Ford Service Manual 550/555 Tractor Backhoe Loader

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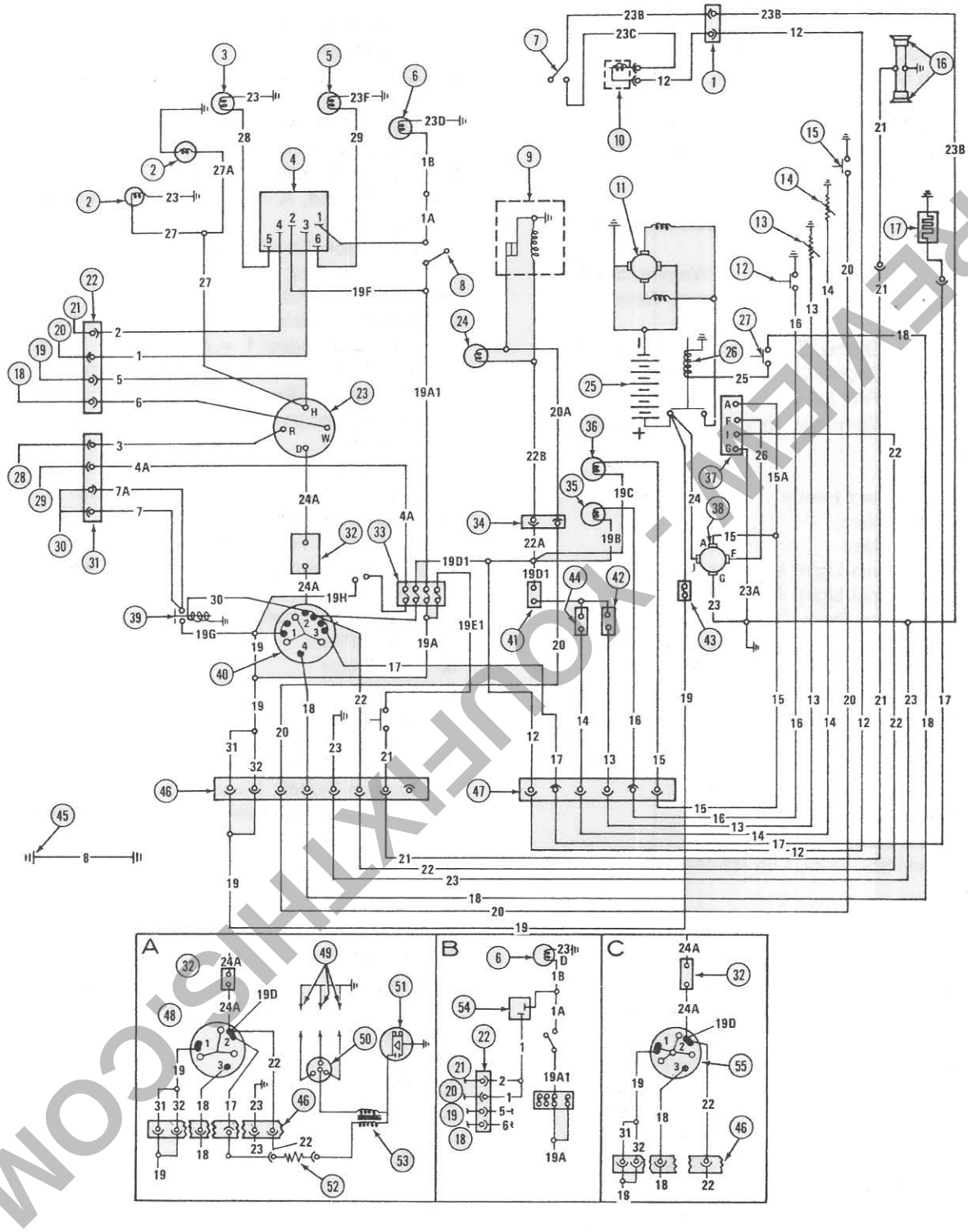


Figure 6
Wiring Schematic (Less Air Conditioner)

A. Gasoline Engine Only
B. Hazard Warning Flasher Only (Less Turn Signal)
C. Diesel Less Thermostart
D. 5-Position Switch with Thermostart

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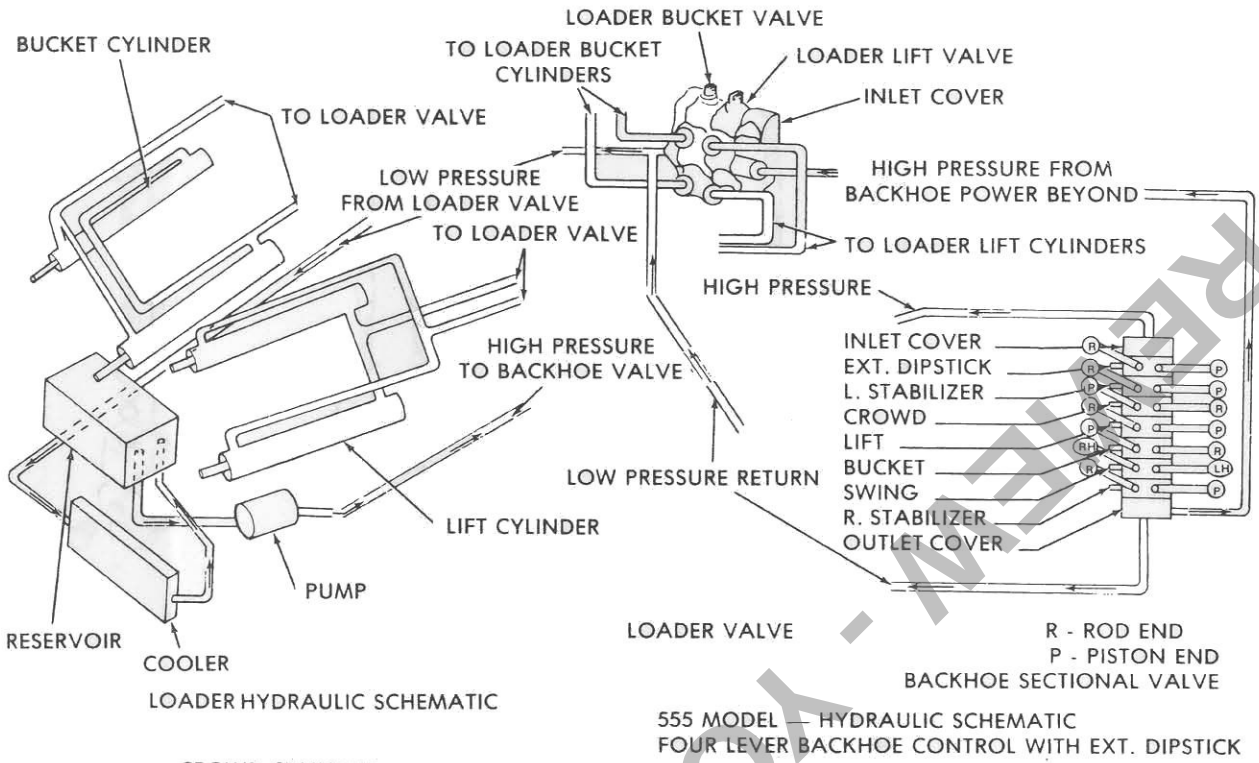


FIGURE 18

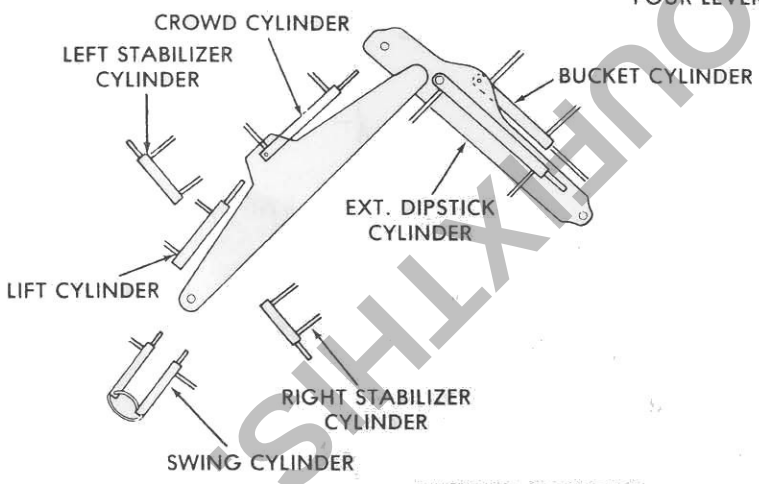


Figure 18
Model 555 Hydraulic Schematic
Four Lever Backhoe Control with
Extendible Dipstick

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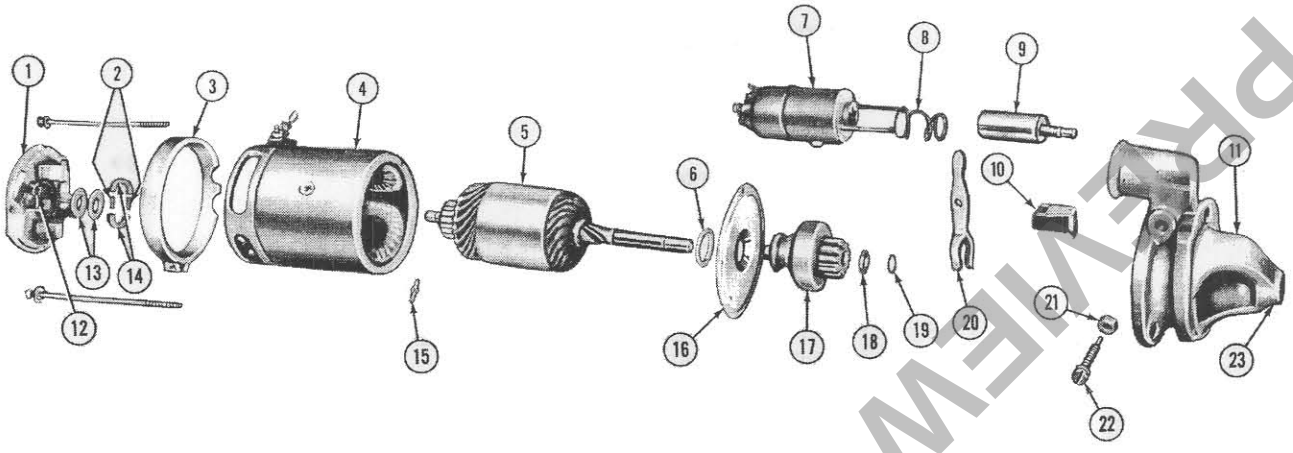


Figure 15
5.0 In. (127mm Starting Motor)

1. Brush End Plate
2. Springs
3. Brush Cover Band
4. Frame
5. Armature
6. Shim
7. Solenoid
8. Plunger Return Spring
9. Solenoid Plunger
10. Seal Grommet
11. Drive End Housing
12. Bushing
13. Thrust Washers
14. Shoes
15. Drift Pin
16. Intermediate Plate
17. Drive Assembly
18. Drive Pinion Stop Collar
19. Collar Retainer
20. Drive Lever
21. Lock Nut
22. Lever Pin
23. Bushing

As the starting motor pinion attempts to slide into mesh with the flywheel ring gear, its path may be blocked by the position of the flywheel gear teeth. If this occurs the solenoid plunger continues to move and compresses the drive engagement spring inside the plunger. This plunger movement allows only the first part of the contacts to close and connects only one of the field coils to the battery, Figure 16. The starter armature and drive pinion then turn at low speed and the combined pressure of the drive engagement spring and the push screw assistance from the drive helix moves the pinion into mesh with the flywheel ring gear. When the pinion is fully engaged and the solenoid second part contacts close and the remaining three field coils are connected to the battery, Figure 17.

Incorporated in the drive pinion assembly is a roller clutch device. This device prevents the armature from rotating excessively if the pinion remains in mesh with the flywheel ring gear after the engine has started.

When the pinion is retracted the rotating armature is quickly stopped by a pair of moulded shoes located in the brush end plate.

NOTE: *Diesel engine starter production change.*

A new 5.0 inch (127 mm) starting motor assembly was introduced in production at Unit Code 8D15B. This starting motor incorporates a new solenoid assembly and improved sealing against moisture entry.

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WATER PUMP

Type ..... Centrifugal
Drive ..... V-Belt
Deflection ..... 0.5-0.75 in. (12-19 mm) Midway between pulleys

COOLING SYSTEM CAPACITIES

With Heater ..... 12 U.S. qts. 10 Imp. qts. 11.4 Liters
Less Heater ..... 11 U.S. qts. 9.2 Imp. qts. 10.4 Liters

ANTIFREEZE

Use antifreeze to Ford specification ESEM 97B-18C. Recommended 50/50 mix for all climates, year round use. Maximum winter protection (50/50 mix) — 33° F (-36°C).

TORQUE VALUES	lb. ft.	(Nm)	(Mkg)
Main Bearing Bolts	115-125	(156-159)	(16-17)
Connecting Rod Nuts	60-65	(82-88)	(8-9)
Cylinder Head Bolts (with Engine Cold)	105-115	(143-156)	(14.5-16)
Intake Manifold-to-Cylinder Head	23-28	(31-37)	(3-3.8)
Exhaust Manifold-to-Cylinder Head	25-30	(34-40)	(3.5-4)
Exhaust Pipe-to-Flange	20-26	(27-35)	(2.8-3.5)
Flywheel-to-Crankshaft	155-165	(210-223)	(21-23)
Oil Pan Drain Plug	25-35	(34-47)	(3.5-4.8)
Valve Rocker Cover Bolts	10-15	(14-20)	(1.42-2)
Crankshaft Pulley-to-Crankshaft	150-180	(203-244)	(21-25)
Valve Rocker Arm—Self-Locking Screw	9-26	(12-35)	(1.2-3.5)
Injector Attaching Bolts	15-18	(20-24)	(2-2.5)
Oil Pump to Block	33-38	(45-51)	(4.6-5.5)
Water Pump-to-Cylinder Block	23-28	(31-37)	(3.2-3.9)
Water Pump Cover-to-Pump	18-22	(24-29)	(2.5-3)
Injector Line Nuts	18-22	(24-29)	(2.5-3)
Injector Pump-to-Front Adaptor Plate	15-20	(20-27)	(2-2.7)
Camshaft Drive Gear-to-Block	100-105	(136-142)	(13.8-14.5)
Front Adaptor Plate-to-Cylinder Block	12-15	(16-20)	(1.7-2)
Front Cover-to-Front Adaptor Plate	13-18	(18-24)	(1.8-2.5)
Camshaft Gear Bolts	40-45	(54-61)	(5.5-6.2)
Oil Filter Retaining Bolt	45-50	(61-67)	(6.2-7)
Oil Filter Mounting Bolt Insert	20-30	(27-40)	(2.8-4)
Starting Motor-to-Rear Adaptor Plate	20-25	(27-34)	(2.8-3.5)
Governor Drive Gear Nut	85-95	(115-128)	(11.8-13)
Oil Pump Gear Stop	65-75	(88-101)	(9-10.3)
Oil Pressure Switch Assembly	20-25	(27-34)	(2.8-3.4)
Fan to Pulley Bolts	14-18	(19-24)	(1.9-2.5)
Drive Plate to Converter	28-32	(38-43)	(3.9-4.4)
Drive Plate to Flywheel	28-32	(38-43)	(3.9-4.4)

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PART 1
ENGINE SYSTEMS

Chapter 3
TROUBLE SHOOTING, SPECIFICATIONS AND SPECIAL TOOLS

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A. TROUBLE SHOOTING

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

PROBLEM	POSSIBLE CAUSE	REMEDY
Engine does not develop full power — Gasoline engine.	1. Clogged air cleaner.	1. Clean or replace element.
	2. Improper governor linkage adjustment.	2. Check and reset.
	3. Carburetor and choke out of adjustment.	3. Check and reset.
	4. Low coil voltage.	4. Check and replace coil if necessary.
	5. Improper breaker point dwell or gap.	5. Check and reset.
	6. Faulty ignition timing.	6. Check and reset.
	7. Improper valve lash adjustment.	7. Check and reset.

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B. SPECIFICATIONS

GENERAL SPECIFICATIONS	DIESEL	GASOLINE
No. of Cylinders	3	3
Displacement:		
in³	201	201
cm³	3294	3294
Bore:		
in	4.4	4.4
mm	111.8	111.8
Stroke:		
in	4.4	4.4
mm	111.8	111.8
Compression Ratio:	16.3:1	7.75:1
Firing Order	1-2-3	1-2-3
Maximum Torque (lb ft)		158@ 1200 rev/min
(Nm)		214
(Mkg)		21.9
Rated Engine Speed (rev/min)	2200	2200
Idle Speed (rev/min)	600-700	600-700
Maximum No Load Speed (rev/min)	2425-2475	2400-2500

COMPRESSION PRESSURE (AT 200 RPM) CRANKING SPEED

Gasoline:	With all the spark plugs removed Choke closed and throttle wide open	160 ± 50 psi
	Cylinder-to-Cylinder Variation	± 25 psi
Diesel:	With the throttle closed and stop control out:	340 ± 50 psi
	Cylinder-to-Cylinder Variation	± 50 psi

CYLINDER BLOCK

Taper of Cylinder Bore	0.001 in. (.254 mm) Repair Limit 0.005 in. (.127 mm) Wear Limit
Cylinder Bore Out-of-round	0.0015 in. (.0381 mm) Repair Limit 0.005 in. (.127 mm) Wear Limit
Cylinder Bore Diameters	4.4007-4.4032 in. (111.778-111.841 mm)
Rear Oil Seal Bore Diameter	5.542-5.546 in. (140.77-140.87 mm)
Block to Head Surface Flatness	0.003 in. (0.08 mm) in. any 6 in. (152 mm) or 0.006 om (0.15 mm) overall limit

RETAINING COMPOUND

Cylinder Sleeve to Cylinder Block	Ford Part No. ESW M2G 160A

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The timing gears are lubricated by oil from the cam follower chamber and the pressure lubricated camshaft drive gear bushing.

Cylinder walls, pistons and piston pins are splash lubricated by 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 cam followers before draining back into the sump through cored openings in the block.

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 vertical muffler.
2. Drain the radiator and cylinder block.
3. Shut off the heater hose taps then disconnect and plug the heater hoses.
4. Remove the radiator top hose.
5. Shut off the main fuel tank tap.
   - Remove the hood panel assembly.
   - Disconnect the air inlet hose at the clamp at the intake manifold.
   - Remove the vertical type exhaust pipe and bracket (where fitted).
6. Bend the lock tabs back and remove the attaching bolts, exhaust manifold and gasket.
7. Disconnect the cold start equipment (where fitted).
8. 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.
9. Disconnect the fuel lines and remove the fuel filter(s) from the inlet manifold.

   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.*
10. Remove the retaining bolts and lockwashers and remove the intake manifold and gasket.
11. Remove the rocker cover bolts, rocker arm cover and gasket from the cylinder head.
12. Disconnect the fuel injector leak-off pipes. Clean the area surrounding the fuel injectors then remove the stud nuts and carefully withdraw the fuel injectors and washers, Figure 4.

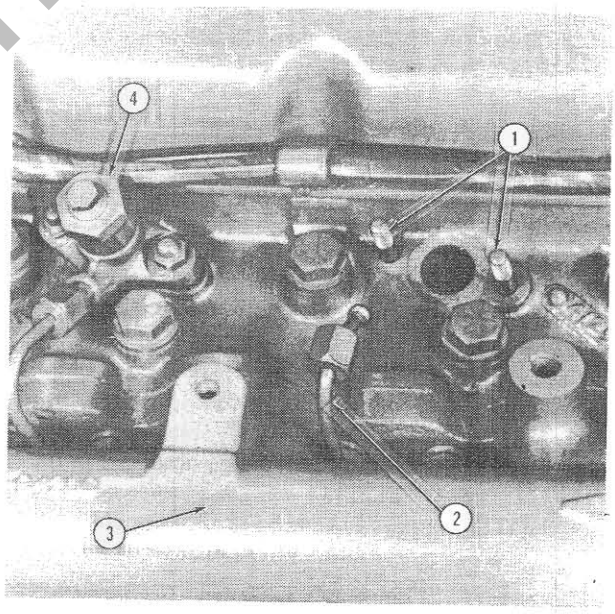


Figure 4
Fuel Injector Removed
1. Fuel Injector Mounting Studs
2. Fuel Injection Tube
3. Intake Manifold
4. Fuel Injector Assembly

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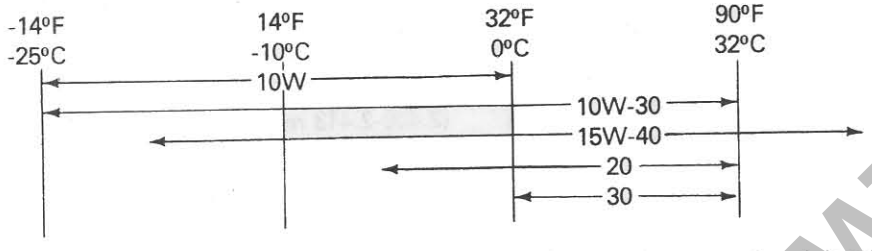
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ENGINE OIL SPECIFICATIONS & USAGE RECOMMENDATION

All diesel engines:
Ford 300 Engine Oil (meets ESN-M2C121-B) or API CD AND MIL-L-2104-C quality.

All gasoline engines:
Ford Premium or Super Premium Motor Oil (D3AZ-19579-A/G/J/K/M) or API SE/SF quality.

The selection of an appropriate viscosity grade for the ambient temperature is made from the following chart:



Note: In areas where prolonged periods of extreme temperatures are encountered, local lubricant practices are acceptable — such as use of SAE 5W or SAE 50 grades.

Note: Oil change intervals should be adjusted according to sulfur-content of diesel fuel.

Sulfur Content, %	Oil Change Interval
Below 0.5	Normal
0.5-1.0	1/2 Normal
Above 1.0	1/4 Normal

The use of fuel with a sulfur content above 1.3% is not recommended.

Engine Oil & Filter Change:
300 hours under normal operating conditions.
200 hours under continuous full load conditions.

ENGINE OIL CAPACITIES

Less Oil Filter	6.0 U.S. qts. 4.9 imp. qts. 5.7 Liters
With Oil Filter	7.0 U.S. qts. 5.8 imp. qts. 6.6 Liters

RADIATOR

Flow Capacity (7 fin per inch)	29 g.p.m.

FAN

6 Blade — Diesel
7 Blade — Gasoline

Tip to Shroud Clearance	1/16 — 1/4 inch.

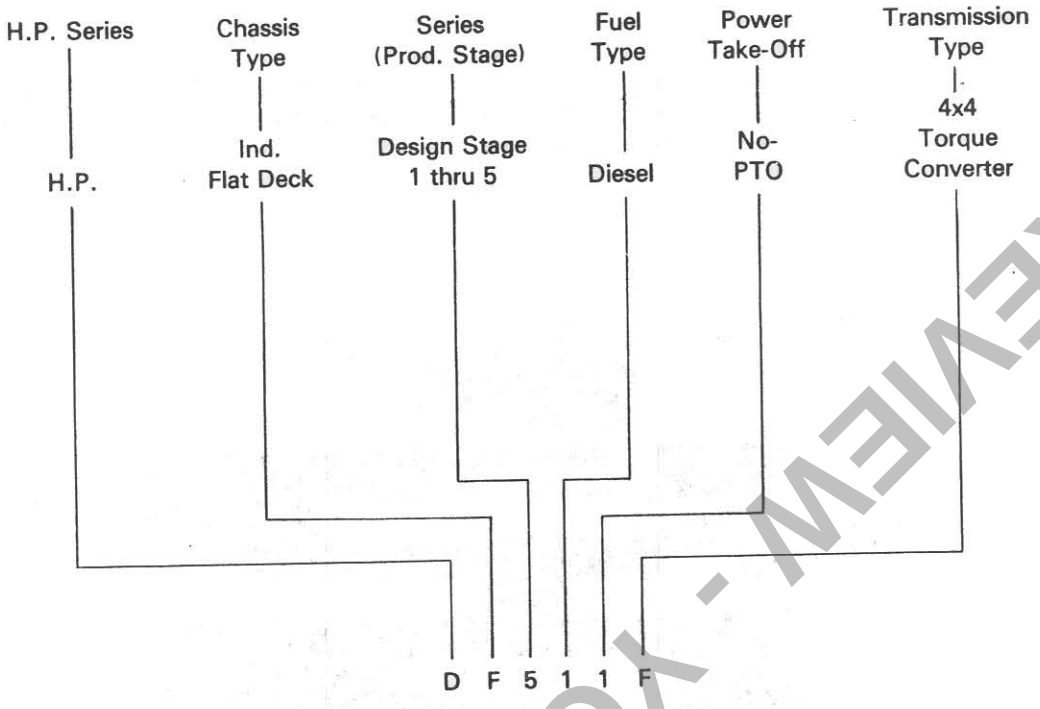
THERMOSTAT

Opening Temperature	188° F (87° C)

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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 6—1976 7—1977 8—1978 9—1979 0—1980 1—1981	A—Jan. H—Aug. B—Feb. J—Sept. C—March K—Oct. D—April L—Nov. E—May M—Dec. F—June G—July	01-32	A—Midnight B—Day C—Afternoon

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)

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PART 1
ENGINE SYSTEMS

Chapter 2
COOLING SYSTEM

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A. COOLING SYSTEM — DESCRIPTION AND OPERATION

The cooling system is of the re-circulating by-pass type with full length water jackets for each cylinder. The coolant is drawn from the bottom tank of the radiator by the water pump which passes the coolant to the cylinder block. The coolant flows through cored passages to cool the cylinder walls. At the rear of the cylinder block the coolant passes upwards and into the cylinder head. Cored passages conduct the coolant to the spark plug or fuel injector nozzle locations before reaching the thermostat.

For all diesel engines, the thermostat is located in the front of the cylinder head. For all gasoline engines the thermostat is located in the front of the temperature controlled intake manifold which receives coolant from the cylinder head to facilitate both engine warm-up and cooling of the manifold intake ports.

On diesel engines, if the thermostat is closed, a re-circulating by-pass is provided to allow a percentage of the coolant to recirculate from the head to the block to effect a faster warm-up.

On gasoline engines, if the thermostat is closed, a re-circulating by-pass is provided to allow a percentage of the coolant to re-circulate from the water-heated intake manifold to the cylinder head and block to also effect a faster warm-up. In both cases, 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 occurs as the coolant passes down through the radiator cores which are exposed to air sucked through the radiator by the fan.

The purpose of the thermostat is to maintain sufficiently high operating temperature to provide maximum combustion and engine efficiency.

A faulty thermostat may cause the engine to operate at too hot or too cold an operating temperature resulting in improper engine performance.

NOTE: *Do not operate an engine without a thermostat. Do not use pure water only in the cooling systems. A mixture of 50% glycol based anti-freeze should be used year around.*

The cooling system incorporates a drain cock on the right-hand side of the cylinder block and at the lower left-hand side of the radiator.

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IMPORTANT: *Air inlet hose connections must be tight to prevent dirt from entering the engine.*

4. Connect the throttle rod to the throttle lever on the carburetor.

   IMPORTANT: *Operate the throttle to be sure the lever adjustment will permit the throttle to fully open and close.*

5. Turn the fuel tank shut-off valve to the "ON" position.

6. Loosen the fuel filter and sediment bowl retainer screw to allow fuel to fill the bowl. Tighten the retainer screw.

D. FUEL TANK, FUEL PUMP FILTER AND LINES

FUEL TANK

For removal and installation of the fuel tank, see "Fuel Tank Removal" Part 10 — Chapter 1.

FUEL PUMP — FILTER AND LINES

REMOVAL

1. Turn the fuel tank shut-off valve to the "OFF" position and remove the line connecting the tank to the fuel pump by disconnecting it at both ends, see Figure 34.

2. Disconnect the line connecting the fuel pump to the fuel filter and sediment bowl. Then disconnect the fuel line from the carburetor fuel inlet fitting and remove the line and the sediment bowl, Figure 34.

3. Clean the bowl and filter and reinstall the bowl with a new gasket.

4. Remove the two cap screws that retain the fuel pump to the engine front cover and remove the fuel pump.

5. Remove the pin in the engine front cover that drives the fuel pump. It may be necessary to use a magnet or needle nose pliers to remove the pin.

6. Inspect the drive pin for wear and install a new pin if it appears to be worn or damaged at the ends.

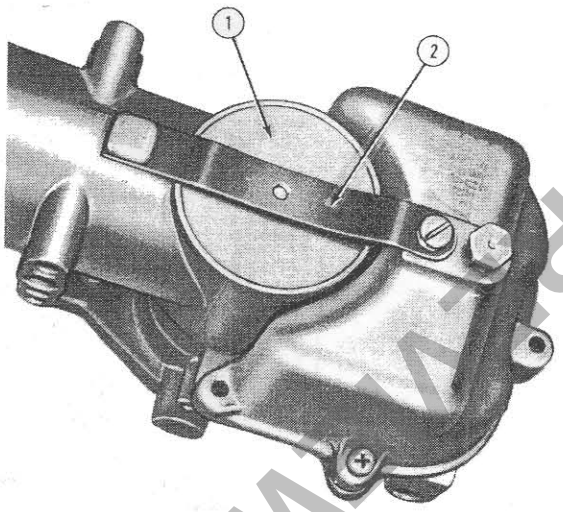


Figure 33
Air Horn Plug Installation

1. Air Horn Plug
2. Retainer Spring

7. Remove the pump top cover by removing the hex head screw at the top of the pump and remove the screen. Clean the pump and screen in solvent and dry with compressed air. Install the screen and cover.

INSTALLATION

1. Install the drive pin in the front cover.

2. Position the pump on the mounting flange on the front cover and secure it with the two cap screws and lock washers.

3. Connect the fuel inlet and outlet lines to the fittings on the pump.

4. Connect the inlet and outlet fuel lines to the fuel filter and sediment bowl and tighten securely.

   NOTE: *Tighten all fittings carefully, as overtightening may strip the threads.*

5. Turn the fuel shut-off valve to the "ON" position.

6. Loosen the fuel filter and sediment bowl retainer screw and allow the bowl to fill with fuel. Tighten the retainer screw.

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PRELIMINARY CHECKS

Prior to electrical testing, thoroughly inspect the starting system. Check all leads and connections for continuity and tightness.

1. Check the Battery — with an hydrometer, check the battery is at least 70% charged and in good condition.

2. Check the Engine is not Seized — be sure the engine is free to rotate.

INITIAL TESTS

The initial tests may be performed without removing any of the starting circuit components from the tractor and enable the following items to be checked:

- Starting Motor Circuit Current Draw
- Starting System Circuit Resistance (Voltage Drop)
- Battery Cables
- Starting Motor Relay and Cable (where fitted)

Test Equipment required:

- Voltmeter (0-20 Volts)
- Ammeter (0-500 Amperes)

STARTING MOTOR CIRCUIT CURRENT DRAW TEST

DIESEL ENGINE

With reference to Figure 20.

1. Disconnect the battery negative cable at the battery.

2. Disconnect the battery positive cable from the starter solenoid. Connect the ammeter positive lead to the battery positive terminal and the ammeter negative lead to the solenoid input terminal.

3. Reconnect the battery ground (negative) cable to the battery negative terminal.

4. Connect the voltmeter positive lead to the battery positive terminal and the voltmeter negative lead to the battery negative terminal.

5. Pull out the engine "Stop" control.

6. Crank the engine while observing the voltmeter and ammeter readings. See Chapter 6, Specifications.

   - If the current draw is within specifications, the starting motor is functioning properly. Proceed to 'Starting System Circuit Resistance'.

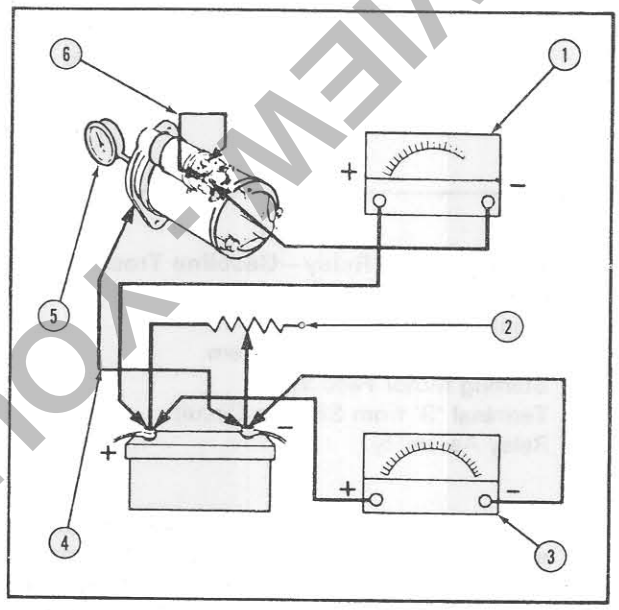


Figure 20
Starting Motor No-Load Test

1. Ammeter
2. Variable Load Resistor
3. Voltmeter
4. Jumper Cable
5. Hand Tachometer
6. Jumper Lead

GASOLINE ENGINE

With reference to Figure 21.

1. Disconnect the battery positive cable from the starting motor relay. Connect the ammeter positive lead to the battery positive terminal and ammeter negative lead to the starting motor relay input terminal.

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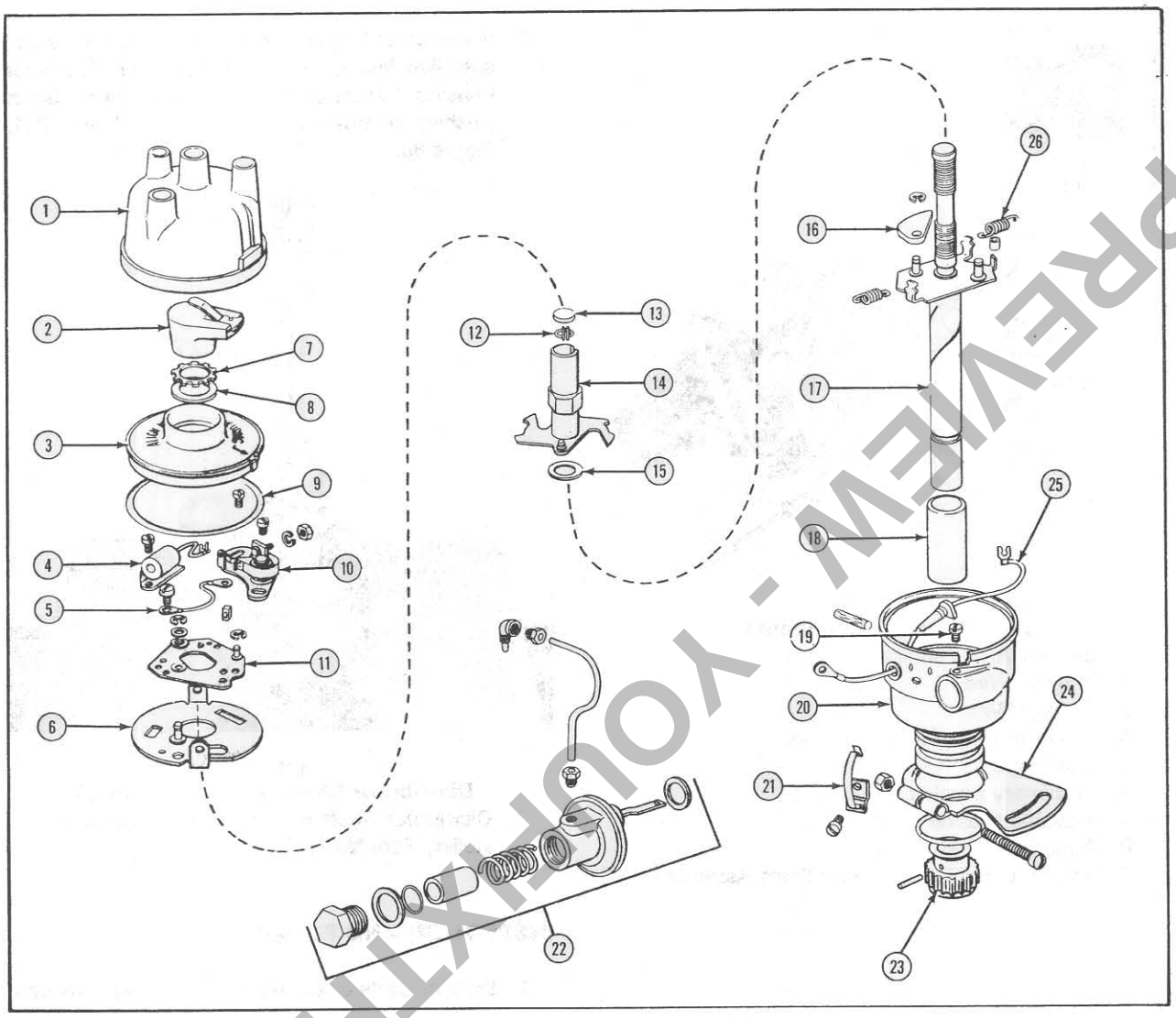


Figure 83
Distributor—Disassembled

1. Cap
2. Rotor
3. Dust Cover
4. Condenser
5. Ground Wire
6. Lower Breaker Plate
7. Seal Retainer
8. Seal
9. "O" Ring
10. Breaker Point Assembly
11. Upper Breaker Plate
12. Cam Retainer
13. Wick
14. Cam Assembly
15. Thrust Washer
16. Weight
17. Distributor Shaft
18. Bushing
19. Screw and Lock Washer
20. Base
21. Bracket and Clamp
22. Vacuum Advance Assembly
23. Driven Gear
24. Timing Clamp
25. Primary Wire
26. Weight Spring

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F. COMPLETE OVERHAUL

REMOVAL

1. Drain the oil from the transmission by removing the drain plug.

2. Separate the engine and front axle assembly and the rear axle center housing from the transmission as described in Part 10, "SEPARATING THE UNIT".

3. Remove the gearshift cover and levers as described in Section C.

4. Remove the clutch release hub and bearing, and the clutch release bearing hub support as described in Section C.

5. Remove the front support plate as described in Section D.

6. Remove the rear support plate as described in Section E.

7. Secondary Countershaft and Output Shaft: Partially withdraw the secondary countershaft, Figure 13, from the transmission until the output shaft can be removed. Remove the output shaft, then the secondary countershaft.

8. Remove the high/low sliding coupling, Figure 14, from the rear of the main shaft.

9. Front Mainshaft Bearing Retainer Plate and Front Mainshaft: Remove the front mainshaft bearing retainer plate and front mainshaft as described in Section D.

10. Gearshift Mechanism: Remove the detent plungers and springs, Figure 17.

11. Using a magnet, remove the detent balls, Figure 17. If a magnet is not available, the balls can be removed after the gearshift rails are removed.

12. Loosen the lock nut and remove the retaining screw from the high/low shift fork, Figure 14. Slide the rail forward enough to remove the fork from the rail. If necessary, loosen the gate nearest the starter safety switch, Figure 18, to allow the rail to move forward.

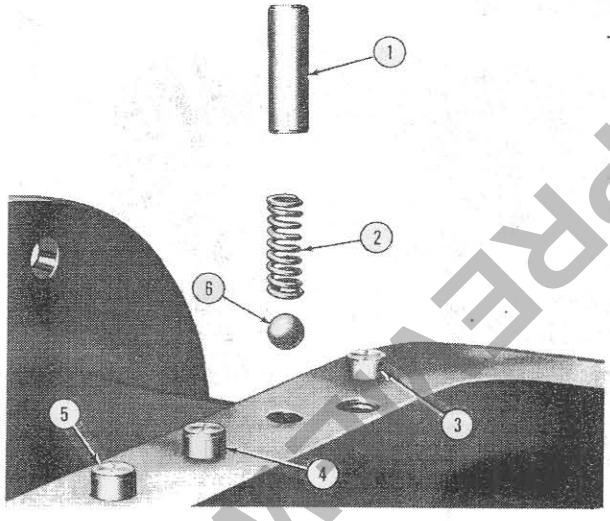


Figure 17
Detent Plungers, Springs and Balls

1. 1st, 4th and Reverse 1st and 3rd Gear Rail Plunger
2. Spring
3. 3rd and 6th Gear Rail Plunger
4. 2nd, 5th and Reverse 2nd and 4th Gear Rail Plunger
5. High-Low Rail Plunger
6. Detent Ball

13. Loosen the lock nut and remove the retaining screw from the connector, Figure 18. Remove the connector and pull the rail from the transmission.

14. Loosen the lock nuts and remove the retaining screws from the remaining shift forks and gate, Figure 18. Remove the forks and gate while pulling the rails from the transmission. After removing the 3rd-6th gear rail remove the arm assembly.

15. Remove the detent balls, Figure 17, if not previously removed.

16. Remove the interlock bore plug, Figure 19, from the left-hand side of the transmission case and remove the interlock plungers from the bore.

17. Mainshaft: Remove the snap ring and thrust washer, Figure 20, from the front of the mainshaft.

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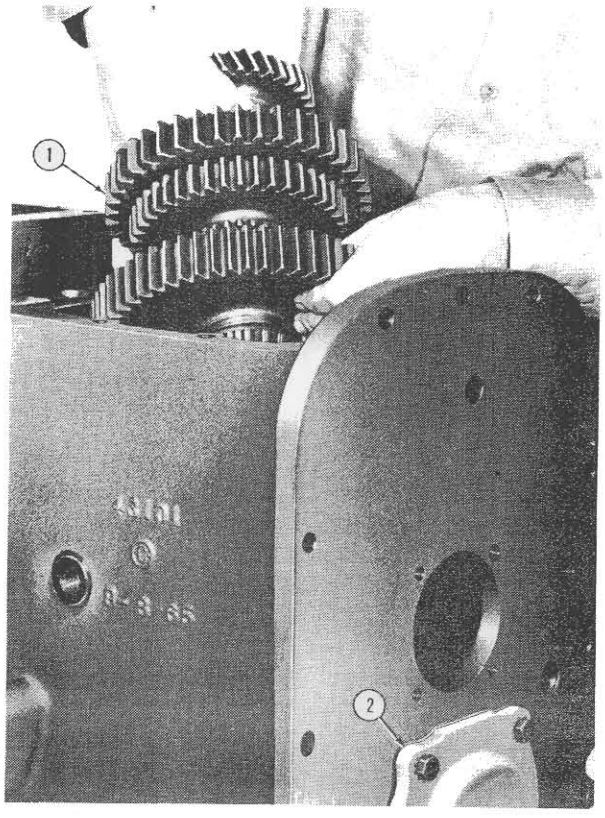


Figure 42
Output Shaft Removal and Installation
1. Output Shaft and Gear Assembly
2. Countershaft Bearing Cap

3. Move the assembly forward so the front bearing is positioned in the bearing cup. Hold the assembly in place, then install the countershaft bearing cap and shims, Figure 40. Secure the cap and shims in place with the four attaching bolts and star washers. Tighten the bolts to the specified torque, Chapter 2.

   NOTE: *Make sure the flat side of the bearing cap and shims is toward the top.*

COUNTERSHAFT PRE-LOAD

Pre-load on the countershaft is governed by means of shims located between the mating surfaces of the countershaft bearing cap and transmission case. The load must be checked with all components removed from the transmission except the countershaft. The pre-load must be checked if any of the following parts are replaced with new parts.

- Countershaft Front Bearing
- Countershaft Gears
- Countershaft Rear Bearing
- Countershaft
- Countershaft Bearing Cap
- Transmission Case

Determine the shims required to give the specified pre-load, Chapter 2, as follows:

1. Make sure the countershaft bearing cap attaching bolts are tightened to the specified torque, Chapter 2, and that the sliding coupling on the shaft is in the neutral position.

2. Using a cord and pull scale, as shown in Figure 43, determine the pull required to turn the countershaft. If the pull is below specification, Chapter 2, remove shims as required and repeat the procedure. If the pull is higher than specified add shims as required and repeat the procedure.

   NOTE: *Make sure the cord is wrapped around the countershaft in the area just ahead of the rear bearing in a manner similar to that shown for output shaft pre-load, Figure 44. Note that the cord does not overlap.*

OUTPUT SHAFT AND GEAR ASSEMBLY

1. Install the 2nd-4th gear shift fork, Figure 39, so it straddles the sliding coupling on the countershaft.

2. Assemble the output shaft and gear assembly as described in Section G.

3. Install the assembled output shaft and gear assembly as shown in Figure 42, so the helical gear on the front of the shaft meshes with the small helical gear on the the countershaft.

REMAINING ASSEMBLIES

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

2. Install the rear input shaft, idler gear retainer, and countershaft reverse gear as described in Section D.

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

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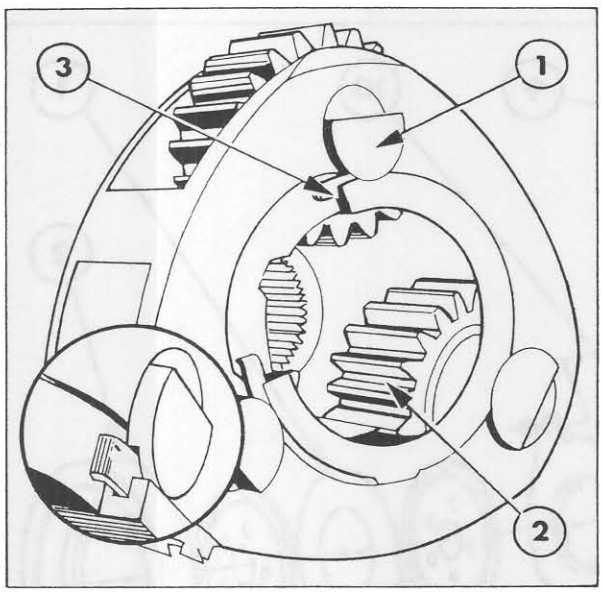


Figure 18
Plate Gear Carrier Assembly

1. Planet Gear Shaft
2. Planet Gear
3. Planet Gear Shaft Retainer

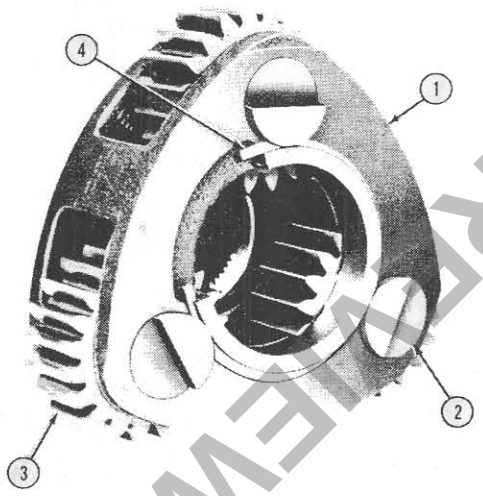


Figure 19
Planet Gear Carrier Ring Replacement

1. Carrier Assembly
2. Gear Shaft
3. Planet Gear
4. Retaining Ring

INSPECTION AND REPAIR

1. Inspect the steel fixed plates for wear and warp. The inspection should include the inner and outer brake housings. Replace parts which are scored or warped.

2. Inspect the rotating discs for wear and warp. Replace the discs if the friction material has worn to the bottom of any grooves, or if the plates are warped more than maximum specified — see Specifications, Chapter 3.

3. Replace the actuating rod seal.

ASSEMBLY

1. Place one actuating disc with the pockets uppermost on a flat surface and position a steel ball in each pocket.

2. Position the other actuating disc over the first with the pockets locating on the steel balls. The actuating lugs should be approximately 1 in. (25.4 mm) apart.

3. Install the four actuating disc return springs on the lugs on the inner edge of the actuating discs.

4. Install the actuating links and secure using the clevis pins, cotter pins and nuts, Figure 22.

INSTALLATION

1. Install the brake actuating assembly and disc assemblies as described in Section B.

2. Install the axle housing to the rear axle center housing, and install the rear axle assembly as described in Part 10.

3. Reconnect the brake actuating linkage and adjust the brake linkage as follows:

   Refer to Figure 13 and 34.

   — Depress the right pedal 1.5 inch (38.1 mm).

   — Loosen the right brake pedal pull rod lock nut and adjust the pull rod to remove all linkage slack. Tighten the lock nut.

   — Repeat the preceding two steps for the left brake.

   — Recheck pedal free travel to be sure it is 1.5 inch (38.1 mm).

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PART 8
STEERING AND FRONT AXLE

Chapter 2
FRONT AXLE

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B.	TOE-IN ADJUSTMENT	25
C.	COMPONENT OVERHAUL	27

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A. FRONT AXLE — DESCRIPTION AND OPERATION

The Front axle, Figure 39 is tapered from the center to the ends and is slightly swept back. It is centrally mounted by two tapered pins through one long pin bore. The pins are inserted from the front.

The dual pin through one long bore gives strength and lateral rigidity to the axle and limits the axle end movement to a radial pivot around the pin axis.

Castings, machined to receive the wheel spindle pins, are welded to the ends of the axle. The wheel spindle assemblies are located on the spindle pins by means of bushings at the upper and lower ends.

A thrust bearing is located at the lower end of each spindle pin to support vertical thrust. The spindle pins and wheel spindle assemblies are held in place by a tapered locking pin through the axle castings and the spindle pins.

The steering arms are bolted to the outer surfaces of the wheel spindle assemblies. The steering arms are connected by means of a connecting rod. Steering cylinder rods are pivoted on the steering arms and the rear of the axle.

The front wheel track is 68 inches (1.727 m) and is not adjustable.

B. TOE-IN ADJUSTMENT

The toe-in of the front wheels is set at the factory. Normally, the front wheels maintain their toe-in adjustment; however, an occasional check of the toe-in should be made after any front axle component overhaul.

Check for correct toe-in as follows:

1. Place the front wheels in the straight-ahead position. Determine the straight-ahead position by turning the steering wheel from lock-to-lock and then halfway back, or drive the tractor forward several feet and backward several feet in a straight line.
2. Measure and record the distance from the inside front rim of one wheel (not the tire) at hub height, to the inside front rim of the other wheel at hub height.
3. Measure and record the distance between the rear of the wheel rims at hub height.

The measurement taken at the rear of the wheels should be between 0.0 in. and 0.5 in. (0.0-12.7 mm) greater than the measurement taken at the front.

If the toe-in is not correct, make the adjustments outlined as follows:

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Bucket idler links are attached to the rod end of the bucket cylinder to allow maximum rollback and dump angles while protecting the cylinder rods from bending forces.

BACKHOE BOOM AND DIPSTICK

Both the boom and dipstick, Figure 7 are constructed of high-strength steel, welded to form box-type members. Heavy steel reinforcements are welded to each end of the boom and dipstick for added strength and to provide resistance to torsional forces. The steel used on the underside of the boom is 25% heavier than the sides and top for greater shock absorption.

The boom houses the tubing for the crowd and bucket cylinders, and serves as attaching points for the rod end of the lift cylinder and the piston end of the crowd cylinder. Replaceable bushings are used at each end of the boom for the swing post and dipstick pivot points.

Model 555:

The Model 555 also incorporates replaceable seals at the swing and dipstick pivot points.

A swing transport lock, Figure 7 is used to lock the boom in an up position and prevent swinging during transport. A stabilizer transport chain between the stabilizer prevents the stabilizers dropping during transport, Figure 7. The transport hook and chain should always be utilized when transporting the backhoe.

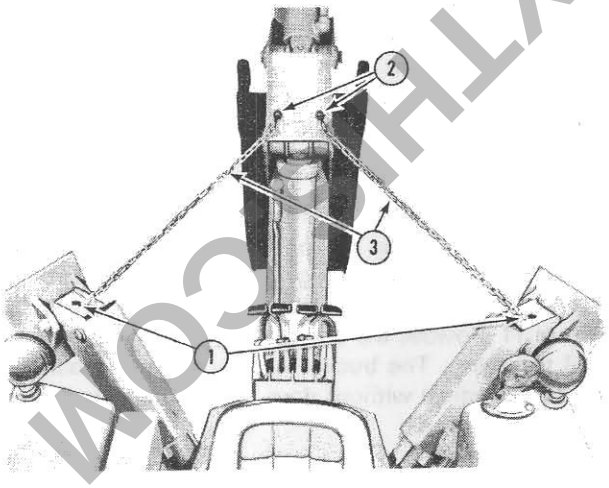


Figure 8
550 Backhoe in Transport Position

1. Stabilizer Chain Slots
2. Boom
3. Transport Chains

Model 550:

Transport chains are used to attach the backhoe boom to the stabilizers during transport, Figure 8. Tabs are welded on the boom and stabilizer arms to which the chains are attached.

The dipstick provides attaching points for the rod end of crowd cylinder and the piston end of the bucket cylinder, as well as attaching points for the bucket and bucket link. The dipstick also houses the bucket cylinder hoses and incorporates replaceable bushings at all five pivot pin locations.

Model 555:

The extendible dipstick available for the 15 ft. backhoe increases the maximum reach approximately 3½ ft. and the maximum digging depth 3'11".

BACKHOE SWING POST

Model 550:

The swing post, Figure 9 is a heavy one-piece iron casting which attaches to the frame by means of two large pivot pins. Movement of the swing post is obtained through two swing cylinders mounted in the frame and connected to the swing post by the swing chain.

Replaceable bushings are used in all pivot points of the post. Replaceable bushings are also used in the frame at the swing post pivots.

Model 555:

The swing post is a one piece casting and incorporates replaceable bushings with seals at the lift cylinder pivot point.

The swing cylinder rod ends connect to the swing post, Figure 10.

BACKHOE MAIN FRAME

The backhoe main frame attached to the tractor subframe and supports the backhoe swing post, stabilizer arms and cylinders, control valves and swing cylinders for the backhoe. The model 550 frame is clamped to the tractor subframe, whereas the model 555 frame is bolted to the tractor subframe. See Figures 5 and 6.

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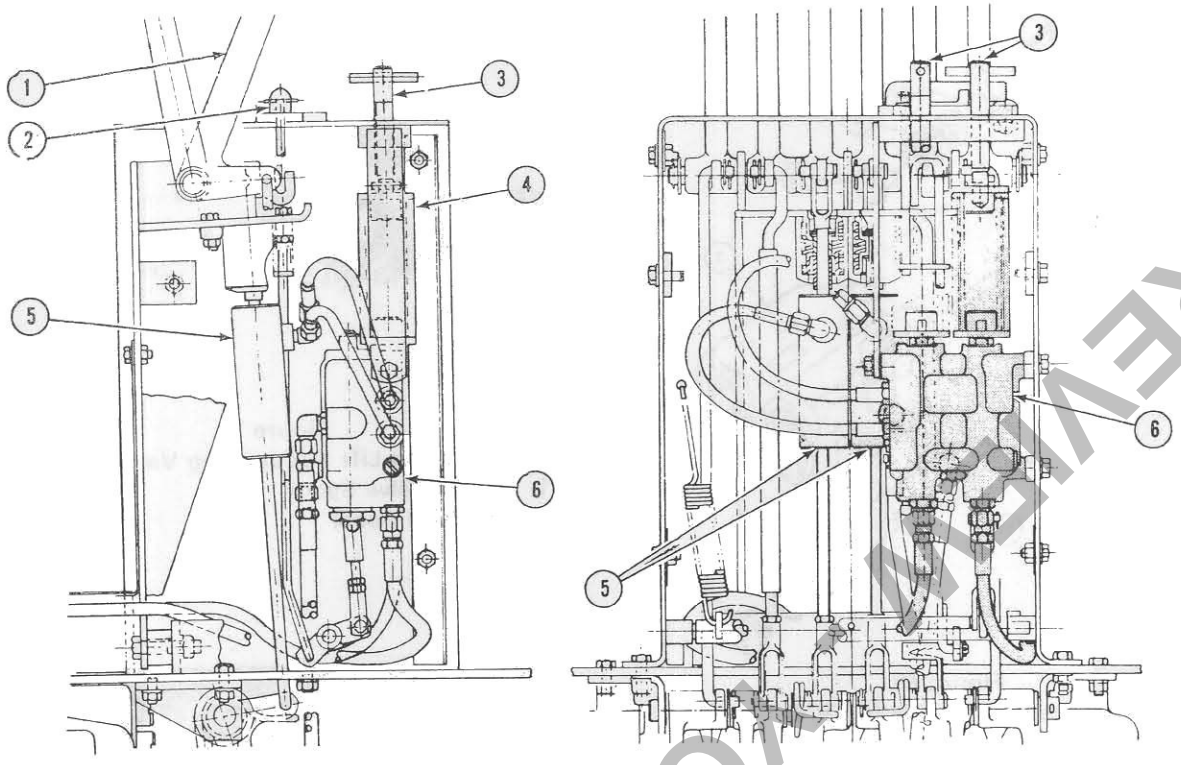


Figure 66
Automated Backhoe Control Assembly

1. Crowd Lever
2. Selector Lever
3. Adjusting Screws
4. Adjusting Linkage
5. Control Cylinder
6. Sequencing Valve

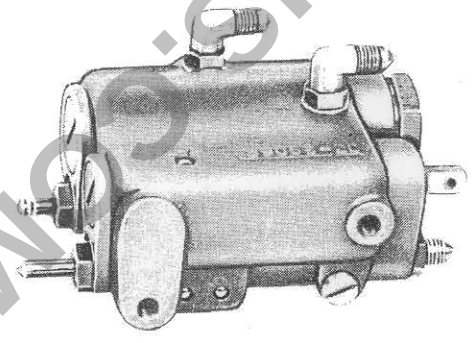


Figure 67
Sequencing Assembly

BUCKET AND LIFT CONTROL CYLINDERS

The bucket and lift, single-acting control cylinders, Figure 71, are attached through linkage to the bucket and lift control spools in the backhoe main control valve. Regulated oil pressure from the sequencing valve forces the control cylinder piston downward which moves the spool in the main control valve and pressurizes the circuit.

SELECTOR LEVER

The selector lever, Figure 72, located on top of the control console between the control levers and the adjusting screws, is attached to the shut-off valve spool linkage in the sequencing valve assembly.

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PART 9

Chapter 3
COMPONENT OVERHAUL

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1. GENERAL PROCEDURES

This Chapter outlines procedures for the inspection and overhaul of the backhoe and loader components such as valving, cylinders, structural members and related serviceable parts.

In cases where valving and cylinders are covered, complete disassembly of these components is given. However, any of these items can be serviced in part by following those steps required to obtain access to the desired part.

IMPORTANT: *Cleanliness is of the utmost importance when servicing components of the hydraulic system. Contaminated oil leads to premature mechanical failure. Faulty O-rings lead to circuit problems which are sometimes difficult to trace. Always install new O-rings and seals at each overhaul of a hydraulic component.*

Exercise care in the disassemly of components. It is imperative from the standpoint of time and a satisfactory repair, that all components be properly installed. Identify all parts upon removal as this can help to prevent a time consuming repair. Component disassembly and re-assembly should always be performed in clean surroundings. Dirt and other foreign matter entering the system during repair can lead to costly failure.

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NOTE: *The O-ring at the clevis end must be installed in valve body groove prior to inserting the spool fully into the bore.*

5. Position the spool wiper assembly over the eye end of the spool and secure the wiper plate to the valve section with the screws previously removed.

6. Install the cap at the spring end and secure with the screws previously removed.

INLET AND OUTLET COVERS

Located in the inlet cover is a system relief valve (1), Figure 186, with a relief setting of 2125 psi. (146.50 bar). A test port (2) for checking the relief valve pressure is also located in this end section.

The power beyond port and the outlet to sump port are found in the valve outlet end cover. The power beyond leads to the loader control valve.

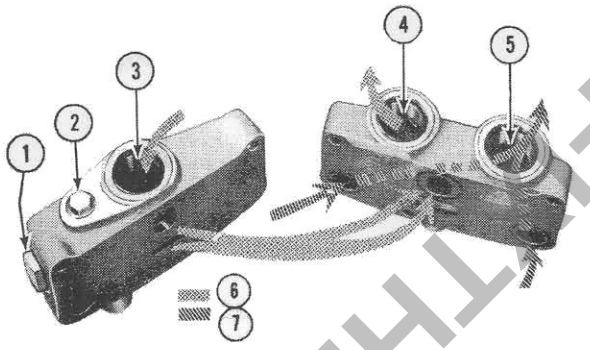


Figure 186
Valve Inlet and Outlet End Covers

1. System Relief Valve
2. Test Port
3. High Pressure Inlet
4. Power Beyond Port
5. Outlet to Sump
6. Pump Pressure
7. Return Oil

E. COMBINATION VALVE

The combination valve contains two functional valves, a cushioning valve, and a flow control valve. Each valve body contains two complete sets of valve components, except for the cushioning valve seat, which slides and serves as a seat for both sides of the valve, and the flow control spool which slides and houses the two poppets. The sliding cushioning valve seat and the flow control spool are selectively fit in the valve body bores and are not serviced separately. The items which are not serviced separately are marked with an asterisk in Figure 106. All other components shown are serviced items.

REMOVAL

The combination valve is attached to the mainframe by two bolts. The swing cylinder hoses attach to the bottom of the valve and the main control valve hoses attach to the top of the valve as shown.

1. Remove the hoses at the combination valve connections.

2. Remove the valve body from the mainframe by removing the two bolts.

DISASSEMBLY

Thoroughly clean the valve body in a suitable cleaning solvent and dry with compressed air. Disassemble the valve body in clean surroundings to prevent entry of dirt into the system. Refer to Figure 187 for parts identification.

1. Remove the two plugs that retain the flow control plunger in the valve body.

2. Remove the springs and washers used to locate and center the spool.

3. Remove the flow control spool from the body bore.

4. Remove the plugs that retain the springs and poppets in each end of the spool.

5. Loosen and remove the caps that retain the cushioning valve components in the valve body. Remove the springs, poppets, sleeves and sliding seat.

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IMPORTANT: *Be sure the oil has had time to cool and the pressure has been relieved before attempting to disconnect the hydraulic lines.*

LIFT CYLINDER CIRCUIT RELIEF TEST

Warm the hydraulic oil to 165°F (73.8°C) by operating the backhoe for approximately 15 minutes before installing the test fittings.

1. Position the bucket and dipstick on the ground, stop the engine and relieve pressure within the system by actuating the control levers.

2. Disconnect the bucket cylinder rod hose and connect the check valve and Tee fittings as in the insert, Figure 228.

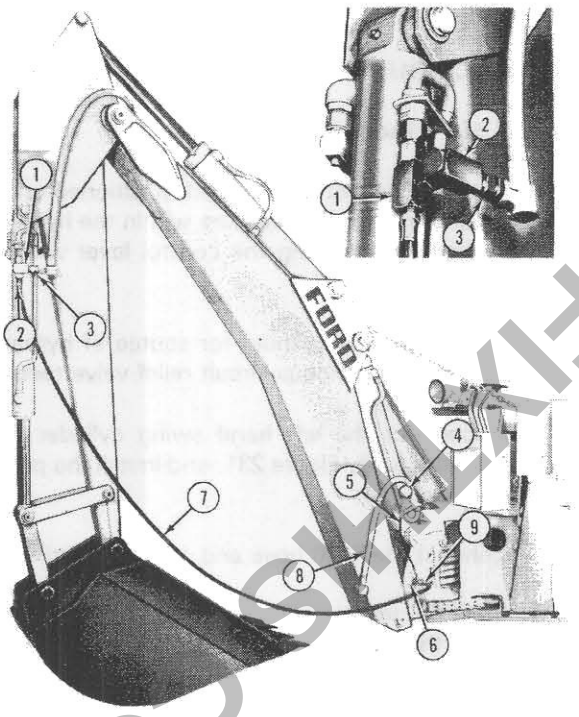


Figure 228
Lift Cylinder Circuit Relief - Rod End
1. Tee Fitting, Tool No. 1363
2. Check Valve Elbow, Tool No. 1362
3. Adaptor, Tool No. 0092
4. Gauge, Tool No. 2028
5. Gauge Hose, Tool No. 7099
6. Lift Cylinder Rod Port
7. Hose, Tool No. 1340
8. Plug, Tool No. 0768
9. Tee Fitting, Tool No. 1361

3. Disconnect the lift cylinder rod hose and plug as shown. Connect the 1361 Tee fitting to the swing post port.

4. Install the 0.5000 psi (0-344.70 bar) gauge and hose assembly to the 1361 Tee fitting by the lift cylinder rod port on the swing post.

5. Start the engine operating at 1700 rpm, actuate the bucket cylinder control lever. As the bucket curls, read the pressure gauge.

6. If a reading between 3600-4200 psi (248.18—289.55 bar) is not obtained, replace the circuit relief valve with a new valve, and recheck the pressure.

7. Shut the tractor engine off and relieve all pressures by actuating the control levers.

8. Disconnect the Tee fitting with the hose assembly from the swing post left side and connect it to the right side of the swing post, Figure 229.

9. Attach the lift cylinder rod end hose in place and cap the piston hose end.

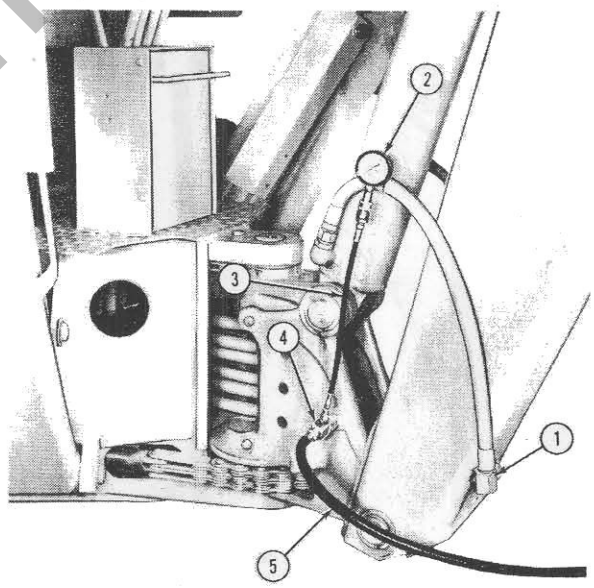


Figure 229
Lift Cylinder Circuit Relief - Piston End
1. Plug, Tool No. 0768
2. Gauge, Tool No. 2028
3. Gauge Hose, Tool No. 7099
4. Tee Fitting, Tool No. 1361
5. Hose, Tool No. 1340

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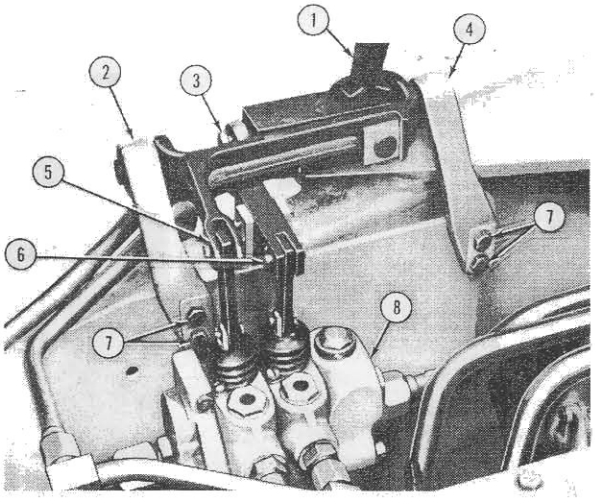


Figure 5
Loader Control Valve Actuating Linkage

1. Control Lever
2. Linkage Front Support
3. Lift Spool Link Pivot
4. Linkage Rear Support
5. Bucket Spool Link Pin
6. Lift Spool Link Pin
7. Support Securing Bolts
8. Loader Control Valve

8. Disconnect the clutch and brake drop rods, Figure 6, at the clevises, remove the upper clevises and lock nuts and lower the drop rods out of the vehicle.

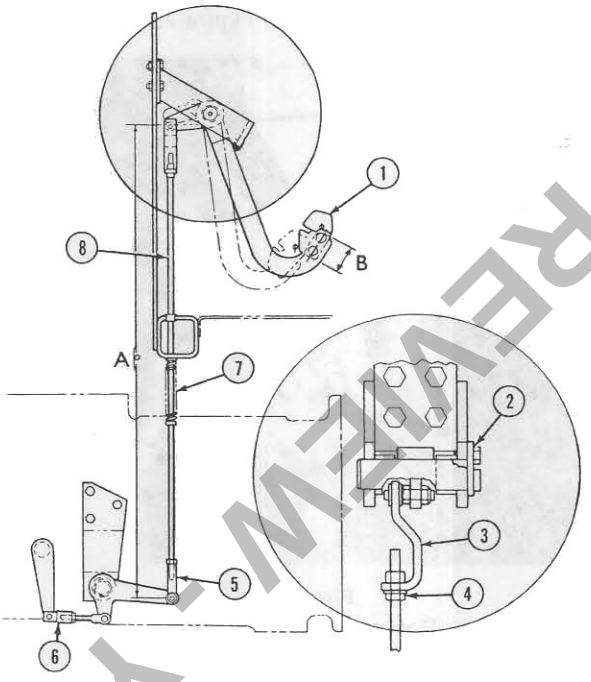


Figure 6
Clutch Linkage

A. 34.60 in. (878.84 mm)
B. 1.6 in. (40.6 mm)
1. Clutch Pedal
2. Clutch Pedal Pivot
3. Clutch Rod Top Clevis
4. Drop Rod Adjuster
5. Drop Rod Lower Clevis
6. Pedal Free Travel Adjuster
7. Return Spring
8. Drop Rod

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