FORD

Service Manual

Tractor-Loader-Backhoe
555A, 555B and 655A

Part 1 – Engine Systems
Part 2 – Fuel Systems
Part 3 – Electrical Systems
Part 4 – Clutches
Part 5 – Transmission Systems
Part 6 – Cab, Heating and Air Conditioning

Vol. 1

40055540A



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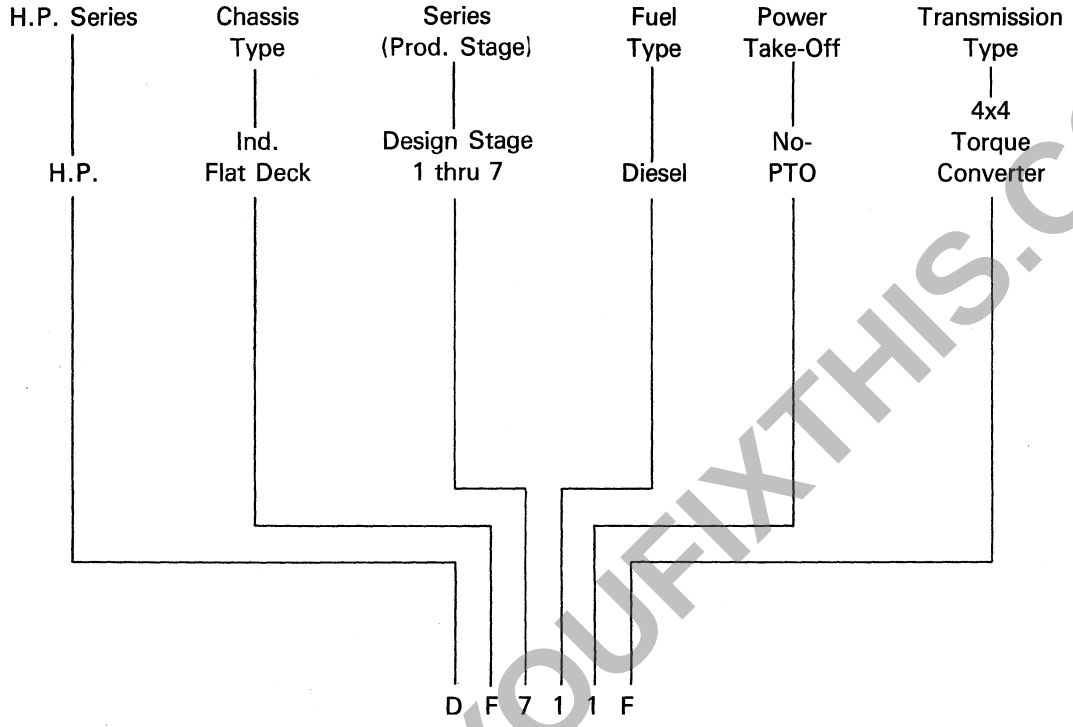
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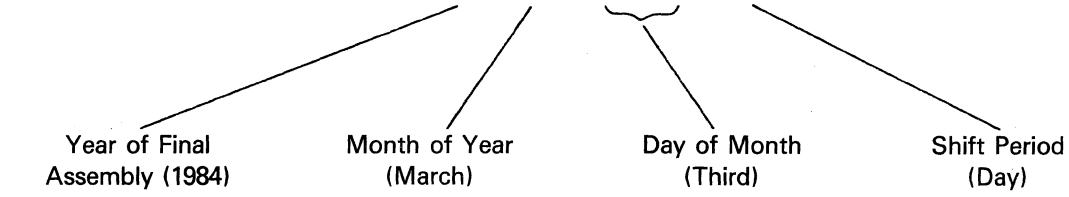
MODEL NUMBER — CODE



KEY TO PRODUCTION DATE CODES

First Number YEAR	First Letter MONTH		Second Number DAY OF MONTH	Second Letter PRODUCTION SHIFT
4 — 1984	A—Jan.	H—Aug.	01-32	A—Midnight
5 — 1985	B—Feb.	J—Sept.		B—Day
6 — 1986	C—March	K—Oct.		C—Afternoon
7 — 1987	D—April	L—Nov.		
8 — 1988	E—May	M—Dec.		
9 — 1989	F—June			
0 — 1990	G—July			

Example of Production Unit Date Code 4 C 0 3 B



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SAFETY PRECAUTIONS

Practically all service work involves the need to drive the tractor. The Operator's Manual, supplied with each tractor, contains detailed safety precautions relating to driving, operating and servicing that tractor. These precautions are as applicable to the service technician as they are to the operator, and should be read, understood and practiced by all personnel.

Prior to undertaking any maintenance, repair, overhaul, dismantling or re-assembly operations, whether within a workshop facility or out "in the field," consideration should be given to factors that may have an effect upon safety, not only upon the mechanic carrying out the work, but also upon bystanders.

PERSONAL CONSIDERATIONS

- The wrong clothes or carelessness in dress can cause accidents. Check to see that you are suitably clothed.

  Some jobs require special protective equipment.

- **Skin Protection**
  Used engine oil may cause skin cancer. Follow work practices that minimize the amount of skin exposed and the length of time used oil remains on the skin.

- **Eye Protection**
  The smallest eye injury may cause loss of vision. Injury can be avoided by wearing eye protection when engaged in chiselling, grinding, discing, welding, painting, etc.

- **Breathing Protection**
  Fumes, dust and paint spray are unpleasant and harmful. These can be avoided by wearing respiratory protection.

- **Hearing Protection**
  Loud noise may damage your hearing and the greater the exposure the worse the damage. If you feel the noise is excessive, wear ear protection.

- **Hand Protection**
  It is advisable to use a protective cream before work to prevent irritation and skin contamination. After work clean your hands with soap and water. Solvents such as white spirit, paraffin, etc., may harm the skin.

- **Foot Protection**
  Substantial or protective footwear with reinforced toe-caps will protect your feet from falling objects. Additionally, oil-resistant soles will help to avoid slipping.

- **Special Clothing**
  For certain work it may be necessary to wear flame or acid-resistant clothing.

- Avoid injury through incorrect handling of components. Make sure you are capable of lifting the object. If in doubt get help.

EQUIPMENT CONSIDERATIONS

- **Machine Guards**
  Before using any machine, be sure the machine guards are in position and serviceable. These guards not only prevent body and clothing from coming in contact with the moving parts of the machine, but also ward off objects that might fly off the machine and cause injury.

- **Lifting Appliances**
  Always ensure that lifting equipment, such as chains, slings, lifting brackets, hooks and eyes are thoroughly checked before use. If in doubt, select stronger equipment than is necessary.

  Never stand under a suspended load or a raised implement.

- **Compressed Air**
  The pressure from a compressed air line is often as high as 100 psi (6.9 bar) 7 (kgf/cm^2). It is perfectly safe if used correctly. Any misuse may cause injury.

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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. DIESEL ENGINE — OVERHAUL

CYLINDER HEAD, VALVES AND RELATED PARTS

REMOVAL

Reference, Figure 4

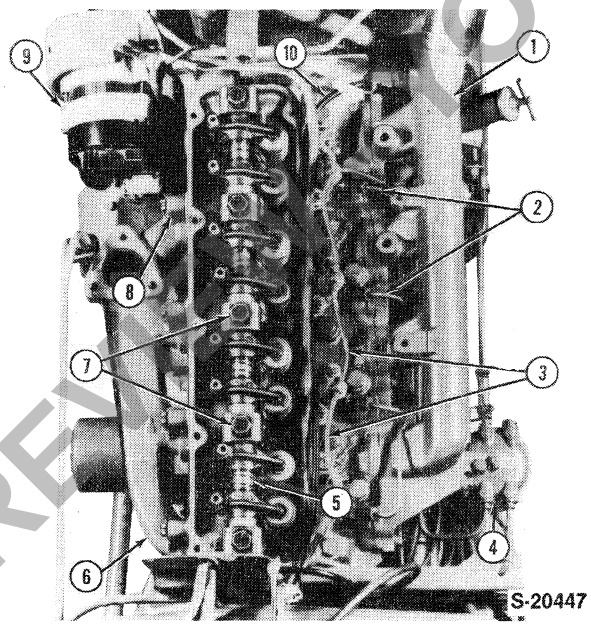


Figure 4
4-Cylinder Engine with Rocker Arm Cover Removed

1. Intake Manifold
2. Injection Tubes
3. Leak-Off Tubes
4. Fuel Filter
5. Rocker Shaft Assembly
6. Exhaust Manifold
7. Rocker Shaft Retaining Bolts
8. Tab Washer
9. Alternator
10. Cold Start Tube

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

1. Disconnect the battery.
2. Remove the vertical muffler
3. Drain the radiator and cylinder block
4. Shut off the heater hose taps then disconnect and plug the heater hose openings.
5. Remove the radiator top hose.
6. Shut off the main fuel tank tap.
7. Remove the hood panel assembly.
8. Disconnect the air inlet hose at the intake manifold.
9. Remove the vertical type exhaust pipe and bracket.
10. Bend the lock tabs back and remove the bolts, exhaust manifold and gasket.
11. Disconnect the cold start fuel lines at the fuel tank and thermostart unit. See Part 2, Chapter 1.
12. Remove the injection lines from the fuel injection pump and injectors. Cap the exposed openings in the pump, injectors and line ends.
13. Disconnect the fuel lines and remove the fuel filters from the inlet manifolds.
14. Remove the bolts and lockwashers and remove the inlet manifold and gasket.
15. Remove the rocker cover bolts, rocker arm cover and gasket from the cylinder heads.
16. Remove the fuel injector leak-off line. Clean the area surrounding the fuel injectors then remove the retaining nuts and carefully withdraw the fuel injectors and sealing washers from the head, Figure 5.
17. Check the push rods for straightness by rotating the rods with the valves closed and identify any bent rods.

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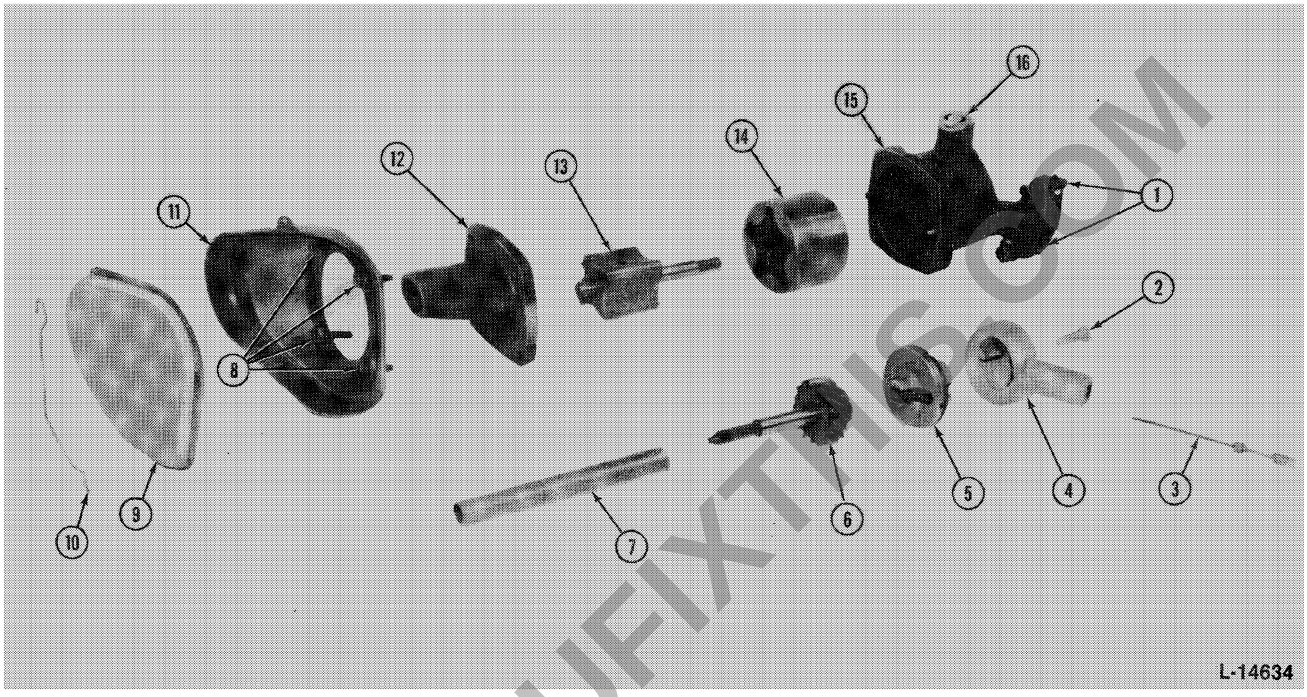


Figure 30
Oil Pump Assembly

1. Oil Pump Retaining Bolts
2. Adapter Retaining Bolt
3. Proofmeter Drive Shaft and Cable Assembly
4. Proofmeter Drive Shaft Adapter
5. Driveshaft Adapter Mounting Base
6. Oil Pump Drive Shaft and Gear Assembly
7. Intermediate Shaft
8. Screw and Washer Assemblies
9. Screen
10. Spring
11. Outer Cover
12. Inner Cover
13. Inner Rotor and Shaft Assembly
14. Outer Rotor
15. Body
16. Pressure Relief Valve Assembly

CONNECTING RODS, BEARINGS, PISTONS, RINGS AND CYLINDER BLOCK

REMOVAL

NOTE: *The connecting rods and pistons can be removed with the engine installed in the tractor after prior removal of the cylinder head, oil pan and oil pump assembly as described in this Chapter.*

1. If necessary, remove any ridge from the top of the cylinder bores with a cylinder ridge reamer or hand scraper, Figure 33. Do not cut down into the piston ring travel area.

2. With the piston at the bottom of its stroke, remove the nuts from the bearing cap bolts and remove the bearing cap and liner, Figure 34.

3. Use the handle end of a hammer to push the piston and rod assembly out of the top of the block. Remove the bearing liner from the connecting rod.

4. Turn the crankshaft to bring each piston to the bottom of its stroke and repeat this procedure. Keep the bearing caps and liners with their respective connecting rods.

CONNECTING ROD BEARINGS:

1. If the bearing liners are scored, have the flash overlay wiped out, show fatigue failure, or are badly scratched, as shown in Figure 35, install new bearing liners.

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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	1. Clogged air cleaner.	1. Clean or replace element.
	2. Fuel line obstructed.	2. Clean.
	3. Faulty injectors.	3. Clean and rest.
	4. Low cylinder compression.	4. Replace piston rings or re-bore/re-sleeve as necessary.
	5. Incorrect valve lash adjustment.	5. Check and reset.
	6. Burnt, worn or sticking. valves.	6. Replace valves and/or guides.
	7. Blown head gasket.	7. Check head flatness and fit new gasket.
	8. Incorrect fuel delivery.	8. Check injectors and pump.

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PROBLEM	POSSIBLE CAUSE	REMEDY
Water temperature gauge fails to reach normal operating temperature.	1. Faulty temperature sender switch.	1. Replace sender switch.
	2. Incorrect or faulty thermostat.	2. Replace thermostat.
	3. Faulty water temperature gauge.	3. Replace temperature gauge.

B. SPECIFICATIONS

GENERAL SPECIFICATIONS	DIESEL	
No. of Cylinders	3	4
Displacement:		
in^3	201	256
cm^3	3294	4196
Bore:		
in	4.4	4.4
mm	111.8	111.8
Stroke:		
in	4.4	4.2
mm	111.8	106.7
Compression Ratio:	16.3:1	16.3:1
Firing Order	1-2-3	1-3-4-2
Maximum Torque (lbs. ft.)	158 @1200 Rev./min	183@ Rev./min
(Nm)	214	248
(Mkg)	21.9	25.3
Rated Engine Speed (rev/min)	2200	2200
Idle Speed (rev/min)	600-700	600-700
Maximum No Load Speed (rev/min)	2425-2475	2425-2475

COMPRESSION PRESSURE (AT 200 RPM) CRANKING SPEED

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

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RADIATOR

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

FAN—

6 Blade — 55A & B; 7 Blade — 655A

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

THERMOSTAT

Opening Temperature ..... 165° F (74° C)

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 ESE-97B-44A. Recommended 50/50 mix for all climates, year round use. Maximum winter protection (50/50 mix) — 34° F (-37° C).

TORQUE VALUES	lbs. 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)

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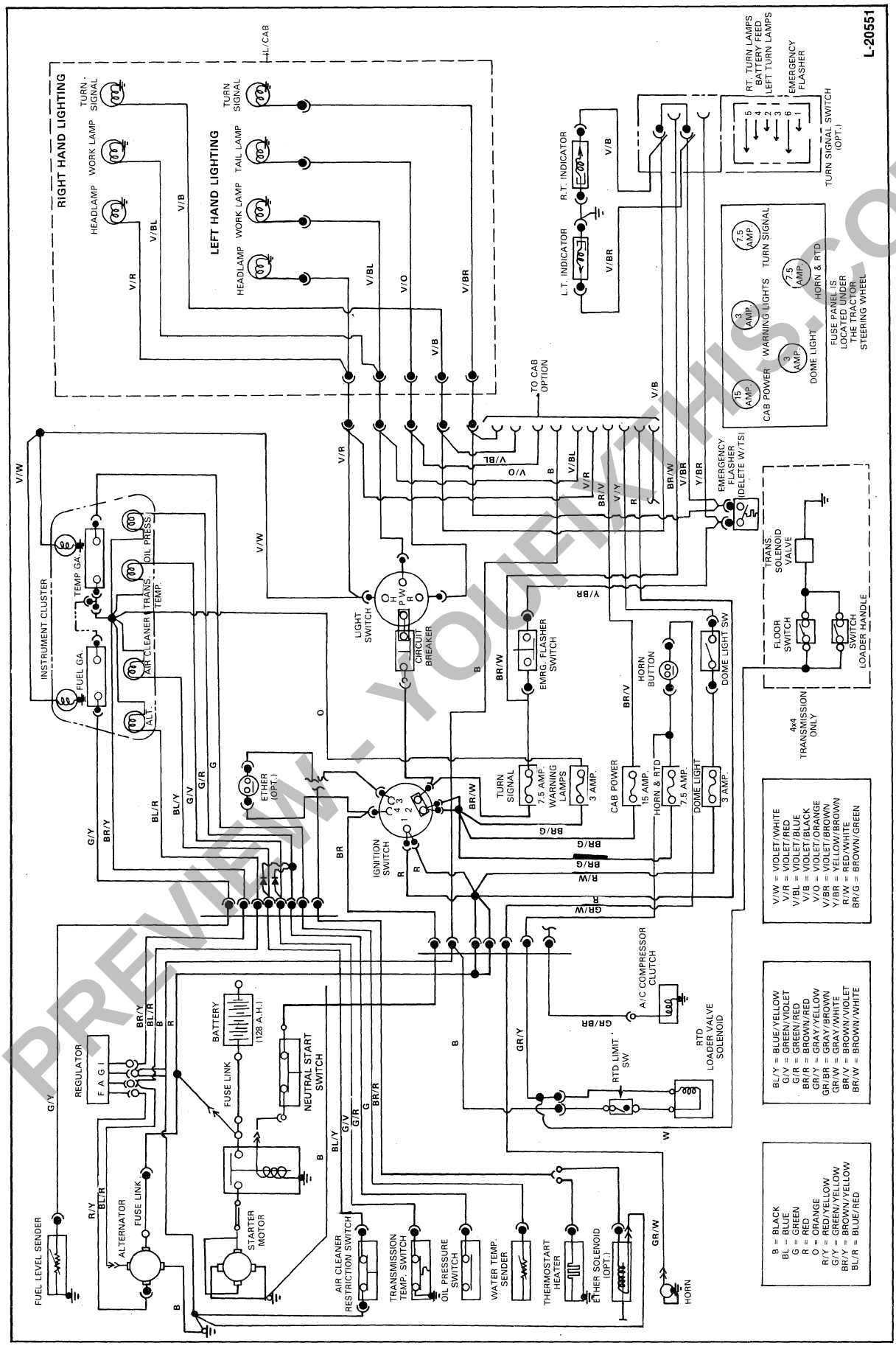


Figure 1
General Wiring Schematic

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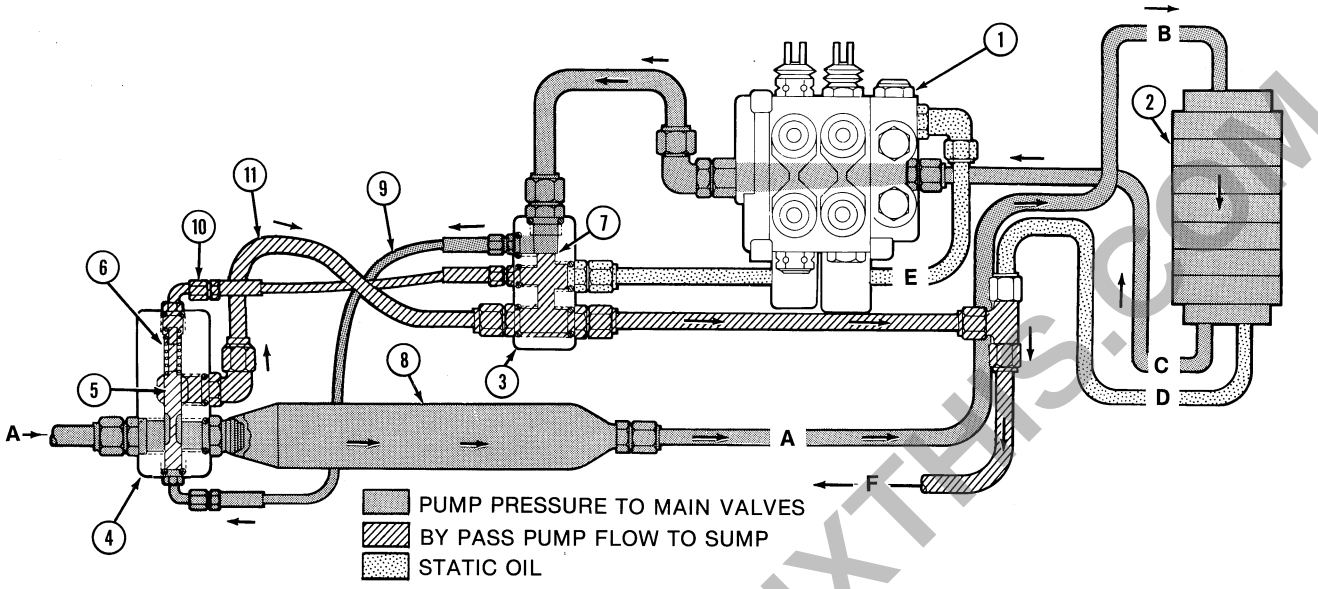


Figure 50
Oil Flow — Unload Valve in By-Pass Position (Tractor Hydraulic System at Partial Flow — Backhoe/Loader not Operating)

A. Pump Oil Flow
B. To Backhoe Valve Inlet Cover
C. From Backhoe Valve — Power Beyond
D. From Backhoe Valve — Return-to-Sump (Static)
E. From Loader Valve — Return-to-Sump (Static)
F. Oil Return-to-Sump
1. Loader Control Valve
2. Backhoe Valve
3. Sensing Manifold
4. Unload Valve
5. Unload Valve Spool
6. Spring
7. Orifice
8. Expansion Chamber
9. High Pressure Sensing
10. Reduced Pressure Sensing
11. Return-to-Sump Line

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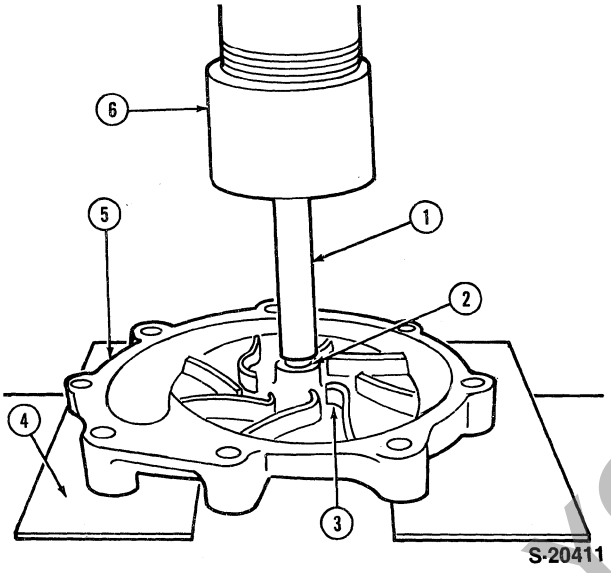
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3. Use a sleeve with a diameter slightly smaller than the bearing shaft to press the shaft and bearing assembly out of the impeller and pump housing, Figure 80.

4. Use a suitable sleeve (such as a 1 inch deep socket) and press the seal assembly out of the impeller side of the pump housing. Discard the seal assembly.



S-20411

Figure 80
Water Pump Shaft and Bearing Removal

1. Sleeve
2. Shaft and Bearing Assembly
3. Impeller
4. Support
5. Front Housing
6. Press

INSPECTION AND REPAIR

Reference Figure 81

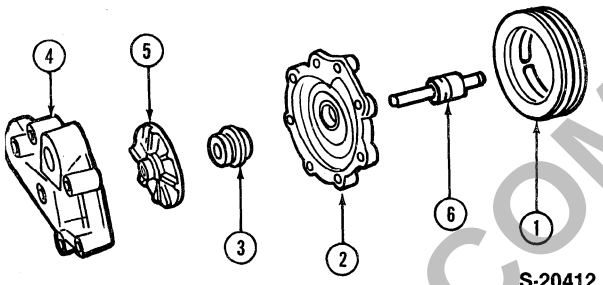
1. Check the impeller for worn or damaged vanes. Install a new impeller if the vanes are damaged.

2. Inspect the bearing shaft for scoring or other damage.

3. Check both parts of the pump housing for cracks or signs of leakage. Replace any defective parts.

ASSEMBLY

NOTE: *Always install a new bearing assembly. Do not use the old bearing.*

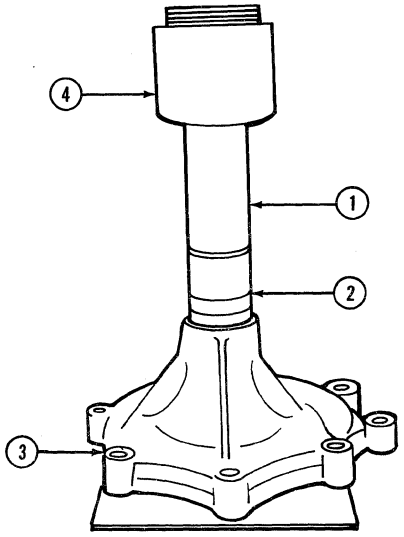


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Figure 81
Water Pump Components

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

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 the bearing is flush with the face of the housing, Figure 82. Use a straight edge to check the final position.



S-20413

Figure 82
Water Pump Shaft and Bearing Installation

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

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

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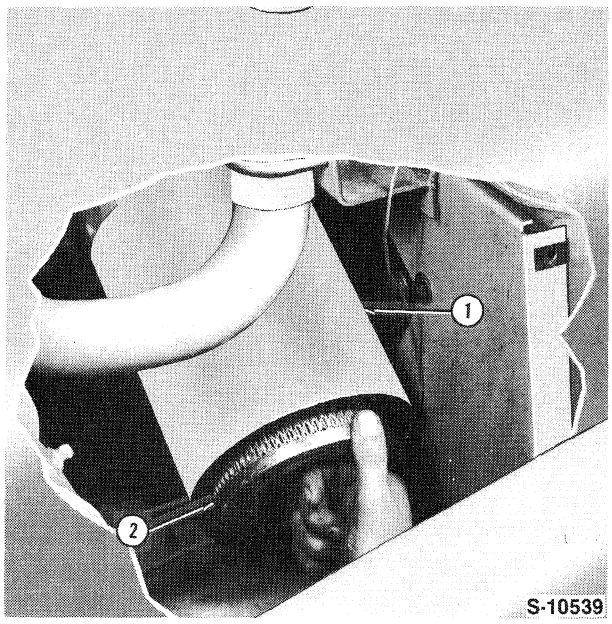


Figure 62
Air Cleaner

1. Air Cleaner Assembly
2. Element



Figure 63
Air Cleaner

INSPECTION

1. Clean and examine the outer casing. Repair any damaged seams.

2. Check the condition and security of the rubber dust collector.

3. Be sure that the air cleaner restriction indicator switch operates properly.

4. Clean the inside of the air cleaner housing with a damp lint-free cloth before installing the outer element.

5. Clean the outer element using one of the following Methods.

METHOD A.

If the outer element is sooty or heavily contaminated, it may be washed using the following procedure.

a. Soak the outer element in warm water (do not use water hotter than the hand can stand) containing a non-sudsing detergent for 15 minutes. Do not soak for more than 24 hours.

b. Gently agitate the element to remove dirt accumulation.

c. Thoroughly rinse the element from the inside to the outside with a gentle stream of water until the water is clear and all loosened foreign material is removed. Water pressure must not exceed 30 PSI (2.0 bar). Allow the element to dry naturally. Do not use compressed air, a light bulb or heat to dry the element.

6. After drying check the element for damage by inserting a lamp into the middle of the element and observing the element surface. An even, fine pattern of light indicates the element is clean and undamaged and is suitable for further service.

METHOD B

a. Remove dust and dirt from the element by inserting a compressed air hose (maximum pressure 30 psi [2.0 bar]) and blowing the accumulated dust and dirt from the inside to the outside.

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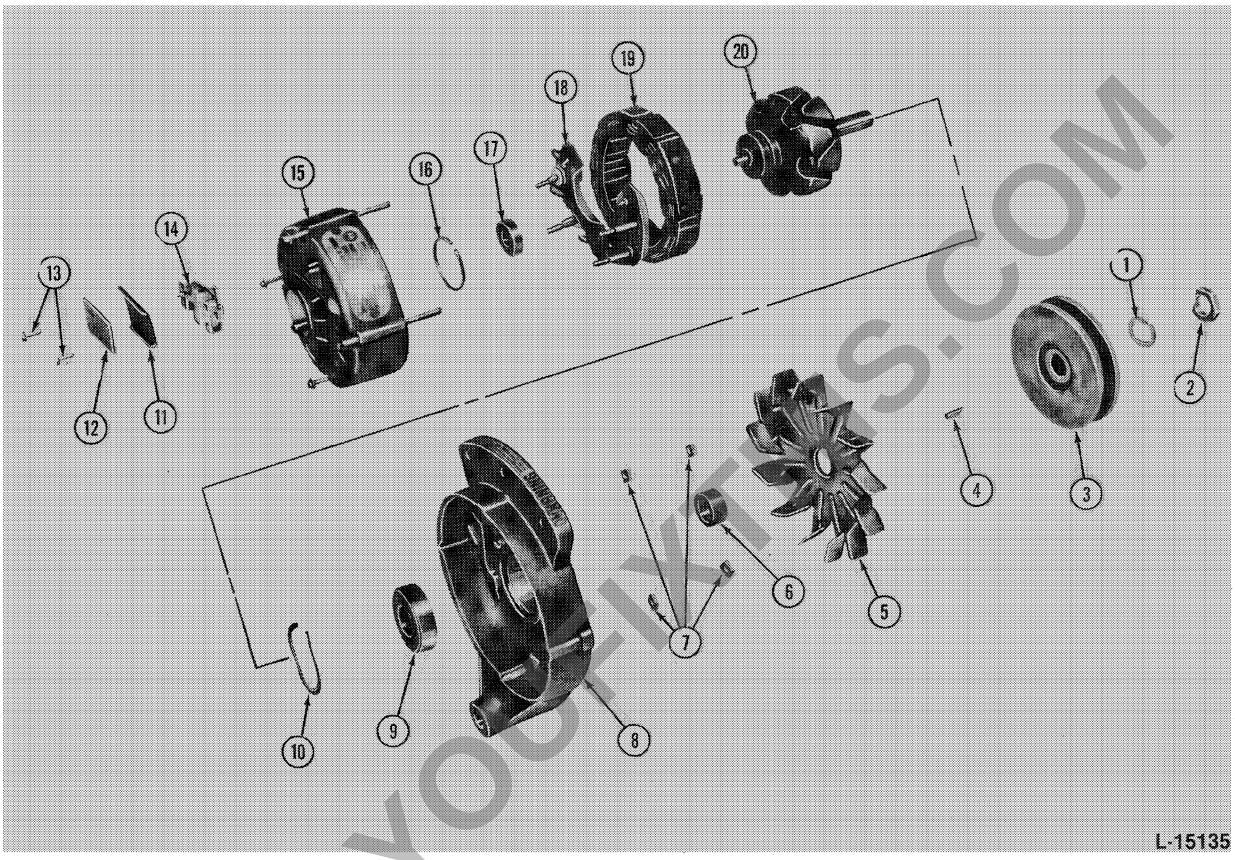


Figure 49
Alternator Disassembled

1. Lockwasher
2. Shaft Nut
3. Pulley
4. Key
5. Fan
6. Pulley Spacer
7. Nuts
8. Front Housing
9. Front Bearing
10. Spring Washer
11. Brush Cover Shield
12. Brush Cover
13. Screws
14. Cover and Brush Assembly
15. Rear Housing
16. Bearing Rear Retainer
17. Rear Bearing
18. Rectifier Assembly
19. Stator Assembly
20. Rotor Assembly

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 but the negative plate is attached 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 which may be used to effectively charge 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.

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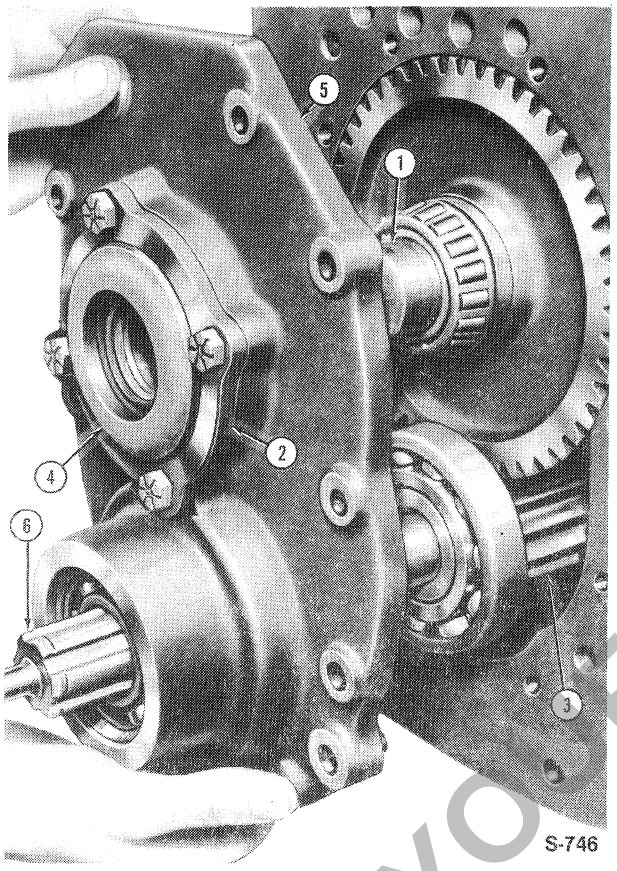


Figure 12
Removing Rear Support Plate

1. Output Shaft
2. Shims
3. Secondary Countershaft
4. Output Shaft Bearing Retainer
5. Rear Support Plate
6. PTO Countershaft

a. Place approximately 0.060 in. (1.524 mm) shims on the output shaft bearing retainer and install the retainer.
b. Install the four attaching bolts and tighten them to the specified torque, see Chapter 4.
c. Mount a dial indicator over the end of the output shaft as shown in Figure 16. The indicator must be readable within the 0.001 in. (0.025 mm).
d. Push the output shaft forward and zero the dial indicator; then pull the shaft rearward and note the reading on the indicator. The reading determines the thickness of shims that must be removed.

IMPORTANT: *If necessary, shims may be removed that total a maximum thickness of 0.002 in. (0.051 mm) more than the indicator reading. However, never remove shims that total less than the indicator reading as this will result in end play instead of pre-load.*

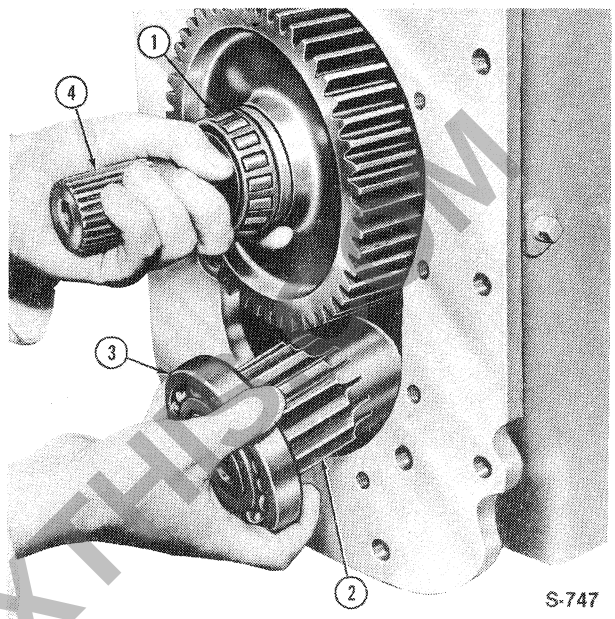


Figure 13
Removing the Secondary Countershaft and Output Shaft

1. Output Shaft Rear Bearing
2. Secondary Countershaft
3. Secondary Countershaft Rear Bearing
4. Output Shaft

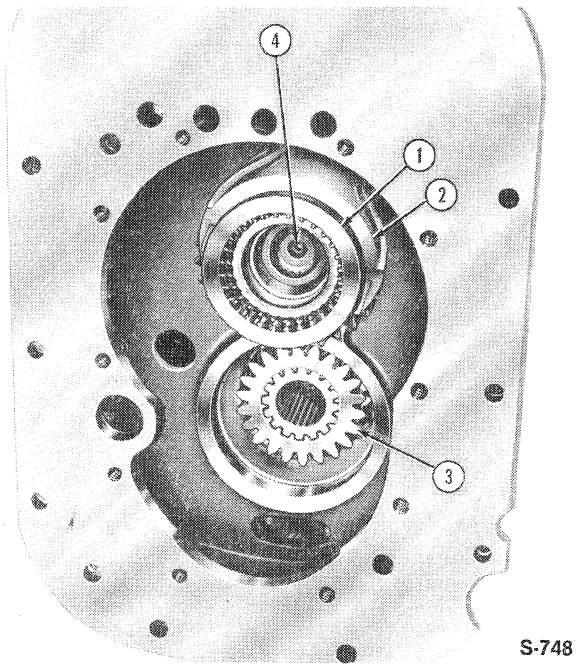


Figure 14
Transmission Rear Components

1. High-Low Shift Fork
2. High-Low Sliding Coupling
3. Coupling
4. Mainshaft

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be necessary to remove the control valve seal unless it is damaged or worn. If necessary, pry the seal from the distributor with a screwdriver.

7. Remove the 'O' ring seals from the caps and detent sleeve.

INSPECTION

1. Thoroughly clean the oil distributor components, Figure 96, with suitable solvent, then blow dry with compressed air. Use compressed air to clean the oil passages in the distributor housing.

2. Inspect the pressure regulating valve and the control valve for nicks and burrs, paying particular attention to the lands on the control valve. Remove nicks or burrs from the control valve lands with a fine pumice stone.

   NOTE: *If the lands are nicked or burred to the extent that cleaning with a stone will leave the lands distorted, a new control valve should be installed.*

3. Check the pressure regulating valve spring and bypass spring for "set" by comparing them with new springs. Refer to Chapter 4 for spring specifications. If the springs have taken a "set," install new springs.

4. Inspect the bypass valve for flat spots, nicks and burrs. If necessary, install a new valve during assembly.

5. Inspect the control valve seal (18) for damage or wear. If necessary, pry the seal from the distributor.

6. Be sure the oil transfer tube, connecting the pump pressure gallery to the modulating valve, is not loose or lost from the distributor.

   NOTE: *The oil transfer tube is used in transmissions up through transmission date code 5C24. After transmission date code 5C24 the modulator valve design was changed to eliminate the need for the transfer tube.*

ASSEMBLY

1. Install new 'O' ring seals on the caps and detent sleeve, Figure 96.

2. Install the bypass valve and spring (long spring) in the distributor housing, then install the cap and 'O' ring seal.

3. Install the pressure regulating valve and spring (short spring) in the distributor, and retain the parts in place by installing upper and lower caps and O-rings.

4. If it was necessary to remove the control valve seal, tap a new seal into position so the sealing lip is flush with the face of the distributor housing.

5. Start the clevis end of the control valve through the cap end of the detent sleeve, then install the detent spring and cups. Holding the spring and cups in place, push the valve into the sleeve.

6. Install the cap and 'O' ring seal in the detent sleeve, then install the assembly into the distributor housing. Tighten the detent sleeve finger tight.

7. Place a new hydraulic pump gasket on the distributor and install the elbow and socket head plug.

8. Installation of the oil distributor is covered in Section D.

FRONT INPUT SHAFT AND REAR CLUTCH ASSEMBLY

DISASSEMBLY

1. Normally it is not necessary to remove the ball bearing from the front input shaft, or the needle bearing from the rear face of the shaft. If the ball bearing is worn or damaged, it can be removed as shown in Figure 97. To remove the needle bearing, collapse the inner race with a hammer and chisel, then pull the outer race from the shaft with Tool Nos. 9516 and 9190.

2. Unlock the sealing rings (6), Figure 97, by squeezing them together, then remove them from the shaft.

3. If not previously removed, pull the bearings (3) and spacer (2) from the rear clutch hub (reverse idler input), Figure 98, and remove the gear from the clutch plates in the housing. Remove the bronze thrust washer (10).

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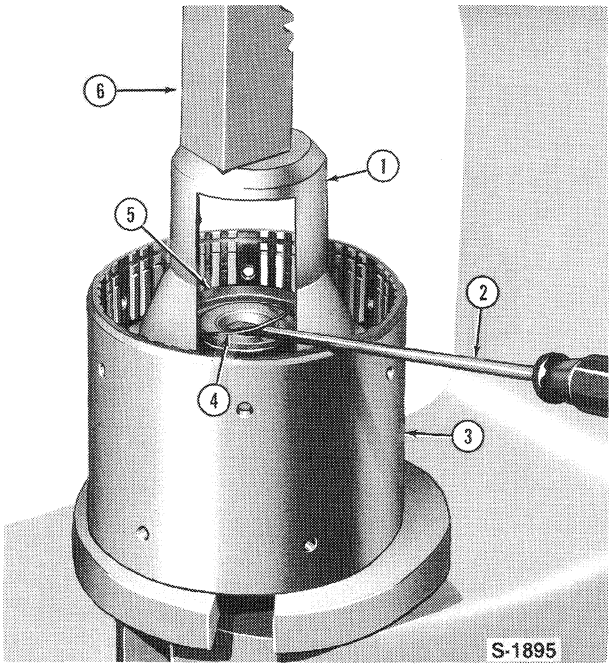


Figure 185
Clutch Housing Inner Snap Ring Removal

1. Press Attachment — Tool No. 1312
2. Screw Driver
3. Clutch Housing
4. Snap Ring
5. Washer — Appropriate Size
6. Press

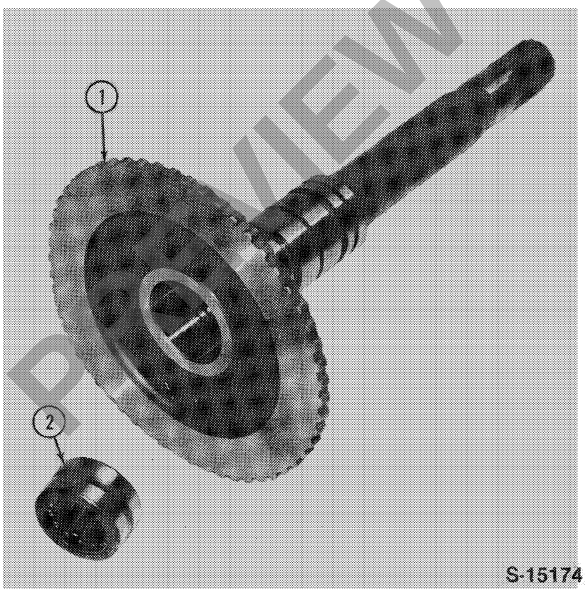


Figure 186
Front Input Shaft and Pilot Bearing

1. Front Input Shaft Assembly
2. Pilot Bearing

3. Inspect the front shaft sealing rings, Figure 183, for cracks and wear, and the sealing ring grooves for wear. Install new parts as required, during assembly. Check the shaft oil passages to be sure they are clean.

4. Inspect the working surface of the clutch pistons, Figure 184, for scoring. If scored, fine emery cloth may be used to smooth the surface. Be sure the 'O' rings seal grooves are clean and that burrs do not exist.

5. Check all of the plates for warpage or distortion. Install new plates if they have taken a set.

6. Check the clutch housing and bushing for hole alignment and wear.

ASSEMBLY

Reference — Figure 187

1. Install new 'O' ring seals on the clutch pistons, Figure 187, and on the hub of the clutch housing. Coat the 'O' ring seals with grease, then install the pistons (one in each end of the housing) so they are seated against the center web of the housing.

2. Position the spring (11), and spring seat (10), Figure 187, on the piston, then compress the spring with a press, Tool No. 1312, and a suitable washer, as shown in Figure 185, so the snap ring can be installed. Make sure the snap ring is fully seated before relieving pressure on the spring.

3. Turn the clutch housing over and install the spring, spring seat, and the snap ring in the other end of the housing by repeating Step 2.

4. Place the bronze thrust washer (10), Figure 184, on the flat hub of the clutch housing (the hub in the front of the housing is recessed), then install the rear clutch hub (1) (reverse idler input), bearings (3), and spacer (2). Install the clutch plates, one by one, starting with a steel plate then a bronze plate.

   NOTE: *Five steel and five bronze plates are used for each clutch pack.*

5. Install the clutch drive plate (4), Figure 184, and retain it in place by installing the appropriate snap ring.

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NOTE: *In general the conditioned air should be 35° to -40°F (+2° to +4°C) cooler than the ambient temperature of the outside air.*

10. If the system is operating satisfactorily, stop the engine, disconnect the gauge set and replace the protective caps on the compressor service valves.



WARNING: *A significant amount of refrigerant vapor may have condensed to a liquid at the service fitting at the high side of the compressor. Use a cloth or other protective material when disconnecting the manifold hose from this fitting to prevent personal injury to hands and face.*

If the refrigerant charge is determined to be insufficient, the system must be tested for leaks and re-charged before accurate tests can be made for normal system operation. See "Evacuating the System" and "Charging the System" this section.

NOTE: *Natural loss of some system refrigerant can be expected over a period of time.*

If, after testing the fully charged system, it is determined that the system is still not functioning or cooling properly, refer to the "A/C System Performance Test and Diagnosis" chart for test results, possible causes and repair.

PRESSURE — TEMPERATURE RELATIONSHIP

Evaporator Temperature		Low Pressure Gauge Reading		
°F	°C	psi	bar	kgf/cm²
-11	-23.9	4	0.28	0.28
- 7	-21.7	6	0.41	0.42
- 2	-18.9	8	0.55	0.56
2	-16.7	10	0.69	0.70
6	-14.4	12	0.83	0.84
10	12.2	14	0.97	0.98
14	-10.0	16	1.10	1.12
18	- 7.8	18	1.24	1.26
20	- 6.7	20	1.38	1.41
22	- 5.6	22	1.52	1.55
24	- 4.4	24	1.66	1.69
27	- 2.8	26	1.79	1.83
29	- 1.7	28	1.93	1.97
32	0	30	2.07	2.11
36	2.2	35	2.41	2.46
42	5.6	40	2.76	2.81
48	8.9	45	3.10	3.16
53	11.7	50	3.45	3.52
58	14.4	55	3.79	3.87
62	16.7	60	4.13	4.22
66	18.9	65	4.48	4.57
70	21.1	70	4.82	4.92

NOTE: *"Boxed" sections of chart indicate normal operating ranges.*

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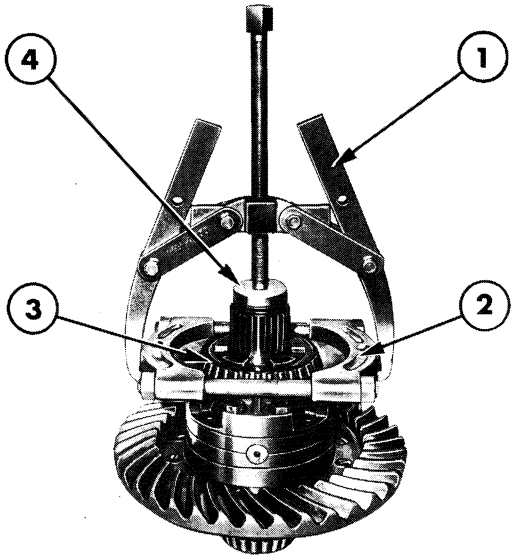


Figure 24
Removing Differential Bearing

1. Tool No. 9516
2. Tool No. 9526
3. Bearing Assembly
4. Tool No. 9210

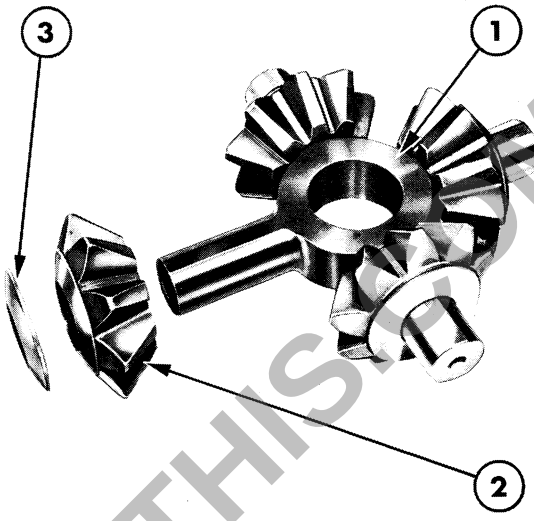


Figure 26
Differential Spider and Pinions

1. Spider
2. Pinion Gears
3. Thrust Washer

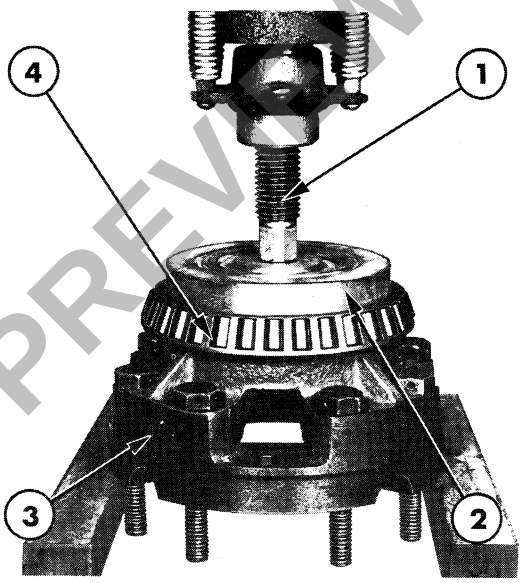


Figure 25
Replacing Differential Bearing

1. Press
2. Tool No. 9210
3. Differential Case
4. Bearing Assembly

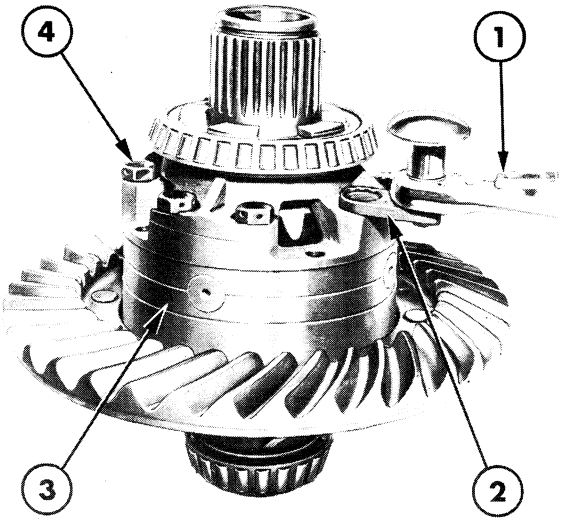


Figure 27
Tightening Differential Case Bolts

1. Torque Wrench
2. Adaptor
3. Differential Case
4. Differential Case Bolts

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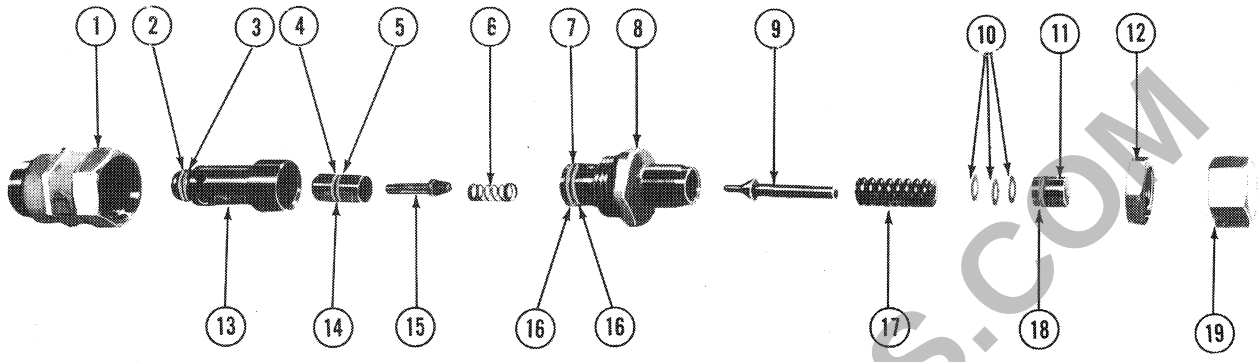


Figure 47
Lift Rod Circuit Relief Valve — Exploded View

1. Body
2. O-Ring
3. Back-Up Ring
4. Poppet
5. O-Ring
6. Spring
7. O-Ring
8. Fitting
9. Pilot Poppet
10. Shim(s)
11. Adjusting Plug
12. Adjusting Nut
13. Sleeve
14. Back-Up Ring
15. Piston
16. Back-Up Rings
17. Spring
18. O-Ring
19. Adjusting Cap

NOTE: *It is important that only a valve of the correct pressure setting be used in a particular circuit. The use of a valve with a higher pressure setting than specified could cause structural damage to the backhoe.*

3. UNLOAD VALVE AND SENSING MANIFOLD — DESCRIPTION AND OPERATION

A by-pass system is incorporated in the hydraulic circuit which allows a major proportion of the oil flow to be re-routed directly back to the reservoir, via the filter and oil cooler, instead of passing through the open center passages of the backhoe and loader main control valves. This system functions only when both the loader and backhoe main control valves are in neutral (no spool is operating) and therefore decreases the loading on the hydraulic pump and the horsepower demand. If, for example, the unit is travelling, more horsepower is now available to the transmission. There are also additional fuel savings during engine idle periods.

The by-pass system effectively re-routes oil flow in excess of 12 gpm (45 liter/min.). This amount of oil always flows through the backhoe and loader main control valves and is essential to the control valve when an element is brought into use. Without this oil flow, control valve operation would be delayed and uncontrollable.

The by-pass system consists of a sensing manifold and a unload valve assembly. The sensing manifold senses if a hydraulic demand exists in either the backhoe or loader control. The unload valve functions to re-route the oil flow above 12 gpm (45 LPM) back to sump when not required by the loader or backhoe operation.

OIL FLOW — UNLOAD VALVE IN BYPASS POSITION — TRACTOR LOADER AND BACKHOE NOT OPERATING

Figure 50 illustrate the by-pass system when both main control valves are in neutral. Oil flow direct from the hydraulic pump enters the unload valve at A. The oil flows to the backhoe (2) and loader (1) main control

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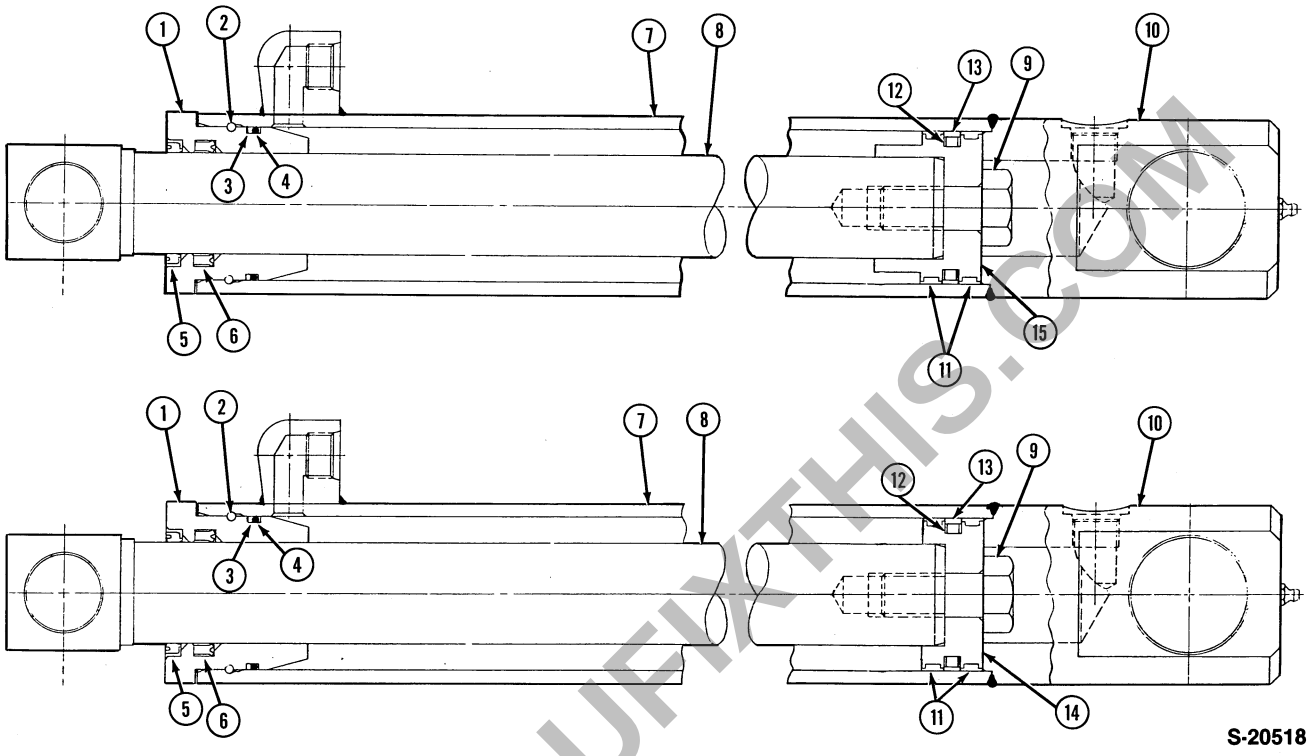


Figure 123
Loader Lift Cylinder

1. Gland
2. Wire
3. Back-Up Washer
4. O-Ring
5. Wiper Seal
6. Seal
7. Cylinder Barrel
8. Rod Assembly
9. Bolt
10. Date Stamp
11. Wear Insert
12. Expander
13. Seal
14. Piston (Prior Production)
15. Piston (Current Production)

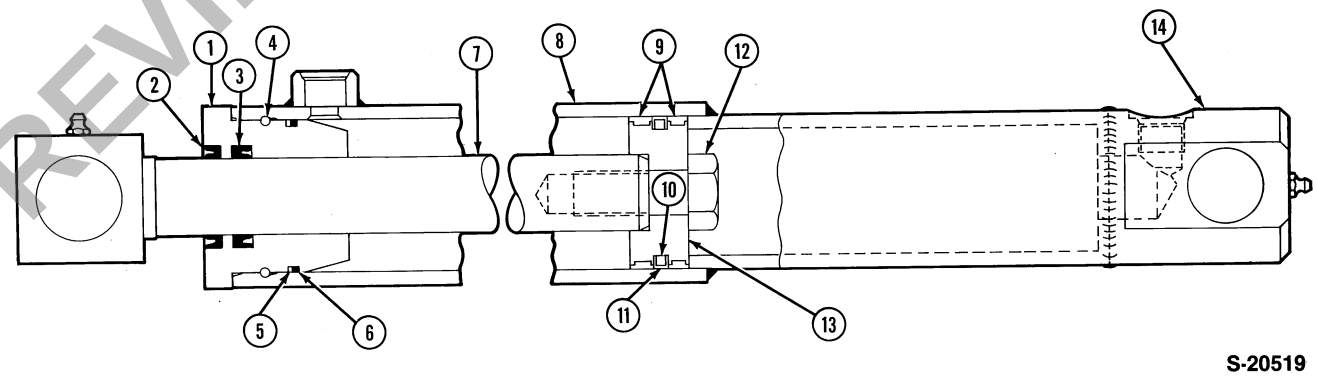


Figure 124
Loader Bucket Cylinder

1. Gland
2. Wiper Seal
3. Seal
4. Wire
5. Back-Up Washer
6. O-Ring
7. Rod Assembly
8. Cylinder Barrel
9. Wear Insert
10. Expander
11. Seal
12. Bolt
13. Piston
14. Date Stamp

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9. If the pressure reading is not within specifications, adjust by adding or removing the spring shims. Recheck the pressure setting after adjusting.

10. Remove the test equipment and reconnect the hoses and the "return-to-dig" wires.

3. LOADER CIRCUIT PERFORMANCE TEST

See "Circuit and Accumulated Leakage Tee Test", for test procedure.

CYLINDER PISTON SEAL LEAKAGE

If cylinder piston seal leakage is suspected, a simple test can be performed.

1. Start the engine and extend or retract the cylinder its full length.

2. Remove the hose from the low pressure side of the cylinder.

3. Actuate the control lever and hold. This will exert system pressure on the packings.

4. Note any leaking from the hose port of the cylinder, or the hose end.

   NOTE: *Since the loader bucket and lift cylinder are double cylinders connected in parallel, leakage in one cylinder will affect the operation of both cylinders.*

4. BACKHOE CONTROL VALVE

SYSTEM RELIEF VALVE TEST

Before checking the valve pressure settings, the hydraulic system must be at normal operating temperature (approx. 165° F — 74° C). Valve pressure adjustments made when the hydraulic oil is cold will result in inaccurate relief pressures during actual operating conditions.

IMPORTANT: *The backhoe hydraulic system incorporates a system relief valve in the backhoe main control valve, a second relief valve is located in the loader control valve. The system relief pressure setting for the loader valve is set at a higher pressure than the system relief pressure setting of the backhoe. When pressure testing the backhoe, only actuate the backhoe control levers.*

NOTE: *The system relief valve can also be checked with the hydraulic tester using the "Circuit and Accumulated Leakage Tee Test" test hook-up. Regardless of the method used, the system relief should always be checked before any other tests are made.*

1. Remove the 9/16"-18 UNF plug from the cap plug on the lower left side of the backhoe control valve assembly to install a pressure gauge in the system.

2. Install the pressure gauge, hose assembly, and Tool No's. 2028, 7099 and 0013, as shown in Figure 194.

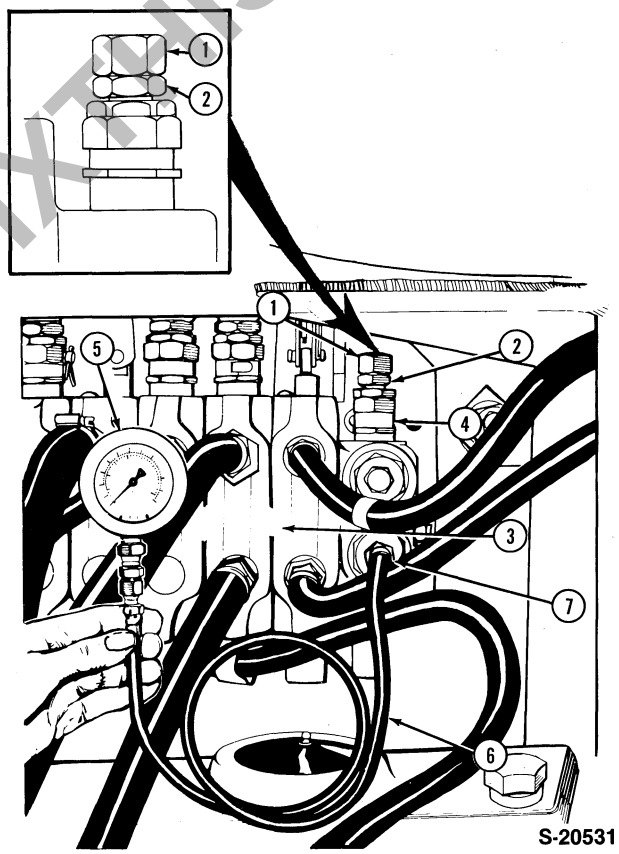


Figure 194
System Relief Pressure Check and Adjustment

1. Adjusting Cap
2. Locknut
3. Control Valve
4. System Relief Valve
5. Gauge, Tool No. 2028
6. Hose, Tool No. 7099
7. Fitting, Tool No. 0013

3. Position the gauge so that it can be read from the backhoe operating seat and start the engine and run at 2200 rev/min.

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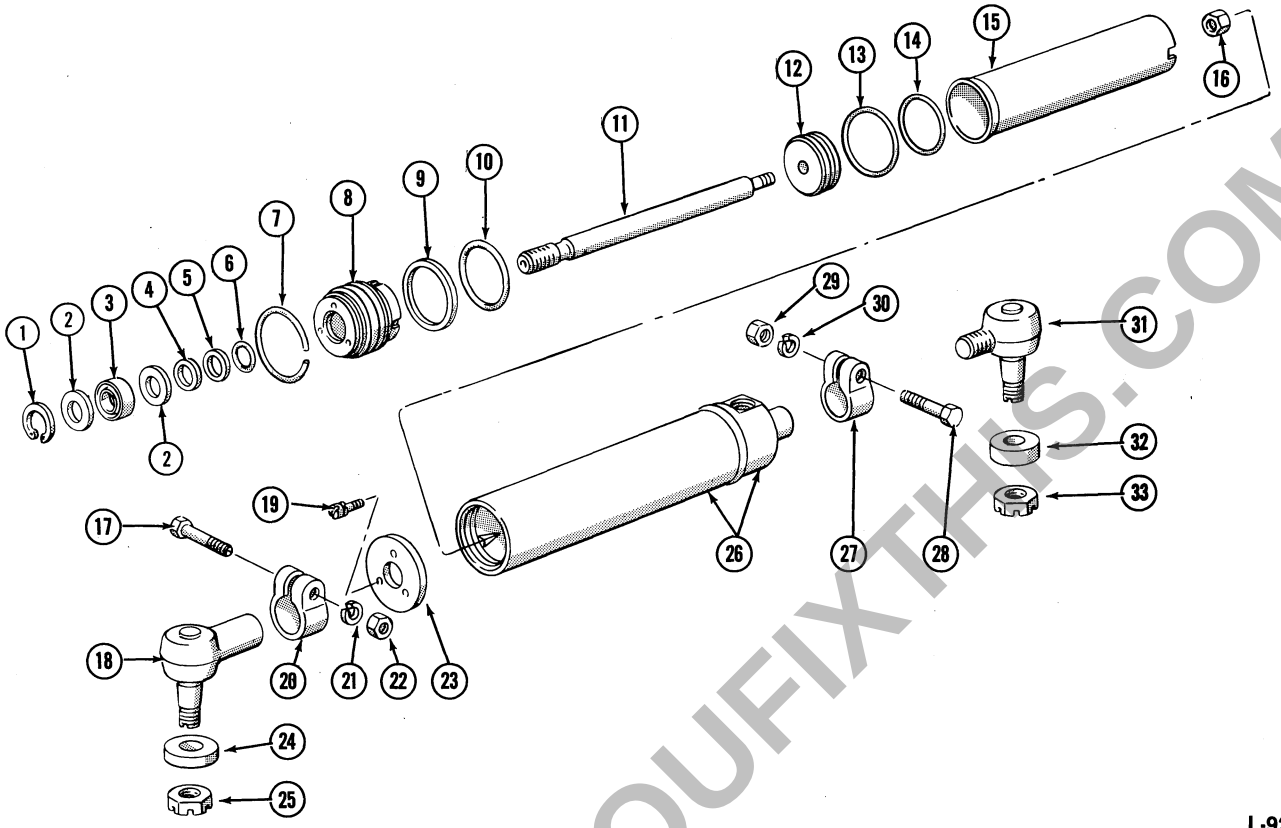


Figure 34
Steering Cylinder

1. Ring, Piston Rod Seal Retainer
2. Washer, Piston Rod Seal Retainer
3. Seal, Piston Rod Outer
4. Washer, Piston Rod O-Ring Retainer
5. Ring, Piston Rod O-Ring Back-Up
6. O-Ring, Piston Rod Inner
7. Gland Lock Ring
8. Gland and Seal Kit
9. Ring Gland, O-Ring Back-Up
10. Gland O-Ring
11. Cylinder Piston Rod
12. Cylinder Piston
13. Cylinder Piston Outside Ring
14. Cylinder Piston Inside Ring
15. Cylinder Inner Tube
16. Piston-to-Rod Nut
17. Clamp Bolt
18. Cylinder End Assembly, Front
19. Plate-to-Gland Screw
20. Cylinder End Clamp
21. Lock Washer
22. Nut
23. Cylinder End Plate
24. End Assembly Dust Cover
25. Nut End Assembly
26. Cylinder Head & Tube Assembly
27. Cylinder End Clamp
28. Bolt
29. Nut
30. Lockwasher
31. Cylinder End Assembly, Rear
32. End Assembly Dust Cover
33. End Assembly Nut

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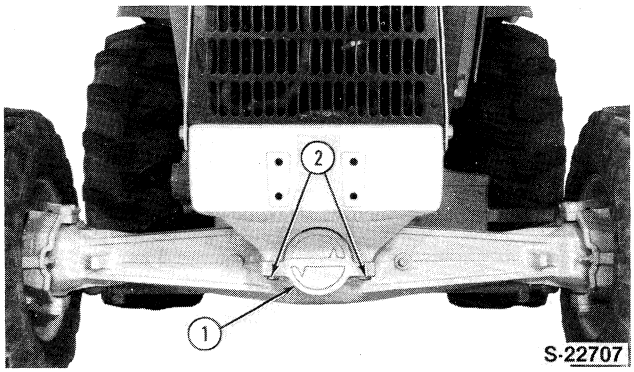


Figure 61
Front Pivot and Bearing Removal
1. Pivot Support
2. Mounting Botls

INSTALLATION

Installation of the front axle assembly follows the removal procedure in reverse. If new oscillation bearings are installed, position the bearing within the support castings. Install the special bolts and grease fittings as shown, Figure 62.

Tighten all nuts and bolts to the specified torque. See "Specifications," Chapter 7.

Refill the axle and wheel hubs to the proper level with Ford 134C oil.

To refill the wheel hubs, rotate one of the wheels until the level/fill/drain plug opening is horizontal (level). Fill the wheel hub until oil reaches the plug opening and reinstall the plug. Repeat this operation on the other wheel.

To refill the front axle and front drop box, remove the level/fill plug on the front of the axle. Fill until oil reaches the plug opening and reinstall the plug.

Lubricate both front and rear oscillation bearings through the grease fittings on each bearing.

C. OVERHAUL

FINAL PLANETARY AND WHEEL HUB BEARINGS

REMOVAL

1. Using a double nut arrangement (1), remove the two flanged wheel lug bolts (2), Figure 63.

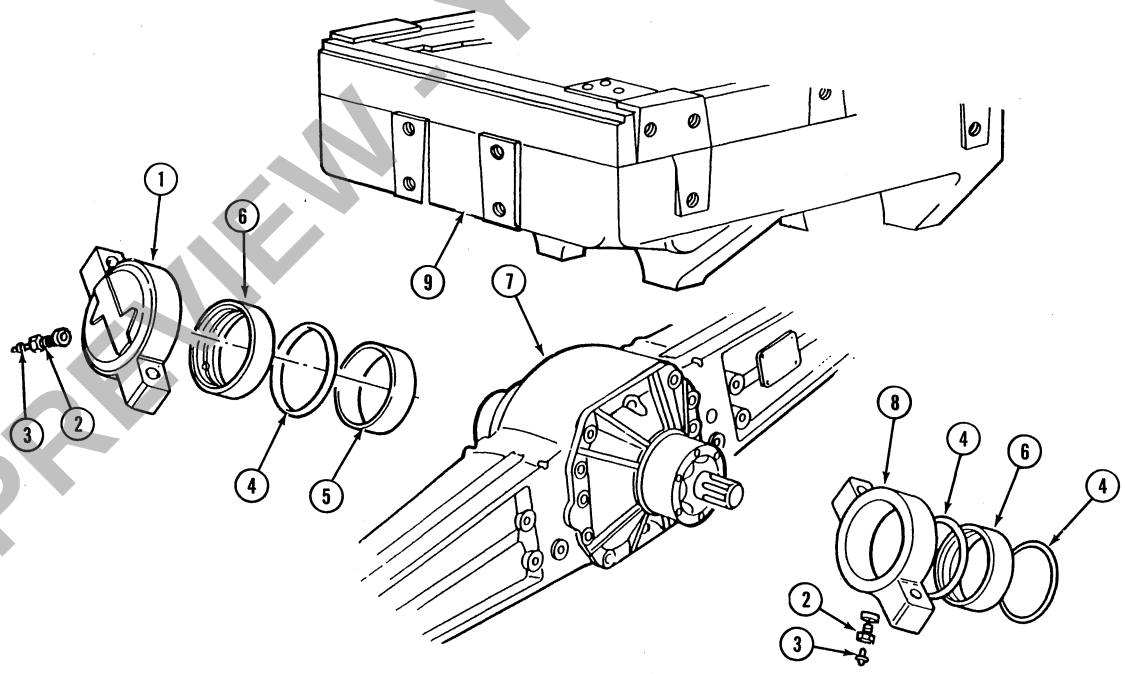


Figure 62
Front Axle Pivot Bearing Installation
1. Front Pivot Support
2. Bolt
3. Grease Fitting
4. Thrust Washer
5. Inner Bushing
6. Outer Bishing
7. Axle Assembly
8. Rear Pivot Support
9. Front Support

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