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MAINTENANCE WITHOUT ACCIDENT
WORK SAFELY


T27999

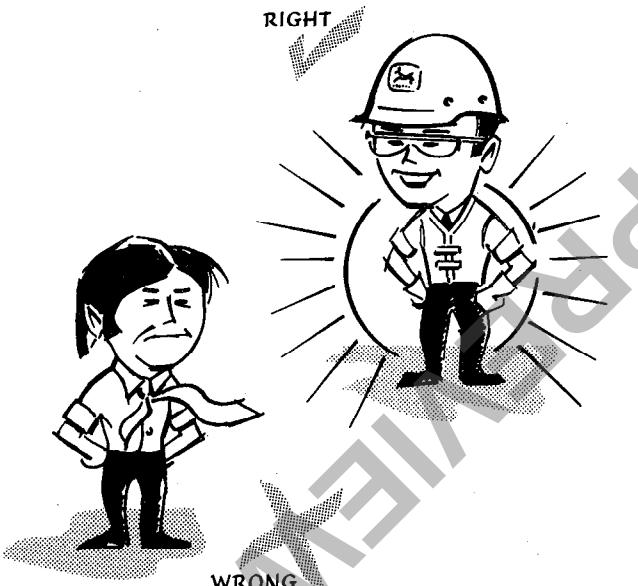
This safety alert symbol identifies important safety messages in this manual and on the loader and loader backhoe. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.

EVERY EMPLOYER HAS A SAFETY PROGRAM. KNOW WHAT IT IS!


T27501N

Consult your shop foreman for specific instructions on a job, and the safety equipment required.

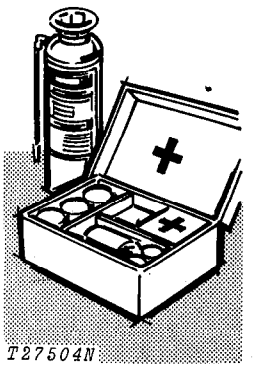
For instance, you may need: Hard hat, safety shoes, safety goggles, heavy gloves, reflector vests, ear protectors, respirators.



T27502N

BE ALERT!

Plan ahead — work safely — know how to use a first-aid kit and a fire extinguisher — and where to get aid and assistance.


T27504N

Maintenance Area

Make sure the maintenance area is adequately vented.

Keep maintenance area CLEAN AND DRY. Oily and wet floors are slippery; greasy rags are a fire hazard; wet spots are dangerous when working with electrical equipment.

Store starting aids in a cool and well-ventilated place, out of the reach of unauthorized personnel.

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Vertical lines indicate pages included in this revision.
*Remove these pages from the manual.

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Section 10
GENERAL

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Group 5
GENERAL MACHINE SPECIFICATIONS

(Specifications and design subject to change without notice. Wherever applicable specifications are in accordance with ICED and SAE Standards. Except where otherwise noted, these specifications are based on a unit equipped with 16.9-24, 6 ply rating, R4 rear tires; 11L-15, 8 ply rating, F-3 front tires; 3/4 cu. yd. (0.57 m³) bucket, and standard equipment.)

Power

(@ 2500 engine rpm):	SAE	DIN
Gross	66 hp (49.2 kW*)	
Net	62 hp (46.2 kW)	65.9 PS

Net engine flywheel power is for an engine equipped with fan, air cleaner, water pump, lubricating oil pump, fuel pump, alternator, and muffler. Gross engine power is without fan. Flywheel power ratings are under SAE standard conditions of 500 ft. altitude and 85°F. temperature and DIN 70 020 standard conditions of 760 mm Hg barometer (sea level) and 20°C. temperature.

*In the International System of Units (SI), power is expressed in kilowatts (kW).

Engine: John Deere 4-cylinder diesel, valve-in-head, 4-stroke cycle

Bore and stroke	4.02x4.33 in. (102x110 mm)
Piston displacement	219 cu. in. (3 588 cm³)
Compression ratio	16.2 to 1
Maximum torque @ 1300 rpm	160 lb-ft (217 Nm) (17.8 kg-m)
NACC or AMA (U.S. Tax) horsepower	25.65
Main bearings	5
Lubrication	Pressure system with full flow filter
Cooling	Pressurized with thermostat and fixed bypass
Fan	Suction
Air cleaner	Dry
Electrical system	12 volt with alternator
Batteries (two 12 volt)	Reserve capacity: 220 minutes

Engine Clutch ..... Foot-operated, single 10 in. (254 mm) plate

Transmission:
Constant mesh, 8 speeds forward, 8 reverse. Hydraulic direction reverser permits no-clutch reversing in all gears.

Gear:	Travel Speeds mph		km/h	
	Fwd.	Rev.	Fwd.	Rev.
1	1.4	1.6	2.3	2.6
2	2.0	2.3	3.2	3.7
3	3.0	3.5	4.8	5.6
4	4.2	4.8	6.8	7.7
5	5.5	6.3	8.9	10.1
6	7.9	9.0	12.7	14.5
7	11.7	13.5	18.8	21.7
8	16.4	18.7	26.4	30.1

Final Drives ..... Inboard, planetary

Hydraulic System: Closed-center

Max. pressure	2350 psi (16 203 kPa) (165.2 kg/cm²)
Loader control	Single-lever
Pump	Piston, constant pressure, variable displacement, 28 gpm (106 L/min) at 2500 engine rpm
Filter	25 micron steel-enclosed paper cartridge in return

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Group 10
PREDELIVERY, DELIVERY, AND AFTER-SALE SERVICES

TEMPORARY UNIT STORAGE

After receiving your unit from the factory and before putting the machine into temporary storage, perform the following checks and services.

For long term storage (over 30 days) information, consult your JD401-C operator's manual.

1. Check battery electrolyte level and charge the battery, if necessary.

2. Check engine coolant level. Maintain midway between the radiator core and filler neck.

3. Fill the fuel tank.

4. Check crankcase oil level. Oil must be between marks on dipstick after machine has been shut down for 10 minutes.

5. Relieve hydraulic pressure by stopping engine, lowering bucket and backhoe and operating control levers and steering wheel until system fails to respond.

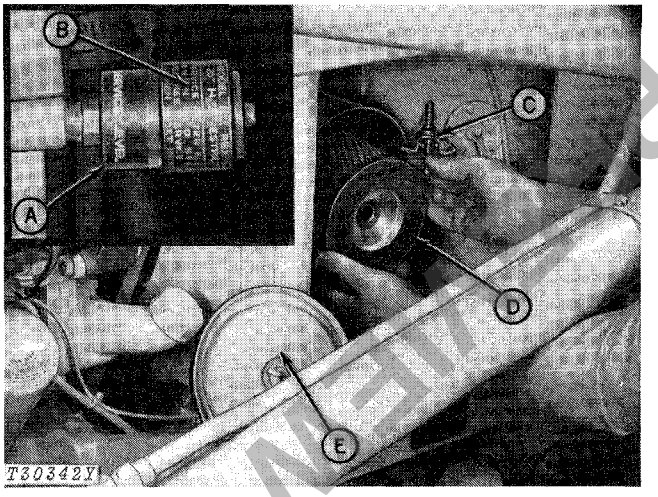
6. Reduce shipping pressure of all tires to the inflation pressure listed on page 10-10-2.

PREDELIVERY SERVICE

Because of the shipping factors involved, plus extra finishing touches that are necessary to promote customer satisfaction, proper predelivery service is of prime importance to the dealer and the customer.

Use the following list when preparing a unit for delivery to the customer.

1. Air Cleaner



A—Restriction Indicator
B—Red Signal
C—Wing Nut
D—Element
E—Cover

Fig. 1-Air Cleaner

Check air filter restriction indicator (A). If red signal can be fully seen, remove element (D) and clean. Install a new element if necessary.

Element checked *Yes* *No*

2. Radiator

Check engine coolant level.

CAUTION: Do not remove radiator filler cap unless the engine is cool. Then loosen the cap slowly to the stop to release pressure before removing the cap.

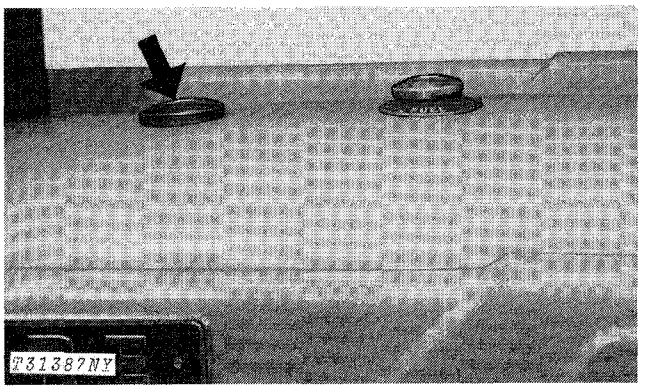


Fig. 2-Radiator Filler Cap

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Group 10
BASIC ENGINE

GENERAL INFORMATION

The cylinder head holds the rocker arm assembly, valve springs, and valves.

Valve guides and seats are integral with the cylinder head.

Intake and exhaust valves in diesel engines have replaceable wear caps. Gasoline exhaust valves have valve rotators.

The camshaft is iron alloy with all cams integral. The gasoline engine camshaft is cast with an integral distributor drive gear. Both the gasoline and diesel engine camshafts have a lobe to actuate the fuel transfer pump.

The camshaft is driven at one-half engine speed by the top idler gear and is supported by three pressure-lubricated bores integral with the cylinder block. Camshaft thrust is taken by a thrust plate fastened to the front of the cylinder block.

Cylinder block and crankcase are cast in one piece.

Cylinder liners are of the replaceable wet-sleeve type, made of hardened alloy cast iron and are a slip fit in the cylinder block. The flange of each liner rests on a shoulder within the block and is sealed by a square rubber packing. The top edge of the liner is sealed flush with the cylinder block by the compression of the cylinder head and gasket. Two O-rings in the block provide additional sealing.

Pistons are aluminum-alloy, cam-ground and weight controlled, with two compression rings and one oil control ring.

Connecting rods have a replaceable bronze bushing for the piston pin and a replaceable, steelbacked, aluminum-lined bearing insert.

The crankshaft is a one-piece steel forging, and is supported on main bearings. The bearings are replaceable, steel-backed, tin-plated, aluminum-lined inserts. The rear main bearing has a thrust surface.

The crankshaft is drilled for pressure lubrication from the main bearings to connecting rod bearings.

The ring gear for the starting motor is shrunk in place on the front outer rim of the flywheel. On the front outer rim of the flywheel is a "TDC" (top dead center) bore that is used when timing injection pump, and adjusting valve tappets.

Two balancer shafts are mounted in the lower half of the cylinder block and each rotates in three pressure-lubricated replaceable bushings.

The balancer shafts rotate in opposite directions to reduce engine vibration. Thrust of the balancer shafts is absorbed by thrust plates fastened to the front of the cylinder block.

The crankshaft gear drives the gear train located at the front of the engine. The upper idler gear transmits power from the crankshaft gear to drive the camshaft gear and the injection pump or governor drive gear. The lower idler gear drives the oil pump gear.

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Group 40
SPECIFICATIONS AND SPECIAL TOOLS

ENGINE REMOVAL AND INSTALLATION

SPECIFICATIONS AND TORQUE VALUES

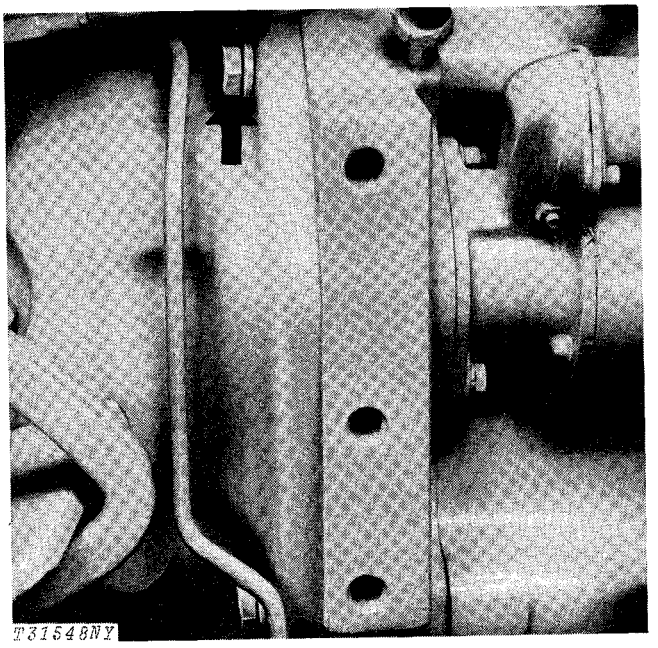


Fig. 1-Engine to Clutch Housing Cap Screws

Engine to clutch housing cap screw torque	250 lb-ft (339 Nm)

ENGINE REMOVAL AND INSTALLATION

SPECIAL TOOLS

Convenience Tools

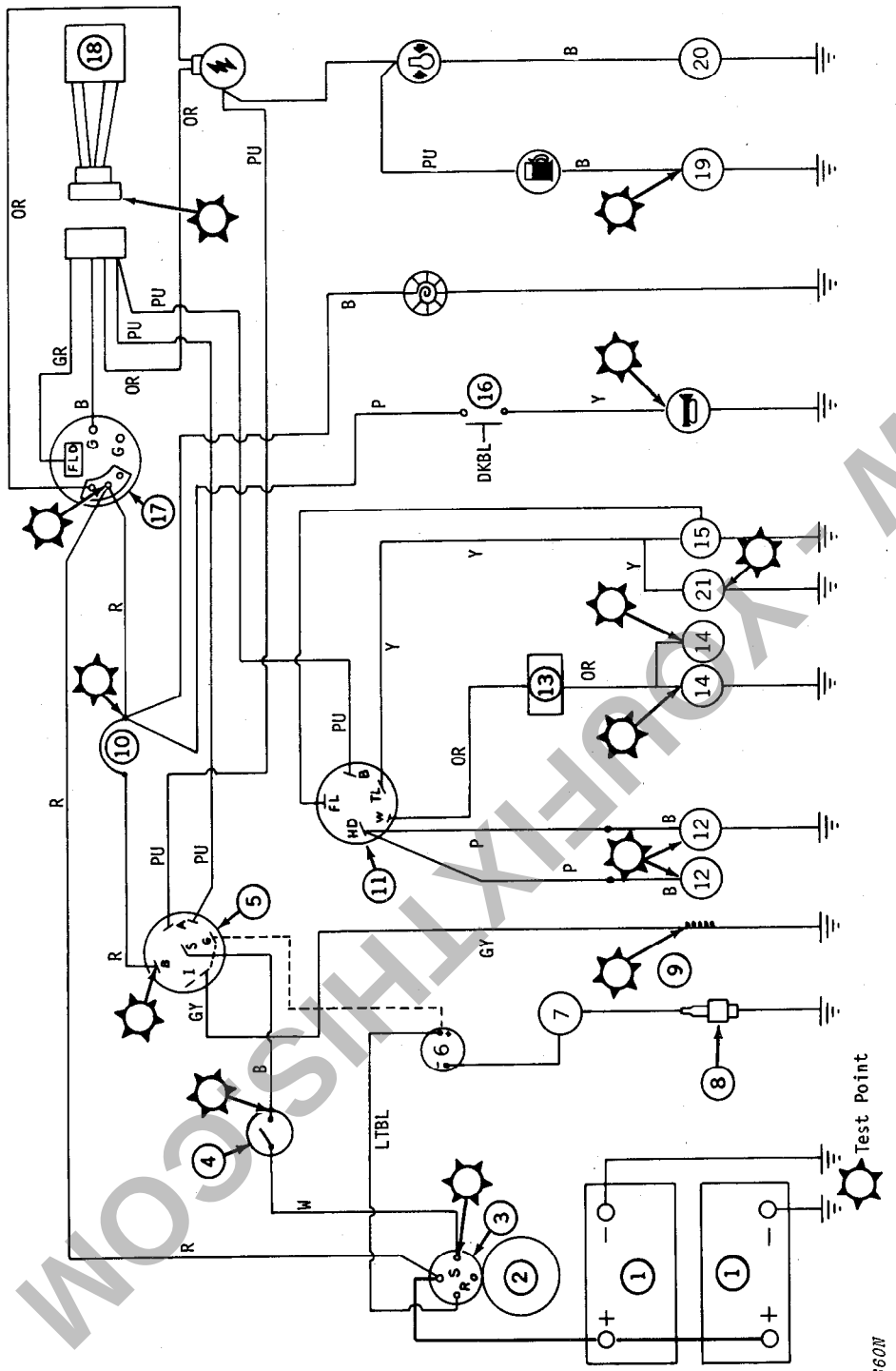
Tool	Tool Number	Use
	JDG-19	Lifting bracket - Engine removal and installation.



Fig. 2-Lifting Brackets

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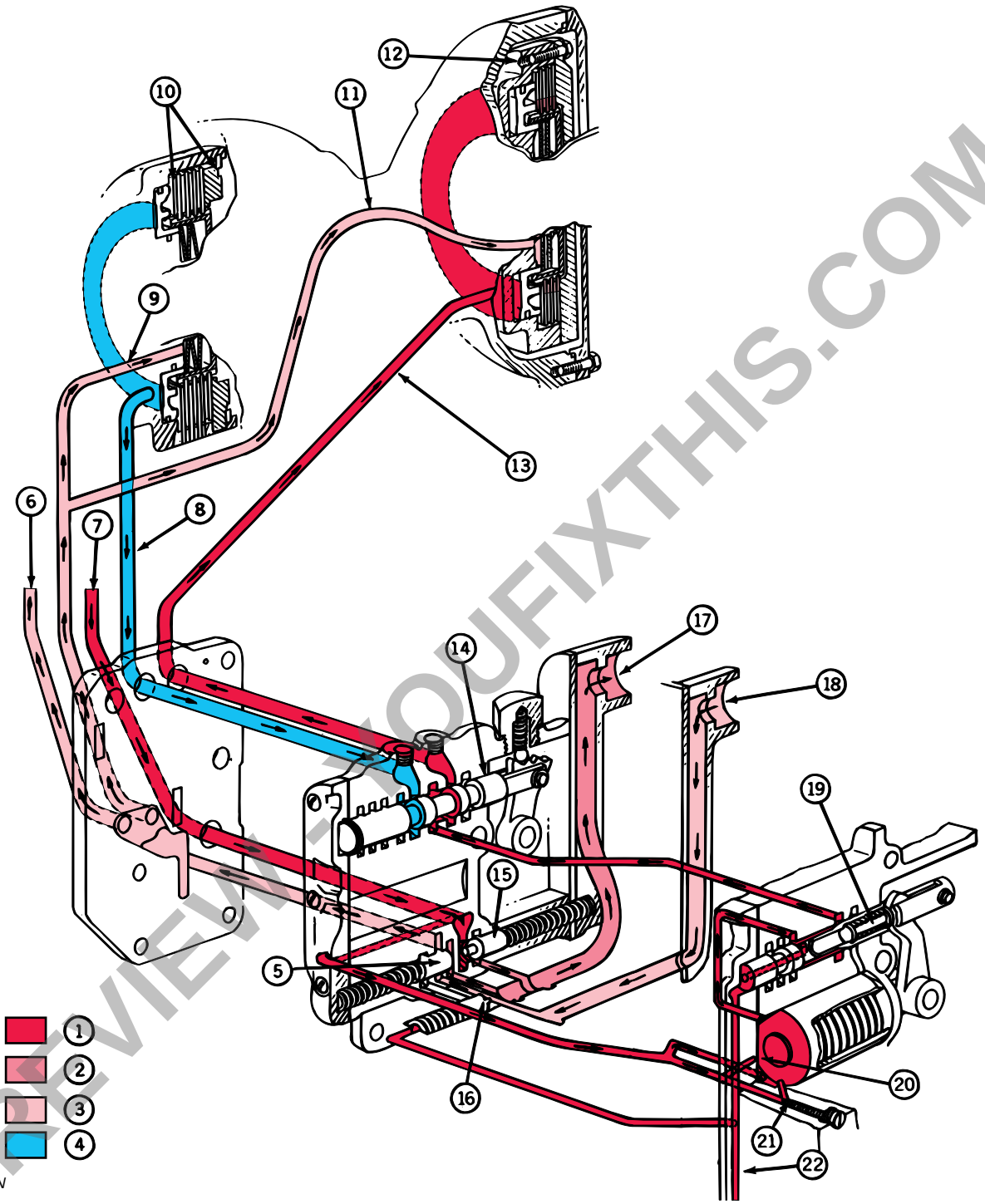


1—Battery
2—Starting Motor
3—Solenoid
4—Neutral Start Switch
5—Key Switch
6—Coil*
7—Distributor*
8—Spark Plug*
9—Fuel Shut-Off Solenoid
10—Circuit Breaker
11—Light Switch
12—Front Headlights (2 used)
13—Flasher
14—Warning Lamps (2)
15—Combination Flood and Taillight
16—Horn Switch
17—Alternator
18—Regulator
19—Sending Unit (Fuel Gauge)
20—Sending Unit (Oil Pressure)
21—Outlet Socket
*—Gas Only

B—Black
BL—Blue
LTBL—Light Blue
OR—Orange
GY—Gray
DKBL—Dark Blue
P—Pink
PU—Purple
R—Red
W—White
Y—Yellow
GR—Green

Fig. 7-Electrical Schematic

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1—Pressure Oil
2—Inlet Oil To Main Hydraulic Pump
3—Lube Oil From Cooler
4—Return Oil To Sump
5—Cooler Bypass and Relief Valve
6—Lube Oil To Transmission
7—Oil From Transmission Oil Pump
8—Oil Line To Reverser Brake
9—Reverser Brake Lube Oil Line
10—Reverser Brake Assembly
11—Forward Clutch Lube Oil Line
12—Forward Clutch Assembly (engaged)
13—Oil Line To Forward Clutch
14—Shift Valve
15—Pressure Regulating Valve
16—Lube Oil Reduction Valve
17—To Cooler
18—From Cooler
19—Clutch Control Valve
20—Fixed Charging Orifice
21—Adjustable Charging Orifice
22—Test Port

Fig. 1-Reverser Clutch Control Valve

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DIAGNOSING MALFUNCTIONS

Engine Will Not Start or Starting Hard

Fuel System Malfunction
- Fuel Tank empty
- Improper type of fuel
- Foreign material in fuel
- Fuel lines clogged or restricted
- Air leak on suction side of fuel system
- Fuel transfer pump malfunction
- Fuel filter restricted (diesel)
- Restricted air intake system
- Faulty injection pump (diesel)
- Faulty injection nozzles (diesel)
- Water, dirt, or air in fuel system
- Carburetor malfunction (gasoline)

Electrical System Malfunction
- Corroded or loose battery cables
- Weak or dead battery
- Cranking speed too slow

Uneven Running or Frequent Stalling

Basic Engine Malfunction
- Improper valve clearance
- Cylinder head gasket leaking
- Valves sticking or burned
- Worn or broken compression rings
- Low compression
- Incorrect timing
- Dirty air intake system
- Exhaust system restricted
- Engine overheating

Fuel System Malfunction
- Improper type of fuel
- Air leak on suction side of fuel system
- Fuel line clogged or restricted
- Fuel transfer pump malfunction
- Fuel filter restricted (diesel)
- Faulty injection pump (diesel)
- Faulty injection nozzles (diesel)
- Water, dirt, or air in fuel system
- Injection nozzle leak-off lines clogged (diesel)
- Injection pump or distributor out of time
- Exhaust system restricted
- Improper carburetor setting (gasoline)

Engine Misses

Basic Engine Malfunction
- Weak valve springs
- Incorrect valve clearance
- Burned, warped, pitted or sticking valves
- Low compression
- Worn camshaft lobes
- Engine overheating

Fuel System Malfunction
- Water, air or dirt in fuel
- Faulty injection nozzles (diesel)
- Faulty injection pump (diesel)
- Faulty transfer pump
- Detonation
- Mixture of gasoline and diesel fuels
- Carburetor out of adjustment (gasoline)

Lack of Power

Basic Engine Malfunction
- Blown cylinder head gasket
- Worn camshaft lobes
- Incorrect valve clearance
- Incorrect valve timing
- Burned, warped, pitted, or sticking valves
- Weak valve springs
- Low compression
- Dirty air intake system
- Incorrect timing
- Engine overheating

Fuel System Malfunction
- Improper type of fuel
- Air leak on suction side of fuel system
- Fuel line clogged or restricted
- Fuel transfer pump malfunction
- Speed control linkage not adjusted properly
- Fuel filter restricted (diesel)
- Fuel injection pump malfunction (diesel)
- Fuel injection nozzle faulty (diesel)
- Water, dirt or air in fuel system
- Injection nozzle leak-off line clogged (diesel)
- Injection pump or distributor out of time
- Clogged manifold system
- Carburetor adjusted too lean (gasoline)

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ADJUSTMENT

The return and pressure valves are adjusted by setting specified distance between the selective control valve cams and the valve rollers while the selective control valve is in neutral position. This is to insure that the return valves open before the pressure valves during selective control valve operation.

A special adjusting cover, JDH-15C is used to make the valve adjustment. The cover valve locking screws hold the valves on their seats.

The adjusting procedure is as follows:

1. Replace the selective control valve cap and four valve guides with the adjusting cover. Make sure the four adjusting screws are not making contact with the valves.

2. With the valve housing in a vise and the open end up, remove the rubber keeper on the cam adjusting screws and loosen the screws.

3. Loosen the cam holding screws (11, Fig. 4) and let the cams rest on the valve rollers. Leave the holding screws slightly loose.

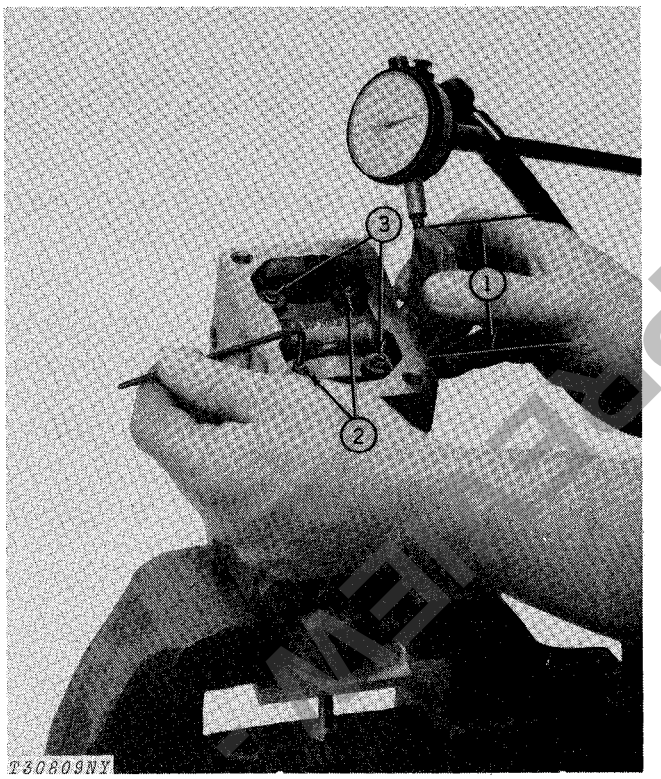
4. Turn in the two adjusting cover valve locking screws on the lever side of the housing to hold the pressure and return valves on that side on their seats. Rotate the rocker assembly to visually make sure that the cam is riding properly on the valve rollers. (The valves could possibly turn 90°, preventing cam contact.)

IMPORTANT: Do NOT use a wrench on any of the adjusting cover screws. Tighten with fingers only.

5. Level the rocker in relation to the housing edge. Gradually screw in the adjusting cover detent piston locking screw to force the detent piston follower to just touch the rocker. Move the rocker slightly until the follower is felt going into the neutral notch. Finger tighten the screw to hold the rocker in neutral.

6. With the rocker held in neutral, install a dial indicator (with minimum 0.140 in. [3.56 mm] travel) on the valve lever two inches (51 mm) from the center of the rocker shaft (Fig. 9). Zero the indicator at midpoint of its travel.

7. Turn in the two cam adjusting screws on the lever side of the housing evenly until they just touch the cam. Do not apply pressure. If screws appear uneven, check the cam for tilt.



1—2.0 in. [51 mm]
2—Return Valve Adjustment
3—Pressure Valve Adjustment

Fig. 9-Valve Adjustment

8. Install rubber keepers and back the cam adjusting screw over the return valve 1/8 turn. Back out the adjusting screw located over the pressure valve 1/4 turn.

9. Tighten cam holding screws and pry cam up against adjusting screws.

NOTE: Each time the cam adjusting screws are backed away from the cams, the cams must be pried up against the screws, without loosening the cam holding screws.

10. Rotate the rocker in both directions. As the cam touches the return valve roller the dial indicator should read 0.024 ± 0.016 in. [0.61 ± 0.41 mm]. As the cam touches the pressure valve roller in the other direction, the indicator should read 0.064 ± 0.016 in. [1.6 ± 0.41 mm]. Turn cam adjusting screws (Fig. 9) in to decrease or out to increase the distance to obtain these specifications.

11. Occasionally check the "zero" reading on the dial indicator as directed in steps 5 and 6.

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SYMPTOM INDEX

SYMPTOMS	PROBABLE FAULTY COMPONENT	VERIFICATION
Drift or leakdown in hydraulic circuit. Possible: No power in circuit.	Cylinder(s) Loader Control Valve Backhoe Control Valve Selective Control Valve	Do the Cylinder Leakage Test, page 70-26-17. If the problem is not the cylinder(s) do the Circuit Leakage Test, page 70-26-16.
No power in a hydraulic circuit (loader, backhoe or remote).	Loader control valve Backhoe control valve Selective control valve	Do the Circuit Leakage Test, page 70-26-16.
Circuit initially moves in opposite direction.	Lift check in the loader control valve or backhoe control valve	Inspect lift check valve and spring. Install new parts as necessary (Section 50, Group 35, 40 or 41).
Slow or no loader operation. No steering power during loader operation. No hydraulic power in a non-priority circuit.	Pressure control valve	Do Pressure Control Valve Test, page 70-26-22 or 70-26-23.
The hydraulic system is slow, general. Chattering of the hydraulic system, general. Transmission (reverser) is slipping. Too much heat in hydraulic system, general.	These problems have many possible causes	Do the System Test, page 70-26-8.
Chattering when a cylinder is being extended.	There is leakage from the charge or return circuit.	Do the System Test, page 70-26-8.

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Specifications	Measurement
Liner Taper (max.)	0.0020 in. (0.51 mm)
Liner Out-of-Round (max.)	0.0020 in. (0.051 mm)
Clearance Between Liner and Piston at Bottom of Skirt (max.)	0.008 in. (0.02 mm)

Piston rings should never be reinstalled on a piston once they have been removed. Throw away old rings and replace with new ones.

Clean and inspect rods, caps, bearings, and piston pin bushings for wear or damage.

Check rod bearings for excessive wear. Use "Plastigage" or equivalent as directed by the manufacturer, if rods are connected to the crankshaft.

NOTE: The use of "Plastigage" will determine clearance between bearing and crankshaft journal, but will not determine which surface is worn or the condition of either bearing or journal surface.

If rod is out of engine, assemble and measure the I.D. of the rod bearing, and the O.D. several places on the crankshaft rod journal. Specifications are as follows:

I.D. of Bearing	O.D. of Journal
2.7502 to 2.7522 in. (69.8551 to 69.9059 mm)	2.7480 to 2.7490 in. (69.799 to 69.824 mm)

Oil clearance should be 0.0012 to 0.0042 inch (0.0305 to 0.1067 mm) between rod bearings and crankshaft journals. Replace bearings as necessary. Undersize bearing inserts are available in 0.002, 0.010, 0.020, and 0.030 inch (0.0508, 0.254, 0.508 and 0.762 mm) sizes.

Piston pin bushing must be reamed after it is pressed into position to provide a "thumb press fit" for pin.

Clean block thoroughly with cleaning solvent or by pressure steam cleaning.

Check oil pressure regulating valve bushing in front end of block for wear or damage. If necessary, replace as directed in Group 15 of this Section.

If dipstick nipple has been removed, coat threads of nipple with joint sealing compound and install in cylinder block. Measure from block rail vertically to center of nipple end. Measurement must be 6 inches (152.4 mm) (-206421) or 8 inches (203.2 mm) (206422-).

If filter base nipple is damaged remove it and press in a new nipple flush with face of bore in block. Position nipple so that threaded boss is away from side of block as far as possible.

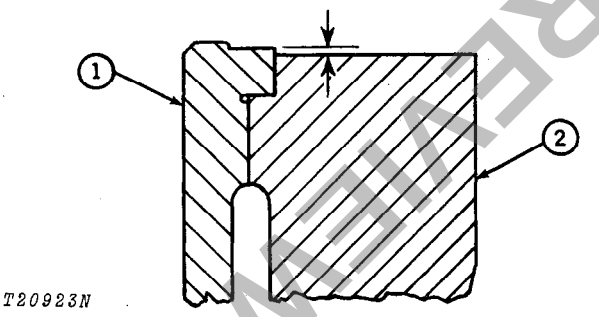
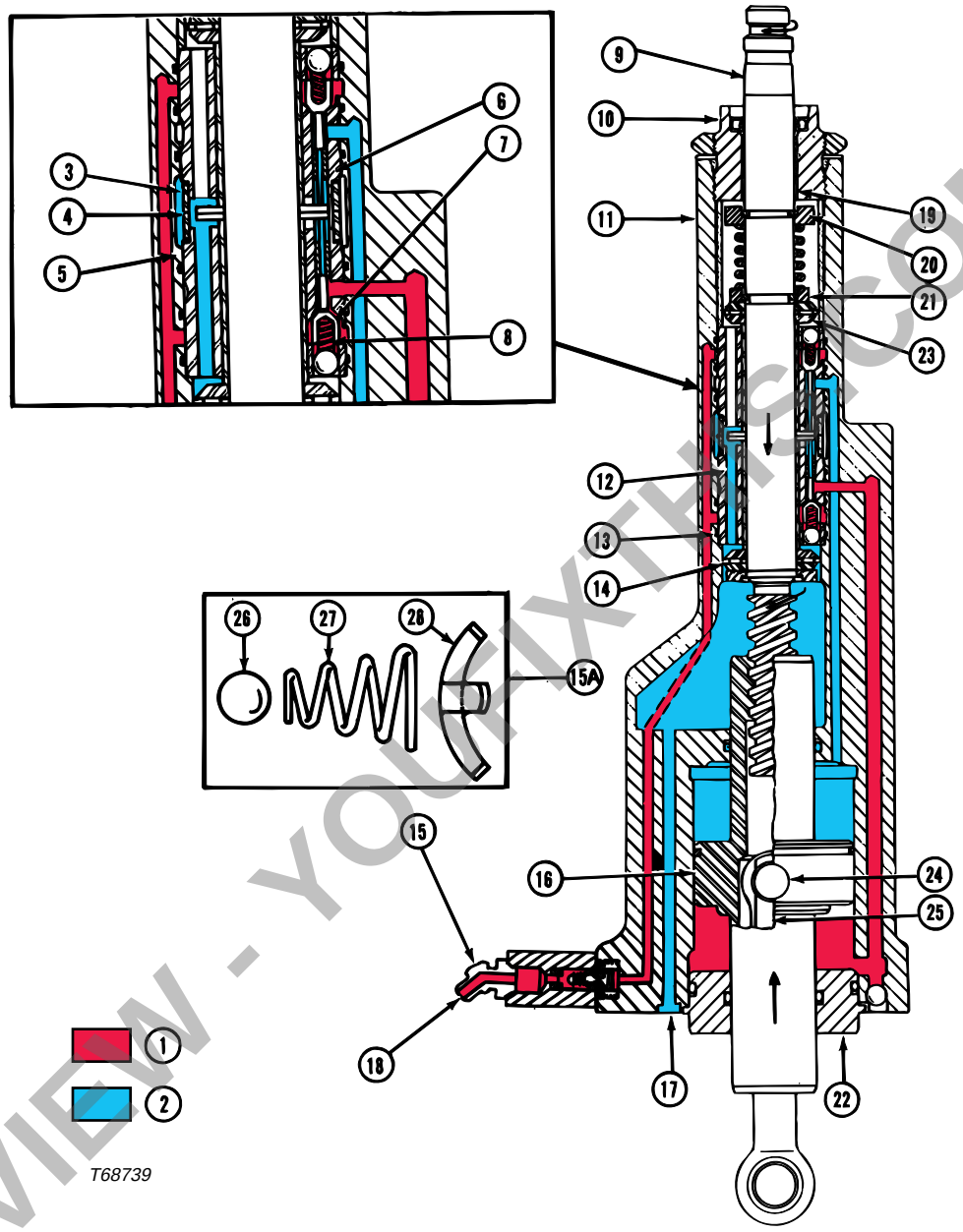


Fig. 11-Location of Liner in Cylinder Block

When installing new cylinder liners in block, use a depth gauge to check the height of the flange on the liner in relation to the cylinder block (Fig. 11). The top of the flange must be 0.001 to 0.004 inch (0.03 to 0.10 mm) above the cylinder block with packings removed from the bottom of the liner. A flange below cylinder block can cause gasket sealing problems. Check this several places around the liner to make sure the liner is seated squarely in the bore of the cylinder block.

IMPORTANT: Be sure to pull cylinder liner and reinstall all packings before final assembly.

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1—Pressure Oil
2—Return Oil
3—Spacer
4—Special Washers
5—Shims
6—Steering Valve Sleeve
7—Steering Valve
8—Spring
9—Steering Wheel Shaft
10—Adjuster
11 —Housing
12 —Operating Sleeve
13 —Steering Valve Body
14 —Needle Thrust Bearing
15 —Check Valve (255284-)
15A—Check Valve (-255283)
16 —Piston
17 —Return to Transmission Sump
18 —From Hydraulic Pump
19 —Sleeve
20—Special Washer
21—Special Washer
22—Piston Guide
23—Needle Thrust Bearing
24—Pin
25—Connecting Rod
26—Ball (-255283)
27—Spring (-255283)
28—Retainer (-255283)

Fig. 1-Power Steering - Right Turn

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Group 10
LOADER FRAME, BOOM AND BUCKET

GENERAL INFORMATION

The loader frame consists of a right and left side and is of welded steel construction.

The boom is of welded construction and attaches to the frame with pivot pins.

A bucket level indicator is located on the right hand bucket cylinder (see Operator's Manual).

Loader hydraulic functions are performed by a single control lever.

The bucket cutting edge is made of high carbon steel.

Two utility rings are welded to the top of the bucket to aid in attaching or removing the bucket.

REMOVAL

Stop engine and work loader control valve to release hydraulic pressure from loader system.

Disconnect battery ground strap and unplug light wires.

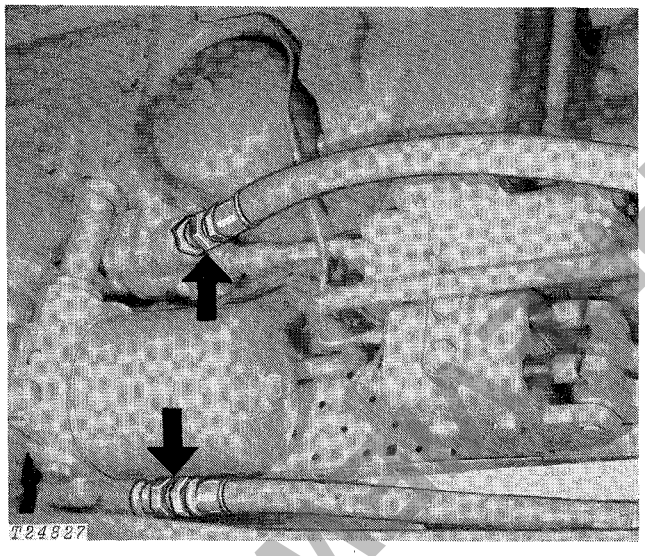


Fig. 1-Pressure and Return Hoses

Disconnect loader pressure and return hoses shown in Fig. 1. Plug fittings and lines to prevent dirt entry.

Disconnect and mark hoses from left-hand bucket and boom cylinders. Plug fittings and lines to prevent dirt entry. Loosen hose clamps to allow hoses to be pulled to right side of tractor.

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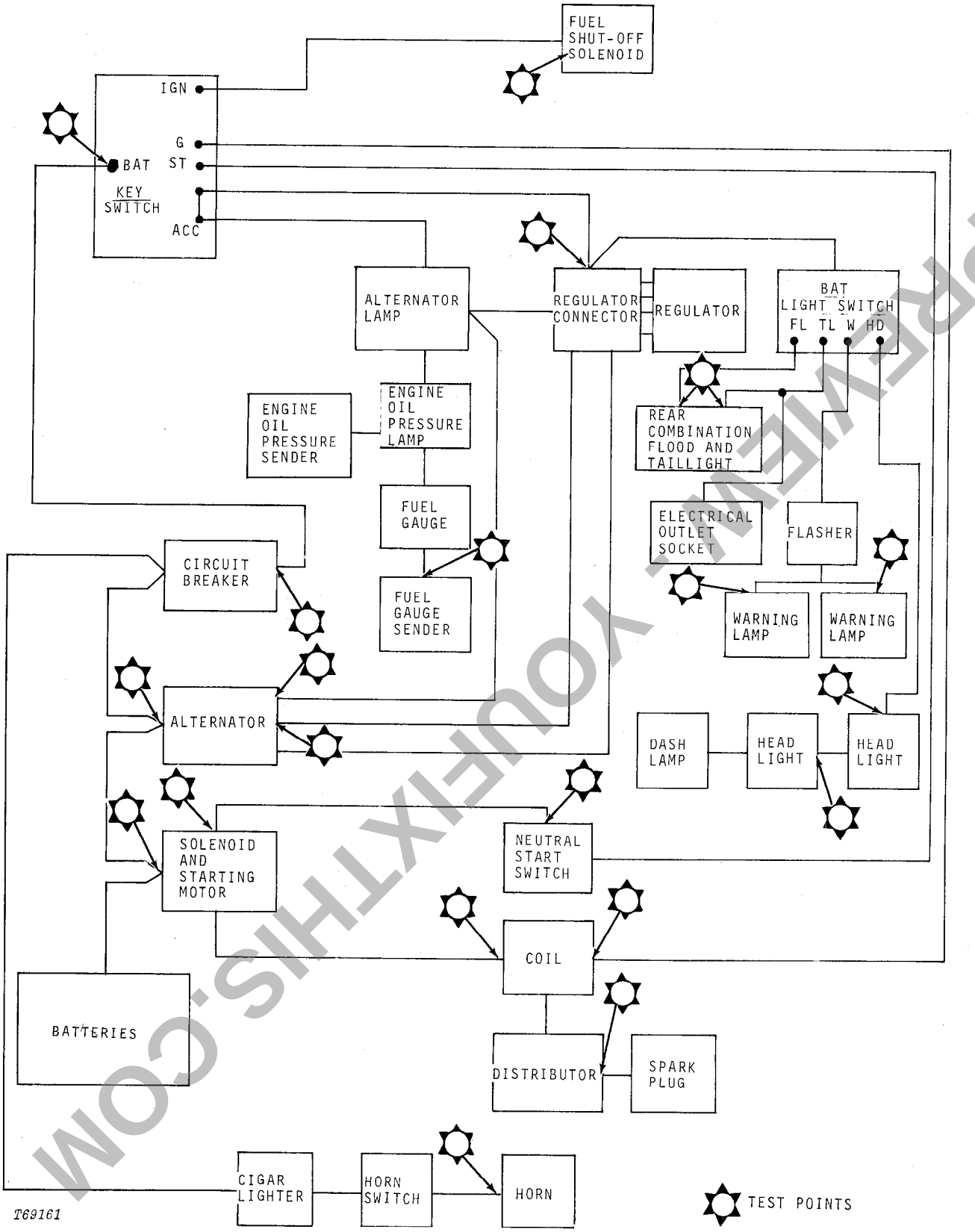
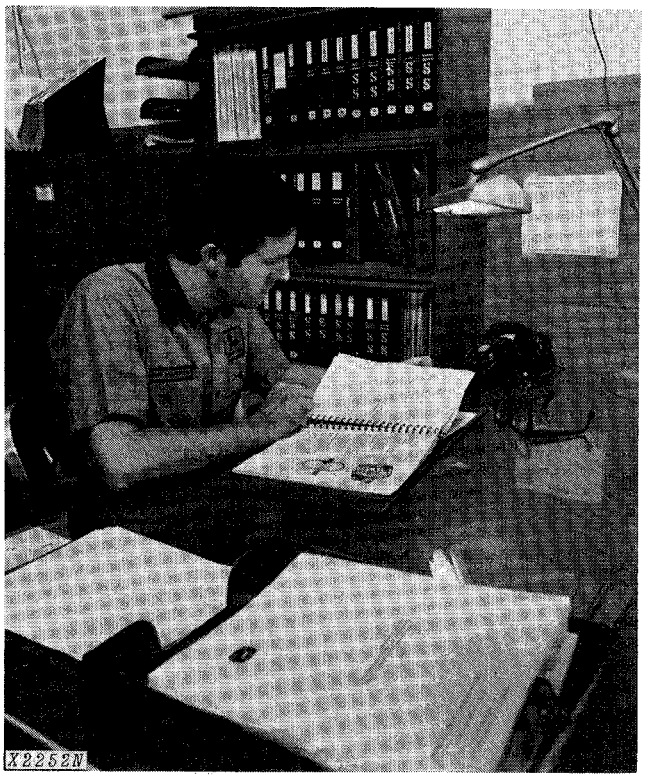


Fig. 6-Electrical System Block Diagram

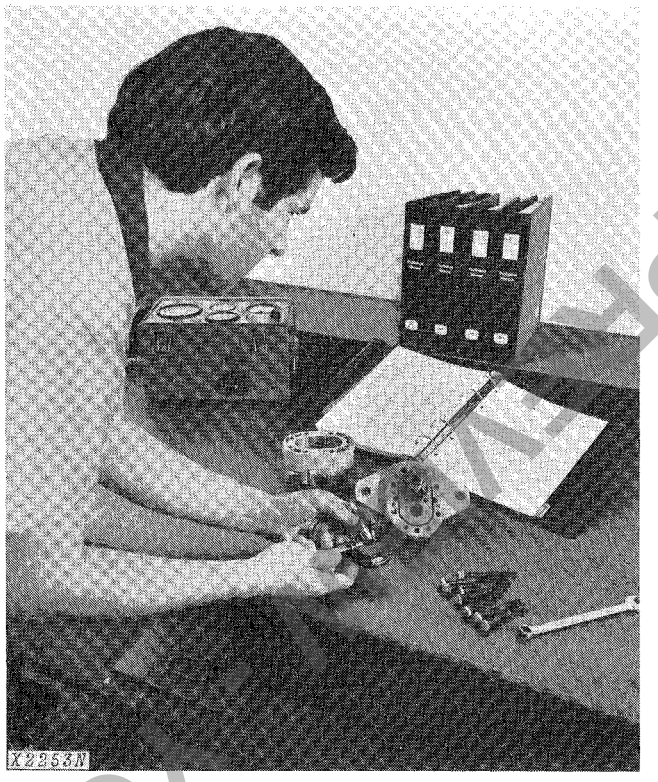
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INTRODUCTION



Use FOS Manuals for Reference



Use Technical Manuals for Actual Service

This technical manual is part of a twin concept of service:

The two kinds of manuals work as a team to give you both the general background and technical details of shop service.

•FOS Manuals—for reference

Fundamentals of Service (FOS) Manuals cover basic theory of operation, *fundamentals* of trouble shooting, *general* maintenance, and *basic* types of failure and their causes. FOS Manuals are for training new personnel and for reference by experienced service technicians.



When a service technician should refer to a FOS Manual for more information, a FOS symbol like the one at the left is used in the TM to identify the reference.

•Technical Manuals—for actual service

Technical Manuals are concise service guides for a *specific* machine. Technical manuals are on-the-job guides containing only the vital information needed by an experienced service technician.

This technical manual was planned and written for you—an experienced service technician. Keep it in a permanent binder in the shop where it is handy. Refer to it whenever in doubt about correct service procedures or specifications.

Some features of this manual:

- Inside front cover - "Table of Contents" and "Maintenance Without Accident".
- Section 10 - General specifications and services.
- Sections 20 through 60 - Removal, repair, testing (components removed), installation, and adjustment.
- Section 70 - Detailed explanation of system operation, diagnosis, visual inspection, testing, and adjustments.
- Specifications grouped and illustrated at the end of each section.

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Adjusting Valve Tappet Clearance

The engine may be either hot or cold during valve adjustment.

Position No. 1 cylinder on TDC. Timing cover screw will enter its hole in flywheel (Fig. 6).

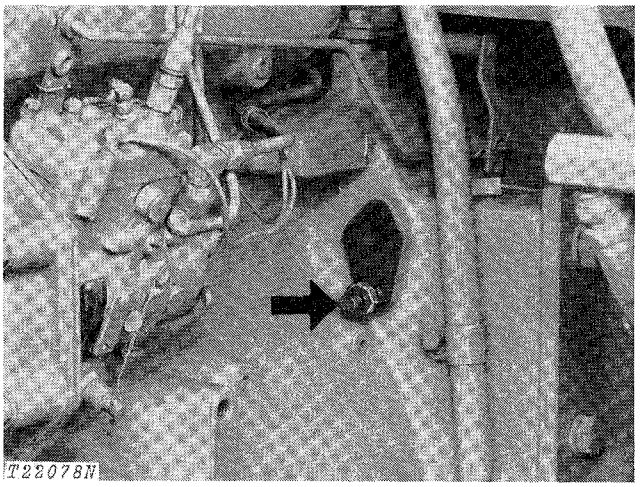


Fig. 6-Setting No. 1 Cylinder at Top Dead Center

Adjust valve clearance on No. 1 and No. 3 exhaust valves to 0.018 inch (0.4572 mm) for diesel and 0.022 inch (0.5588 mm) for gasoline and on No. 1 and 2 intake valves to clearance of 0.014 inch (0.3556 mm) for both gasoline and diesel. Using a feeler gauge to measure clearance, turn valve adjusting screw up or down until clearance is correct (Fig. 7).

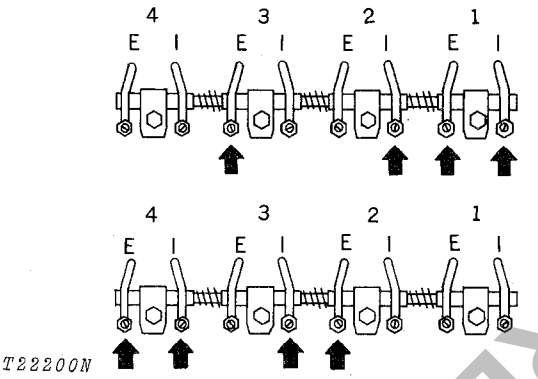


Fig. 7-Adjusting Valve Tappet Clearance

Remove timing screw from flywheel. Rotate engine flywheel 360 degrees and reinsert timing screw into hole on flywheel rim.

Adjust valve clearance on No. 2 and 4 exhaust and No. 3 and 4 intake valves to clearances specified.

Remove timing screw from flywheel and reinstall timing cover.

Retighten cylinder head cap screws and recheck valve clearances after thirty minutes run-in with engine at 1900 to 2200 rpm with 3/4 to full load. See "Engine Break-In", page 20-40-11.

NOTE: If liners, pistons or rings were replaced follow complete "Engine Break-In" on page 20-40-11.

CAMSHAFT

REMOVAL

To service camshaft and related parts, engine normally need not be removed from unit. If engine has to be removed, see Group 5 of this section.

Disconnect battery ground cables.

Remove rocker arm and timing gear covers. Remove rocker arm assembly and push rods.

Remove distributor and fuel transfer pump.

Check camshaft end play. End play is governed by the thrust plate thickness. End play is 0.0025 to 0.0085 inch (0.0635 to 0.2159 mm). End play up to 0.0150 inch (0.381 mm) is acceptable.

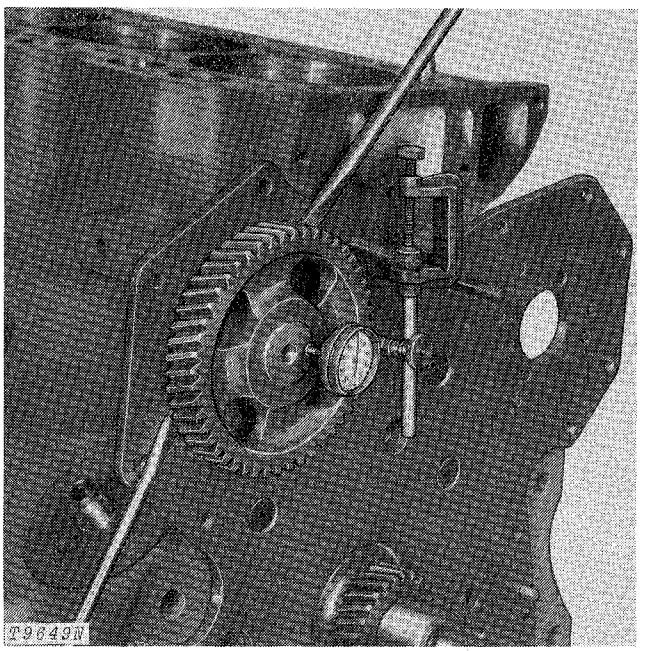


Fig. 8-Checking Camshaft End Play

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BASIC ENGINE

SPECIAL TOOLS

Essential Tools

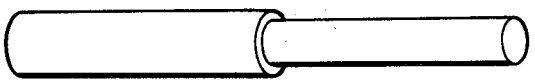
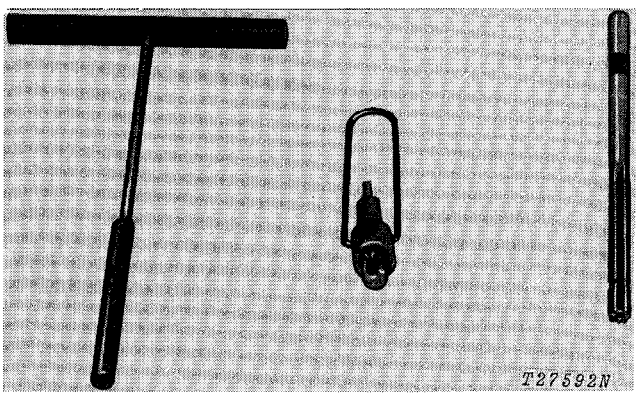
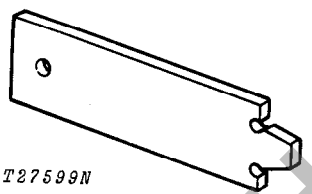
Tool	Tool No.	Use
 T27596N	JDE-7	Valve Guide Pilot Driver - Used for removing and installing valve guides with JDE-9.
 T27592N	D20002W1	Knurling Tool - To knurl engine valve guides.
 T27599N	JDE-62	Ring Groove Wear Gauge - To measure keystone ring groove wear.

Fig. 20-Valve Guide Pilot Driver

Fig. 21-Knurling Tool

Fig. 22-Keystone Ring Groove Wear Gauge

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Key Switch

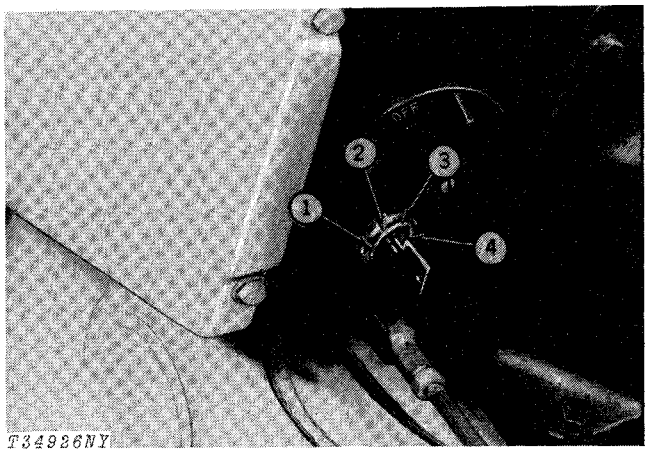


Fig. 3-Key Switch Position

The key switch is a sealed unit and cannot be repaired.

In position (1) the "ACC" terminals are energized.

In position (2) the key switch is in the "OFF" position and the key can be removed.

In position (3) the "IGN" and "ACC" terminals are energized.

In position (4) the "IGN" and "ST" terminals are energized and the "G" terminal is momentarily grounded. A spring in the switch will automatically return the switch back to position (3).

Light Switch

The light switch "BAT" terminal is energized by the key switch "ACC" terminal. To bypass the key switch remove the purple wire from the "BAT" terminal and install the unused red wire coming off the circuit breaker.

In "W" position the "BAT" and "W" terminals are energized. In this position, the warning lamps will be lit.

In "F" position, the "BAT", "HD", and "FL" terminals are energized. In this position, the front head-lights are lit and the rear combination flood and taillight light is lit as a white flood light.

In "H" position the "BAT", "HD", "TL" and "W" terminals are energized. In this position, the head-lights are on bright, the warning lamps are lit, and the rear combination flood and taillight is lit as a red taillight.

In "H^2" position, the same terminals are energized and the same lights are lit as in "H" position. The only difference is that the "HD" terminal is energized through a one ohm resistor and the front headlights are dimmer.

Lights

Failure of lights to burn may be caused by a burned-out unit, broken wire, a disconnected wire, switch failure or a tripped circuit breaker if light switch is wired to circuit breaker.

The replacement lamp trade No. for the front headlights is 4411.

The replacement lamp trade No. for the rear combination flood and taillight light is 4428 and the bulb No. is 1003.

The replacement bulb trade No. for the warning lamps is 1156.

Dash Lamp

The dash lamp is wired to the "HD" terminal of the light switch. When the front headlights are lit, the dash lamp will be on.

The replacement bulb trade No. is 1816.

Flasher

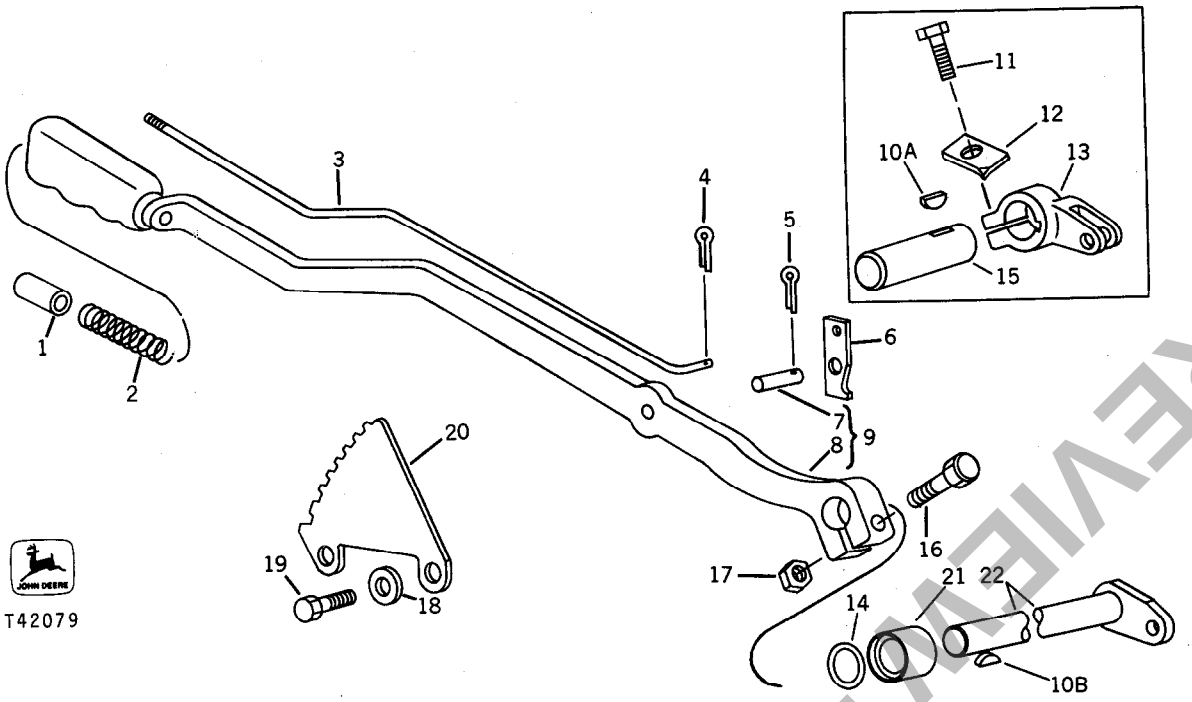
The flasher unit for the warning lights is located inside the instrument panel. It is energized by the light switch "W" terminal.

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PARKING BRAKE



1—Pawl Operating Rod Button
2—Spring
3—Pawl Operating Rod
4—Cotter Pin
5—Cotter Pin
6—Pawl
7—Brake Pin
8—Brake Lever
9—Brake Lever with Pin
10A—Woodruff Key (2 used) (-230659)
10B—Woodruff Key (230660-)
11 —Cap Screw (-230659)
12 —Lock Plate (-230659)
13 —Brake Shaft Arm (-230659)
14 —O-Ring
15 —Brake Shaft (-230659)
16—Cap Screw
17—Nut
18—Bushing (2 used)
19—Cap Screw (2 used)
20—Notched Quadrant
21—Spacer (230660-)
22—Brake Shaft with Arm (230660-)

Fig. 5-Parking Brake Lever and Linkage

Adjustment

Apply parking brake firmly five times to seat linkage.

Burnish brake band as follows:

1. Apply parking brake firmly.
2. Place transmission in fourth gear forward.
3. Set engine speed at 1500 rpm.
4. Engage clutch and burnish brake band for 20 to 25 seconds.

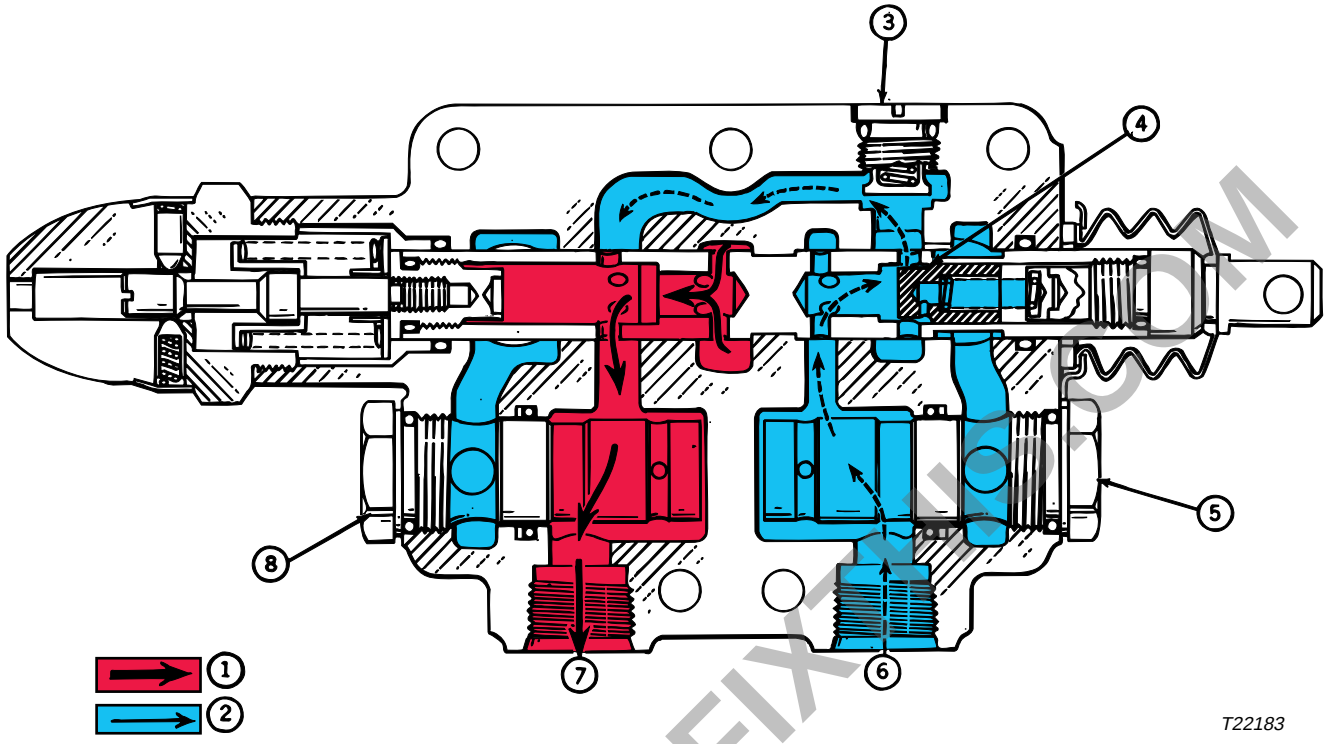
Set brake lever so that brake pawl (6, Fig. 5) is in first notch above long tooth.

Tighten brake set screw (10, Fig. 6) with a wide blade screwdriver by hand until it is not possible to turn the screw another complete half turn.

Final position of screw should have concave surface of screw head mating with surface of pivot pin (11) or brake band arm (17).

Loosen jam nut (2, Fig. 7) on bottom left side of transmission case. Tighten brake band stop screw (3) hand tight, then back off two turns. Tighten jam nut (2).

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1—Pressure Oil
2—Return Oil
3—Anti-Cavitation Check Valve
4—Lift Check
5—Relief Valve
6—From Cylinder
7—To Cylinder
8—Relief Valve

Fig. 10-Bucket Section (Fast Dump Regenerative Circuit Shown)

Bucket Fast Dump (Regenerative) Circuit

When the bucket spool is moved, the hydraulic pump moves oil to the control valve. Pressure oil then flows to the bucket cylinders.

With the bucket spool in full dump position, the return oil to reservoir is blocked. Oil that is displaced from the cylinder is directed through the valve spool lift check and anti-cavitation check valve into the regenerative channel.

This "one-way" circuit between the two cylinders creates an increased volume of oil for a fast dump.

Bucket Power Circuit

When the bucket spool is moved, the pump moves oil to the control valve. Pressure oil then flows to the bucket cylinders.

Displaced oil from the cylinders is forced back to the control valve and reservoir.

Third Function Valve

The third function valve is similar to Fig. 10 except it does not have the anti-cavitation check valve (3) or regenerative circuit, and has only one relief valve (8).

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Group 61
REMOTE CYLINDER

REMOVAL

Remove remote cylinder from equipment.

REPAIR

Refer to Fig. 1 for reference to disassemble and assemble the remote cylinder.

Remove cylinder end cap (16). Stop and bleed valves (13) may be removed by pushing stop rod assembly into cylinder to its limit. Pull stop valve from bleed valve. After removing ball from recess, bleed valve may be removed from the stop rod.

Remove piston (22), and piston rod (36).

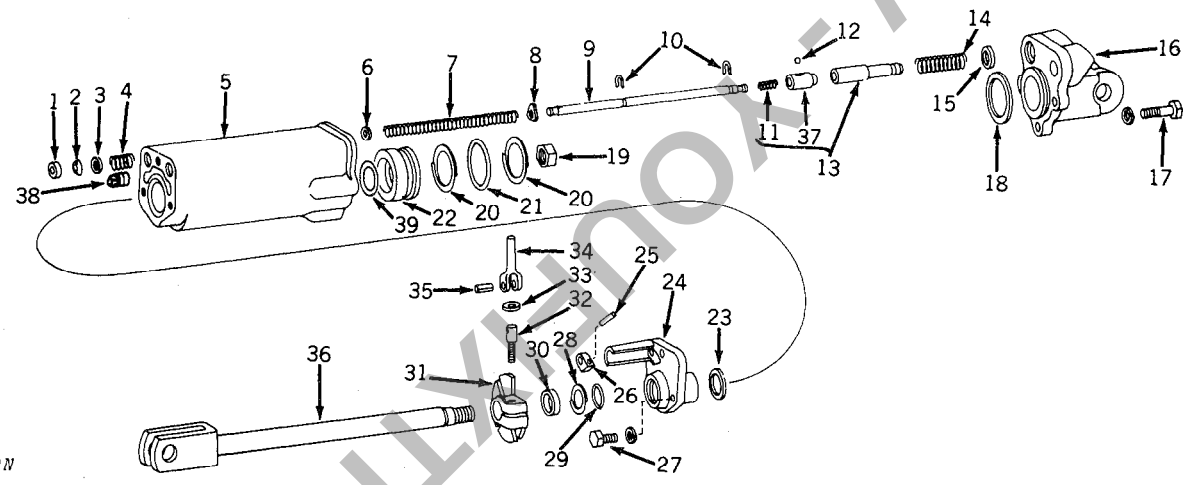
Push stop rod (9) all the way into cylinder to prevent distortion of stop rod while driving groove pin (25) from stop rod arm (26). Push V-packing assembly (2) from housing.

1. Press in a new piston rod oil seal (30) with sealing lip toward outer end of bore.

2. Install stop rod V-packing assembly (2) with sealing lip toward outer end of bore.

3. Install piston rod guide (24) and gasket (23) but do not tighten attaching hardware.

Install stop rod assembly. Use stop and bleed valve assembly to push stop rod (9) through stop rod V-packing. Tighten piston rod guide hardware to 35 lb-ft (47 Nm).



1—Stop Rod Packing Adapter
2—V-Packing (3 used)
3—Stop Rod Packing Adapter
4—Stop Rod Packing Spring
5—Remote Cylinder
6—Washer
7—Stop Rod Spring
8—Stop Rod Washer
9—Stop Rod
10—Snap Ring (2 used)
11—Bleed Valve Spring
12—Bleed Valve Ball
13—Stop and Bleed Valves
14—Stop Valve Spring
15—Oil Passage Gasket (2 used)
16—Remote Cylinder End Cap
17—Cap Screw and Lock Washer (4 used)
18—Gasket
19—Piston Nut
20—Backup Ring (2 used)
21—O-Ring
22—Piston
23—Piston Rod Guide Gasket
24—Piston Rod Guide
25—Groove Pin
26—Stop Rod Arm
27—Cap Screw and Lock Washer (3 used)
28—Backup Ring
29—O-Ring
30—Oil Seal
31—Piston Rod Stop
32—Stop Screw
33—Washer
34—Adjusting Lever
35—Spring Pin
36—Piston Rod with Yoke
37—Bleed Valve
38—Pipe Plug
39—O-Ring

Fig. 1-Hydraulic Stop Remote Cylinder

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SPECIAL WELDING INSTRUCTIONS

A low hydrogen (with iron powder) electrode (American Welding Society, Series E7018) is recommended for this type of work. The sizes most easily handled in horizontal or out of flat positions are 5/32 inch [3.96 mm] and 3/16 inch [4.76 mm] diameters.

To obtain maximum strength, it is imperative that all craters at the termination of each weld be filled. Because of the cupping action of heavy electrode coating, it is necessary to drag the electrode lightly or hold a very short arc.

As a second choice, an E7010 Series Electrode can be used in DC reverse polarity after preheating the cutting edge to approximately 300 degrees F [148.9C]. Allow the edge to cool slowly.

When repairing a small section of the cutting edge, it is necessary to preheat around damaged area regardless of the electrode used. This will prevent rapid cooling of the edge around the weld which could cause the cutting edge to become brittle.

When cutting edge is cracked, cut completely through cutting edge. Extend cut 1/2 inch [12.7 mm] beyond each end of crack.

Weld crack from both sides.

When welding cracks between cutting edge and bucket, extend weld at least 1/2 inch [12.7 mm] beyond each end of the crack.

INSTALLATION

Install loader by reversing removal procedure.

Run unit and check loader operation. Check for hydraulic leaks.

It is important that loader bolts be kept tight at all times. Loose bolts will result in breakage of parts with probable delays.

Check the mounting bolts on a reinstalled loader after the first fifty hours of operation. See Fig. 9 and 10.

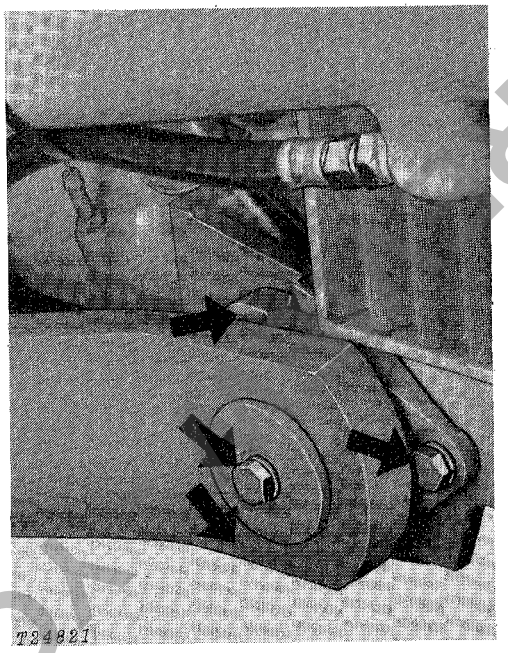


Fig. 9-Front Mounting Pad Bolts

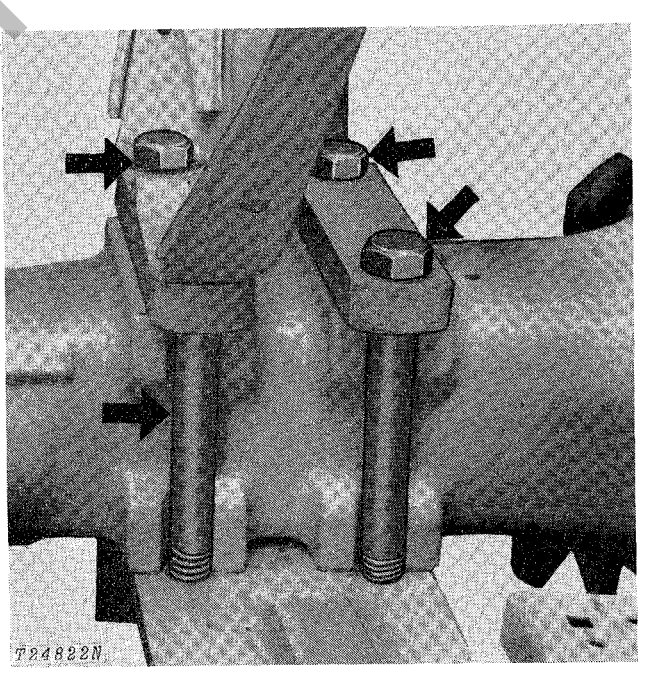


Fig. 10-Rear Mounting Pad Bolts

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The components of the Hydraulic Analyzer are a master hydraulic system analyzer, a tachometer/temperature reader and an accessory kit for utility equipment.

The master hydraulic system analyzer is used for the measurement of pressures in the hydraulic system. Two vacuum gauges are also available when needed. Each gauge is connected to a coupling adapter. The coupling adapters and gauges have numbers for identifications.

The contents of the analyzer are:

1. One 0 to 5000 psi (0 to 345 bar) pressure gauge.
2. One 0 to 30 in. Hg (0 to 1 016 mbar) vacuum or a 0 to 150 psi (0 to 10 bar) pressure gauge.
3. One 0 to 30 in. Hg (0 to 1 016 mbar) vacuum gauge.
4. Four 0 to 400 psi (0 to 28 bar) pressure gauges.

The tachometer/temperature reader is used for the measurement of engine rpm and oil temperature of the hydraulic system. The power for the reader is the loader electrical system. The reader is adaptable to either 12 or 24 volt system.

For easy connection of the analyzer the accessory kit has the necessary fittings, adapters and orifices.

The design of the Hydraulic Analyzer is for the test of hydraulic systems. The test of hydraulic system conditions are made at specific engine rpm and oil temperature with the specific orifice installed. The orifice is installed into a circuit so all flow from the hydraulic pump goes through it.

To check for leakage in a circuit use the following general procedure. Install the orifice into the circuit. Connect the pressure gauges to the test ports of the hydraulic pump. Connect the tachometer/temperature reader to the unit. Start the engine and run at 1500 rpm. Operate the control lever (the circuit with orifice installed) to put the cylinder at the end of its stroke. Hold the control lever in this position. This will cause the hydraulic oil to flow through the orifice and heat the oil. When the oil is at the specific temperature, increase or decrease engine rpm to get the specific pressure. If the engine rpm is more than the specification the circuit has leakage or the hydraulic pump is worn.

The Hydraulic System Pretest Check Sheet (Fig. 2) is a general list of possible symptoms (problems) of the hydraulic system.

The Symptom Index is a list of possible symptoms from the Pretest Check Sheet and customer complaint. Also next to the symptom is the probable faulty component(s) and a test to verify it.

Follow the procedure below to test the hydraulic system:

1. Do the Pretest Inspection and Operational Checks. Write the results on the Pretest Check Sheet.

2. Find the symptoms from the Pretest Check Sheet in the Symptom Index, page 70-76-5 to 70-26-7.

3. Do the verification tests.

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