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# 1973 TRUCK SHOP MANUAL

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## **1973 Ford Truck Shop Manual**

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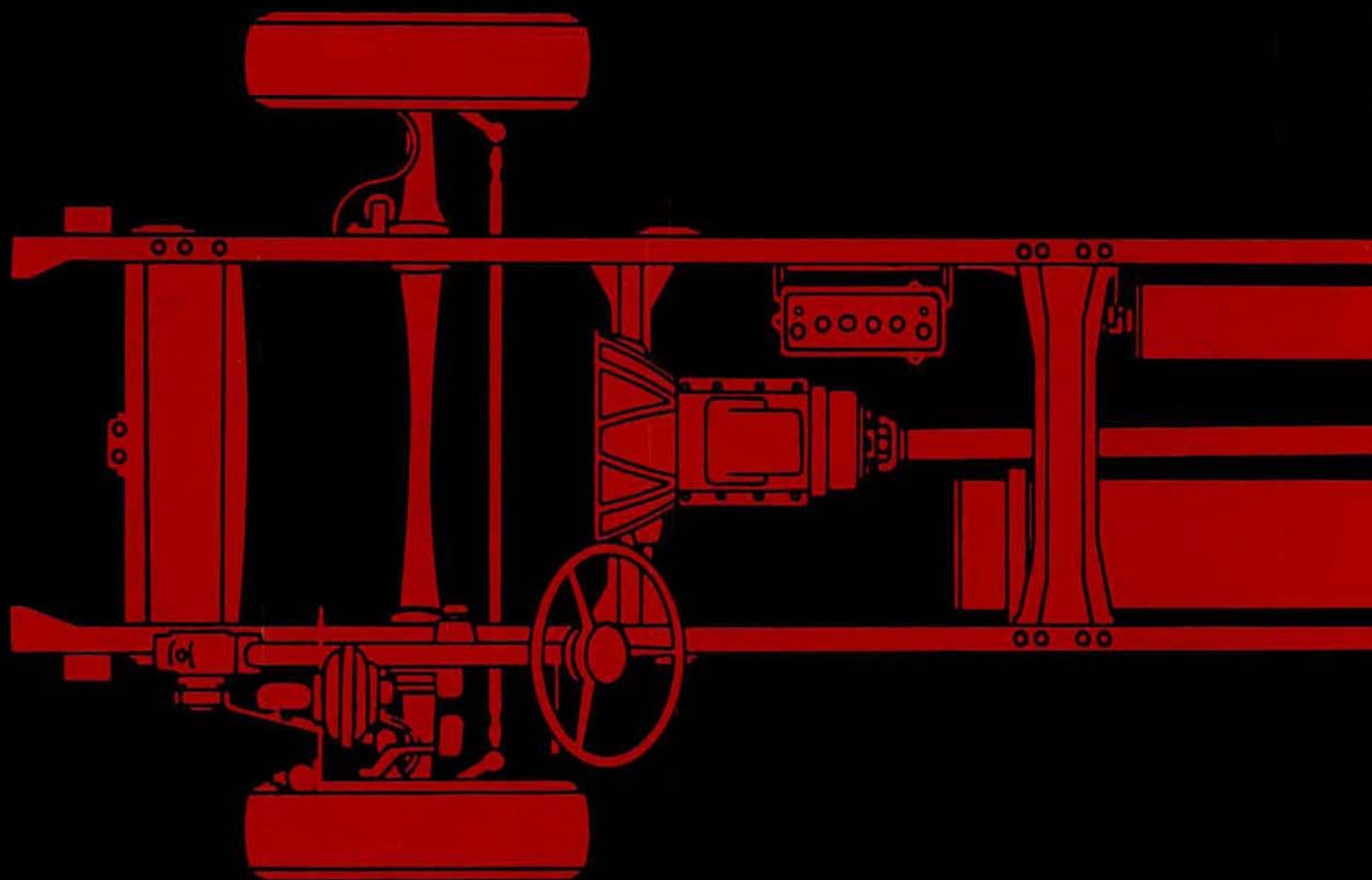
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# 1973 TRUCK SHOP MANUAL



## Volume 1 Chassis



License #2011747

# 1973 TRUCK SHOP MANUAL

## Volume I Chassis

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# FOREWORD

This manual is divided into five volumes: 1 – Chassis, 2 – Engine, 3 – and 4 – Electrical and Body, 5 – Maintenance and Lubrication. These volumes should provide Service Technicians with complete information covering normal service repairs on all 1973 model trucks built by the Ford Companies in the U. S. and Canada. As changes in the product occur, this information will be updated by Technical Service Bulletins. When issued, T.S.B. information always supersedes the information in the manual.

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

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

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

**Example:**                      11    –    02    –    21

Volume 1 – Group 11 – Part 02 – Page 21

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



## Service Publications

# Identification Codes

GROUP

10

## GENERAL INFORMATION

### 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.

The remaining information codes on the V.C. Label are the same as the Truck Rating Plate Codes (Fig. 1). Vehicle codes shown on the Truck Rating Plate are explained in the following paragraphs.

### RATING PLATE

Figure 1 illustrates a typical Truck Rating Plate. On light and medium cowl and windshield vehicles, the Rating Plate is mounted on the right side of the cowl top panel under the hood. On stripped Parcel Delivery vehicles, the rating plate is placed in an envelope and

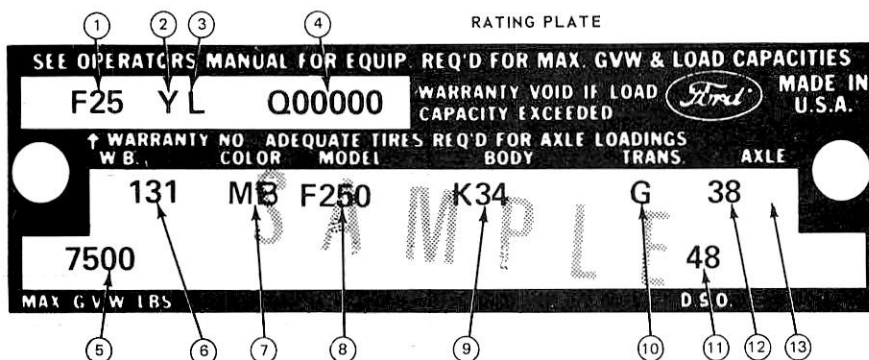
included in the Boxed Items parts. On Bronco models, the plate is mounted on the inside panel of the glove compartment door. On all other vehicles, the Rating Plate is mounted on the rear face of the left front door.

### VEHICLE IDENTIFICATION NUMBER

The identification number is the first line of numbers and letters appearing on the Rating Plate (Fig. 1). The first letter and two numbers indicate the truck model and series (the letter prefix identifies the type of body or cab and the numbers are the first two numbers of a truck series). The letter following the truck series code designates the engine identification code. The letter following the engine identification code indicates the assembly plant at which the vehicle was built. The remaining numbers indicate the consecutive unit number. The charts that follow list the various vehicle identification number codes.

### VEHICLE DATA

The Vehicle Data appears on the Rating Plate on the two lines following the identification number. The first three digits under W.B. designate the wheelbase in inches. The one or two letters under COLOR identify the exterior paint color (two letters designate a two-tone). The letter and three digits under MODEL designate the truck model within a series. The letter and numerals under BODY designate the interior trim and body type (the letter identifies the interior trim scheme and the numerals identify the body or cab type). The transmission installed in the vehicle is identified under TRANS by either a numeric or alphabetical code (if two symbols appear, the first identifies the auxiliary transmission, if so equipped, and the second symbol identifies the main transmission). A letter and a number or two numbers under AXLE identify the rear axle ratio (when required, a letter is



- ① TRUCK SERIES CODE
- ② ENGINE CODE
- ③ ASSEMBLY PLANT CODE
- ④ CONSECUTIVE UNIT NO.
- ⑤ RECOMMENDED MAX. GROSS VEHICLE WEIGHT

- ⑥ WHEELBASE
- ⑦ EXTERIOR PAINT CODES
- ⑧ MODEL CODE
- ⑨ BRONCO, ECONOLINE AND 100-6000 - TRIM CODE; 700-9000 SERIES - FIRST CHARACTER IS CAB TRIM, SECOND IS SEAT TYPE, AND THIRD IS BODY CODE

- ⑩ TRANSMISSION CODES
- ⑪ DISTRICT/SPECIAL ORDER CODES
- ⑫ REAR AXLE CODES
- ⑬ FRONT AXLE CODES (IF SO EQUIPPED)

FIG. 1 Typical Truck Rating Plate and Vehicle Certification Label

also stamped behind the rear axle code to identify the front axle capacity). The maximum gross vehicle weight in pounds is stamped under MAX. G.V.W.

A two-digit number is stamped under D.S.O. to identify the district which ordered the vehicle. If the vehicle is built to special order (Domestic Special Order, Foreign Special Order, Limited Production Option, or other special order), the complete order

number will also appear under D.S.O. The charts that follow list the various vehicle data codes.

### W.B. (WHEELBASE)

The wheelbase in inches is entered in this space.

### MAX. G.V.W. LBS

The maximum gross vehicle weight in pounds is recorded in this space.

### D.S.O.

If vehicle is built on a D.S.O., F.S.O., L.P.O. (special orders) the complete order number will be reflected under the D.S.O. space including the District Code Number.

### MODEL DESIGNATION (FIRST 3 CODE SYMBOLS - WARRANTY SERIAL NO. LINE)

U	<u>Bronco</u>	F	Conventional	(Gas)	F-70	F-700
U-14	<u>Basic Series</u>	K	Conventional	(Diesel)	F-75	F-750
U-15	U-100 (Pickup) 4 x 4		Chassis		F-80	L-800
	U-100 (Wagon) 4 x 4	Pick-up	Cab	Basic Series	F-81	L-800
E	<u>Econoline</u>	F-10	F-17	F-100	F-90	L-900
	<u>Basic Series</u>	F-11	F-18	F-100 4 x 4	K-80	L-8000 (Diesel)
	<u>100 Series</u>	F-25	F-27	F-250	K-81	L-8000
E-11	E-100 Club Wagon	F-26	F-28	F-250 4 x 4	K-90	L-9000
E-12	E-100 Custom Club Wagon	F-35	F-37	F-350	N-60	LN-600
E-13	E-100 Chateau Wagon				N-61	LN-600
E-14	E-100 Regular Van	F-50		F-500	N-70	LN-700 (Gas)
E-15	E-100 Window Van	F-60		F-600	N-75	LN-750
E-16	E-100 Display Van	F-61		F-600	N-80	LN-800
	<u>200 Series</u>	F-65, F-66		F-600 4 x 4	N-90	LN-900
E-21	E-200 Club Wagon	K-60		F-6000 (Diesel)	R-60	LN-6000
E-22	E-200 Custom Club Wagon	K-61		F-6000 (Diesel)	R-61	LN-6000
E-23	E-200 Chateau Wagon	K-70		F-7000 (Diesel)	R-70	LN-7000 (Diesel)
E-24	E-200 Regular Van		B	Bus (Gas)	R-80	LN-8000
E-25	E-200 Window Van		J	Bus (Diesel)	R-81	LN-8000
E-26	E-200 Display Van		B-50	B-500	R-90	LN-9000
	<u>Bus Models</u>		B-60	B-600	S-80	LNT-800
E-27	E-200 Standard		B-61	B-600	S-90	LNT-900 (Gas)
E-28	E-200 Custom		B-70	B-700	W-90	LNT-8000
E-29	E-200 Chateau		B-75	B-750	W-90	LNT-9000 (Diesel)
E-30	Camper		J-70	B-7000 (Diesel)	C-60	C-600
	<u>300 Series</u>		P	Parcel (Gas)	C-61	C-600
E-31	E-300 Club Wagon		G	Parcel (Diesel)	C-70	C-700 (Gas)
E-32	E-300 Custom Club Wagon	P-35			C-75, C-76	C-750
E-33	E-300 Chateau Wagon	P-40			C-80	C-800
E-34	E-300 Regular Van	P-50			C-90	C-900
E-35	E-300 Window Van	P-60		P-600 (DSO)	D-60	C-6000
E-36	E-300 Display Van	G-50		P-5000 (DSO) (Diesel)	D-70	C-7000 (Diesel)
	<u>Bus Models</u>				D-80	C-8000
E-37	E-300 Standard				T-80	LT-800
E-38	E-300 Custom	M-35		Motor Home (Gas)	T-90	LT-900 (Gas)
E-39	Chateau	M-40			U-80	LT-8000
V-80	LTS 800 (Gas)	M-50			U-90	LT-9000 (Diesel)
V-90	LTS 900	Y-80		LTS 8000 (Diesel)	L-80	CT-800
		Y-90		LTS 9000	L-90	CT-900 (Gas)
					O-80	CT-8000 (Diesel)
					Z-90	W-9000
					X-90	WT-9000 (Diesel)

ENGINE CODES BRONCO-ECONO-CLUB WAGONS-PARCEL-SCHOOL BUS-LT & MED TRUCKS			
Code	CID Engine	Cyl.	
T	Gas (Bronco)	200-1V	6
G		302-2V	8
A	Gas (Econoline)	240-1V	6
G		302-2V	8
A	Gas (F100-250-350)	240-1V	6
B		300-1V	6
G		302-2V	8
Y		360-2V	8
H		390-2V	8
B	Gas	300-1V	6
B	(600 Series)	300-1V H.D.	6
C		330-2V	8
D		330-2V H.D.	8
E		361-2V	8
U	Diesel	522 (V 150)	8
W		380	6
A	Gas (Parcel Delivery)	240-1V	6
B		300-1V	6
K	Diesel (Detroit)	353N	3 (DSO)
1	Gas (Low Compression Export)	240-1V	6
2		300-1V H.D.	6
3		302-2V	8
4		330-2V H.D.	8
8		360-2V	8
5		361-2V	8
Heavy and Extra Heavy Truck-Series 700 through 9000 LN 500-9000 and C-500-900			
Code	Cylinders	Engine C.I.D.	
A	6	240-1V	
B	6	300-1V	
C	8	330-2V M.D.	
D	8	330-2V H.D.	Gas

## CONSECUTIVE UNIT SERIAL NUMBERS

## 1972 CALENDAR YEAR PRODUCTION

Month	Through 600 Series	Heavy-Extra Heavy Series
August	Q00,000-Q09,999	Q10,000-Q19,999
September	Q20,000-Q29,999	Q30,000-Q39,999
October	Q40,000-Q49,999	Q50,000-Q59,999
November	Q60,000-Q69,999	Q70,000-Q79,999
December	Q80,000-Q89,999	Q90,000-Q99,999

## ASSEMBLY PLANTS CODE LETTERS

Code	Assembly Plant
C	Ontario Truck
E	Mahwah
I	Highland Park
K	Kansas City
L	Michigan Truck

## AUXILIARY TRANSMISSION CODE

CODE	DESCRIPTION	CODE	DESCRIPTION
2	Spicer 5831D	5	Spicer 8341C
3	Spicer 7231B	6	Spicer 8031C
4	Spicer 7231D	8	Spicer 7041
Heavy and Extra Heavy Truck - Series 700 through 9000 LN500-9000 and C-500-900			

Heavy and Extra Heavy Truck-Series 700 Through 9000 LN-500-9000 and C-500-900			
Code	Cylinders	Engine C.I.D.	
E	8	361-2V	
F	8	391-4V	
H	8	401-4V	
K	8	477-4V	Gas
L	8	534-4V	
U	8	330-2V H.D.	Liquid
W	8	361-2V	Propane
9	8	534-4V	Gas
X	8	391-4V	(DSO)
1	6	240-1V	Gas
3	8	330-2V M.D.	Low
4	8	330-2V H.D.	Compression
5	8	361-2V	
B		903 Cummins-V903	
C		636 Caterpillar-V8-225	
D		855 Cummins NTC-270	
E		903 Cummins-V903-270	
F		855 Cummins-NHCT-270	
G		903 Cummins V903-290	
J		855 Cummins-NHC-250	
K		855 Cummins-NHCT-270	
L		855 Cummins-NHCT-270	
M		855 Cummins-NTC-260	
N		855 Cummins NTC-280	
P		855 Cummins-NTC-300	
Q		855 Cummins-NTC-320	
R		855 Cummins-NTC-335	Diesel
T		568 Detroit 8V-71N	
U		522 Caterpillar V8-150	
V		522 Caterpillar V8-175	
W		855 Cummins-NTC-290	
X		927 Cummins-N927	
Y		927 Cummins-N927	
Z		927 Cummins-N927	
1		855 Cummins-NH-230	
2		426 Detroit 6-71N	
3		638 Caterpillar 1674	
4		573 Caterpillar-V8-200	
5		855 Cummins NHCT-270	
6		568 Detroit 8V-71N	
7		568 Detroit 8V-71NE	
8		318 Detroit 6V-53N	
9		555 Cummins V-8	
0		855 Cummins NTC-350	

## 1973 CALENDAR YEAR PRODUCTION

Month	Through 600 Series	Heavy-Extra Heavy Series
January	R00,000-R09,999	R10,000-R19,999
February	R20,000-R29,999	R30,000-R39,999
March	R40,000-R49,999	R50,000-R59,999
April	R60,000-R69,999	R70,000-R79,999
May	R80,000-R89,999	R90,000-R99,999
June	S00,000-S09,999	S10,000-S19,999
July	S20,000-S29,999	S30,000-S39,999

## ASSEMBLY PLANTS CODE LETTERS

Code	Assembly Plant
N	Norfolk
P	Twin Cities
R	San Jose
S	Allen Park
V	Kentucky Truck

## EXTERIOR PAINT COLOR CODES

Code	Color	M-30J/M-32J Spec. No.	Code	Color	M-30J/M-32J Spec. No.
A	Black	1724-A	R	Lt. Aqua	3066-A
B	Lt. Blue	3429-A	R	Ginger Met.	5186-HS
C	Spec. White	1525-A	S	Br. Dk. Blue Met.	5094-HS
D	Lt. Yellow	3439-A	T	Red	2008-A
E	Med. Blue Met.	5087-HS	U	Med. Lime Met.	5021-HS
F	Lt. Green	5058-A	V	Dk. Green	5005-A
G	Chrome Yellow	1526-A	W	Lt. Ginger Met.	3516-HS
H	Med. Beige	3569-A	X	Lt. Goldenrod	3565-A
H	Med. Green Met.	5187-HS	Z	Lt. Copper Met.	5035-HS
J	Rangoon Red	1515-A	2	Maroon	3059-A
K	Med. Ivy Green	3150-A	4	Br. Lime	5027-A
L	Dk. Green	1237-A	6	Br. Med. Blue	5004-A
M	White	1619-A	7	Med. Blue	2098-A
N	Platinum	921-A	8	Yellow	3341-A
P	Med. Green Met.	3462-HS	9	Prime Red	M6J102-B
Q	Lt. Green	5060-A		Prime Gray	M6J103-B

## CLUB WAGON INTERIOR TRIM CODES

13, 14, 15	Lt. Gray/Black Vinyl
23, 24, 25	Lt. Blue/Med. Blue Vinyl or Cloth and Vinyl
33, 34, 35	Lt. Ginger/Med. Ginger Vinyl or Cloth and Vinyl
43, 44, 45	Lt. Green/Med. Green Vinyl or Cloth and Vinyl

## ECONOLINE INTERIOR TRIM CODES

1, 11, 12	Lt. Gray/Black Vinyl
2, 21, 22	Lt. Blue/Med. Blue Vinyl
3, 31, 32	Lt. Ginger/Med. Ginger Vinyl
4, 41, 42	Lt. Green/Med. Green Vinyl
26, 27, 28	Lt. Blue/Med. Blue Vinyl
36, 37, 38	Lt. Ginger/Med. Ginger Vinyl
46, 47, 48	Lt. Green/Med. Green Vinyl
8, B1	Lt. Blue/Med. Blue Vinyl
C, C1, C2	Lt. Ginger/Med. Ginger Vinyl
D, D1, D3	Lt. Green/Med. Green Vinyl

## LIGHT AND MEDIUM TRUCK TRIM CODES

4, 4B, 43, DB, M3, MB	Black Vinyl
D, M	Black Cloth and Vinyl
2, 23, B, K3	Lt. Blue/Med. Blue Vinyl
23	Med. Blue Cloth and Vinyl
KB, SB, 2B, 2C, BB	Black with Blue Vinyl
5, 53, E, N3	Red/Dk. Red Vinyl
N, V	Dk. Red Cloth and Vinyl
5B, 5C, EB, NB, VB	Black with Red Vinyl
6, 63, F, O3	Lt. Green/Med. Green Vinyl
O, W	Med. Green Cloth and Vinyl
6B, 6C, FB, OB, WB	Black with Green Vinyl
3, 33, C, L3	Pastel Ginger Vinyl
L, T	Light and Pastel Ginger Cloth and Vinyl
3B, 3C, CB, LB, TB	Black with Ginger Vinyl

## BRONCO INTERIOR TRIM CODES

3, 34	Pastel Parchment Vinyl
-------	------------------------

## HEAVY TRUCK TRIM CODES

4, D, D3, DC, 43, 4C, 4A, 4B, 41, 42, D2, DB, 46, D6, 4F, DF	Black Vinyl	CB	Black with Ginger Vinyl
B2	Lt. and Med. Blue Vinyl	11	Med. Gray Vinyl
E2	Red and Dk. Red Vinyl	11	Lt. Gray Vinyl
F2	Lt. Green/Med. Green Vinyl	12, A2	Lt. and Med. Gray Vinyl
C2	Pastel Ginger Vinyl	13, 1C, A3, AC, 14, 1D, A4, AD, 15, 1E, A5, AE	Med. Gray Vinyl
BB	Black with Blue Vinyl	A2	Gray Multicolor and Lt. Gray Vinyl
EB	Black with Red Vinyl	G4, G5, G7, GD, GE, GG	Ginger (Saddle) Vinyl
FB	Black with Green Vinyl		



RATING PLATE "BODY" TYPE CODE  
ECONOLINE VANS & CLUB WAGONS

CUSTOM	STANDARD	CAB/TRIM
A	1	GRAY/BLACK
B	2	BLUE
C	3	GINGER
D	4	GREEN

VAN SEATS	WAGON SEATS
1 STATIONARY PASSENGER	3 FIRST & SECOND ROW - 5 PASSENGER
2 FLIP PASSENGER	4 FIRST, SECOND & THIRD ROW - 8 PASSENGER
6 DELUXE DRIVER	5 FIRST, SECOND, THIRD & FOURTH ROW - 12 PASSENGER
7 DELUXE DRIVER & DELUXE STATIONARY PASSENGER	
8 DELUXE DRIVER & FLIP PASSENGER	

LIGHT & MEDIUM TRUCK - 100 THRU 6000 AND BRONCO

CUSTOM	RANGER	RANGER XLT	STD.	CAB/TRIM
B	K	2	BLUE	
C	L	3	GINGER	
D	M	4	BLACK	
E	N	5	RED	
F	W	6	GREEN	
G	P	--	AVOCADO	

H.D. VINYL	BRONCO REAR SEAT	STD.	SEATS
B	--	2	BENCH SEAT
C	4	3	FOAM CUSHION BRONCO REAR SEAT

Seat Codes - Medium and Heavy Truck			
HD Black Vinyl	Driver w/Companion	Single Driver	Width
A	--	--	1
B	--	--	2
C	--	3	L-S Union Custom Bench Seat
D	--	4	L-S No. 675
E	--	5	Bostrom Westcoaster
F	--	6	Bostrom T-Bar
G	①	7	National Cush-N-Aire
H	--	8	Bostrom Level Air

① w/Leair Siegler companion seat.

FRONT AXLE CODES  
LIGHT AND MEDIUM TRUCKS

CODE	Manual	Power
A	3,800	
B	4,700	
J	5,000	Ford
K	5,500	
L	6,000	
M	7,000	
P	3,500	DANA 6CF HD
Q	3,000	DANA 44 LOCK

CODE	Manual	Power	Description
1	J	5000 lb.	
2	K	5500 lb.	
3	L	6000 lb.	
4	M	7000 lb.	
5	N	9000 lb.	
6	--	12,000 lb	Center Point

CODE	Manual	Power	Description
7	P	12,000 lb.	
8	--	12,000 lb.	Steer-Ease
9	R	15,000 lb.	
S	--	16,000 lb.	
T	--	18,000 lb.	
U	--	20,000 lb.	
Z	--	DSO Front Axle	

Medium & Heavy Trucks (Except F-8-500-600, 6000)

DISTRICT CODES

11 BOSTON	42 CLEVELAND	72 SAN JOSE	FORD OF CANADA
12 BUFFALO	43 MILWAUKEE	73 SALT LAKE CITY	MERCURY REGIONS
13 NEW YORK	46 INDIANAPOLIS	74 SEATTLE	FORD REGIONS
14 PITTSBURGH	47 CINCINNATI	75 PHOENIX	
15 NEWARK	48 DETROIT	76 DENVER	
16 PHILADELPHIA	52 DALLAS	83 GOVERNMENT	
17 WASHINGTON	53 KANSAS CITY	84 HOME OFFICE RESERVE	
21 ATLANTA	54 OMAHA	85 AMERICAN RED CROSS	
22 CHARLOTTE	55 ST. LOUIS	89 TRANSPORTATION SERVICES	
23 MEMPHIS	56 DAVENPORT	87 BODY COMPANY	
24 JACKSONVILLE	57 HOUSTON	90'S EXPORT	
28 LOUISVILLE	58 TWIN CITIES		
41 CHICAGO	71 LOS ANGELES		

A1 CENTRAL	A2 EASTERN	A3 ATLANTIC	A4 MIDWESTERN	A6 WESTERN	A7 PACIFIC	I2 EXPORT
NOTE: EXPORT ALPHABETICAL						

## REAR AXLE CODE (2780-lb. to 7400-lb. Capacity)

Code	Description	Ratio	Code	Description	Ratio	Code	Description	Ratio
A2	Ford 3300 ①	3.70	04	Ford 2780	4.57	24	Dana 60 (5300)	4.10
A3	Ford 2780 ①	4.11	05	Ford 3300	4.11	25	Dana 60 (5300)	4.56
A5	Ford 3300 ①	4.11	08	Ford 3300	3.50	27	Dana 70 (7400)	4.10
B4	Dana 60 ① (5200)	4.10	09	Ford 3300	3.70	28	Dana 70 (7400)	4.56
B8	Ford 2780 ①	3.50	10	Ford 3050	3.25	71	Dana 60 (5050)	3.54
B9	Ford 3300 ①	3.50	11	Ford 3050	3.50	72	Dana 60 (5050)	3.73
C7	Dana 60 ① (5300)	3.54	12	Ford 3050	3.70	73	Dana 60 (5050)	4.10
C8	Dana 60 ① (5300)	3.73	02	Ford 3300	3.00	36	Dana 70 (7400)	3.73
D7	Dana 70 ① (7400)	4.10	17	Ford 3300	3.25	37	Dana 60 (5300)	3.54
H2	Ford 3600 ①	3.50	18	Ford 2780	3.50	38	Dana 60 (5300)	3.73
H3	Ford 3600 ①	4.09	22	Dana 70 (7400)	4.88	G1	Dana 60 ① (5050)	3.54
03	Ford 2780	4.11	23	Dana 70 (7400)	5.13	G3	Dana 60 ① (5050)	4.10

① Limited-Slip or Traction-Lok

## REAR AXLE CODE (11,000-lb. to 18,500-lb. Capacity)

Code	Description	Capacity	Ratio	Code	Description	Capacity	Ratio	Code	Description	Capacity	Ratio
E1	Eaton 16244	(17,500)	5.57/7.75	FQ	Eaton 17121	(18,500)	6.14	42	Rockwell D-100	(13,000)	6.20
E2	Eaton 16244	(17,500)	6.17/8.58	GQ	Eaton 17121	(18,500)	6.50	44	Rockwell D-100	(13,000)	6.80
E3	Eaton 16244	(17,500)	6.50/9.04	HQ	Eaton 17121	(18,500)	7.17	52	Rockwell H-170	(17,500)	5.86
F1	Eaton 15201	(15,000)	5.14/7.17	JQ	Eaton 17121	(18,500)	7.60	53	Rockwell H-170	(17,500)	6.14
F2	Eaton 15201	(15,000)	5.83/8.12	32	Rockwell C-100		6.20	54	Rockwell H-170	(17,500)	6.83
F3	Eaton 15201	(15,000)	6.33/8.81	34	Rockwell C-100		6.80	55	Rockwell H-170	(17,500)	7.17
EH	Eaton 17221	(18,500)	5.57/7.60	31	Rockwell C-100		5.83	62	Rockwell F-106	(15,000)	6.20
FH	Eaton 17221	(18,500)	6.14/8.38	40	Rockwell D-100		5.29	64	Rockwell F-106	(15,000)	6.80
GH	Eaton 17221	(18,500)	6.50/8.87	41	Rockwell D-100	(13,000)	5.83	66	Rockwell F-106	(15,000)	7.20
HH	Eaton 17221	(18,500)	7.17/9.77								

## REAR AXLE CODE (22,000-lb. and 23,000-lb. Single-Axle)

Code	Description	Capacity	Ratio	Code	Description	Capacity	Ratio	Code	Description	Capacity	Ratio
DB	Eaton 18221	(22,000)	5.57/7.60	HG	Eaton 19121	(23,000)	4.56	H3	Rockwell R-171	(23,000)	4.63
EB	Eaton 18221	(22,000)	6.14/8.38	DK	Eaton 18121	(22,000)	6.50	H4	Rockwell R-171	(23,000)	4.88
FB	Eaton 18221	(22,000)	6.50/8.87	EK	Eaton 18121	(22,000)	7.17	H5	Rockwell R-171	(23,000)	5.29
GB	Eaton 18221	(22,000)	7.17/9.77	AP	Eaton 19221	(23,000)	4.33/5.90	H6	Rockwell R-171	(23,000)	5.86
AG	Eaton 19121	(23,000)	4.11	CP	Eaton 19221	(23,000)	5.43/7.39	H7	Rockwell R-171	(23,000)	6.14
BG	Eaton 19121	(23,000)	4.33	DP	Eaton 19221	(23,000)	6.17/8.40	H9	Rockwell R-171	(23,000)	3.70
CG	Eaton 19121	(23,000)	4.88	EP	Eaton 19221	(23,000)	6.67/9.08	1A	Rockwell R-170	(23,000)	6.42/8.38
DG	Eaton 19121	(23,000)	5.43	GP	Eaton 19221	(23,000)	4.11/5.60	2A	Rockwell R-170	(23,000)	7.09/9.07
EG	Eaton 19121	(23,000)	6.17	H1	Rockwell R-171	(23,000)	4.11	3A	Rockwell R-170	(23,000)	7.21
FG	Eaton 19121	(23,000)	6.67	H2	Rockwell R-171	(23,000)	4.33	4A	Rockwell R-170	(23,000)	4.11

## TANDEM REAR AXLE CODES

Code	Description	Capacity	Ratio	Code	Description	Capacity	Ratio	Code	Description	Capacity	Ratio
EC	Eaton 30DSC	(32,000)	6.50	GF	Eaton 34DSE	(34,000)	6.14	HW	Eaton 34DET	(34,000)	7.17/9.77
FC	Eaton 30DSC	(32,000)	7.17	HF	Eaton 34DSE	(34,000)	6.50				
GC	Eaton 30DSC	(32,000)	7.60	MF	Eaton 34DSE	(34,000)	7.17				
JF	Eaton 34DSC	(34,000)	4.11	KF	Eaton 34DSE	(34,000)	7.60				
BF	Eaton 34DSC	(34,000)	4.33	LF	Eaton 34DSE	(34,000)	3.70				
CF	Eaton 34DSC	(34,000)	4.56	FW	Eaton 34DTE	(34,000)	6.14/6.38				
DF	Eaton 34DSC	(34,000)	4.88	GW	Eaton 34DTE	(34,000)	6.50/8.87				

## TRANSMISSION CODES

Code	Description	Code	Description
Bronco		Light, Medium and Heavy Truck, Parcel Delivery and School Bus (Cont'd.)	
C	3 Speed Manual	<del>X</del>	Fuller T-905B 5 Speed
Econoline-Club Wagon		P	Warner T-19 4 Speed
C	3 Speed Manual	P	C-6 Automatic
G	Automatic (C4)	Q	Spicer 5652 5 Speed
Light, Medium and Heavy Truck, Parcel Delivery and School Bus		R	Spicer 8716
A	New Process 435 4 Speed	S	Spicer 5756-B 5 Speed
B	Spicer 8516	T	New Process 542 FO 5 Speed
B	Spicer P8516 Overdrive	T	Fuller TRO-9509 8 9 Speed
C	Ford-Manual 3 Speed	U	Spicer 6852G 5 Speed
C	Fuller RT-610 10 Speed	V	Fuller RT-910
D	Clark 387 V 5 Speed	W	Spicer 6352B 5 Speed
E	Warner T-19G	X	Fuller T-905A 5 Speed
E	Fuller 5 H74 5 Speed	Y	Transmatic MT41-6 Speed
F	Fuller 5HA74 5 Speed	Z	Transmatic MT40-6 Speed
F	Warner T-18 4 Speed	1	Spicer 8552A 5 Speed
G	C-4 Automatic	1	Transmatic MT42-6 Speed
G	Warner T-87G	2	Clark 282V 5 Speed
H	Allison MT650	3	Fuller RT-906
J	Fuller RTO 9513	4	Clark 280 VO 5 Speed
J	FMX Automatic (Parcel)	5	Fuller RTO-910
K	Spicer 6453A 5 Speed	6	Fuller RTO-915
L	Allison AT540	7	Clark 385V 5 Speed
M	Clark 285V 5 Speed	8	Allison MT640
N	Spicer 6352 5 Speed	9	Fuller RT-915
<del>X</del>	New Process 542FL 5 Speed	9	New Process 542 FD 5 Speed

CW1172-C

# Wheels and Tires

GROUP

11

PART 11-01	Page	PART 11-10	Page
General Wheel and Tire Service .....	11-01-01	Wheel Hubs and	
<b>PART 11-02</b>		Bearings—Front .....	11-10-01
Wheels and Tires—		<b>PART 11-11</b>	
Drop Center Rim .....	11-02-01	Wheel Hubs and	
<b>PART 11-03</b>		Bearings—Rear .....	11-11-01
Wheels and Tires—		<b>PART 11-12</b>	
Two-Piece Rims .....	11-03-01	Wheel Hubs and Bearings—	
<b>PART 11-04</b>		Front Wheel Drive .....	11-12-01
Wheels and Tires—		<b>PART 11-14</b>	
Three-Piece Rims .....	11-04-01	Wheel Hubs and Bearings—	
		Rear (Full Floating Axle) .....	11-14-01

## PART 11-01 General Wheel and Tire Service

Applies to All Models			
COMPONENT INDEX	Page	COMPONENT INDEX	Page
FRONT WHEEL BEARING		TIRE INSPECTION .....	01-03
Maintenance .....	01-03	WHEEL INSPECTION .....	01-03

CF1801-C

### SAFETY

#### SAFETY PRECAUTIONS WHEN SERVICING TRUCK TIRES

CAUTION AND SAFETY FIRST are bywords when handling tires, particularly truck tires! Careful attention to the suggestions that follow may prevent crippling injuries, or even death. **Make it a rule to respect the terrific force contained in an inflated tire.** You may be glad some day that you did.

Prepare for any tire repair operation in a safe and efficient way. In changing tires on drop center wheels, remove the wheel and tire from the truck. Greater

safety, ease and a quicker job can be done than with making the tire change with the wheel on the truck. In servicing of **all tires** use caution not to drop them (or the wheels or assemblies) on the feet, hands or body, or heavily on the floor (Fig. 1). Practice good methods of lifting; use your legs as well as your arms and your body. This can help to prevent painful, internal injury. When carrying tires or wheels don't step in any oil. **Keep the floor clean and dry.**

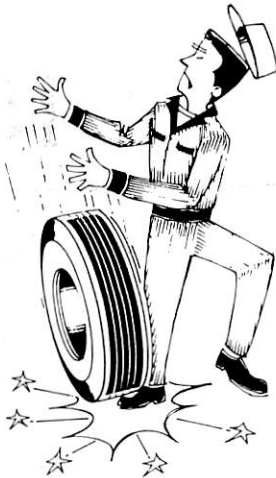
Deflating a tire properly is very important to your safety. First reduce the pressure **as much as you possibly can** by pushing the valve core plunger. **Only then should you remove the valve core.**

Keep your eyes away from the valve! Figure 2 shows the safe way to do it.

Demounting tires from wheels or rims requires special care. Tires on drop center rims are best handled on a wheel holder, or tire changing machine (Fig. 3).

This will prevent cuts on hands and wrists and will make it unnecessary to use a mallet for seating the tire.

Use only standard tire mounting tools and equipment. The use of makeshift tools, screwdrivers or pliers to force tires on or off rims or wheels is **dangerous.**



F1857-A

FIG. 1 Handling Wheels and Tires



F1858-A

FIG. 4 Use of Tire Irons



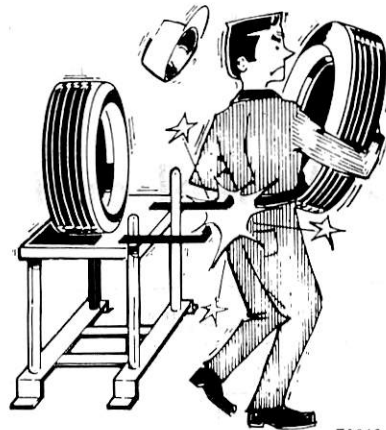
F1859-A

FIG. 7 Seating of Rings



F1853-A

FIG. 2 Safe Air Removal



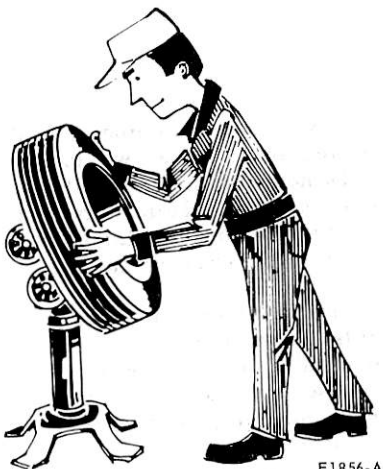
F1860-A

FIG. 5 Tire Spreader



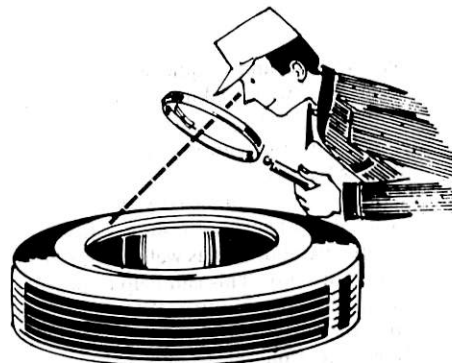
F1855-A

FIG. 8 Inflation Details



F1856-A

FIG. 3 Changing Tire on Drop Center Rim



F1854-A

FIG. 6 Visual Inspection



A new Rotunda tire changer is available. Details include a bead seater/inflator using an automatically adjustable inflation ring. This feature aids in properly seating the bead for inflation. To properly operate the new Rotunda tire changer follow the instructions provided.

As with the drop center rims be certain on split rim assemblies that all air is out before unlocking a rim or ring. Use special care when using tire irons. Grip them firmly and keep them free of oil and grease. They can slip and fly with tremendous force (Fig. 4).

A careful inspection should be made of the tire and all necessary repairs should be performed. A tire spreader is very helpful (Fig. 5) but use care when working around it. Keep the spreader arms closed when the machine is idle.

Inspect the rim parts carefully for rust; damage or distortion (Fig. 6). Never use rims, locking rings or flanges which are out of shape, rusted or

cracked or broken in any way. Never use a ring or other rim parts of different manufacture than the original rims or any different size, or type.

Tires and rims often require a buffing operation before being mounted once the regular repairs have been made.

**Always wear Safety Goggles, or a face shield when performing any buffing operation.**

Avoid hammering rings or rims with steel hammers. Small bits of steel may be broken off the hammer or rim, flying into the eyes (wear safety goggles) face or body. Use rubber-covered, steel-headed hammers wherever possible (Fig. 7). Rubber mallets only should be used on passenger car tires; although with modern tire changing equipment no pounding is necessary.

Make certain the rim ring is seated to full depth of the groove, fits tightly all around, and is securely locked.

Stand away from the valve stem as far as possible while inflating tires.

Avoid a position where the face or body is immediately over the work being done on any tire in which there is pressure.

Use only accurate, tested gauges to insure proper air pressure. Check all gauges regularly with a master gauge.

Play it SAFE. Set a good example for others who work with you. Follow the above suggestions completely. If you are ever tempted to take a short cut because you are in a hurry, that is the time that you could get hurt!

With certain types of wheels, however, it is necessary to seat the rings while the tire is being inflated. In either case before inflating study the next step.

Attach a portable safety device, made especially for the purpose, to the assembly. This portable device should be used with all types of wheels and rims.

Or, if the assembly is not of the type which requires inflation to seat the rings, a Safety Cage should be used, although the portable device is the best (Fig. 8).

## 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.**

## CLEANING AND INSPECTION

### WHEELS

Wheel stud nuts should be inspected and tightened in the first 500 miles, to avoid accidental loosening of the wheels. Loose wheel stud nuts may cause shimmy and vibration. Elongated stud holes in the wheels may also result from the loose stud nuts.

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

Check for damage that would affect the runout of the wheels. Wobble or shimmy caused by a damaged wheel will eventually damage the wheel bearings.

Inspect the wheel rims for dents that could permit air to leak from the tires.

### TIRES

The tires should be checked frequently to be sure that the air pressures agree with those specified for the tires and vehicle model. Inspect the tire threads, and remove all stones, nails, glass or other objects that may be wedged in the thread. Check for holes or cuts that may permit air leakage from the tire, and make the necessary repairs.

Inspect the tire side walls for cuts, bruises, and other damage. If internal damage is suspected, demount the tire

from the wheel for further inspection and repair or replacement.

Check the tire valve for air leaks, and replace the valve if necessary. Replace any missing valve caps.

On F-100, 250, 350 and Econoline models, it is important that except for deep dish (dual type) all be balanced.

Fig. 9 describes common tire wear conditions.

### FRONT WHEEL BEARINGS

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.

Front hubs and bearings should be

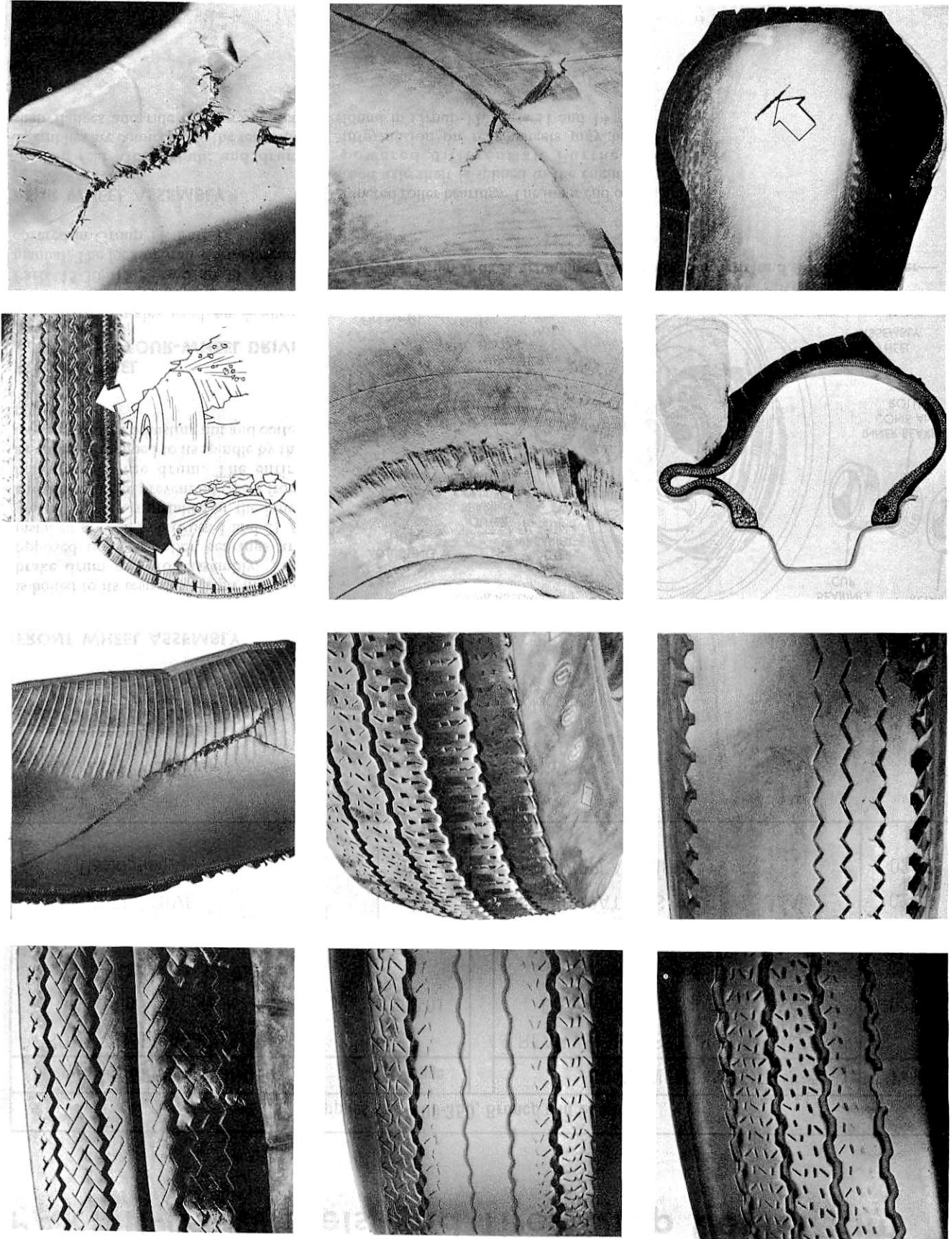
cleaned, inspected and lubricated whenever the hubs are removed or at the mileage/time periods indicated in the maintenance schedule.

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.

Bearing adjustment is described in Part 11-10 for front wheels. Part 11-12 covers front drive bearing adjustment. Part 11-11, and 11-14 cover rear wheel bearing adjustments.

FIG. 9 Tire Wear Conditions



# PART 11-02 Wheels and Tires Drop Center Rim

Applies to F-100-350, Bronco and Econoline			
COMPONENT INDEX	Page	COMPONENT INDEX	Page
FRONT WHEEL ASSEMBLY		REAR WHEEL ASSEMBLY	
Description .....	02-01	Description .....	02-01
FRONT WHEEL ASSEMBLY		WHEEL REPLACEMENT .....	02-02
4-WHEEL DRIVE		SPECIFICATIONS .....	02-03
Description .....	02-01	TIRE REPLACEMENT .....	02-02

## DESCRIPTION

### FRONT WHEEL ASSEMBLY

Each front wheel and tire assembly is bolted to its respective front hub and brake drum or rotor assembly. Two opposed tapered roller bearings are installed in each hub (Figs. 1 and 2). A grease retainer is installed at the inner end of the hub to prevent lubricant from leaking into the drum. The entire assembly is retained to its spindle by the lock nut and/or adjusting nut and cotter pin.

### FRONT WHEEL ASSEMBLY—FOUR-WHEEL DRIVE

The front axles used on 4-wheel drive models are covered in Group 15, Parts 15-30, 15-32 and 15-33 of this manual. The locking hub assemblies are covered in Group 11, Part 12.

### REAR WHEEL ASSEMBLY

The rear wheel, hub, and drum assemblies are connected to the rear axle shaft flanges and ride on two opposed

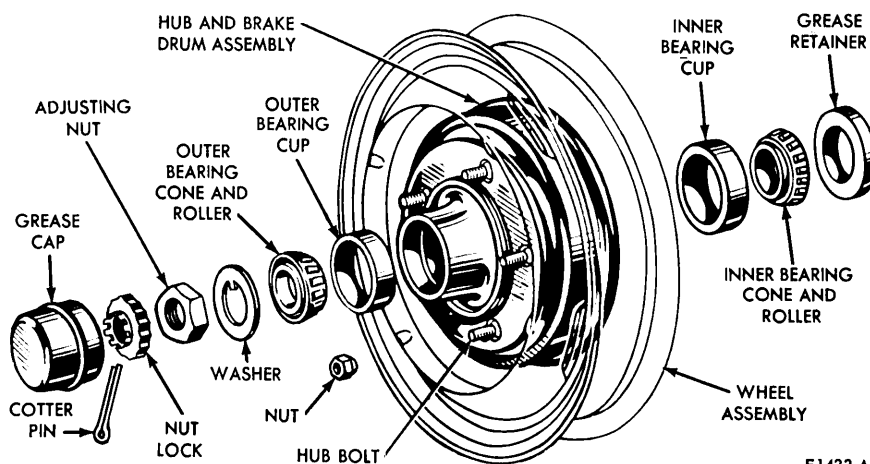


FIG. 1 Drum Brakes Econoline Front Hub, Bearings and Grease Retainer—

tapered roller bearings. The inner end of each axle shaft is splined to the engine powered differential. Further information on rear wheels may be found in Group 11, Parts 11 and 14

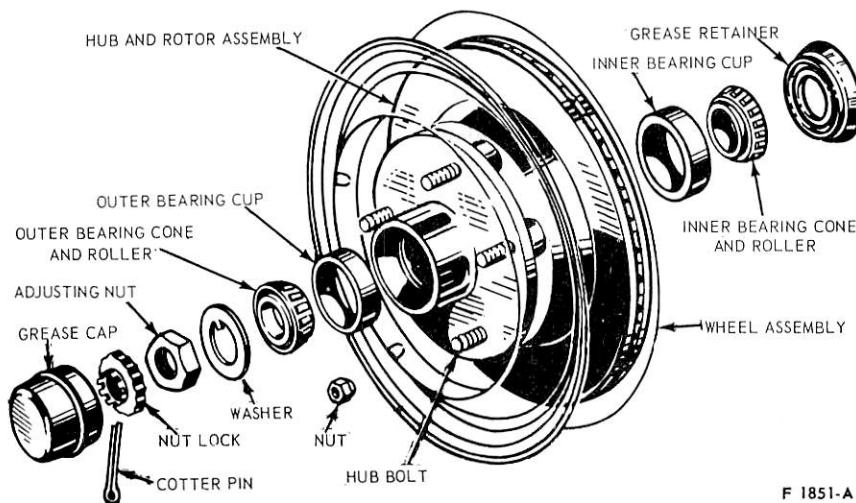


FIG. 2 Front Hub, Bearings and Grease Retainer—Disc Brakes—Typical

## REMOVAL AND INSTALLATION

### WHEEL REPLACEMENT

#### LIGHT VEHICLES

##### Removal

1. Pry off the hub cap (if the vehicle is so equipped), and loosen but do not remove the wheel stud nuts.
2. Raise the truck until the wheel and tire clear the floor.
3. Remove the wheel stud nuts and the wheel and tire from the hub and drum assembly, or the hub and rotor assembly.

##### Installation

1. Clean all dirt from the hub and drum. The replacement wheel and tire must be clean.
2. Position the wheel and tire on the hub and drum assembly, or the hub and rotor assembly and install the wheel stud nuts. Tighten the stud nuts enough to hold the wheel firmly in place. **Always tighten alternate nuts to draw the wheel evenly against the hub and drum.**

On dual wheels, except F-350, P-350 and P-400 be sure to back off the outer nut before tightening the inner nut. Then tighten the outer nut. F-350, P-350 and P-400 dual wheels have mounting bolt holes which are alternately flared inward and outward. These surfaces must be mated when the wheels are mounted. Fig. 3 illustrates the dual wheel radial alignment locating pin used on certain applications.

3. Lower the vehicle to the floor, and

tighten the wheel stud nuts to the specified torque. **On a new vehicle, and each time a wheel and tire is installed, the wheel nuts should be checked for tightness.** When installing the hub cap, notice the wheel hubs. The hub cap should be positioned on the wheel over one of the retaining hubs and the two locating hubs. Be sure that the lip of the hub cap is firmly seated in the groove of the retaining hub, and then force the cap over the second retaining hub. **Any other procedure necessitates heavy pounding with possible damage to the hub cap.**

#### MEDIUM VEHICLES

##### Removal

1. Loosen but do not remove the wheel stud nuts.
2. Raise the vehicle until the wheel and tire clear the floor.
3. Remove the wheel stud nuts and the wheel and tire from the hub and drum.

##### Installation

1. Clean all dirt from the hub and drum. The replacement wheel and tire must be clean.
2. Position the wheel and tire on the hub and drum, and install the wheel stud nuts. Tighten the stud nuts enough to hold the wheel firmly in place. **Always tighten alternate nuts to draw the wheel evenly against the hub and drum.**

On dual wheels, be sure to back off

the outer nut before tightening the inner nut. Then tighten the outer nut.

3. Lower the truck to the floor, and tighten the wheel stud nuts to the specified torque. **On new vehicles, and each time a wheel and tire is installed, the wheel nuts should be checked for tightness.**

### TIRE REPLACEMENT PRECAUTIONS

The tire must be completely deflated before removal, and the bead must not be damaged by a tire iron.

After installation, a tube tire should be inflated to recommended pressure, deflated, and then inflated again to insure that the tube is not folded inside the tire. Be sure the tube flap is properly positioned before inflating the tire. **On F-100 and 250 series, it is important that each front and rear tire and wheel be balanced.**

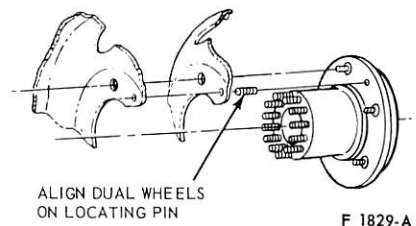


FIG. 3 Dual Wheel Radial Alignment to Hub (F-350)



On E-100 and E-300 all wheels should be balanced. On U-100, and vehicles with dual rear wheels, only front wheels should be balanced.

When installing tires on vehicles equipped with Bead Ledge rims, thoroughly lubricate the tire beads. Inflate the tire until the bead seats against the rim of the wheel, then deflate

to the specified pressure. Follow the instructions supplied with the Rotunda (KKRE-888 or equivalent) tire changer.

## SPECIFICATIONS

### WHEEL TORQUE LIMITS – F-100 THRU F-350, ECONOLINE, BRONCO, P-350 THRU 500

Model	Nut Size	Ft-Lbs	Model	Nut Size	Ft-Lbs
E-100, E-200 F-100 (4 x 4), U-100 (Std. Wheel) P-100 F-250-250 (4 x 4) P-350 (W-5200 lb. Axle)	1/2-20	90	F-350, P-350, P-450, (W/Dual Wheels and 7400 lb Axle)	9/16-18	210
E-300 (8-Stud Wheel) F-350, P-350 P-400, (W/8-Stud Wheel and 7400 lb. Axle)	9/16-18	135	P-350, P-400 (W/17" Wheels)	5/8-18	210
			P-500	3/4-16 or 1-1/8-16	450

CF 1804B

# PART 11-03 Wheels and Tires—Two Piece Rims

Applies to All 500-9000 Series Vehicles			
COMPONENT INDEX	Page	COMPONENT INDEX	Page
TIRE REMOVAL AND MOUNTING — Two-Piece Rims .....	03-01	TIRE REMOVAL AND MOUNTING — Two-Piece Semi-Drop Center Rims.....	03-02

## DESCRIPTION

Two-piece rims, for disc wheels are used with tube-type tires only. These rims have a 5 degree tapered seat and are available in 5.0, 5.50 and 6.5 rim sizes. Refer to the first page of Group 11, Part 01 for safety procedures and illustrations.

## REMOVAL AND INSTALLATION

The tire must be completely deflated before removal, and the bead must not be damaged by a tire iron.

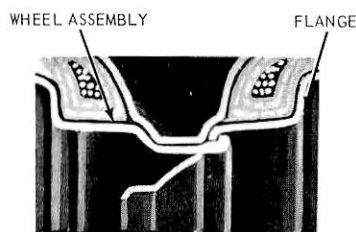
After installation, a tube tire should be inflated to recommended pressure, deflated, and then inflated again to insure that the tube is not folded inside the tire. Be sure the tube flap is properly positioned before inflating the tire.

### TIRE REMOVAL AND MOUNTING—TWO PIECE RIM

#### REMOVING TIRE FROM WHEEL

To remove the rim ring (Fig. 1) from a rim without a tire, stand the wheel up so that the tool slot of the ring is at the top, and the lower portion of the ring is in the rim well. Insert the rim tool between the rim slot and the gutter of the rim, lift the ring over the gutter, and pry the ring off the rim (Fig. 2).

1. Place the wheel (ring side up) on the floor. Insert the hook end of the rim tool between the ring flange and the tire bead, and continuing around the ring, pry the tire off the tapered seat of the ring (Fig. 2).
2. Press the side of the ring opposite the double embossing down into the ring well. Insert the straight end of the rim tool into the notch between



2-PIECE RIM

F1805-A

FIG. 1 Two-Piece Rim Installation

- and below the double embossing (Fig. 4).
3. Force the tool downward to disengage the ring from the rim gutter. Work the tool around the rim, freeing the ring from the rim, and remove the ring.
4. Turn the wheel over and loosen the opposite tire bead from the rim by hammering the hook end of the rim tool between the rim flange and the tire bead. Pry the tire bead away from the taper, and remove the tire from the rim (Fig. 3).

#### Mounting Tire to Wheel

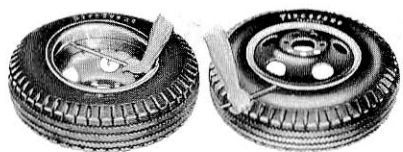
1. After positioning the tube in the tire, place the wheel gutter (Fig. 4). Hook



FIG. 2 Removing Ring and Loosening Tire Bead—Two-Piece Rim

the section soap both beads of the tire and position the tire on the rim.

2. After positioning the tube in the tire, place the wheel gutter (Fig. 4). Hook the section opposite the notch under the gutter so that the cutaway portions of the ring retaining bead span the rim gutter (Fig. 4).
3. Insert the straight end of the rim tool in the notch, and pull the ring onto the rim, at the same time forcing the ring over the gutter with a soft hammer (Fig. 5). Remove the tool, and continue to drive the ring down until it is entirely engaged in the gutter. Press down on the ring (as shown in Fig. 5) to make certain that it will rock. If there is no movement, the ring is not completely seated and will be forced off violently, either during inflation



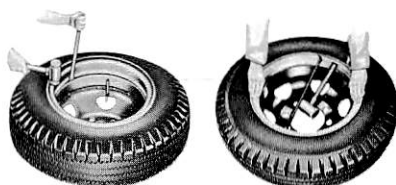
F1460-A

FIG. 3 Removing Ring and Removing Tire—Two-Piece Rim



F1027-A

FIG. 4 Positioning and Starting Ring—Two-Piece Rim



F1028-A

FIG. 5 Installing and Checking Ring—Two-Piece Rim

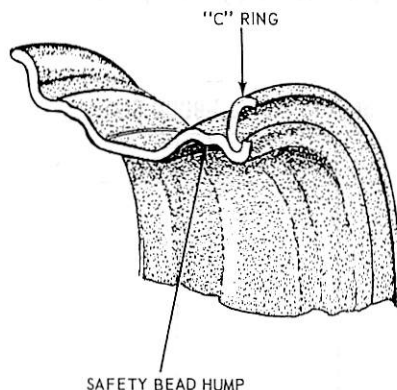
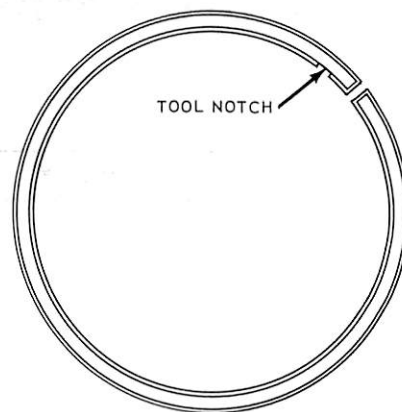


FIG. 6 Two-Piece Split Ring

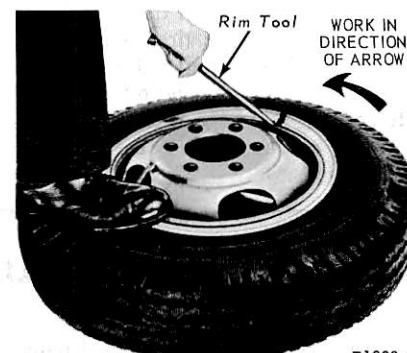


F1473-B



F1337-B

FIG. 7 Loosening Tire Bead



F1338-B

FIG. 8 Removing Split Ring

or when the truck is operated. When inflating the tire, do not stand in front of the ring.

### TIRE REMOVAL AND MOUNTING—TWO-PIECE SEMI-DROP CENTER RIM WITH C-STYLE RING

This two-piece wheel uses a split C-type ring (Fig. 6).

#### REMOVAL OF SIDE RING FROM RIM WITHOUT TIRE

1. Stand the wheel up so that the tool slot of the ring is at the top and the lower portion of the ring is in the rim well.
2. Insert the rim tool between the rim slot and the gutter of the rim. Lift the ring over the gutter, and pry the ring off the rim.

#### REMOVAL OF SIDE RING FROM RIM WITH TIRE

1. Deflate tire completely and place the wheel (ring side up) on the floor.

2. Break the tire bead free from the rim, being careful not to damage the bead (Fig. 7).
3. Insert the straight end of the rim tool into and under the notch in the ring (Fig. 8).
4. Force the tool downward to disengage the ring from the rim gutter. Work the tool around the rim, freeing the ring from the rim, and remove the ring.
5. Turn the wheel over and loosen the opposite tire bead from the rim by hammering the hook end of the rim tool between the rim flange and the tire bead. Pry the tire bead away from the taper, and remove the tire from the rim (Fig. 9).

#### MOUNTING TIRE TO WHEEL

1. Position the tube in the tire and place the wheel (gutter side up) on the floor. Soap both beads of the tire and position the tire on the rim. It is important that the tire be soaped well as it must be forced over the

safety bead hump and the rim edge (Fig. 10).

2. Position the ring with the notch about 3 inches from the valve stem.
3. Insert the rim tool under the ring at a position approximately 180 degrees from the notch and pry onto rim. Work the remaining section of rim over the gutter with a second tool.
4. Make certain that the ring is entirely seated in the gutter. If the ring is not seated correctly as described, it may be forced off violently, either during inflation or when the truck is operated.
5. After installation, the tire should be over-inflated to 75 psi to snap the tire beads over the bead humps and fully seat the tire against the rim and side ring. Then the tire should be deflated, and then inflated again to recommended pressure to insure that the tube is not folded inside the tire. Be sure the tube flap is properly positioned before inflating the tire. Always use a cage or safety chain

during initial inflation.

It is important that the new C shaped side ring be used only with the new wheel with a bead hump. (See Fig. 6). The old style ring must be used only with the old tapered seat rim.

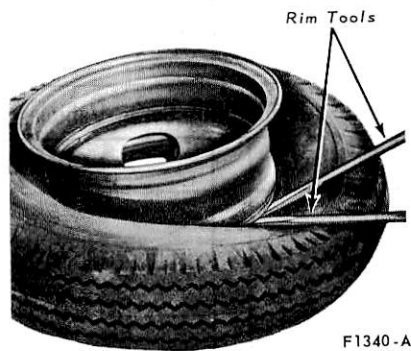


FIG. 9 Removing Tire From Rim



FIG. 10 Installing Tire First Bead on Wheel

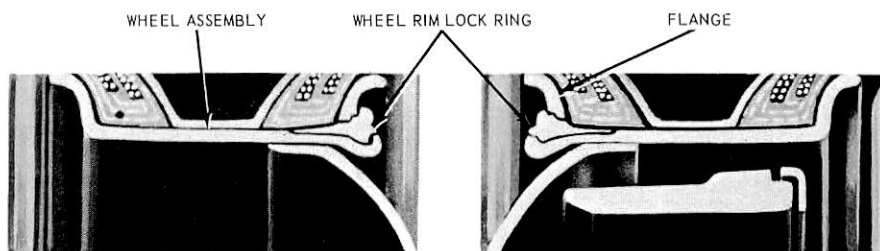
# PART 11-04 Wheels and Tires—Three Piece Rims

Applies to All 500-9000 Series Vehicles			
COMPONENT INDEX	Page	COMPONENT INDEX	Page
TIRE REMOVAL AND MOUNTING —		TIRE REMOVAL AND MOUNTING —	
Three-Piece Rims .....	04-01	Cast Spoke Wheels .....	04-02

## DESCRIPTION

Three-piece rims are nondemountable for disc wheels or demountable for cast spoke wheels, Fig. 1, shows a dual wheel sectional view.

Demountable rims for cast-spoke wheels are secured by a lane at the back edge of each spoke, and a lug retained by a stud and nut at the edge of each spoke. Refer to the first page of Group 11, Part-01 for safety procedures and illustrations.



3-PIECE RIM, DUAL WHEELS

F1806-A

FIG. 1 Three-Piece Rim—Dual Wheel Sectional View

## REMOVAL AND INSTALLATION

The tire must be completely deflated before removal, and the bead must not be damaged by a tire iron.

After installation, a tube tire should be inflated to recommended pressure, deflated, and then inflated again to insure that the tube is not folded inside the tire. Be sure the tube flap is properly positioned before inflating the tire.

### TIRE REMOVAL AND MOUNTING—THREE-PIECE RIM

Tire mounting procedures are the same for disc wheels and for cast wheels equipped with the three-piece rims, except that cast spoke wheels require special final centering and run-out adjustment.

#### Removing Tire From Wheel

1. Place the wheel and deflated tire on the floor, with the ring up. Insert the

straight end of the rim tool in the depression in the locking ring and loosen the tire bead by pressing down on the side ring (Fig. 2).

2. Insert the straight end of the rim tool in the notch provided in the locking ring, and pry the locking ring out of the gutter (Fig. 2). Lift out the locking ring, and remove the slide ring (Fig. 3).
3. Turn the wheel over and loosen the tie bead from the rim by hammering the hooked end of the rim tool between the rim flange and the tire bead. Pry the tire bead away from the taper all the way around the rim until the tire is free. Remove the tire.

#### Mounting Tire To Wheel

1. Position the wheel (gutter side up) on the floor. Soap both beads of the tire and position the tire on the rim.
2. Position the solid side ring on the



F1461-A

FIG. 2 Loosening Tire Bead and Locking Ring—Three-Ring Rim

tire, and insert the tapered toe of the split locking ring between the rim and the side ring (Fig. 3).

3. Using a soft hammer, drive the locking ring into place (Fig. 4). Start at one end of the split ring and progressively drive the ring into the gutter until the entire ring is seated (Fig. 4). **The ring must be entirely seated around the entire**

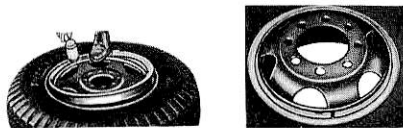


circumference of the rim. The split ends must be engaged in the gutter, or the ring will be forced off violently during inflation or when the truck is driven. When inflating the tire do not stand in front of the ring.



F1462-A

FIG. 3 Removing Locking Ring and Positioning Locking Ring—Three-Piece Rim



F1463-A

FIG. 4 Starting Locking Ring and Locking Ring Installed—Three-Piece Rim

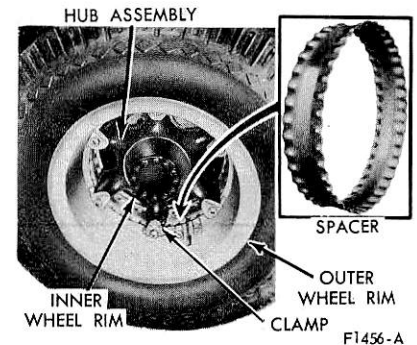
### TIRE REMOVAL AND MOUNTING—CAST SPOKE WHEELS

#### Removal

1. To remove the rim and tire from a cast wheel, apply the parking brake, and block at least one wheel. Raise the vehicle and rim clamps.
2. With dual rear wheels, lift off the outer rim and tire, remove the spacer rim, and the inside rim and tire assembly.

#### Installation

1. To install the tire and rim on a dual wheel, place the inner tire and rim on the wheel hub. The rim must ride high enough up on the tapered retainer flange of the inner section of the wheel to prevent the assembly from sliding down on the tapered surface.
2. Position the spacer between the inner and outer rim.
3. Place the outer rim and tire assembly on the wheel, and install the 6 clamps (Fig. 5). First, draw up the top clamp tightly so that the spacer will push the inner rim up on the tapered surface of the inner section of the wheel, and then tighten the bottom clamp. This procedure tends to center the rim on the wheel.



F1456-A

FIG. 5 Three-Piece Rim Installed on Cast Wheel

4. Tighten the remaining clamps alternately and evenly, and torque all wheel nuts to specification. Lateral or side run-out should not exceed 1/8 inch for front rims and 1/4-inch for dual rear rims, checked at the outer bead surface of the wheel.

# PART 11-10 Wheels, Hubs and Bearings— Front (Except Front Drive)

Applies to F100-F-350, P-350, P-500 and E100/300			
COMPONENT INDEX	Page	COMPONENT INDEX	Page
FRONT WHEEL ASSEMBLY		FRONT WHEEL GREASE	
Description .....	10-01	SEAL AND BEARING	
FRONT WHEEL BEARING		Removal and Installation .....	10-02
Adjustment .....	10-01	Repacking .....	10-02

## DESCRIPTION

### FRONT WHEEL ASSEMBLY

Each front wheel and tire assembly is bolted to its respective front hub and brake drum or rotor assembly. Two opposed tapered roller bearings are installed in each hub (Fig. 1, Part 11-02 and Figs. 3 and 4 of this Part). A grease

retainer is installed at the inner end of the hub to prevent lubricant from leaking into the drum. The entire assembly is retained to its spindle by the locknut and/or adjusting nut and cotter pin, or an adjusting nut, lock nut combination (Figs. 3 and 4).

## ADJUSTMENTS

### FRONT WHEEL BEARING ADJUSTMENT

To check the wheel bearing adjustment, raise the front of the vehicle, grasp the tire at the sides, and alternately push inward and pull outward on the tire. If any looseness is felt, adjust the front wheel bearings.

#### F-100, 250, 350, ECONOLINE

1. Remove the hub cap and remove the grease cap from the hub.
2. Wipe any excess grease from the end of the spindle and remove the cotter pin and nut lock.
3. While rotating the wheel, torque the adjusting nut (Fig. 1, Part 11-02) to 17-25 ft-lb to seat the bearings.
4. Install the nut lock so that the cotter pin hole in the spindle is aligned with a slot in the nut lock.
5. Back off the adjusting nut and nut lock two slots of the nut lock and install the cotter pin.

6. Check the front wheel rotation. If the wheel rotates freely with no noticeable end play, install the grease cap. If the wheel is still loose, or it rotates roughly or noisily, the bearing cones and rollers and the cups are dirty or worn and should be cleaned or replaced.
7. Install the hub cap.

#### P-350 THRU 500

1. Remove the hub cap, if so equipped, and remove the grease cap from the hub.
2. Remove any excess grease from the end of the spindle and remove the adjusting nut cotter pin.
3. While rotating the wheel, torque the adjusting nut (See Fig. 4, under Disassembly and Assembly) to 40-55 ft-lbs to seat the bearings.
4. Back off the adjusting nut to the next castellation if necessary to align the nut with the cotter pin hole. Then, back off the adjusting nut two

castellations and install the cotter pin.

5. Check the front wheel rotation. If the wheel rotates freely with no noticeable end play, install the grease cap. If the wheel is still loose, or it rotates roughly or noisily, the bearing cones and rollers and the cups are dirty or worn and should be cleaned or replaced.
6. Install the hub cap, if used.

### ALL MEDIUM, HEAVY AND EXTRA HEAVY TRUCKS

#### Single Nut with Cotter Pin (5000-7000 Pound Front Axles)

1. While rotating the wheel, torque the adjusting nut to 70-100 ft-lb to seat the bearings.
2. Back off the adjusting nut 180 degrees (one half turn).
3. Hand tighten the adjusting nut finger tight (13-17 in-lb) while moving the top part of the tire in and out.

4. If the cotter pin hole lines up with a castellation in the nut, insert and secure a new cotter pin. If they do not line up, back off the adjusting nut to align a castellation with the first available cotter pin hole. Final bearing adjustment must provide .001-.010 end play.
5. Install the gasket and grease cap and adjust the brakes. **The final adjustment must not result in a preloaded bearing.**

#### **DOUBLE NUT WITH LOCK RING (15000 POUND FRONT AXLE)**

1. While rotating the wheel in both directions, torque the adjusting nut to 100-125 ft-lbs to seat the bearings.
2. Back off the adjusting nut one complete turn (See Fig. 4, under Removal and Installation).
3. Again while rotating the wheel in both directions, retorque the adjusting nut to 40-55 ft-lb.
4. Back off the adjusting nut to obtain an initial .004 and .010 inch end play between the wheel hub and spindle.
5. Install the lock ring.
6. Install the washer with the dimple indexed in one of the holes in the locking ring.
7. Install the lock nut and torque to 100-125 ft-lb.
8. Recheck the end play (Final limit .001 to .010 inch). Re-adjust if necessary.
9. Bend the washer outward to lock the nut in position.
10. Install the gasket and grease cap and adjust the brakes. **The final adjustment must not result in a preloaded bearing.**

#### **DOUBLE NUT WITH DOUBLE WASHER (12000 POUND CENTER POINT AXLE)**

1. While rotating the wheel in both directions, torque the adjusting nut to 100-125 ft-lb to seat the bearings.
2. Back off the adjusting nut one complete turn (See Fig. 4, under Disassembly and Assembly).
3. Again while rotating the wheel in both directions, retorque the adjusting nut to 40-55 ft-lb.
4. Back off the adjusting nut to obtain an initial .004 to .010 inch end play between the hub and spindle.
5. Install the outer washer and lock nut and torque to 100-125 ft-lb.
6. Recheck the end play (final limit .001 to .010 inch). Re-adjust if necessary.
7. Install the gasket and grease cap and adjust the brakes. **The final adjustment must not result in a preloaded bearing.**

#### **SINGLE NUT WITH COTTER PIN (16000, 18000 AND 20000 POUND FRONT AXLE)**

1. While rotating the wheel in both directions, torque the adjusting nut to 100-125 ft-lb to seat the bearings.
2. Back off the adjusting nut one complete turn (See Fig. 4, under Disassembly and Assembly).
3. Again while rotating the wheel in both directions, retorque the adjusting nut to 40-55 ft-lb.
4. Back off the adjusting nut if necessary to align the nut castellations with the first available cotter pin hole.

5. Using the same cotter pin hole as a reference point, back off the adjusting nut one **additional** castellation to allow the wheel to rotate freely within the limits of .001 to .010 inch end play.
6. Insert and secure the cotter pin.
7. Install the gasket and grease cap and adjust the brakes. **The final adjustment must not result in a preloaded bearing.**

#### **DOUBLE NUT WITH LOCK RING (9000 AND 12000 POUND FRONT AXLE)**

1. While rotating the wheel in both directions, torque the adjusting nut to 100-125 ft-lb to seat the bearing.
2. Back off the adjusting nut one complete turn.
3. Again while rotating the wheel in both directions, retorque the adjusting nut to 40-55 ft-lb.
4. Back off the adjusting nut to obtain an initial .004 to .010 inch end play between the wheel hub and spindle.
5. Install the lock ring making sure the adjusting nut dowel is inserted into the lock ring.
6. Install the outer washer and lock nut. Torque to 100-150 ft-lb.
7. Recheck the end play (final limit .001 to .010 inch). Re-adjust if necessary.
8. Bend the washer outward to lock the outer nut in position.
9. Install the gasket and grease cap and adjust the brakes. **The final adjustment must not result in a preloaded bearing.**

## **DISASSEMBLY AND ASSEMBLY**

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

Wheel bearing lubricant has been changed from sodium base grease to lithium base grease.

Sodium base grease is not compatible with lithium base grease and should not be intermixed. Therefore, do not lubricate front and/or rear wheel bearings without first ascertaining the type of original wheel bearing lubricant. Usage of incompatible bearing lubricants could result in premature lubricant breakdown.

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

#### **LIGHT VEHICLE-E100, E300, P350 AND P500**

1. Raise the vehicle until the wheel and tire clear the floor and remove the wheel and tire from the hub. If the drums will not remove easily, back off the brake shoe adjusting screw so

that the shoes do not contact the brake drum. Remove the grease cap from the hub.

2. Remove the cotter pin, nut lock, adjusting nut and washer from the spindle (Fig. 1, Part 11-02).
3. Remove the outer bearing cone and roller. Pull the hub and drum assembly off the wheel spindle. Then, remove and discard the grease retainer. Remove the inner bearing cone and roller from the hub. **Remove all traces of old lubricant from bearings, hubs, and axle spindle.**
4. Inspect the cups for scratches, pits or cracks. If the cups are worn or

damaged, remove them with a drift. Clean the inner and outer bearing cones and rollers with solvent and dry them thoroughly. **Do not spin the bearings dry with compressed air.**

5. Inspect the cones and rollers for cracks, nicks, brinelling, or seized rollers. Inspect the grease retainer and replace it if it is cracked, nicked, or dented. If the new grease retainer is leather, soak it in light engine oil for about 30 minutes before installation.
6. Cover the spindle with a clean cloth and brush all loose dust and dirt from the brake assembly. **Remove the cloth from the spindle carefully to prevent dirt from falling on the spindle.**
7. Install the inner and outer bearing cups in the hub with the appropriate installing Tool (Fig. 1). Be sure to seat the cups properly in the hub. The cups will be properly seated when they are fully bottomed. Pack the inside of the hub with CIAZ-19590-B wheel bearing grease. Fill the hub until the grease is flush with the inside diameters of both bearing cups. Pack the bearing cones and rollers with wheel bearing grease. Use a bearing packer 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 in the inner cup and install the grease retainer (Fig. 2) with the appropriate driving tool. Be sure that the retainer is fully bottomed. Install the hub and drum on the wheel spindle. **Keep the hub centered on the spindle to prevent damage to the grease retainer or the spindle threads.**
9. Install the outer bearing cone and roller and the flat washer on the spindle, then install the adjusting nut.
10. Adjust the wheel bearing as outlined under Adjustments.

### F100-F350 Disc Brake Equipped

The removal and installation of front wheel grease seals and bearings for disc brake equipped vehicles differs only in two respects from the procedure for drum brake equipped vehicles. First it is necessary to remove the brake caliper (refer to Group 12, Part 24). In this case the caliper can be suspended by wiring it above the hub and rotor. **Be careful not to twist or strain the flexible brake line.**

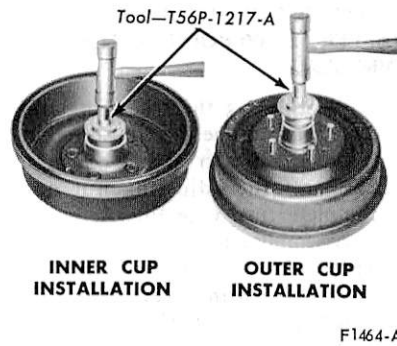


FIG. 1 Installing Bearing Cups

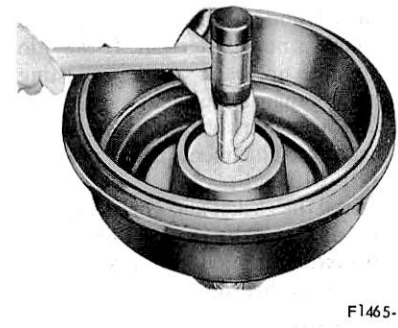


FIG. 2 Installing Grease Retainer

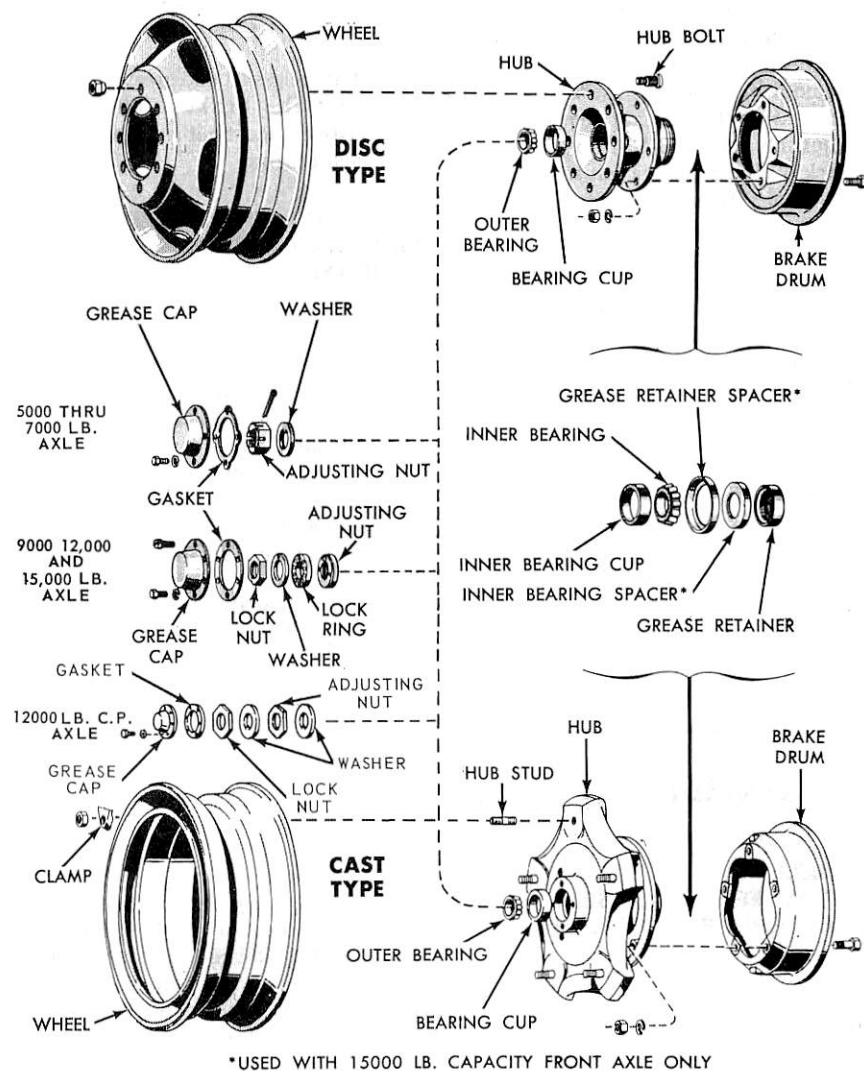


FIG. 3 Typical Front Hubs and Bearings

Then follow the procedure outlined for E100-E300 and P350-P500 with only one exception. A different tool, T37T-1190-B is required to install the special

shielded grease seal. Finally, install the brake caliper following the steps given in Group 12, Part 24.

### MEDIUM, HEAVY AND EXTRA HEAVY VEHICLES

There are two basic types of hub, disc and cast, shown in Fig. 3. The basic design of the hub bearings is the same in all hubs, but minor differences in size exist between the various models. The outer bearing attaching parts differ according to front axle weight capacity as indicated in Fig. 3. For further detailed views of hubs, bearings and grease retainers See Fig. 4.

1. Raise the vehicle until the tires clear the floor and install safety stands to support the front axle. Remove the grease cap and gasket from the hub.
2. To check the wheel bearing adjustment, alternately push inward and outward on the tire. If any excessive looseness is felt or there is no end play, adjustment of the front wheel bearings is necessary.
3. With 5000, 5500, 6000, 7000, 16000, 18000 or 20000 pound capacity front axles, remove the cotter pin, adjusting nut and flat washer from the spindle. With 9000, 12000 or 15000 pound capacity front axles, remove the lock nut, washer, locking ring and the adjusting nut and pin. With a 12000 pound capacity center point front axle, remove the lock nut, inner washer, adjusting nut and outer washer.
4. Inspect the condition of the spindle and nut threads to insure a free running nut when reassembling.
5. Remove the outer bearing cone and roller. Pull the hub and drum assembly off the spindle. Remove the inner bearing and seal using a brass drift. **Be careful not to damage the bearing cage.**
6. Remove all traces of old lubricant from the bearings, hubs and axle spindle. Inspect the cups for pitting, galling or unusual wear. If either cup is worn or damaged, remove it with a brass drift. Clean the inner and outer bearing cones and rollers with solvent and dry them thoroughly. **Do not spin the bearings dry with compressed air.**
7. Inspect the cones and rollers for pitting, galling or unusual wear. Particularly inspect the rollers for end wear and flat or rough spots. Replace all worn or damaged assemblies. It is recommended that the cone and roller assemblies and cups be replaced in sets.
8. Replace the grease retainer.
9. Cover the spindle with a clean cloth and brush all loose dust and dirt from the brake assembly. Remove the cloth from the spindle carefully to prevent dirt falling on the spindle.

10. Install the inner and outer bearing cups in the hub with the appropriate tool (Fig. 1). Check for proper seating of the new bearing cups by trying to insert a 0.0015 inch feeler gauge between the cup and wheel hub. The feeler gauge should not enter.
11. Pack the inside of the hub with Lithium base wheel bearing grease (C1AZ-19590-B). Fill the hub until the grease is flush with the inside diameters of both bearing cups. Pack the bearing cones and rollers with wheel bearing grease. Use a bearing packer 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.
12. Place the inner bearing cone and roller in the inner cup and install the grease retainer with the appropriate tool. Be sure the retainer is fully bottomed. On all synthetic type seals, coat the seal lips with wheel bearing grease (C1AZ-19590-B) before installing the hub and drum. On seals which are not coated on the OD with sealer by the supplier, coat the grease seal bore in the hub with a thin coat of non-hardening sealer prior to installing the grease seal.
13. Install the hub and drum on the wheel spindle. **Keep the hub centered on the spindle to prevent damage to the grease retainer or the spindle threads.**
14. With 5000, 5500, 6000, 7000, 16000, 18000 or 20000 pound capacity front axles, install the outer bearing cone and roller and the flat washer on the spindle. Then, install the adjusting nut. With 9000, 12000 and 15000 pound capacity front axles, install the outer bearing cone and roller and the bearing adjusting nut. With a 12000 pound capacity center point front axle, install the washer and adjusting nut. Make the final bearing adjustment, under Adjustments.

### MEDIUM, HEAVY AND EXTRA HEAVY VEHICLES (OIL LUBRICATION)

Stemco Seals and National Seals available as regular production options, provide sealing where oil is used for bearing lubrication. The tools required for Stemco Seal Installation are only available from the Stemco warehouse. Refer to Specifications for the tooling required. Fig. 5 illustrates a front wheel Stemco Seal Installation.

### FRONT HUB SEAL INSTALLATION

Clean all parts before starting the

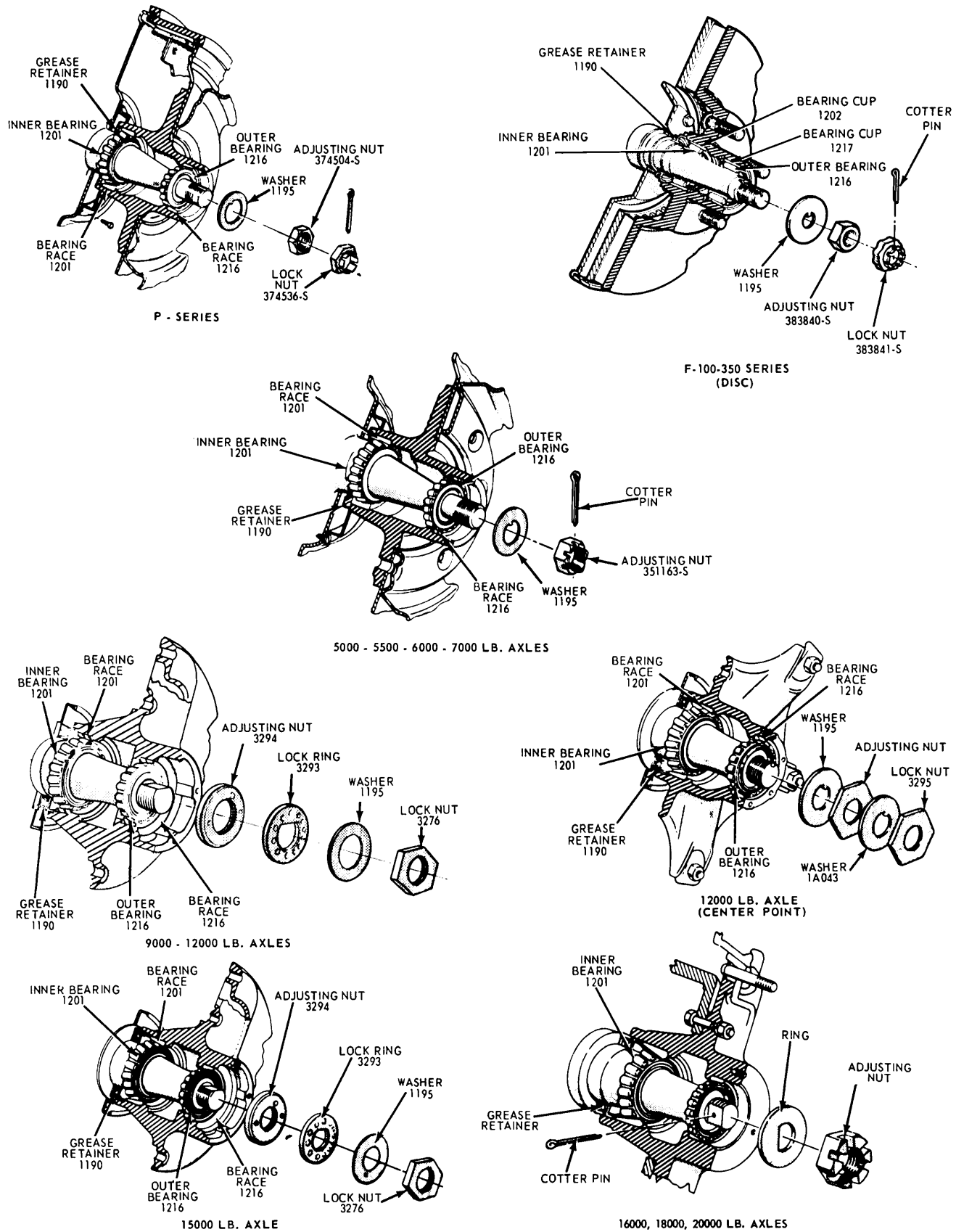
installation of Stemco Seals.

1. Oil the spindle and push the axle ring flush against the axle face where applicable.
2. Remove all burrs from the wheel hub bore seal area and clean thoroughly.
3. Position the seal in the hub bore (Part Number Up).

Drive the seal into position using the correct tool. It must be perfectly square with the bore, and bottom evenly. Install the wheel and adjust the bearings. Install the Stemco hub cap. Remove the filler plug and add oil (ESW-M2C105-B SAE 90). Double check the oil level before releasing the vehicle for service. Oil level must be between the oil level line on the hub cap and 1/4-inch above the line.

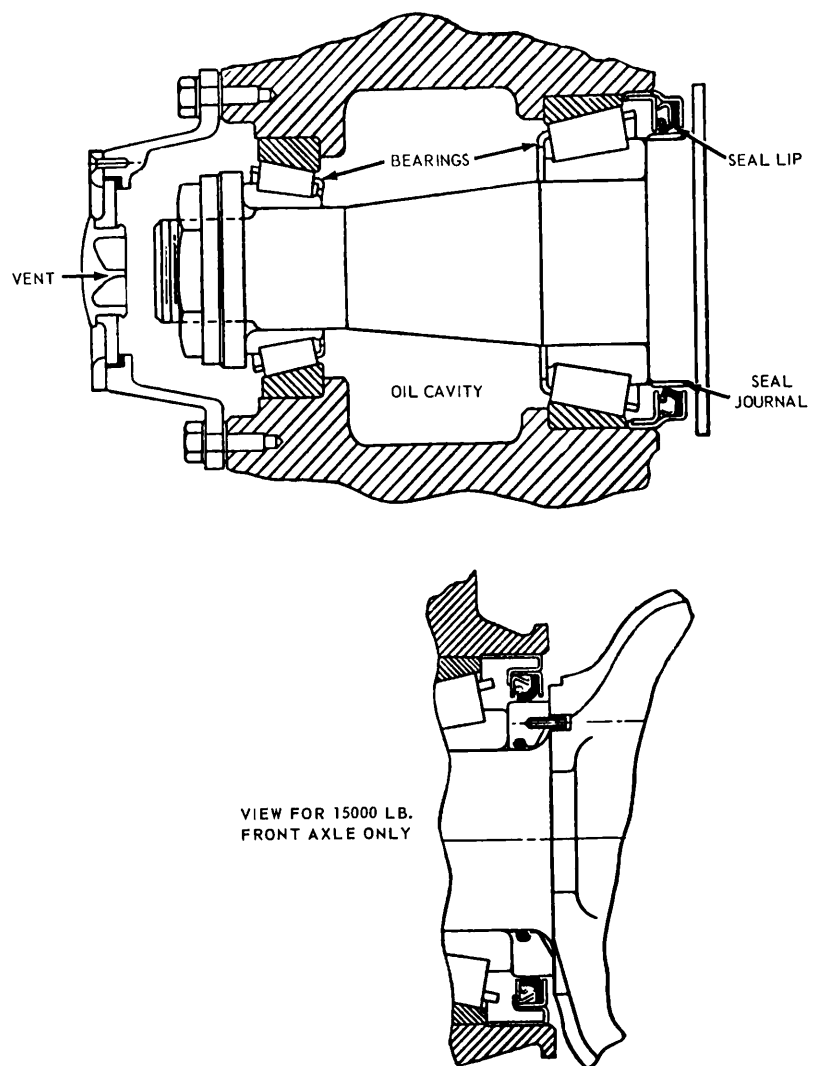
National Seals (Fig. 6) are installed as follows:

1. Clean all parts, remove rough spots and install axle ring flush against face where applicable.
2. Position the seal into the hub (notice oil side marking) with drive tool and hammer into a press fit.
3. Install the wheel and adjust the bearings the same as for any seal installation. Install the see through hubcap and the retaining screws.
4. Remove the filler plug and add oil to level on see through hubcap.



F1474-D

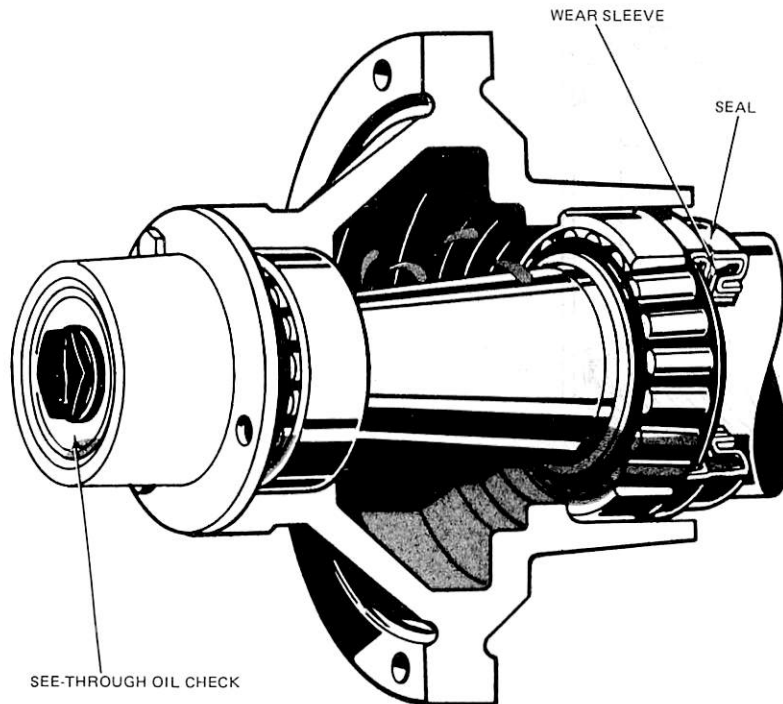
FIG. 4 Front Hubs, Bearings and Grease Retainers



E2124-A

FIG. 5 Front Seal Installation (Stemco)





F1831-A

FIG. 6 National Seal Installation

## SPECIFICATIONS

### WHEEL TORQUE LIMITS—F-100 THRU F-350, ECONOLINE, BRONCO, P-SERIES

Model	Nut Size	Ft-Lbs
E-100, E-200	1/2-20	90
F-100 (4 x 4), U-100 (Std. Wheel)		90
F-250-250 (4 x 4)		
P-350-3500 (W-5200 lb. Axle)		
E-300 (Std. Wheel)	9/16-18	135
F-350, P-350		
F-350, P-350, P-450	9/16-18	210
P-3500, P-4000 (W/Dual Wheels and 7400 lb. Axle)		
P-350, P-400, P-3500, P-4000 (W/17" Wheels)	5/8-18	210

### WHEEL TORQUE LIMITS—500 THRU 9000 SERIES

Description	Nut Size	Ft-Lbs
Front Wheel Nut	All	450
Cast Wheel Rim Nut	5/8-11	170-200
	3/4-10	170-220

### SPECIAL SERVICE TOOLS

Tool No.	Description
T-59T-1197-B	Front Wheel Bearing Adjustment Spanner Wrench
Tool 1175-AB	Grease Seal Remover Head
T50T-100-A	Impact Slide Hammer
T56P-1217-A	Front Hub Bearing Cup Replacer
T73T-1190-B	Shielded Grease Seal Installer

### SPECIAL SERVICE TOOLS—STEMCO

Ford Seal Kit Part No.	Stemco Tool No.	Ford Seal Kit Part Name
DOHZ-1190-A	5064-5351	Kit — Front Hub Grease Retainer and Wiper
	5061-5062	
DOHZ-1190-B	5066-5353	
DOHZ-1190-C	5067-5398	
DOHC-1190-D	None-5386	
DOHZ-1190-E	5007-5358	

Kits on this page consist of one axle ring and one seal for just one wheel

# PART 11-11 Wheel Hubs and Bearings—Rear

Applies to Bronco, Econoline E100, E200 and F-100 Only			
COMPONENT INDEX	Page	COMPONENT INDEX	Page
AXLE SHAFT		REAR WHEEL BEARING	
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## 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. 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.

## REMOVAL AND INSTALLATION

### REMOVAL OF AXLE SHAFT

The rear axle shafts, wheel bearings, and oil seal can be replaced without removing the differential assembly from the axle housing.

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 the seal journal must pass through the seal without cutting of the seal element during axle removal or installation will result in early seal failure.

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

### 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. Loosen the inner retainer ring by nicking it deeply with a cold chisel in several places (Fig. 2). It will then slide off easily.
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 or other irregularities which would affect the sealing action of the oil seal. Check the axle shaft splines for burrs, wear or twist. Carefully

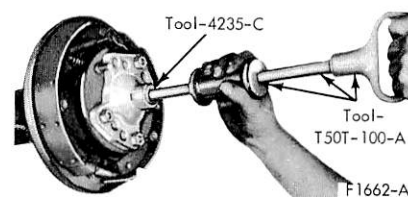


FIG. 1 Removing Axle Shaft

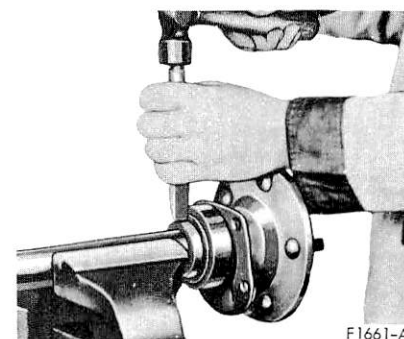


FIG. 2 Removing Rear Wheel Bearing Retainer Ring

- 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.
  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 specification.
3. Install the brake drum and the drum attaching (Tinnerman) nuts.
4. Install the wheel and tire on the drum. Install the wheel cover.

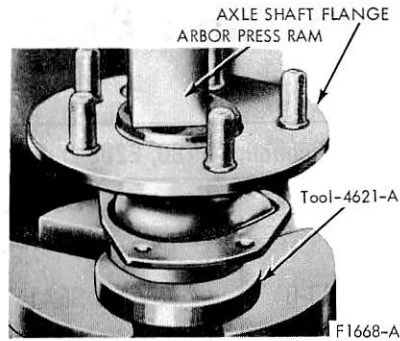


FIG. 3 Installing Rear Wheel Bearing

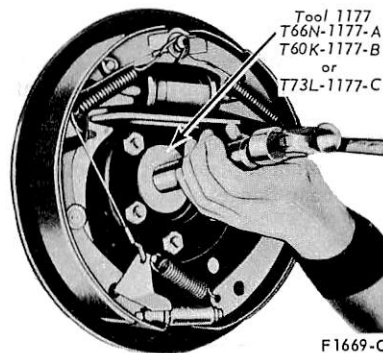


FIG. 4 Installing Rear Wheel Bearing Oil Seal

# PART 11-12 Wheel Hubs and Bearings— Front Wheel Drive

Applies to Bronco, F-100, F-250 and F-600 Only			
COMPONENT INDEX	Page	COMPONENT INDEX	Page
ADJUSTMENTS .....	12-01	DISASSEMBLY AND ASSEMBLY.....	12-07
DESCRIPTION .....	12-01	REMOVAL AND INSTALLATION .....	12-03

## DESCRIPTION

Front drive assemblies are available for Bronco, F-100, F-250 and F-600 vehicles.

## ADJUSTMENTS

### FRONT WHEEL BEARING ADJUSTMENT

#### BRONCO AND F-100

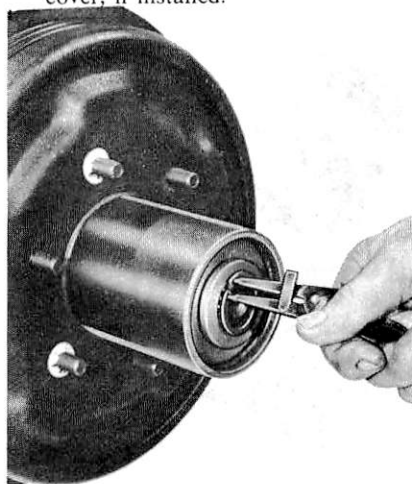
1. Raise the vehicle and install safety stands.
2. Back off the brake adjusting screw if necessary.
3. Remove the front hub grease cap and the driving hub snap ring (Fig. 1).
4. Remove the splined driving hub and the pressure spring. This may require a slight prying assist (Fig. 2).
5. Remove the wheel bearing lock nut and lock ring.
6. Using Tool T59T-1197-B and a torque wrench, tighten the bearing adjusting nut to 50 ft-lbs while rotating the wheel back and forth to seat the bearing.
7. Back off the adjusting nut approximately 90 degrees.
8. Assemble the lock ring by turning the nut to the nearest notch where the dowel pin will enter.
9. Install the outer lock nut and torque to 80-100 ft-lbs. Final end play of the wheel on the spindle should be 0.001 to 0.010 inches.
10. Install the pressure spring and driving hub, the driving hub snap ring and after applying non-hardening sealer to the seating edge of the grease cap, install the grease

cap. If equipped with free-running lock-out hubs, refer to Front Wheel Drive Lock-Out Hub Installation. The non-lockout type hub is shown in Fig. 3.

11. Adjust the brake if it was backed off.
12. Remove the safety stands and lower the vehicle.

#### F-250

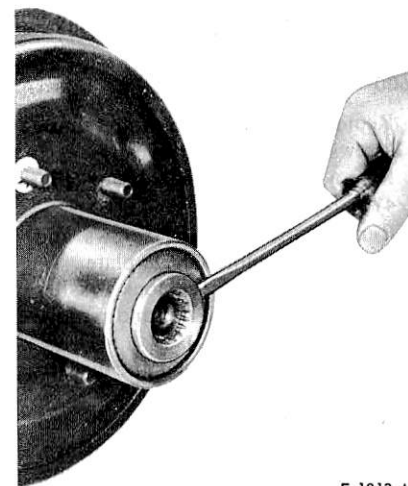
1. Raise the vehicle and install safety stands.
2. Back off the brake adjusting screw, if necessary. Remove the wheel cover, if installed.



F 1812-A

FIG. 1 Removing Snap Ring

3. Remove the front hub grease cap. Remove the driving hub retaining snap ring and slide the splined driving hub from between the axle shaft and the wheel hub (Fig. 2). Remove the driving hub spacer. (If equipped with free running lock-out hubs, refer to Front Wheel Drive Lock-Out Hub Removal in Group 15).
4. With Tool T59T-1197-B, remove the lock nut and lock ring from the spindle.



F 1813-A

FIG. 2 Removing Splined Driving Hub

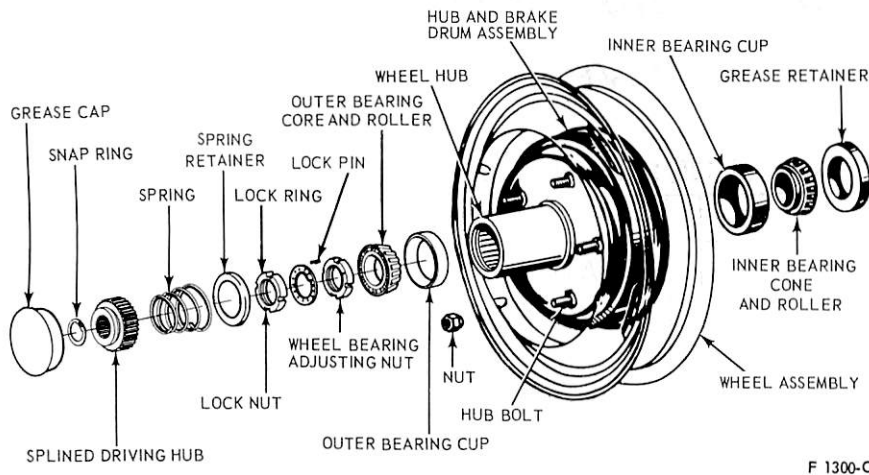


FIG. 3 Front Hub Installation—Four-Wheel Drive-non lockout type

5. Using Tool T59T-1197-B and a torque wrench, tighten the bearing adjusting nut (Fig. 2, Part 11-02) to 50 ft-lb, while rotating the wheel back and forth to seat the bearings.
6. Back the adjusting nut off approximately 90 degrees. Assemble the lock ring by turning the nut to the nearest notch where the dowel pin will enter.
7. Install the outer lock nut and torque to 80-100 ft-lbs. Final end play of the wheel on the spindle should be 0.001 to 0.010 inch.
8. Install the driving hub, spacer, snap ring and hub grease cap. Apply a thin coat of non-hardening sealer to the setting edge of the grease cap, before installation. (If equipped with free-running lock-out hubs, refer to Front Wheel Drive Lock-Out Hub Installation).
9. Adjust the brake, if backed off to permit drum removal.
10. Remove the safety stands and lower the vehicle.

**F-600**

1. Remove the outer hub cap retaining screws, and remove the cap.
2. Remove the retaining lock ring (Fig. 4).
3. Remove the retaining screws and remove the splined drive plate.
4. Bend the tab of the lock washer away from the lock nut and remove the lock nut (Fig. 5).
5. Remove the lock washer and **discard** it.
6. While rotating the wheel back and forth to correctly seat the bearings, torque the adjusting nut to 50 ft-lbs.
7. Back off the adjusting nut from 1/4 to 1/3 turn.
8. Position a **new** lock washer against

the adjusting nut and apply a film of oil to the outer face of the lock washer.

9. Run the lock nut up against the lock washer and torque it to 100-150 ft-lbs.
10. Bend one tab of the lock washer over the adjusting nut.
11. Bend one tab of the lock washer (in the opposite direction) over the lock nut. **Use a blunt tool when bending the tabs to avoid making any chips which could cause serious bearing damage.**
12. Apply Silastic Sealer to the front and rear mounting faces of the splined drive plate.
13. Position the drive plate, install the retaining screws and torque them to specifications.
14. Install the retaining lock ring.
15. Position the outer hub cap and install the retaining screws and torque them to specifications.

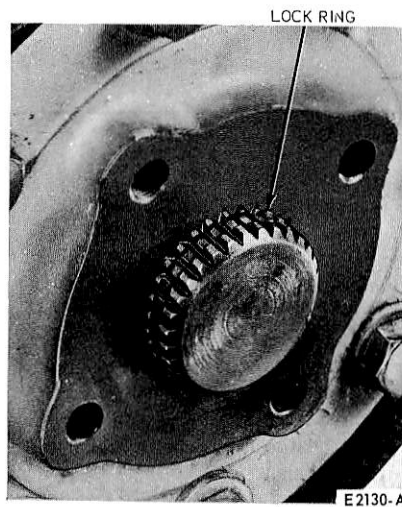


FIG. 4 Access to Lock Ring

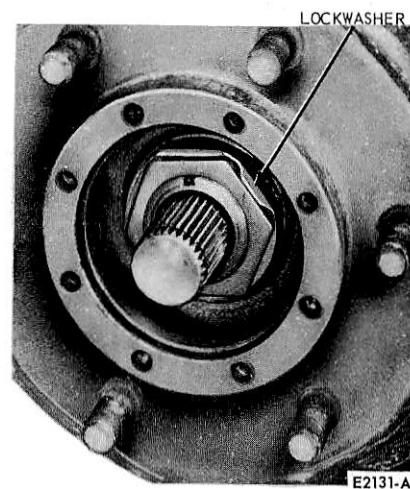


FIG. 5 Lock Nut and Washer Assembled

## REMOVAL AND INSTALLATION

### LOCK-OUT HUB (INTERNAL TYPE)

#### BRONCO, F-100, F-250 (3300 LB AXLE)

##### Removal

1. Remove the lock-out hub screws and washers (refer to Fig. 6).
2. Remove the hub ring and the knob. Wipe the parts clean.
3. Remove the internal snap ring from the groove in the hub.
4. Remove the cam body ring and clutch retainer (as an assembly) from the hub. Disassemble the parts.
5. Remove the axle shaft snap ring. It may be necessary to push inward on the gear and pull out on the axle with a bolt to make the snap ring removal easier.
6. Remove the drive gear and clutch gear. A slight rocking of the hub may make them slide out easier.
7. Remove the coil spring.
8. Remove the spring retainer ring.

##### Installation

1. Grease the inner hub with high speed grease (Fig. 7).
2. Install the spring retainer ring, positioned as shown with recessed undercut area going in first. Be sure it seats against the bearing (Fig. 8).

3. Install the coil spring with large end entering first (Fig. 9).
4. Install the axle shaft sleeve and ring and the inner clutch ring. Notice that the teeth are meshed together in a locked position for easy assembly. It may be necessary to rock the hub back and forth for spline alignment. Keep the two gears in locked position (Fig. 10).
5. Install the axle shaft snap ring. Push inward on gear, and if necessary, pull out axle shaft with bolt to allow clearance in groove for snap ring on the axle shaft. Be sure snap ring is fully seated in the snap ring groove of the shaft (Fig. 11).
6. Install the actuating cam body ring into the outer clutch retaining ring. Assemble into hub (Fig. 12).
7. Install the internal snap ring. Be sure snap ring is fully seated in the snap ring groove of the hub (Fig. 13).
8. Apply a small amount of Lubriplate Grease on the ears of the cam (Fig. 14).
9. Apply a small amount of Parker O-ring lube in groove of actuating knob before assembling outer O-ring (Fig. 14).
10. Assemble knob in hub ring and assemble to axle with knob in locked

position. Assemble screws and washers alternately and evenly, making sure the retainer ring is not cocked in the hub.

11. Torque the six lock-out hub screws to 35 to 40 inch pounds. Be sure the washers are under each retaining screw. At first the lock-out hubs will probably seem hard to engage and disengage, but after mileage they should loosen up for easier operation. Either lock-out hub will fit either wheel.

Do not drive vehicle until you are sure that both lock-out hubs are engaged or disengaged. When vehicle is driven in water deep enough to cover the hubs, it is recommended that the internal parts be disassembled and inspected for possible water or dirt. After inspection, relubricate all parts before assembly to prevent rusting or corrosion.

### LOCK-OUT HUB (EXTERNAL TYPE)

#### F-250 (3500 LB AXLE)

##### Removal

1. Remove the lock-out hub screws and washers (refer to Fig. 15), and discard them.

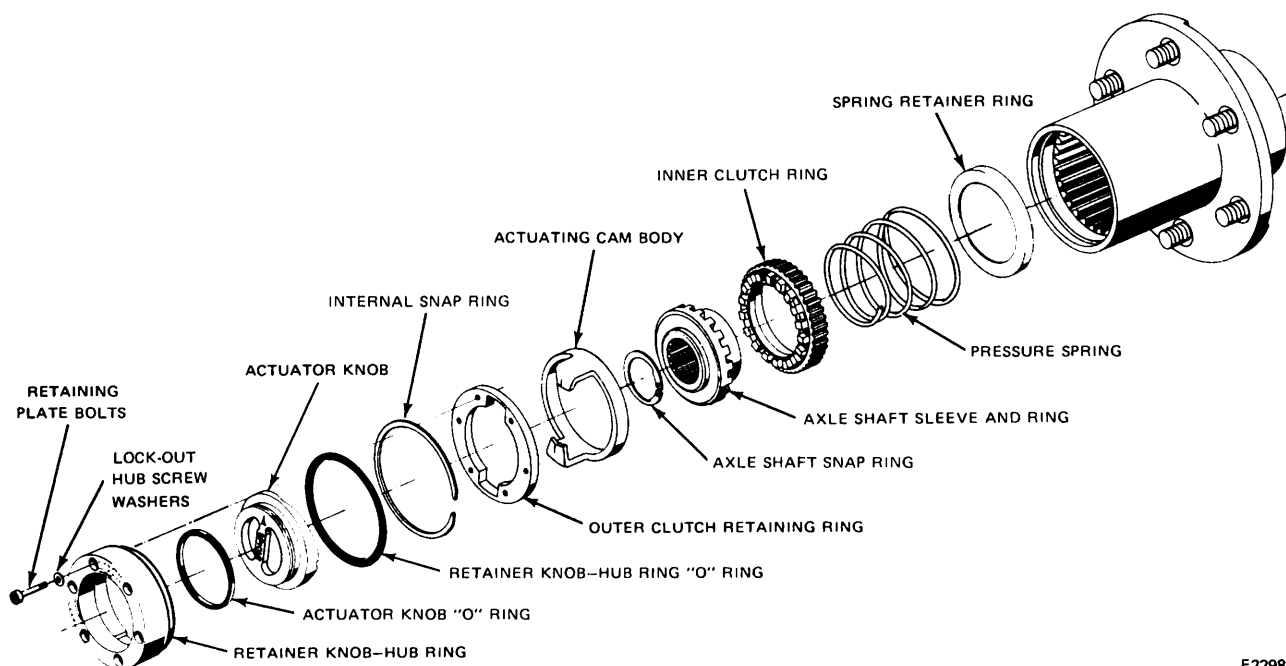


FIG. 6 Lock-Out Hub Internal Type—Bronco, F-250 (3300 Lb. Axles) Optional F-100



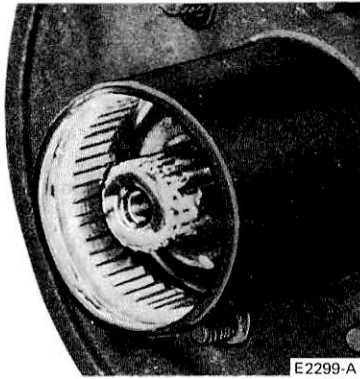


FIG. 7 Grease Application

2. Loosen the gear hub housing and slide away from the hub and drum assembly.
3. Remove the inner metal gasket (and discard it), the gear hub housing, and remove and discard the outer gasket. Wipe clean the exposed parts.
4. Remove the snap ring while holding pressure on the clutch gear.
5. Ease the clutch gear and pressure spring out of the assembly. The actuator knob should be in the lock position for this step.
6. Turn the actuator knob to the free position. With a drift, drive the lock pin out of the assembly.
7. Remove the actuating cam from the knob.
8. Remove the knob retainer snap ring and remove the knob from the knob retainer.
9. Using a capscrew pull out slightly on the axle shaft and remove the snap ring which retains the bushing and inner clutch gear assembly.
10. Remove these parts and disassemble. If wear or damage are evident on either the inner or outer clutch gear they should both be replaced as a set.

#### Installation

Before assembling lock-out hubs inspect the splines of the axle shaft making sure they are free of any possible nicks or burrs.

Threaded screw holes in the wheel hub should be cleaned before assembling new retainer screws. These holes can be cleaned by directing compressed air into the threaded holes.

1. Apply a small amount of MOLY XL hi-speed grease to the back face and the thrust face of the bushing, also to the splines of the inner clutch gear. Assemble inner clutch gear into

bushing. Install the bushing and inner clutch gear onto axle shaft, making sure the splines of the inner clutch gear are aligned with the splines of the axle shaft, as shown (Fig. 16).

2. Install a new snap ring. If necessary, pull out axle shaft with capscrew to allow clearance in groove for snap ring on axle shaft. Be sure snap ring is fully seated (Fig. 17).
3. Apply a small amount of Parker O-ring lubricant on the actuator knob, making sure knob is completely lubricated in the area shown. Assemble O-ring onto actuating knob.
4. Install the actuating knob into the knob retainer with arrow pointing to free position. Install the knob retainer snap ring. Spread snap ring with snap ring pliers. Use a small screwdriver to position the snap ring in the groove of the knob (Fig. 18).
5. Install the actuating cam onto the knob, aligning ears of the cam with the slots of the retainer. Position parts on a small piece of wood as shown. Assemble the lock pin through the groove of the cam and holes in the actuating knob. Be sure ends of the pin are flush with the outside diameter of the cam (Fig. 19).
6. Turn actuator knob to **lock** position. Apply a small amount of MOLY XL hi-speed grease to both grooves of the cam as shown (Fig. 20).
7. Install the pressure spring and outer clutch gear. Compress the pressure spring by forcing down on clutch gear and assemble snap ring. Make sure snap ring is secure in the groove of the cam. Turn actuator knob to free position. Assemble six dished washers to the six retainer screws exactly as shown (Figs. 21 and 22).
8. Install 2 screws with correctly positioned washers into the knob retainer. This will properly line up the parts in steps 9 and 10. Apply a small amount of hi-speed grease to the outer spline and teeth of the outer clutch gear. Remove any excess lubricant from the gasket surface of the retainer.
9. Install a new outer retainer gasket. Assemble gear hub housing by aligning the splines of the housing with those of the outer clutch gear as shown. Assemble a new inner (metal) gasket on hub housing (Fig. 23).
10. Position the lock-out hub subassembly to axle assembly using the two new retainer screws as pilots to assure that the holes of the gasket are in alignment with the holes of

the wheel hub. Tighten retainer screws to secure the lock-out hub. Turn actuator knob to lock position.

11. Install the remaining four new retainer screws with washers. Tighten screws evenly. Torque to 30-35 ft-lbs. The lock-out may be hard to engage and disengage, however after use, they should loosen up for easier operation. Either lock-out will fit either wheel.
12. **Do not drive vehicle until both lock-out hubs are either engaged or disengaged.**

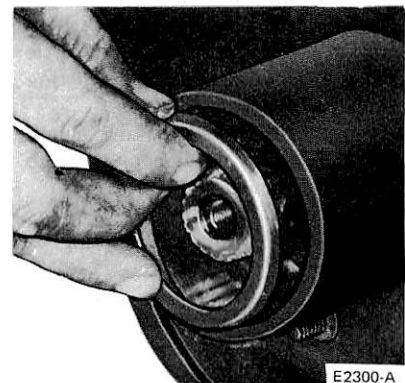


FIG. 8 Spring Retainer Ring Installation



FIG. 9 Coil Spring Installation



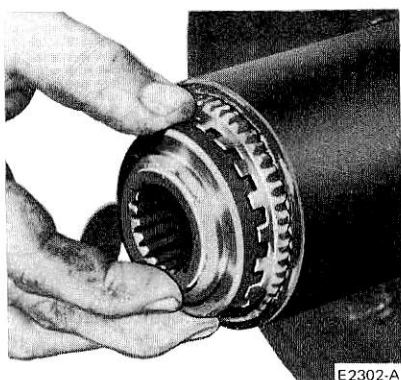


FIG. 10 Axle Shaft Sleeve and ring, and Inner Clutch Ring Installation

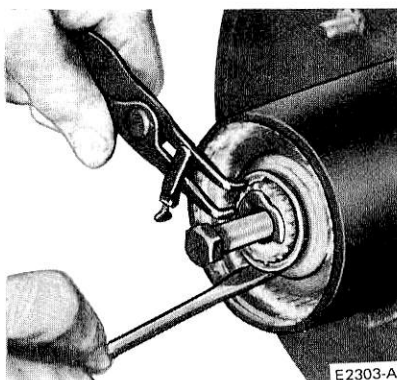


FIG. 11 Installing Axle Shaft Snap Ring

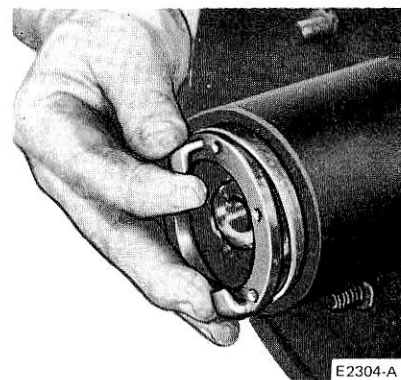


FIG. 12 Installing Cam Body Ring into the Clutch Retaining Ring

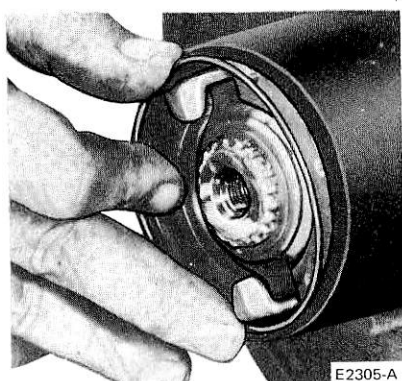
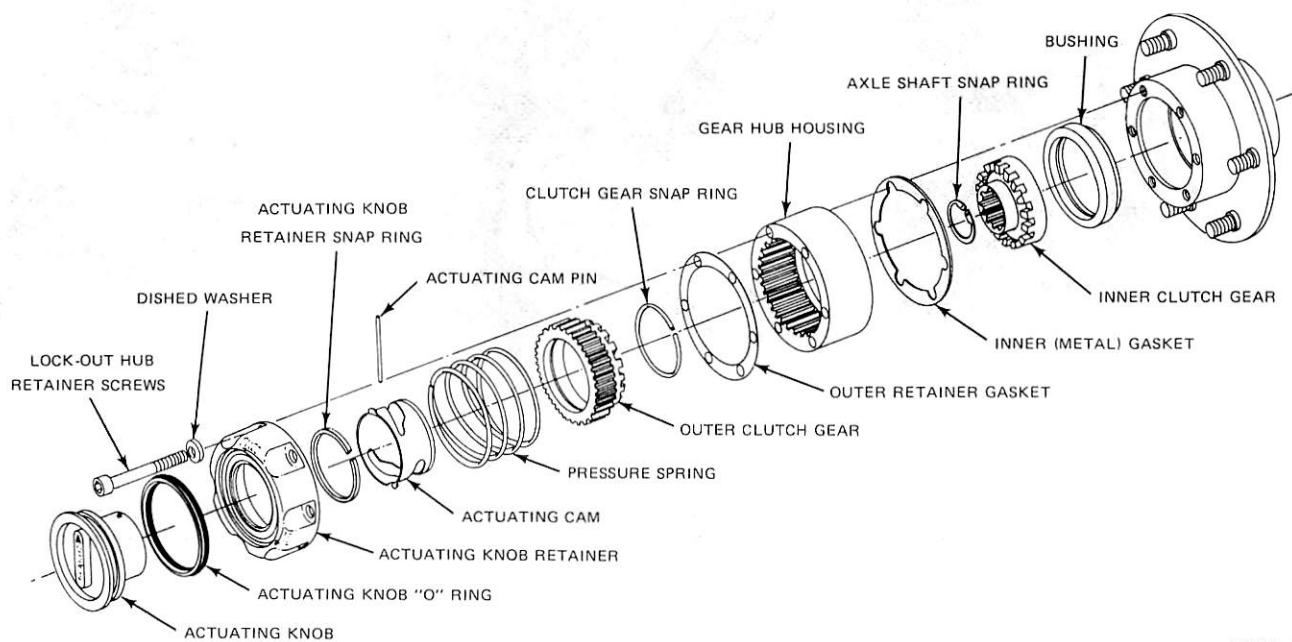


FIG. 13 Installing Internal Snap Ring

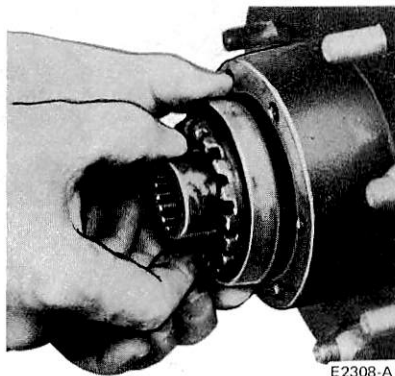


FIG. 14 Lubrication Areas

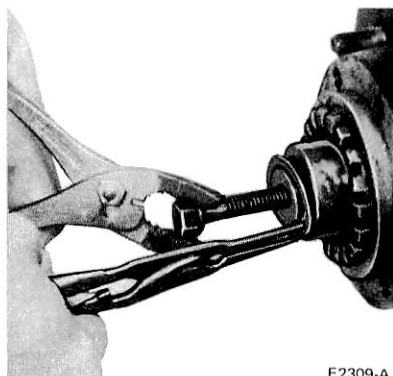


E2306-A

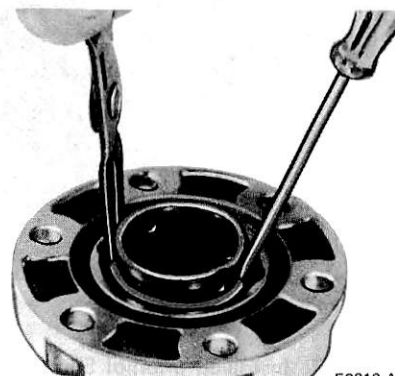
FIG. 15 Lock-Out Hub—External Type (F-250-3500 Lb. Axles)



E2308-A



E2309-A



E2310-A

FIG. 16 Bushing and Inner Clutch Gear Installation

FIG. 17 Snap Ring Installation

FIG. 18 Knob Retainer Snap Ring Installation

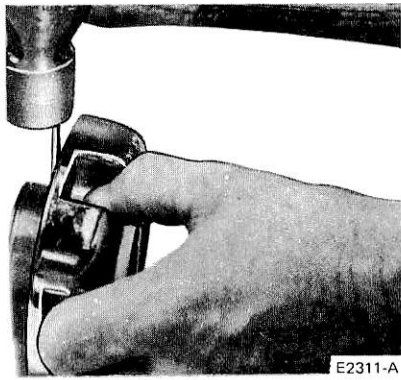


FIG. 19 Lock Pin Installation

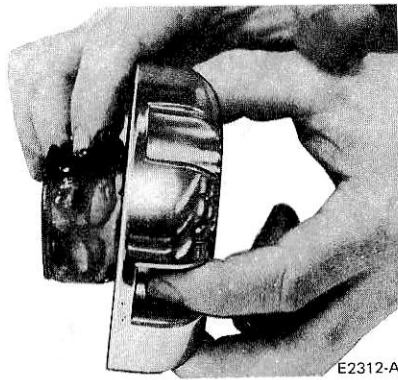


FIG. 20 Grease Application

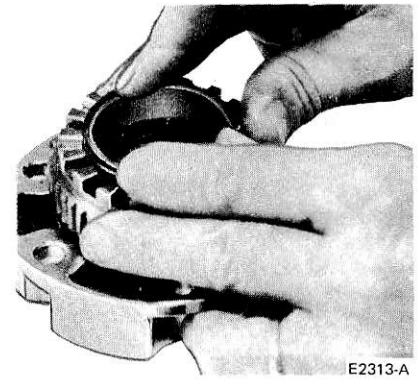


FIG. 21 Pressure Spring and Outer Clutch Gear Installation

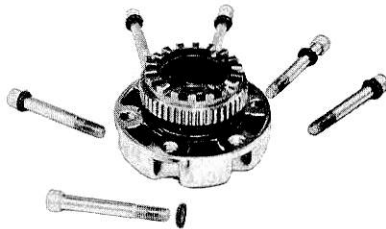


FIG. 22 Dished Washer Assembly Detail

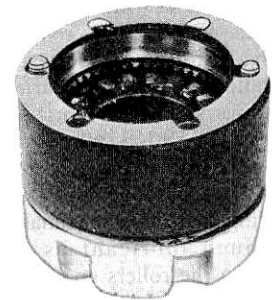


FIG. 23 Assembly Positions of Gear Hub Housing and Gaskets

## DISASSEMBLY AND ASSEMBLY

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

Wheel bearing lubricant has been changed from sodium base grease to lithium base grease.

Sodium base grease is not compatible with lithium base grease and should not be intermixed. Therefore, do not lubricate front and/or rear wheel bearing without first ascertaining the type of original wheel bearing lubricant. Usage of incompatible bearing

lubricants could result in premature lubricant breakdown.

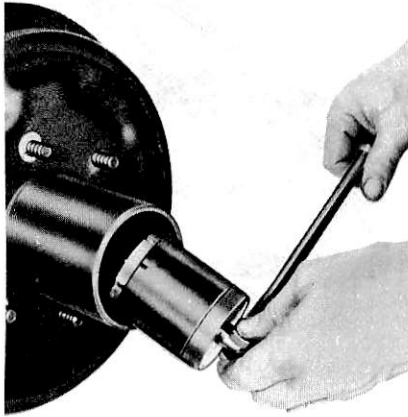
If bearing adjustment will not eliminate looseness or rough and noisy operation, the hub and bearings should be cleaned, inspected, and repacked with specified wheel grease. If the bearing cups or the cone and roller assemblies are worn or damaged, they should be replaced.

#### BRONCO AND F-100

1. Raise the vehicle and install safety stands.
2. Back off the brake adjusting screw if

necessary.

3. Remove the front hub grease cap and driving hub snap ring (Fig. 1).
4. Remove the splined driving hub and the pressure spring. This may require a slight prying assist (Fig. 2).
5. Remove the wheel bearing lock nut, lock ring, and adjusting nut (Fig. 24), using Tool T59T-1197-B.
6. Remove the hub and drum assembly. The outer wheel bearing and spring retainer will slide out as the hub is removed (Fig. 25).
7. Carefully drive the inner bearing cone and grease seal out of the hub



F 1814-A

FIG. 24 Lock nut, Lock Ring and Adjusting Nut Removal



F 1815-A

FIG. 25 Hub, Drum and Outer Bearing Removal



F 1816-A

FIG. 26 Inner Bearing Cone and Grease Seal Removal

(Fig. 26) using T69L-1102-A.

8. Inspect the bearing cups for pits or cracks. If necessary, remove them with a drift (Fig. 27). **If new cups are installed, install new bearings.** The bearings should be lubricated with C1AZ-19590-B wheel bearing grease. Clean all old grease from the hub. Pack the cones and rollers. If a bearing packer is not available, work as much lubricant as possible between the rollers and the cages.
9. Position the inner bearing cone and roller in the inner cup and install the grease retainer.
10. Carefully position the hub and drum assembly on the spindle.
11. Install the outer bearing cone and roller and the adjusting nut.
12. Using Tool T59T-1197-B and a torque wrench, tighten the bearing adjusting nut to 50 ft-lbs while rotating the wheel back and forth to seat the bearings.
13. Back off the adjusting nut approximately 90 degrees.
14. Assemble the lock ring by turning the nut to the nearest notch where the dowel pin will enter.
15. Install the outer lock nut and torque to 80-100 ft-lbs. Final end play of the wheel on the spindle should be 0.001 to 0.010 inches.
16. Install the pressure spring and driving hub snap ring and after applying non-hardening sealer to the seating edge of the grease cap, and install the grease cap. If equipped with free-running lock-out hubs, refer to Removal and Installation for the type of hub involved.
17. Adjust the brake if it was backed off.
18. Remove the safety stands and lower the vehicle.

#### F-250

1. Raise the vehicle and install safety stands.
2. Back off the brake adjusting screw, if necessary. Remove the wheel cover, if installed.
3. Remove the front hub grease cap. Remove the driving hub retaining snap ring (Fig. 2, Part 11-02) and slide the splined driving hub from between the axle shaft and the wheel hub. Remove the driving hub spacer. If equipped with free-running lock-out hubs, refer to Removal and Installation for the type of hub involved.
4. **With Tool T59T-1197-B, remove the lock nut, washer, and wheel bearing adjusting nut (Fig. 3) from the spindle. Remove the wheel, hub and drum as an assembly. The wheel outer bearing will be forced off the spindle at the same time. Protect the spindle and inner bearing cone from dirt.**
5. Remove the grease retainer and the inner bearing cone and roller assembly from the hub with Tool 1175AB, and T50T-100-A. Discard the grease retainer.
6. 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 a drift.
7. Thoroughly clean the inner and outer bearing cones and rollers 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.**

8. 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.**

9. If the inner bearing cup was removed, install the cup or a new cup in the hub. **Be sure to seat the cup properly in the hub.**
10. Install the outer bearing cup in the hub with a suitable tool. **Be sure the cup is properly seated in the hub.**
11. Pack the inside of the hub with CIAZ-19590-B lubricant. Add lubricant to the hub only until the grease is flush with the inside diameter of both bearing cups.
12. All old grease should be completely cleaned from the bearings before repacking them with new grease. Pack the bearing cone and roller assemblies with CIAZ-19590-B lubricant. 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.
13. Place the inner bearing cone and roller assembly in the inner cup, and install the new grease retainer. **Be sure that the retainer is properly seated.** Coat the grease retainer sealing lip with a liberal amount of CIAZ-19590-B lubricant.
14. 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.**

15. Install the wheel outer bearing cone and adjusting nut. Adjust the front wheel bearings as detailed in Adjustments under Front Wheel Bearing Adjustment.

#### F-600

1. Remove the wheel and tire from the hub and drum. Remove the outer hub cap retaining screws, and remove the cap.
2. Remove the retaining lock ring (Fig. 3).
3. Remove the retaining screws and remove the splined drive plate.
4. Bend the tab of the lock washer away from the lock nut and remove the lock nut (Fig. 4).
5. Remove the lock washer and **discard it.**
6. Remove the adjusting nut.
7. Remove the hub and drum carefully from the spindle. Cover the spindle to protect it from dirt and foreign material. If the drum is difficult to remove, back off the brake adjustment to provide clearance.
8. Carefully remove the inner bearing and seal.
9. Clean the bearing recess and using a suitable solvent, clean the bearings. **Do not spin dry with compressed air.**

Repack the bearings with grease after drying thoroughly. Inspect the bearing cups. If cracked, pitted, or otherwise damaged, they should be replaced. If they are replaced, the bearings should also be replaced.

10. The cups can be removed using a hammer and a drift.
11. Install the new cups using Tool T68T-1174-AB for the inner bearing cup and Tool T68T-1173-AB for the outer bearing cup.
12. **Install the inner bearing, lubricate and install the grease seal using Tool T68T-1173-AC.**
13. Position the hub and drum on the spindle.
14. Install the outer bearing and the adjusting nut. Install the wheel and tire on the hub and drum.
15. While rotating the wheel back and forth to correctly seat the bearings, torque the adjusting nut to 50 ft-lbs.
16. Back off the adjusting nut from 1/4 to 1/3 turn.
17. Position a **new** lock washer against the adjusting nut and apply a film of oil to the outer face of the lock washer.
18. Run the lock nut up against the lock washer and torque it to 100-150 ft-lbs.
19. Bend one tab of the lock washer over the adjusting nut.
20. Bend one tab of the lock washer (in

the opposite direction) over the lock nut. **Use a blunt tool when bending the tabs to avoid making any chips which could cause serious bearing damage.**

21. Apply Silastic Sealer to the front and rear mounting faces of the splined drive plate.
22. Position the drive plate, install the retaining screws and torque them to specifications.
23. Install the retaining lock ring.
24. Position the outer hub cap and install the retaining screws.



FIG. 27 Bearing Cup Removal

# PART 11-14 Wheel Hubs and Bearings— Rear (Full Floating Axle)

Applies to All 250 and Higher Series Vehicles

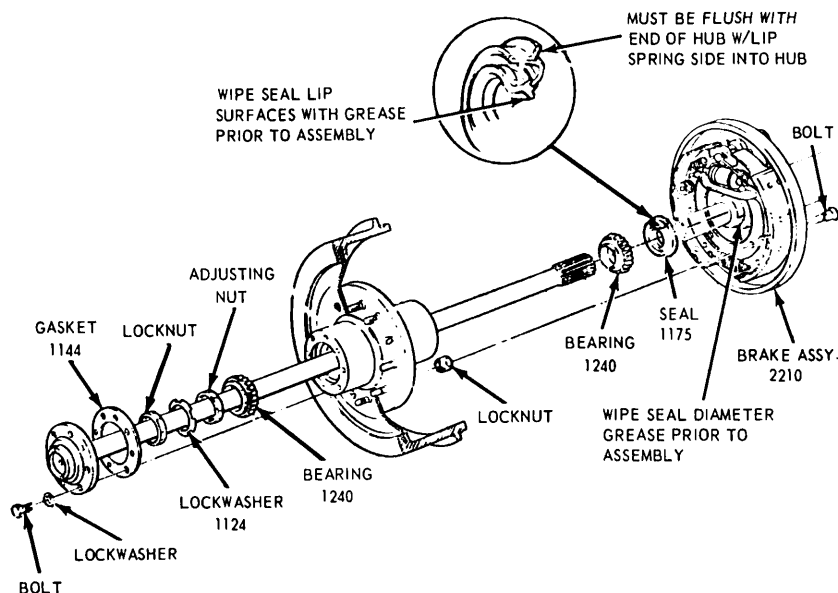
COMPONENT INDEX	Page	COMPONENT INDEX	Page
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## DESCRIPTION

On all the full-floating axle wheel hubs with tapered roller bearings, a seal is installed behind the inner bearing to keep the wheel bearing lubricant from the brake lining and brake drum (Figs. 1 and 2).

The wheel bearings are packed with wheel bearing lubricant (C1AZ-19590-B) to provide initial lubrication until axle lubricant flows into the wheel hubs and bearings during vehicle operation. On these axles the wheel hub is vented through the axle housing vent. The seal assembly (500-9000 Series) mounts on the wheel hub and seals on a wear sleeve (wiper) which is installed on the axle housing tube (Fig. 2).

The wear sleeves (500-9000 Series) must be installed squarely on the axle housing using the appropriate tools (Fig. 3). Do not use heat on the wear



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FIG. 1 Rear Wheel Hub—Dana Full-Floating Axle—Models 60, 60-3E, and 70

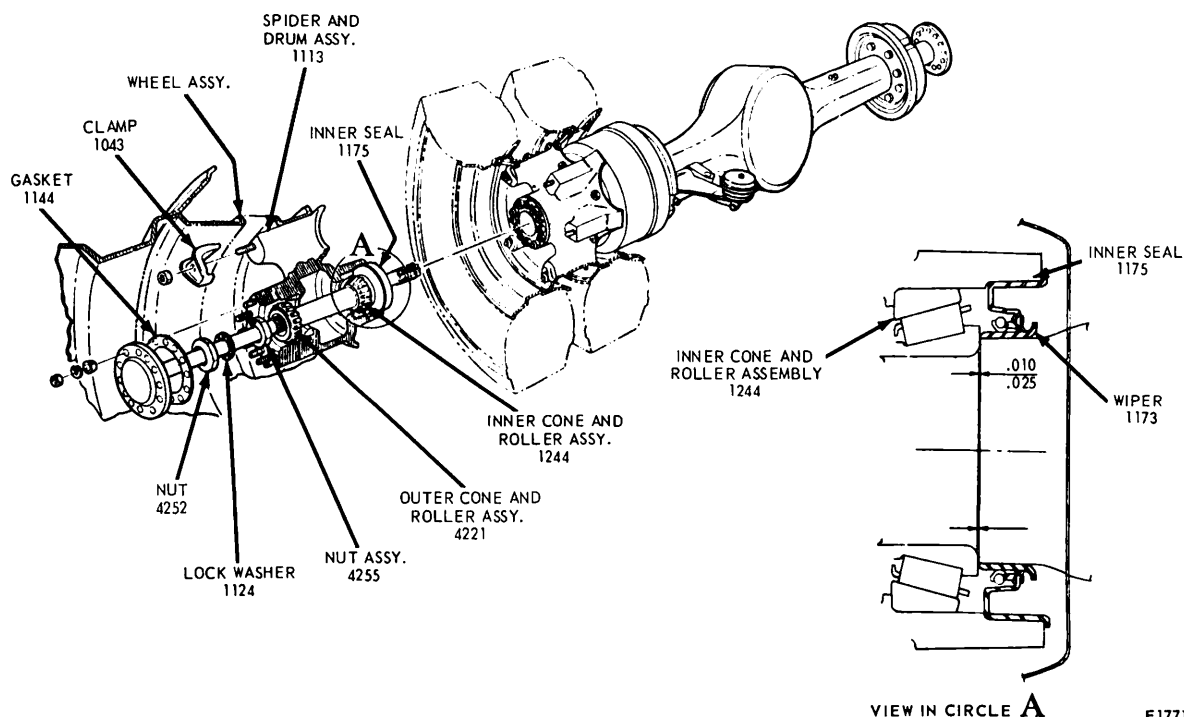


FIG. 2 Typical Rear Wheel Hub—Full-Floating Axle—500-9000 Series



sleeves to facilitate installation. Use the proper tool as shown in Fig. 3. The sleeves are designed with flanges to eliminate the possibility of installing the sleeves backwards. Although preservative has been applied to the wear sleeve prior to packaging, a light oil (SAE-10 or its equivalent) should be applied to the wear sleeve to facilitate assembly of the sleeve to the axle housing. After installation of the wear sleeve, the clearance between the end of the wear sleeve and inner wheel bearing shoulder should be 0.010 to 0.025 inches (Fig. 2).

The seal assembly is to be installed in the wheel hub. The garter spring

should be checked to assure the spring is in the spring groove behind the primary seal lip after the seal is in position. Before installing the wheel, apply grease (C1AZ-19590-B) between the lips of the seal.

The wheel bearing must be thoroughly cleaned and repacked with lithium base grease (C1AZ-19590-B) before installing the wheel assembly.

To prevent damage to the primary and secondary lips of the seal assembly, a locator sleeve or tool should be used to guide the hub and drum onto the axle. A new seal assembly must be installed whenever a wheel is removed.

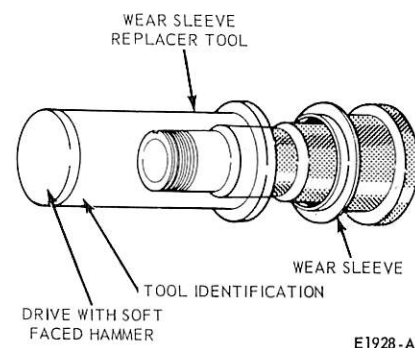


FIG. 3 Tool Application of Wear Sleeve (Wiper) Installation

## DISASSEMBLY AND ASSEMBLY

### BEARINGS, CUPS AND SEALS

#### F-250, (4 X 2 AND 4 X 4), F-350, E-300, P-350, AND P-400 SERIES

1. Set the parking brake and loosen the axle shaft retaining bolts (Fig. 1).
2. Raise the rear wheels off the floor and place work stands under the rear axle housing so that the axle is parallel with the floor. Back off the rear brake adjustment, if necessary.
3. Remove the axle shaft retaining bolts and discard them.
4. Remove the axle shaft and discard the gasket.
5. Remove the wheel lock nut, lock washer and wheel bearing adjustment nut using Tool T70T-4252-D, or T70T-4252-E. **Under no condition should the lock nut be**

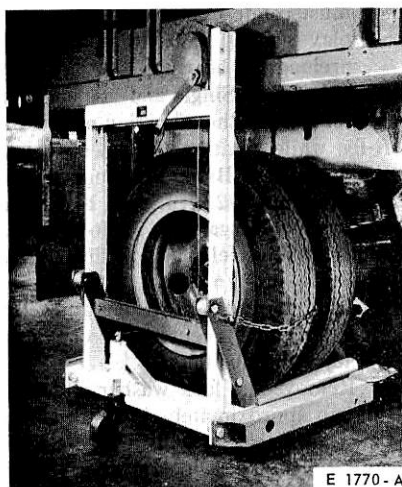


FIG. 4 Typical Wheel Jack

- removed with a chisel. Discard the lock washer.
6. With the type of wheel jack shown in Fig. 4, raise the wheel to the point that all weight is removed from the wheel bearings. Remove the outer bearing cone. Now, pull the wheel assembly **straight out and away** from the axle.
7. Thoroughly clean the spindle of the axle housing.
8. With a brass drift, and care to prevent damaging the bearing cage, drive the inner bearing cone and inner seal out of the wheel hub.
9. Clean all old grease and axle lubricant out of the wheel hub.
10. Inspect the bearing races and rollers for pitting, galling or erratic wear patterns. Inspect the rollers for end wear. Replace the bearings if worn or damaged.
11. If the bearing cups are to be replaced, drive them out with a brass drift. Install the new cups with a tool such as OTC 27797.
12. Check for proper seating of the new bearing cups by trying to insert a 0.0015 inch feeler gauge between the cups and the wheel hub.
13. Pack each bearing cone and roller assembly with a bearing packing tool, using C1AZ-19590-B (ESA-MIC75-B) long life lubricant.
14. Place the inner bearing cone and roller assembly in the wheel hub. Install a new hub inner Seal using Tool T73T-1190-A.
15. Position the wheel assembly at the axle housing. Wrap the threads of the spindle with electricians tape. Carefully slide the wheel assembly

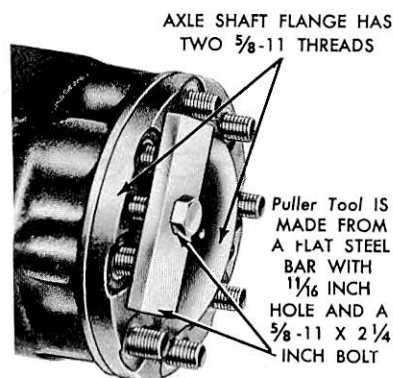
straight (to avoid seal damage) onto the axle housing spindle. Remove the electricians tape.

16. Install the outer wheel bearing and start the bearing adjuster nut. Remove the wheel jack.
17. Torque the adjusting nut to 50-80 ft-lbs while rotating the wheel. Back off (loosen) the adjusting nut 3/8 of a turn using Tool T70T-4252-D or T70T-4252-E.
18. Install a new lock washer coated with axle lube and smooth side out. Install the lock nut (Tool T70T-4252-D or T70T-4252-E). Torque the lock nut to 90-110 ft-lbs. With the lock nut at proper torque, the wheel assembly must rotate freely and with an end play of 0.001-0.010 inch. **Be sure of this specification. Check it closely with suitable dial indicator set up. Do not preload the bearings.**



FIG. 5 Axle Shaft Removal—Tapered Dowels





E 1768-A

FIG. 6 Axle Shaft Puller

19. With a satisfactory end play and freely turning wheel bend two lock washer tabs inward over flats of the adjusting nut and two tabs outward over flats of the lock nut.
20. Install the axle shaft, new axle flange gasket, lock washers and new axle shaft retaining bolts. Torque the lock bolts to 40-50 ft-lbs.
21. Adjust the brakes. Then, remove the work stands and lower the vehicle.

#### 500-9000 SERIES

1. Release the parking brake and loosen the axle shaft stud nuts.
2. Raise the rear wheels off the floor and place the work stands under the rear axle housing so that the axle is parallel with the floor. Back off the rear brake adjustment.
3. Remove the axle shaft stud nuts.
4. If tapered dowels are installed in the axle shaft flange, place a drift in the center of the flange and strike it sharply to loosen the dowels (Fig. 5). Remove the axle shaft.

On axles where tapered dowels are not used, two puller threads (5/8-11) are provided in the axle shaft flange. These axle shafts may be pulled with a slide hammer installed in the puller threads or with the type of tool shown in Fig. 6. This tool can be made from a piece of flat steel bar with an 1 1/16 inch hole in it, and a 2 1/4 inch long 5/8-11 bolt. As the bolt is turned clockwise, the axle shaft flange is pulled away from the wheel hub. If the thread load becomes excessive when pulling an axle shaft, install a second puller on the opposite side of the flange, if so equipped.

5. Bend the lock washer tab away from the lock nut, and then remove the lock nut, lock washer, and the adjusting nut.
6. With the type of wheel jack shown in Fig. 4, raise the wheel to the point

that all wheel weight is removed from the wheel bearings. Remove the outer bearing cone. Now, pull the wheel straight out and away from the axle.

7. Inspect the inner seal wear sleeve on the axle housing spindle for signs of wear or pitting. If necessary to replace the wear sleeve, use a hammer and a cold chisel. Being careful not to damage the seal journal of the axle housing, make two evenly spaced indentations in the wear sleeve surface and slip the wear sleeve off the axle housing. Thoroughly clean the spindle of the axle housing. Then, position a new proper size wear sleeve squarely to the axle housing spindle and, with the use of proper driving tool (Fig. 3), and a soft faced hammer, drive the wear sleeve on the axle housing spindle until it seats evenly against the shoulder of the seal journal of the spindle. A light coating of S.A.E. 10 oil should be applied to the inner surface of the wear sleeve to facilitate assembly of the wear sleeve to axle housing.
8. With a piece of hard wood which will just clear the outer bearing cup, or a brass drift, carefully drive the inner bearing cone and inner seal out of the wheel hub.
9. Clean all the old grease or axle lubricant out of the wheel hub.
10. Inspect the bearing races and rollers for pitting, galling, and erratic wear patterns. Inspect the rollers for end wear (Fig. 7).
11. If the bearing cups are to be replaced, drive them out with a drift. Install the new cups with the tool shown in Fig. 8 or press them in.
12. Check for proper seating of the new bearing cups by trying to insert a 0.0015 inch feeler gauge between the cup and the wheel hub.
13. Pack each bearing cone and roller assembly with a bearing packer tool.

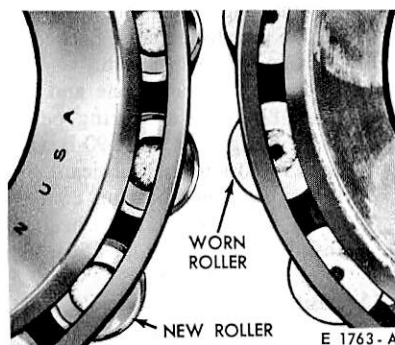


FIG. 7 Roller Bearing End Wear

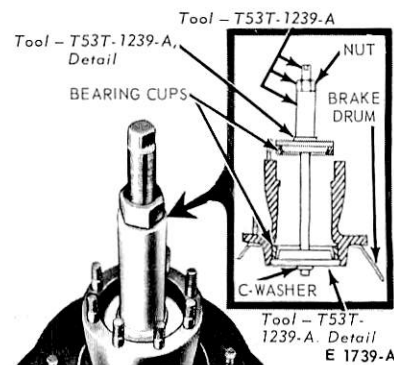


FIG. 8 Installing Bearing Cup

14. Place the inner bearing cone and roller assembly in the wheel hub, and then install a new hub inner seal.
15. Apply a light film of CIAZ-19590-B (ESA-MIC75-B) to the axle spindle; then position a seal protector tool over the axle spindle threads.
16. Position the wheel assembly at the axle housing. Carefully slide the wheel assembly straight (to avoid seal damage) onto the axle housing spindle. Then, remove the seal protector from the axle spindle.
17. Install the outer wheel bearing and start the bearing adjuster nut. Remove the wheel jack.
18. **11000-17500 lb. Single Rear Axles and 30000 lb. Tandem Rear Axles:** Torque the adjusting nut to 140 ft-lbs while rotating the wheel to seat the bearings. Back off (loosen) the adjusting nut 1/2 turn; then, torque the adjusting nut again to 50 ft-lbs while rotating the wheel. Back off (loosen) the adjusting nut 1/3 turn. Install the lock washer. Back off the adjusting nut, if necessary to align the lock washer hole with the dowel pin. Install the lock nut and tighten to 125 ft-lbs. The wheel assembly must rotate freely and with an end play of 0.001 to 0.010 inch. **Do not preload the bearings.**

**All Other Single and tandem Rear Axles:** Torque the adjusting nut to 185 ft-lbs while rotating the wheel to seat the bearings. Back off (loosen) the adjusting nut 1/2 turn; then, torque the adjusting nut again to 50 ft-lbs while rotating the wheel. Back off (loosen) the adjusting nut 1/6 turn.

19. Install a new lock washer and select a tab which is centered on one of the adjusting nut flats.

Remove the lock washer and bend this tab approximately 45 degrees such that the final bend will fit flush on the nut. Reinstall the lock washer. Install the lock nut and torque it to 125 ft-lbs (Fig. 9). With the lock nut at proper torque, the wheel assembly must rotate

freely and with an end play of 0.001-0.010 inch. Do not preload the bearings. Bend the pre-bent lock washer tab flush against the flat of the adjusting nut. Bend another tab flush on the lock nut. Do not use a chisel or other sharp tool to bend the tabs as metal chips could work into the bearings.

20. Install the axle shaft, a new gasket, lock washers and axle shaft retaining nuts. Torque the nuts to specifications.
21. Adjust the brakes. Then, remove the work stands and lower the vehicle.

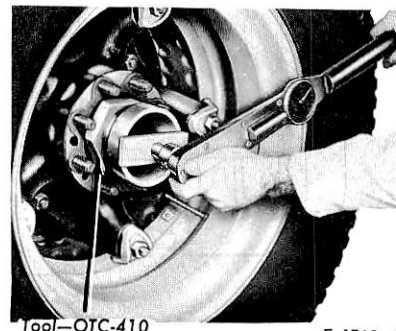
#### **MEDIUM, HEAVY AND EXTRA HEAVY VEHICLES (OIL LUBRICATION)**

Stemco Seals available as regular production options, provide sealing where oil is used for bearing lubrication. The tools required for Stemco Seal Installation are only available from the Stemco warehouse. Refer to specifications for the tooling required. Fig. 10 illustrates a rear wheel Stemco Seal installation.

#### **Rear Hub Seal Installation**

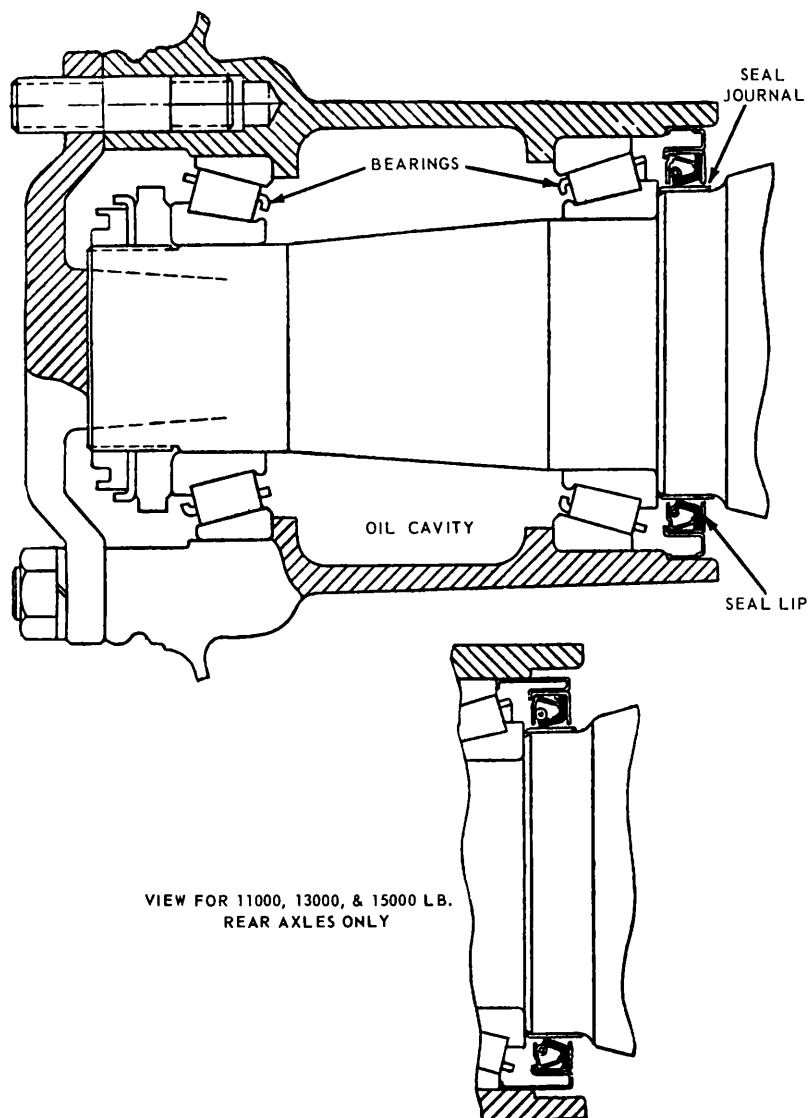
1. Thoroughly clean the axle spindle.
2. If the spindle shoulder is scored or pitted apply a thin coat of Permatex No. 2.
3. Position the axle ring and drive it into position flush with the inner bearing shoulder using the correct tool. Procedures vary with different applications. Refer to the instructions packed with each seal set.
4. Remove all burrs and protrusions from the oil seal area of the wheel hub.
5. Pack the inner bearing cone with CIAZ-19590-B (ESA-MIC75-B) and position it in the bearing cup.
6. Position the oil seal at the mouth of the bore and drive it squarely into position using the correct tool. The seal must be evenly bottomed.
7. Take special care not to damage the oil seal while installing the wheel.
8. Fill the wheel cavity with oil before installing the outer bearing.

9. Pack the outer bearing with MIC75-B and install it and then adjust the bearings as outlined in step 18, under 500-900 series.
10. Inspect axle shaft gasket mating surfaces for nicks, burrs, and dirt; then install the axle shaft.
11. Check the rear axle lube level and add oil if required.



E 1769-A

FIG. 9 Installing Lock Nut



E2125-A

FIG. 10 Rear Seal Installation (Stemco)

## SPECIFICATIONS

### SPECIAL SERVICE TOOLS STEMCO<sup>①</sup>

Ford Seal Kit Part No.	Stemco Tool No.	Ford Seal Kit Part Name
D0HZ-1175-A	5008-5308	Kit -- Oil Seal Inner Rear Wheel
D0HZ-1175-B	5002-5011	
D0HZ-1175-C	5074-5383	
D0HZ-1175-D	5072-5397	
D0HZ-1175-E	5071-5391	
D0HZ-1175-F	5076-5399	

<sup>①</sup> Kits on this page consist of one axle ring and one seal for just one wheel.

CE2330-A

# Brakes

GROUP  
**12**

	Page		Page
<b>PART 12-01</b>		<b>PART 12-54</b>	
General Hydraulic Brake Service . . . . .	12-01-01	Vacuum Brake Booster — Tandem	
<b>PART 12-02</b>		Diaphragm, Frame-Mounted	
Drum Brakes — Single Cylinder,		(Bendix) . . . . .	12-54-01
Dual Piston . . . . .	12-02-01	<b>PART 12-58</b>	
<b>PART 12-05</b>		Vacuum Brake Booster — Single	
Drum Brakes — Single Cylinder,		Diaphragm, Dash-Mounted	
Single Piston . . . . .	12-05-01	(Midland) . . . . .	12-58-01
<b>PART 12-08</b>		<b>PART 12-60</b>	
Drum Brakes — Dual Cylinders,		Vacuum Brake Booster — Single	
Dual Pistons . . . . .	12-08-01	Diaphragm, Frame-Mounted	
<b>PART 12-09</b>		(Midland) . . . . .	12-60-01
Drum Brakes — Dual Cylinders,		<b>PART 12-70</b>	
Single Piston (Wagner) . . . . .	12-09-01	Parking Brake — Cable Actuated,	
<b>PART 12-24</b>		Rear Wheels . . . . .	12-70-01
Disc Brakes — Sliding and		<b>PART 12-77</b>	
Floating Caliper . . . . .	12-24-01	Parking Brake — External Band,	
<b>PART 12-40</b>		Transmission Mounted . . . . .	12-77-01
General Air Brake Service . . . . .	12-40-01	<b>PART 12-79</b>	
<b>PART 12-43</b>		Parking Brake — Internal Shoe,	
Air Brakes — Single Wedge		Transmission Mounted . . . . .	12-79-01
(Rockwell) . . . . .	12-43-01	<b>PART 12-81</b>	
<b>PART 12-44</b>		Parking Brake — Internal Shoe,	
Air Brakes — Single Wedge		Transfer Case Mounted . . . . .	12-81-01
(Bendix) . . . . .	12-44-01	<b>PART 12-83</b>	
<b>PART 12-46</b>		Parking Brake — Maxibrake, Rear	
Air Brakes — Double Wedge		Wheels, Air . . . . .	12-83-01
(Bendix) . . . . .	12-46-01	<b>PART 12-84</b>	
<b>PART 12-48</b>		Parking Brake — MGM Stopgard-	
Air Brakes — Cam Type . . . . .	12-48-01	Rear Wheels, Air. . . . .	12-84-01
<b>PART 12-50</b>		<b>PART 12-85</b>	
Vacuum Brake Booster — Single		Parking Brake — MGM Shortstop, Rear	
Diaphragm, Dash-Mounted		Wheels, Air . . . . .	12-85-01
(Bendix) . . . . .	12-50-01	<b>PART 12-86</b>	
<b>PART 12-52</b>		Parking Brake — MGM Low Profile,	
Vacuum Brake Booster — Tandem		Rear Wheels, Air . . . . .	12-86-01
Diaphragm, Dash-Mounted		<b>PART 12-87</b>	
(Bendix) . . . . .	12-52-01		
<b>PART 12-53</b>			
Vacuum Brake Booster — Single			
Diaphragm, Frame-Mounted			
(Bendix) . . . . .	12-53-01		

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