for wear. If the lining is worn to within 1/32 inch of the rivet heads or if there is more than 0.125 taper from end to end or if lining shows evidence of brake fluid contamination, replace all (4) shoe and lining assemblies on both front wheels.

3. Check the caliper to spindle attaching bolt wires. If the wires are damaged, install new bolts, torque to specifications, and replace the wires.

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 pointer 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 0.003 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: A lathe such as Rotunda Disc Brake Lathe FRE-1466-B should 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 surface of the rotor must be flat and parallel within 0.0007 inch; lateral runout must not exceed 0.003 inch total indicator reading, braking surfaces are to be 80/15 micro inches.

On all models, the minimum limit dimension from the inboard bearing cup to the inboard rotor face and the

minimum rotor thickness dimension, must be observed when removing material from the rotor braking surfaces. Rotor minimum thickness is shown on each rotor (Fig. 7). If the rotor thickness is less than that shown on the rotor, either through wear or after refishing, the rotor must be replaced. A ball and micrometer gauge bar (Tool T71P-1102-A) is to be used when checking minimum dimensions (Fig. 8). Refer to Part 12-20 for specifications.

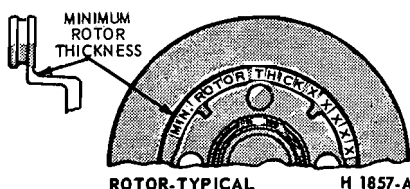


FIG. 7 Disc Brake Rotor Minimum Thickness Marking Location

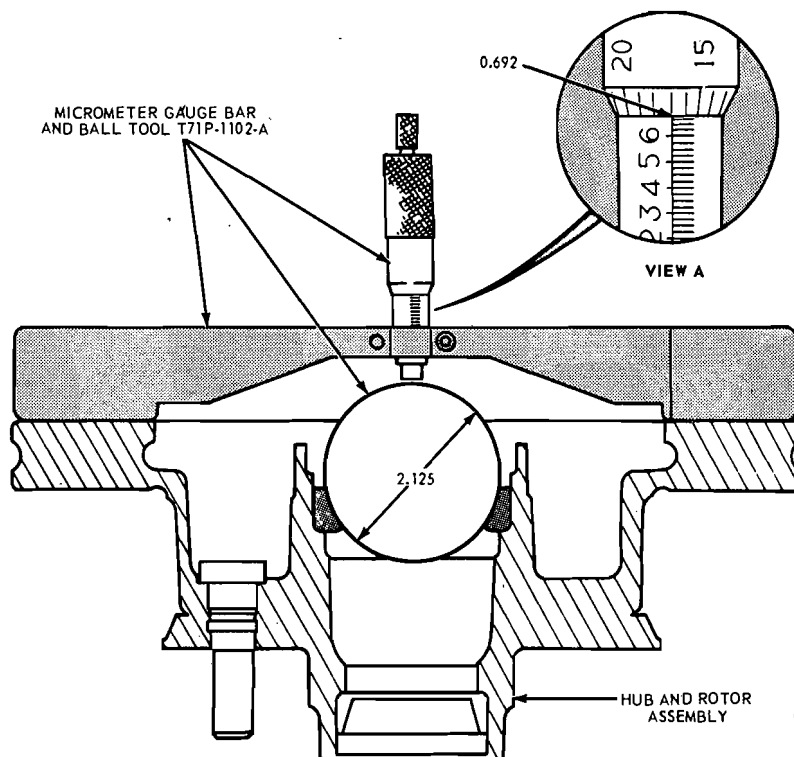


FIG. 8 Gauging Rotor Inner Braking Surface (Pinto Shown)

When the runout check is finished, be sure to adjust the bearings as outlined in Group 11-02 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 the caliper housing is leaking it should be replaced. If a seal is leaking, the caliper must be disassembled and new seals installed. If a piston is seized in the bore a new caliper housing is required.

Check the brake hoses for signs of cracking, leaks or abrasion. Replace them if necessary.

### Disc Brake Service Precautions

1. 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.

2. If a caliper piston is removed for any reason, the piston seal must be replaced.

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

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

5. 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.

6. Riding of the brake pedal (common on left foot applications) should be avoided during vehicle operation.

7. 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.

8. On floating caliper type disc brakes, whenever the caliper is removed the caliper locating pins should be inspected for wear or damage.

9. On floating caliper type disc brakes, the caliper assembly must be removed from the spindle prior to removal of the shoe and lining assemblies.

10. On floating caliper type disc brakes the calipers must not be interchanged from one side to the other. When the caliper is installed on its proper anchor plate and spindle, the bleeder screw will point to the rear of the vehi-

cle. If a caliper is installed on the wrong side of the vehicle, it is not possible to bleed the system properly.

11. Do not attempt to clean or restore oil or grease soaked brake linings. When contaminated linings are found, brake linings must be replaced in complete axle sets.

### DRUM BRAKES

1. Remove the wheel from the drum, and remove the drum as outlined in Part 12-02.

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 within 1/32 inch of the rivet heads or if the shoes are damaged, they must be replaced. Replace any lining that had 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 that the brake drum braking surface diameter is within specifications. If the braking surface diameter exceeds specifications, the drum must be replaced.

4. Check the condition of brake shoes, retracting springs, hold-down springs, and drum for signs of overheating. If the shoes have a slight blue coloring, indicating overheating, replacement of the retracting and hold-down springs is strongly recommended. Overheated springs lose their pull and could cause the new lining to wear prematurely, if they are not replaced. If the brake drums are heat spotted, indicating an overheated condition, they should be replaced.

5. If the vehicle 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 entrance of dirt into the cylinder. The cylinder cups 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 drum and, if necessary, refinish. Brake drum maximum inside braking surface diameter is shown on each drum (Fig. 9). If the maximum inside braking surface diameter shown on the drum is exceeded either by wear or refinishing, the drum must be replaced. Refer to Part 12-02 for refinishing.

### BRAKE BOOSTER

Check the booster operation as noted in Part 12-01, Power Brake Functional Test. If the brake booster is damaged or inoperative replace it with a new booster. The brake booster is serviced only as an assembly-including the check valve.

### HYDRAULIC LINES

Steel tubing is used throughout the brake system with the exception of the flexible hoses at the front wheels and at the rear axle housing brake tube connection.

Always bleed the applicable primary or secondary brake system after primary or secondary brake system hose or line replacement. Centralize the pressure differential valve after bleeding the system.

### Brake Tubing

If a section of the brake tubing becomes damaged, the entire section should be replaced with tubing of the same type, size, shape and length. Copper tubing should not be used in a hydraulic system. When bending brake tubing to fit underbody or rear axle contours, be careful not to kink or crack the tube.

All brake tubing should be double flared properly to provide good leak-proof connections. Clean the brake tubing by flushing with clean brake fluid before installation.

When connecting a tube to a hose, tube connector, or brake cylinder, tighten the tube fitting nut to specified torque with Milbar Tool 1112-144 or equivalent.

### Brake Hose

A flexible brake hose should be replaced if it shows signs of softening, cracking, or other damage.

When installing a new front brake hose, position the hose to avoid contact

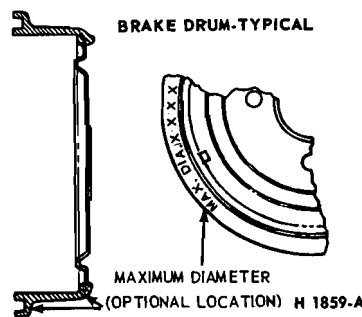


FIG. 9 Brake Drum Maximum Inside Braking Surface Diameter Marking Location

with other chassis parts. Place a new copper gasket over the hose fitting and thread the hose assembly into the front wheel cylinder. Engage the opposite end of the hose to the bracket on the frame. Install the horseshoe-type retaining clip,

and connect the tube to the hose with the tube fitting nut.

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

connector. Engage the front end of the hose to the bracket on the frame. Install the horseshoe-type retaining clip, and connect the tube to the hose with the tube fitting nut.

## 9 SPECIAL SERVICE TOOLS

### SPECIAL SERVICE TOOLS

Tool No.	Description	Tool No.	Description
Rotunda WRE-500-50	Brake Pedal Effort Gauge	T71P-1102-A	Ball and Bar Gauge
Rotunda ARE-345	Vacuum and Fuel Pump Tester Gauge	Rotunda FRE-1432	Brake Drum Micrometer
Rotunda 1436	Diaphragm Type Bleeder	Rotunda FRE-1466-B	Disc Brake Lathe
Tool 4201-C	Universal Dial Indicator and Bracket	Milbar 1112-144	Inch Pound Torque Wrench

CH1860-B

# PART 12-02 Drum Brakes—Single Cylinder, Dual Piston

<b>COMPONENT INDEX</b> Applies to Models as Indicated	<b>All Models</b>	<b>Ford</b>	<b>Mercury</b>	<b>Meteor</b>	<b>Cougar</b>	<b>Torino</b>	<b>Comet, Maverick</b>	<b>Pinto</b>	<b>Montego</b>	<b>Mustang</b>	<b>Lincoln- Continental</b>	<b>Thunderbird</b>	<b>Continental- Mark IV</b>
BRAKE BACKING PLATE Removal and Installation	02-07												
BRAKE BOOSTER Cleaning and Inspection-See Part 12-01													
Description		02-02	02-02	02-02	02-02	02-02	N/A	N/A	02-02	02-02	N/A	N/A	N/A
Removal and Installation		02-10	02-10	02-10	02-10	02-10	N/A	N/A	02-10	02-10	N/A	N/A	N/A
BRAKE DRUM Cleaning and Inspection-See Part 12-01													
Refinishing	02-13												
Removal and Installation (Front)		02-05	02-05	02-05	02-05	02-05	02-05	02-05	02-05	02-05	N/A	N/A	N/A
Removal and Installation (Rear)	02-05												
BRAKE PEDAL Removal and Installation		02-11	02-11	02-11	02-12	02-11	02-11	02-12	02-11	02-12	N/A	N/A	N/A
BRAKE SHOES Adjustments	02-04												
Relining	02-13												
Removal and Installation	02-05												
DRUM BRAKE Description	02-02												
DUAL BRAKE SYSTEM Description	02-02												
MASTER CYLINDER Cleaning and Inspection	02-13	02-13	02-13	02-13	02-13	02-13	02-13	02-13	02-13	02-13	N/A	N/A	N/A
Disassembly and Overhaul	02-13										N/A	N/A	N/A
Removal and Installation-Non-Power		02-07	02-07	02-07	02-07	02-07	02-07	02-07	02-07	02-07	N/A	N/A	N/A
Removal and Installation-Power		02-08	02-08	02-08	02-08	02-08	N/A	N/A	02-08	02-08	N/A	N/A	N/A
PRESSURE DIFFERENTIAL VALVE Removal and Installation	02-09												
WHEEL CYLINDER Cleaning and Inspection	02-13												
Disassembly and Overhaul	02-13												
Removal and Installation	02-06												
SPECIFICATIONS AND SPECIAL SERVICE TOOLS	02-15												
A page number indicates that the item is for the vehicle(s) listed at the head of the column. N/A indicates that the item is not applicable to the vehicle(s) listed.													

# 1 DESCRIPTION

## DUAL BRAKE SYSTEM

The drum brake system employs single anchor, internal expanding and self adjusting brake assemblies (rear wheels only, if equipped with disc brakes).

The self-adjusting brake mechanism consists of a cable, cable guide, adjusting lever, adjusting screw assembly, and adjuster spring (Figs. 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 routed along the web of 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 vehicle is moving rearward and only when the secondary shoe is free to move toward the drum beyond a predetermined point.

A vacuum booster is used with the power brake system.

The dual-master cylinder brake system has been incorporated in all models to provide increased safety. The system consists of a dual-master cylinder (Fig. 3), pressure differential valve assembly and a switch (Fig. 4). The switch on the differential valve activates a dual-brake warning light, located on the instrument panel.

The rearward reservoir of the master cylinder is used to supply hydraulic pressure to the front brake wheel cylinders. The forward reservoir is used to supply hydraulic pressure to the rear brake wheel cylinders.

## BRAKE BOOSTER

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 manifold vacuum and atmospheric pressure for its power.

Adjustment of the push rod and replacement of the check valve and grommet are the only services permitted on the brake booster. The booster unit is to be exchanged when it is inspected, checked and found to be inoperative.

## PRESSURE DIFFERENTIAL VALVE

A self centering pressure differential valve assembly is used on all vehicles having power or non-power drum type brakes.

The valve body is step bored to accommodate a sleeve and seal installed over the piston and into the larger valve body bore in the front brake system area. The brake warning light switch is mounted at the center of the valve body and the spring loaded switch plunger fits into a tapered shoulder groove in the center of the piston. In this position the electrical continuity through the switch is interrupted and the brake warning lamp on the instrument panel is out.

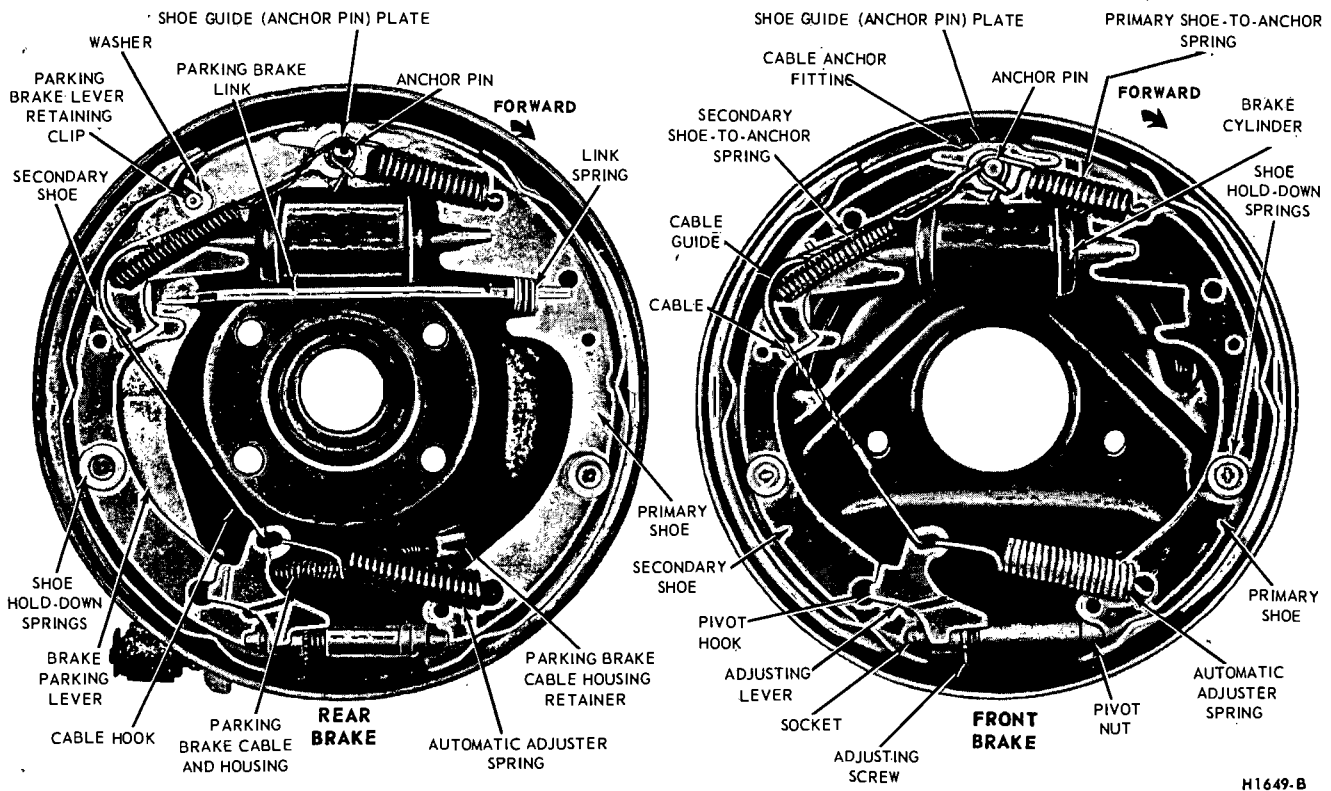
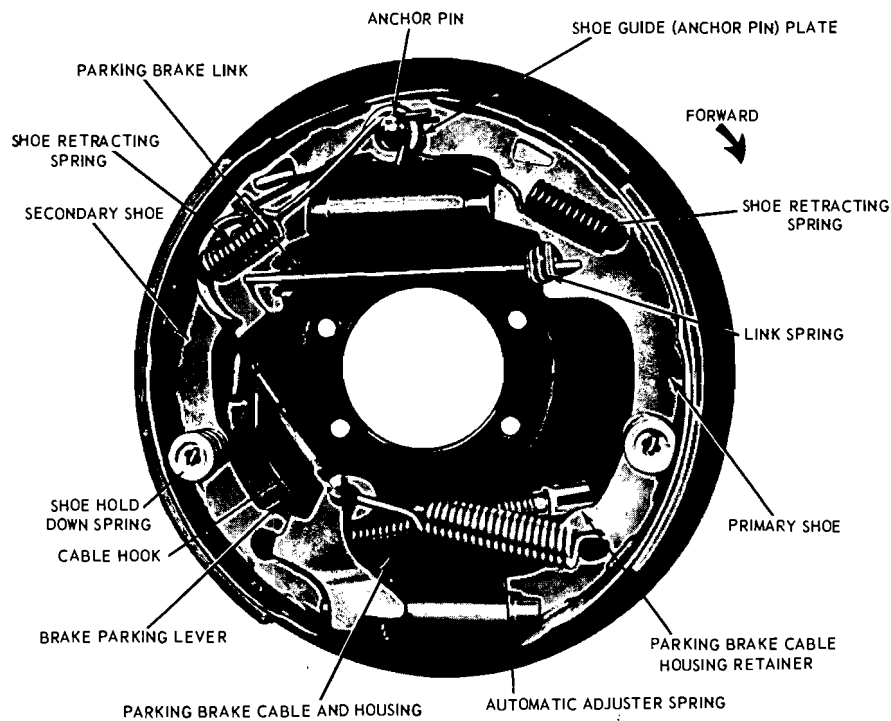
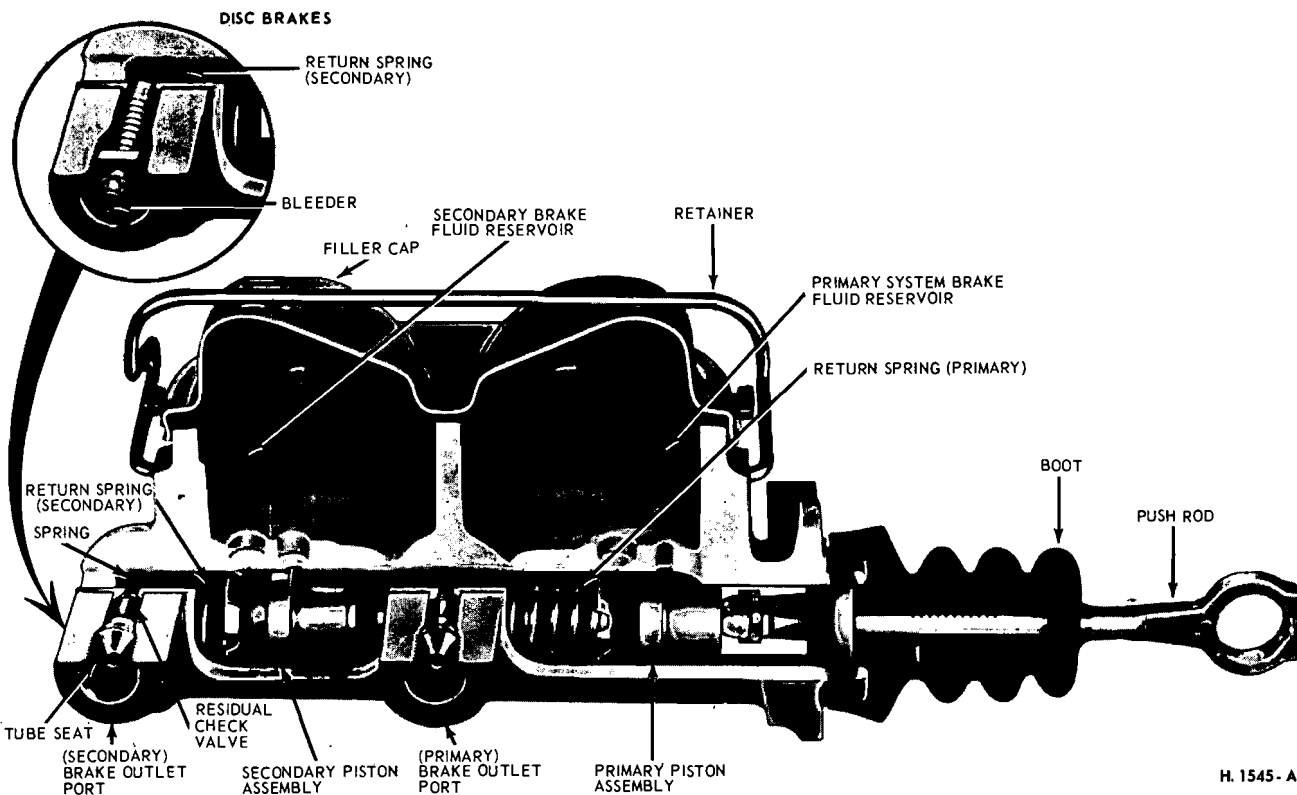


FIG. 1 Self-Adjusting Brake Assemblies—Typical



H 1843-A

FIG. 2 Self Adjusting Brake Assembly (Pinto Rear Brake)



H. 1545 - A

FIG. 3 Dual Master Cylinder—Typical

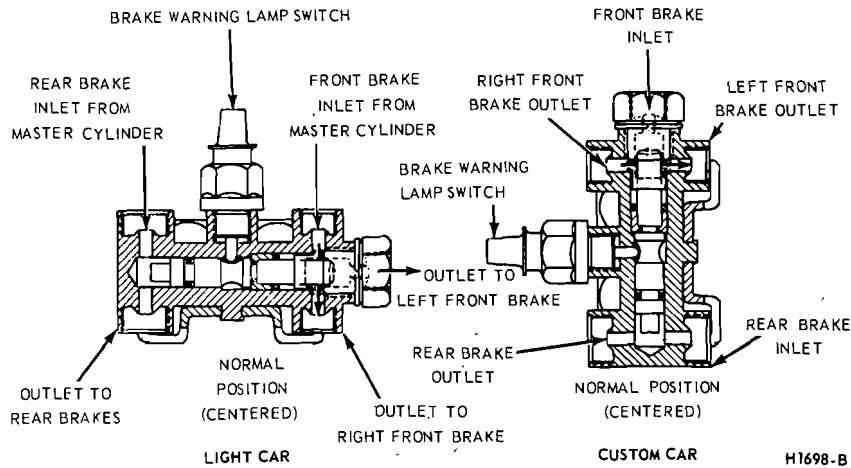


FIG. 4 Pressure Differential Valve and Brake Warning Light Switch

### 3 ADJUSTMENTS

#### BRAKE SHOES

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

The hydraulic drum 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, using the tool and the procedure detailed below.

When adjusting the rear brake shoes, check the parking brake cables for proper adjustment. Make sure that the equalizer operates freely.

To adjust the brake shoes:

1. Use Rotunda Tool HRE 8650, (Fig. 5) to determine the inside diameter of the drum braking surface.

2. Reverse the tool as shown in Fig. 4 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 lubricant (ESA-M1C75-B).

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 backing plate, be-

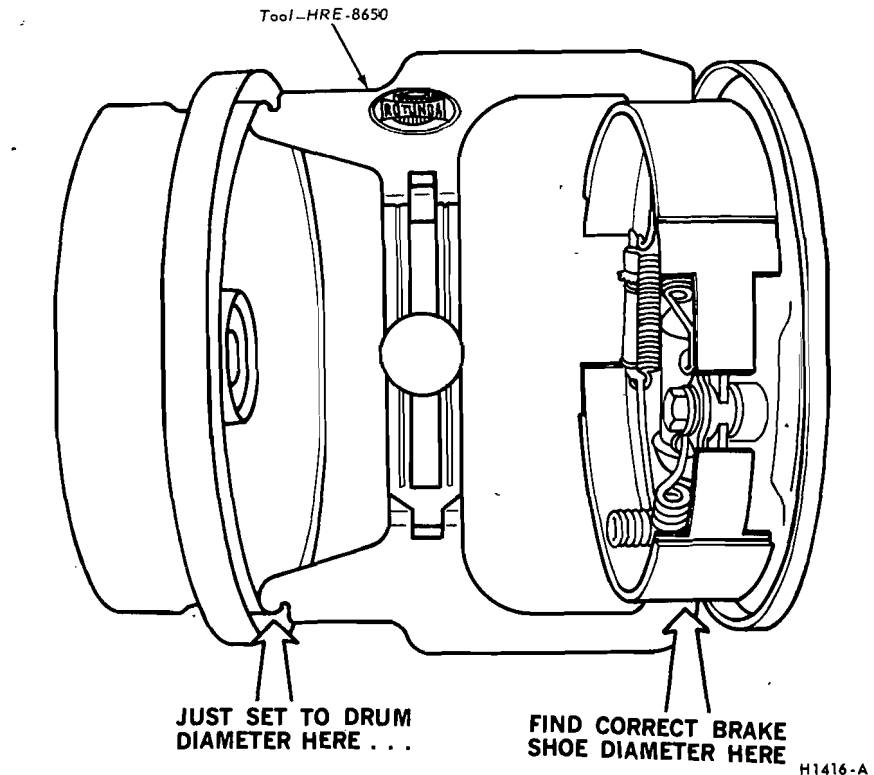


FIG. 5 Adjusting Brake Shoes Using Tool HRE-8650

ing careful not to get the lubricant on the linings.

5. Install the drums. Install Tinnerman nuts and tighten securely.

6. Install the wheels on the drums and tighten the nuts to specification.

7. Complete the adjustment by applying the brakes several times with a minimum of 50 lbs pressure on the pedal (non-power brakes) or 25 lbs pressure

(power brakes) while backing the vehicle. After each stop the vehicle must be moved forward.

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

## 4 REMOVAL AND INSTALLATION

### BRAKE DRUMS

#### Removal—Front

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 drum off the wheel spindle.

4. If the drum will not come off, pry 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. 6). **Be very careful not to burr, chip, or damage the notches in the adjusting screw; otherwise the self-adjusting mechanism will not function properly.**

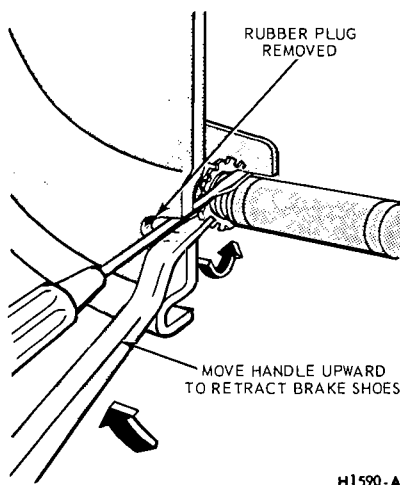


FIG. 6 Backing Off Brake Adjustment

#### Installation—Front

1. If the drum is being replaced, remove the protective coating from the new drum with carburetor degreaser. Then, use sandpaper to insure that no residue remains. Wipe the drum with a cloth soaked with denatured alcohol. Install new bearings and grease seal. Pack the wheel bearings, install the inner bearing cone and roller assembly in the inner cup, and install the new grease seal see Part 11-02.

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 11-02, then install the grease cap. Install the wheel and hub cap.

#### Removal—Rear

1. Raise the vehicle so that the tire is clear of the floor.

2. Remove the hub cap and wheel. Remove the three drum retainer nuts and remove the brake drum. If the drum will not come off, pry 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 screw. While holding the adjusting lever away from the adjusting screw, back off the adjusting screw with the brake adjusting tool (Fig. 6). **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—Rear

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

2. Adjust the brakes as outlined under Brake Shoe Adjustments in this section. Place the drum over the brake assembly and into position.

3. Install the three drum retainer nuts and tighten securely. Install the wheel on the axle shaft flange studs against the drum, and tighten the attaching nuts to specifications.

### BRAKE SHOES

#### Removal

1. With the wheel and drum removed install a clamp over the ends of the brake cylinder as shown in Fig. 7.

2. Remove the secondary shoe to anchor spring with the tool shown in Fig. 7. With the same tool remove the primary shoe to anchor spring and unhook the cable eye from the anchor pin.

3. On Ford, Mercury, Meteor, Thunderbird, Continental Mark IV and Lincoln Continental models, remove the shoe guide (anchor pin) plate (Fig. 1).

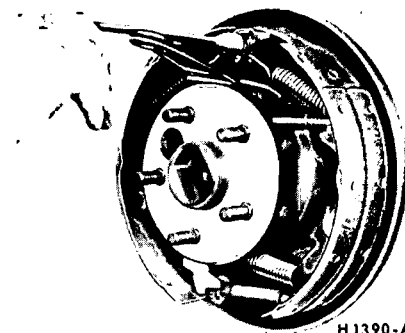


FIG. 7 Retracting Spring Removal

4. Remove the shoe hold-down springs, shoes, adjusting screw, pivot nut, socket and automatic adjustment parts.

5. On rear brakes, remove the parking brake link and spring. Disconnect the parking brake cable from the parking brake lever.

6. After removing the rear brake secondary shoe, disassemble the parking brake lever from the shoe by removing the retaining clip and spring washer (Fig. 1).

#### Installation

1. Before installing the rear brake shoes, assemble the parking brake lever to the secondary shoe and secure 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 the assembly with the hold down springs. On the rear brake, install the parking brake link and spring, back off the parking brake adjustment then connect the parking brake cable to the parking brake lever (Figs. 1 and 2).

4. Install the shoe guide (anchor pin) plate on the anchor pin when so equipped.

5. Place the cable eye over the anchor pin with the crimped side toward the backing plate.

6. Install the primary shoe to anchor spring (Fig. 8).

7. Install the cable guide on the secondary shoe web with the flanged hole fitted into the hole in the secondary shoe web. Thread the cable around the cable guide groove (Fig. 1).

**It is imperative that the cable be positioned in this groove and not between the guide and the shoe web.**

8. Install the secondary shoe to

anchor spring with the tool shown in Fig. 8.

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.

9. Apply high-temperature grease (ESA-M1C75-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 installation on the wrong side of the vehicle, the socket end of the adjusting screw is stamped with an R or L (Fig. 9). The adjusting pivot nuts can be distinguished by the number of grooves machined around the body of the nut.

10. 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.

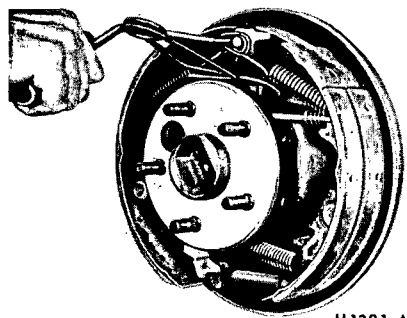


FIG. 8 Retracting Spring Installation

11. 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 right or left brake assembly (Fig. 9).

12. 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.

13. 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 (Fig. 1).

14. After installation, check the action of the adjuster by pulling the section of the cable between the cable guide

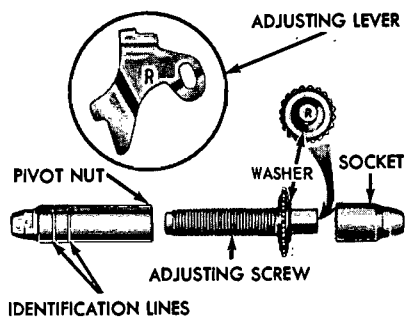


FIG. 9 Adjusting Screw and Lever Identification

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 this 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.

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. On models equipped with 11 inch brakes, the cable should measure 11 1/8 inches (plus or minus 1/64 inch) from the end of the cable anchor to the end of the cable hook. On models equipped with 9 inch brakes, the cable should measure 8 13/32 inches. On models equipped with 10 inch brakes, the cable should measure 9 51/64 inches 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.

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

## WHEEL CYLINDER

### Removal

1. Remove the wheel and the drum.

2. Remove the brake shoe assemblies, following procedures outlined in this section.

3. Disconnect the brake line from the brake cylinder. On a vehicle with a vacuum brake booster, be sure the engine is stopped and there is no vacuum in the booster system before disconnecting the hydraulic lines.

To disconnect the hose at a front cylinder, loosen the tube fitting that connects the opposite end of the hose to the brake tube at a bracket on the frame. 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.

4. On all except the front wheels on Ford, Mercury, and Meteor models, remove the wheel cylinder attaching bolts and lock washers and remove the cylinder. On the front wheel of Ford, Mercury and Meteor models, remove the nut and washer that attaches the cylinder to the anchor pin. Remove the cylinder from the anchor pin.

### Installation

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

1. On all models except Ford, Mercury and Meteor, to install a front wheel cylinder, position the cylinder to the backing plate. Install the two lock washers and attaching bolts. Torque them to specifications.

On Ford, Mercury and Meteor models, to install a front wheel cylinder, position the cylinder on the anchor pin against the backing plate. Install the washer and cylinder attaching nut on the anchor pin, and torque it to specification. Lock the washer retainer securely.

2. Install a new copper gasket over the hose fitting. Thread the hose

into the cylinder and tighten it to specified torque.

3. Engage the opposite end of the hose to the bracket on the frame. Install the horseshoe-type retaining clip, and connect the brake tube to the hose with the tube fitting nut. Tighten the nut to specification with tool 1112-144.

4. To install a rear wheel cylinder, place the rear wheel cylinder into position. Enter the tubing into the cylinder, and start the tube fitting nut into the threads of the cylinder.

5. Secure the cylinder to the backing plate by installing the attaching bolts and lock washers.

6. Tighten the tube fitting nut to specification with tool 1112-144.

7. Install the links in the ends of the wheel cylinder, install the shoes and adjuster assemblies, and adjust the shoes as outlined in this section.

8. Adjust the brakes as described in this part. Install the brake drum and wheel. Bleed the brakes and centralize the differential valve as outlined in Part 12-01.

## BRAKE BACKING PLATE

### 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, remove the axle shaft from the applicable rear axle as outlined in Group 15 and disengage the parking brake cable retainer from backing plate. Remove the backing plate and gasket.

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

### Installation

If a rear backing plate is to be replaced, position a new rear backing plate and gasket on the attaching bolts in the axle housing flange. Insert parking brake cable into backing plate and secure retaining fingers. Install the rear axle shaft for applicable rear axle. Refer to Group 15 for the proper installation procedure.

1. If the front brake backing plate is to be replaced, position a new front backing plate and gasket 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 as outlined in this section, and install the brake drums and wheels. Bleed the brake system and centralize the differential valve as outlined in Part 12-01.

## DUAL MASTER CYLINDER

### Removal—Non-Power Brakes

Refer to Figs. 10, 11, 12, 13 and 14.

1. Disconnect the stoplight switch wires at the connector. Remove the spring retainer. Slide the stop light switch off the brake pedal pin just far enough to clear the end of the pin, then remove the switch from the pin. Use care to avoid switch damage during removal.

2. Slide the master cylinder push rod and the nylon washers and bushings off the brake pedal pin.

3. Remove the brake tubes from the primary and secondary outlet ports of the master cylinder.

4. Remove the lock nuts or cap screws and lockwashers that secure the master cylinder to the dash panel and lift the cylinder forward and upward from the vehicle.

### Installation—Non-Power Brakes

1. Position the boot on the push rod and secure the boot to the master cylinder. Carefully insert the master cyl-

inder push rod and boot through the dash panel opening and position the master cylinder on the panel.

2. Install the lock nuts or cap screws at the dash panel and torque them to specification.

3. 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 and master cylinder push rod on the brake pedal pin, install the nylon bushing and washer and secure them in position with the spring 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 inch of the top of the dual reservoirs. Use Brake Fluid-Extra Heavy Duty (ESA-M6C25-A) or equivalent for all drum brake applications. The extra heavy duty brake system fluid is colored blue for identification. Do not mix low temperature brake fluids with the specified fluid for the 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 12-01, for proper procedure.

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

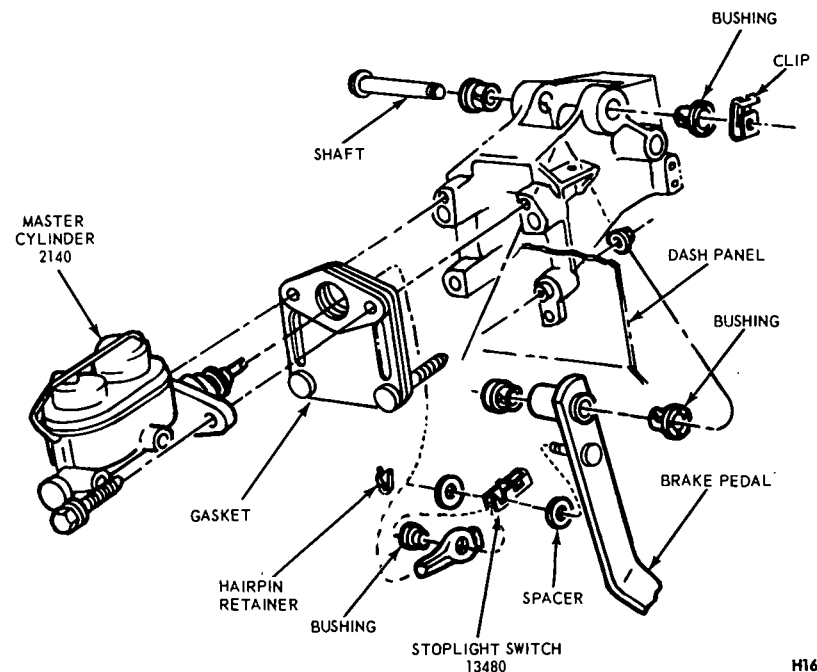


FIG. 10 Master Cylinder and Brake Pedal Installation—Non-Power Brakes—Ford, Mercury and Meteor

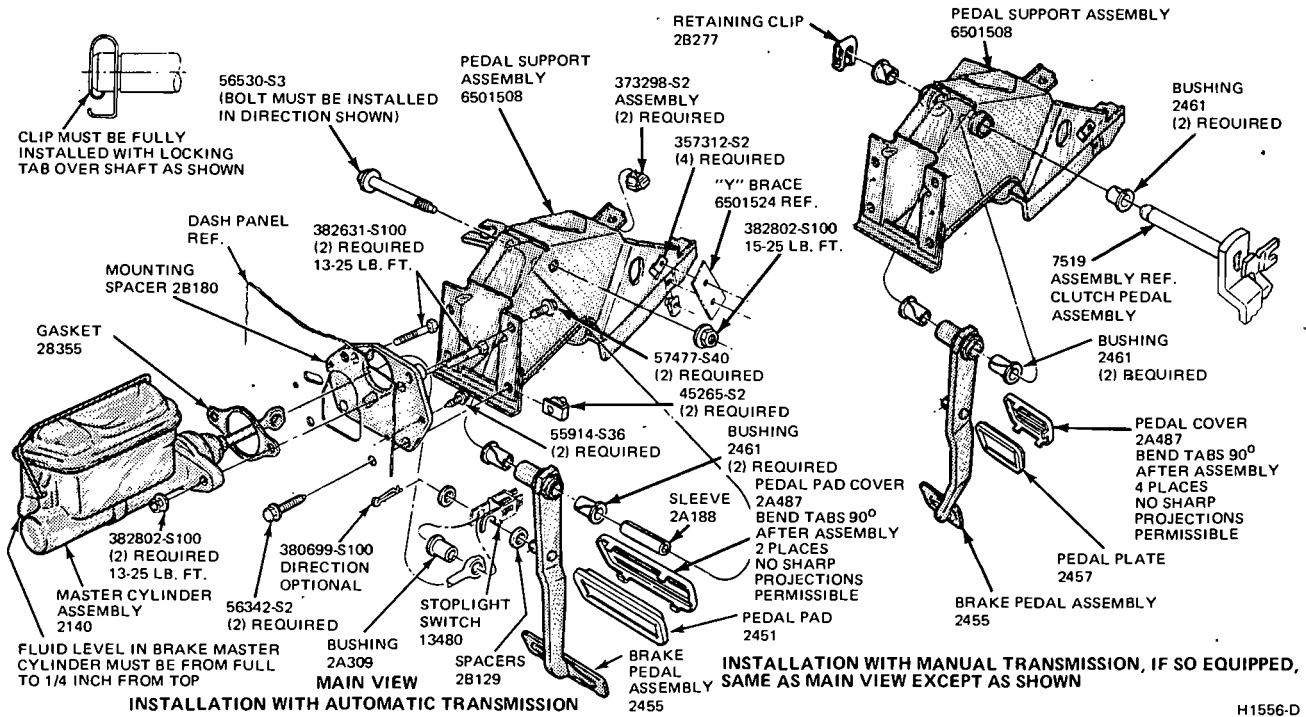


FIG. 11 Master Cylinder and Brake Pedal Installation—Non-Power Brake—Torino and Montego

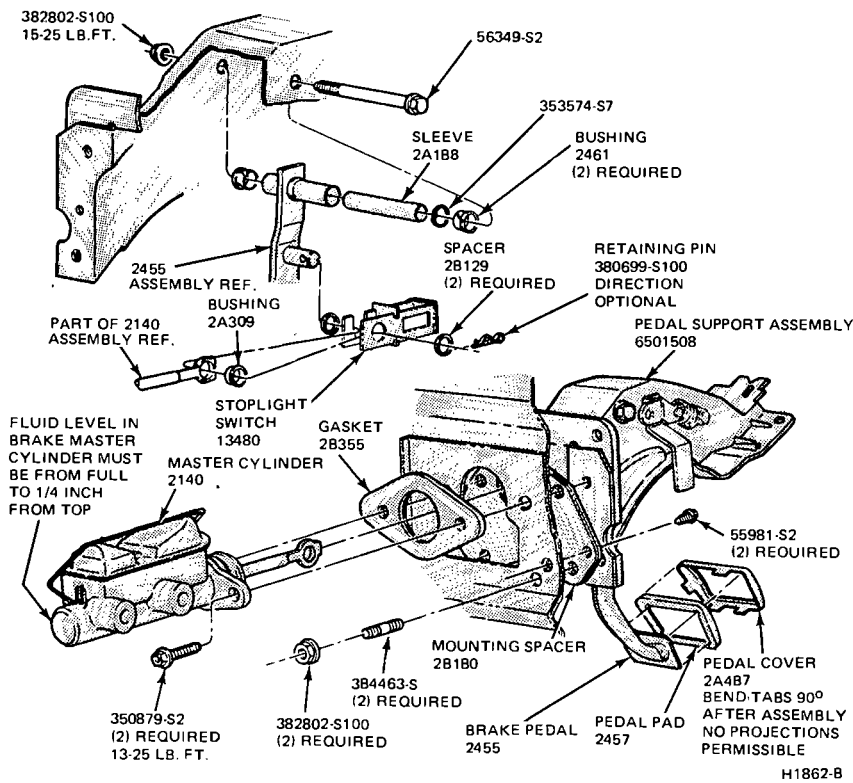


FIG. 12 Master Cylinder and Brake Pedal Installation—Non-Power Brake—Mustang and Cougar

### DUAL MASTER CYLINDER-POWER BRAKES

#### Removal

1. Remove the brake tubes from the primary and secondary outlet ports of the master cylinder (Figs. 15 thru 17).
2. Remove the two nuts and two lock washers attaching the master cylinder to the brake booster assembly.
3. Slide the master cylinder forward and upward from the vehicle.

#### Installation—Power Brakes

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 12-01, 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 (Figs. 15 thru 17).
3. Install the attaching nuts and lock washers and torque them to specifications.
4. Install the front and rear brake tubes to the master cylinder outlet fittings.

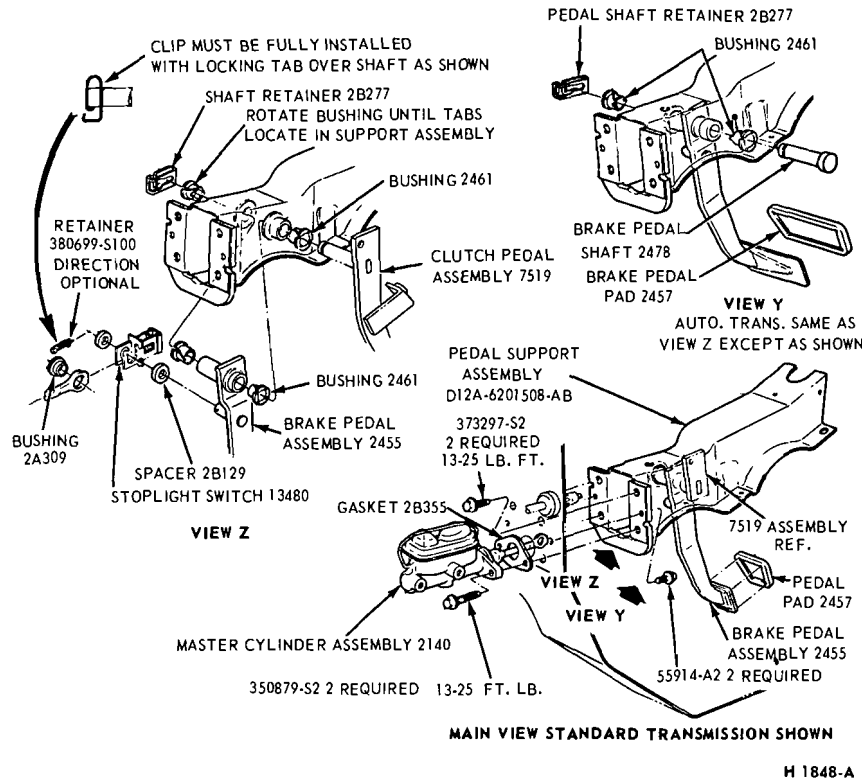


FIG. 13 Master Cylinder and Brake Pedal Installation—Pinto

5. Fill the master cylinder with the specified brake fluid to within 1/4 inch of the top of the dual reservoirs. Use Brake Fluid-Extra Heavy Duty-(ESA-M6C25-A) for all brake applications. The extra heavy duty brake fluid is colored blue for identification. Do not mix low temperature brake fluids with the specified fluids for the brake system.

6. 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 12-01, for the proper procedure.

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

**PRESSURE DIFFERENTIAL VALVE ASSEMBLY**

**Removal**

The pressure differential valve assembly is serviced as an assembly only. Do not attempt to repair this unit.

1. Disconnect the brake warning light connector from the warning light switch.

2. Disconnect the inlet and outlet tubes from the valve assembly.

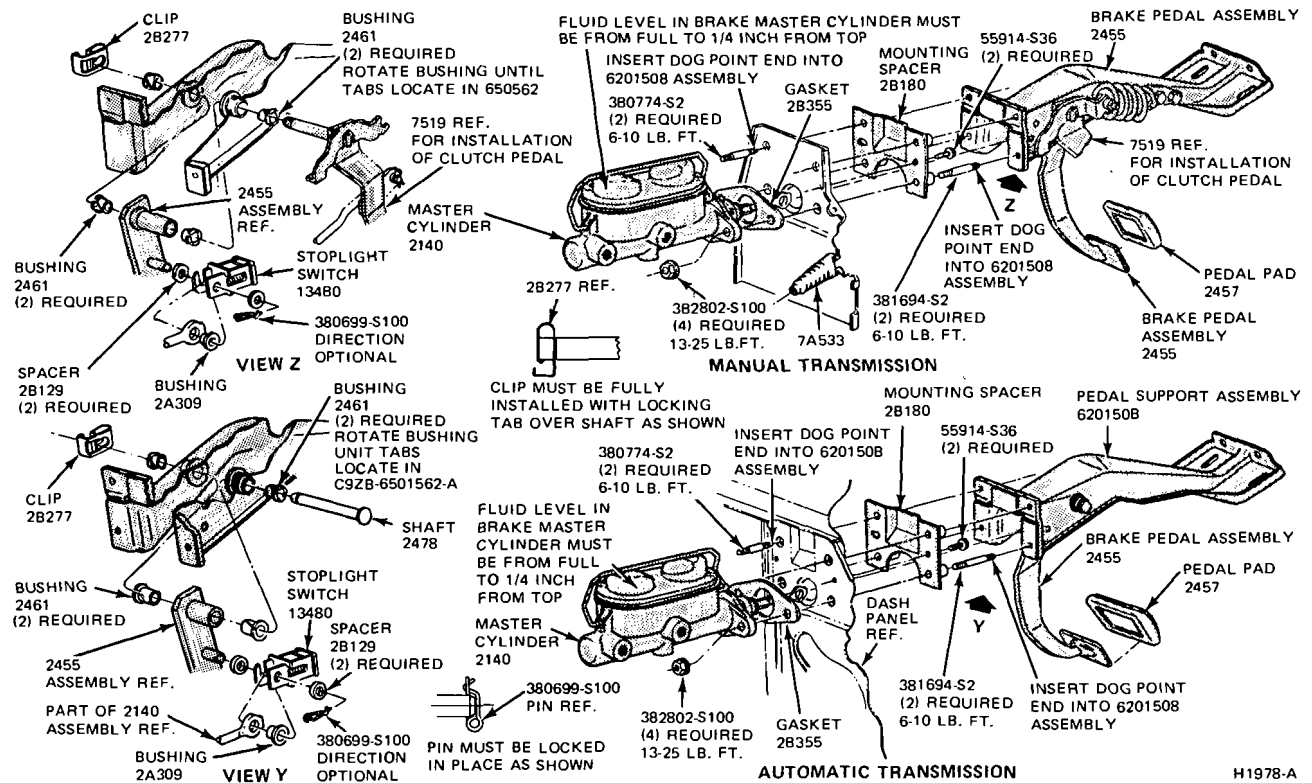
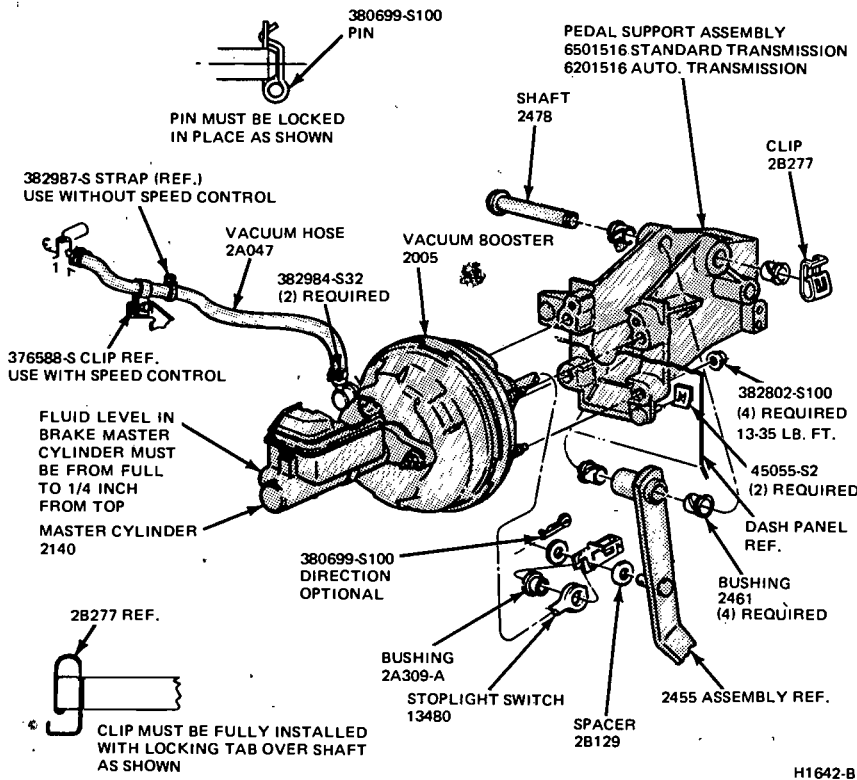


FIG. 14 Master Cylinder and Brake Pedal Installation—Maverick and Comet



H1642-B

FIG. 15 Master Cylinder and Brake Pedal Installation—Power Brake—Ford, Mercury and Meteor

3. Remove the two attaching nuts and bolts from the valve bracket on the underside of the fender apron and remove the valve assembly and bracket from the vehicle.

**Installation**

1. Position the valve assembly and bracket to the fender apron. Install the attaching nuts and bolts: torque them to specifications.

2. Install the inlet and outlet tubes to the valve assembly. Torque them to specifications.

3. Connect the brake warning light connector to the warning light switch.

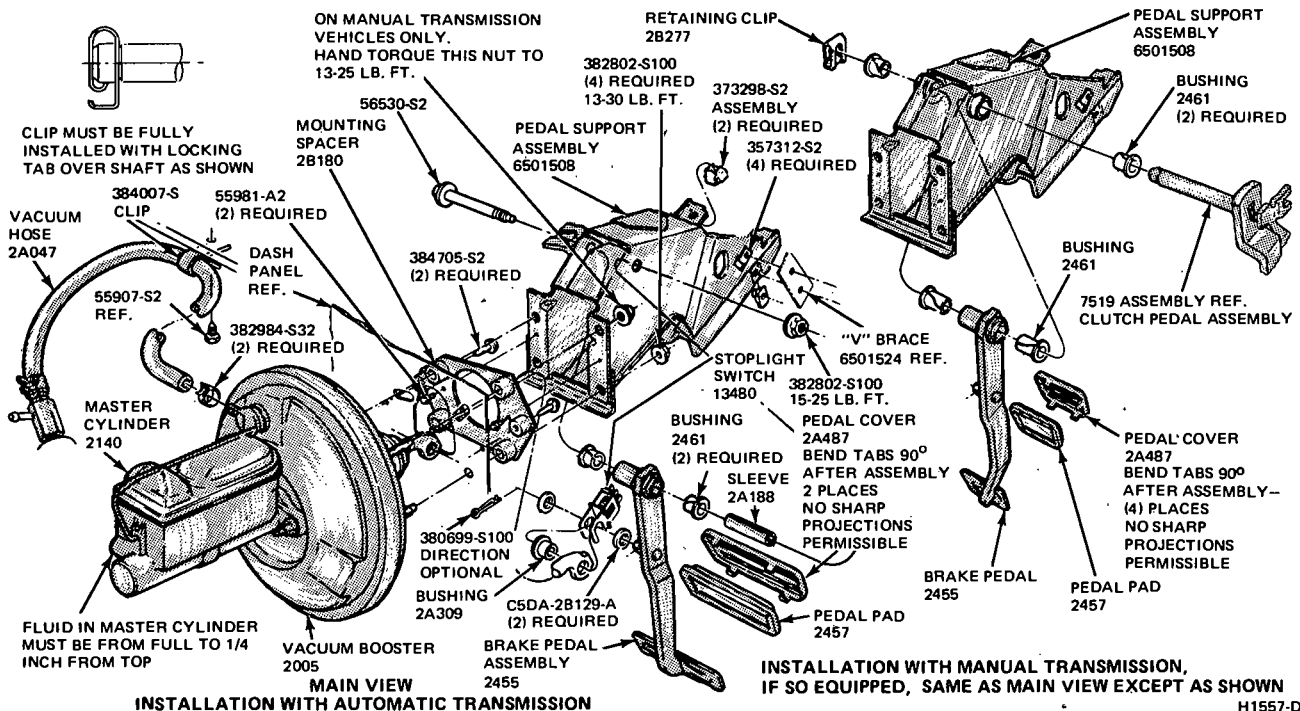
4. Bleed the system and centralize the pressure differential valve following the procedures in Centralizing the Pressure Differential Valve.

**BRAKE BOOSTER**

**Removal**

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

Disconnect the stop light switch wires at the connector. Remove the hair-pin retainer. Slide the stop light switch off from the brake pedal pin just far



H1557-D

FIG. 16 Master Cylinder and Brake Pedal Installation—Power Brake—Torino and Montego

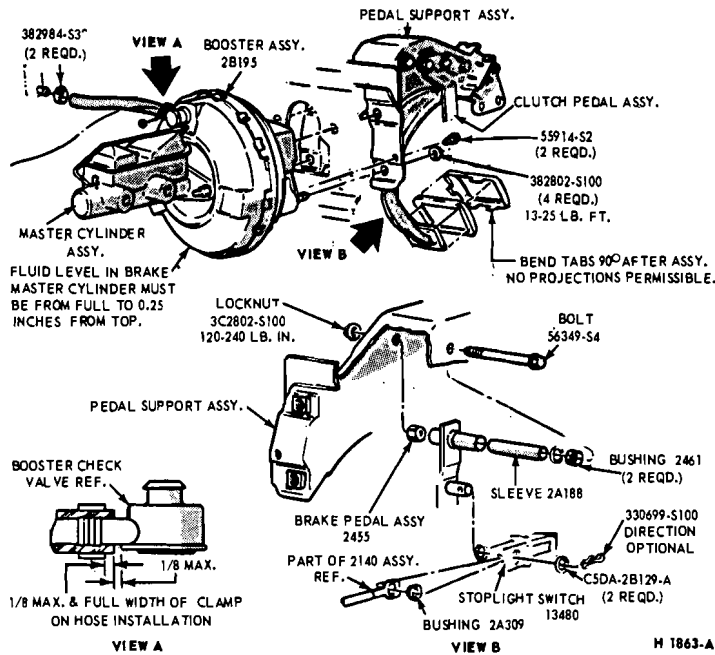


FIG. 17 Master Cylinder and Brake Pedal Installation—Power Brake—Mustang and Cougar

enough for the switch outer hole to clear the pin, and then remove the switch from the pin. Be careful not to damage the switch during removal. Slide the booster push rod and the nylon washers and bushing off the brake pedal pin (Figs. 15 thru 17).

2. Open the hood and remove the master cylinder from the booster. Secure it to one side without disturbing the hydraulic lines. It is not necessary to disconnect the brake lines, but care should be taken that the brake lines are not deformed. Per manent deformation of brake lines can lead to tube failure.

3. Disconnect the manifold vacuum hose from the booster unit.

4. Remove the booster-to-dash panel attaching nuts or bolts (Figs. 15 thru 17). Remove the booster and bracket assembly from the dash panel, sliding the push rod link out from the engine side of the dash panel.

#### Installation

1. Mount the booster and bracket assembly to the dash panel by inserting the push rod or push rod link in through the hole and boot in the dash panel. Install the bracket-to-dash panel attaching lock nuts (Figs. 15 thru 17).

2. Connect the manifold vacuum hose or hoses to the booster.

3. 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 12-01, Power Brake Mas-

ter Cylinder Push Rod Adjustment. Install the master cylinder and torque the attaching nuts to specifications.

4. 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:

Install the inner nylon washer, the booster 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 as shown in Figs. 15 thru 17. 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.

#### BRAKE PEDAL

##### Ford, Mercury and Meteor

#### Removal

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

2. Remove the hairpin retainer. Slide the stop light switch off 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 or booster push rod and the nylon wash-

ers and bushing off the brake pedal pin (Figs. 10 and 15).

3. Remove the hairpin-type retainer and washer from the brake pedal shaft, then remove the shaft, the brake pedal and the bushings from the pedal support bracket.

#### Installation

1. Apply a coating of SAE 10 Engine oil to the bushings and locate bushings in their proper places on the pedal assembly and pedal support bracket (Figs. 10 and 15).

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 retainer.

3. Install the inner nylon washer, the master cylinder or booster 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 as shown in Figs. 10 and 15. Be careful not to bend or deform the switch. Secure these parts to the pin with the hairpin retainer.

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

5. Check the Brake Pedal Free Height and Travel Measurements, Part 12-01.

#### Comet, Maverick, Montego and Torino W/Manual Shift Transmission

#### Removal

1. Remove the clutch pedal assist spring.

2. Disconnect the clutch pedal to-equalizer rod at the clutch pedal by removing the 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 or booster push rod and the nylon washers and bushing off from the brake pedal pin (Figs. 11, 14 and 16).

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.

### Installation

1. Apply a coating of SAE 10 engine 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 clip (Figs. 11, 14 and 16).
3. Install the clutch pedal assist spring.
4. Connect the clutch pedal-to-equalizer rod to the clutch pedal assembly with the bushing and the spring clip retainer. Apply SAE 10 engine oil to the bushing.
5. Install the inner nylon washer, the master cylinder or booster 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 Figs. 11, 14 and 16. 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 16-02) to specification, if required.
8. Check the Brake Pedal Free Height and Travel Measurements (Part 12-01, Section 1).

### Comet, Maverick, Montego and Torino W/Automatic Transmission or Cougar and Mustang W/Manual Transmission

#### Removal

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 or booster push rod and the nylon washers and bushing off from the brake pedal pin (Figs. 11, 12 and 14).
3. On all vehicles except Mustang and Cougar, 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. On Mustang and Cougar vehicles, remove the locknut and bolt from the pedal support.

Remove the pedal assembly from the support bracket.

#### Installation

1. Apply a coating of SAE 10 engine oil to the bushings and locate all the bushings in their proper places on the pedal assembly and pedal support bracket (Figs. 11, 12 and 14).
  2. Position the brake pedal assembly to the support bracket, then install the pedal shaft or bolt through the support bracket and brake pedal assembly. Install the retainer or locknut.
  3. Install the inner nylon washer, the master cylinder or booster 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. 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 12-01.

### Pinto W/Automatic Transmission

#### Removal

1. Disconnect the stop light switch wires at the connector.
2. Remove the hairpin retainer. Slide the stop light switch off the brake pedal pin just far enough for the switch outer hole to clear the pin, and then lower the switch away 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 (Fig. 13).
3. Remove the hairpin-type retainer and washer from the brake pedal shaft, then remove the shaft, the brake pedal and the bushings from the pedal support bracket.

#### Installation

1. Apply a coating of SAE 10 Engine oil to the bushings and locate bushings in their proper places on the pedal assembly and pedal support bracket (Fig. 13).
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 retainer.
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 nylon washer as shown in Fig. 13. **Be careful not to bend or deform the switch.** Secure these parts to the pin with the hairpin retainer.

4. Connect the stop light switch wires to the connector, and install the wires in the retaining clip.
5. Check the Brake Pedal Free Height and Travel Measurements, Part 12-01.

### Pinto W/Manual Transmission

#### Removal

1. Remove the clutch cable clevis shaft retainer and shaft from the clutch pedal (Fig. 13).
2. Disconnect the stop light switch wires at the connector.
3. 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.
4. Slide the master cylinder push rod and the nylon washers and bushing off the brake pedal pin (Fig. 13).
5. 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 (Fig. 13).

#### Installation

1. Apply a coating of SAE 10 engine 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 clip (Fig. 13).
3. Position the clutch cable clevis to the clutch pedal assembly. Install the clevis shaft and spring clip retainer. Apply SAE 10 engine oil to the shaft.
4. 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. 13. Secure these parts to the pin with the self-locking pin.
5. Connect the stop light switch wires to the connector, and install the wires to the retaining clip.
6. Adjust the clutch pedal free play (Group 16) to specification, if required.
7. Check the Brake Pedal Free Height and Travel Measurements (Part 12-01, Section 1).

## 5 OVERHAUL

### BRAKE DRUM REFINISHING

Minor scores on a brake drum can be removed with sandpaper. 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. Brake drum maximum inside diameter is shown on each drum (Fig. 16). If the maximum inside diameter shown on the drum is exceeded either through wear or refinishing, the drum must be replaced.

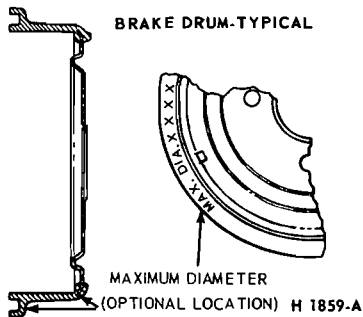


FIG. 18 Brake Drum Maximum Inside Braking Surface Diameter Marking Location

Check the inside diameter of the brake drum with a brake drum micrometer (Tool FRE-1432).

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.

### BRAKE SHOES

#### Relining

Brake linings that are worn to within 1/32 inch of the rivet head or are less than 0.030 inch thick (bonded lining) or have been contaminated with brake fluid, grease or oil must be replaced. Failure to replace worn linings will result in a scored drum. When it is necessary to replace linings, 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 attempt to repair a damaged brake shoe.

1. Wash the brake shoes thoroughly in a clean solvent. Remove all burrs or rough spots from the shoes.

2. Check the inside diameter of the brake drum with a brake drum micrometer (Tool FRE-1432).

3. Position the new lining on the shoe. Starting in the center, insert and secure the rivets, working alternately towards each end. **Replacement linings are ground and no further grinding is required.**

4. Check the clearance between the shoe and lining. The lining must seat tightly against the shoe with not more than 0.008 inch clearance between any two rivets.

### WHEEL CYLINDERS

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 brake cylinder from the backing plate to disassemble, inspect, or hone and overhaul the cylinder. Removal is necessary only if the cylinder is damaged or scored beyond repair.

If repair is necessary on a wheel cylinder, it is required practice, during the warranty period, to replace the cylinder as a unit instead of overhauling it with a service repair kit.

#### Disassembly

1. Remove the links and the rubber boots from the ends of the brake cylinder. Remove the pistons, cups, and return spring and expander assembly from the cylinder bore (Fig. 19).

2. Remove the bleeder screw from the cylinder.

3. Discard all rubber parts and wash all other parts in clean alcohol.

4. Replace scored pistons. Always replace the rubber cups and dust boots.

5. 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.

6. Wash the cylinder with clean alcohol after honing and dry it with compressed air.

7. Check the bleeder hole to be sure that it is open.

#### Assembly

Use all parts in the wheel cylinder repair kit.

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 and expander assembly, cups, and pistons into their respective positions in the cylinder bore (Fig. 19). Place a boot over each end of the cylinder.

### DUAL MASTER CYLINDER

When a repair is necessary on the master cylinder, it is required practice during the warranty period to replace the cylinder as a unit instead of overhauling the cylinder with a service repair kit.

#### 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. Discard the old brake fluid.

2. Remove the secondary piston stop bolt from the bottom of the cylinder (Fig. 20).

3. Remove the bleed screw, if required.

4. Depress the primary piston and remove the snap ring from the retaining groove at the rear of the master cylinder bore (Fig. 21). Remove the push rod and the primary piston assembly from the master cylinder bore. Do not remove the

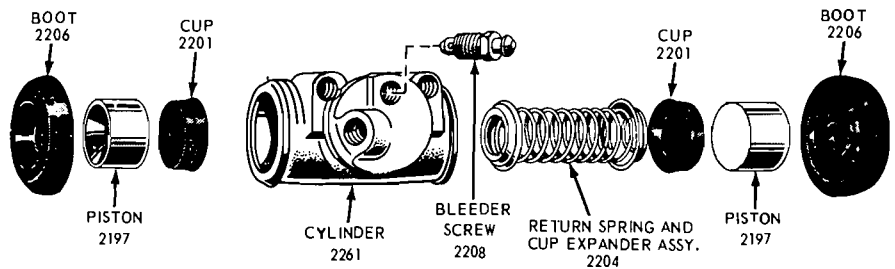


FIG. 19 Brake Wheel Cylinder—Typical

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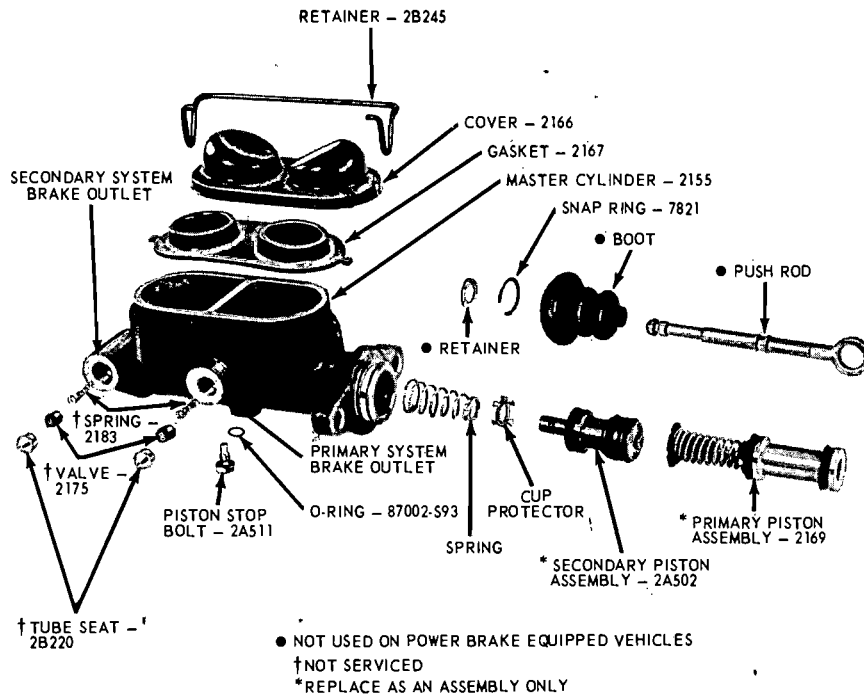


FIG. 20 Dual Master Cylinder Disassembled

screw that retains the primary return spring retainer, return spring, primary cup and protector on the primary piston. This assembly is factory pre-adjusted and should not be disassembled.

5. Remove the secondary piston assembly. Do not remove the outlet tube seats, outlet check valves and outlet check valve springs from the master cylinder body.

6. Clean all parts in clean isopropyl alcohol, and inspect the parts for chipping, excessive wear or damage. When using a master cylinder repair kit, install all the parts supplied.

7. Check all recesses, openings and internal passages to be sure they are

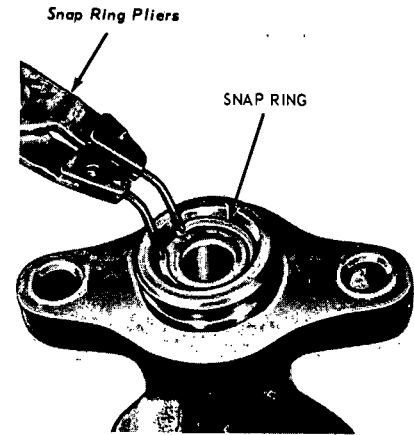
open and free of foreign matter. Use an air hose to blow out dirt and cleaning solvent. Place all parts on a clean pan or paper.

8. 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 Extra Heavy Duty Brake Fluid (ESA-M6C25-A).

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



H1477-C

FIG. 21 Removing Snap Ring—Typical

3. Install the primary piston assembly in the master cylinder bore.

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

5. Install the push rod, boot and retainer on the push rod, if so equipped. Install the push rod assembly into the primary piston. Make sure the retainer is properly seated and holding the push rod securely.

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

7. Install the secondary piston stop bolt and O-ring in the bottom of the master cylinder.

8. Install the bleed screw (if so equipped). Install the gasket (diaphragm) in the master cylinder filler cover. Position the gasket as shown in Fig. 20. Make sure the gasket is securely seated.

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

H 1499-B

## 9 SPECIFICATIONS AND SPECIAL TOOLS

### Drum Brake Lining Dimensions

#### DRUM BRAKE LINING DIMENSIONS (INCHES)

FORD-MERCURY-METEOR					
MODELS	POSITION	COLOR CODE	BRAKE SIZE	LINING SIZE ①	
				FRONT	REAR
Ford-Meteor passenger car. 240-302-351-CID - All except LTD. 390 & 400 CID Ford - All except LTD.	Primary	Black-Yellow	11	2.50 x 9.34	2.25 x 9.34
	Secondary	Blue-Black	11	2.50 x 12.12	2.25 x 12.12
Ford-Mercury-Meteor Passenger Car. 400 CID - all Meteor	Primary	Black-Yellow	11	3.00 x 9.34	2.25 x 9.34
	Secondary	Blue-Black	11	3.00 x 12.12	2.25 x 12.12
240-302 CID New York Taxi - Ford. Without A/C - 429 Police Interceptor - Ford. Ford LTD - All Engines	Primary	Black-Yellow	11	N/A	2.25 x 9.34
	Secondary	Blue-Blue	11	N/A	2.25 x 12.12
Mercury Police - All Engines except Police Interceptor - 429 CID	Primary	Black-Yellow	11	N/A	2.25 x 9.34
	Secondary	Blue-Blue	11	N/A	2.25 x 12.12
Mercury Police Interceptor - 429 CID	Primary	Yellow-Yellow	11	N/A	2.50 x 9.34
	Secondary	Green-Green	11	N/A	2.50 x 12.12
Ford-Mercury-Meteor Station Wagons. 302-351 CID - All Ford-Meteor except Squire.	Primary	Black-Yellow	11	3.00 x 9.34	2.25 x 9.34
	Secondary	Blue-Black	11	3.00 x 12.12	2.25 x 12.12
Ford-Mercury-Meteor Station Wagons. 400-429 CID. Ford Country Squire - All Engines.	Primary	Black-Yellow	11	N/A	2.25 x 9.34
	Secondary	Blue-Blue	11	N/A	2.25 x 12.12
TORINO-MONTEGO					
250 & 302 CID Torino-Montego Sedan, Hardtop, and Station Wagon	Primary	Yellow-Black	10	N/A	2.00 x 8.43
	Secondary	Blue-Blue	10	N/A	2.00 x 10.82
Station Wagons - 351 - 429 CID	Primary	Yellow-Black	10	N/A	2.00 x 8.43
	Secondary	Blue-Blue	10	N/A	2.00 x 10.82
PINTO					
All Models	Primary	Yellow-Black	9	2.0 x 6.12	1.38 x 6.12
	Secondary	Blue-Black	9	2.0 x 8.63	1.38 x 8.63
MUSTANG AND COUGAR					
Mustang 250 and 302 CID	Primary	Yellow-Black	10	2.50 x 8.43	1.75 x 8.43
	Secondary	Blue-Blue	10	2.50 x 10.82	1.75 x 10.82
351 CID Mustang and Cougar	Primary	Yellow-Black	10	2.50 x 8.43	2.00 x 8.43
	Secondary	Blue-Blue	10	2.50 x 10.82	2.00 x 10.82
MAVERICK AND COMET					
200 & 250 CID	Primary	Yellow-Black	9	2.25 x 7.65	1.50 x 7.65
	Secondary	Blue-Black	9	2.25 x 9.82	1.50 x 9.82
302 CID and 250 CID with D70 x 14 Tires	Primary	Yellow-Black	10	2.25 x 8.43	1.75 x 8.43
	Secondary	Blue-Blue	10	2.25 x 10.82	1.75 x 10.82
LINCOLN CONTINENTAL					
All Models	Primary	Yellow-Black	11	N/A	2.50 x 9.34
	Secondary	Blue-Blue	11	N/A	2.50 x 12.12
THUNDERBIRD AND CONTINENTAL MARK IV					
All Models	Primary	Yellow-Black	11	N/A	2.25 x 9.34
	Secondary	Blue-Blue	11	N/A	2.25 x 12.12

① Wear Limits – Riveted: 0.031 from top of rivets. – Bonded: 0.030 total lining thickness.

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

Car Line	Models	Brake Drum		Wheel Cylinder Bore Dia.		Master Cylinder Bore Dia.	
		Inside Diameter	Boring Limit (Max.) ①	Front ②	Rear ②	With Power Brake	Less Power Brake
Ford Mercury and Meteor	Taxi and Station Wagon	11.030	11.090	1.093	0.938	1.000	1.000
	Other	11.030	11.090	1.125	0.938	1.000	1.000
Montego, Torino	All	10.000	10.060	N/A	1.000	1.000	1.000
Pinto	All	9.000	9.060	1.000	0.719	N/A	0.9375
Maverick and Comet	9 Inch Brake - Passenger Car	9.000	9.060	1.062	0.844	0.9375	1.000
	10 Inch Brake - Passenger Car	10.000	10.060	1.125	0.875	0.9375	1.000
Mustang and Cougar	351 CID Engine and All Cougars	10.000	10.060	1.125	0.906	1.000	1.000
	250, 302, CID Engine	10.000	10.060	1.125	0.875	1.000	1.000
Thunderbird	All	11.030	11.090	N/A	1.000	1.000	N/A
Continental Mark IV	All	11.030	11.090	N/A	1.000	1.000	N/A
Lincoln Continental	All	11.030	11.090	N/A	0.938	1.000	N/A

(1)Max. Runout 0.007  
(2)Max. Allowable Hone 0.003

CH1864-B

**TORQUE LIMITS—GENERAL—FT.LBS.**

	Ford-Mercury Meteor	Torino, Pinto Montego, Comet Maverick	Mustang-Cougar	Thunderbird Continental Mark IV	Lincoln Continental
Master Cylinder to Dash Panel Screw	13-25	13-25	13-25		
Master Cylinder to Booster	13-25	13-25	13-25	13-25	13-25
Booster to Dash Panel	13-25	13-25	13-25	13-25	13-25
Wheel Cylinder to Backing Plate Screws	10-20	10 in. Brake 10-20 9 in. Brake 5-7	10-20	10-20	10-20
Wheel Cylinder & Backing Plate Anchor Pin Nut	20-30				
Rear Brake Backing Plate to Axle Housing:				50-70	30-35
Removable Carrier	50-70				
Integral Type	20-40	20-40	20-40		
Front Brake Backing Plate to Spindle	25-45	20-35	20-35		
Pressure Differential Valve Bracket Bolts and Nuts	7-11	7-11	7-11	7-11	7-11
Wheel Cylinder Bleeder Screw	6-15	32-65 Inch-lb.	32-65 Inch-lb.	6-15	6-15
Brake Hose Connection to Front Wheel Cylinder	12-20	12-20	12-20		
Brake Line Connection to Rear Axle Housing:				30-40	
Removable Carrier	30-40	12-19	12-19		
Integral Type	25-35	12-19	12-19		
Hydraulic Tube Connections <sup>①</sup>					
3/8 x 24	10-15	10-15	10-15	10-15	10-15
7/16 x 24	10-15	10-15	10-15	10-15	10-15
1/2 x 20	10-17	10-17	10-17	10-17	10-17
9/16 x 18	10-17	10-17	10-17	10-17	10-17
Wheel to Hub and Drum	70-115	70-115	70-115	70-115	70-115
① All hydraulic lines must be tightened to the specific torque value and be free of fluid leakage.					

**SERVICE TOOLS**

Tool No.	Description	Tool No.	Description
HRE 8650 (Rotunda)	Brake Adjusting Gage	Tool 7000-DE	Rubber Tipped Air Nozzle
BL-41-A (Snap-on)	Brake Cylinder Retaining Clamp	Tool 33621	Internal Snap Ring Pliers
B3404-B (Snap-on)	Brake Adjusting Tool	Milbar 1112-144	
2162	Adapter Cap		Inch Pound Torque Wrench
BT-11 (Snap-on)	Brake Shoe R & R Spring	T71P-4234-A (Ford) Rotunda FRE 1432	Axle Shaft Remover Brake Drum Micrometer

CH1865-B

# PART 12-20 Disc Brakes—Single Piston Floating and Sliding Caliper

COMPONENT INDEX Applies to Models Indicated	All Models	Ford	Mercury	Meteor	Cougar	Torino	Comet, Maverick	Pinto	Montego	Mustang	Lincoln- Continental	Thunderbird	Continental- Mark IV
<b>BRAKE BOOSTER</b>													
Description		20-05	20-05	20-05	20-05	20-05	N/A	N/A	20-05	20-05	20-05	20-05	20-05
Removal and Installation		20-16	20-16	20-16	20-16	20-16	N/A	N/A	20-16	20-16	20-16	20-16	20-16
<b>BRAKE PEDAL</b>													
Removal and Installation		20-16	20-16	20-16	20-17	20-17	N/A	20-17	20-17	20-17	20-18	20-17	20-17
<b>DISC BRAKE</b>													
Description		20-03	20-03	20-03	20-03	20-05	N/A	20-04	20-05	20-03	20-03	20-05	20-05
<b>DISC BRAKE CALIPER</b>													
Cleaning and Inspection		20-20	20-20	20-20	20-20	20-20	N/A	20-20	20-20	20-20	20-20	20-20	20-20
Disassembly and Overhaul		20-20	20-20	20-20	20-20	20-20	N/A	20-20	20-20	20-20	20-20	20-20	20-20
Removal and Installation		20-06	20-06	20-06	20-06	20-07	N/A	20-06	20-07	20-06	20-06	20-07	20-07
<b>DISC BRAKE ROTOR AND HUB</b>													
Cleaning and Inspection-See Part 12-01							N/A						
Refinishing		20-18	20-18	20-18	20-18	20-18	N/A	20-18	20-18	20-18	20-18	20-18	20-18
Removal and Installation		20-12	20-12	20-12	20-12	20-12	N/A	20-12	20-12	20-12	20-12	20-12	20-12
<b>DISC BRAKE ROTOR SPLASH SHIELD SHIELD</b>													
Removal and Installation		20-15	20-15	20-15	20-15	20-15	N/A	20-15	20-15	20-15	20-15	20-15	20-15
<b>DISC BRAKE SHOE AND LINING</b>													
Cleaning and Inspection-See Part 12-01							N/A						
Removal and Installation		20-09	20-09	20-09	20-10	20-11	N/A	20-10	20-11	20-10	20-09	20-11	20-11
<b>DUAL BRAKE SYSTEM</b>													
Description		20-02	20-02	20-02	20-02	20-02	N/A	20-02	20-02	20-02	20-02	20-02	20-02
<b>MASTER CYLINDER</b>													
Cleaning and Inspection		20-19	20-19	20-19	20-19	20-19	N/A	20-19	20-19	20-19	20-19	20-19	20-19
Disassembly and Overhaul		20-19	20-19	20-19	20-19	20-19	N/A	20-19	20-19	20-19	20-19	20-19	20-19
Removal and Installation-Power		20-15	20-15	20-15	20-15	20-15	N/A	N/A	20-15	20-15	20-15	20-15	20-15
<b>PRESSURE DIFFERENTIAL AND PRESSURE CONTROL VALVE</b>													
Removal and Installation		20-16	20-16	20-16	20-16	20-16	N/A	20-16	20-16	20-16	20-16	20-16	20-16
<b>SPECIFICATIONS AND SPECIAL SERVICE TOOLS</b>													
		20-21	20-21	20-21	20-21	20-21	N/A	20-21	20-21	20-21	20-21	20-21	20-21

A page number indicates that the item is for the vehicle(s) listed at the head of the column.  
N/A indicates that the item is not applicable to the vehicle(s) listed.

## 1 DESCRIPTION

Disc brakes are available as optional equipment for the front wheels on Ford, Mercury, Meteor, Mustang, Cougar and Pinto models and are standard on Thunderbird, Continental Mark IV, Torino, Montego and Lincoln Continental models. The dual-master cylinder equipped hydraulic brake system employs single anchor, internal expanding and self-adjusting drum brake assemblies on the rear wheels of vehicles with disc brakes.

The disc brake consists of a ventilated rotor and caliper assembly. The caliper used is a single piston floating caliper (Fig. 1) or a single piston sliding caliper (Figs. 2 and 3).

A pressure control valve provides balanced braking action between front and rear brakes.

A vacuum booster is used with the disc brake system on all models except Pinto.

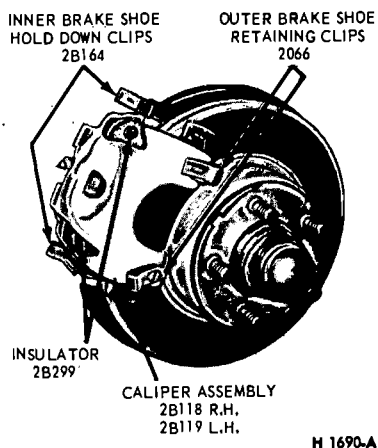


FIG. 1 Disc Brake Assembly—Floating Caliper

### DUAL MASTER CYLINDER

The dual-master cylinder is used in all models to provide increased safety.

### PRESSURE DIFFERENTIAL, METERING AND PROPORTIONING VALVE

**Ford, Mercury, Meteor, Torino, Montego, Lincoln Continental, Thunderbird and Continental Mark IV**

The new brake control valve assembly combines the metering valve,

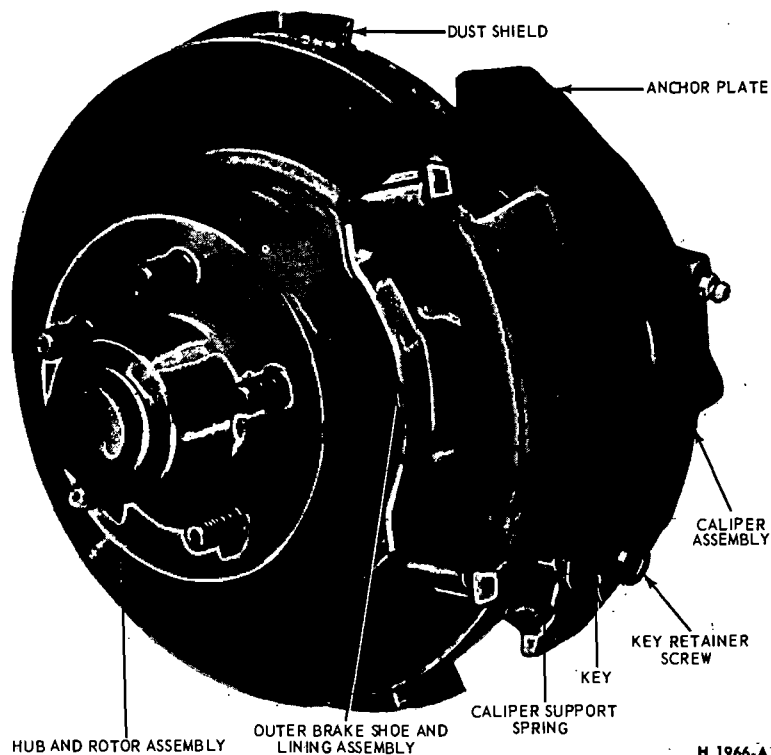


FIG. 2 Disc Brake Assembly—Continental Mark IV, Thunderbird, Montego and Torino

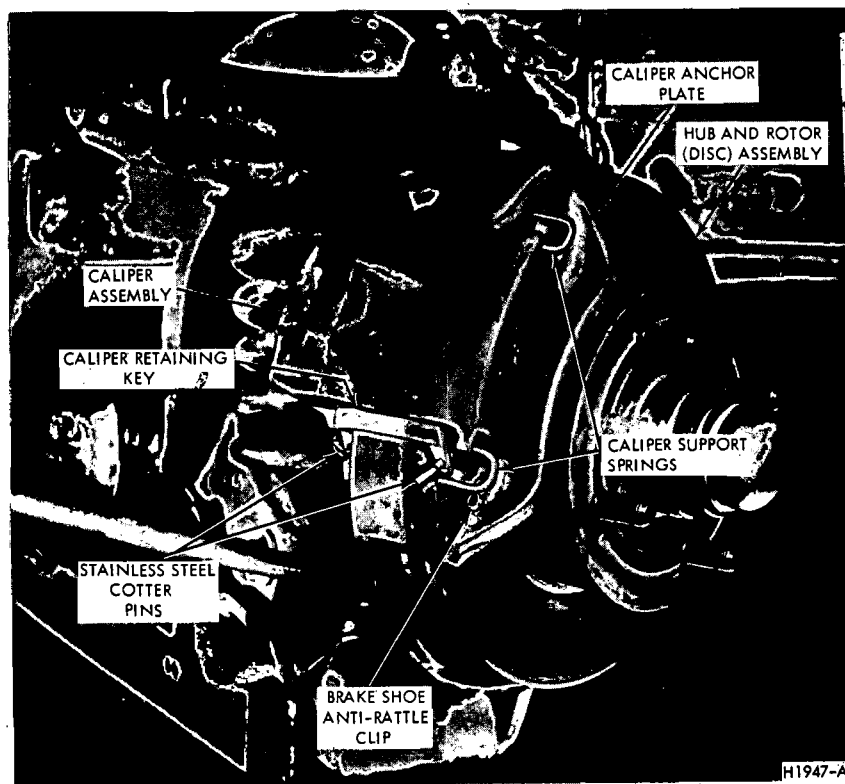


FIG. 3 Disc Brake Assembly—Pinto

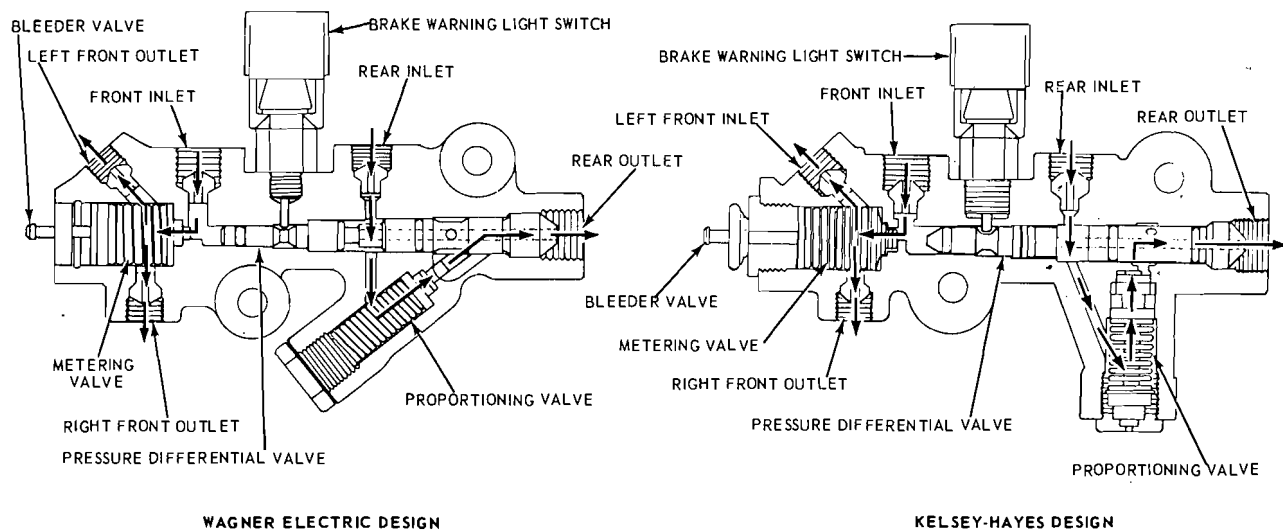


FIG. 4 Pressure Differential, Metering and Proportioning Valve Assembly Sectional View—All Models Except Pinto

pressure differential valve and proportioning valve in a single cast iron housing. The valve assembly retains the differential piston self-centering feature of the 1971 valve assembly with the metering valve and pressure differential piston assembled in the valve body casting central bore. The proportioning valve is assembled in a separate angular or vertical bore of the cast iron housing with two differently calibrated springs used in each design (Fig. 4).

#### Pressure Differential Valve

The new brake control valve assembly castings have been step bored to accommodate the pressure differential piston with a sleeve and seal mounted over the rear portion of the piston. The brake warning light switch is mounted on the top of the valve body casting above the piston tapered shoulder groove. When the piston is in the centralized position the spring loaded switch plunger fits into the tapered shoulder groove and the switch contacts are open, interrupting electrical continuity to the brake warning light on the instrument panel.

#### Metering Valve

The metering valve is located in the front end of the control valve housing central bore between the front brake system inlet port and the right and left front brake outlet ports. Its function is to regulate the hydraulic fluid pressure to the front disc brakes until the line pressure increases to approximately 355 to 530 psi. The metering valve location at the front end of the housing center

bore provides easy accessibility of the valve bleeder rod during bleeding of the front brake system (Fig. 5).

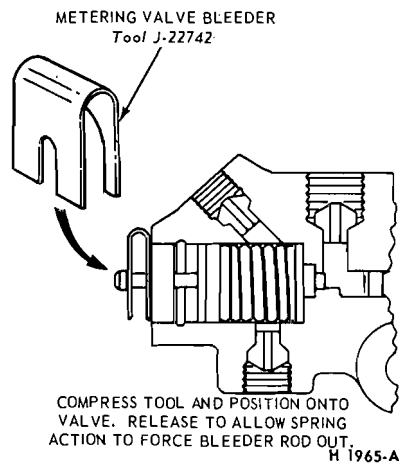


FIG. 5 Pressure Bleeding Tool

#### Proportioning Valve

The proportioning valve assembly is installed in a separate angular or vertical bore at the bottom of the valve body casting between the rear brake system inlet and outlet ports. The proportioning valve functions to regulate rear brake system hydraulic pressure after the rear line pressure reaches approximately 400 psi for Ford, Mercury, Meteor and Lincoln Continental, Continental Mark IV and Thunderbird cars and 500 psi for Torino and Montego. A plug and tube seat with o-ring seals is pressed into the rear end of the central bore. A hole

through the center of the plug and tube seat directs the hydraulic fluid from the proportioning valve to the rear brake system outlet port.

#### PRESSURE DIFFERENTIAL VALVE

##### Pinto

The pressure differential valve (Fig. 6) provides balanced braking action between front and rear brakes.

The valve body is step bored to accommodate a sleeve and seal installed over the piston and into the larger valve body bore in the front brake system area. The brake warning light switch is mounted at the center of the valve body and the spring loaded switch plunger fits into a tapered shoulder groove in the center of the piston. In this position, the electrical continuity through the switch is interrupted and the brake warning lamp on the instrument panel is out.

If there should be a pressure loss in either the front or rear brake system, the valve will be moved off center. The electrical circuit through the switch will be completed and the warning light will be on. After repairs are made, and the brake system properly bled, the valve will center itself and the warning light will be out.

#### FLOATING CALIPER

##### Ford, Mercury, Meteor, Lincoln Continental, Mustang and Cougar

The caliper assembly is made up of a floating caliper housing assembly

H 1964-A

H 1965-A

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