

FORD

INDUSTRIAL TRACTORS

Repair Manual

Reprinted

40023021 (SE4044)

YouFixThis.com

Download full manual at youfixthis.com

PART 1
ENGINE SYSTEMS

Chapter 1
ENGINES AND LUBRICATION SYSTEM

Section		Page
A.	DESCRIPTION AND OPERATION	1
B.	CYLINDER HEAD, VALVES, AND RELATED PARTS	5
C.	ENGINE FRONT COVER AND TIMING GEARS	13
D.	OIL PAN AND OIL PUMP	18
E.	CONNECTING RODS, BEARINGS, PISTONS, AND CYLINDER BLOCK	21
F.	MAIN BEARINGS, FLYWHEEL, AND CRANKSHAFT	28
G.	CAMSHAFT	35

Chapter 2
COOLING SYSTEM

Section		Page
A.	COOLING SYSTEM—DESCRIPTION AND OPERATION	37
B.	COOLING SYSTEM—OVERHAUL	38
C.	WATER PUMP	42

Chapter 3
TROUBLE SHOOTING, SPECIFICATIONS AND SPECIAL TOOLS

Section		Page
A.	TROUBLE SHOOTING	49
B.	SPECIFICATIONS	53
C.	SPECIAL TOOLS	63

PREVIEW - YOUFIXTHIS.COM

YouFixThis.com
Download full manual at youfixthis.com

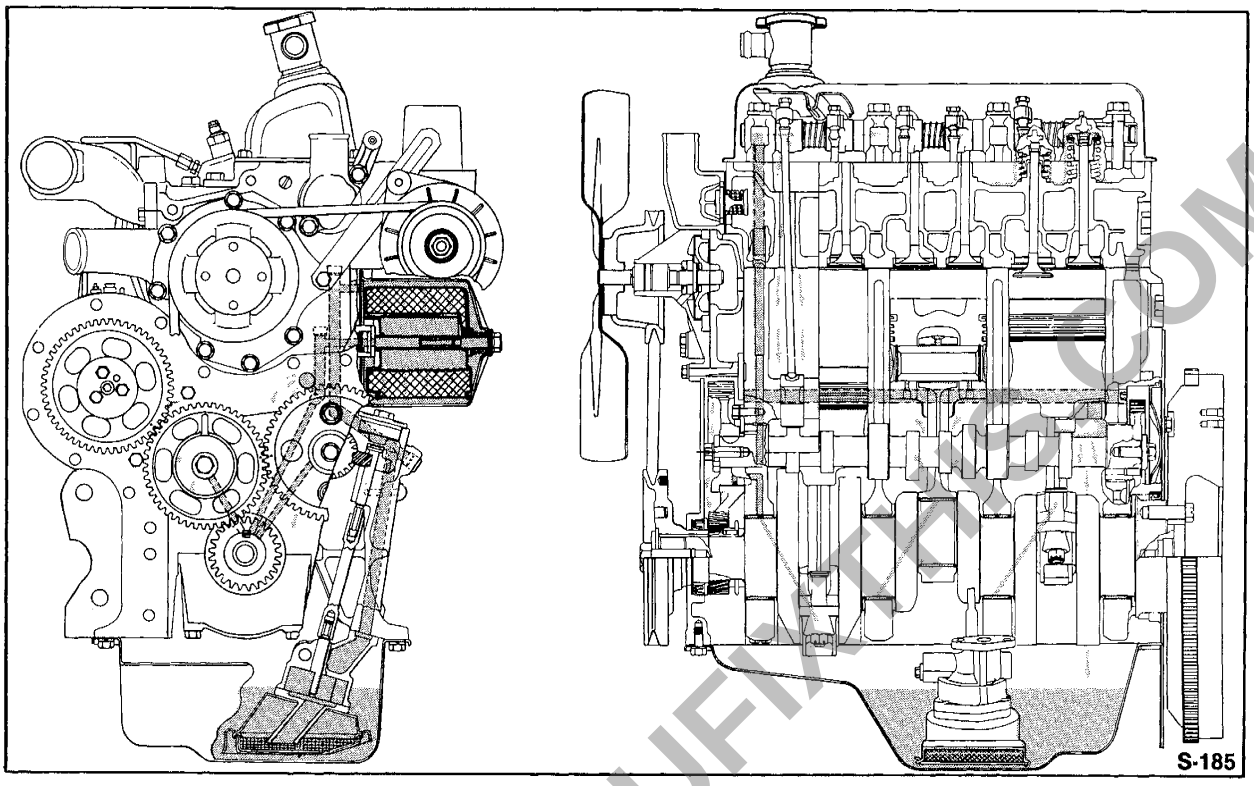


Figure 3
3-Cylinder Engine Lubrication System

Oil flows from the filter to the main oil gallery which runs the length of the cylinder block and intersects the tappet bores.

The main gallery also supplies oil through drilled passages in the block to the crankshaft main bearings, and to the connecting rod journals via drillings in the crankshaft. Additional drilled passages from each main bearing direct oil to the camshaft bearings.

The camshaft drive gear bushing is pressure lubricated through a drilled passage from the front main bearing. The gear has small oil passages machined on both sides which allow the oil to escape.

The timing gears are lubricated by oil from the main gallery and the pressure lubricated camshaft drive gear bushing.

Cylinder walls, pistons and piston pins are splash lubricated by oil thrown from the connecting rods and rotating crankshaft.

An intermittent flow of oil is directed to the valve rocker arm shaft assembly via a drilled passage in the cylinder block located vertically above the No. 1 camshaft bearing. This drilling aligns with a corresponding hole in the cylinder head. As the camshaft turns, holes in the camshaft and camshaft bearing align and a regulated stream of oil is directed to the cylinder head and on up the rocker arm shaft support bolt to the rocker shaft. The oil flows from the shaft through drilled holes in each rocker arm bushing to lubricate both ends of the arms. Excess oil flows down the push rods and assists in lubricating the tappets before draining back into the sump through cored openings in the block.

YouFixThis.com
Download full manual at youfixthis.com
PREVIEW - YOUFIXTHIS.COM

B. ENGINE OVERHAUL—CYLINDER HEAD, VALVES AND RELATED PARTS

REMOVAL

NOTE: *The cylinder head can be removed with the engine installed in the tractor.*

1. Disconnect the battery.
   - Remove the battery and battery tray.
   - Remove the vertical muffler (if installed)
2. Drain the radiator and cylinder block.
3. Shut off the heater hose taps then disconnect and plug the heater hoses. (if present)
4. Remove the radiator top hose.
5. Shut off the main fuel tank tap.
   - Remove the hood panel assembly.
   - Remove the radiator shell support.
   - Remove the two bolts securing the fuel tank to the hood rear support.
   - Disconnect the horizontal type exhaust pipe, if present, from the exhaust manifold.
   - Disconnect the air inlet hose at the intake manifold (diesel), or at the carburetor on gasoline models.

     NOTE: *On gasoline engines, disconnect the fuel line and linkage from the carburetor. Remove the carburetor from the intake manifold. Disconnect the vacuum advance line from the intake manifold.*
6. Disconnect and remove the rocker cover ventilation tube.
7. Disconnect the alternator, oil pressure and temperature senders, air cleaner restriction indicator and cold start wiring harness connections, if present.
8. Remove the alternator adjusting bracket, Figure 4.

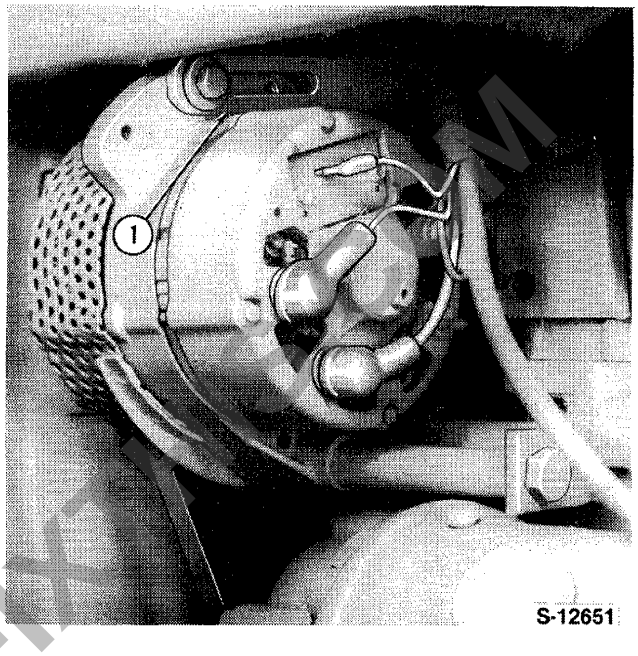


Figure 4
Alternator Assembly
1. Belt Tension Adjusting Bracket

   - Remove the vertical type exhaust pipe and bracket, if present.
9. Bend the lock tabs back, withdraw the attaching bolts and remove the exhaust manifold and gasket.
10. Disconnect the cold start equipment, if present.
11. On diesel engines, remove the injector lines from the fuel injection pump and the injectors. Cap the exposed openings in the pump, injectors and tube ends.
    - Disconnect the fuel lines and remove the fuel filter(s).
12. Withdraw the retaining bolts and lockwashers and remove the inlet manifold and gasket.
13. Withdraw the securing bolts and remove the rocker arm cover and gasket from the cylinder head.

PREVIEW - YOUFIXTHIS.COM

PRINTED IN U.S.A.

YouFixThis.com
Download full manual at youfixthis.com

THERMOSTAT

Opening Temperature ..... 185-192°F (85-89°C)

Full Open Temperature ..... 210-215°F (99-102°C)

WATER PUMP

Type ..... Centrifugal

Drive ..... V-Belt

Belt Deflection ..... 0.5-0.75 in (12-19 mm) midway between pulleys.

COOLING SYSTEM CAPACITIES

	U.S. pts.	Imp. pts.	Litres
With Heater	24	20	11.4
Less Heater	22	18.3	10.4

ANTIFREEZE

Use Ford antifreeze to provide protection down to the temperature required.

Temperature protection	Percentage of Antifreeze
25°F (- 4°C)	10%
16°F (- 9°C)	20%
4°F (-16°C)	30%
-11°F (-24°C)	40%
-33°F (-36°C)	50%

NOTE: *Use of 50/50 solution of Ethylene Glycol Antifreeze is recommended for year around usage (higher boiling point of 50/50 mix improves summer cooling performance).*

TORQUE VALUES	lb. ft.	(Nm)	(Kgm)
Main Bearing Bolts	120	(163)	(14)
Connecting Rod Nuts	63	(85)	(9)
Cylinder Head Bolts (with Engine Cold)	110	(150)	(15)
Intake Manifold-to-Cylinder Head	26	(35)	(4)
Exhaust Manifold-to-Cylinder Head	28	(38)	(4)
Exhaust Pipe-to-Flange	23	(31)	(4)
Flywheel-to-Crankshaft	160	(217)	(22)
Oil Pan Drain Plug	30	(41)	(4)
Valve Rocker Cover Bolts	13	(18)	(2)
Crankshaft Pulley-to-Crankshaft	165	(224)	(23)
Self-Locking Screw-Valve Rocker Arm	18	(24)	(3)

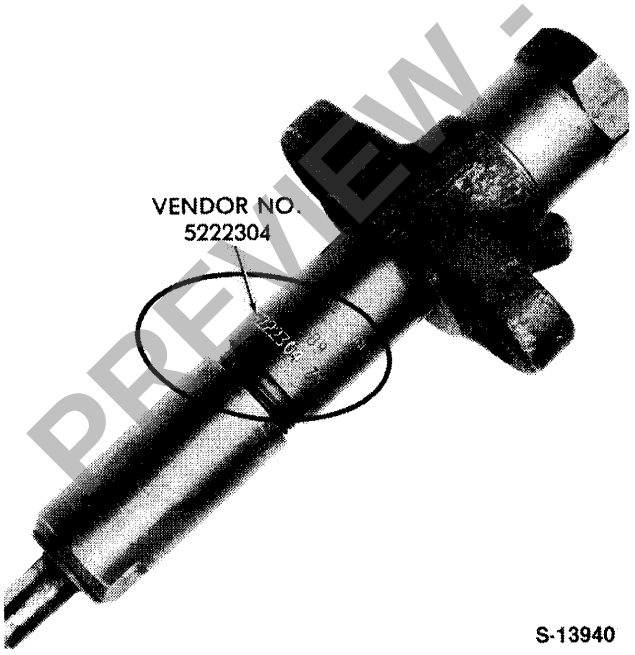
PRINTED IN U.S.A.

PREVIEW - YOUFIXTHIS.COM
YouFixThis.com
Download full manual at youfixthis.com

Model No.	Yr. Range	C.I.D.	Injector Part No.	Assy. Vendor #	Nozzle Part No.	Assy. Vendor #	Orifice	Press. Setting
231	75-7/81	158	D4NN-9F593-ER	5222003	D4NN-9E527-E	6698	0.094-0.104	3250
230A	8/81-	175	E1NN-9F593-AAR	5221919	E1NN-9E527-AA	6829CF	0.100-0.104	2850
340	75-7/81	175	D4NN-9F593AR	5221903	D4NN-9E527-A	6665	0.106-0.114	2850
340A	8/81-	192	EONN-9F593AAR	5221917	D9NN-9E527-BA	6780CF	0.108-0.112	2850
445	75-	183	D4NN-9F593AR	5221903	D4NN-9E527-A	6665	0.106-0.114	2850
540 545	75-7/81	201	D9NN-9F593-AAR*	5221909	D8NN-9E527-B	6666	0.115-0.122	2850
530A 540A 545	8/81-	201	D9NN-9F593-AAR	5221909	D8NN-9E527-BB	6774CF	0.120-0.124	2850

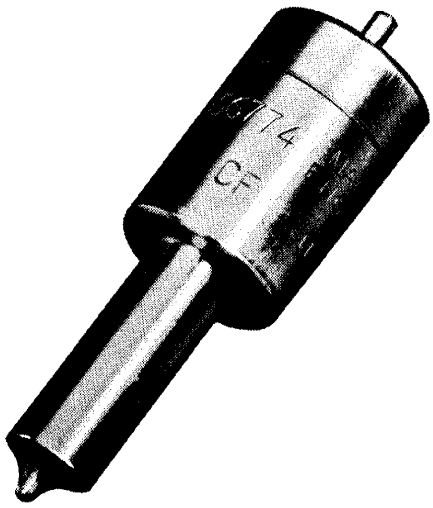
* Same as D8NN-9F593 DBR (5222304) except for leak-off tube banjo bolt

Figure 47
Injector Identification and Specification Chart



S-13940

Figure 48
Injector Assembly—
Vendor's Identification Number



S-15109

Figure 49
Nozzle—Vendor's Part Number

YouFixThis.com
Download full manual at youfixthis.com
PREVIEW - YOUFIXTHIS.COM

PART 2
FUEL SYSTEMS

Chapter 5
TROUBLE SHOOTING, SPECIFICATIONS AND SPECIAL TOOLS

Section		Page
A.	TROUBLE SHOOTING	37
B.	SPECIFICATIONS	42
C.	SPECIAL TOOLS	43

A. TROUBLE SHOOTING

TROUBLE SHOOTING TABLES

IMPORTANT: *Whenever effecting a repair the reason for the cause of the problem must be investigated and corrected to avoid repeat failures.*

The following table lists problems and their possible causes with the recommended remedial action.

GASOLINE ENGINES

PROBLEM	POSSIBLE CAUSES	REMEDY
Fuel not reaching the carburetor	1. Fuel shut-off valve closed	1. Check the fuel shut-off valve at the fuel tank is in the "ON" position
	2. Plugged fuel line	2. Loosen the fuel shut-off valve-to-sediment bowl line at the bowl and ensure fuel is reaching the bowl. If not, remove and flush the line.
	3. Plugged sediment bowl	3. Check and clean out sediment bowl
	4. Plugged fuel inlet screen	4. Check and clean the wire mesh in the fuel inlet fitting at the carburetor

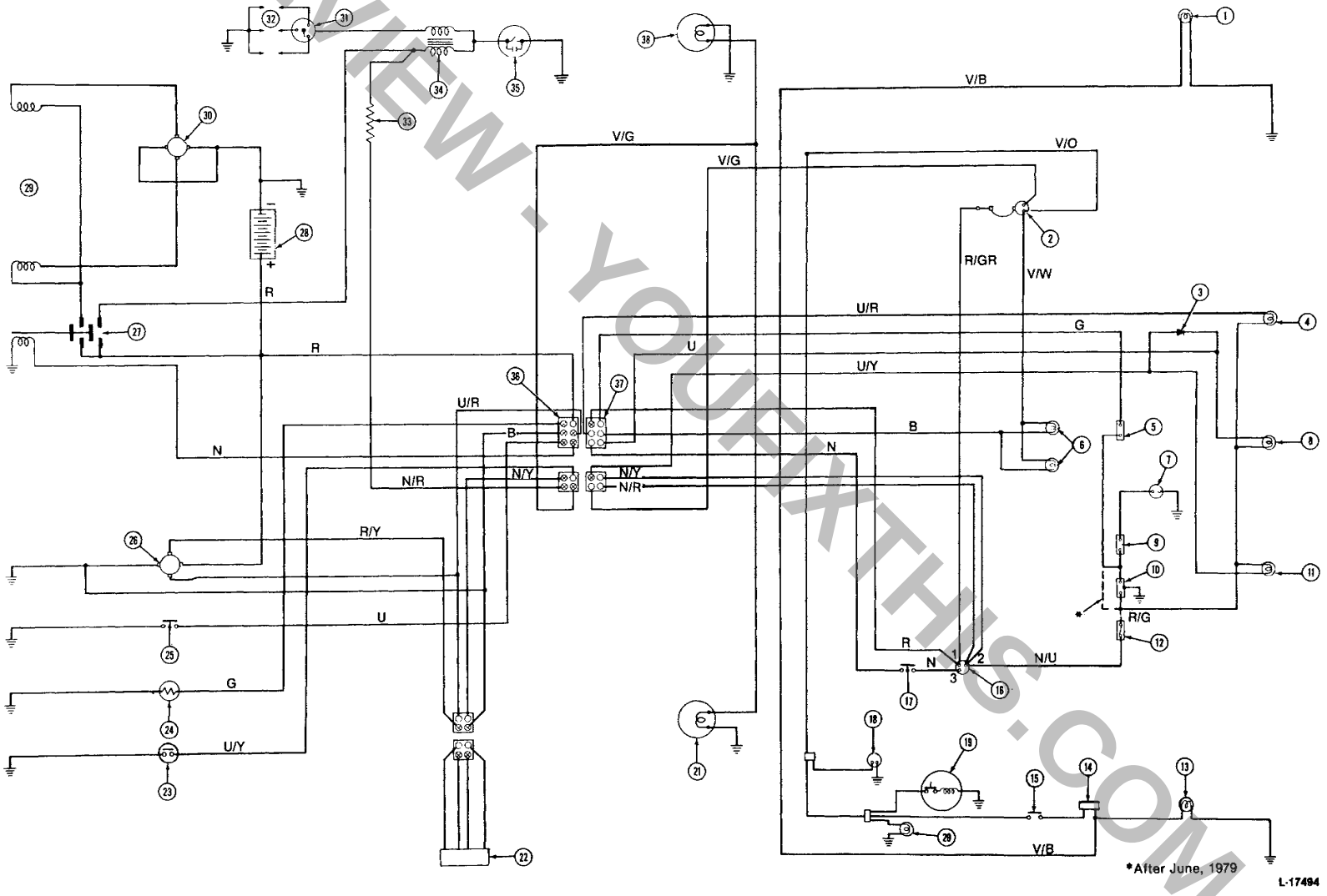
PRINTED IN U.S.A.

PREVIEW - YOUFIXTHIS.COM
YouFixThis.com
Download full manual at youfixthis.com

YouFixThis.com

Download full manual at youfixthis.com

PREVIEW - YOUFIXTHIS.COM



WIRING DIAGRAM
FORD 230A - 530A - Gasoline

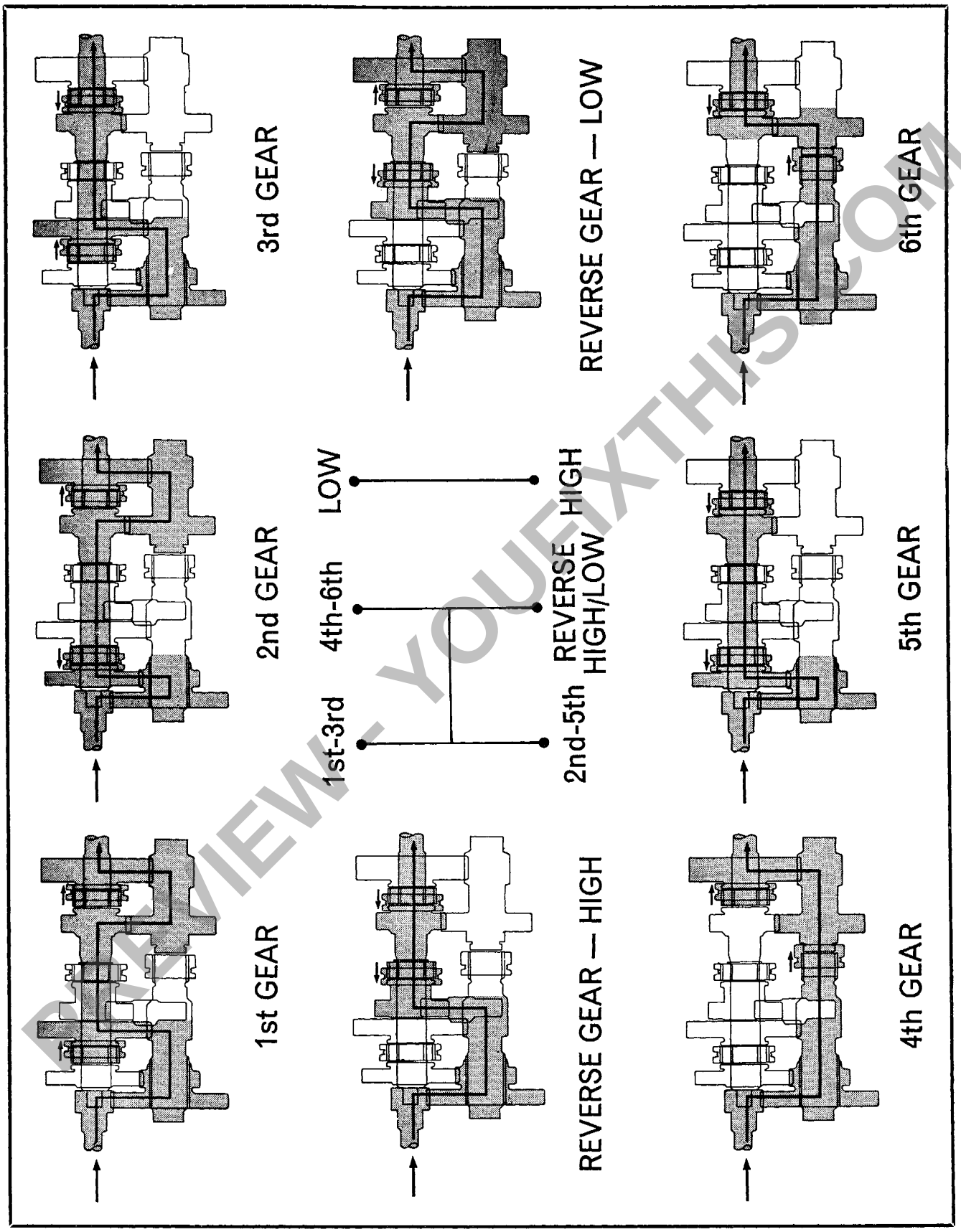


Figure 4
Power Flow and Shift Pattern Diagrams

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

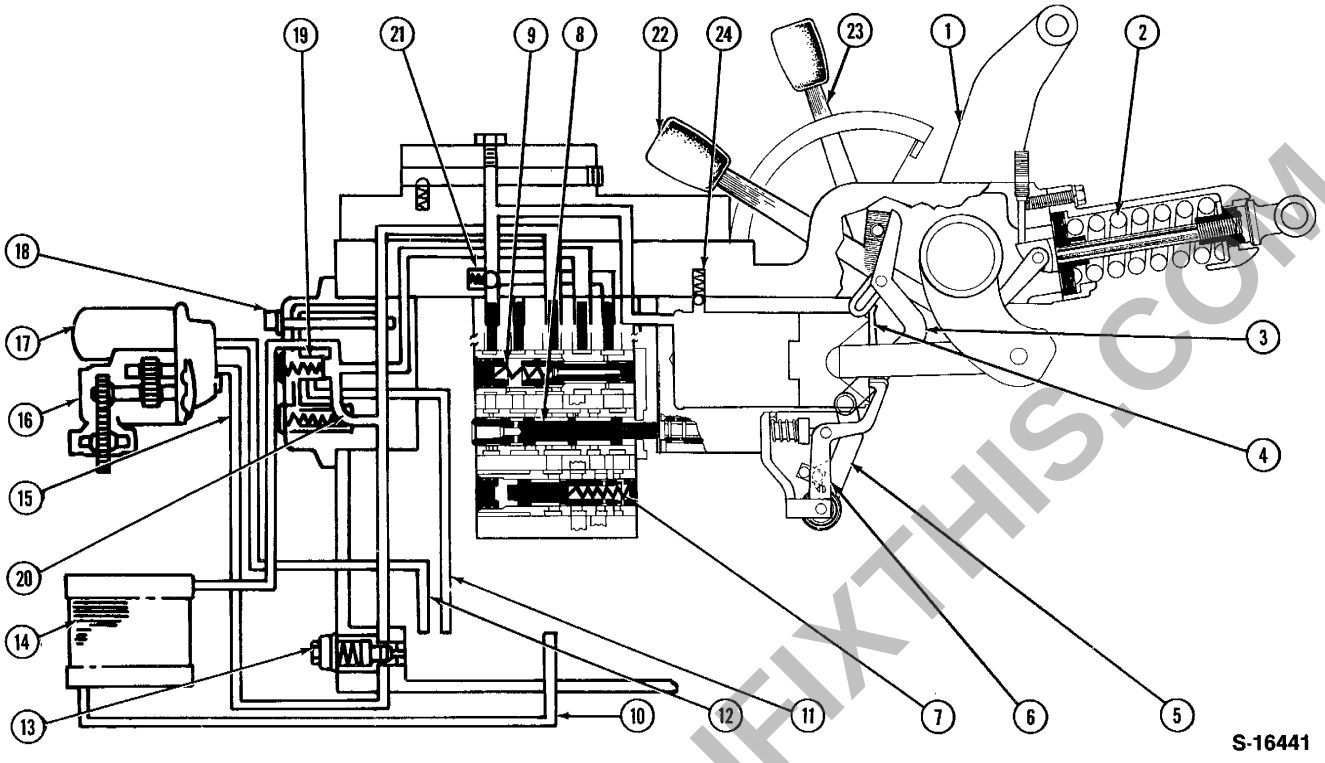


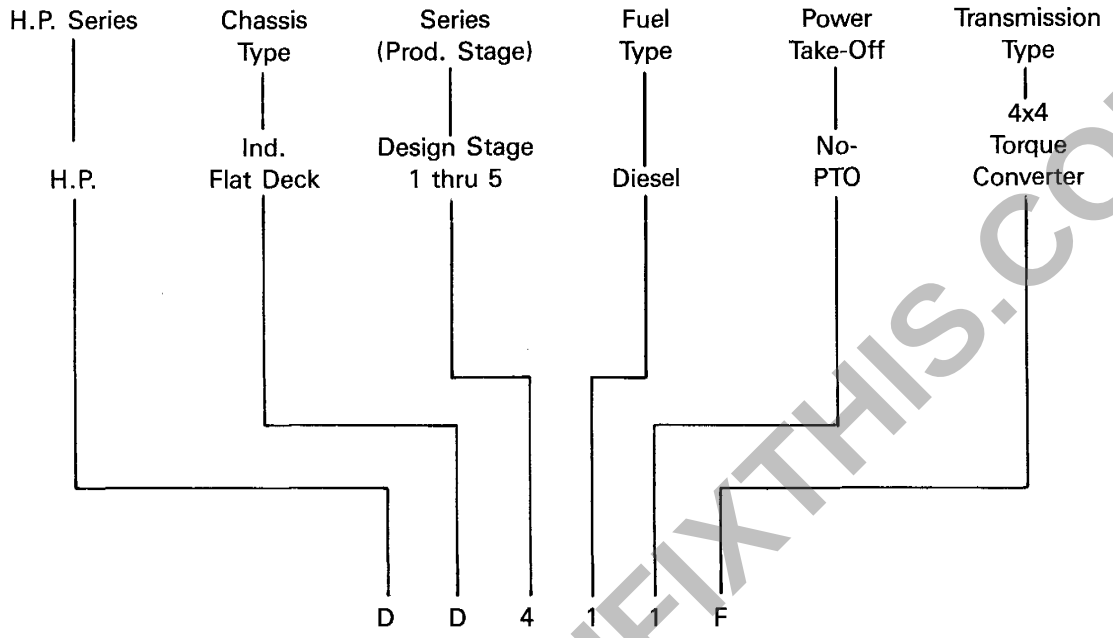
Figure 1
Hydraulic System—Schematic—Ford 230A-530A

1. Lift Arm
2. Draft Control Main Spring
3. Draft Lever
4. Position Lever
5. Actuating Lever
6. Control Valve Lever
7. Feathering Valve
8. Control Valve
9. Unload Valve
10. Oil Cooler Return to Sump
11. Dump Pipe
12. Hydraulic Pump Inlet Tube
13. Pressure Relief Valve
14. Oil Cooler
15. Pump Pressure Tube
16. Engine Mounted Gear Pump (optional)
17. Micronic Inlet Filter
18. Flow Control Valve Restrictor Knob
19. Cooler Valve
20. Flow Control Valve
21. Check Valve
22. Draft Control Lever
23. Position Control Lever
24. Lift Cylinder Safety Valve

PREVIEW - YOUFIXTHIS.COM

YouFixThis.com
Download full manual at youfixthis.com

MODEL NUMBER — CODE



KEY TO PRODUCTION DATE CODES

First Number YEAR	First Letter MONTH		Second Number DAY OF MONTH	Second Letter PRODUCTION SHIFT
5 — 1975	A—Jan	H—Aug.	01-32	A—Midnight
6 — 1976	B—Feb.	J—Sept.		B—Day
7 — 1977	C—March	K—Oct.		C—Afternoon
8 — 1978	D—April	L—Nov.		
9 — 1979	E—May	M—Dec.		
0 — 1980	F—June			
1 — 1981	G—July			

Example of Production Unit Date Code 7 L 0 3 B

- 7 — Year of Final Assembly (1977)
- L — Month of Year (November)
- 03 — Day of Month (Third)
- B — Shift Period (Day)

PREVIEW - YOUFIXTHIS.COM
YouFixThis.com
Download full manual at youfixthis.com

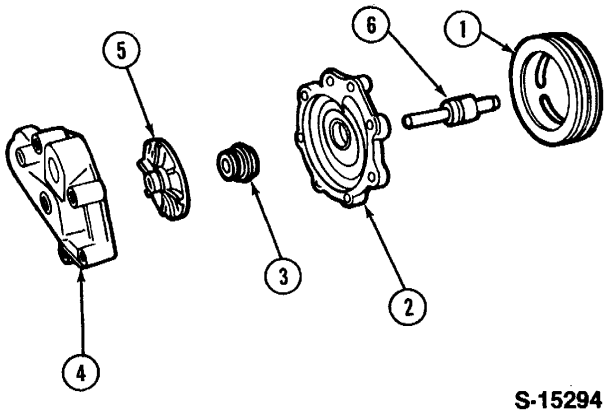


Figure 85
Water Pump Components

1. Pulley
2. Front Cover
3. Seal Assembly
4. Rear Cover
5. Impeller
6. Bearing Shaft Assembly

ASSEMBLY:
Engine production after 3/23/81

1. Use a suitable sleeve which passes over the shaft and rests on the outside diameter of the bearing and press the bearing shaft into the housing until bearing is flush with the face of the housing, Figure 86.

   Use a straight edge to check the final position.

2. Turn the pump housing over and position in a press with the seal bore facing upwards.

3. Coat the outer diameter of the seal flange with a thin application of thread sealer (Ford Part No. D8AZ-19554-A) and position the seal assembly over the shaft in the center bore of the housing.

4. Place Tool No. 4672 over the shaft and onto the seal assembly. Press the seal assembly into the bore until the flange is flush with the top of the housing, see Figure 87.

5. Support the shaft on a block of wood and use a length of pipe of suitable diameter to press the impeller onto the shaft and flush with the rear face of the housing. Check the final position with a straight edge, Figure 88.

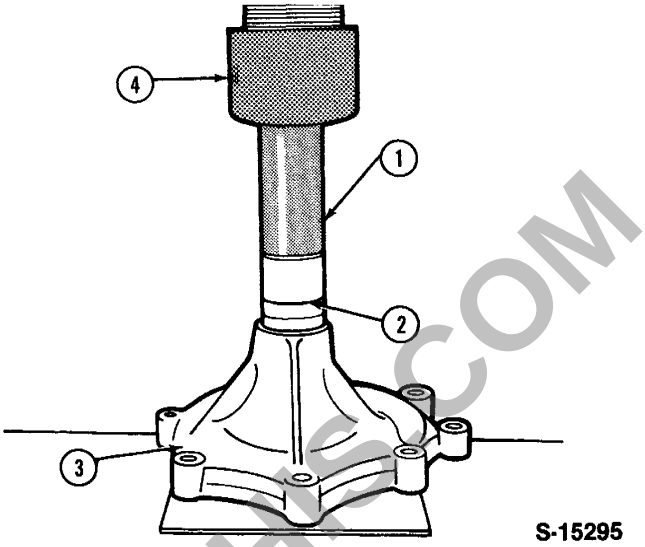


Figure 86
Water Pump Shaft and Bearing Installation

1. Sleeve
2. Shaft and Bearing Assembly
3. Front Cover
4. Press

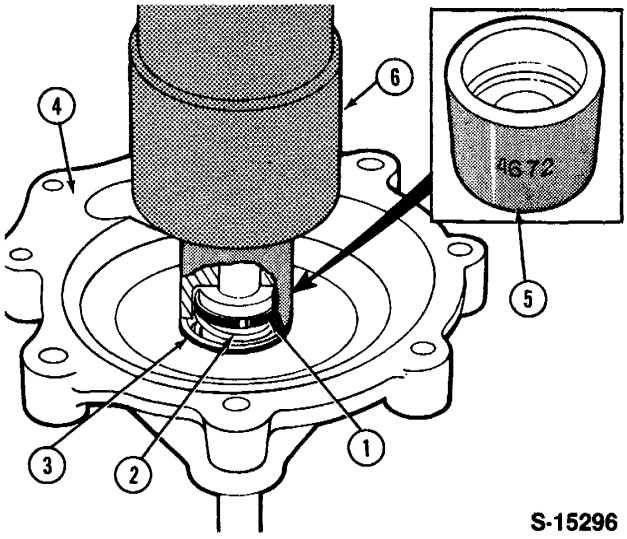


Figure 87
Water Pump Seal Installed

1. Seal
2. Spring
3. Seal Retainer
4. Front Cover
5. Tool No. 4672 (shown cut away)
6. Press

YouFixThis.com
Download full manual at youfixthis.com
PREVIEW - YOUFIXTHIS.COM

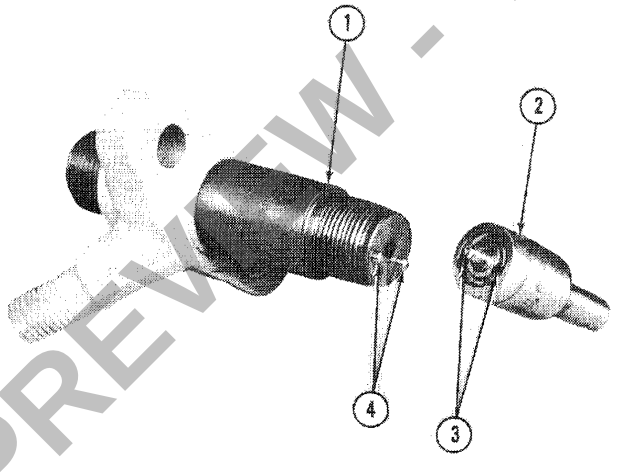
When an injector assembly or a new nozzle assembly is retained in inventory for six months or more, the lubricant between the needle and nozzle may deteriorate. This condition may cause the needle to stick due to a build-up in the needle-to-nozzle sealing area.

If storing the injectors causes improper operation, they should be disassembled and cleaned using the procedure described in this section.

ASSEMBLY

1. Clean all parts in fuel oil prior to assembly. Rinse all parts in clean fuel oil and assemble the components while still wet.

2. Position the nozzle and valve assembly onto the nozzle holder, making sure that the dowel pin holes are correctly located, Figure 50. Holding the injector body in the fixture, install the retaining nut with a new washer and tighten to the specified torque. See "Specifications" Chapter 5.



S-12772

Figure 50
Assembling the Injector

1. Nozzle Holder
2. Nozzle
3. Dowel Pin Holes
4. Locating Dowels

3. Install the spindle, spring disc, spring and adjusting nut, turning the nut until spring pressure is felt.

4. To set the nozzle opening pressure connect the injector to the injector tester. Tighten the adjusting nut, Figure 51, until the specified opening pressure is achieved.



S-12773

Figure 51
Nozzle Opening Pressure Adjustment

5. Install the cap nut with a new copper washer and re-test the injector. If the injector fails any of the tests after cleaning, replace the nozzle and valve.

INSTALLATION

1. Installation is the reverse of the removal procedure. Fit new cork and copper sealing washers to the injector and new copper sealing washers to the leak-off pipe banjo fitting. Tighten the mounting nuts and the fuel line nuts to the specified torques.

2. Bleed the fuel system.

3. If the injectors are to be stored before installation, clean in calibrating oil. Storage for longer than thirty days may necessitate disassembling and cleaning the injectors before installation.

PRINTED IN U.S.A.

YouFixThis.com
Download full manual at youfixthis.com
PREVIEW - YOUFIXTHIS.COM

STATOR

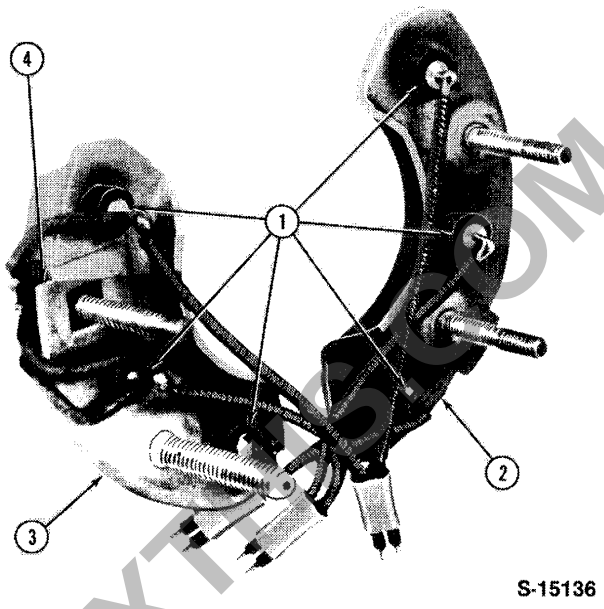
The stator contains windings in which current is induced by the revolving magnetic field of the rotor.

The stator is fabricated from laminations of thin steel stampings onto which three separate wires are wound. The laminations are specially formed to concentrate the magnetic field.

During each complete revolution of the rotor, all three stator windings have induced currents passing first in one direction and then the other; in other words a 3-phase alternating current.

Because alternating current is generated in a series of pulsations, the rotor features six pairs of poles to provide an overall smoother output. For every revolution of the rotor the output characteristic of each stator winding completes six cycles.

Alternating current (A.C.) is unsuitable for charging the battery, which requires pure direct current (D.C.). Therefore, the three stator windings are connected to a rectifier assembly which rectifies or converts the alternator output to direct current.



S-15136

Figure 33
Rectifier Assembly

1. Diodes
2. Negative Plate
3. Positive Plate
4. Field Diode Assembly

RECTIFIER ASSEMBLY

The rectifier assembly consists of six output and three field diodes, Figure 33.

NOTE: *A diode is basically an electronic "check valve" which allows current to flow in one direction only.*

Three of the six output diodes are mounted in a positive plate and three in a negative plate. The two plates are separated and one end of each of the three stator windings is connected to a different diode in each plate.

The plates are heat sinks which both dissipate heat and serve as conductors for the diodes. Two studs on each plate attach the assemblies to the rear housing. One stud on the positive plate is the alternator regulator terminal and the other is the output terminal.

The positive plate is insulated from the rear housing. The negative plate is not insulated and the upper stud serves as the alternator ground connection.

As the rotor revolves, the diodes rectify or convert the alternating current of the stator to a direct current suitable for charging the battery.

The three field diodes are encased in epoxy resin and mounted on the positive diode plate. One end of each of the three stator output wires also connects to one of these diodes. The field diodes supply direct current to the rotor field winding and can only be replaced as a complete unit.

REGULATOR

The regulator controls and maintains the alternator output voltage at a safe working level. The unit consists of diodes, transistors and calibrating resistors, connected by four wires into the charging system, Figure 34.

The regulator components are sealed in epoxy resin and can only be replaced as a complete unit.

The regulated voltage level is established in manufacture and cannot be adjusted in service.

ALTERNATOR OPERATION

With reference to Figure 35.

YouFixThis.com
Download full manual at youfixthis.com
PREVIEW - YOUFIXTHIS.COM

WIRING DIAGRAM
FORD 230A - 530A - Gasoline

PREVIEW - YOUFIXTHIS.COM

YouFixThis.com
Download full manual at youfixthis.com



Figure 14(B)
Removing P.T.O. Countershaft Front Bearing

an assembly, as indicated in Step 3 above.

4. Partially withdraw the secondary countershaft assembly until the front bearing is out of its location. Rest the assembly on the bottom of the rear compartment and withdraw the output shaft immediately above it. The secondary countershaft assembly can then be lifted out, Figure 15.

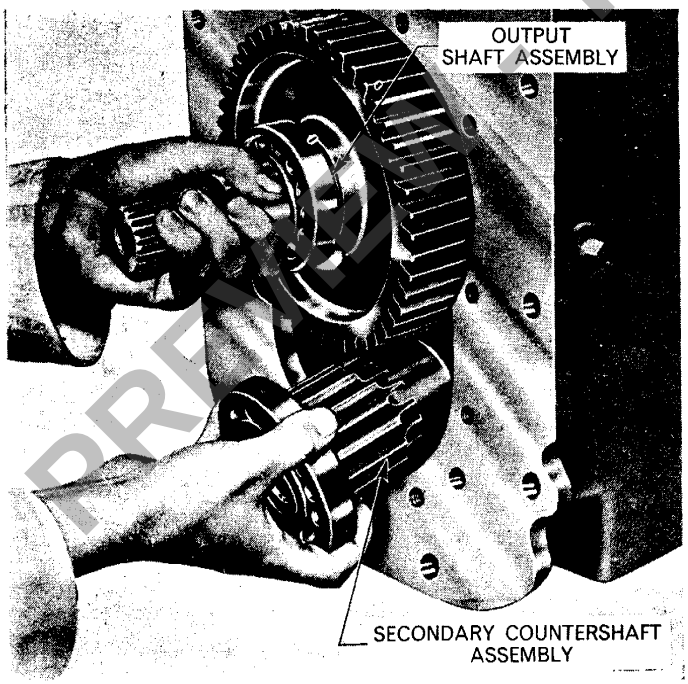


Figure 15
Removing Output Shaft

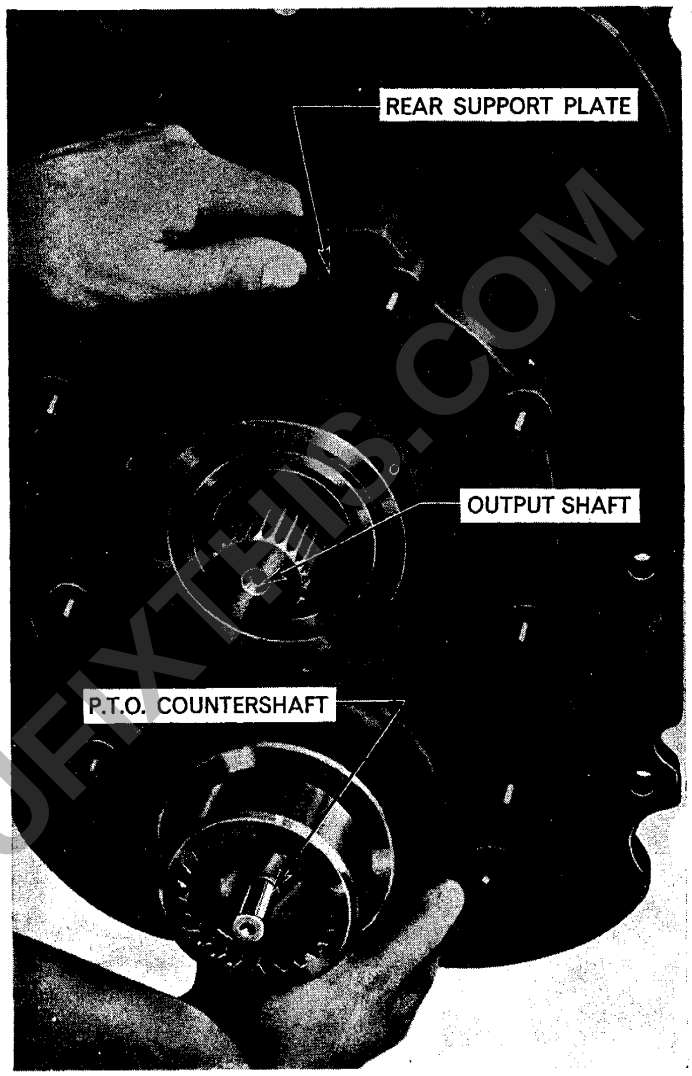


Figure 16
Removing Rear Support Plate

5. Remove the High/Low sliding coupling from the rear of the mainshaft, Figure 17.

B. Inspection and Repair

P.T.O. Countershaft Assembly

1. Remove the snap ring retaining the P.T.O. countershaft rear bearing and push the shaft and rear bearing rearwards out of the support plate.
2. Inspect the countershaft and the rear bearing and, if necessary, pull the bearing off the shaft using Tools Nos. 1002, 951 and 625-6, Figure 18.

YouFixThis.com
Download full manual at youfixthis.com

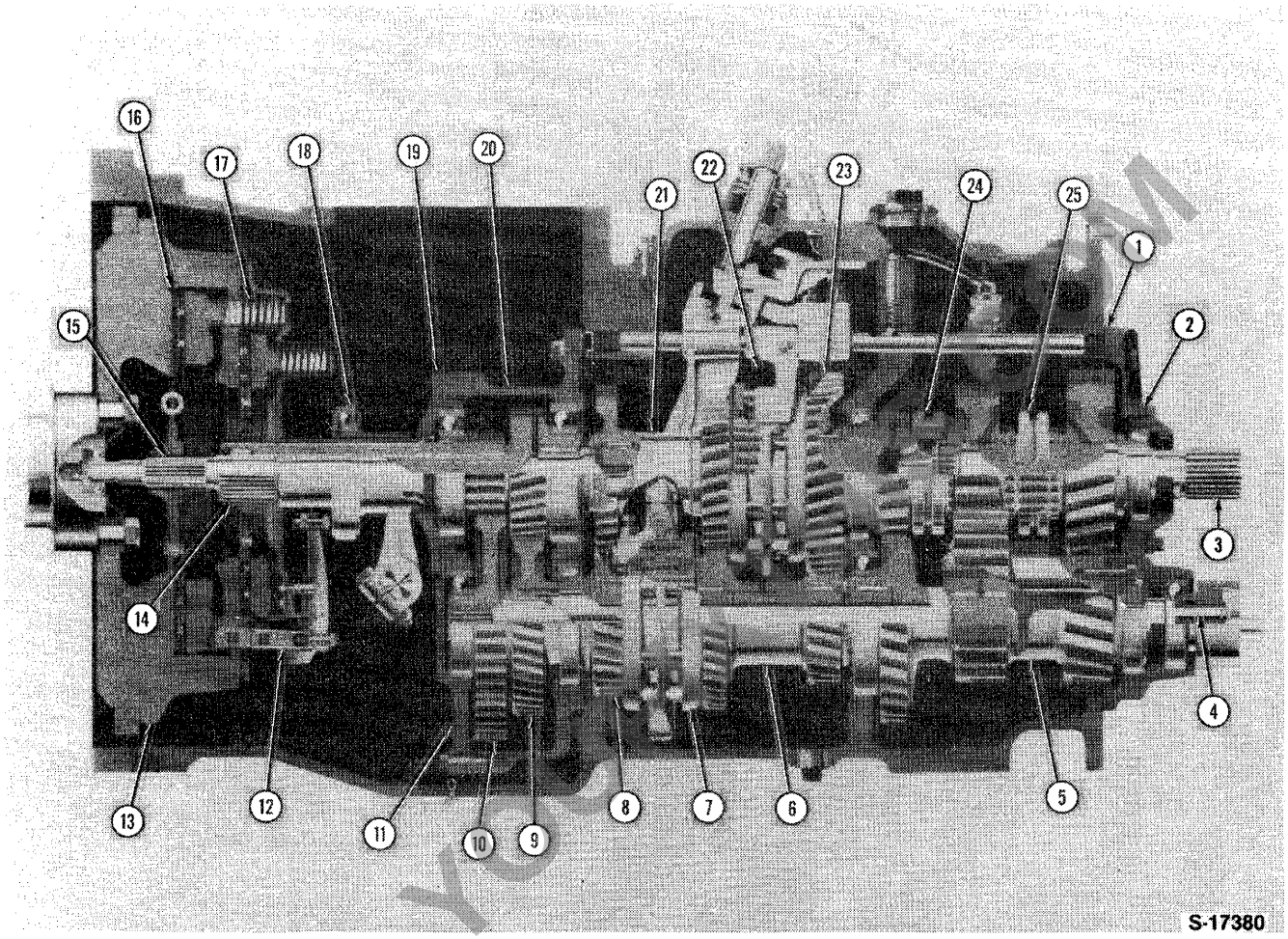


Figure 94
Ford 230A and 530A Synchromesh Transmission Assembly

1. Rear Support Plate
2. Output Shaft Retainer
3. Output Shaft
4. P.T.O. Countershaft
5. Range Cluster Gear
6. Mainshaft Cluster Gear
7. Mainshaft Synchronizer
8. Mainshaft Gear
9. Mainshaft Drive Gear
10. P.T.O. Countershaft Gear
11. Input Housing Cover
12. Release Lever
13. Flywheel
14. P.T.O. Input Shaft
15. Transmission Input Shaft
16. Transmission Clutch Disc
17. Clutch Cover
18. Clutch Release Bearing
19. Clutch Release Bearing Hub Support
20. Input Housing
21. Countershaft Cluster Gear
22. Countershaft Synchronizer
23. Countershaft Gear
24. High Range Sliding Coupling
25. Reverse/Low Sliding Coupling

PREVIEW - YOUFIXTHIS.COM

YouFixThis.com
Download full manual at youfixthis.com

4. Apply a light film of oil on a new seal and install the seal using Tool No. 9211-13 and a soft-faced mallet as shown in Figure 202.

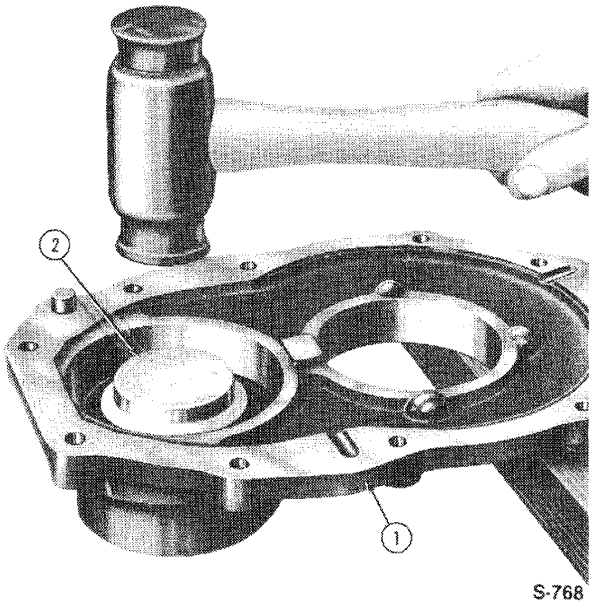


Figure 202
P.T.O. Countershaft Oil Seal - Installation
(Transmission and Ind. P.T.O.)
1. Rear Support Plate
2. Tool No. 9211-13

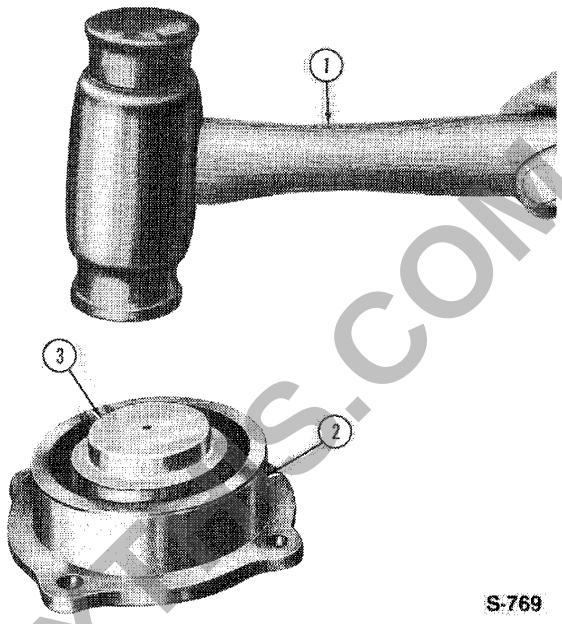


Figure 203
Output Shaft Oil Seal - Installation
1. Soft Faced Mallet
2. Output Shaft Bearing Retainer
3. Tool No. 9210-10

Output Shaft Bearing Retainer

1. Inspect the output shaft oil seal and bearing cup in the output shaft bearing retainer for wear or damage. If necessary, drive the oil seal, then the bearing cup, from the front of the retainer using a suitable punch.

2. Apply a light film of oil on a new seal and install the seal in the retainer using Tool No. 9210-10 and a soft-faced mallet as shown in Figure 203. Install a new bearing cup in the same manner using Tool No. 9211-15.

Secondary Countershaft and Output Shaft

1. Inspect the front and rear bearings on the secondary countershaft for wear or damage. If necessary, remove the front bearing as shown in Figure 204. Remove the rear bearing using Tool Nos. 9516, 9526, 9210-5 and 9212-2.

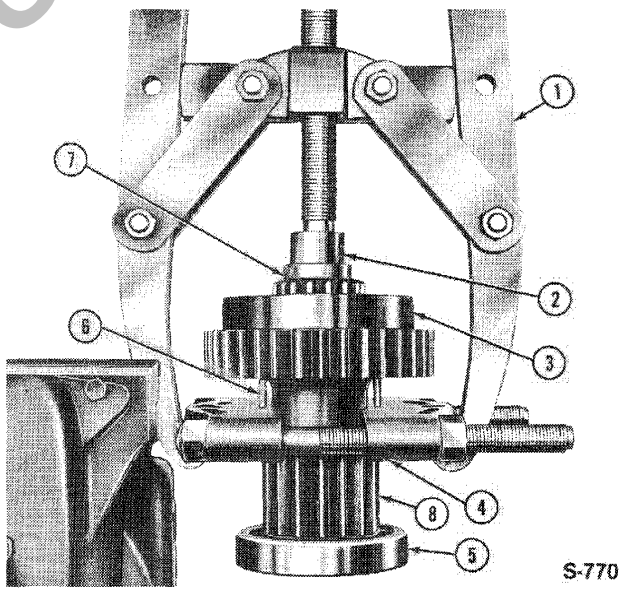


Figure 204
Secondary Countershaft Front Bearing — Removal
1. Tool No. 9516
2. Tool No. 9212-2
3. Front Bearing
4. Tool No. 9190
5. Rear Bearing
6. Rods
7. Tool No. 9210-5
8. Secondary Countershaft

YouFixThis.com
Download full manual at youfixthis.com
PREVIEW - YOUFIXTHIS.COM

OUTPUT SHAFT AND GEAR ASSEMBLY

DISASSEMBLY

1. Remove the output shaft oil seal sleeve, rear bearing, thrust washer, 1st gear, connector and coupling, and 3rd gear, Figure 275, using Tool Nos. 9516 and 9212, as shown in Figure 276.

2. Removal of the output shaft front bearing, thrust washer, 4th gear, and 2nd gear, Figure 275, is the same as Step 1 except that Tool No. 9198 is used in place of Tool No. 9516.

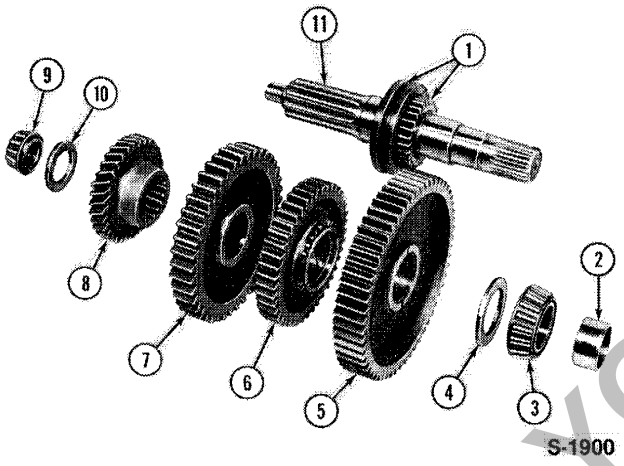


Figure 275
Output Shaft and Gears
1. Connector and Coupling
2. Oil Seal Sleeve
3. Rear Bearing
4. Thrust Washer
5. 1st Gear Output Gear
6. 3rd Gear Output Gear
7. 2nd Gear Output Gear
8. 4th Gear Output Gear
9. Front Bearing
10. Thrust Washer
11. Output Shaft

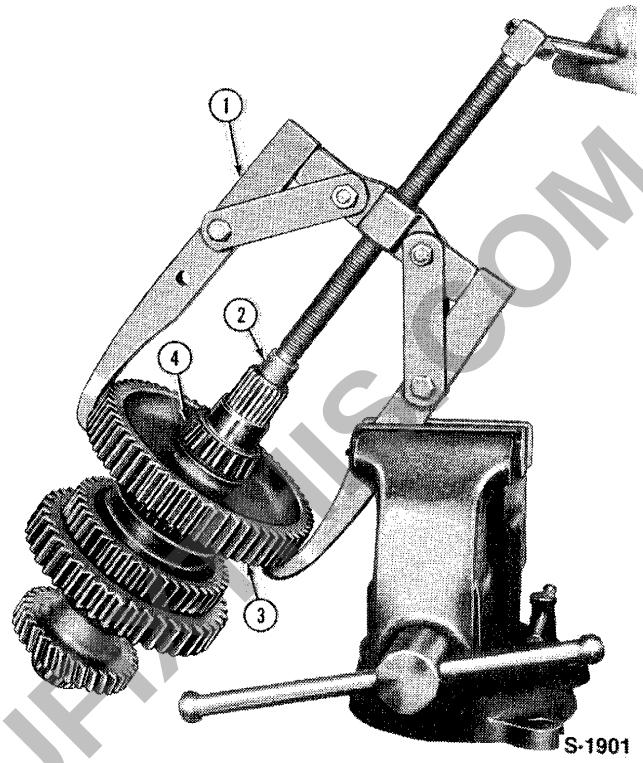


Figure 276
Output Shaft Rear Bearing Removal
1. Puller — Tool No. 9516
2. Shaft Protector — Tool No. 9212
3. 1st Gear Output Gear
4. Rear Bearing

INSPECTION

1. Thoroughly clean the output shaft components, Figure 275, with suitable solvent, then blow dry with compressed air. Do not spin the bearings with compressed air.

2. Check the front and rear bearing cones for smooth rotation. If the bearings are worn install new bearings, including cups, during assembly.

3. Inspect the output shaft gears for cracks, burrs, or chipped teeth. Remove burrs with fine emery cloth or a fine stone. If the gears are chipped or cracked, new gears should be installed.

4. Place the 1st and 3rd gears on the output shaft and check for excessive play between the gear bushings and shaft. If the play feels excessive, new gears should be installed, as the bushings are not serviced separately.

ASSEMBLY

1. Install the 2nd and 4th gears, Figure 275, on the output shaft so the hubs of the two gears face each other.

2. Place the thrust washer and front bearing on the shaft, then drive or press the bearing into place using a hammer or press, and a sleeve of the ap-

YouFixThis.com
Download full manual at youfixthis.com
PREVIEW - YOUFIXTHIS.COM

Install the detent ball, spring and plug in the bore in the side of the case.

Install the shift cover assembly using a new cover gasket.

REMAINING ASSEMBLIES

1. Install the gearshift components as outlined in Section E.

   Install the front input shaft and clutch housing as described in Section D.

   Install the transmission hydraulic pump and oil distributor as outlined in Section D.

   Install the torque converter as described in Section D.

CONNECTING THE TRANSMISSION TO THE REAR AXLE AND ENGINE

1. Connect the transmission to the rear axle as described in Part 12, "SEPARATING THE UNIT."

2. Connect the transmission to the engine as described in Section D.

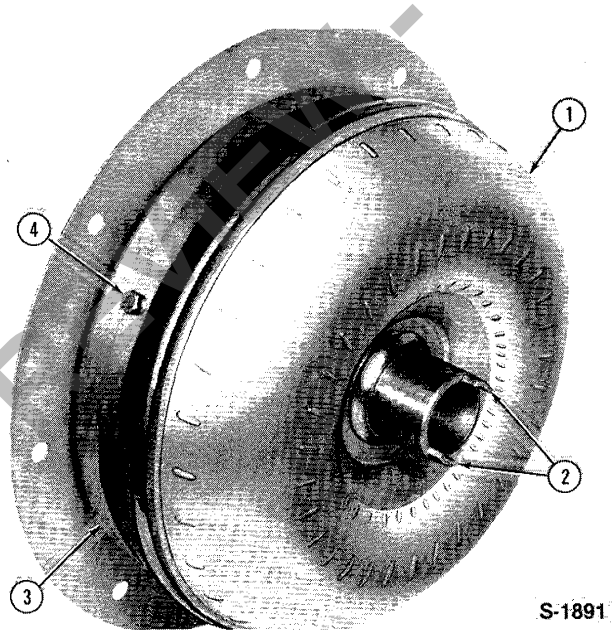


Figure 346
Torque Converter and Drive Plate

1. Torque Converter
2. Tangs
3. Drive Plate
4. Drain Plug

G. COMPONENT OVERHAUL

- Torque Converter
- Transmission Hydraulic Pump
- Modulator Valve Body Assembly
- Oil Distributor Assembly
- Dump Valve
- Front Input Shaft and Rear Clutch Assembly
- Rear Input Shaft and Idler Gear Assembly
- Output Shaft and Gear Assembly
- Countershaft and Gear Assembly

TORQUE CONVERTER

The torque converter, Figure 346, is a welded unit and cannot be disassembled. The only maintenance performed on the converter, other than the stall test covered in Section "H," is cleaning and visual inspection. A commercial torque converter cleaner may be used to clean the converter. However, if a commercial cleaner is not available, the converter should be cleaned as outlined below.

1. If not previously drained, remove the drain plug, Figure 346, and drain as much oil as possible from the converter by tilting the converter in all directions.
2. Install the drain plug, then fill the converter about half full, through the hub, with paraffin base solvent or any cleaning solvent specified for cleaning transmissions.
3. Plug the opening in the hub, then circulate the solvent inside the converter by shaking the converter.
4. Remove the drain plug and the plug from the hub opening. Drain the solvent from the converter.
5. Repeat Steps 1 to 4, as required, until the solvent that is drained from the converter is clean.
6. Install the drain plug.

INSPECTION

Inspect the tangs on the converter hub for wear or damage and the weld joints for cracks. If the hub is worn or damaged and/or the weld joints cracked, a new converter should be installed. A new drive plate should be installed if it is warped.

YouFixThis.com

Download full manual at youfixthis.com

The foot brakes may be locked in the "on" position by a latch located beneath the right-hand platform. The latch is operated by a rod positioned on the right-hand side of the rear axle center housing.

To lock the foot brakes, depress both pedals then pull the handle up and rotate through one quarter turn. To release the lock, reverse the procedure.

TRANSMISSION HANDBRAKE (Optional Equipment)

A dry disc type independent transmission handbrake is available as an option for all Ford 230A and 530A Tractors. The operating lever is located on the left-hand side of the tractor beside the operator's seat, Figure 21.

The brake housing is bolted to the left-hand side of the rear axle center housing and the operating lever is bolted directly onto the brake housing, Figure 22.

A bevel drive gear, splined onto the main drive pinion shaft, meshes with a driven gear mounted on the inner end of the handbrake shaft. The outer end of the handbrake shaft is splined to accept two brake discs which sandwich an actuator assembly. The actuator assembly consists of two plates with ramped pockets in which are located steel balls. The plates are held together by two springs.

A compression spring is installed between the brake disc hubs and passes through the center of the actuator plates to prevent vibration between the brake disc and the shaft splines.

When the operating lever is lifted to the "on" position, the actuator plates rotate relative to one another. This action causes the steel balls to ride up the ramped pockets, forcing the actuator plates apart.

As the actuator plates move apart, the brake discs are forced against the brake housing to effect a braking action on the brake shaft and lock the transmission main drive output shaft.

Tractors with Independent PTO have a drive gear shield installed to prevent aeration of the hydraulic oil.

IMPORTANT: *The transmission handbrake is a parking brake and should only be used to stop a moving tractor in an emergency. After such an event check all transmission and handbrake components for damage.*

B. REAR AXLE SHAFT ASSEMBLY — OVERHAUL

REMOVAL

IMPORTANT: *Prior to removal, be sure the tractor is on level ground, then block the front wheels and release the handbrake.*

With reference to Figure 3:

1. Place a suitable container under the tractor and drain the rear axle oil.
2. Raise and support the rear of the tractor, then remove the rear wheel(s).
3. Release the parking brake catch, loosen the rear wheel brake adjuster, then withdraw the brake drum. Re-install the rear wheel retaining nuts to protect the studs during axle removal.
4. Remove the bearing retainer securing nuts, then pull and withdraw the axle shaft, bearing retainer, brake assembly and brake camshaft as an assembly from the axle housing.
5. Remove the shims from the bearing retainer, then detach the brake camshaft.

DISASSEMBLY

1. Ford Tractors without Differential Lock: Drill and crack the collar retaining the outer bearing assembly on the shaft, Figure 4. Use a 3/8 in. (10 mm) drill first, then counter drill to 1/2 in. (13 mm). Use a suitable chisel to crack and remove the collar from the shaft, Figure 5.

YouFixThis.com
Download full manual at youfixthis.com
PREVIEW - YOUFIXTHIS.COM

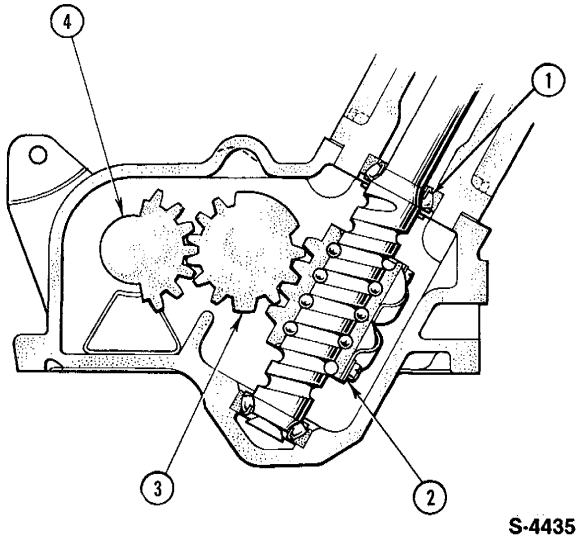


Figure 2
Nut and Rocker Shaft Tooth Engagement

1. Taper Roller Bearing
2. Shaft and Nut Assembly
3. Rear Rocker Shaft
4. Forward Rocker Shaft

PREVIEW - YOUFIXTHIS.COM

B. STEERING GEAR — OVERHAUL

REMOVAL

1. Remove the column gear shift assembly (where fitted), see "TRANSMISSION SYSTEM" — Part 5.
2. Remove the center cover from the steering wheel, remove the steering wheel retaining nut and use a suitable puller to pull the steering wheel off the upper column.
3. Remove the rear hood and fuel tank, see "FUEL SYSTEMS" — Part 2.
4. Remove the drag link to steering arm retaining nuts and disconnect the drag links on both sides of the steering gear.
5. Remove the bolts retaining the steering gear to the transmission housing.
6. Remove the steering gear from the tractor.

DISASSEMBLY

1. Remove the steering arm retaining nuts and lockwashers, and withdraw the steering arms. If the arms are tight on the rocker shafts, use Puller, Tool No. 9196, Figure 3.
2. Withdraw the front rocker shaft cover retaining bolts.
3. Remove the rocker shaft adjuster screw locknut, and screw the adjuster clockwise until the cover is free, then remove the cover, Figure 4.
4. Remove the forward rocker shaft from the housing.
5. Remove the rear rocker shaft in a similar manner.
6. Remove the four bolts retaining the column extension to the main housing.

YouFixThis.com
Download full manual at youfixthis.com

Chapter 4
SPECIFICATIONS AND SPECIAL TOOLS

Section		Page
A.	SPECIFICATIONS	43
B.	SPECIAL TOOLS	45

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

LIFT CYLINDER SAFETY VALVE

This spring operated valve is mounted directly into the lift cylinder wall. If shock loadings are encountered, for example when transporting implements over rough ground, the valve opens to relieve excess pressure and protects the system.

COOLER VALVE

The spring operated cooler by-pass valve, in cooler-equipped applications, is located in the flow control valve housing, Figure 6. It routes part of the system return oil through the oil cooler, while limiting return circuit pressure to approximately 45 psi (3.1 bar). The return circuit directs both restricted pump oil and system exhaust oil to the cooler before returning to the sump. Excessive pressure on the valve results in the oil being dumped straight to the sump thereby protecting the oil cooler circuit.

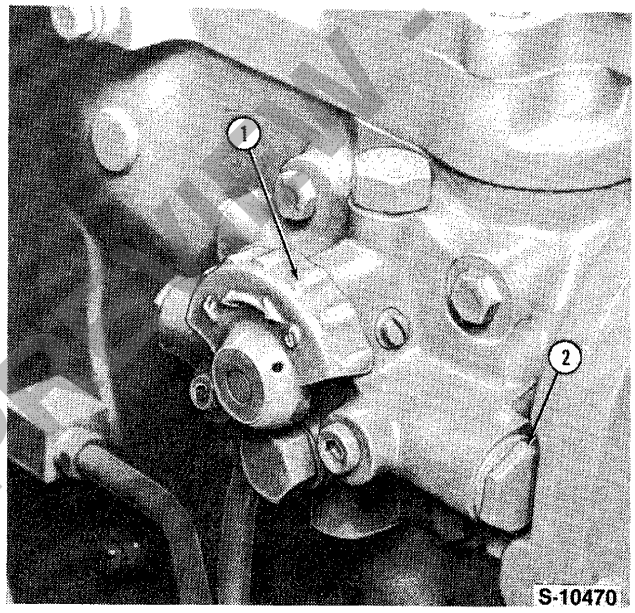


Figure 6
Flow Control

1. Flow Control Knob
2. Cooler By-pass Valve Plug

OIL FLOW

Figures 7, 8, 9 and 10 show the hydraulic system oil flows to the neutral, lowering, slow raise and fast raise functions.

To facilitate detailed explanation of the hydraulic oil flow in the lift cylinder valve circuitry assembly, simplified diagrams for the neutral, lowering, slow and fast raise functions are shown in Figures 11, 12, 13 and 14 respectively.

Oil Flow in Neutral

With reference to Figure 7:

Hydraulic oil is drawn from the rear axle center housing reservoir by the hydraulic pump. Pump pressure oil is then circulated to the hydraulic system.

The oil flows first past the system relief valve and then past the flow control valve to the flow control restrictor. According to the position of the restrictor only a certain percentage of the oil is allowed to pass and the reduced pressure of this oil is registered, via a bleed gallery behind the flow control valve. The pressure of the restricted oil builds up on the face of the flow control valve spool which moves against bleed oil pressure and allows excess oil to be dumped to the return circuit. Actual movement of the flow control valve depends upon the pressure differential between the force of the restricted oil on the valve face and the combined coil spring force and oil pressure behind the valve.

The excess oil combines with returning system oil before passing to the reservoir via the oil cooler, if installed.

System return pressure in excess of approximately 45 psi (3.1 bar) causes the cooler valve to uncover a port which allows the oil to flow directly to the reservoir. This action protects the oil cooler from excessive system pressure. Systems not equipped with an oil cooler do not have a cooler valve, and return oil flows directly to the sump.

With reference to Figure 11:

From the restrictor, the reduced pressure oil passes through passages in the lift cover and lift cylinder assembly to the unload valve. Due to the position of the control valve, the oil on the left-hand side of the unload valve is allowed to escape to the reservoir via a hole drilled in the control valve. The supply oil enter-

YouFixThis.com
Download full manual at youfixthis.com

position. As in the raised position the spool blocks the oil circulation from passages 'A' and 'B' and forces the pump oil through the check valve. The oil flows through the spool land at 'E' and passes to the return port 'G' via drilling in the control valve body.

The return port 'G' is connected to the tractor hydraulic return circuit to assure return oil is passed through the oil cooler (if fitted).

Oil returning from the single acting cylinder through port 'C' can pass around the spool land at 'H', and return to the sump at atmospheric pressure at port 'J'.

PREVIEW - YOUFIXTHIS.COM

YouFixThis.com
Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 25 of 800 pages

The full manual includes:

- All 800 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

Ford 230A, 231, 340, 340A, 445, 530A, 531, 540A, 545, Ford Industrial Tractors Repair Manual

Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual