SERVICE MANUAL

SKID-STEER LOADER
L-451, L-452, L-454, L-455

NEW HOLLAND



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PLEASE READ CAREFULLY!

INCLUDED THROUGHOUT THIS MANUAL AND ON MACHINE DECALS YOU WILL FIND PRECAUTIONARY STATEMENTS SUCH AS "CAUTION", "WARNING" AND "DANGER", FOLLOWED BY SPECIFIC INSTRUCTIONS.

THESE PRECAUTIONS ARE INTENDED FOR THE PERSONAL SAFETY OF YOU AND THOSE WORKING WITH YOU. PLEASE TAKE THE TIME TO READ THEM.

PERSONAL SAFETY!

CAUTION: THE WORD "CAUTION" IS USED WHERE A SAFE BEHAVIORAL PRACTICE ACCORDING TO OPERATING AND MAINTENANCE INSTRUCTIONS AND COMMON SAFETY PRACTICES WILL PROTECT THE OPERATOR AND OTHERS FROM ACCIDENT INVOLVEMENT.

WARNING: THE WORD "WARNING" DENOTES A POTENTIAL OR HIDDEN HAZARD WHICH HAS A POTENTIAL FOR SERIOUS INJURY. IT IS USED TO WARN OPERATORS AND OTHERS TO EXERCISE EVERY APPROPRIATE MEANS TO AVOID A SURPRISE INVOLVEMENT WITH MACHINERY.

DANGER: THE WORD "DANGER" DENOTES A FORBIDDEN PRACTICE IN CONNECTION WITH A SERIOUS HAZARD.

ADDITIONAL PRECAUTIONARY STATEMENTS SUCH AS "ATTENTION" AND "IMPORTANT" ARE FOLLOWED BY SPECIFIC INSTRUCTIONS. THESE STATEMENTS ARE INTENDED FOR MACHINE SAFETY.

MACHINE SAFETY!

ATTENTION: THE WORD "ATTENTION" IS USED TO WARN THE OPERATOR OF POTENTIAL MACHINE DAMAGE IF A CERTAIN PROCEDURE IS NOT FOLLOWED.

IMPORTANT: THE WORD "IMPORTANT" IS USED TO INFORM THE READER OF SOMETHING HE NEEDS TO KNOW TO PREVENT MINOR MACHINE DAMAGE IF A CERTAIN PROCEDURE IS NOT FOLLOWED.

IMPORTANT!

FAILURE TO FOLLOW THE "CAUTION", "WARNING", AND "DANGER" INSTRUCTIONS MAY POSSIBLY RESULT IN SERIOUS BODILY INJURY OR DEATH.

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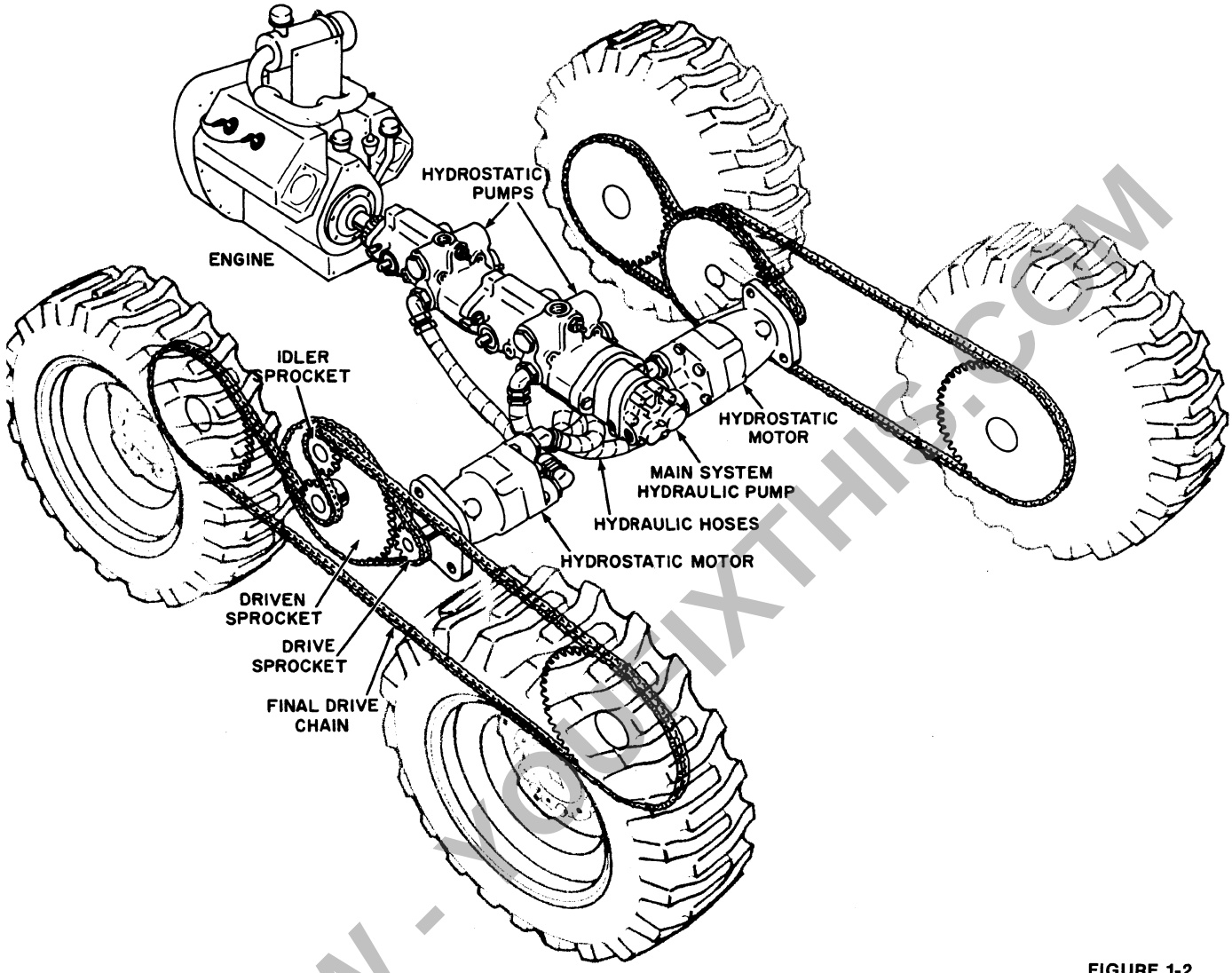


FIGURE 1-2

CAUTION!

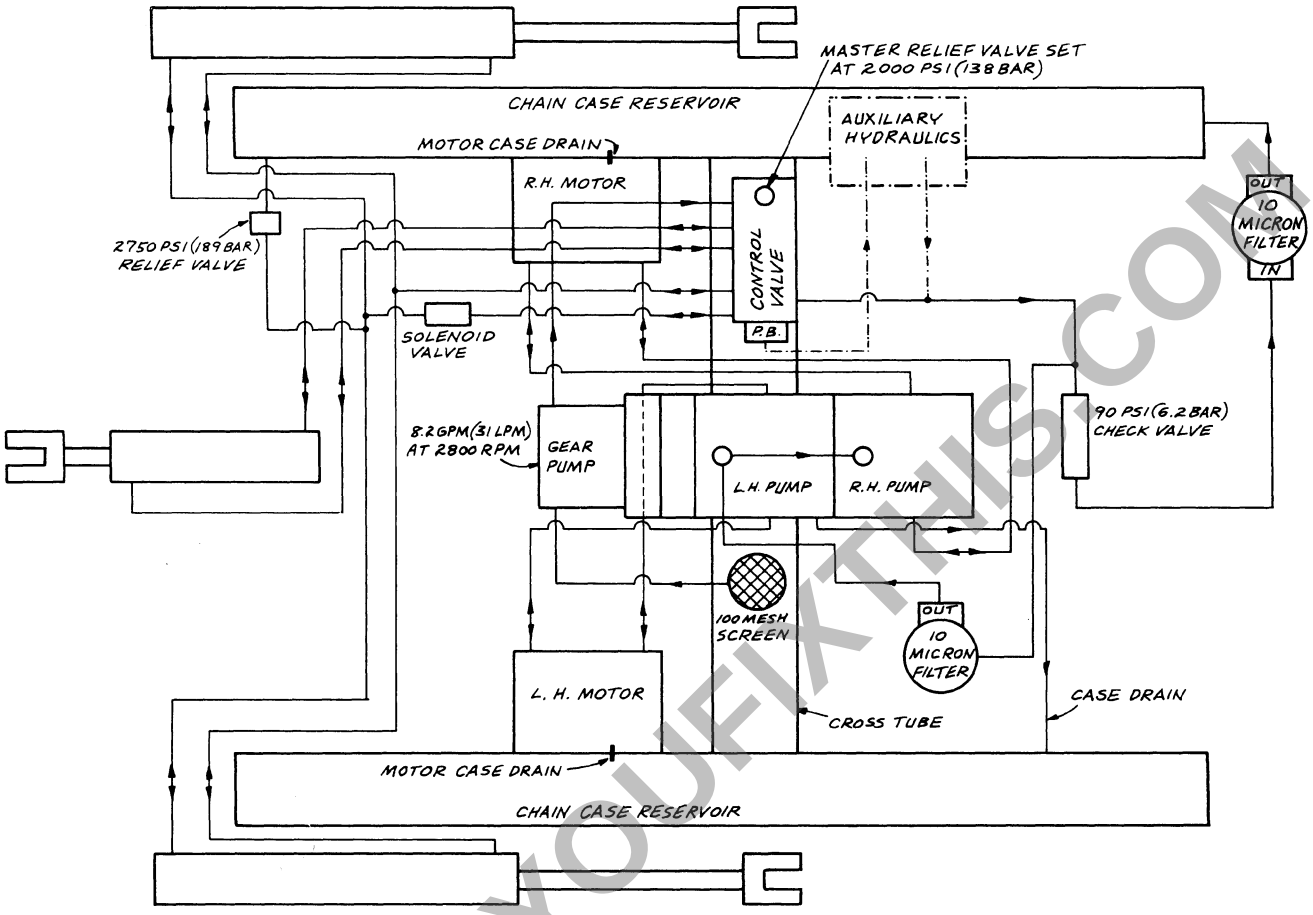
BE A SAFE OPERATOR. Before attempting to operate the loader, thoroughly acquaint yourself with:

1. **The safety information in the Operator's Manual and Skid-Steer Loader Safety Manual.**
2. **The operating instructions in the Operator's Manual.**
3. **The controls on the loader.**

When a loader digs into a pile of dirt, the operator strives to exert maximum tractive effort with very little speed. The variable displacement hydrostatic units are destroked so they drive the motors at the required slow speed while generating maximum torque. Minimum power losses occur because input speeds are reduced drastically below levels attainable with slipping clutches as used in mechanical drives.

To obtain maximum torque at the wheels, the control levers should be close to the neutral position. This differs from a mechanical drive unit where the operator pushes the control levers as far forward as possible to prevent the clutches from slipping. The positiveness of the hydrostatic drive at low speeds allows the operator to ease the bucket into loads, rather than using the impact loading technique which is so often necessary when using mechanically driven units.

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L-454 — L-455 LOADER HYDRAULIC DIAGRAM

FIGURE 1-4

The loader lift system consists of the oil strainer, gear pump, control valve, boom cylinders, and bucket cylinder. Hydraulic oil is pulled from the chain case reservoir through the 100-mesh strainer screen and into the gear pump. The gear pump supplies oil to the main control valve with a master relief valve set at 2000 PSI (138 bar) to limit the maximum system pressure. Oil is then supplied to the boom or bucket cylinders on demand. Return oil from the open center control valve flows through the 10-micron bypass-type filter to the left side (front) hydrostatic pump. Oil then flows through the back plate to the right side (rear) hydrostatic pump to provide adequate oil flow. A 90 PSI (6.2 bar) check valve is used in between the control valve and 10-micron filter which will direct oil flow over 90 PSI (6.2 bar) through a 10-micron bypass-type filter and return it to the chain case reservoir.

The left and right piston pumps supply oil to the piston motors whenever the steering levers are activated. A case drain line moves leakage oil from the piston pump cases to the reservoir. The piston motor cases drain directly into the reservoir through the output shaft bearings.

A pressure-beyond fitting supplies oil from the main control valve to the auxiliary hydraulic kit if this option has been installed.

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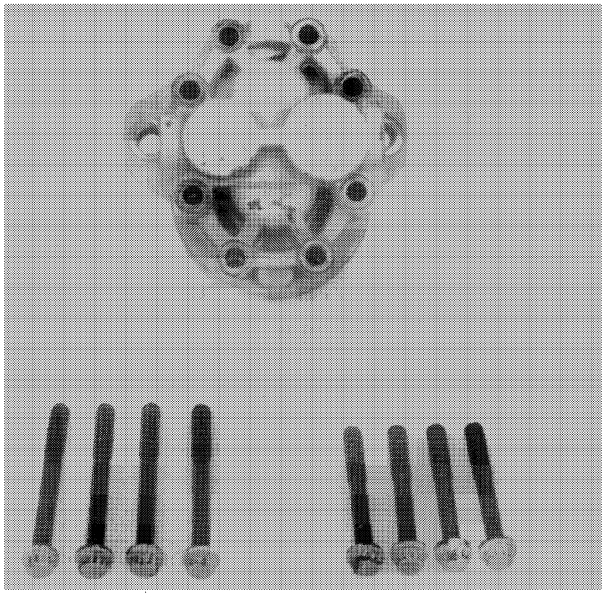


FIGURE 6-2

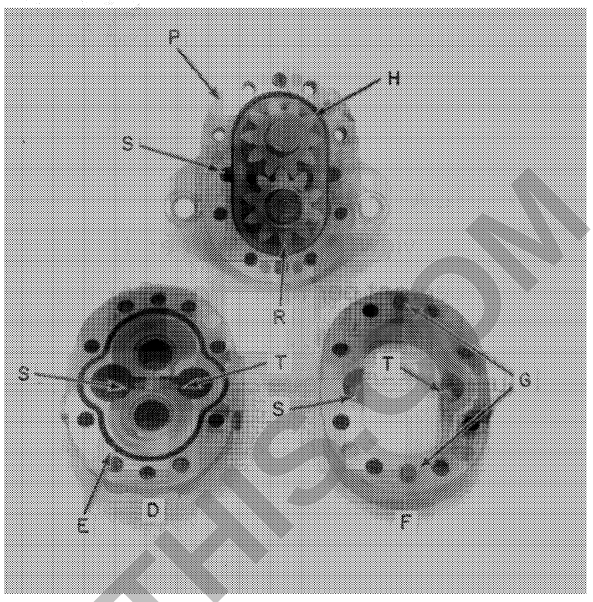


FIGURE 6-3

4. Remove the tie bolts, Figure 6-2.

   NOTE: Two types of gear pumps are used. One style uses four long and four short tie bolts. The other uses eight tie bolts of the same length. See the service parts manual for the parts needed to rebuild either style.

5. Remove the pump from the vise. Bump the splined shaft against a wooden block or tap it with a plastic hammer to separate front plate, P, from back plate, D. The body, F, will remain with either the front or back plate due to two dowel pins, G, Figure 6-3. The idler gear assembly, R, can now be removed.

6. To separate the body, F, from the section it remained with, place the drive gear and shaft assembly, G, in the bearing. Tap the shaft end with a plastic hammer.

7. Remove O ring, E, from the back plate assembly, Figure 6-3.

8. Remove diaphragm, I, by prying with a sharp tool, being careful not to damage the housing. Remove the two check springs, N, and two check balls, O. Remove backup gasket, J, and protector gasket, K. Remove diaphragm seal, L, from the front plate. Remove shaft seal, Q, Figure 6-5.

   NOTE: This procedure applies to both types of pumps, but there are no check balls in the later version, Figure 6-7.

PARTS INSPECTION

1. Clean all parts in a suitable solvent.
2. Remove all minor nicks and burrs from the parts with emery cloth.
3. Gear Assembly
   a. Inspect drive gear shaft, H, Figure 6-3, for a broken keyway under the gear or worn splines.

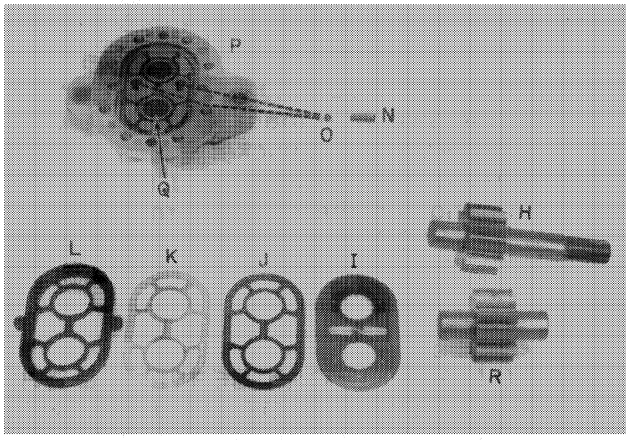


FIGURE 6-4

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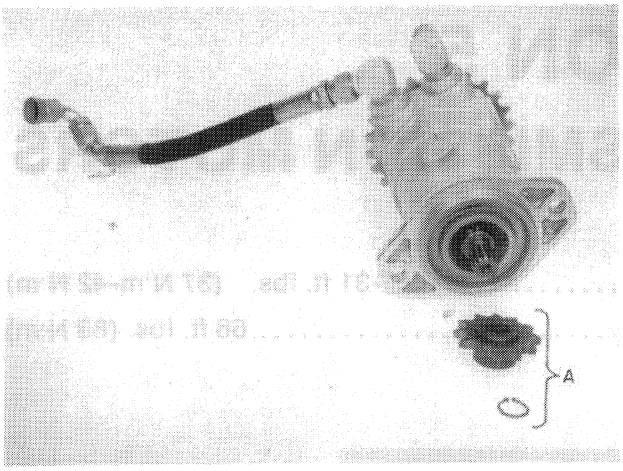


FIGURE 5-2

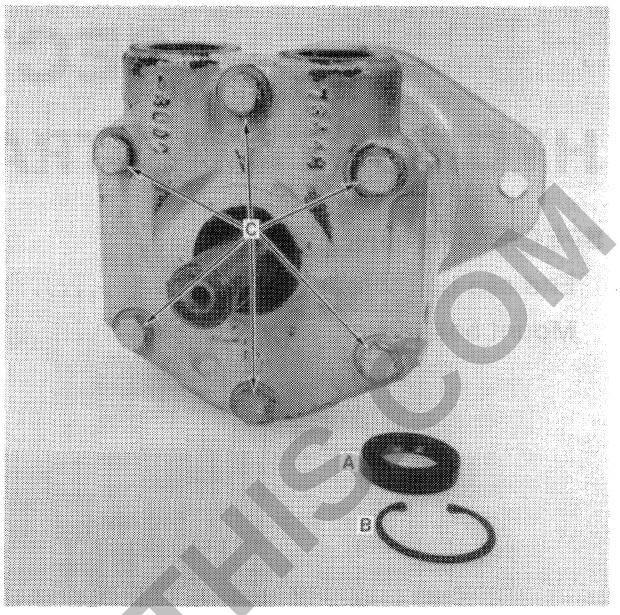


FIGURE 5-4

2. Remove the sprocket and snap ring from the motor shaft, A, Figure 5-2, and the sprocket brake held on by two 90° opposed setscrews and shaft key, A, Figure 5-3.
3. Thoroughly clean the motor and scribe a line as shown in Figure 5-1 to insure proper reassembly.
4. Remove seal, A, held on by snap ring, B, Figure 5-4.
5. Remove the six retaining cap screws, C, Figure 5-4, and remove back plate, A, Figure 5-5, from the motor housing.



FIGURE 5-3

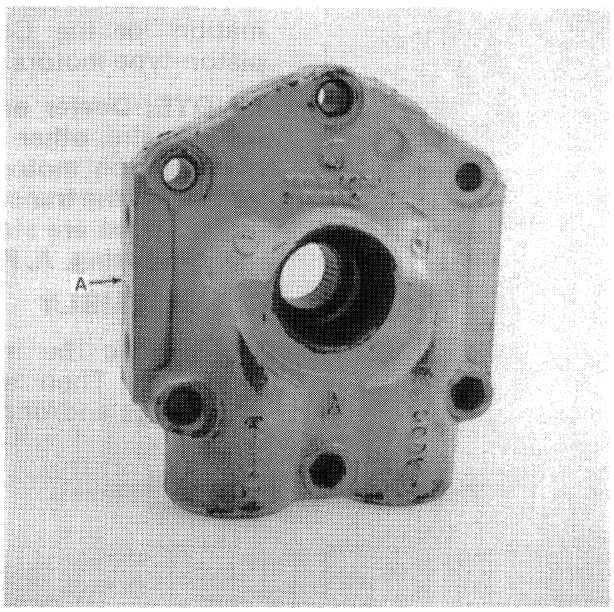


FIGURE 5-5

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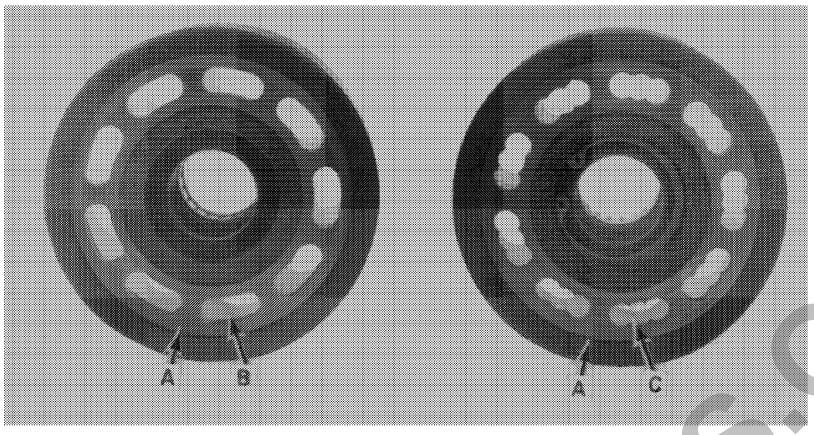


FIGURE 4-19

5. Shoe Plate

   Check for cracks at the holes for the spherical washer or shoes. The shoe plate is only available as part of the rotating group.

6. Spherical Washer

   Check for wear on the top surface where the shoe plate fits. The spherical washer is only available as part of the rotating group.

7. Rotating Piston Block

   Replace the rotating group if:

   a. Cylinders, C, Figure 4-20, are worn or scored so the pistons do not move freely.

   b. Surface, A, Figure 4-19, is worn or grooved or shows metal buildup. Nicks must not extend from the cylinders to the edge of the raised area, A.

   c. Cylinder ports may be milled, B, or drilled, C, Figure 4-19 (two types of blocks).

   d. The three block loading pins, A, Figure 4-20, are spring loaded. They are held in place by the pin keeper (split bushing), B.

      Check loading pin action by placing the pin side of the piston block on a flat steel surface. Press on the opposite end (top) of the block with both hands to compress the large spring. Release the pressure, and the spring should force out the three pins. All the pins should extend out of the block the same distance and must be straight.

8. Valve Plates

   ATTENTION: The outer layer of the heat-treated sides of the valve plate is less than 0.001" thick (0.025 mm) and dull black. Do not try to smooth or polish the side of the valve plate by lapping.

   After heat-treating, a ¾" (20 mm) wide band of dry-film lubricant is applied to both sides of the valve plate, Figure 4-17.

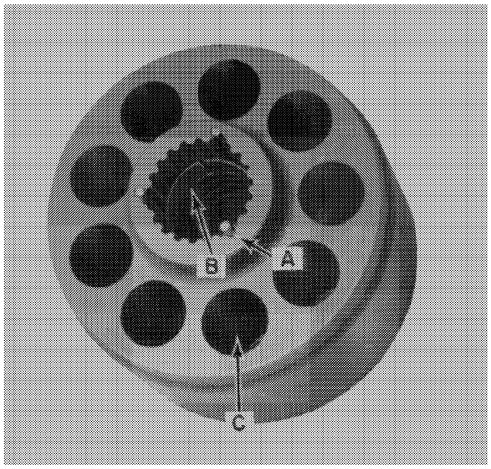


FIGURE 4-20

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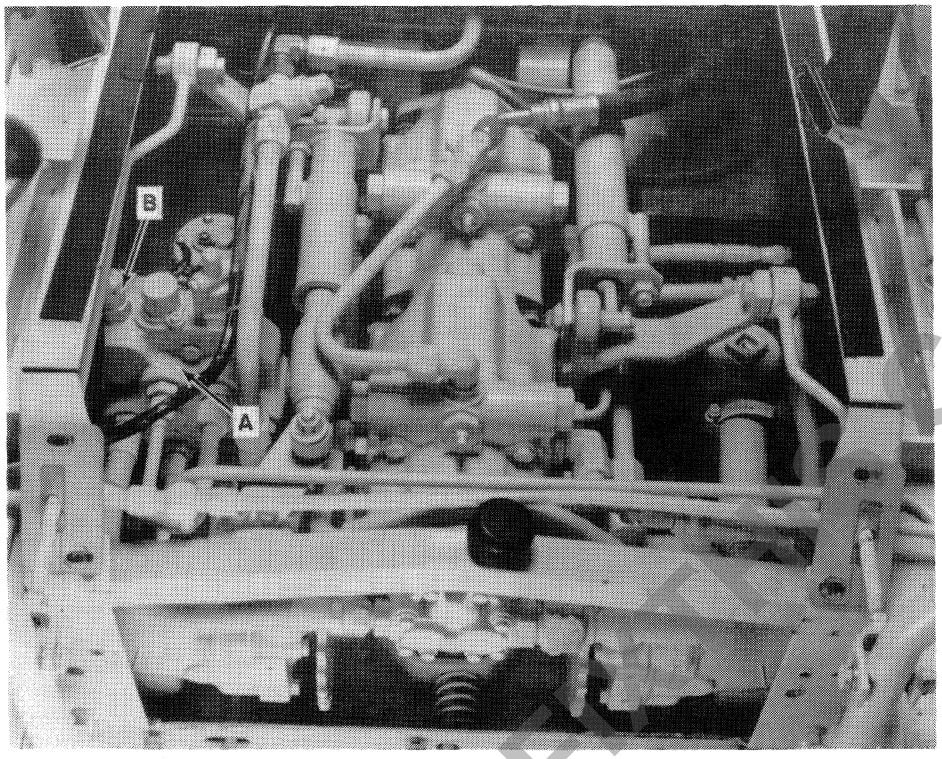


FIGURE 8-3

The control valve is located in the loader at A, Figure 8-3.

Service of the control valve is limited to these areas:

1. The main system relief valve
2. The lift check valves
3. The spools and O rings

SERVICING

The main system relief valve, B, Figure 8-3, is a cartridge-type valve, preset and stamped at the factory to 2,000 PSI (13,780 kPa). However, the system pressure will vary from 2,000 PSI (13,780 kPa) to 2,200 PSI (15,169 kPa) when the hydraulic oil temperature is 120°F (49°C).

If the system pressure does not fall into this pressure range when checked, install a new relief valve. The cartridge-type relief valve is not serviceable.

WARNING: GAUGES, GAUGE FITTINGS, AND HOSES MUST HAVE OPERATING PRESSURE RATINGS AT LEAST 25 PERCENT HIGHER THAN THE HIGHEST PRESSURES OF THE SYSTEM.

NEVER ADJUST THE RELIEF VALVES TO HIGHER PRESSURES THAN THOSE SPECIFIED BY THE EQUIPMENT MANUFACTURER.

WARNING: FLUID UNDER PRESSURE CAN HAVE SUFFICIENT FORCE TO PENETRATE THE SKIN, CAUSING SERIOUS PERSONAL INJURY. ALWAYS PROTECT THE SKIN AND EYES FROM ESCAPING FLUID UNDER PRESSURE.

IF INJURED BY ESCAPING FLUID, OBTAIN MEDICAL ASSISTANCE AT ONCE. SERIOUS INFECTION OR REACTION CAN DEVELOP IF MEDICAL TREATMENT IS NOT ADMINISTERED IMMEDIATELY.

BEFORE DISCONNECTING THE LINES OR FITTINGS, BE SURE TO RELIEVE ALL PRESSURE. BEFORE APPLYING PRESSURE TO THE SYSTEM, BE SURE ALL CONNECTIONS ARE TIGHT AND LINES, PIPES, AND HOSES ARE NOT DAMAGED.

WARNING: RAISE THE BOOM, EXTEND THE BOOM LOCK ARMS, AND LOWER THE BOOM ONTO THE ARMS. STOP THE ENGINE AND WORK THE BOOM AND BUCKET PEDALS TO RELIEVE HYDRAULIC PRESSURE IN THE BOOM AND BUCKET SYSTEM BEFORE DISMOUNTING.

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TROUBLESHOOTING

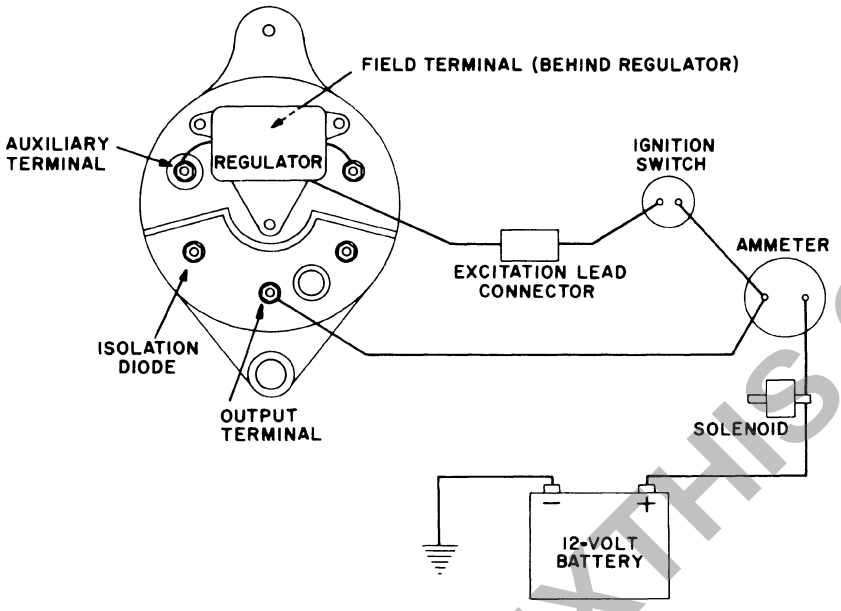


FIGURE 10-3

When a charging problem is encountered:

1. Check the alternator drive belt for proper tension.
2. Be sure all connections are making good contact, Figure 10-3.

   If the connections are correct:

   a. There should be battery voltage at the output terminal at all times.

   b. With the ignition switch on, there should be voltage at the excitation lead connector, Figure 10-3.

   If these points do not remedy the problem, refer to Section 12 of this manual.

CAUTION

BEFORE SERVICING THE LOADER OR ANY OF ITS ATTACHED EQUIPMENT, BE SURE THE ATTACHMENTS ARE LOWERED TO THE GROUND OR THE BOOM ARMS ARE SUPPORTED BY THE BOOM LOCK ARMS.

ALTERNATOR TEST FOR 12-VOLT NEGATIVE GROUND RA SERIES ALTERNATORS WITH ISOLATION DIODE

Make the following tests with the alternator in the vehicle with output and regulator connections maintained to the alternator except as noted in Steps 4 and 5. Carefully remove the regulator and disconnect the leads between the regulator and alternator in Steps 4 and 5.

TEST PRECAUTIONS:

DO NOT disconnect the alternator output lead while the alternator is operating.

DO NOT disconnect the voltage regulator while the alternator is operating.

DO NOT ground the field terminal.

Check the condition of the battery. Use a fully charged battery when testing the alternator.

Disconnect the ground cable of the battery when removing and installing the alternator.

Check the alternator charging system and electrical system wiring. It must be wired according to the wiring diagram in the operator's manual.

There must be battery voltage at the alternator positive output terminal at all times while the battery is connected.

Make certain the alternator drive V-belt is properly tensioned.

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SECTION 13
SPECIFICATIONS

DIESEL ENGINES	L-451	L-455
Manufacturer	Deutz	Kubota
Model	F2L511	D1402B
Cylinders	2	3
Cycle	4 - Stroke	4 - Stroke
Bore and Stroke	3.9 x 4.1" (100 x 105 mm)	3.25 x 3.23" (85 x 82 mm)
Displacement	101 cu. in. (1650 cm^3)	85.13 cu. in. (1395 cm^3)
Speeds —		
Fast (No Load)	2400/2500 RPM	2800/2900 RPM
Idle (No Load)	1000± 50 RPM	1000 ± 50 RPM
Horsepower (Mfg. Rating) @ RPM	31.5 @ 2400	28.5 @ 2800
Valve Clearance —		
Intake (Cold)	0.006" (0.15 mm)	0.007" - 0.008" (0.18 mm - 0.22 mm)
Exhaust (Cold)	0.006" (0.15 mm)	0.007" - 0.008" (0.18 mm - 0.22 mm)
Firing Order	1, 2, 3	1, 2, 3
Oil Filter - Repl. Cartridge	Deutz 1164626, NH 283120 Fram PH46	Kubota 155213243-Suffix No. 0, 1, 2, 3 NH 50320
Approximate Fuel Consumption At Continuous Full Load	1.7 gal./hr. (6.4 L/Hr.)	1.7 gal./hr. (6.4 L/Hr.)
Crankcase Capacity (includes filter)	3.7 qts. (3.5 L)	7 qts. (6.7 L)
Ignition Type	Compression	Compression
Fuel Filter	Replaceable Cartridge Deutz 1161341 NH 283119 Fram P 4102	Replaceable In-line NH 269212 Replaceable Cartridge NH 501699
ENGINE GRADABILITY	35° All Directions*	30° All Directions*

*These are maximum angles for engine operation on an intermittent basis.

Air Cleaner		
-Dry Type Filter		
Primary Element	NH 221406	NH 221406
Safety Element	NH 272744	NH 272744

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