

both sides which allows the oil to exhaust. The timing gears are splash-lubricated by oil from the tappet chamber and from the pressure-lubricated camshaft drive gear.

Cylinder walls, pistons, and piston pins are splash-lubricated by the crankshaft. An intermittent flow of oil is fed to the valve rocker arm shaft assembly through a drilled passage in the cylinder block at the No. 1 camshaft bearing which indexes with a hole in the cylinder head. From the head, the oil flows up around the No. 1 rocker arm support bolt to the rocker shaft. The oil from the shaft flows through drilled holes in each rocker arm to lubricate the valve end and the adjusting screw end of the rocker arm. Oil from the ball ends of the rocker arms flows down the push rods and assists in lubricating the tappets and push rods. Excess oil drains into the

push rod chamber through the push rod holes in the cylinder head and then back to the oil pan sump through cored openings in the block.

A water jacketed oil cooler is attached to the top of the front steering motor behind the radiator. The lubricating oil flows to the cooler from a tapping into the main oil gallery which runs the full length of the cylinder block, and returns to the oil pan sump via a pipe tapped into the right-hand side of the cylinder block.

The fitting at the oil outlet from the oil cooler is an assembly containing an oil pressure relief valve. This valve helps to maintain satisfactory oil pressure in the oil gallery at low engine speed.

2. CYLINDER HEAD, VALVES AND RELATED PARTS

CYLINDER HEAD

The cylinder head can be removed from the engine for service with the engine installed in the tractor. The following procedure applies.

A. Removal

1. Remove both hood side panels.
2. **Ford 8000:** Remove the pre-cleaner from the air intake tube. Pull the exhaust extension from the muffler. Remove the top hood panel.

Ford 9000: Remove the pre-cleaner from the air intake tube. Remove the muffler from the exhaust extension. Remove the top hood panel.

3. Drain the coolant from the radiator and disconnect the upper hose from the block.
4. Disconnect the three tubes from the power steering pump.
5. Disconnect the three tubes from the steering motor in the front pedestal.
6. Disconnect the four tubes from the steering motor in the control pedestal.
7. **Ford 8000:** Disconnect the air intake tube at the intake manifold.

Ford 9000: a. Disconnect and remove the air cleaner-to-turbocharger tube.

- b. Disconnect the oil pressure and return lines at the turbocharger and engine and remove them.

8. **Ford 8000:** Disconnect the muffler from the exhaust manifold.

Ford 9000: a. Remove the four bolts which secure the turbocharger to the exhaust manifold.

- b. Remove the bolt which secures the exhaust extension to the brace.

c. Remove the complete turbocharger and exhaust extension assembly. Ensure that all turbocharger ports are plugged to prevent the entry of foreign matter.

9. Remove the wiring harness from the clips on the support brace and disconnect the harness at the temperature sending unit and at the power steering reservoir.
10. Place a sling around the assembly to which the muffler (Ford 8000 only), air cleaner, and power steering reservoir are attached.
11. Remove the attaching hardware from each corner of the assembly and lift the entire assembly away from the tractor as illustrated in Figure 1.
12. Bend the lock tabs, Figure 2, back and remove the bolts which secure the exhaust manifold to the cylinder head.
13. Remove the exhaust manifold and metal gasket.
14. Disconnect the injector lines from the injection pump and from the injectors. Cap the exposed openings in the pump, injectors, and lines to prevent the entry of foreign matter. Disconnect the cold start equipment (if installed).

gear and shaft cover. Remove the cover and extract the drive gear and shaft, Figure 30.

B. Disassembly

1. Remove the oil pump screen and inlet tube and cover assembly, Figure 29, by removing the two bolts securing it.
2. Remove the four cap screws and remove the pump cover, Figure 31. Remove the rotor and shaft assembly and the outer rotor.
3. Insert a self-tapping screw of the proper diameter into the hole in the relief valve plug and pull the plug out of the chamber. Remove the spring and relief valve, Figure 31.

C. Cleaning and Inspection

1. Wash all parts in solvent and dry thoroughly. Use a brush to clean the inside of the pump housing and the pressure relief valve chamber. Be sure all dirt and metal chips are removed.
2. Check the inside of the pump housing and the rotor and shaft assembly for excessive wear.
3. Check the inside face of the pump cover for wear or score marks. If these conditions exist, install a new cover.
4. With the rotor and shaft assembly installed in the pump body, place a straight edge over the rotor

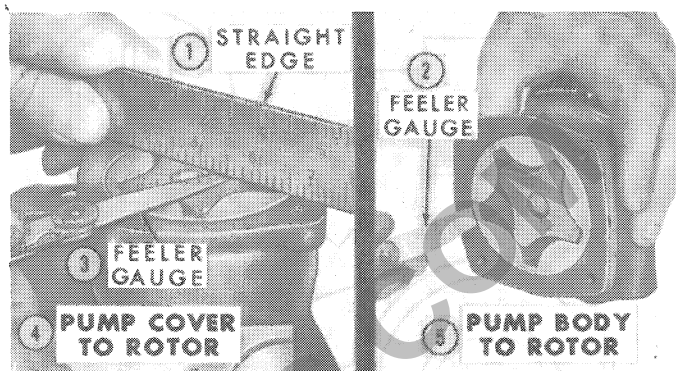


Figure 32

Checking Oil Pump Clearance

and shaft assembly and the pump body. Measure the clearance between the straight edge and the inner rotor and shaft assembly and between the straight edge and the outer rotor, Figure 32. If the measurement is not within specifications, page 64, install a new rotor assembly.

NOTE: The shaft and rotors are serviced only as an assembly.

5. Measure the rotor-to-housing clearance by inserting feeler blades between the rotor and the housing. Take the measurements at four places, 90° apart. If the measurements are not within specifications, page 64, install a new rotor assembly. Remeasure clearances with the new rotor assembly in the pump body. If the measurements are still not within specifications install a new pump body.
6. Check the relief valve spring tension. If the spring tension is not within specifications, page 64, install a new spring.
7. Check the relief valve for score marks and be sure it is free to move within the bore; the valve should have two flats on each side at the location shown in Figure 33.
8. Check the oil pump drive gear for worn or broken teeth. If any of these conditions exist, install a new drive gear and shaft assembly.
9. Check the intermediate drive shaft to be sure the hexagon socket ends are not excessively worn.

D. Assembly

The oil pump assembly is shown in Figure 31.

1. Oil all the parts thoroughly.
2. Install the oil pressure relief valve and spring, and drive in a new plug.

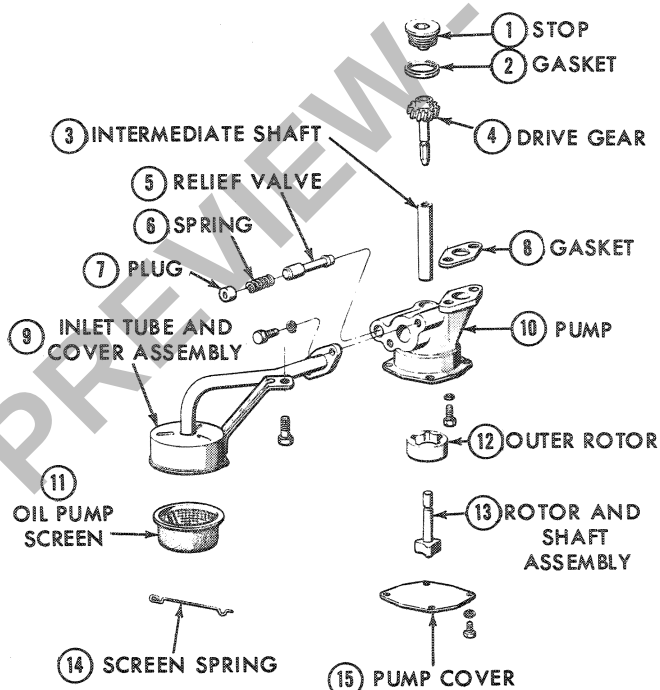


Figure 31

Oil Pump Disassembled

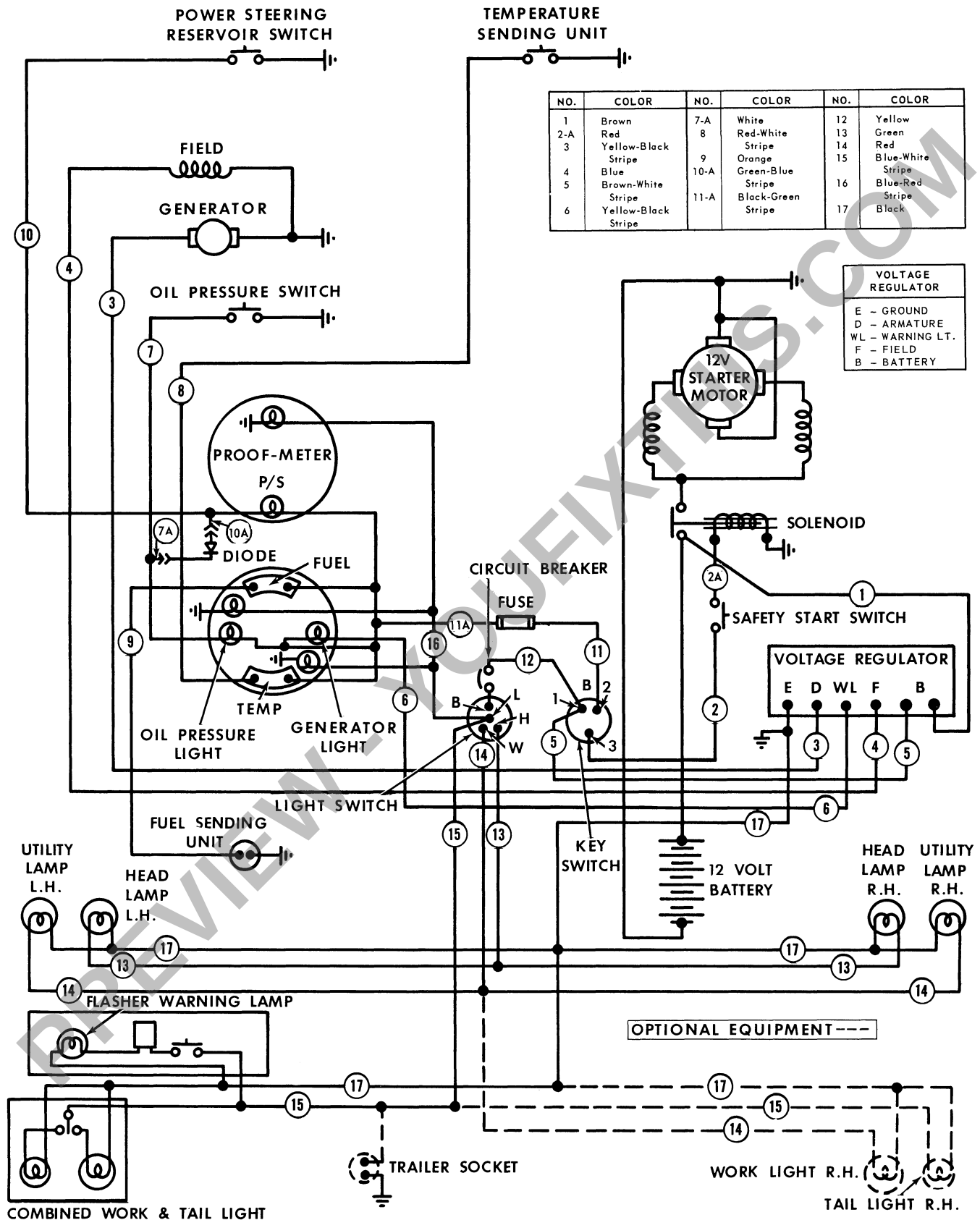


Figure 1
Ford 8000 Electrical Wiring Diagram – Tractors with Generators

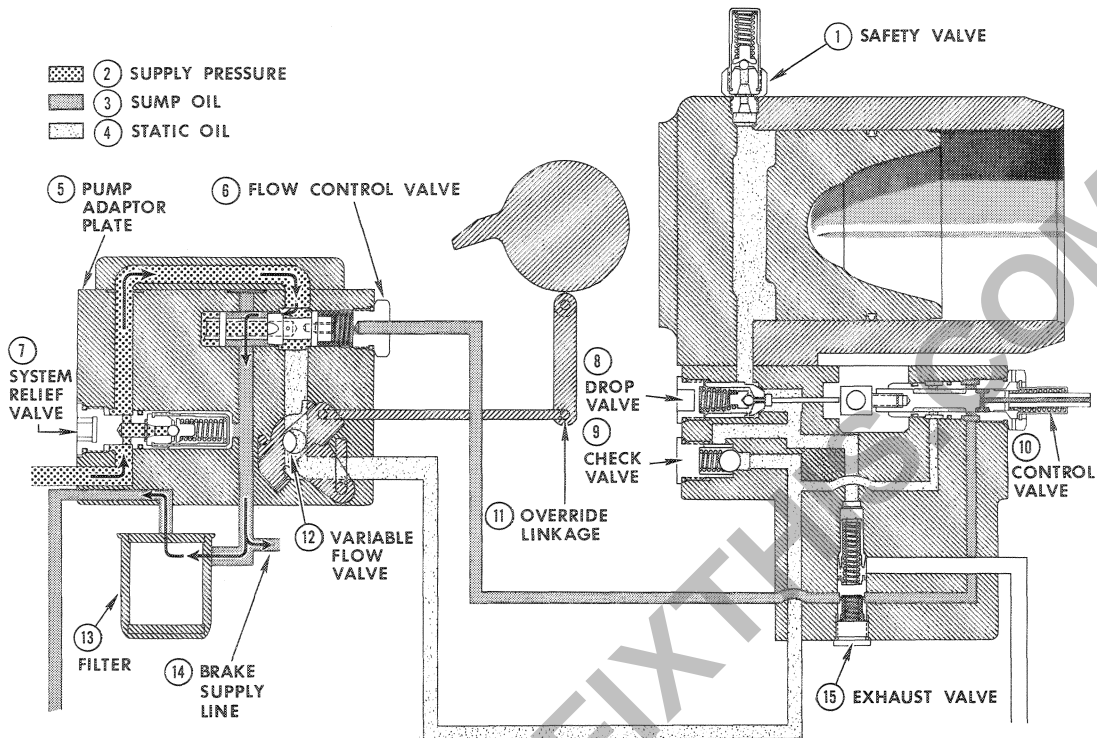


Figure 6
Hydraulic System Oil Flow - Neutral

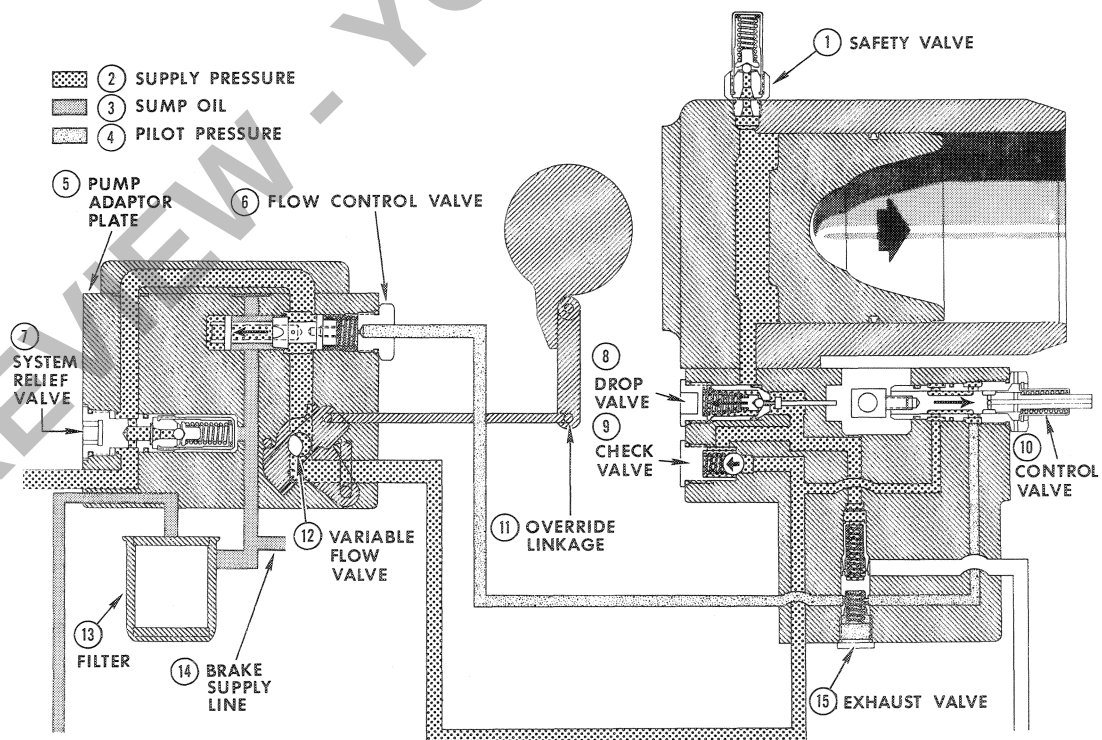


Figure 7
Hydraulic System Oil Flow - Lifting

Water Pump:

Type	Centrifugal
Drive	V-belt

Thermostat:

Opening Temperature — Ford 8000	188°F. (87.6°C.)
Ford 9000	168°F. (75.6°C.)
Full Open — Ford 8000	212°F. (100°C.)
Ford 9000	192°F. (88.8°C.)

Torque Specifications (Lubricated Threads)

	Thread Size	Pounds Feet	Kilogram- metres
Main Bearing Bolts	9/16-12	115-125	15.89-17.28
Connecting Rod Nuts	7/16-20	60-65	8.30-8.99
Cylinder Head Bolts (with Engine Cold)	1/2 -13	95-105	13.13-14.51
Intake Manifold-to-Cylinder Head	3/8 -16	23-28	3.18-3.87
Exhaust Manifold-to-Cylinder Head	3/8 -16	25-30	3.46-4.14
Flywheel-to-Crankshaft	9/16-18	100-110	13.82-15.21
Oil Pan Drain Plug	7/8 -16	25-35	3.46-4.84
Valve Rocker Cover Bolts	5/16-18	10-15	1.38-2.07
Crankshaft Pulley-to-Crankshaft	3/4 -16	130-160	17.96-22.12
Self-Locking Screw — Valve Rocker Arm	7/16-20	9-26	1.24-3.59
Injector Attachment Bolts	5/16-24	10-15	1.38-2.07
Oil Pump to Block	3/8 -16	23-28	3.18-3.87
Water Pump-to-Cylinder Block	3/8 -16	23-28	3.18-3.87
Turbine Housing Clamp Band		120 in. lbs.	1.6596 kgm
Compressor Cover Cap Screws		60 in. lbs.	0.8298 kgm
Compressor Wheel Lock Nut		156 in. lbs.	1.7979 kgm
Water Pump Cover-to-Pump	5/16-18	18-22	2.49-3.04
Oil Pan-to-Cylinder Block (Stamped)	3/8 -16	20-24	2.76-3.31
Oil Pan-to-Cylinder Block (Cast)	3/8 -16	30-35	4.15-4.84
Injector Line Nuts	M 12x1.5	18-22	2.49-3.04
Injection Pump-to-Front Adapter Plate	5/16-24	20-25	2.76-3.46
Camshaft Drive Gear-to-Block	1/2 -20	100-105	13.82-14.51
Spark Plugs (Dry Thread) Ford 8000 Only	14 mm.	26-30	3.59-4.15
Front Adapter Plate-to-Cylinder Block	5/16-18	13-18	1.80-2.49

Part 1

ENGINE SYSTEM

Chapter 4

TROUBLE SHOOTING

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1. Trouble Shooting	55

1. TROUBLE SHOOTING

Trouble	Possible Causes	Trouble	Possible Causes
Engine Does Not Develop Full Power	<ol style="list-style-type: none"> 1. Clogged air cleaner. 2. Fuel line obstructed. 3. Faulty injectors. 4. Low cylinder compression. 5. Improper valve lash adjustment. 6. Burned, worn, or sticking valves. 7. Blown head gasket. 8. Incorrect fuel delivery. 	Low Oil Pressure	<ol style="list-style-type: none"> 1. Engine oil level low. 2. Wrong grade of oil. 3. Blocked oil pump sump screen. 4. Oil pressure relief valve faulty. 5. Oil pump drive shaft worn. 6. Excessive oil pump rotor and shaft assembly clearance. 7. Excessive main or connecting rod bearing clearances.
Engine Knocks	<ol style="list-style-type: none"> 1. Diluted or thin oil. 2. Insufficient oil supply. 3. Low oil pressure. 4. Excessive crankshaft end play. 5. Flywheel runout excessive. 6. Excessive connecting rod or main bearing clearance. 7. Bent or twisted connecting rods. 8. Crankshaft journals out-of-round. 9. Excessive piston-to-cylinder bore clearance. 10. Excessive piston ring side clearance. 11. Broken rings. 12. Excessive piston pin clearance. 13. Piston pin retainer loose or missing. 14. Excessive camshaft end play. 15. Imperfections on timing gear teeth. 16. Excessive timing gear backlash. 	Oil Pressure Warning Light Fails to Operate	<ol style="list-style-type: none"> 1. Bulb burned out. 2. Warning light pressure switch faulty. 3. Warning light circuit faulty.
		Excessive Oil Consumption	<ol style="list-style-type: none"> 1. Engine oil level too high. 2. External oil leaks from the engine. 3. Worn valves and/or valve guides or worn seals. 4. Head gasket not sealing. 5. Oil loss past the pistons and rings. 6. Oil cooler leak.
		Engine Overheats	<ol style="list-style-type: none"> 1. Hose connection leaking or collapsed. 2. Radiator cap not sealing or defective. 3. Radiator leakage. 4. Improper fan belt adjustment. 5. Radiator fins restricted. 6. Thermostat operating improperly.

Part 1
ENGINE SYSTEM

Chapter 5
SPECIFICATIONS AND SPECIAL TOOLS

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1. SPECIFICATIONS

ENGINE

Displacement	401 cu. ins. (6580 cc)
Compression Ratio	16.5:1
Stroke	4.4 ins. (111.75 mm)
Bore	4.4 ins. (111.75 mm)
Bore/Stroke Ratio	1.00:1
Firing Order	1-5-3-6-2-4
Rated Engine Speed:	
Ford 8000	2300 rpm
Ford 9000	2200 rpm
Idle Speed	700-800 rpm
Maximum No-Load Speed	
Ford 8000	2530-2580 rpm
Ford 9000	2420-2470 rpm
Compression Pressure at 200 rpm Cranking Speed with the Throttle Closed and Stop Control Out	430 ± 50 psi

Cylinder Block

Material	Cast Iron
Cylinder Arrangement	In line vertical
Taper of Cylinder Bore	0.001 in. (0.0254 mm.)
Cylinder Bore Out-of-Round	0.001 in. (0.0254 mm.)
Cylinder Bore Diameter	4.4007–4.4032 in. (111.777–111.841 mm.)
Gasket Surface Finish	90–150 R.M.S. micro
Rear Oil Seal Bore Diameter	5.542–5.546 in. (140.77–140.87 mm.)

Part 9

TRACTOR MAINTENANCE SCHEDULE

Chapter 1

PRE-DELIVERY AND 50 HOUR SERVICE, AND MAINTENANCE AND LUBRICATION

Section

Page

1. Pre-Delivery and 50-Hour Service 1
2. Maintenance and Lubrication 3

1. PRE-DELIVERY AND 50 HOUR SERVICE

INOPERATIVE SERVICE CHECKS	Pre-Delivery	50 Hours
1. Check tire pressure	X	X
2. Check air cleaner and hose connections	X	
3. Clean air cleaner and check hose connections		X
4. Replace diesel fuel filters and bleed system		X
5. Check oil level in in-line injection pump	X	
6. Change oil in in-line injection pump		X
7. Tighten in-line pump delivery valve holders		X
8. Check radiator coolant level	X	X
9. Check fan belt and water pump-generator belt	X	X
10. Check battery cleanliness, vent openings, electrolyte level and charge	X	X
11. Inspect all electrical cables, terminals, and wires		X
12. Check engine oil level	X	
13. Drain and refill engine oil		X
14. Replace primary engine oil filter		X
15. Check transmission oil level	X	X
16. Check hydraulic and rear axle center housing oil level	X	X
17. Check P.T.O. gear box oil level	X	X
18. Check hydraulic lift draft control adjustment	X	
19. Replace hydraulic oil filter		X
20. Check upper link, drawbar, and pin for proper position	X	

Part 1

ENGINE SYSTEM

Chapter 1

ENGINE AND LUBRICATION SYSTEM

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3. Engine Front Cover and Timing Gears	12
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7. Camshaft	36
8. Engine Compression Test	38

Chapter 2

TURBOCHARGER

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Chapter 3

COOLING SYSTEM

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Part 1

ENGINE SYSTEM

Chapter 3

COOLING SYSTEM

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3. Water Pump	51

1. DESCRIPTION AND OPERATION

The cooling system is of the recirculating bypass type with full length water jackets for each cylinder. The coolant is routed from the bottom tank of the radiator to the water cooled oil cooler which is connected between the radiator and the inlet side of the water pump, which delivers the coolant to the cylinder block. As the coolant enters the block it travels through cored passages to cool the cylinder walls. Upon reaching the rear of the cylinder block, the coolant flows into the cylinder head. It then flows through cored passages to the nozzle tip area. This flow within the cylinder head water jacket provides sufficient cooling at maximum temperature cooling points. The coolant continues to flow through the cylinder head to the thermostat. The thermostat is located in the front of the head.

If the thermostat is closed, a recirculating bypass is provided, allowing a portion of the coolant to recirculate from the head to the block for faster warm-up. When the thermostat is open, the coolant flows from the outlet connection of the head or manifold to the top tank of the radiator. Cooling is accomplished as the coolant flows down through the radiator tubes which are exposed to the cooler air temperatures created by the fan blast. From the bottom of the radiator the coolant flows through the bottom radiator hose, which is also attached to the oil cooler, and back through a hose to the inlet side of the water pump.

MAINTENANCE

Cleaning the Cooling System:

Normally, rust, sludge, and other foreign material can readily be removed from the cooling system by using a cooling system cleaning solvent. However, in severe cases, pressure flushing may be required. Various types of flushing equipment are available. A pulsating or reversed-flow flushing will loosen sediment more quickly and more efficiently than a steady flushing in the normal direction of coolant flow. If pressure flushing is to be used, always remove the thermostat and make sure the cylinder head bolts are tightened properly before flushing. After the cooling system has been cleaned and filled, a good commercial rust inhibitor should be added. However, the rust inhibitor is not necessary if the cooling system is to be conditioned with permanent antifreeze containing rust inhibitor. Remove the hoses from the oil cooler and flush the cooler.

Draining and Filling the Cooling System:

To drain the cooling system, open the drain cock on the right-hand side of the engine block, and the radiator outlet on the lower right-hand side of the radiator. Open the radiator pressure cap to speed draining. To fill the system, close the drain cocks, fill the system with coolant and add rust inhibitor or antifreeze, according to the season and locality. All permanent antifreeze sold by reputable manufacturers contains an anti-rust additive. Therefore, the addition of rust inhibitor, when permanent antifreeze is used, will not generally be necessary.

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3. FORK SHIFT CAM, COVER, AND INDEX ARM

A. Removal and Disassembly

1. Remove the battery cover, center platform, battery compartment side member, battery cables (negative cable first) and the hold-down rods and clamp, battery, and battery support. Refer to Figure 7.
2. Remove the transmission cover and detent ball as outlined in "PARKING BRAKE DETENT, ROD, AND LINKAGE ADJUSTMENT", page 3, Remove the drain plug and drain the oil from the transmission.

NOTE: Pressure lubricated transmissions have an oil reservoir common with the rear axle center housing. Remove the square head drain plug from the bottom of the rear axle center housing to drain the oil from both the rear axle center housing and the transmission case. Be prepared to drain approximately 17 U.S. Gallons.

3. Disconnect the linkage rod from the gearshift cam lever, Figure 8, by removing the cotter pin and the clevis pin securing the rod to the lever.
4. Remove the twelve cover-to-case bolts and remove the cover. Remove the bolt securing the gearshift

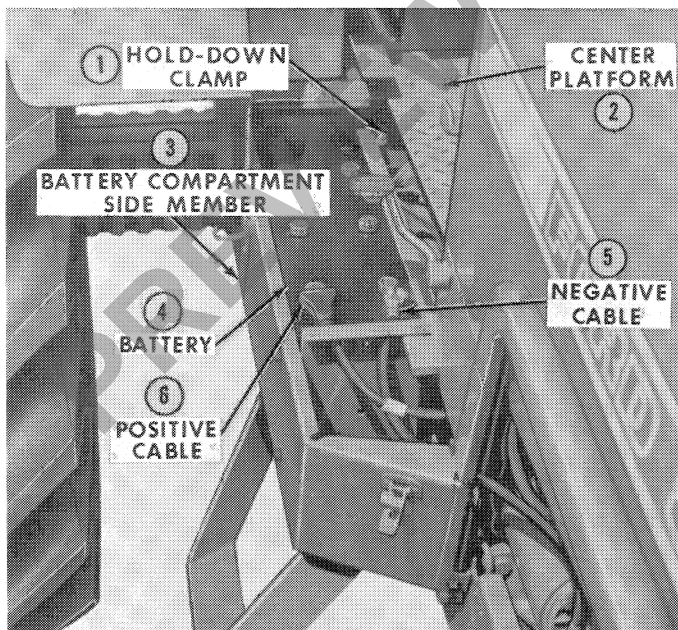


Figure 7
Access to Fork Shift Cam Cover

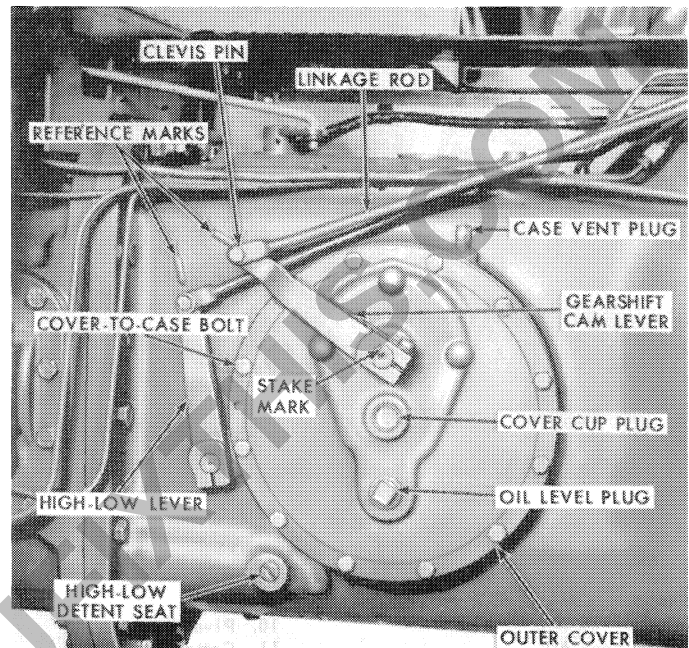


Figure 8
Right Side of Transmission – Splash Lubricated Shown

cam lever to the control shift input gear shaft and remove the lever. Remove the three inner-to-outer cover bolts and remove the inner cover, Figure 9. Take out the control shift input gear. Remove the fork shift cam washer and the gasket. Remove the shift control seal assembly from the outer cover.

5. Pull the fork shift cam out carefully. Remove the cam inner washer and the four bearings from the shift forks and the cam index arm, Figure 10.
6. Remove the spring from the fork shift cam index arm (2), Figure 4, and remove the nut (8) from the index arm pivot bolt (10). Remove the washer (6), the bushing, the arm (2), and the thrust washer and pivot bolt (10).
7. Remove the high-low detent seat, Figure 8, and remove the gasket from the seat. Remove the spring and detent ball. Use a magnet to remove the ball if necessary.
8. **Splash Lubricated Transmissions:** Remove the case vent plug, Figure 8.

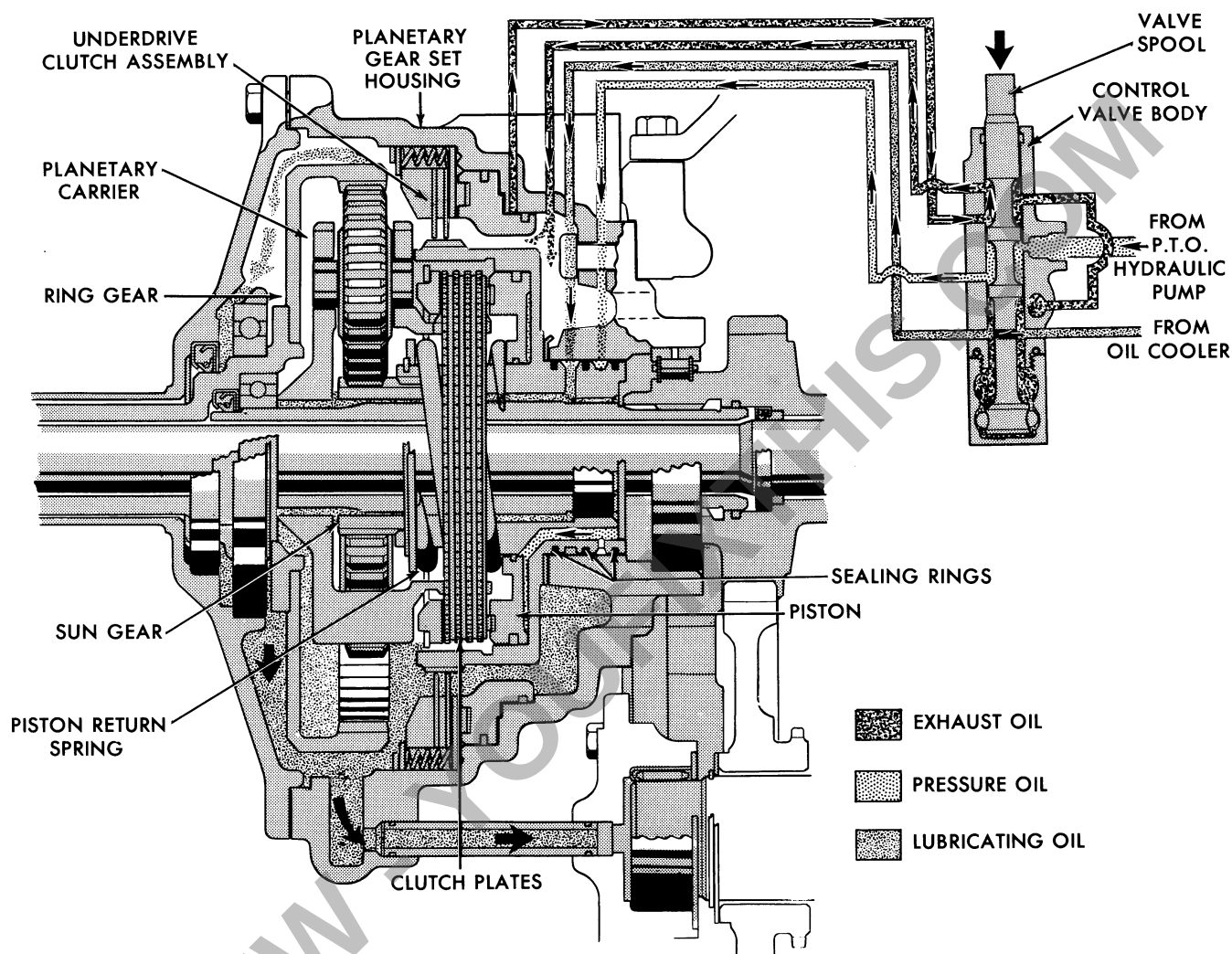


Figure 82
Oil Flow - Dual Power Direct Drive

Engaging the direct drive clutch locks the planetary carrier to the sun gear, which is splined to the clutch hub. When any two members of a planetary assembly are locked together a direct drive results with no change in speed or direction of rotation. Thus, power applied to the ring gear is taken off the planetary carrier producing a direct drive since the planetary carrier and the sun gear are locked together.

Figure 83 illustrates oil flow directed to the underdrive clutch. When the underdrive pedal is engaged, the control valve spool is moved to the up position and oil is directed through a drilled passage in the planetary housing directly to the underdrive clutch piston. The pressure moves the piston, compressing the piston return springs, and locks the steel and friction clutch plates together,

engaging the clutch. Oil released from the direct drive clutch moves to the control valve. It flows through a drilled passage in valve body and returns to sump through a drilled passage in the planetary housing.

Engaging the underdrive clutch locks the direct drive clutch housing to the planetary housing. Since the sun gear is splined to the inner hub of the direct drive clutch assembly, it is also locked to the planetary housing. Applying power to the ring gear and holding the sun gear forces the pinions of the planetary carrier to rotate on their own axis and walk around the sun gear taking the carrier with them. The carrier, being the output member of the system, turns in the same direction but at a slower speed than the ring gear producing an underdrive ratio.

REAR AXLE, BRAKES, AND POWER TAKE-OFF

Chapter 3

SERVICING THE POWER TAKE-OFF

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2. Control Valve and Linkage Overhaul	32
3. Power Take-Off Shafts and Gears Overhaul.....	34

1. POWER TAKE-OFF CLUTCH OVERHAUL

A. Removal

1. **Ford 8000:** Remove the hydraulic pump cover assembly as directed in Part 6, "HYDRAULIC SYSTEM", Chapter 2.

Ford 9000: Separate the tractor between the transmission and the rear axle center housing as directed in Part 8, "SEPARATING THE TRACTOR", Chapter 1.

2. Remove the four bolts that secure the upper shaft rear bearing retainer, then remove the retainer, gasket, P.T.O. drive gears and bearings, and the shaft, Figure 54.

NOTE: The Ford 9000 Tractor utilizes only one drive gear (and one driven gear). Refer to Figure 54.

3. Remove the P.T.O. clutch valve locating pin from the left side of the center housing, Figure 55.
4. Disconnect the P.T.O. hydraulic line from the fitting on the inner right sidewall of the center housing.

NOTE: Tractors equipped with the Dual Power transmission will have a Dual Power transmission regulating valve in place of the fitting described above. This valve maintains 150–175 psi pressure to the Dual Power transmission control valve. Remove the valve from the wall of the housing.

5. **Ford 8000:** Slide the P.T.O. clutch rearward off the input shaft and remove from the center housing through the hydraulic pump opening, Figure 56.

Ford 9000: Slide the P.T.O. clutch, Figure 55, off the input shaft and remove it from the center housing.

6. Remove the thrust washer from the input shaft.

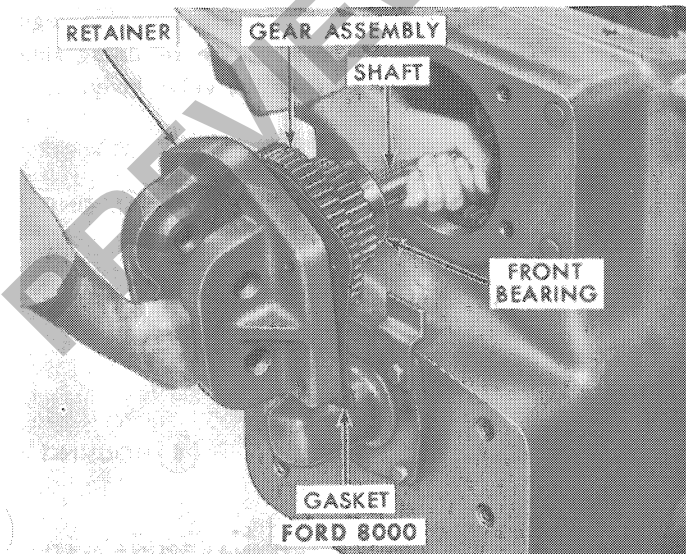
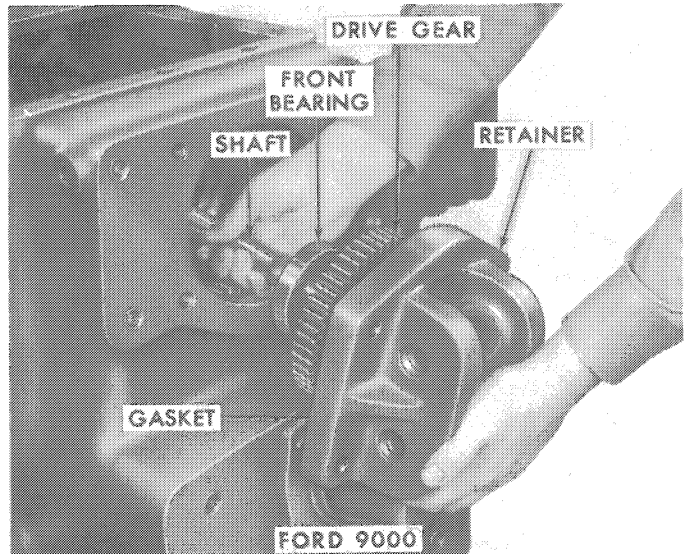


Figure 54
Removing P.T.O. Upper Shaft and Gears

along with a new O-ring. Adjust the screw to obtain the dimension that was recorded at disassembly, otherwise the remote control valve pressure must be checked as outlined on page 7.

5. Place the centering spring (10) and collars (9 and 12) on the spool. Retain the parts in place by installing the retaining ring (7).
6. Lubricate the spool with the specified hydraulic fluid, then carefully install the valve housing (13) over the spool.
7. Place new O-rings on the mating surfaces of the housing (13) and valve body (2), then carefully insert the spool (3) into the body (2).
8. Place the end cap (8) over the centering spring end of the spool. Retain the parts by installing the screws (11).
9. Attach the linkage bracket (1) to the valve body and spool.

10. Place new O-rings and a new backup ring on the detent plug (17). Make sure the backup ring is nearest the threaded portion of the plug.
11. Place the detent spring (16) and detent piston (15) in the plug (17). Place the ball (14) in the piston, then install the assembly in the valve housing (13).

E. Installation

1. With the valves stacked together and the manifold attaching bolts installed through the valves, position the valves on the hydraulic pump cover as shown in Figure 44. Make sure all O-rings are installed between the mating parts.
2. Tighten the attaching bolts to 20-25 lbs. feet.
3. Connect the linkage at points (1) and (2).
4. Attach the hoses to the remote valve fittings, then tighten the fitting jam nuts to 45-55 lbs. feet.
5. Install the access panel.

6. ADJUSTMENTS

INTERNAL ADJUSTMENTS

The following adjustments must be made during assembly of the component parts, as they are not accessible externally.

Connecting Rod Actuator Adjustment

The connecting rod actuator, Figure 46, is located inside the hydraulic lift cover. The assembly must be adjusted to a length of $13\ 25/32 \pm 1/64$ inch as measured between centers of the attaching holes. Before the adjustment can be made, the hydraulic lift cover must be removed and the actuator removed from the cover. Refer to Section 1. "HYDRAULIC LIFT COVER, A. Removal" and "B. Disassembly," pages 13 and 15.

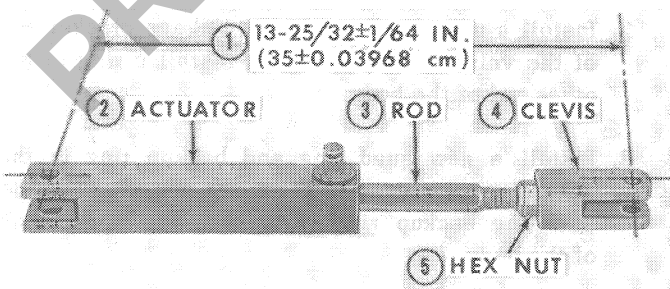


Figure 46
Connecting Rod Actuator Adjustment

To make the adjustment, loosen the hex nut and turn the clevis as required to obtain the dimension shown in Figure 46. Tighten the nut securely.

Lift Control Valve Adjustment

The lift control valve, Figure 47, is attached to the lift cylinder inside the hydraulic lift cover. Before the valve can be adjusted, the hydraulic lift cover must be removed and the lift cylinder and control valve removed from the cover. Refer to Section 2. "LIFT CYLINDER AND CONTROL VALVE ASSEMBLY," page 19.

Adjust the valve as follows:

1. Insert a 1/8 inch diameter drill, Figure 47, through the hole in the bushing, then while pushing the keeper to the left, rotate the valve until the drill will pass through the assembly as shown.
2. Adjust the keeper in the end of the valve to obtain 0.012-0.016 inch clearance between the keeper and poppet actuator. Measure the clearance with a feeler gauge as shown.
3. Remove the drill after making the adjustment.

TORQUES

Front Motor Assembly	Lbs. Ft.	(kgm)
Front Motor-to-Pedestal Bolts (4)	180–220	(24.8–30.4)
Piston-to-Rack Bolts (2)	14–20	(1.9–2.8)
Slipper Retaining Bolts (4)	20–26	(2.8–3.6)
Cover-to-Housing Bolts (4)	20–26	(2.8–3.6)
Cylinder-to-Housing Bolts (8)	30–40	(4.2–5.5)
 Front Axle		
Connecting Rod-to-Sleeve Bolts (2)	25–35	(3.5–4.9)
Jam Nuts (2)	100–125	(13.8–17.3)
Axle-to-Center Axle Bolts (4)	130–160	(18.0–22.1)
Front Support-to-Pedestal Bolts (4)	180–220	(24.8–30.4)
Rear Support-to-Pedestal Bolts (4)	180–220	(24.8–30.4)
Front Pedestal-to-Engine Bolts (4)	180–220	(24.8–30.4)
Front Pedestal-to-Oil Pan Bolts (2)	270–330	(37.3–45.5)
Engine Oil Pan-to-Transmission Bolts (2)	180–220	(24.8–30.4)
Spindle Arm-to-Spindle Bolts (2)	135–165	(18.7–22.8)
Tricycle Spindle-to-Steering Motor Bolts (4)	209–231	(28.8–31.9)
Wheel Retaining Nuts (12)	75–90	(10.4–12.4)
Rod and End Attaching Lock Nuts (4)	70–90	(9.7–12.4)
Center Arm-to-Motor Bolts (3)	180–220	(24.8–30.4)
 Steering Motor, Shaft, and Tilt Mechanism		
Steering Wheel Knob-to-Shaft Nut	11–15	(1.5–2.1)
Steering Wheel-to-Shaft Nut	60–80	(8.3–11.0)
Pivot Pin Lock Nuts (2)	180–220	(24.8–30.4)
Throttle Linkage Support Retaining Bolts (2)	20–27	(2.8–3.7)
Steering Motor Support Retaining Bolts (4)	48–64	(66.2–88.3)
Adjuster Assembly	10–15	(1.38–2.07)
Steering Motor Cover Retaining Bolts (2)		
Before Back-off	96–120 lbs. in.	(1.10–1.38 kgm)
After Back-off	10 lbs. in.	(.115 kgm) minimum
 Pump and Related Parts		
Pump Bolts (4)	13–17	(1.8–2.4)
Drive Gear Retaining Nut	55–60	(7.6–8.3)

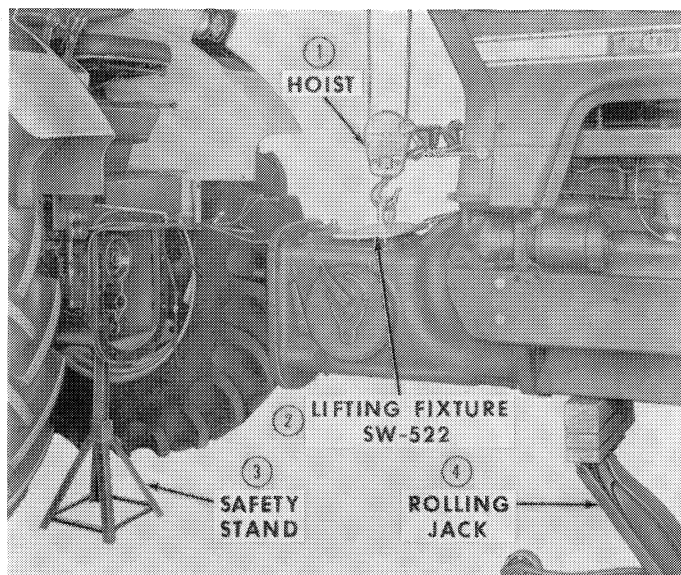


Figure 11
Rear Axle Assembly Separated from Transmission

brackets should angle out from the support down to the floor. Refer to page 18 for a sketch of the brackets. A rolling jack must then be placed under the front of the rear axle assembly rather than the safety stand, shown in Figure 11, so the rear axle can be moved away from the transmission.

16. Remove the transmission-to-rear axle center housing bolts.
17. Remove the P.T.O. clutch locating pin, Figure 7.
18. Pull the transmission, engine, and front axle assembly away from the rear axle assembly as shown in Figure 11, or if the tractor is a Row Crop with dual front wheels, move the rear axle assembly away from the front of the tractor.

CONNECTING THE REAR AXLE ASSEMBLY TO THE TRANSMISSION

1. To facilitate installation of the rear axle assembly, remove the hydraulic pump as outlined in Part 6, "HYDRAULIC SYSTEM".
2. Install a new gasket on the face of the rear axle center housing.
3. With the lifting fixture, Tool No. SW-522, and hoist attached to the transmission as shown in Figure 11, and a rolling jack under the engine oil pan; move the transmission, engine and front axle as-

sembly toward the rear axle assembly. If the tractor is a Row Crop with dual front wheels, move the rear axle assembly toward the front of the tractor.

4. Working through the hydraulic pump cover opening, Figure 8, start the coupling over the transmission output shaft. Also start the P.T.O. shaft into the P.T.O. clutch drive hub.
5. With the mating parts engaged, draw the transmission to the rear axle assembly by installing the transmission-to-rear axle center housing bolts. Tighten the bolts to the specified torque, page 17. Remove the jacks, hoist, lifting fixture, and wood wedges, or support brackets if the tractor is a Row Crop with dual front wheels.
6. Install the P.T.O. clutch locating pin, Figure 7. Torque the pin to 70-95 lbs. feet.
7. Install the hydraulic pump as outlined in Part 6, "HYDRAULIC SYSTEM".
8. Fill the rear axle assembly with the specified lubricant (ESN-M2C53-A or M-2C53-B).
9. Connect the parking brake linkage to the transmission by installing the roll pin, Figure 10.
10. Connect the four brake lines and install the shift linkage. Torque the brake line fittings to 90-120 lbs. inch.
11. Connect the fuel inlet tube at the rear of the engine and open the fuel shut-off valve.
12. Install the battery compartment, Figure 9.
13. Install the battery in the compartment, but do not connect the cables.
14. Install the tool box compartment and attach the wiring harness clips to the compartment.
15. Connect the wiring harness at the quick disconnect that is located between the tool box compartment and the transmission.
16. Connect the harness to the voltage regulator.
17. Connect the battery cables to the starting motor and battery (positive cable first).
18. Install the center panel of the operator's platform.

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