# ↓1971CARSHOPSHOPMANUAL

VOLUME ONE CHASSIS



MAVERICK

TORINO

MUSTANG

FORD

THUNDERBIRD

MONTEGO

COUGAR

COMET

METEOR

MERCURY

LINCOLN CONTINENTAL CONTINENTAL MARK III Copyright © 2007, Forel Publishing Company, LLC, Woodbridge, Virginia

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# 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 1971 model passenger cars (except Pinto) built by the Ford Companies in the U. S. and Canada. Service procedures for the Pinto are covered in the Pinto Car Shop Manual. As changes in the product occur, this information will be updated by Technical Service Bulletins. When issued, TSB information always supersedes that published herein.

Within each volume, information is grouped by system or component plus "General Service" parts which contain information which is 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 locater 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.

Indicates:

42 - 04 - 23Volume 4 - Group 42 - Part 4 - Page 23

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







#### 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) is attached to the rear face of the driver's door. 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.





#### ASSEMBLY PLANT CODES

Α	Atlanta
3	Oakville (Canada)
5	Mahwah
	Dearborn
}	Chicago
4	Lorain
	Los Angeles
(	Kansas City
1	Norfolk
)	Twin Cities
1	San Jose
	Allen Park
	Metuchen
	Louisville
۷	Wayne
	St. Thomas
	Wixom
(	St Louis

CY1299-B

#### Assy Plant Codes

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.

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 or letter (or both) indicating the exterior paint color code. The TRIM code consists of a number-letter combination designating the interior trim. The Axle code is a number or letter indicating the rear axle ratio and standard or locking type axles. The TRNS. code is a number or letter indicating the type of transmission, numerals for manual and letters for automatic. The DSO code consisting of two numbers designates the district in which the car was ordered and may appear in conjunction with a Domestic Special Order or Foreign Special Order number when applicable. Ford of Canada DSO codes consist of a letter and a number.

#### DATE CODES

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

Month	Code First Year	Code Second Year		
January February March April June June June June June June September October December	A B C E F G H X M	N P Q R S T U V W X Y Z		

#### **ENGINE CODES**

Code	No. of Cyls.	Displacement				
U	6	~170 CID				
T	6	200 CID-1V				
20	6	200 CID-1V				
L	6	250 CID-1V				
30	6	250 CID-1V				
۷	6	240 CID-1V				
B	6	240 CID-1V (Police)				
E	6	240 CID-1V (Taxi)				
F	8	302 CID-2V				
60	8	302 CID-2V				
D	8	302 CID-2V (Taxi)				
G	8	302 CID-4V (Boss)				
н	8	351 CID-2V				
M	8	351 CID-4V				
Q	8	351 CID-4V GT				
1Y	8	390 CID-2V				
S	8	400 CID-2V				
K -	8	429 CID-2V				
N	8	429 CID-4V				
C	8	429 CID-4V CJ				
1	8	429 CID-4V CJ Ram-Air				
P	8	429 CID-4V Police				
A	8	460 CID-4V				
O Low C	O Low Compression Export					

#### **TRANSMISSION CODES**

Code	Туре
1	3-Speed Manual
5	4-Speed Manualwide ratio
6	4-Speed Manualclose ratio
W	Automatic (C4)
U	Automatic (C6)
X	Automatic (FMX)
Z	Automatic (C6 Special)

#### REAR AXLE RATIO CODES



#### DISTRICT CODES (DSO)

Units built on a Domestic Special Order, Foreign Special Order, or other Special orders will have the complete order number in this space. Also to appear in

LINCOLN-MERCURY

11   Boston     15   New York     16   Philadelphia     17   Washington     21   Altanta     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	Code	District
15   New York     16   Philadelphia     17   Washington     21   Altanta     22   Dallas     23   Jacksonville     26   Memphis     31   Buffalo     32   Cincinnati     33   Cleveland     34   Detroit     41   Chicago     42   St. Louis     51   Denver     52   Los Angeles     53   Oakland     54   Seattle     84   Home Office Reserve     90   Export	11	Boston
16   Philadelphia     17   Washington     21   Altanta     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	15	New York
17   Washington     21   Altanta     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	116	Philadelphia
21   Altanta     22   Dallas     23   Jacksonville     26   Memphis     31   Buffalo     32   Cincinnati     33   Cleveland     34   Detroit     41   Chicago     42   St. Louis     51   Denver     52   Los Angeles     53   Oakland     54   Seattle     84   Home Office Reserve     90   Export	17	Washington
22   Dallas     23   Jacksonville     26   Memphis     31   Buffalo     32   Cincinnati     33   Cleveland     34   Detroit     41   Chicago     42   St. Louis     51   Denver     52   Los Angeles     53   Oakland     54   Seattle     84   Home Office Reserve     90   Export	21	Altanta
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	22	Dallas
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	23	lacksonville
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	26	Memohis
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	21	Ruffalo
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	32	Cincienati
34   Detroit     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	22	Claudond
41 Chicago   42 St. Louis   46 Twin Cities   51 Denver   52 Los Angeles   53 Oakland   54 Seattle   84 Home Office Reserve   90 Export	20	Detroit
41	34	Chienee
42 St. Louis   46 Twin Cities   51 Denver   52 Los Angeles   53 Oakland   54 Seattle   84 Home Office Reserve   90 Export	41	Chicago
46     Twin Cities       51     Denver       52     Los Angeles       53     Oakland       54     Seattle       84     Home Office Reserve       90     Export	42	St. Louis
51     Denver       52     Los Angeles       53     Oakland       54     Seattle       84     Home Office Reserve       90     Export	46	Twin Cities
52     Los Angeles       53     Oakland       54     Seattle       84     Home Office Reserve       90     Export	51	Denver
53 54Seattle 84Home Office Reserve 90Export	52	Los Angeles
54Seattle 84Home Office Reserve 90Export	53	Oakland
84 Home Office Reserve 90 Export	54	Seattle
90 Export	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	<b>B</b> 4	
A6	Western	B6	
A7	Pacific	B7	
12	Export	12	

#### this space is the two-digit code number of the District which ordered the unit. If the unit is a regular production unit, only the District code number will appear.

#### FORD

Code	District
11	Boston
13	New York
15	Newark
16	Philadelphia
17	Washington
21	Atlanta
22	Charlotte
24	lacksonville
25	Richmond
28	Louisville
32	Cleveland
33	Detroit
35	Lansing
37	Buffalo
38	Pittshurgh
41	Chicago
лз 	Milwaukee
ΛΛ	Twin Cities
44 16	Indiananolis
чо Л7	Cincinnati
4/ 51	Depuer
51	Kansas Citu
JJ	Omobo
34 EE	Ulliana St. Louin
<b>7</b> 7	St. Louis
50	Davenport
٥ <u>.</u>	Dallas
62	Houston
bj	Memphis
64	New Urleans
65	Uklahoma City
/1	Los Angeles
/2	San Jose
/3	Salt Lake City
74	Seattle
75	Phoenix
83	Government
84	Home Office Reserve
85	American Red Cross
87	Body Company
89	Transportation Services

#### EXTERIOR PAINT COLOR CODES

	M-32-J				M-32-J	
Code	Number	Color		Code	Number	Color
Α	1724-A	Black		S	1736-A	Med. Gray Gold Met.
M	1619-A	White		W	3341-A	Yellow
1	1730-A	Calypso Coral		D	3470-A	Bright Yellow
T	2008-A	Red		0	3565-A	Lt. Goldenrod Yellow
3	3560-A	Bright Red		Ε	3492-A	Med. Goldenrod Yellow
B	3562-A	Maroon Met.	{	U	3659-A	Grabber Orange
L	3318-A	Lt. Gray Met.		2	5003-A	Med. Tan
K	3346-A	Dk. Slat Gray Met.		¥	3314-A	Lt. Pewter Met.
N	921-A	Platinum		R	3342-A	Dk. Brown Met.
Q	3064-A	Med. Blue Met.		5	3564-A	Med. Ginger Met.
X	1903-A	Dk. Blue Met.				
6	3077-A	Bright Blue Met.				
J	3657 A	Grabber Blue		GLAMOUI	R PAINTS	
Y	3320-A	Bright Astra Blue Met.		10	5072.4	Med Juy Bronze Met
F	3321-A	Med. Bright Aqua Met. 🤛		79	5071.4	Med. By Diolize met.
Н	3472-A	Lt. Green		/ /	JU/ 1-n	Mat
P	3462-A	Med. Green Met.		Ed	5069.4	Med Ivy Bronze Met
<u>c</u>	3542-A	Dk. Green Met.		30	5003-7	Med Ginger Bronze
ζ	5002-A	Grabber Green Met.		55	5000-A	Mat
G	3345-A	Dk. Vintage Green		ng	5007.4	Med Blue Met
	5001-A	Bright Lime Green	•	60	5070-4	Med Red Met
88	3198-A	Lt. Gold		••••••	5070-A	mea, nea met.

10

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VISA

## **Identification Codes**

## **BODY SERIAL AND STYLE CODES** The two-digit numeral which follows

the assembly plant code identifies the

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

Vehi cle	Body Serial Code	Body Style Code	Body Type	Model	Vehicle	Body Serial Code	Body Style Code	Body Type	Model
TORINO	27	54A	4-Dr. Sedan	Torino	MERCURY	48	57B	4-Dr. Hardtop	
	25	65A	2-Dr. Hardtop			54	53F	4-Dr. Sedan	Monterey
	34	63C	2-Dr. Hardtop-Sportsroof	Torino 500		56	65F	2-Dr. Hardtop	Custom
	30	65C	2-Dr. Hardtop			58	57F	4-Dr. Hardtop	_
	31	54C	4-Dr. Sedan	-		63	53H	4-Dr. Hardtop Sedan	Marquis
	32	57C	4-Dr. Hardtop	-	ļ	66	<b>6</b> 5H	2-Dr. Hardtop	-
	36	57E	2 Dr. Hardtop-Formal	Torino		68	57H	4-Dr. Hardtop	
	33	65 E	4-Dr. Hardtop	Brougham		62	53K	4-Dr. Hardtop Sed an	Broughan
	35	63F	2-Dr. Hardtop-Sportsroof	Torino GT		64	65K	2-Dr. Hardtop	
	37	76F	Convertible	-		67	57K	4-Dr. Hardtop	
	38	63H	2-Dr Hardton-Sportsroof	Cobra		72	71B	4 Dr. 6 Pass.0	Montere
	40	710		Station					Wagon
	40	710	Torino 500	Wagons-4 Dr.		74	71H	4-Dr. 6 Pass.0	Marquis
	42	710	Torino Squiro (Brougham	<del>.</del> .		76	71K	4-Dr. 6 Pass.①	Marquis
	45	71E	Panahasa	Renchara	1				Colony
	40	004	Ranchero	- Kanchero	MERCURY	40	53X	4-Dr. Hardtop Sedan	Marquis
	4/	008	Ranchero SUU	_	(CANADA ONLY)	41	65 X	2-Dr. Hardtop-Formal	
	48	660	Ranchero Gi	4		42	57X	4-Dr. Hardtop	
	49	66E	Kanchero Squire		METEOR	20	53B	4-Dr. Sedan	Rideau
OMET	30	54B	4-Dr. Sedan	Standard	(CANADA)	22	53D	4-Dr. Sedan	Rideau
	31	628	2 Dr. Sedan			23	65D	2-Dr. Hardtop-Formal	
OUGAR	91	650	2-Dr. Hardtop®	Standard		25	53F	4-Dr. Sedan	Montca
	92	76D	Convertible			26	65F	2-Dr. Hardtop	
	93	65F	2-Dr. Hardtop	XR-7 Luxury -		27	57F	4-Dr. Hardtop	-
	94	76F	Convertible			36	71D	Rideau 500-6 Pass.	Station
ORD	51	54B	4-Dr. Sedan	Custom		38	71F	Montcalm-6 Pass	Wagons
	52	65D	2-Dr. Hardtop(Canada On	y) Custom 500	MONTEGO	01	65A	2.Dr Hardton	Monteg
	53	54D	4-Dr. Sedan	Custom 500	MONTEGO	02	544	4.Dr Sedan	
	54	54F	4-Dr. Sedan	Galaxie 500		05	57R	4 Dr. Hardton	Monteg
	58	65F	2. Dr. Hardtop			06	54B	4-Dr. Sedan	-
	56	57F	4-Dr. Hardtop			00	65B	2. Dr. Hardton	_
	61	76H	Convertible	LTD		10	540	A Dr. Sedan	Montee
	64	57H	4-Dr. Hardtop			10	540	4-DI. Seudi	Brough
	62	65H	2-Dr. Hardtop	_	ļ	11	630		
	63	53H	4-Dr. Hardtop Sedan		II.	12	570	4-Dr. Hardtop	Cuclond
	66	53K	4-Dr. Hardtop Sedan	LTD Brougham		15	100	2. Dr. Hardtop	Cyclone
	67	57K	4-Dr. Hardtop	-1		1/	656	2-Dr. Hardtop	
	68	65K	2-Dr. Hardtop	_		16	65H	2-Dr Hardton	Cyclone
	70	71B	4-Dr. Wagon	Custom Ranch		08	710	Montego MX	Station
	72	71D	4-Dr. Wagon	Custom 500		12	710	Montego MX Villager	Wagons
				Ranch	MUSTANC	01	650	2.Dr Hardton	Standa
	74	71F	4-Dr. Wagon	Country Sedan	MUSTANU	02	630	2.Dr. Sporteroof®	
	76	71H	4-Dr. Wagon	Country	11	02	760	Convertible	
	L			Squire®	]]	03	70U	2.Dr. Hardton	Granda
INCOLN	82	53A	4-Dr. Sedan			05	100	2 Dr. Seatternet	Mach
CONTINENTAL	81	65A	2-Dr. Hardtop		THUNDEDOIDO	00	DJK	2. Dr. Hardtan	wach I
MARK III	89	65A	2-Dr. Hardtop		II I HONDERRIND	83	ACO		_
MAVERICK	91	62A	2-Dr. Sedan	Standard	]]	83	650	2-Ur. Hardtop	_
1	0.0	1 644	A Do Sodan	-1	JI	84	658	Z-Dr. Landau®	
	7022	MO	rt Sedan	Grabber	11	84	65D	2.Dr. Landau	_
📁 b U N	ΛUΠ		an	Monterev	11	87	57B	4-Dr. Landau®	_
	and the second se	of the local division of the local divisione	and and and and		J 1	1 87	1 570	1 4. Dr. Landau	1

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## Identification Codes

#### INTERIOR TRIM CODES

Code	Trim Scheme
1A	Black Vinyl
1A	Black Cloth and Vinyl
1B	Med. Blue Vinyl
1B	Med. Blue Cloth and Vinyl
1D	Dk. Red Vinyl
1D	Dk. Red Cloth and Vinyl
1E	Med. Vermillon Vinyl Med. Ginger Vinyl
1R	Med. Green Vinyl
1R	Med. Green Cloth and Vinyl
1R	Dk. Green Cloth and Vinyl
1 ¥¥	Vinite Vinyi Lt. Grav Gold Vinyi
1Y	Lt. Gray Gold Cloth and Vinyl
1Z	Dk. Tobacco Cloth and Vinyl
2A	Black Cloth and Vinyl
2A 2A	Black Knit Vinvl
2B	Med. Blue Cloth and Vinyl
2B	Med. Blue Vinyl
2B	Dk. Blue Knit Vinyl Dk. Bod Vinyl
20 2F	Med. Vermilion Cloth and Vinvl
2Ē	Med. Vermilion Vinyl
2F	Med. Ginger Cloth and Vinyl
2F	Med. Ginger Vinyl Med. Green Cloth and Vinyl
2R	Med. Green Vinyl
2R	Dk. Green Knit Vinyl
2W	White Vinyl
2 VY	It Gray Gold Cloth and Vinyl
2Y	Lt. Gray Gold Vinyl
3A	Black Knit Vinyl
3A	Black Cloth and Vinyl Mod. Blue Cloth and Vinyl
3B	Med. Blue Knit Vinvl
3B	Dk. Blue Cloth and Vinyl
3D	Dk. Red Cloth and Vinyl Mod. Vermilion Cloth and Vinyl
3E	Med. Ginger Cloth and Vinyl
3F	Med. Ginger Knit Vinyl
3P	Med. Gray Cloth and Vinyl
3K 3R	Med. Green Knit Vinyl
3R	Med. Green Cloth and Vinyl
3W	White Knit Vinyl
3Y	Lt. Gray Gold Cloth and Vinyl Black Cloth and Vinyl
4A	Black Knit Vinvl
4A	Black Vinyl
4A	Black Leather and Vinyl
4B	Med. Blue Vinvl
4B	Med. Blue Knit Vinyl
4B	Dk. Blue Knit Vinyl
4B 4D	Dk. Blue Leather and Vinyl
4D	Dk. Red Leather and Vinvl
4E	Med. Vermilion Cloth and Vinyl
4E	Med. Vermilion Knit Vinyl Med. Gingor Cloth and Vinyl
4F	Med. Ginger Vinvl
4F	Med. Ginger Leather and Vinyl
4K	Lt. Aqua Leather and Vinyl
4F	Med. Green Cloth and Vinyl
4 R	Med. Green Vinyl
4R	Dk. Green Knit Vinyl
S	UK, Green Leather and Vinyl White Vinyl
8	WE DE Walk Ward
	VITNOW

VISA

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100 MRAN

RayRal

**Click Here To** 

Code	Trim Scheme
4Y	Lt. Gray Gold Vinyl
4Y	Lt. Gray Gold Leather and Vinyl
4Z	Dk. Tobacco Leather and Vinyl
5A	Black Knit Vinyl
5A	Black Lioth and Vinyi
5R	Med Blue Knit Vinyl
5B	Med. Blue Cloth and Vinyl
5B	Med. Blue Vinyl
5D	Dk. Red Knit Vinyl
5D	Dk. Red Cloth and Vinyl
5£	Med. Vermilion Knit Vinyl
5F	Med. Ginger Cloth and Vinyl
5 R	Med. Green Knit Vinvl
5R	Med, Green Cloth and Vinyl
5W	White Knit Vinyl
5Y	Lt. Gray Gold Knit Vinyl
טז גע	Lt. Gray Gold Cloth and Vinyl
57	Dik Tohacco Cloth and Vigut
6A	Black Vinvl
6A	Black Cloth and Vinyl
6A	Black Leather and Vinyl
6B	Med. Blue Leather and Vinyl
6D	Neu, Blue Villy/
6D	Dk. Red Vinvl
6E	Med. Vermilion Vinyl
6F	Med. Ginger Leather and Vinyl
6F	Med. Ginger Vinyl
6P	Med. Green Leather and Vinyi
6W	White Leather and Vinvl
6W	White Vinyl
6Y	Lt. Gray Gold Vinyl
7A	Black Cloth and Vinyl
7A 7A	Black Leather and Vinyl
7B	Med. Blue Cloth and Vinyl
7B	Med. Blue Vinyl
7B	Dk. Blue Leather and Vinyl
/D	Dk. Red Cloth and Vinyl
70 7F	Med Ginger Cloth and Vinyl
7F	Med. Ginger Vinvl
7R	Med. Green Cloth and Vinyl
7 R	Med. Green Vinyl
/ K	UK. Green Leather and Viny
7 ¥¥ 7Y	t Gray Gold Cloth and Vinyl
8A	Black Cloth and Vinvl
8A	Black Knit Vinyl
8A	Black Leather and Vinyl
8B	Med. Blue Cloth and Vinyl
8D	Nieu, Blue Kill Vinyl
8D	Dk. Red Leather and Vinvl
8E	Med. Vermilion Cloth and Vinyl
8E	Med. Vermilion Knit Vinyl
.8F 9c	Med. Ginger Knit Vinyl
ог 8R	Med Green Knit Vinvl
8W	White Knit Vinyl
8Y	Lt. Gray Gold Cloth and Vinyl
9A	Black Vinyl
9A	Black Cloth and Vinyl
9B	Med. Blue Cloth and Vinvi
9D	Dk. Red Cloth and Vinyl
9D	Dk. Red Vinyl
9E	Med. Vermilion Cloth and Vinyl
9E	Med. Cinger Vinyl
9F	Med. Ginger Cloth and Vinvl
9R	Med. Green Vinyl

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Code	Trim Scheme
9R	Med. Green Cloth and Vinvl
9Y	Lt. Gray Gold Cloth and Vinyl
9Y	Lt. Gray Gold Vinyl
ΔΔ	UK. TODACCO VINYI Black Cloth and Vinyi
AB	Dk Blue Cloth and Vinyl
AD	Dk. Red Cloth and Vinyl
AE	Med. Vermilion Cloth and Vinyl
AF	Med. Ginger Cloth and Vinyl
ΔP	Lt. Aqua Cloth and Vinyl Med. Grav Cloth and Vinyl
AR	Dk. Green Cloth and Vinyl
ΑΥ	Lt.Gray Gold Cloth and Viryl
BA	Black Cloth and Vinyl
BA	Black Knit Vinyl Black Vinyl
RR	Med Blue Cloth and Vinvl
BB	Med. Blue Vinvi
BE	Med. Vermilion Cloth and Vinyl
BF	Med. Ginger Cloth and Vinyl
D7 BR	Med. Ginger Knit Vinyl Med. Green Cloth and Vinyl
BR	Med. Green Knit Vinvl
BR	Med. Green Vinyl
BY	Lt. Gray Gold Vinyl
CA	Black Knit Vinyl Black Vinyl
CA	Black Cloth and Vinvi
СВ	Med. Blue Knit Vinyl
СВ	Med. Blue Vinyl
СВ	Dk. Blue Cloth and Vinyl
CD	Dk. Ked Vinyi Dk. Red Cloth and Vinyi
CE	Med. Vermilion Knit Vinyl
CF	Med. Ginger Knit Vinyl
CF	Med. Ginger Cloth and Vinyl
CR	Med. Ginger Vinyl Med. Green Knit Vinyl
CR	Med. Green Vinvl
CR	Dk. Green Cloth and Vinyl
CW	White Knit Vinyl
	Lt. Gray Gold Cloth and Vinyl Risck Cloth and Vinyl
DB	Med Blue Cloth and Vinyl
DD	Dk. Red Cloth and Vinyl
DE	Med. Vermilion Cloth and Vinyl
DR	Med. Ginger Cloth and Vinyl
DY	Lt. Grav Gold Cloth and Vinvi
EA	Black Cloth and Vinyl
EB	Med. Blue Cloth and Vinyl
LB	Dk. Blue Cloth and Vinyl
EE	Med. Vermilion Cloth and Vinyl
ĒF	Med. Ginger Cloth and Vinyl
ER	Med. Green Cloth and Vinyl
EK	Dk. Green Cloth and Vinyl
F7	DK. Gray GOID GOTH and Vinyl
FA	Black Vinyl
FA	Black Leather and Vinyl
ר ש ב ח	Med. Blue Vinyl
FD	UK. Ked Vinyl Dk. Red Leather and Vinyl
F F	Med. Ginger Vinvl
F R	Med. Green Vinyl
FW	White Vinyi
FT	LT, Gray GOID VINYI Dk. Tobacco Leather and Vinyi
GA	Black Vinvl
GA	Black Knit Vinyl
GB	Med. Blue Vinyl
GF	UK. KEG KRIT VIRYI Med Vermilion Viryi
GF	Med. Ginger Vinvl
GR	Med. Green Vinyl

CY-1304-A

#### INTERIOR TRIM CODES Cont'd.

Code	Trim Scheme
GW	White Knit Vinvl
HA	Black Cloth and Vinyl
НВ	Med. Blue Cloth and Vinyl
HR	Med. Green Cloth and Vinyl
HY	Lt. Gray Gold Cloth and Vinyl
JA	Black Vinyl
JB	Med. Blue Vinyl
JE	Med, Vermilion Vinyl
JF	Med. Ginger Vinyl
JR	Med. Green Vinyl
JW	White Vinyl
JY	Lt. Gray Gold Vinyl
KA	Black Vinyl
KA	Black Knit Vinyl
KA	Black Cloth and Vinyl
KA	Black Leather and Vinyl
КВ	Med. Blue Cloth and Vinyl
КВ	Dk. Blue Leather and Vinyl
KD	Dk. Red Cloth and Vinyl
KD	Dk. Red Leather and Vinyl
KF	Med. Ginger Leather and Vinyl
KK	Lt. Aqua Leather and Vinyl
KP	Med. Gray Leather and Vinyl
KR	Dk. Green Leather and Vinyl
KR	Med. Green Cloth and Vinyl
KW	White Knit Vinyl
KW	White Leather and Vinyl
KY	Lt. Gray Gold Knit Vinyl
KY	Lt. Gray Gold Vinyl
KY	Lt. Gray Gold Cloth and Vinyl
KY	Lt. Gray Gold Leather and Vinyl
KZ	Dk. Tobacco Cloth and Vinyl
KZ	Dk. Tobacco Leather and Vinyl
LU	Lt. Beige Vinyl
MA	Black Knit Vinyl

Code	Trim Scheme
MB	Med. Blue Knit Vinyl
NA	Black Knit Vinyl
PB	Med. Blue Cloth and Vinyl
PE	Med. Vermilion Cloth and Vinyl
PF	Med. Ginger Cloth and Vinyl
QA	Black Knit Vinyl
QF	Med. Ginger Knit Vinyl
QR	Med. Green Knit Vinyl
QW	White Knit Vinyl
RA	Black Knit Vinyl
RA	Black Vinyl
RA	Black Cloth and Vinyl
RB	Med. Blue Knit Vinyl
RB	Med. Blue Vinyl
RD	Dk. Red Cloth and Vinyl
RE	Med. Vermilion Knit Vinyl
RE	Med. Vermilion Vinyl
RF	Med. Ginger Knit Vinyl
RF	Med. Ginger Vinyl
RR	Med. Green Knit Vinyl
RW	White Knit Vinyl
ΤΑ	Black Knit Vinyl
ТВ	Med. Blue Knit Vinyl
<u>TE</u>	Med. Vermilion Knit Vinyl
<u>[</u> F	Med. Ginger Knit Vinyl
IR	Med. Green Knit Vinyl
UA	Black Knit Vinyl
UA	Black Vinyl
UB	Med. Blue Vinyl
UF	Med. Ginger Knit Vinyl
UR	Med. Green Knit Vinyl
UW	White Knit Vinyl
UY	Lt. Gray Gold Knit Vinyl
JY	Lt. Gray Gold Vinyl
/ A	Black Knit Vinyl

Code	Trim Scheme
VA	Black Cloth and Vinyl
VA	Black Vinyl
VB	Med. Blue Vinyl
VD	Dk. Red Cloth and Vinyl
VD	Dk. Red Vinyl
VF	Med. Ginger Vinyl
VR	Med. Green Vinyl
VY	Lt, Gray Gold Vinyl
٧Ζ	Dk. Tobacco Vinyl
WA	Black Cloth and Vinyl
WA	Black Knit Vinyl
WA	Black Vinyl
WB	Med, Blue Cloth and Vinyl
WB	Med. Blue Vinyl
WD	Dk. Red Vinyl
WE	Med. Vermilion Cloth and Vinyl
WF	Med. Ginger Cloth and Vinyl
WF	Med, Ginger Vinyl
WR	Med. Green Cloth and Vinyl
WR	Med. Green Vinyl
WW	White Knit Vinyl
YA	Black Knit Vinyl
YB	Med. Blue Knit Vinyl
YE	Med. Vermilion Knit Vinyl
YF	Med. Ginger Knit Vinyl
YR	Med. Green Knit Vinyl
YW	White Knit Vinyl
ZA	Black Cloth and Vinyl
ZB	Med. Blue Cloth and Vinyl
ZD	Dk. Red Cloth and Vinyl
ZF	Med. Ginger Cloth and Vinyl
<u>ZR</u>	Med. Green Cloth and Vinyi
ΖΥ	Lt. Gray Gold Cloth and Vinyl
22	Dk. Tobacco Cloth and Vinyl

CY-1305-A

Interior Trim Codes Cont'd.

#### MODEL YEAR CODE

.

The number 1 designates 1971. CONSECUTIVE UNIT NUM-BERS—1971 Passenger cars 100,001—Ford, Torino, Mustang, Thunderbird, Maverick 500,001—Mercury, Meteor, Montego, Cougar, Comet 800,001—Lincoln Continental and Mark III



W.he	els and	l tires	GROUP
PART 11-01 General Wheel	PAGE	PART 11-10 Wheel Hubs and	PAGE
and Tire Service	11-01-01	Bearings—Front	11-10-01
PART 11-02 Wheels and Tires—Drop		PART 11-11 Wheel Hubs and	
Center Rim	11-02-01	BearingsRear	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	11-01-01	WHEEL BALANCING WHEEL INSPECTION	11-01-01 11-01-01					

# **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.

# 5 CLEANING AND INSPECTION

#### WHEEL INSPECTION

Wheel hub nuts should be inspected and tightened to specification at predelivery. Loose wheel hub nuts y cause shimmy and vibration. BUY IT NOWL Click Here to Order affect 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. 1.



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

COMPONENT INDEX	Page	COMPONENT INDEX	Page
FRONT WHEEL ASSEMBLY Description FRONT WHEEL BEARING	11-02-01	REAR WHEEL ASSEMBLY Description SPACE SAVER SPARE TIRE	. 11-02-01
Adjustment HOISTING INSTRUCTIONS	··· 11-02-02 ··· 11-02-02	Description WHEELS AND TIRES Removal and Installation	11-02-01 11-02-03

# **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 FoMoCo Inflator C9WA-



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

**19F514-A** 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.

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.

## **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 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 (2x4x16 inches) should be placed on the hoist channel between the adapters. This will prevent the adapters from damaging the fror 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 (Fig. 1) 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. 3).

5. Back off the adjusting nut one half turn. Retighten the adjusting nut

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\* FIG. 3 \* Front Wheel Bearing Adjustment

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 (Fig. 2) 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 several times to push the shoe and linings away from the rotor.

5. While rotating the wheel, hub, and rotor assembly, torque the adjusting nut to 17-25 ft-lbs to seat the bearings (Fig. 3).

6. Back the adjusting nut off one half turn. Retighten the adjust ing 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.

# PEAOVAL AND INSTALLATION

VISA

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 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  $(2\pi 4\pi 16 \text{ inches})$  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.



FIG. 4 Loosening Tire Bead

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. 4).

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. 5). 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.



FIG. 5 Tubeless Tire Mounting Band



# PART 11-10 Wheel Hubs and Bearings—Front

Applies to All Models									
Page	COMPONENT INDEX	Page							
1-10-03 1-10-03	FRONT WHEEL GREASE SEAL Removal and Installation HOISTING INSTRUCTIONS SPECIAL TOOLS	11-10-01 11-10-01 11-10-04							
₽ 1 1	Page -10-03 -10-03 -10-01	Page   COMPONENT INDEX     -10-03   FRONT WHEEL GREASE SEAL     -10-03   Removal and Installation     -10-03   SPECIAL TOOLS							

## **1 DESCRIPTION**

#### 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, Part 11-02, Section 1).

# 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 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





F1476-A

FIG. 1 Removing Front Wheel Bearing Cups— Disc (Drum-Type Similar)

#### **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, 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. 1).

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. 2. 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. 3).

10. All old grease should be completely cleaned from the bearings and surrounding surfaces before repacking them with new grease (C1AZ19590-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. 2. Be sure that the retainer is properly seated.

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).





#### FIG. 3 Front Wheel Hub Lubrication

15. Adjust the wheel bearings as outlined in Part 11-02, Section 3 and install a new cotter pin. Bend the ends of the cotter pin around the castellations of the nut lock. Install the grease cap.

16. Install the hub cap or wheel ~ cover.

#### **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. 1).

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



FIG. 4 Installing Front Wheel Bearing Cup—Disc Type

the replacement cup(s) in the hub with the tools shown in Fig. 4. 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. 5. Be sure the retainer is properly seated.



FIG. 5 Installing Grease Retainer—Disc

15. Install the hub and rotor assembly on the wheel spindle. Keep the hub centered on the spindle to ant damage to the grease retainer



of the cotter pin around the castellations of the nut lock.

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

19. Install the wheel and tire on the hub.

20. 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 lubricant to the hub only until the grease is flush with the inside diameter of both bearing cups (Fig. 3).

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. 2. 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 Part 11-02, Section 3, and install a new cotter pin. Bend the ends of the cotter pin around the castellations of the nut lock. Install the grease cap.

14. Install the hub cap or wheel cover.

#### 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 Section 2, Part 11-02, Section 3 and install a new cotter pin. Bend the ends of the cotter pin around the castellations of the nut lock. Install the grease cap. 12. Install the hub cap or wheel cover.

13. 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	Tool-1217-K	Front Wheel Bearing Cup
T69L-1102-A	Front Wheel Bearing Remover		(Inner) Installer-Disc
Tool-1217-J	Front Wheel Bearing	T56P-1217-A	Front Wheel Bearing Cup
ſ	Cup (Outer) Installer-Disc		(Inner and Outer) Installer-Drum
		Tool-1175-AH	Grease Seal Installer-Disc

CF1666-A



# PART 11-11 Wheel Hubs and Bearings—Rear

Applies To All Models								
COMPONENT INDEX	Page	COMPONENT INDEX	Page					
BEARING AND SEAL - INTEGRAL CARRIER AXLE Removal and Installation BEARING AND SEAL - REMOVABLE CARRIER AXLE	11-11-02	HOISTING INSTRUCTIONS REAR WHEEL ASSEMBLY Description SPECIAL TOOLS	11-11-01 11-11-01 11-11-04					

# **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 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. Except for integral carrier—Ford Light Duty (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 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 ( $2 \times 4 \times 16$  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 CARRIER TYPE AXLE

The rear axle shafts, wheel bearings, and oil seal can be replaced without 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



FIG. 2 Removing Rear Whee! Bearing Retainer Ring

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.

#### 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.

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.

#### 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 drum attaching (Tinnerman) nuts.

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 (Tinnerman) nuts 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



FIG. 4 Installing Rear Wheel Bearing Oil Seal

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 scaling action of the oil seal. Check the axle shaft splines for 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.



F 1003-A

FIG. 5 Differential Pinion Shaft and Lock Bolt



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

#### 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.

10. Install the brake drum and



FIG. 8 Installation of Axle Shaft Bearing

tighten the attaching (Tinnerman) nuts.

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. 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.



FIG. 7 Removal of Axle Seal or Axle Bearing





FIG. 9 Rear Axle Shaft Bearing Seal Installation

# 9 SPECIAL SERVICE TOOLS

#### SPECIAL TOOLS

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Tool Number	Description	Tool Number	Description
Tool 4235-C-Use With T50T-100-A	Axle Shaft Remover	Tool 66L-12132-B Use With T50T-100-A and	Axle Seal or Wheel Bearing Remover
T60K-1225-A	Rear Wheel Bearing Remover	CJ-6625(Snap_On)	
Tool 4621-A	Rear Wheel Bearing Installer	Т60К-7697-В	Bearing Installer
Tool 1175-AB	Oil Seal Remover	T65F-1177-A	Oil Seal Installer
T66N-1177-A or T60K-1177-B	Oil Seal Installer		

CF1667-A



	Brake	S	y	group 12
PART 12-01 General Hydraulic Brake Servic	PAGE	PART 12-50	a Boostor Single	PAGE
PART 12-02	.e12-01-01	Diaphragi	n. Dash	
Drum Brakes—Single Cylinder,		Mounted (	Bendix)	12-50-01
Dual Piston (Bendix)		PART 12-70	,	
PART 12-20		Parking Brak	es—Cable Actuated	·
Disc Brakes—Single Piston,		Rear Whee	ls	12-70-01
Floating Caliper	12-20-01			

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# PART 12-01 General Hydraulic Brake Service

COMPONENT INDEX Applies to Models As Indicated	All Models	Ford	Mercury	Meteor	Cougar	Torino	Comet	Maverick	Montego	Mustang	Lincoln- Continental	Thunderbird	Continental- Mark III
BRAKE BOOSTER								1					
Adjustments		01-05	01-05	01-05	01-05	01-05	01-05	N/A	01-05	01-05	01-05	01-05	01-05
Cleaning and Inspection		01-07	01-07	01-07	01-07	01-07	01-07	N/A	01-07	01-07	01-07	01-07	01-07
Tests		01-03	01-03	01-03	01-03	01-03	01-03	N/A	01-03	01-03	01-03	01-03	01-03
BRAKE PEDAL													
Free Height Test	01-01												
Total Travel Test	01-01												
BRAKE PRESSURE DIFFERENTIAL													
AND/OR PRESSURE CONTROL VALVE													
Centralizing	01-06												
DISC BRAKES													
Cleaning and Inspection		01-06	01-06	01-06	01-06	01-06	01-06	N/A	01-06	01-06	01-06	01-06	01-06
Service Precautions		01-07	01-07	01-07	01-07	01-07	01-07	N/A	01-07	01-07	01-07	01-07	01-07
DRUM BRAKES													
Cleaning and Inspection	01-07												
HYDRAULIC LINES													
Inspection	01-07							•					
Repair	01-07												
HYDRAULIC SYSTEM BLEEDING	01-04			•					1				
PARKING BRAKE CONTROL													
Vacuum Release Test		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	01-03	01-03	01-03
SPECIAL SERVICE TOOLS	01-08							•					
A page number indicates that the item is for t $N/A$ indicates that the item is not applicable to t	SPECIAL SERVICE TOOLS 101-08   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 Ford Brake Fluid—Extra Heavy Duty—Part Number C6AZ-19542-A (ESAM6C25-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 wiffied brake fluid.

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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 to the center of the pedal by observing the pressure gauge, and measure the distance from the brake pedal to the fixed reference point on the steering wheel rim parallel to the centerline of the steering column.

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

5. If the pedal travel is more than the specified maximum shown in Fig. . 1, dimension B, make several sharp reverse stops (equivalent to 50 pounds pedal pressure) with a forward stop before each. Move the 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 (ARE345) 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.

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 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

## **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 Bendix power brake booster assemblies is accomplished as follows: 1. Disconnect the master cylinder

from the booster assembly and secure



of the above conditions exist, adjust as required.

#### **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.

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**

The Ford, Mercury, Meteor, Continental Mark III, Lincoln Continental, Thunderbird 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 Ford Fluid-Extra Heavy Duty-Part Number C6AZ19542-A (ESA-M6C 25-A). The



H1871-A

FIG. 4 Brake Booster Push Rod Measurement

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



FIG. 5 Wrench for Bleeding Brake Hydraulic System 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 cylinder 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 Ford Brake Fluid - Extra Heavy Duty Part N u m b e r C 6 A Z - 1 9 5 4 2 - A (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 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 Ford, Mercury, Meteor, Continental Mark III, Lincoln Continental and Thunderbird models 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 drumtype 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.

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 gasket 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 AND/OR** PRESSURE CONTROL 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 offcenter position.

To centralize the pressure differential 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.

#### **CLEANING AND INSPECTION** 5

#### 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, re-torque the bolts 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 approxi mately 1 inch from the outer edge. Rotate the rotor and take an indicator



reading. If the reading exceeds 0.003 inch on custom vehicles and 0.002 inch on light vehicles total lateral runout on the indicator, replace or resurface the disc brake rotor. The following requirement must be met when resurfacing disc brake rotors:

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.

.875 MIN. LIGHT CAR

TORINO-MUSTA NG-COUGA R

.017 MIN.

MONTEGO



LIGHT CAR

LIGHT CAR



Callina D



The finished braking surface of the rotor must be flat and parallel within 0.0007 inch; lateral runout must not exceed 0.003 inch on custom vehicles and 0.002 inch on light vehicles total indicator reading, braking surface are to be 80/15 micro inches.

On all models, the minimum limit ing 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 refinishing, the rotor must be replaced. A ball and gage bar (Rotunda Kit FRE-70170) is to be used when checking minimum dimensions (Fig. 8).

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 re moved 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 vehicle. 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 if oversize linings must be installed.

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 a 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 diameter is shown on each drum (Fig. 9). If the maximum inside 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.

#### **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 leakproof 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 1112144 or equivalent.

#### **Brake Hose**

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

When installing a new front brake hose, position the hose to avoid contact with other chassis parts. 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	Rotunda FRE-70370	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

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

COMPONENT INDEX Applies to Models As Indicated	Models	, p	ercury	eteor	ugar	rino	met	ıverick	ontego	stang	ncoln- ntinental	underbird	ntinental- ırk III
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BRAKE BACKING PLATE											•		
Removal and Installation	02-06												
BRAKE BOOSTER													
Cleaning and Inspection - See Part 12-01													
Description		02-03	02-03	02-03	02-03	02-03	N/A	N/A	02-03	02-03	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
BRAKEDRUM												•	
Cleaning and Inspection - See Part 12-01													
Refinishing													
Removal and Installation (Front)		02-04	02-04	02-04	02-04	02-04	02-04	02-04	02-04	02-04	N/A	N/A	N/A
Romoval and Installation (Rear)	02-05				_								
BRAKE PEDAL		-											
Removal and Installation		02-10	02-10	02-10	02-11	02-10	02-10	02-10	02-10	02-11	N/A	N/A	N/A
BRAKE SHOES													
Adjustments	02-03												
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DRUM BRAKE				1									
Description	02-01			İ									
DUAL BRAKE SYSTEM		l					_						
Description	02-01							•					
MASTER CYLINDER													
Cleaning and Inspection		02-12	02-12	02-12	02-12	02-12	02-12	02-12	02-12	02-12	N/A	N/A	N/A
Disassembly and Overhaul		02-12	02-12	02-12	02-12	02-12	01-12	02-12	02-12	02-12	N/A.	N/A	N/A
Removal and Installation - Non-Power		02-07	02-07	02-07	02-08	02-08	02-08	02-08	02-08	02-08	N/A	N/A	N/A
Removal and Installation - Power		02-09	02-09	02-09	02-09	02-09	N/A	N/A	02-09	02-09	N/A	N/A	N/A
PRESSURE DIFFERENTIAL VALVE				r									
Removal and Installation	02-10												
WHEEL CYLINDER											-		
Cleaning and Inspection	02-04		-										
Disassembly and Overhaul	02-04		-								_		
Removal and Installation	02-06												
SPECIFICATIONS AND SPECIAL													
SERVICE TOOLS	02-06		<u> </u>	<u> </u>	<u> </u>		<u> </u>						L
A page number indicates that the item is for	the vel	hicle(s	) liste	d at th	e head	d of the	e colui	mn.					
N/A indicates that the item is not applicable to the vehicle(s) listed.													

# **1 DESCRIPTION**



routed along the webb 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 drum brake system.

#### DUAL MASTER CYLINDER 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. 2), pressure differential valve assembly and a switch (Fig. 3). The switch on the differential valve activates a dual-brake warning light, located on the instrument panel.

#### **BRAKE BOOSTER SYSTEM**

This 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. 3)

# **3 ADJUSTMENTS**

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.

#### BRAKE SHOE ADJUSTMENTS

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.

ReyRal

To adjust the brake shoes: Use Rotunda Tool HRE 8650, (4) to determine the inside



screw slots. Make sure the adjusting screw rotates freely. If necessary, lubricate the adjusting screw threads with a thin, uniform coating of CIAZ 19590-B Moly Dysulfide.

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, being 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 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.

#### WHEEL CYLINDER REPAIR

Wheel cylinders should not be disassembled unless they are leaking or unless new cups and boots are to be installed. It is not necessary to remove the brake cylinder from the backing plate to disassemble, inspect, or hone



FIG. 5 Brake Wheel Cylinder--- Typical

and overhaul the cylinder. Removal is necessary only when the cylinder is damaged or scored beyond repair.

## 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 (cup expanders are an integral part of the return spring on Ford, Mercury, Meteor, Lincoln Continental, Continental Mark III and Thunderbird Models) from the cylinder bore (Fig. 5).

2. Remove the bleeder screw from the cylinder.

3. Wash all parts in clean brake fluid. Dry with compressed air.

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

Assembly

1. Apply a light coating of heavyduty 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. 5). Place a boot over each end of the cylinder. Bleed the brake system.

## **4 REMOVAL AND INSTALLATION**

#### FRONT BRAKE DRUM

#### Removal

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

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

**3.** Pull the drum off the wheel



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

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



FIG. 6 Backing Off Brake Adjustment

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.

#### REAR BRAKE DRUM

#### Removal

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

2. Remove the hub cap and wheel. Remove the three Tinnerman nuts and remove the brake drum. If the drum will not come off, 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 selfadjusting mechanism will not function properly.

#### Installation

1. Remove the protective coating from a new drum with carburetor degreaser; then sand lightly and wipe with a cloth soaked 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 Tinnerman nuts and tighten securely. Install the wheel on the axie shaft flange studs against the drum, and tighten the attaching nuts to specifications.



# BRAKE SHOES AND ADJUSTING SCREW

#### Removal

1. With the wheel and drum removed install a clamp over the ends of the 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 III and Lincoln Continental models, remove the shoe guide (anchor pin) plate (Fig. 1).

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 hightemperature 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 (Fig. 1).

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



FIG. 8 Retracting Spring Installation

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 CIAZ 19590-B Moly Dysulfide 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. Two grooves on the nut indicate a right thread; one groove indicates a left thread.

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.

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 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 Ford, Mercury, Meteor, Thunderbird, Continental Mark III, and Lincoln Continental models, 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 Torino, Montego, Mustang, and Cougar models the cable should measure 8 13/32 inches on 9 inch brakes or 9 3/4 inches on 10 inch brakes from the end of the cable

ADJUSTING LEVER

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 1201.

# DUAL MASTER CYLINDER- NON POWER BRAKES

#### Ford, Mercury and Meteor

#### Removal

#### Refer to Fig. 10.

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 lift the switch straight upward



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

# 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 tube from the primary and secondary outlet ports of the master cylinder.

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

#### Installation

1. Position the boot on the push rod and secure the boot to the master cylinder. Carefully insert the master cylinder push rod and boot through the dash panel opening and position the master cylinder on the panel.

2. Install the 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 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 Ford Brake Fluid-Extra Heavy Duty-Part Number C6AZ-19542-A (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 power disc brake system.

8. Bleed the dual-master cylinder and the primary and secondary brake systems. Centralize the pressure differential valve. Refer to Hydraulic System Bleeding and Centralizing of the Differential Valve, Part 12-01, for proper procedure.

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

#### Torino, Montego, Maverick, Mustang and Cougar

#### Removal

Refer to Figs. 11 and 12.

1. Working from inside the vehicle below the instrument panel, disconnect the master cylinder push rod from the brake pedal assembly. The push rod cannot be removed from the master cylinder.

2. Disconnect the stoplight switch wires at the connector. Remove the hairpin retainer. Slide the stop light switch off the brake pedal pin



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FIG. 13 Master Cylinder Installation — Power Brake—Ford, Mercury and Meteor

just far enough to clear the end of the pin, then lift the switch straight upward from the pin. Use care to avoid switch damage during removal.



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

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

5. Remove the lock nuts or cap screw and lockwashers that secure the master cylinder to the dash panel and lift the cylinder forward and upward from the car.

#### Installation

Refer to Figs. 11 and 12.

1. Position the boot on the push rod and secure the boot to the master cylinder. Carefully insert the master cylinder push rod and boot through the dash panel opening.

2. On Torino or Montego models, position the gasket and master cylinder on the mounting studs on the dash panel. Install the lock nuts on the studs at the dash panel and torque them to specification.

3. On Mustang or Cougar models, position the master cylin der on the dash panel. Install the retaining screws and torque them to specification. Coat the nylon bushings with SAE 10W oil. Install the nylon washer and bushing on the brake pedal pin.

4. Position the stop light switch 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 and tighten to specified torque.

7. Fill the master cylinder with the specified brake fluid to within 1/4 inch of the top of the dual reservoirs. Use Ford Brake Fluid-Extra Heavy Duty-Part Number C6AZ-19542-A for all brake applications. The brake 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 2-1, Section 2 for the proper procedure.

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

#### DUAL MASTER CYLINDER-**POWER BRAKES**

#### Removal

1. Remove the brake tubes from the primary and secondary outlet ports





VIEW A

Master Cylinder Installation—Power Brake—Mustang and Cougar FIG. 15

of the master cylinder (Figs. 13 thru 15).

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

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. 13 thru 15).

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.

5. Fill the master cylinder with the specified brake fluid to within 1/4 inch of the top of the dual reservoirs. Use Ford Brake Fluid-Extra Heavy Duty-Part Number C6AZ-19542-A (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 disc 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 front inlet and rear outlet tubes from the valve assembly (Fig. 3).

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 front inlet and rear 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:

BUY IT NOW! Click Here To Order booster push rod and the nylon washers and bushing off the brake pedal pin (Figs 13 thru 15).

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. Permanent deformation of brake lines can lead to tube failure.

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

4. Remove the booster-to-dash panel attaching nuts or bolts (Figs. 13 thru 15). Remove the booster and bracket assembly from the dash panel, sliding the push rod link out from the engine side of the dash panel.

5. On Torino and Montego models, remove the push rod link boot from the dash panel.

#### Installation

1. On Torino and Montego models, install the push rod link boot in the hole in the dash panel as shown in Fig. 14. Install the four spacers on the mounting studs.

2. 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 or bolts (Figs. 13 thru 15).

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

4. Before installing the master cylinder, check the distance from the outer end of the booster assembly push rod to master cylinder surface. Turn the screw in or out to obtain the specified length. Refer to Part 12-01, Power Brake Master Cylinder Push Rod Adjustment. Install the master cylinder and torque the attaching nuts to specifications.

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

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. 13 thru 15. **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 washers 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 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.

> Torino, Montego and Maverick— Manual-Shift Transmission

#### Removal

1. Remove the clutch pedal assist spring.

2. Disconnect the clutch pedalto-equalizer rod at the clutch pedal by removing the retainer and bushing. pedal shaft, then remove the clutch pedal and shaft assembly, the brake pedal assembly, and the bushings from the pedal support bracket (Figs. 11 and 14).

#### 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 and 14).

3. Install the clutch pedal assist spring.

4. Connect the clutch pedaltoequalizer 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 and 14. 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).

#### Torino, Montego, Maverick, Mustang and Cougar—Automatic Transmission or Mustang and Cougar with Standard 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, 14 and 15).

3. On all vehicles except Mustang and Cougar, re move 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, 14 and 15).

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 as shown in Figs. 11, 12, 14 and 15. 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 1201.

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## **5 MAJOR REPAIR OPERATIONS**

#### **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.

Check the inside diameter of the drum with a brake drum BUY IT NOW! Click Here To Order

#### **BRAKE SHOE 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



FIG. 16 Brake Drum Maximum Inside Diameter Marking Location the shoe and lining. The lining must seat tightly against the shoe with not more than 0.008 inch clearance between any two rivets.

#### **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. 17).

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. 18). Remove the push rod and the primary piston assembly from the master cylinder bore. Do not remove the screw that retains the primary return spring retainer, return spring, primary cup 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 isopro pyl 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



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H1477-C

FIG. 18 Removing Snap Ring-Typical

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

#### Assembly

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

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

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

and install the snap ring in the cylinder bore groove.5. Install the push rod, boot and

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. 17. Make sure the gasket is se curely seated.

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



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#### SPECIFICATIONS AND SPECIAL SERVICE TOOLS 9

#### DRUM BRAKE LINING DIMENSIONS (INCHES)

			BRAKE	LINING S	IZE O	
MODELS	POSITION	COLOR CODE	SIZE	FRONT	REAR	
Mercury passenger car - 351 Monterey & Monterey	Primary 🖌	Black-Yellow	11	2.50 x 9.34	2.25 x 9	
240-302-351-CID - All except LTD & Lemoyne. 390 & 400 CID Ford - All except LTD.	Secondary	Blue-Black	11	2.50 x 12.12	2.25 x 12	
Ford-Mercury-Meteor Passenger Car.	Primary	Black-Yellow <sup>®</sup>	11	3.00 x 9.34	2.25 x 9.	
100 CID - all Meteor except Lemoyne 400 & 429 CID - All Mercury 429 CID - All Ford and Meteor except LTD and Lemoyne.	Secondary	Blue-Black	11	3.00 x 12.12	2.25 x 1	
240-302 CID New York Taxi - Ford.	Primary	Black-Yellow	11	NA	2.25 x 9.	
Without A/C - 429 Police Interceptor - Ford. Ford LTD - All Engines	Secondary	Blue-Black	11	NA	2.25 x	
Mercury Police - All Engines except Police	Primary	Black-Yellow	11	NA	2.25 x 9	
nterceptor - 429 CID	Secondary	Blue-Black	11	NA	2.25 x	
Mercury Police Interceptor - 429 CID	Primary	Yellow-Yellow	11	<u>NA</u>	2.50 x 9	
	Secondary	G reen-G reen	11	<u>NA</u>	2.50 x	
ord-Mercury-Meteor Station Wagons.	Primary	Black-Yellow		3.00 x 9.34	2.25 x 9.	
nd 400 w/o A/C - All Ford-Meteor except Squire. 390 nd 400 w/o A/C - All Ford-Rideau-Monterey M71B.	Secondary	Blue-Black	11	3.00 × 12.12	2.25 x 1	
ord-Mercury-Meteor Station Wagons.	Primary	Black-Yellow	11	NA	2.25 x 9.	
100 CID without A/C - Montcalm & All Mercury except Monterey M71B. 400 CID Meteor and Mercury with A/C. All 429 CID Meteor and Mercury. 390 & 400 CID Ford with A/C. 429 - All Ford. Ford Squire - All Engines.	Secondary	Blue-Black	11	NA	2.25 x	
	TORING	MONTEGO			<b></b>	
50 & 302 CID Torino-Montego Sedan and Hardtop.	Primary	Yellow-Black	10	2.25 x 8.43	2.00 x 8	
	Secondary	Blue-Blue	10	2.25 x 10.82	2.00 x	
250 & 302 Torino-Montego Conv.	Primary	Yellow-Black	10	2.50 x 8.43	2.00 x 8	
250 & 302 Torino-Montego Sta. Wag. 351 & 429 ClD Fairlane-Montego Sedan & Hdtop. and 351 Conv. 250, 302 & 351 Torino-Montego LPO Police-Maximum Fade Resistant.	Secondary	Blue-Blue	10	2.50 x 10.82	2.00 x 1	
250-302 & 351 Montego Police LPO Maximum Wear	Primary	Yellow-Black	10	2.50 x 9.51	2.00 x 9	
Resistant (Bonded) .	Secondary	Blue-Blue	10	2.50 x 10.75	2.00 x	
51 & 429 CID Torino-Montego Station Wagons.	Primary	Yellow-Black	10	2.50 x 8.43	2.00 x 8	
	Secondary	Blue-Blue	10	2.50 x 10.82	2.00 x	
	MUSTANG AND	COUGAR	,L_	<b></b>		
Austang	Primary	Yellow-Black	10	2.25 x 8.43	2.00 x 8.	
200 and 302 CID	Secondary	2 Blue	10	2.25 x 10.82	2.00 x	
351 and 429 CID	Primary	Yellow-Black	10	2.50 x 8.43	2.00 x 8.	
unsrank ann ponkal	Secondary	Blue-Blue	10	2.50 x 10.82	2.00 x	
	MAVERICK AN	D COMET				
00 & 250 CID	Primary	Red-Blue	9	2.25 x 7.62	1.50 x 7.	
00.01D	Secondary	Green	9	2.25 x 9.77	1.50 x 9.	
	Primary	Yellow-Black	10	2.25 x 8.43	1.75 x 8.	
	Secondary	Blue-Blue	10	2.25 x 10.82	1.75 x 1	
·	LINCOLN CONT				1	
Tels	Primary	Yellow-Black	11	NA	2.50 x 9.	
	Secondary	Blue-Blue	11	NA	2.50 x	
BUY IT NOW	RBIRD AND CON	IINENIAL MARK III				
BUY IT NOW!	RBIRD AND CON	Yellow-Black	11	NA	2.25 x 9.	

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		Bra	ake Drum	Wheel Cylin Dia	nder Bore	MasterCylinder Bore Dia.		
	Models	Inside Diameter	Boring Limit (Max.)①	Front@	Rear@	With Power Brake@	- Less Power Brake@	
Ford,	Taxi and Station Wagon	11.030	11.090	1.093	0.938	1.000	1.000	
Mercury and Meteor	Other	11.030	11.090	1,125	0.938	1.000	1.000	
Manhaka	Pass. except Conv. 250, 302 CID Engines	10.000	10.060	1.125	0.906	0.9375	1.000	
and	Pass. and Conv. 351, 390, 429 CID Engines	10.000	10.060	1.125	0.906	0.9375	1.000	
	Convertible 250, 302 CID Engines	10.000	10.060	1.125	0.906	0.9375	1.000	
	Station Wagon	10.000	10.060	1.125	0.968	0.9375	1.000	
Maverick	9 Inch Brake - Passenger Car	9.000	9.060	1.0623	0.8443	0.9375	1.000	
Comet	10 Inch Brake - Passenger Car	10.000	10.060	1.125	0.875	0.9375	1.000	
Mustang	351, 429, 428 CID Engine	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	0.938	1.000	N/A	
Continental Mark III	All	11.030	11.090	N/A	0.938	1.000	N/A	
Lincoln Continental	All	11.030	11.090	N/A	0.938	1.000	N/A	
⊙Max. Runout 0.007 @Max. Allowable Hone 0	.003	an <b>n</b> ot be ho	ned on Mav	verick or Mus	tang with			

BORE DIAMETERS-BRAKE DRUM, WHEEL CYLINDER AND MASTER CYLINDER

and the second

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## TORQUE LIMITS-GENERAL-FT-LBS

· ·	Ford-Mercury Meteor	Torino Montego Maverick	Mustang- Cougar	Thunderbird Continental Mark III	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
	10.00	10 in. Brake 10-20	10 in. Brake 10-20	10.20	10.20
Wheel Cylinder to Backing Plate Screws	10-20	9 in. Brake 5-7	9 in. Brake 5-7	10-20	10-20
Wheel Cylinder & Backing Plate Anchor Pin Nut	20-30				
Rear Brake Backing Plate to Axle Housing: Removable Carrier	50-70			50-70	30-35
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-Ib.	32-65 Inch-Ib.	6-15	6-15
Brake Hose Connection to Front Wheel Cylinder	12-20	12-20	12-20		
Brake Line Connection to Rear Axle Housing: Removable Carrier	30-40	12-19	12-19	30-40	
Integral Type	25-35	12-19	12-19		
Hydraúlic Tube Connections① 3/8 x.24	10-15	10-15	10-15	10-15	10-15
7/18 x 24	10-15	10-15	10-15	10-15	10-15
1/2 x 20	10-17	10-17	<u>۱</u> 0-17	10-17	10-17
9/16 x 18	10-17	10-17	10.17	10-17	10-17
	70.115	4 lug - 55-85	4 lug 55-85	70 115	70.115
IWNEEL TO HUD AND Drum	/0-115	5 lug 70-115	5 lug 70-115	/0-115	/0-115
① All hydraulic lines must be tightened to	o the specified torque	value and be free of	fluid leakage.		

## SERVICE TOOLS

Tool No.	Former No.	Description
HRE 8650 (Rotunda)		Brake Adjusting Gage
BL-41-A (Snap-on)	LM 119	Brake Cylinder Retaining Clamp
B3404-B (Snap-on)	. 2018-A	Brake Adjusting Tool
	2162	Adapter Cap
BT-11 (Snap-on)	2035N	Brake Shoe R & R Spring
Tool 7000-DE		Rubber Tipped Air Nozzle
Tool 33621	33621	Internal Snap Ring Pliers
	Milbar 1112-144	Inch Pound Torque Wrench
T71P-4234-A (Ford)	4235-C	Axle Shaft Remover
Rotunda FRE 1432		Brake Drum Micrometer



CH1865-A

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

COMPONENT INDEX	lodels	_	ury	0L	ar	0		rick	ego	ang	ln- inental	derbird	nental- III
Applies to Models As Indicated	A II M	Ford	Merci	Mete	Coug	<b>Forin</b>	Come	Mave	Mont	Must	Linco Conti	[huno	Conti Mark
BRAKE BOOSTER			<b>F</b> .	<b>_</b>	- <b>-</b> -			<b>F</b> .					
Cleaning and Inspection - See Part 12-01													
Description		20-03	20-03	20-03	20-03	20-03	N/A	N/A	20-03	20-03	20-03	20-03	20-03
Removal and Installation		20-09	20-09	20-09	20-09	20-09	N/A	N/A	20-09	20-09	20-09	20-09	20-09
BRAKE PEDAL			-										
Removal and Installation		20-10	20-10	20-10	20-10	20-10	N/A	N/A	20-10	.20-10	20-11	20-10	20-10
DISC BRAKE													
Description		20-02	20-02	20-02	20-02	20-02	N/A	N/A	20-02	20-02	20-02	20-02	20-02
DISC BRAKE CALIPER													
Cleaning and Inspection		20-14	20-14	20-14	20-14	20-14	N/A	N/A	20-14	20-14	20-14	20-14	20-14
Disassembly and Overhaul		20-13	20-13	20-13	20-13	20-13	N/A	N/A	20-13	20-13	20-13	20-13	20-13
Removal and Installation		20-04	20-04	20-04	20-05	20-05	N/A	N/A	20-05	20-05	20-04	20-04	20-04
DISC BRAKE ROTOR AND HUB													
Cleaning and Inspection - See Part 12-01													
Refinishing		20-11	20-11	20-11	20-11	20-11	N/A	N/A	20-11	20-11	20-11	20-11	20-11
Removal and Installation		20-06	20-06	20-06	20-06	20-06	N/A	N/A	20-06	20-06	20-06	20-06	20-06
DISC BRAKE ROTOR SPLASH SHIEL													
Removal and Installation		20-06	20-06	20-06	20-06	20-06	N/A	N/A	20-06	20-06	20-06	20-06	20-06
DISC BRAKE SERVICE PRECAUTION	NS												
See Part 12-01								1					
DISC BRAKE SHOE AND LINING													
Cleaning and Inspection - See Part 12-01													
Removal and Installation		20-04	20-04	20-04	20-04	20-04	N/A	N/A	20-04	20-04	20-04	20-04	20-04
DUAL BRAKE SYSTEM													
Description		20-02	20-02	20-02	20-02	20-02	N/A	N/A	20-02	20-02	20-02	20-02	20-02
MASTER CYLINDER													
Cleaning and Inspection		20-12	20-12	20-12	20-12	20-12	N/A	N/A	20-12	20-12	20-12	20-12	20-12
Disassembly and Overhaul		20-12	20-12	20-12	20-12	20-12	N/A	N/A	20-12	20-12	20-12	20-12	20-12
Removal and Installation - Power		20-07	20-07	20-07	20-07	20-07	N/A	N/A	20-07	20-07	20-07	20-07	20-07
PRESSURE DIFFERENTIAL AND													
PRESSURE CONTROL VALVE													
Removal and Installation		20-08	20-08	20-08	20-08	20-08	N/A	N/A	20-08	20-08	20-08	20-08	20-08
PRESSURE METERING VALVE									ĺ				
Removal and Installation		20-08	20-08	20-08	N/A	N/A	N/A	N/A	N/A	N/A	20-08	20-08	20-08
SPECIFICATIONS AND SPECIAL					•								
SERVICE TOOLS	02-15					<u> </u>		. <u> </u>					
A page number indicates that the item is for the vehicle(s) listed at the head of the column.													





## **1 DESCRIPTION**

Disc brakes are available as optional equipment for the front wheels on Ford, Mercury, Meteor, Torino, Montego, Mustang and Cougar models and are standard on Thunderbird, Continental Mark III, and Lincoln Continental models. The



FIG. 1 Disc Brake Assembly— Floating Caliper

dual-master cylinder equipped hydraulic brake system employs single anchor, internal expanding and selfadjusting 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).

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

On Ford, Mercury, Meteor, Continental Mark III, Lincoln Continental and Thunderbird models a metering valve, in the hydraulic line between the differential valve and the front wheel disc brakes, prevents the front brakes from applying until approximately 125 psi is obtained in the system (Fig. 1). This delaying action is required to prevent the front brakes from performing all the braking action on low speed stops and thereby increasing the rate of lining wear, and from locking on ice and slippery pavement.

A vacuum booster is used with the power disc brake system.

# DUAL MASTER CYLINDER 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. 2), pressure differential valve assembly and a switch (Fig. 3). The switch on the differential valve activates a dual-brake warning light, located on the instrument panel.

#### Floating Caliper

The caliper assembly is made up of a floating caliper housing assembly and an anchor plate. The anchor plate is bolted to the wheel spindle arm by two bolts. The floating caliper is attached to the anchor plate by steel stabilizers on Ford, Mercury, Meteor, Lincoln Continental, Thunderbird and Continental Mark III models and by one stabilizer on Torino, Montego, Mustang and Cougar models. The floating caliper slides on two locating pins which also attach to the stabilizers. The floating caliper contains the single cylinder and piston assembly. The cylinder bore contains a



piston with a molded rubber dust boot to seal the cylinder bore from contamination (Fig. 4). A square section rubber piston seal is positioned in a groove in the cylinder bore and is used to provide sealing between the cylinder and piston (Fig. 5).

The outer brake shoe and lining assembly is longer than the inner assembly, and the shoe and lining assemblies are not interchangable. The outboard shoe and lining is fixed to the floating caliper and is retained by two pins and spring clips. The shoe and lining assembly consists of friction material bonded to a metal plate called the shoe. It is replaced as a unit.

#### Rotor

The cast iron disc is of the ventilated rotor-type incorporating forty fins and is attached to, and rotates with the wheel hub. A splash shield bolted to the spindle is used primarily to prevent road contaminants from contacting the inboard rotor and lining surfaces. The wheel provides protection for the outboard surface of the rotor.

#### **BRAKE BOOSTER SYSTEM**

This diaphragm-type brake booster is a self-contained vacuum-hydraulic



H 1568-B



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.





FIG. 5 Function of Piston Seal

## 4 REMOVAL AND INSTALLATION

#### DISC BRAKE CALIPER ASSEMBLY

#### Removal

1. Remove the wheel and tire assembly from the hub. Use care to avoid damage or interference with the bleeder screw fitting during removal.

2. Disconnect the brake hose from the caliper. Cap the hose fitting to prevent brake system contamination and loss of brake fluid from the master cylinder. Mark the left and right caliper assemblies with chalk prior to removal from the vehicle.

3. Remove the caliper locating pins and lower stabilizer attaching

bolts and discard the stabilizer (Figs. 3 and 6).

4. Lift the caliper from the anchor plate.

#### Installation

1. Install the caliper assembly over the rotor with the outer brake shoe against the rotor braking surface during installation in the anchor plate to prevent pinching the piston boot between the inner brake shoe and the piston. Check that the correct caliper is installed on the correct anchor plate as marked during disassembly.

2. Position the new stabilizer (supplied in the brake kit). Apply water to the locating pins and attach the stabilizer to the caliper. Be sure the locating pins are free of oil, grease or dirt. Torque the caliper locating pins to specifications.

3. Install the stabilizer to anchor plate attaching screws and torque to specifications.

4. Remove the cap from the brake hose fitting. Install a new copper washer on each side of the hose fitting and install the brake hose to the caliper. Torque the attaching bolt to specifications.

5. Bleed the brake system and centralize the brake pressure differential valve as outlined in Part 12-01.

6. Fill the master cylinder as required to within 1/4 inch of the top of the reservoir.

7. Install the wheel and tire assembly and torque the wheel nuts to specifications.

8. Apply the brake pedal prior to moving the vehicle to position the brake linings.

9. Road test vehicle.

#### DISC BRAKE SHOE AND LINING

#### Ford, Mercury, Meteor, Thunderbird, Continental Mark III, Lincoln Continental

#### Removal

1. Remove the master cylinder cap and check the fluid level in the primary (large) reservoir. Remove enough fluid until the reservoir is half full. Discard this fluid.

2. Remove the wheel and tire assembly from the hub. Be careful to avoid damage or interference with the caliper splash shield or bleeder screw fitting.

3. Remove the inner shoe hold down clips (Fig. 1).

4. Place a small screwdriver under the outer shoe retaining clip tang and lift away from the pin groove and slide the clip from the shoe retaining pin. Remove the other brake shoe retaining clip. See Fig. 1 and remove the outer brake shoe.

5. Remove the caliper locating pins (Fig. 6).

6. Remove the upper stabilizer to anchor plate attaching bolt and remove the upper stabilizer to avoid interference with the brake hose during caliper removal (Fig. 6).

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