

CONDENSED SERVICE DATA

TRACTOR MODELS	501, 601, 701, 2030, 2031, 2110, 2120, 2130, 2131			801, 901, 1801, 4030, 4040, 4110, 4120, 4121, 4130, 4131		501D, 601D, 701D, 2030D, 2031D, 2110D, 2120D, 2130D, 2131D		801D, 901D, 1801D, 4030D, 4040D, 4110D, 4120D, 4121D, 4130D, 4131D	
	600, 700			800, 900					
GENERAL									
Engine Make	Own	Own	Own	Own	Own	Own	Own	Own	Own
Cylinders	4	4	4	4	4	4	4	4	4
Bore—Inches	3.44	3.44	3.90	3.90	3.90	3.56	3.90	3.56	3.90
Stroke—Inches	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
Displacement—Cubic Inches	134	134	172	172	172	144	172	144	172
Compression Ratio	6.6	7.5	6.75	(1)	(1)	16.0	16.0	16.0	16.0
Pistons Removed From:	Above	Above	Above	Above	Above	Above	Above	Above	Above
Main & Rod Bearings Adjustable?	No	No	No	No	No	No	No	No	No
Generator & Starter Make	Ford								
Carburetor Make (Gasoline)	Marvel-Schebler TSX								
Carburetor Make (LP-Gas)	Zenith								
Distributor Make	Ford								
TUNE-UP									
Compression, Gage Lbs.	120-130	130-140	120-130	130-140 (2)	130-140 (2)	365-400	365-400	365-400	365-400
Firing Order	1-2-4-3	1-2-4-3	1-2-4-3	1-2-4-3	1-2-4-3	1-2-4-3	1-2-4-3	1-2-4-3	1-2-4-3
Valve Tappet Gap—Intake & Exhaust	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Valve Face Angle—Degrees	43½	43½	43½	43½	43½	43½	43½	43½	43½
Valve Seat Angle—Degrees	45	45	45	45	45	45	45	45	45
Ignition Timing	See Paragraph 159								
Injection Timing	See Paragraph 139								
Spark Plug Make	Autolite								
Spark Plug Model (Gasoline)	AL7T	AL7T	AL7T	AL7T	AL7T	AL7T	AL7T	AL7T	AL7T
(LP-Gas)	ATL3A	ATL3A	ATL3A	ATL3A	ATL3A	ATL3A	ATL3A	ATL3A	ATL3A
Engine Low Idle—RPM	475	475	475	475	475	675	675	675	675
Engine High Idle—RPM (4-Speed)	2250	2250	2250	2250	2250	2250	2250	2250	2250
(5-Speed or "Select-O-Speed")	2450	2450	2450	2450	2450	2450	2450	2450	2450
Battery Terminal Grounded	Positive	Positive	Positive	Positive	Positive	Negative	Negative	Negative	Negative
SIZES—CAPACITIES—CLEARANCES									
Crankshaft Journal Diameter	2.4981	2.4981	2.4981	2.4981	2.4981	2.4973	2.4973	2.4973	2.4973
Crankpin Diameter	2.2985	2.2985	2.2985	2.2985	2.2985	2.2985	2.2985	2.2985	2.2985
Camshaft Journals Diameter	1.9255	1.9255	1.9255	1.9255	1.9255	1.9255	1.9255	1.9255	1.9255
Piston Pin Diameter	0.9122	0.9122	0.9122	0.9122	0.9122	1.1242	1.1242	1.1242	1.1242
Valve Stem Diameter, Intake	0.342	0.342	0.342	0.342	0.342	0.342	0.342	0.342	0.342
Valve Stem Diameter, Exhaust	0.341	0.341	0.341	0.341	0.341	0.341	0.341	0.341	0.341
Main Bearings Running Clearance	Refer to Paragraph 109								
Rod Bearings Running Clearance	Refer to Paragraph 108								
Piston Skirt Clearance	Refer to Paragraphs 104 and 105								
Crankshaft End Play	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
Camshaft Bearing Running Clearance	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025
Cooling System—Gallons	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
Crankcase—Quarts (with Filter)	5	5	5	5	5	5	5	5	5
Transmission—Quarts (4-Speed)	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
(5-Speed)	8	8	8	8	8	8	8	8	8
"Select-O-Speed"	12	12	12	12	12	12	12	12	12
Differential—Quarts	8	8	(3)	(3)	(3)	8	8	8	(3)
Final Drive Housings, Each—Qts. (Row-Crop)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Hydraulic Reservoir—Quarts	8(4)	8(4)	8(4)	8(4)	8(4)	8(4)	8(4)	8(4)	8(4)
Steering Gear Housing	1.5 lbs.	1.5 lbs.	1.5 lbs.	1.5 lbs.	1.5 lbs.	1.5 lbs.	1.5 lbs.	1.5 lbs.	1.5 lbs.
Power Steering System	Fill to Proper Level—See Paragraph 37, 49, 60 or 68								

(1) 7.5:1 gasoline; 8.64:1 LP-Gas.

(2) For gasoline; 150-160 for LPG.

(3) Row Crop Models Only, 8 Quarts — All Other Models, 11½ Quarts.

(4) On models without both hydraulic system and PTO, leave hydraulic reservoir empty. On models without hydraulic system, but equipped with PTO, add six (6) quarts of oil to hydraulic reservoir.

FRONT SYSTEM AND MANUAL STEERING ALL-PURPOSE TYPE

(LCG Type Front System and Manual Steering are Similar)

SPINDLE BUSHINGS

1. Refer to Fig FO1. To renew the spindle bushings, support front of tractor and disconnect the steering arms from the wheel spindles. Slide spindle and wheel assemblies out of axle extensions. Drive old bushings from axle extensions and install new ones using a piloted drift. New bushings will require no final sizing if not distorted during installation. Renew thrust bearing if unduly noisy.

AXLE CENTER MEMBER AND PIVOT PIN BUSHING

2. To remove the axle center member (18—Fig. FO1), support front of tractor, remove grille and unbolt radius rods and axle extensions from axle center member. Swing the axle extension and wheel assemblies away from tractor. On early models with non-threaded pivot pins, remove the cap screw retaining the axle pivot pin to the front end support and, using a slide hammer, remove the pivot pin. On models with threaded pivot pin, remove the cap screw (23—Fig. FO1) and locking flange (22—Fig. FO1) and unscrew the threaded pin by turning it counter-clockwise. Loosen radiator retaining nuts at bottom if necessary, to provide removal clearance and withdraw axle center member from either side of tractor.

The axle pivot pin bushing (17) can be renewed at this time. Make certain that pivot pin (20) has a free fit in the bushing before reinstalling the axle center member.

Install snap ring (21) on the late production threaded pin (20) on standard models, turn pin in until snap ring is tight against front support and then back pin out so that retainer (22) can be installed. On "heavy duty" axles with hex head pivot pin, tighten pin to a torque of 200 Ft.-Lbs. On all models, tighten radius rod to center axle bolts (16) to a torque of 75-135 Ft.-Lbs.

FRONT SUPPORT

3. To remove front support, remove grille on all models. Remove lower front panel and hood to front

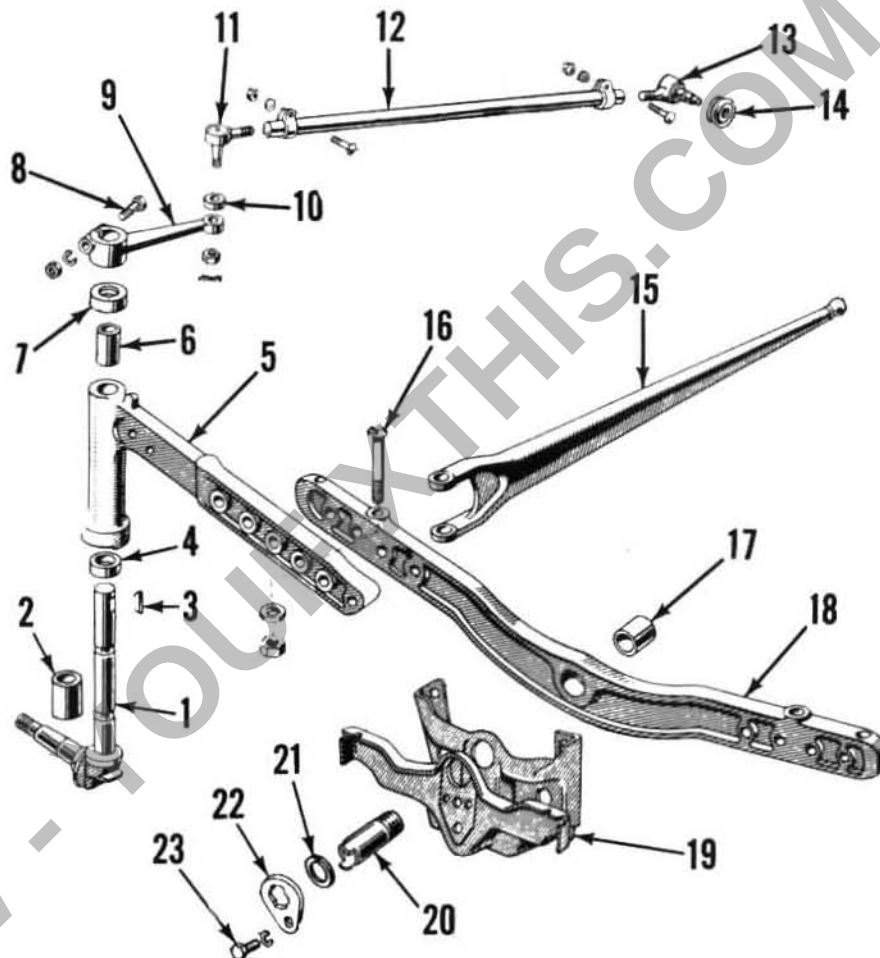


Fig. FO1 — Exploded view of All-Purpose type front axle and related parts. Optional "heavy duty" front axle is similarly constructed except that pivot pin (20) has hex head, snap ring (21) is not used and retainer (22) has hex opening for pivot pin head. A flat washer (not shown) is used on cap screw (23) between retainer (22) and front support (19) on "heavy duty" assemblies to prevent retainer from being cocked. Early production pivot pin was not threaded and pivot pin (20) and retainer (22) were integral welded assembly.

- | | | | |
|--------------------------|------------------------|------------------------|-------------------|
| 1. Spindle (R.H.) | 7. Dust seal | 13. Drag link end | 19. Front support |
| 2. Lower spindle bushing | 8. Clamp bolt | 14. Dust cover | 20. Pivot pin |
| 3. Woodruff key | 9. Steering arm (R.H.) | 15. Radius rod | 21. Snap ring |
| 4. Thrust bearing | 10. Dust seal | 16. Radius rod bolt | 22. Retainer |
| 5. Axle extension (R.H.) | 11. Drag link end | 17. Bushing | 23. Cap screw |
| 6. Upper spindle bushing | 12. Drag link | 18. Axle center member | |

support bolts on 801 and 4000 Series. Unbolt radiator from front support. Place floor jack under front end of transmission, then remove axle pivot pin as in Paragraph 2. Remove nuts from front support to engine studs. Remove studs or pry front support forward to clear studs, then remove front support from below. Lower hood side panels will spring out far enough to clear lower part of radiator when moving front support forward.

When installing, tighten the retaining stud nuts to a torque of 135-150 Ft. Lbs.

DRAG LINKS AND TOE-IN

4. Drag link ends are of the non-adjustable automotive type. The procedure for renewing the drag link ends is evident. Vary the length of each drag link an equal amount to provide a front wheel toe-in of $\frac{1}{4}$ to $\frac{1}{2}$ inch.

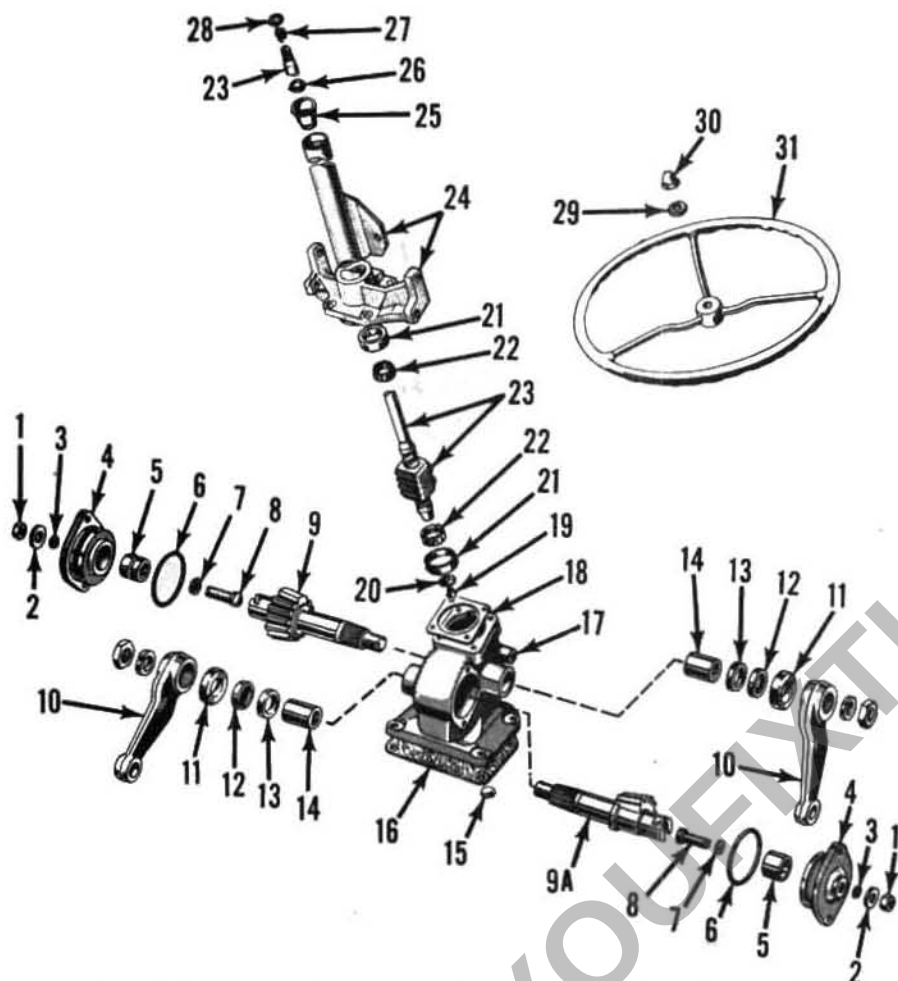


Fig. FO2 — Exploded view of manual steering gear assembly used on All-Purpose and LCG tractors. Wormshaft bearing end play is adjusted by varying the thickness of the shim stack (18); shims are available in thicknesses of 0.002, 0.005, 0.010 and 0.030. Sector end play is adjusted with adjusting screws (8). Use thickness of shim (7) that will provide zero to 0.002 clearance of adjusting screw head in slot of sector gear (9 or 9A).

- | | | | |
|--|--------------------------|----------------------------------|------------------------|
| 1. Lock nuts | 8. Adjusting screw | 15. Expansion or Hex plug | 21. Bearing cups |
| 2. Flat washers | 9. Sector gear (double) | 16. Gasket (Select-O-Speed only) | 22. Thrust bearings |
| 3. Packing | 9A. Sector gear (single) | 17. Gear housing | 23. Wormshaft assembly |
| 4. End covers | 10. Pitman arms | 18. Shims | 24. Wormshaft housing |
| 5. Bushings | 11. Dust seals | 19. Eyelet | 25. Bearing |
| 6. "O" ring | 12. Packing retainers | 20. Bearing retainer | 26. Spring seat |
| 7. Shim (0.063, 0.065, 0.067 or 0.069) | 13. Packing | | 27. Coil spring |
| | 14. Bushings | | 28. Dust seal |

STEERING GEAR

NOTE: Late production industrial models are equipped with heavy duty steering sector gears (9 and 9A—Fig. FO2). Only the heavy duty sector gears will be available for servicing all models when current stocks of standard sector gears are exhausted. If necessary to renew a standard sector gear using a heavy duty gear, both sector gears must be renewed. Gears may be identified as follows: Standard sector gear (9A) has 7 full teeth; heavy duty sector gear (9A) has 5 full teeth. Standard sector gear (9) has 6 full teeth and 3 rack teeth; heavy duty sector gear (9) has 4 full teeth and 3 rack teeth. Service procedures remain unchanged.

5. ADJUSTMENT. To adjust the steering gear, first make certain that gear housing is properly filled with lubricant, disconnect both drag links from steering gear arms to remove load from the gear unit and proceed

as follows:

6. WORMSHAFT END PLAY. To check wormshaft end play, first loosen the lock nuts (1—Fig. FO2) on the sector shaft adjusting screws (8) and back the screws out at least two full turns. If the end play of the wormshaft (steering wheel shaft) is not within the desired limits of 0.006-0.010, adjust the end play by varying the thickness of the shim stack (18) between the steering shaft tube and the steering gear housing. Shims are available in thicknesses of 0.002, 0.005, 0.010 and 0.030. Ford recommends a minimum shim stack installation of not less than three 0.002 shims or not less than two 0.005 shims. Tighten the steering shaft cover retaining cap screws to a torque of 25-30 Ft.-Lbs. Renew wormshaft bearings as outlined in paragraph 10 if end play is over 0.010 with minimum recom-

mended shim stack thickness.

After checking or adjusting wormshaft end play, readjust sector shaft end play as follows:

7. SECTOR SHAFT END PLAY. Before adjusting sector shaft end play, be sure that wormshaft end play is correctly adjusted as outlined in paragraphs 5 and 6, then proceed as follows: Turn the steering wheel to the mid or straight ahead position. With the lock nuts on both sector shaft adjusting screws loosened and the adjusting screw on the right hand side (as viewed from rear of tractor) backed out several turns, turn the adjusting screw on left side of steering housing in (clockwise) until there is no perceptible end play in the sector shaft to which the right steering arm is attached. While holding the adjusting screw in this position, tighten the lock nut. Then, turn the adjusting screw on right side of housing in until there is no perceptible end play in the sector shaft to which the left steering arm is attached, hold the adjusting screw in this position and tighten the lock nut.

Reconnect the drag links to the steering arms.

8. REMOVE AND REINSTALL. To remove the steering gear and housing assembly, first remove steering wheel, then withdraw the spring, felt packing and spring seat from top of steering column. On "Select-O-Speed" transmission models, remove PTO control and gear selector as outlined in paragraph 234. Remove hood. Disconnect throttle rod from bell crank and unbolt throttle rod bracket from transmission. Disconnect the Proof-Meter cable, ammeter lead wire and oil pressure gage line at instrument panel. Disconnect the battery ground cable from steering gear housing and wires from junction block on steering column.

Remove the generator regulator from bracket on steering column and disconnect the temperature gage wire from fuel tank frame. Unbolt instrument panel, slide the panel over top of steering column and lay it on top of fuel tank. Unbolt battery carrier from steering gear housing. Disconnect head light switch and ignition switch from the hood rear lower panel; then, unbolt and remove the hood rear lower panel from tractor. Unclip tail light wire from steering gear housing and disconnect drag links from pitman arms. Remove the cap screws retaining steering gear housing to transmission case and lift the steering gear assembly from tractor. **NOTE:** On "Select-O-Speed"

350. WIRING DIAGRAMS.

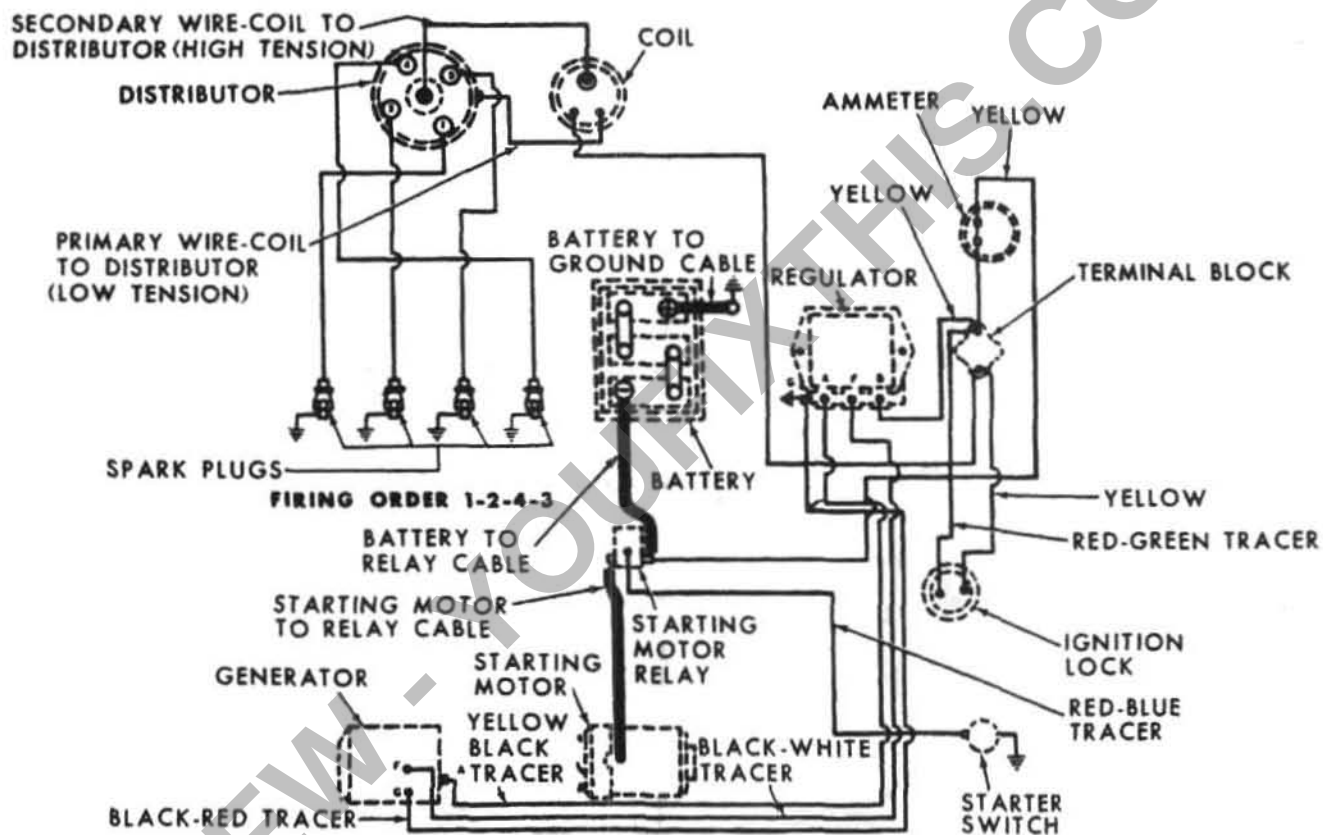


Fig. FO298 - Electrical system wiring diagram for 6-volt models.

DIESEL SYSTEM TROUBLE-SHOOTING CHART

	Lack of Fuel	Engine Surging or Rough	Cylinders Uneven	Engine Smokes or Knocks	Injection Pump Does Not Shut Off	Engine Dies at Low Speed	Loss of Power
Defective Speed Control Linkage.....	★				★		★
Air in Fuel System.....	★			★		★	
Clogged Filter	★					★	★
Fuel Lines Leaking or Clogged.....	★	★	★			★	★
Friction in Injection Pump.....		★					★
Inferior or Contaminated Fuel.....		★		★		★	★
Faulty Injection Pump Timing.....		★		★		★	★
Defective Nozzle or Injector.....		★	★	★			★
Faulty Governor and/or Linkage Adjustment....		★		★	★		★
Sticking Plunger		★				★	★
Faulty Primary Pump.....	★						★
Faulty Distribution of Fuel.....	★	★	★	★			★
Injection Pump Not Turning.....	★						
Friction in Governor.....		★					

130. **BLEEDING.** Open fuel tank shut-off valve and drain cock at bottom rear of filter base. Close the drain cock on filter base when fuel flows out. Open the air bleed screw located on the top of the fuel filter approximately two turns and observe the fuel flow. When the air bubbles disappear and the fuel flows in a solid stream, close the bleed screw. **CAUTION:** Never open the air bleed screw while engine is running. To do so will introduce air into fuel system. Remove the pump leak-off line at the governor cover and crank the engine until fuel flows in a solid stream from the fitting on pump.

If tractor does not start readily, loosen the injection line connections at the injectors while cranking engine, then retighten when fuel flows from the connection.



Fig. FO101 — To completely test an injector nozzle requires the use of a nozzle tester as shown.

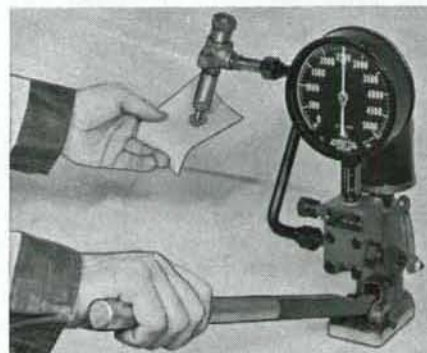


Fig. FO103 — With nozzle pressure brought to within 150 psi of opening pressure and held for one minute, the fuel stain should not exceed a 1/2-inch diameter when clean blotting paper is applied to nozzle tip.

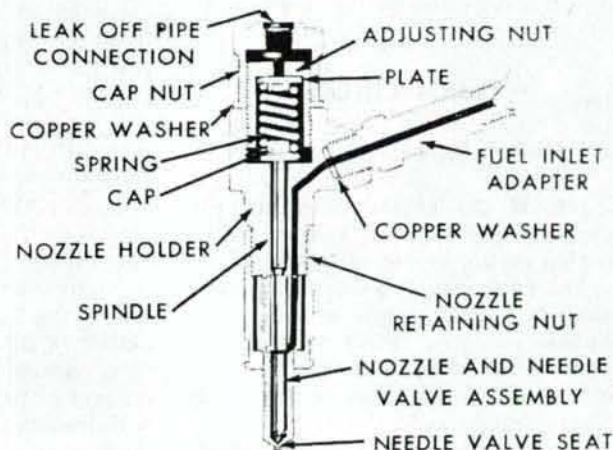
INJECTION NOZZLES

All Diesel Models

Ford diesel engines are fitted with Simms fuel injector assemblies. The injector nozzles have four 0.010 or 0.011 diameter holes spaced in a spiral pattern at 90 degrees apart around the tip of the nozzle. Injector nozzles having the 0.010 spray holes are identified by the Simms part No. NL-123 etched on large diameter of nozzle body and nozzles having 0.011 spray holes have Simms part No. NL-141 etched on nozzle body.

All 144 cu. in. diesel engines and 172 cu. in. diesel engines after tractor Serial No. 82582 of 1958-62 production are equipped with injector nozzles having 0.011 spray holes and 172 cu. in. diesel engines prior

Fig. FO102 — Sectional view of the four orifice Simms injector which is used in the Ford diesel engine.





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	501-2111	4031-4131	2110-4110	(4121 is Similar)	4140
BELT PULLEY	294	294	294	294	294
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	501-2111	4031-4131	2110-4110	(4121 is Similar)	4140
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	501-2111	4031-4131	2110-4110	Similar)	4140
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SERIES	600-601 800-801				
	2031-2131	700-701	2030-2130	4030-4130	1801
	2120-4120	900-901	(4121 is	4040	
	501-2111	4031-4131	2110-4110	Similar)	4140
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CONTROL VALVE AND POWER CYLINDER ASSEMBLY

NOTE: The outlined procedures refer specifically to early type unit shown in Fig. FO42. Except for obvious differences, procedures for late type unit (Fig. FO43) are similar.

58. R&R AND OVERHAUL. Disconnect tie rod end from left steering arm and swing tie rod back to gain access to the cylinder rod end connection. Place a drain pan under the pressure line connections, disconnect pressure and return lines at the cylinder tubes and allow pump and cylinder to drain into the pan. While the system is draining, disconnect the control cable from control valve operating stud and cable shield from cylinder housing. Disconnect cylinder end of the power steering cylinder from right steering arm by removing the cotter pin and castellated nut. Lower right end of cylinder to the floor. Fit a suitable end wrench over the machined flat at outer end of the piston rod and thread the rod out of the rod end attached to front axle. Slip actuating cable shield and bracket assembly off the end of the piston rod and place the cylinder on a clean bench for disassembling. See Fig. FO40.

59. Clamp the cylinder assembly in a vise as shown in Fig. FO41, but do not clamp the vise at the control valve ports. Use only enough pressure to hold the cylinder, being careful not to distort the outer tube. Using a suitable spanner wrench, unscrew the shaft bearing (3—Fig. FO42) from the outer tube. The bearing (3), inner tube (5), piston (7) and rod (6) can then be withdrawn from the outer tube. If inner tube does not come with the rod, remove it after the rod has been withdrawn. Remove the inner tube from the rod and bearing assembly, carefully remove all paint, burrs and foreign material from outer end of piston rod and slide the bearing off the end of the rod. Remove tubing and clamp from cylinder assembly and remove the operating stud (24) by pulling it upward out of the cylinder. Unscrew the cylinder end assembly (26) from outer tube, remove tube from vise and tap rod end of cylinder on the bench to jar out the valve body and operating mechanism. Remove the guide spacer (21) from valve guide and drive out the roll pin securing guide to valve spool.

Fig. FO44 — Bump valve body, spool and retainer from outer cylinder as a unit after removing piston and inner tube.

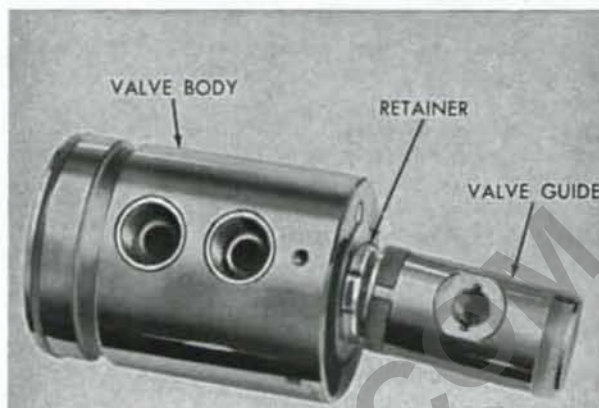
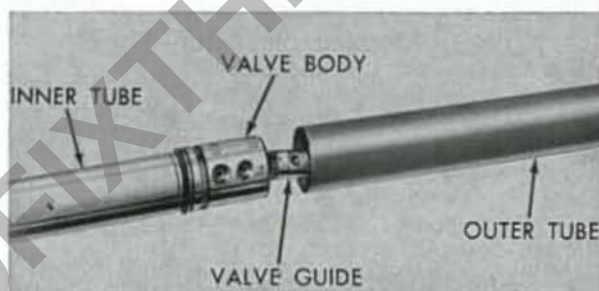


Fig. FO45 — Install valve body, guide, inner tube, piston, shaft and bearing in outer tube as a unit.



Clean the parts with a suitable solvent and discard all "O"-rings and seals. Renew any other parts which are worn, scored, or otherwise damaged.

Lubricate all parts in clean oil before reassembly. Install the brass connecting pin to valve spool with a roll pin and install plug in opposite end of spool. The plug will position itself during operation, so proper positioning at this time is not important. Start the valve spool in the valve body from cylinder end of body and push spool through only far enough to clear pin hole in yoke end of the spool, to prevent damage to "O"-ring on forward end of spool. Reinstall the inner plug in valve body, making sure it is fully seated. Place the "O"-ring and retainer over the yoke end of spool and reinstall the guide, securing same to spool with the roll pin.

Reassemble the piston rod and install bearing over the rod. Clamp outer end of piston rod in a vise with the piston end up. Make sure to clamp the rod in the vise at the milled flats.

Assemble the inner tube in position over the piston and secure outer end in the bearing. Connect valve body assembly to the inner tube by the inner plug and insert rod and control valve assembly into the outer cylinder. Screw the bearing into the outer cylinder a few turns and check to see that ports are in line with holes in the outer cylinder. Install the spacer tube over the valve guide and align and insert the operating stud. Screw the cylinder end assembly into the control valve end of outer tube until the peening mark made on the threads at original assembly align with the $\frac{1}{8}$ inch hole in the outer tube. Then, turn the cylinder rod bearing into the outer tube and tighten to a torque of 200-230 Ft. Lbs.

Stake both ends of the cylinder to the outer tube and reinstall unit on tractor by reversing the removal procedure. Refill reservoir with Ford Hydraulic Fluid, M2C41; then bleed system as outlined in paragraph 49, and adjust as in 53.

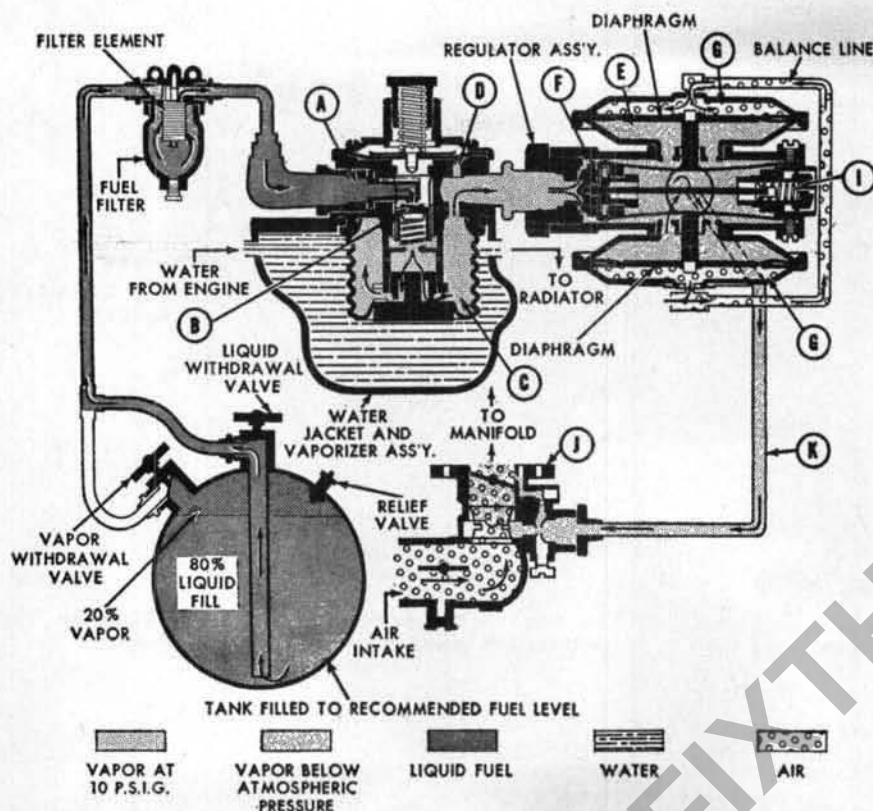


Fig. FO85 — Schematic view showing the fuel flow through the LP-Gas system. The LP-Gas system is of the liquid withdrawal type.

vacuum in the tube (K) and chamber (E) that results in the proper flow of fuel to the engine.

The carburetor choke butterfly must be temporarily closed to obtain a richer mixture for starting purposes.

TRUBLE-SHOOTING

120. The following trouble-shooting paragraphs list troubles which can be attributed directly to the fuel system; however, many of the troubles can be caused by derangement of other parts such as valves, battery, spark plugs, distributor, coil, etc.

The procedure for remedying many of the causes of trouble is evident. The following paragraphs will list the most likely causes of trouble, but only the remedies which are not evident.

ENGINE WILL NOT START. Could be caused by:

- Choke not closing when control is pulled out. Choke must be closed momentarily when starting a cold engine to start the vaporized fuel flowing. Do not hold choke closed for more than two or three seconds while cranking or engine may become flooded. Clean out a

flooded engine by cranking several revolutions with choke and throttle wide open.

- Improperly blended fuel. An excess of Butane will cause hard or no starting. Since Butane is liquid at temperatures below 32 degrees F., there will be an insufficient quantity of vapor for starting purposes.
- Excess flow valves in the fuel tank withdrawal valves closed. If the liquid or vapor withdrawal valves are opened too fast, the excess flow valves will shut-off the fuel flow automatically. Close the withdrawal valves to reset the excess flow valves; then, open the withdrawal valves slowly.
- Improperly adjusted regulator.

INSUFFICIENT ENGINE POWER. Could be caused by:

- Improperly adjusted carburetor.
- Clogged or restricted air filter.
- Leaking carburetor or manifold connections.
- Loose fuel line connections.
- Improperly adjusted regulator.
- Faulty ignition timing.
- Improperly adjusted spark plug gap. Gap should be 0.028-0.033.

ENGINE FALTERS OR DIES ABOVE IDLE SPEEDS. Could be caused by:

- Improperly adjusted carburetor.
- Clogged or restricted air filter.
- Leaking carburetor or manifold connections.
- Loose fuel line connections. Check with soapy water.
- Improperly adjusted regulator.
- Improperly adjusted spark plug gap. Gap should be 0.028-0.033.
- Clogged fuel filter element.

CARBURETOR

121. **ADJUSTMENT.** Clockwise rotation of the idle and main adjustment screws leans the mixture. Refer to Fig. FO86. Initial idle needle setting is one turn open. Initial main adjustment needle setting is $5\frac{1}{2}$ turns open. To adjust the carburetor, start engine and bring to operating temperature then turn the throttle stop screw either way as required to provide an engine slow idle speed of 450-475 rpm. Turn the idle adjusting needle clockwise until engine begins to "stall"; then, turn the screw counter-clockwise until engine runs smoothly. To adjust the main adjusting needle, bring engine up to operating temperature, remove any three spark plug wires, open the throttle to full throttle setting and adjust the main needle until highest operating rpm is obtained. Turn the needle clockwise until engine speed just begins to drop, then turn needle counter-clockwise just enough to bring the engine speed back to top rpm.

Recheck low idle rpm.

122. **R&R AND OVERHAUL.** Before removing any of the fuel system components, close both withdrawal valves; and start and run the engine until all fuel is consumed and engine stops.

Two types of Zenith carburetors have been used. On early models, a secondary regulator is located on the vaporizer assembly and fuel enters the carburetor at approximately atmospheric pressure. Starting with serial number 131530 of 1958-62 production, a pressure regulating carburetor is used, incorporating a secondary regulator. On these models, fuel enters the carburetor at the 10 psi. vaporizer outlet pressure. Removal procedures are similar for the two units, but method of overhaul will differ.

Company that the cluster shaft, gear and bearings be renewed as an assembly.

Reassembly is evident; however, keep in mind that the larger of the two end gears of the cluster gear is toward the front of the gear case. Reassemble the balance of the transmission as outlined in paragraphs 171 through 174 and reinstall in tractor as outlined in paragraph 170.

REMOVE AND REINSTALL

178. Separate (split) the tractor at the clutch housing as outlined in paragraph 161, 162 or 163, disconnect the clutch release bearing springs and remove the bearing. Remove the socket head cap screw securing the shift lever pivot arm to the transmission and disconnect the pivot arm; then, unbolt and remove the reversing transmission from the mounting flange on front face of main transmission housing.

The reversing transmission mounting flange can be removed at this time by removing the four socket head mounting screws and withdrawing flange and shims from the tractor transmission housing as shown in Fig. FO139.

Reinstall by reversing the removal procedure after first checking the bearing pre-load as outlined in paragraph 179.

OVERHAUL

179. To overhaul the reversing transmission after it has been removed, first unbolt and remove the input shaft housing (38—Fig. FO144) together with the shaft (24) and bear-

ing (34). Shaft and bearing can be removed from the input housing after removing snap ring (23). Seal (36), bearing (34) and pilot bearing (22) can be renewed at this time. Unbolt and remove the shifter cap assembly (2) and drift the shifter rail (11) out of the housing and shifter fork assembly. Two detent balls and one spring are contained in a drilling in the shifter rail and engage in detents in the shifter fork. Lift the shifter fork out of the housing, remove thrust washer (21) and snap ring (20) from the front end of the main drive gear shaft (29) and slide the shaft and bearing (31) rearward out of the housing. Remove in turn the shift collar (18), sleeve (19), reverse gear (15) and spacer (13) as the main gear and shaft are withdrawn. Main drive gear (29), bearing (31), and the needle bearings (14 and 16) in the reverse drive gear can be renewed at this time if required. Drive the reverse idler shaft (40) forward out of the housing and remove the gear (43) and thrust washers (41 and 46) from the housing. Drift the cluster gear shaft (50) rearward out of the housing and remove the cluster gear (53) and spacers from the housing.

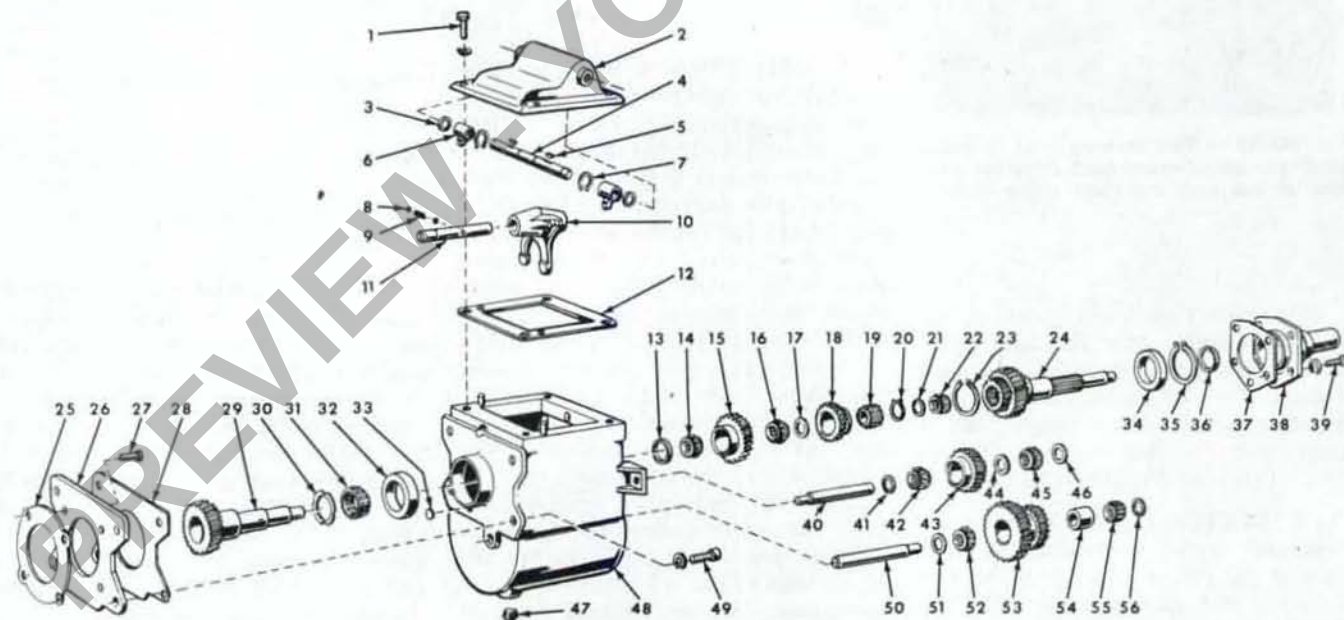


Fig. FO144 — Exploded view of reversing transmission which is optional factory equipment on some models with four-speed transmission and is also available for field installation. When servicing transmission, it is recommended that new type non-directional slinger (30), Ford part No. CONN-7C237-B, be installed in place of slinger used on earlier models.

1. Cap screws
2. Shift cover
3. "O" ring
4. Selector shaft
5. Woodruff keys
6. Selector forks
7. Snap rings
8. Steel ball
9. Spring
10. Shift fork

11. Shift rail
12. Cover gasket
13. Spacer
14. Roller bearing
15. Reverse gear
16. Roller bearing
17. Thrust washer
18. Shift collar
19. Splined sleeve
20. Snap ring

21. Thrust washer
22. Roller bearing
23. Snap ring
24. Clutch shaft
25. Shims
26. Mounting flange
27. Socket head screws
28. Gasket
29. Drive gear
30. Oil slinger

31. Bearing cone & roller assy.
32. Bearing cup
33. Expansion plug
34. Bearing
35. Snap ring
36. Oil seal
37. Gasket
38. Housing

39. Cap screws
40. Idler shaft
41. Thrust washer
42. Roller bearing
43. Idler gear
44. Spacer
45. Roller bearing
46. Thrust washer
47. Drain plug

48. Gear case
49. Cap screws
50. Cluster shaft
51. Thrust washer
52. Roller bearing
53. Cluster gear
54. Spacer
55. Roller bearing
56. Thrust washer

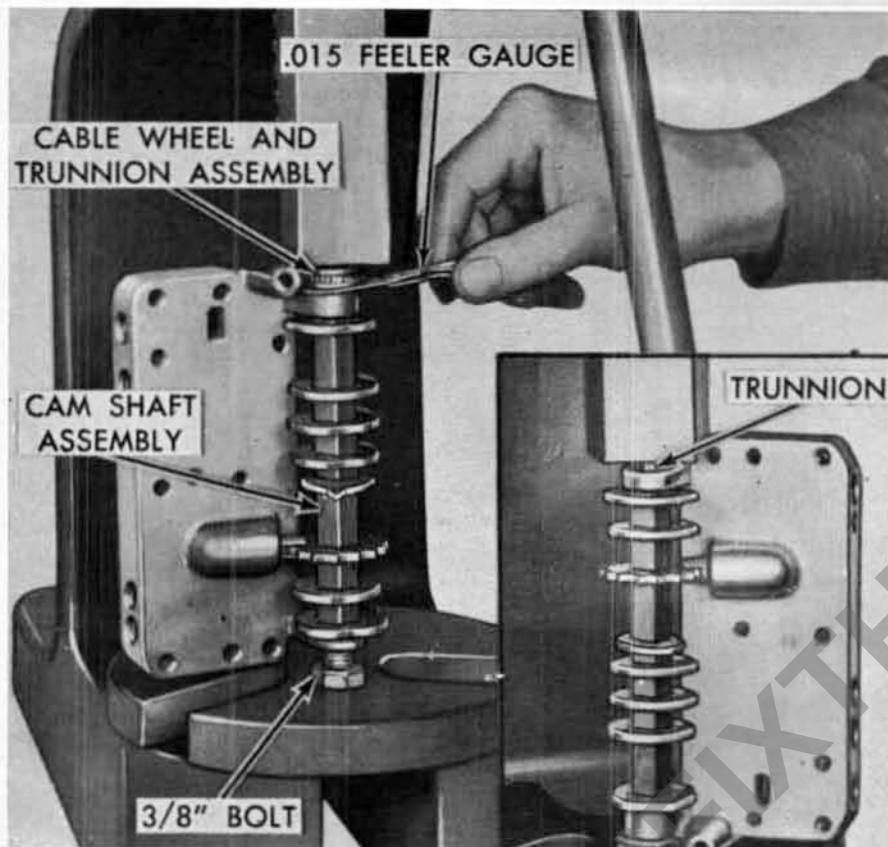


Fig. FO184 — Camshaft installation using a press to install trunnions. Suggested clearance of 0.015 should be maintained between cable wheel and valve body.

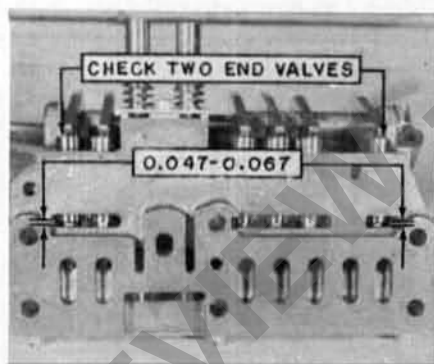


Fig. FO185 — Control valve alignment using feeler gages suggested for proper valve operation.

exceeds $\frac{1}{4}$ -inch. Before reassembly, be sure splines in disc hub and on input shaft are clean and free of rust; then, apply a thin film of light silicone grease (Ford part No. M1C-43) to splines of both parts.

Check the friction surfaces of the flywheel and clutch pressure plate for scoring, excessive wear or warping. If flywheel is reconditioned, remove material from clutch housing mounting surface to maintain distance be-

tween this surface and the friction surface at 2.026-2.032.

When reassembling, be sure that concave (cup) side of Belleville washer is towards pressure plate. The hub of the clutch disc is piloted in bore of flywheel; thus, no aligning pilot tool is required. Tighten the clutch housing retaining cap screws to a torque of 25-30 Ft.-Lbs.

241. TRANSMISSION PUMP. To remove the transmission pump first

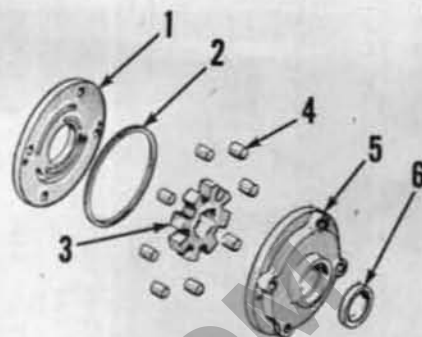


Fig. FO187 — Exploded view of transmission pump assembly. "O" ring (2) and oil seal (6) are only component parts serviced separately from complete pump assembly.

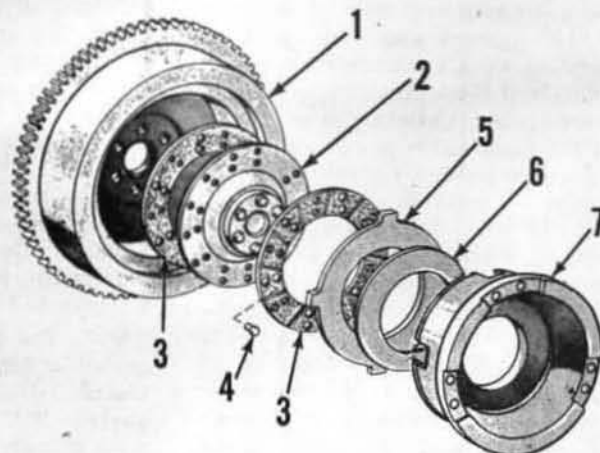
- | | |
|-------------|--------------|
| 1. Cover | 4. Rollers |
| 2. "O" ring | 5. Pump body |
| 3. Rotor | 6. Oil seal |

split the tractor between the transmission and engine assembly as outlined in paragraphs 161, 162 or 163 and unbolt and remove pump. Refer to Fig. FO187 for exploded view of pump.

The roller vane type hydraulic pump can only be renewed as an assembly, however the shaft seal (6) and pump cover "O" ring (2) are serviced separately. The seal can be renewed from the outside without disassembling pump. Use OTC step plate 630-5 or its equivalent to drive seal into pump housing. To renew the "O" ring, remove the two screws retaining the back cover to the pump body, remove the cover, and lift out the "O" ring with a pointed tool. Renew the pump if any of the parts are damaged, scored or excessively worn. Pay particular attention to cam surface in pump body (5). Always renew the mounting gasket when reinstalling the pump. Tighten pump mounting bolts evenly to a torque of 15-18 Ft.-Lbs.

Fig. FO186 — Exploded view of the torque limiting clutch assembly.

1. Flywheel
2. Clutch disc
3. Facings
4. Rivets
5. Pressure plate
6. Belleville washer
7. Clutch cover



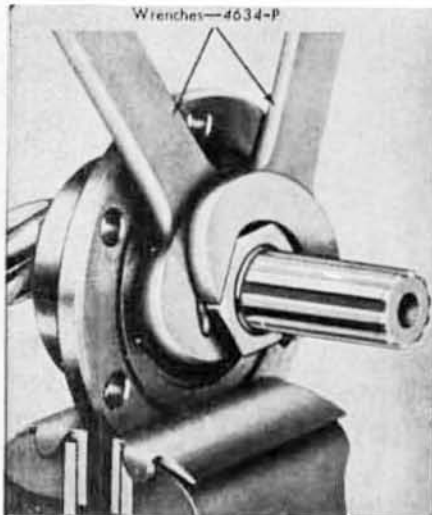


Fig. FO245 — Adjusting bearing of main drive bevel pinion on models using nut type adjustment.

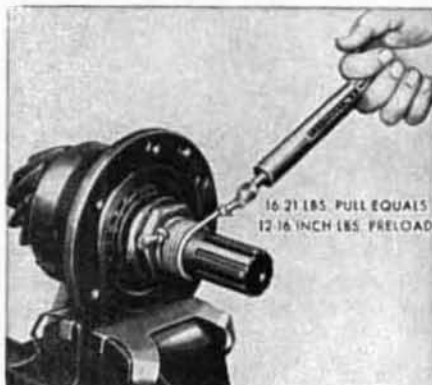


Fig. FO246 — Check bevel pinion shaft bearing preload as shown. Scale should read 16-21 pounds.

bly and renew worn or damaged parts.

Reassemble pinion and bearings and adjust bearings with nuts (3 and 5—Fig. FO243) as shown in Fig. FO245, or tighten clamp (9—Fig. FO243) until a torque of 12 to 16 inch pounds is required to turn pinion. When checked as shown in Fig. FO246, the spring scale pull should be 16-21 lbs. After adjustment, bend tabs on lockwasher to secure the shaft nuts or tighten clamp bolt (8—Fig. FO243).

274. BEVEL RING GEAR. To renew the bevel ring gear, remove the differential unit as per paragraph 265, 269, 270 or 271. The procedure for renewal of the ring gear when the differential unit is on the bench is outlined in paragraph 272.

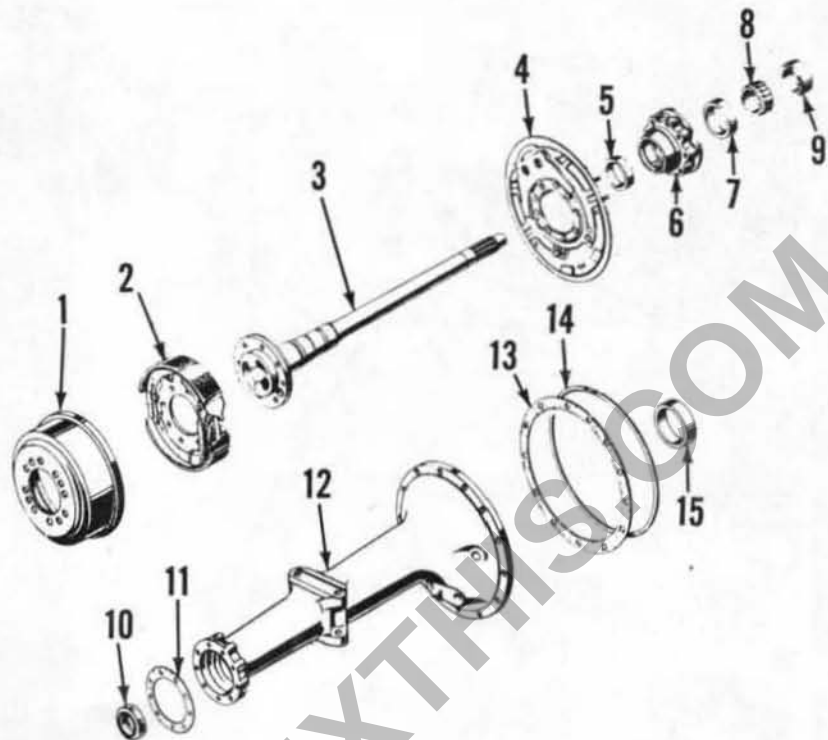


Fig. FO247 — Exploded view of rear axle assembly used on all models except Row Crop and Offset types. Bearing cone and roller (8) is retained in position on axle shaft (3) by lock collar (9) which is installed by heating collar to allow it to be placed on shaft. On cooling, collar shrinks to seize shaft tightly. Gasket (13) is used on models where axle housing (12) is attached to center housing with 7/16-inch studs; "O" ring is used (without gasket) on industrial and other models using 9/16-inch studs to retain axle housing to center housing.

- | | | | |
|-------------------|--------------------------|------------------|-----------------|
| 1. Brake drum | 5. Grease seal | 9. Lock collar | 13. Gasket |
| 2. Brake assembly | 6. Bearing retainer | 10. Oil seal | 14. "O" ring |
| 3. Axle shaft | 7. Bearing cup | 11. Shims | 15. Bearing cup |
| 4. Backing plate | 8. Bearing cone & roller | 12. Axle housing | |

WHEEL AXLE SHAFT, BEARING AND SEAL

All-Purpose, Utility Industrial, Heavy Duty Industrial, LCG and Grove Types

275. BEARING ADJUSTMENT. To adjust the bearings, add or remove shims (11—Fig. FO247) from between one axle shaft bearing retainer and one axle housing until one axle shaft has an end play of 0.002-0.016. To add shims, it will be necessary to remove the axle shaft as follows:

276. R&R AND OVERHAUL. To remove either rear wheel axle shaft, support rear of tractor, disconnect the brake linkage and remove the wheel and tire assembly and brake drum. Unbolt the bearing retainer from axle housing and withdraw the axle shaft, brake and bearing retainer assembly from tractor. The inner oil seal (10—Fig. FO247) can be renewed at this time and must be installed with lip facing the differential.

277. To renew the rear axle shaft, outer grease seal (5), bearing cup (7) or cone and roller assembly (8), it will be necessary to remove the locking collar (9) and press the axle shaft out of the bearing cone and roller assembly.

Use of a special rear axle puller (Nuday tool No. NCA-4235) and a cracking chisel (Nuday tool No. NCA-4235-A1) or equivalent tools is required. The NCA-4235 tool is fitted with drilling guides which can be used to drill a $\frac{3}{8}$ -inch pilot hole through the locking collar and to enlarge the hole with a $\frac{1}{2}$ -inch drill. The guides align the drill bits so that the drill point will strike the bearing inner race and will not be damaged. The drill motor will speed up when the drill bit reaches the bearing race. Withdraw the drill bit, remove the guide and insert the NCA-4235-A1 cracking chisel with the sharp edges towards the axle shaft. Drive the chisel into the $\frac{1}{2}$ -inch drilled hole with a heavy hammer until the locking ring is split. Then, press the axle

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