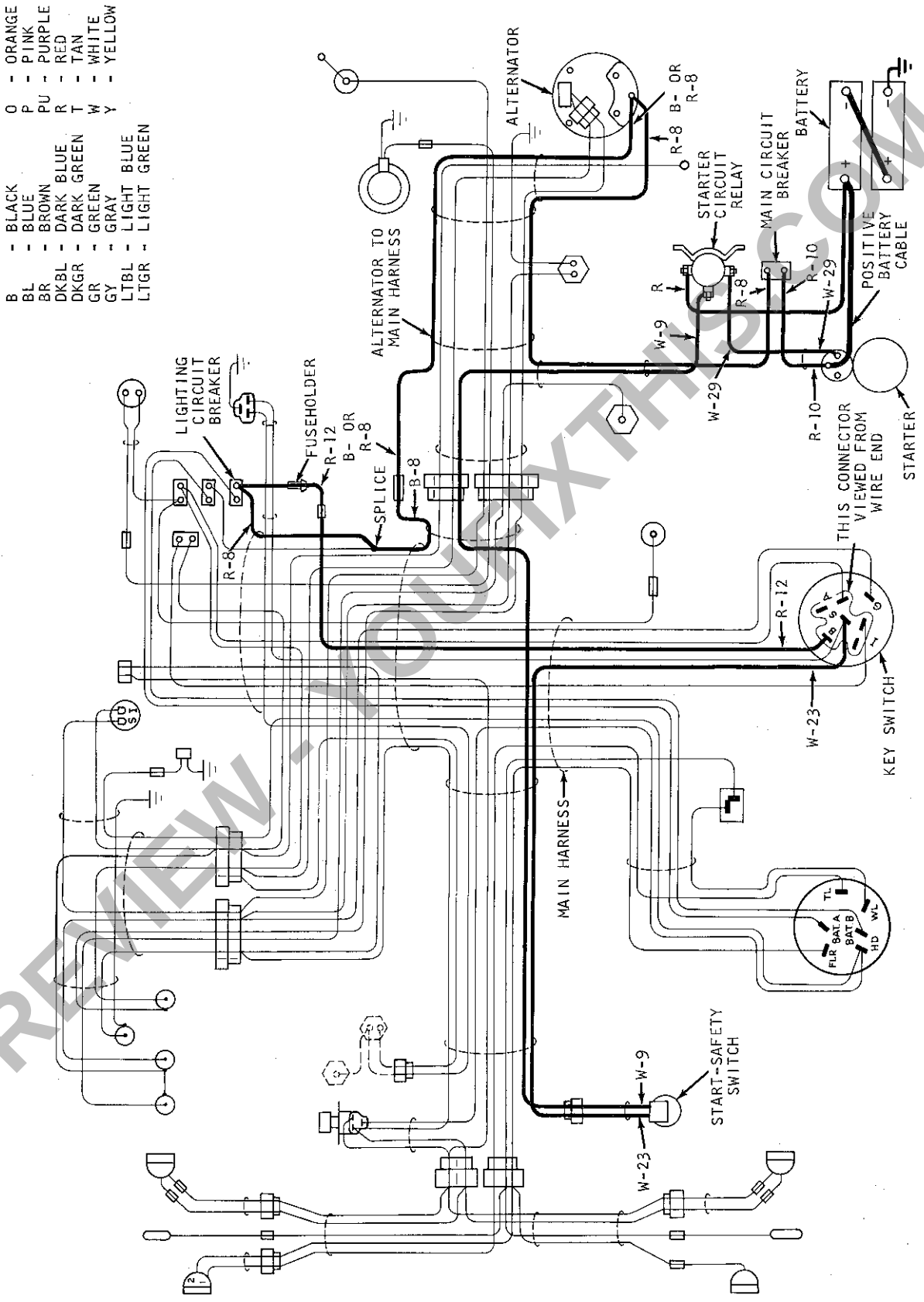


Fig. 2 - Starting Circuit (Shown in Bold Line)

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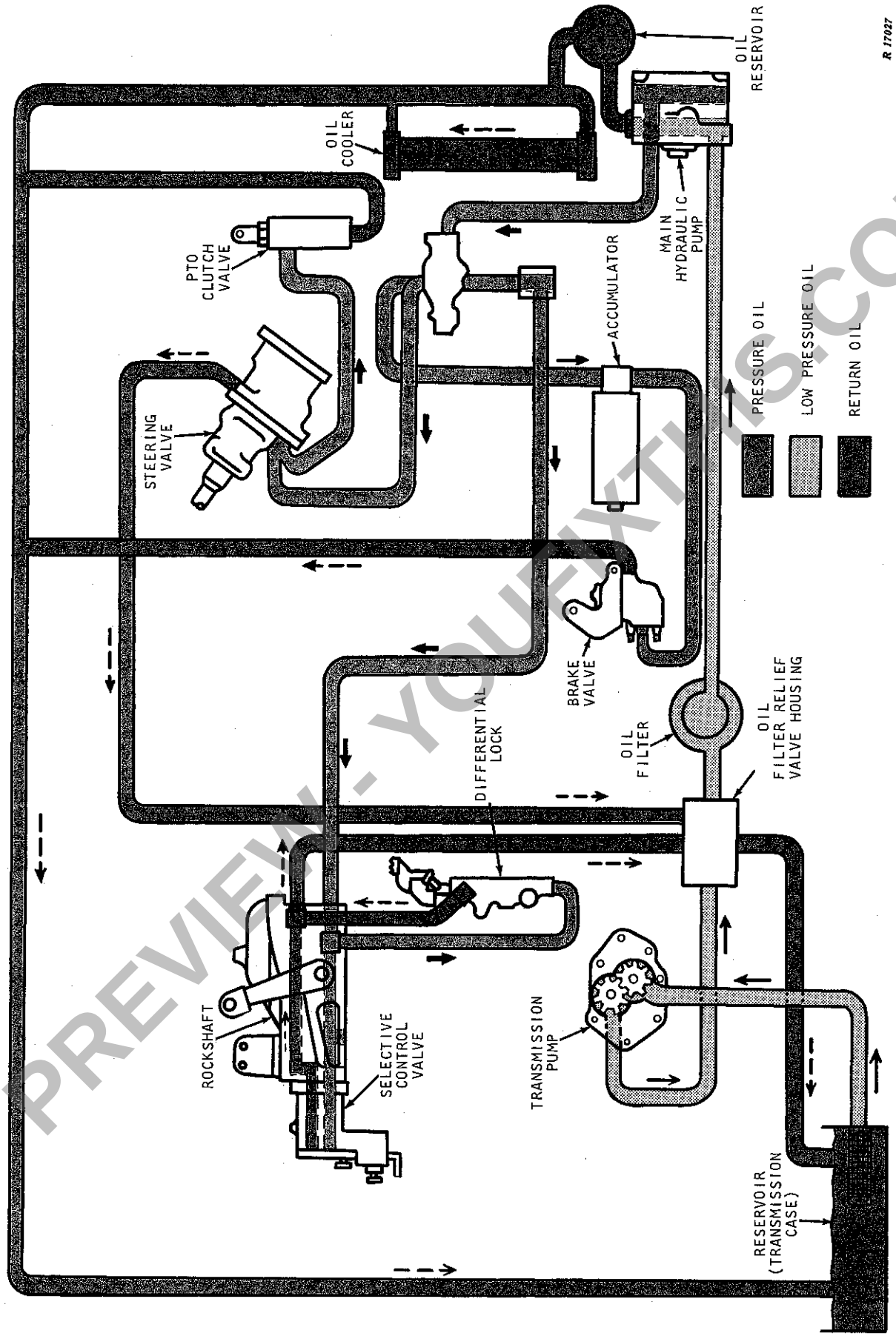


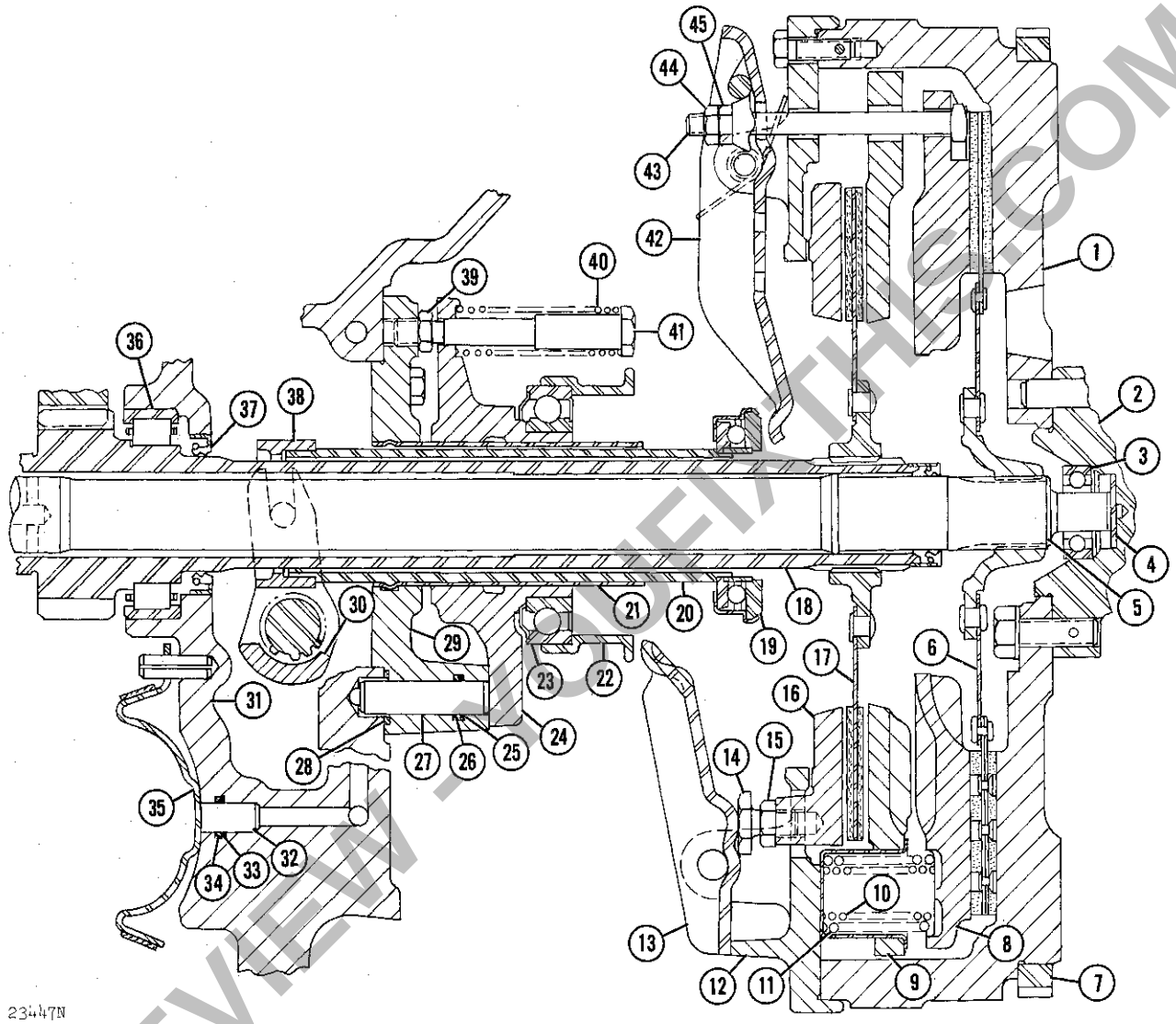
Fig. 1-Circuit Flow Diagram

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Use the JDE-26 Sleeve to protect oil seal when installing the transmission clutch shaft into the PTO clutch shaft. Be sure to replace protector plug in sleeve after use.

Figure 6 shows the clutch assembly with the PTO option. If the tractor comes less PTO, the PTO clutch shaft (18, Fig. 6) is deleted and the rear oil seal (37) is replaced with a seal with a smaller I.D.



1—Flywheel
2—Crankshaft
3—Pilot Bearing
4—Thrust Washer
5—Clutch Shaft
6—Transmission Clutch Disk
7—Ring Gear
8—Clutch Pressure Plate
9—PTO Clutch Pressure Plate
10—Inner Spring
11—Outer Spring
12—Clutch Cover
13—PTO Operating Lever
14—Adjusting Screw
15—Lock Nut
16—PTO Rear Clutch Plate
17—PTO Clutch Disk
18—PTO Clutch Shaft
19—Thrust Bearing
20—Clutch Operating Tube
21—Support Tube
22—PTO Clutch Operating Collar
23—Ball Bearing
24—PTO Clutch Operating Sleeve
25—Backup Ring
26—O-ring
27—PTO Clutch Operating Piston
28—Packing
29—Support
30—Clutch Fork
31—Clutch Housing
32—PTO Brake Piston
33—Sealing Ring
34—Backup Ring
35—PTO Brake Shoe with Facing
36—Roller Bearing
37—Oil Seal
38—Clutch Operating Collar
39—Lock Nut
40—Return Spring
41—Adjusting Screw
42—Transmission Clutch Operating Lever
43—Operating Bolt
44—Lock Nut
45—Adjusting Nut

Fig. 6-Transmission and PTO Clutch Assembly

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INSPECTION PROCEDURES—Continued

Service	Specification	Reference
HYDRAULIC SYSTEM		
Check rockshaft and remote cylinder operation	.....	Section 70, Group 30
3-point hitch negative stop adjustment	1/8th turn back out after contacting transmission case.	Section 70, Group 30
Check power steering	Smooth, easy operation.	Section 70, Group 20
Check brakes and accumulator	3 in. maximum travel for one emergency application immediately after stopping engine.	Operator's manual
AIR CONDITIONING		
Check operation of air conditioning system and heating system	.....	Operator's manual
Check air conditioner compressor drive belt tension	1/4 in. deflection 15 lb. pull	Operator's manual
NUTS AND CAP SCREWS		
Tighten accessible nuts and cap screws that seem to require adjustment	.....	.....

RECOMMENDED TORQUE IN FOOT-POUNDS

Bolt Diameter	Plain Head*	Three Radial Dashes*	Six Radial Dashes*
1/4	6	10	14
5/16	13	20	30
3/8	23	35	50
7/16	35	55	80
1/2	55	85	120
9/16	75	130	175
5/8	105	170	240
3/4	185	300	425
7/8	160	445	685
1	250	670	1030

** The types of bolts and cap screws are identified by head markings as follows:*

Plain Head: regular machine bolts and cap screws.

3-Dash Head: tempered steel high-strength bolts and cap screws.

6-Dash Head: tempered steel *extra* high-strength bolts and cap screws.

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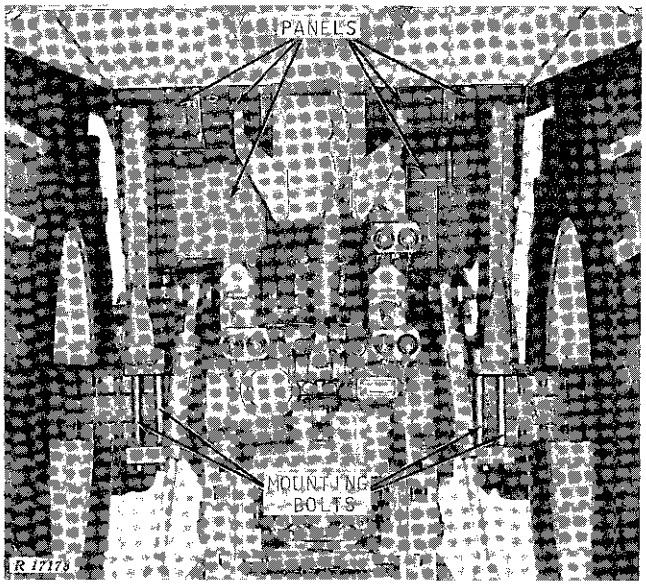


Fig. 4-Rear Mounting Bolts and Panels

Remove the cab front and rear mounting bolts (Figs. 3 and 4). Lift cab from tractor.

INSTALLING ROLL-GARD CAB

Reverse the removal steps. The centerline of cab should line up with centerline of tractor. The foam rubber seal on center cowl panel of cab should be equally compressed around the contour of hood. Shift cab as required to align correctly. Be sure to install rubber pads on rear axle housing, and tighten the rear mounting bolts to specification.

Adjust the compressor drive belt (on air conditioned cabs) to specification.

After the cab panels and extensions are in place, seal all holes and openings with tape, foam material, or sealant before installing floor pads and mats. Careful sealing of all openings must be done for the pressurizer to be effective in keeping out dust and dirt.

Install floor pads and mats.

SEPARATING ENGINE FROM CLUTCH HOUSING

Follow all precautions regarding safety, cleanliness, and general mechanical procedures. See the John Deere "Fundamentals of Service" manuals.

CAUTION: Before separating tractor, be sure that the brake accumulator is discharged. The accumulator can be discharged by opening the right-hand brake bleed screw, and holding the brake pedal down for a few minutes.

Drain cooling system and remove cowl, side shields, grille screens, muffler, hood, and right-hand control support cover.

Disconnect battery ground cable (left-hand battery is grounded).

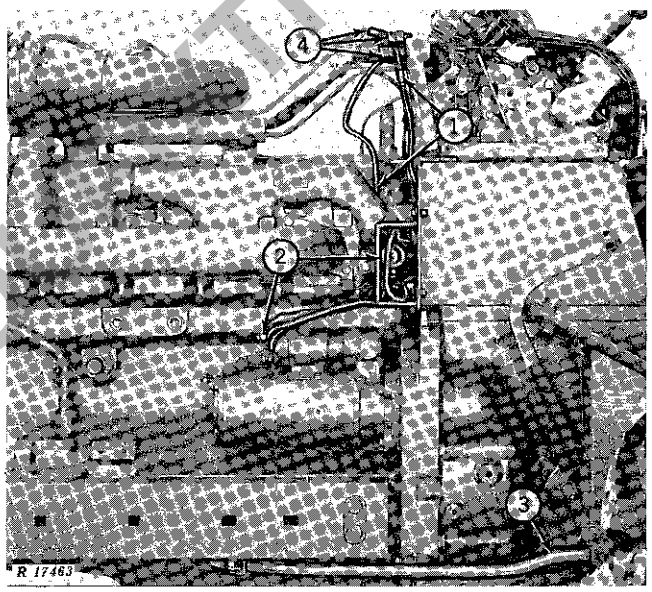


Fig. 5-Left-Hand Side Separation Procedures

1. Disconnect engine temperature gauge bulb, and ether starting aid pipe.

2. Detach starter circuit relay mounting bracket from control support and disconnect battery cable from starter.

3. Remove left-hand battery and the left-hand battery front support bracket. Disconnect the hydraulic pump inlet pipe.

4. Disconnect wiring from connectors.

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There will be a certain amount of "normal leakage" inside the wheel housing. This "leakage" is returned back to sump through the bleed line which also runs through the pivot pin (Fig. 10). Should there be excess leakage in the wheel unit, due to bad sealing, building pressure in excess of 50 psi, a relief valve located in the oil manifold (Fig. 10) would relieve pressure to the outside of the wheel unit.

Power Flow

Using Fig. 11 as a guide, the power flow through the wheel unit can be traced. The wheel motor drive shaft is located in the center of the wheel motor. This shaft rotates with the motor. Another shaft with a spur gear integral to the shaft on the outside end splines into the motor drive shaft. The spur gear on this shaft is the sun gear of the outer planetary. The carrier of this planetary has the sun gear of the inner planetary splined to the outer carrier. The carrier of the inner planetary is attached by cap screws to the front wheel outer wheel hub.

The ring gear of the outer planetary is pressed into the outer wheel hub. The inner planetary ring gear is a part of the brake piston assembly.

When pressure oil is introduced to the brake pistons, they move out to lock the ring gear to the wheel motor housing, thus stopping rotation. Power from the wheel motor drive shaft is transferred to the outer planetary sun gear causing the planet pinions to rotate on their axes. Power flows to the outer planetary carrier which is splined to the inner planetary sun gear. Thus sun gear transmits power to the planet pinions of the inner planetary. Since the carrier of this planetary is attached to the outer wheel hub, the flow travels through the planetary carrier to the wheel hub, and finally to the tractor tire.

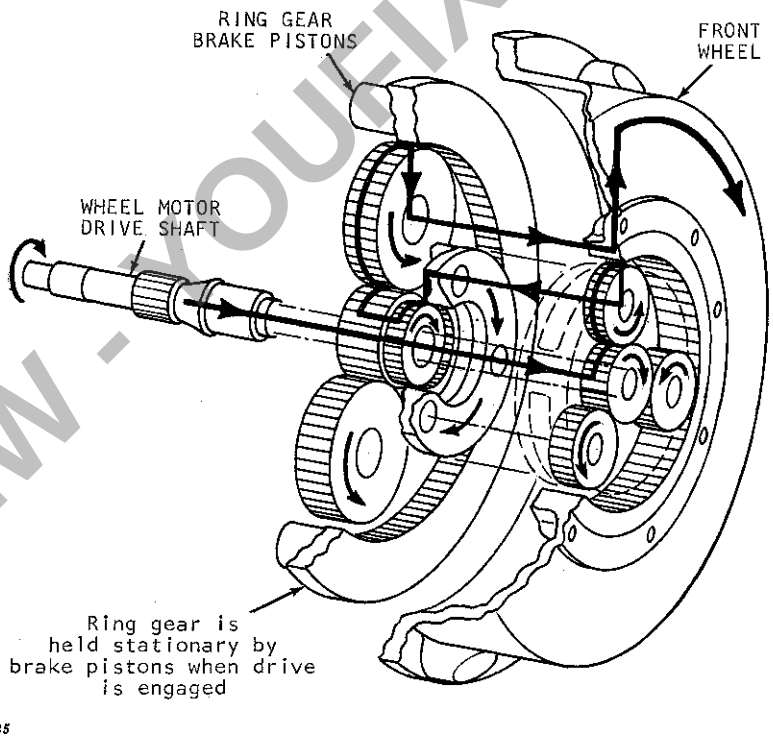


Fig. 11-Power Front-Wheel Drive Planetary System

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Group 5

GENERAL INFORMATION AND DIAGNOSIS

GENERAL INFORMATION

This is a liquid cooled, 6-cylinder, turbocharged, valve-in-head, vertical in-line four-cycle diesel engine.

DIAGNOSING ENGINE MALFUNCTIONS

WILL NOT START

Fuel System Malfunction—See Section 30
- Foreign matter in fuel
- Improper fuel
- Faulty fuel pump
- Fuel shut-off at tank
- Restricted air intake system
- Faulty injection nozzles
- Plugged fuel filter

Electrical System Malfunction—See Section 40
- Corroded or loose battery
- Weak battery
- Faulty injection pump solenoid

UNEVEN RUNNING OR FREQUENT STALLING

Basic Engine Problem—See This Section
- Improper valve clearance
- Cylinder head gasket leaking
- Valves sticking or burned
- Worn or broken compression rings
- Low compression
- Incorrect timing
- Coolant temperature below normal
- Engine overheating

Service Problem—See Section 10
- Low Fuel Supply
- Restricted fuel lines or filter
- Faulty fuel pump
- Faulty injection pump
- Faulty injection nozzles
- Exhaust system restricted

ENGINE MISSES

Basic Engine Problem—See This Section
- Weak valve springs
- Incorrect valve clearance
- Burned, warped, pitted, or sticking valves
- Low compression
- Worn camshaft lobes (may be caused by faulty damper)
- Incorrect timing
- Engine overheating

Fuel System Malfunction—See Section 30
- Air in fuel
- Faulty injection nozzles
- Faulty injection pump
- Detonation
- Water in fuel
- Mixture of gasoline and diesel fuels

LACK OF POWER

Basic Engine Problem—See This Section
- Blown cylinder head gasket
- Worn camshaft lobes
- Incorrect valve clearance
- Incorrect valve timing
- Burned, warped, pitted or sticking valves
- Weak valve springs
- Low compression
- Incorrect timing
- Wrong viscosity crankcase oil.
- Engine overheating.

Service Problem—See Section 10
- Dirty or obstructed air cleaners
- Improper fuel
- Wrong oil viscosity

Fuel System Malfunction—See Section 30
- Plugged fuel filter
- Faulty injection pump
- Faulty injection nozzles
- Faulty fuel pump
- Restricted exhaust system
- Low intake manifold pressure
- Incorrect throttle linkage

Power Train Malfunctions—See Section 50
- Clutch slipping

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Section 10
GENERAL

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Group 5
GENERAL TRACTOR SPECIFICATIONS

HORSEPOWER:
- Observed at PTO 115

ENGINE:
- Type ..... 6-cylinder, in-line, valve-in-head, diesel, turbocharged
- Bore and stroke ..... 4-1/4 in. x 4-3/4 in.
- Displacement ..... 404 cu. in.
- Compression ratio ..... 15.7 to 1
- Firing order 1-5-3-6-2-4
- Valve clearance ..... Intake-0.018 in. Exhaust-0.022 in.
- Injection pump timing ..... TDC
- Engine Speeds:
  - Working range ..... 1500 to 2200 rpm
  - Maximum transport speed ..... 2500 rpm
  - Engine speeds:
    - Slow idle ..... 800 rpm
    - 1900 rpm load ..... 2150 rpm idle
    - 2200 rpm load ..... 2400 rpm idle
    - 2500 rpm load ..... 2650 rpm idle

LUBRICATION SYSTEM: Full pressurized with full-flow micronic oil filter, water cooled oil cooler, and bypass valves for filter and cooler.

FUEL SYSTEM:
- Type ..... Direct injection
- Filter ..... Two-stage with replaceable impregnated paper element.
- Injection pump type ..... Inlet metering, distributing type
- Air cleaner . . Dry type with safety element

COOLING SYSTEM:
- Type ..... Pressurized with centrifugal pump
- Temperature control ..... Heavy-duty thermostat

CAPACITIES:
- Fuel tank ..... 44 U.S. gals.
- Cooling system ..... 28 U.S. qts.
- Crankcase (with filter change) ..... 16 U.S. qts.
- Transmission-hydraulic system (add 4-1/2 gals. to capacity if equipped with Power Front Wheel Drive) ..... 14 U.S. gals.

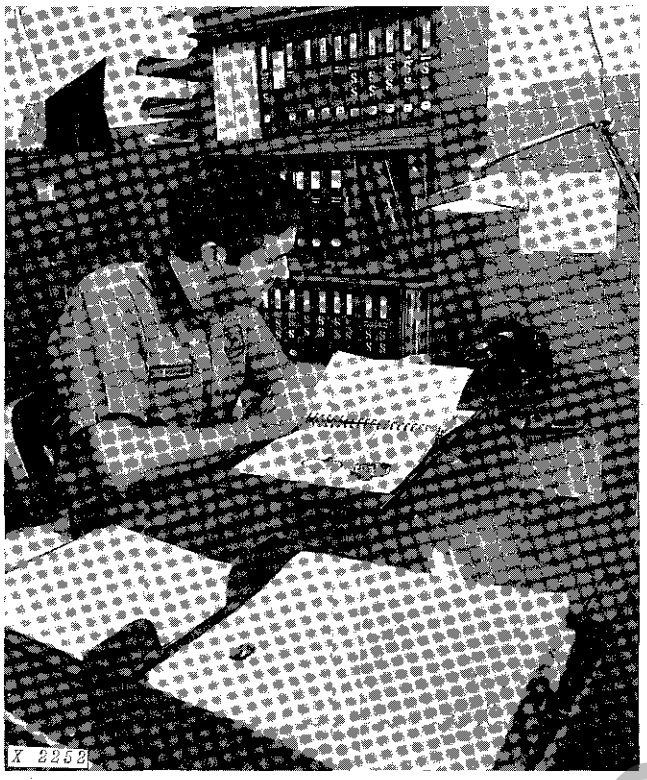
TRANSMISSION:
- Type ..... Syncro-Range, constant mesh
- Clutch ..... Heavy-duty, 13-1/2 in. plate, foot operated
- Gear selections ..... 8 forward and 2 reverse
- Shifting ..... 4 stations, synchronized forward shifting within stations

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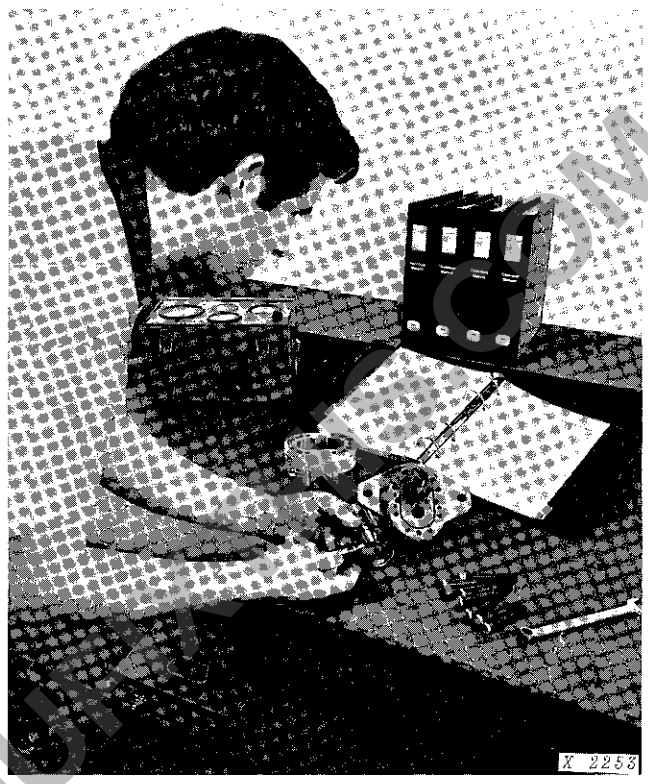
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INTRODUCTION



Use FOS Manuals for Reference



Use Technical Manuals for Actual Service

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

- **FOS Manuals—for reference**
- **Technical Manuals—for actual service.**

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

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

Technical Manuals are concise service guides for a *specific* machine. Technical Manuals are on-the-job guides containing only the vital information needed by a journeyman mechanic.



When a serviceman 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.

Some features of this technical manual:

- *Table of contents at front of whole manual*
- *Contents at front of each Section*
- *Specifications at end of each Group*
- *Special tools at end of each Group*

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

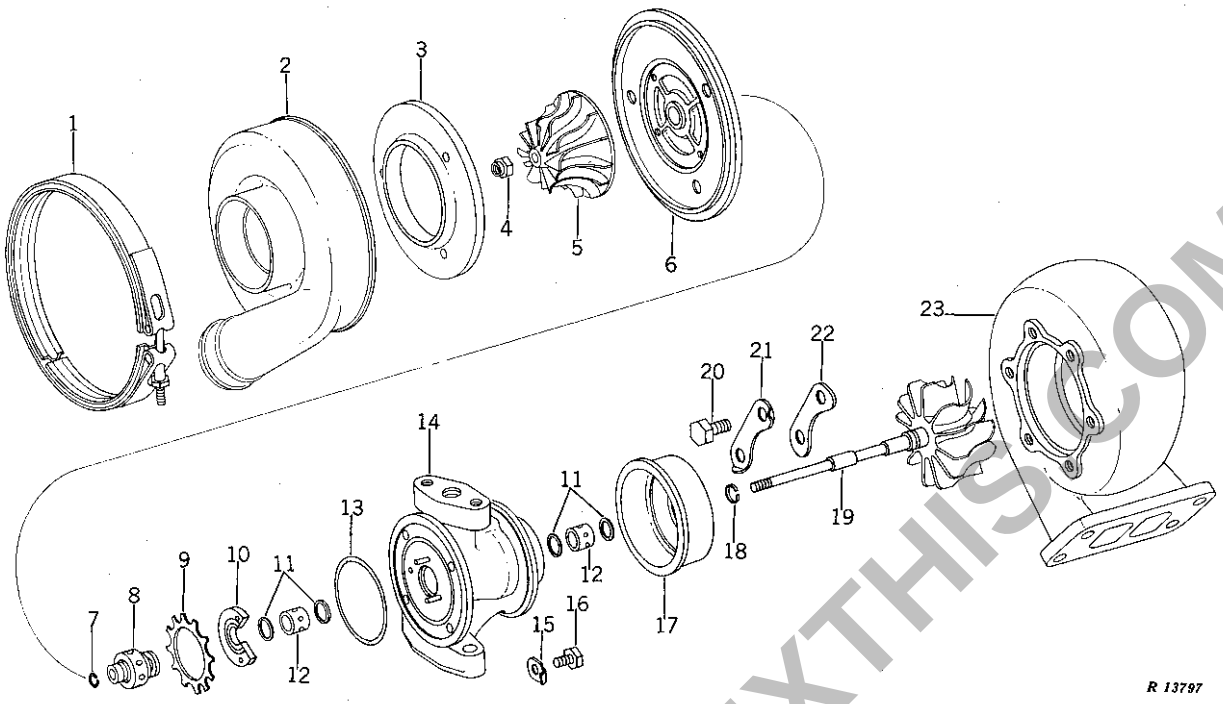
This technical manual was planned and written for you—a journeyman mechanic. Keep it in a permanent binder in the shop where it is handy. Refer to it whenever in doubt about correct service procedures or specifications.

Using the technical manual as a guide will reduce error and costly delay. It will also assure you the best in finished service work.

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1-Clamp
2-Compressor Housing
3-Diffuser
4-Lock Nut
5-Impeller
6-Back Plate
7-Piston Ring
8-Thrust Collar
9-Spring
10-Thrust Washer
11-Retaining Ring (4 used)
12-Bearing (2 used)
13-O-Ring
14-Center Housing
15-Lock Plate (4 used)
16-Cap Screw (4 used)
17-Wheel Shroud
18-Piston Ring
19-Turbine Wheel
20-Special Bolt (6 used)
21-Lock Plate (3 used)
22-Clamp (3 used)
23-Turbine Housing

Fig. 4-Turbocharger Parts

Shaft Wheel

Turbine wheel must show no signs of rubbing and vanes must not be torn or worn to a feather edge. Shaft must show no signs of scoring, scratches, or seizure with the bearings.

Impeller

Impeller must show no signs of rubbing or damage from foreign material. It must be completely free of dirt or other foreign material. Impeller bore must not be galled.

Seal Parts

Seals must show no signs of rubbing or scoring of the running faces.

Housing

Housing must show no signs of contact with rotating parts. Oil and air passages must be clean and free of obstructions.

Repair or Replacement

Burnish or polish out minor surface damage. Use silicon carbide abrasive cloth for aluminum parts and crocus abrasive cloth for the steel parts.

If removed, replace the following parts: (Fig. 4) seal ring (13), lock nut (4), lock plate (15 and 21), piston rings (18 and 7), bearings (12), retaining rings (11), and bolts (20).

Thrust bearing (8) and thrust collar piston ring groove showing signs of nicks, scoring, shellac deposits, or imbedded foreign material must be replaced.

Assembly

Check each part prior to installation for cleanliness.

Refer to Fig. 4 and install inboard bearing retaining rings (See "Special Tools"). Lubricate bearings with clean engine oil and insert in place. Install turbine bearing and compressor bearing retaining rings.

Place turbine wheel upright. Guide the shaft through center housing shroud and bearing. Place thrust washer over rear section of the thrust collar.

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ADJUSTMENTS

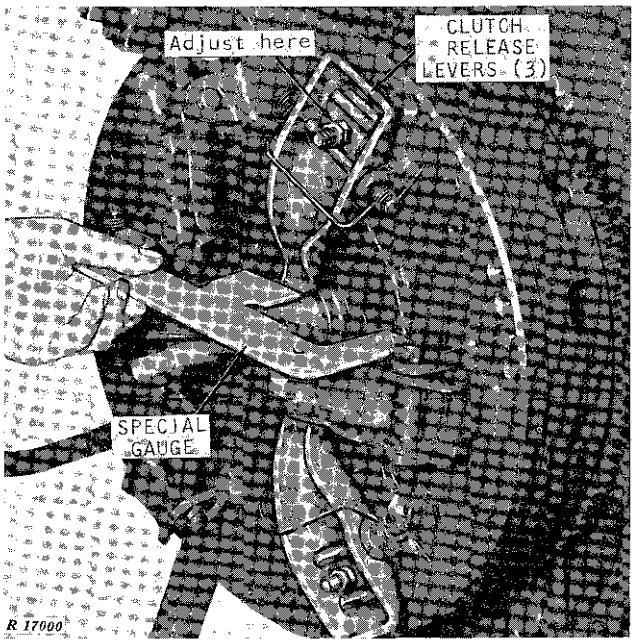


Fig. 14-Release Lever Adjustment

Use special gauge No. JDE-19 or JDE-61 to adjust transmission clutch release levers (Fig. 14). Adjust each clutch release lever to just touch the gauge by turning adjusting nuts in or out. When each release lever is correctly adjusted, tighten jam nut securely. Recheck adjustment.

NOTE: When a used clutch disk is to be reinstalled, use a new clutch disk to make the adjustments given here. This will prevent damage to the flywheel or clutch plate when the clutch disk is finally worn out.

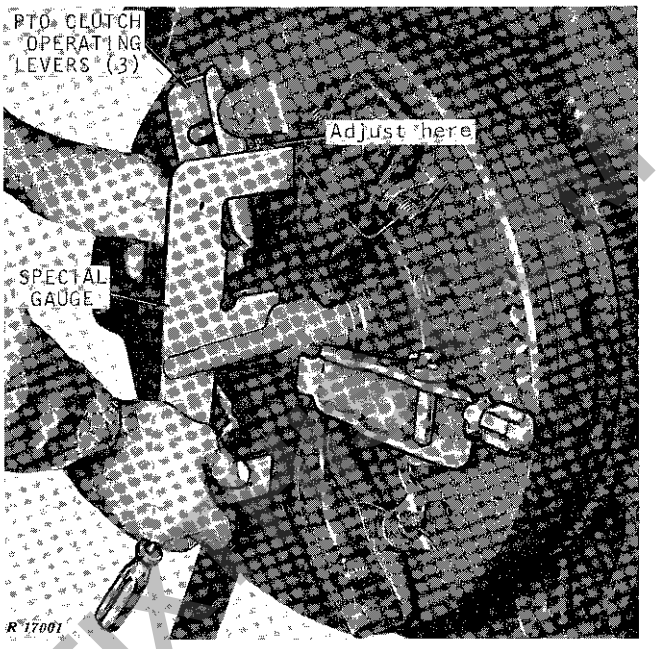
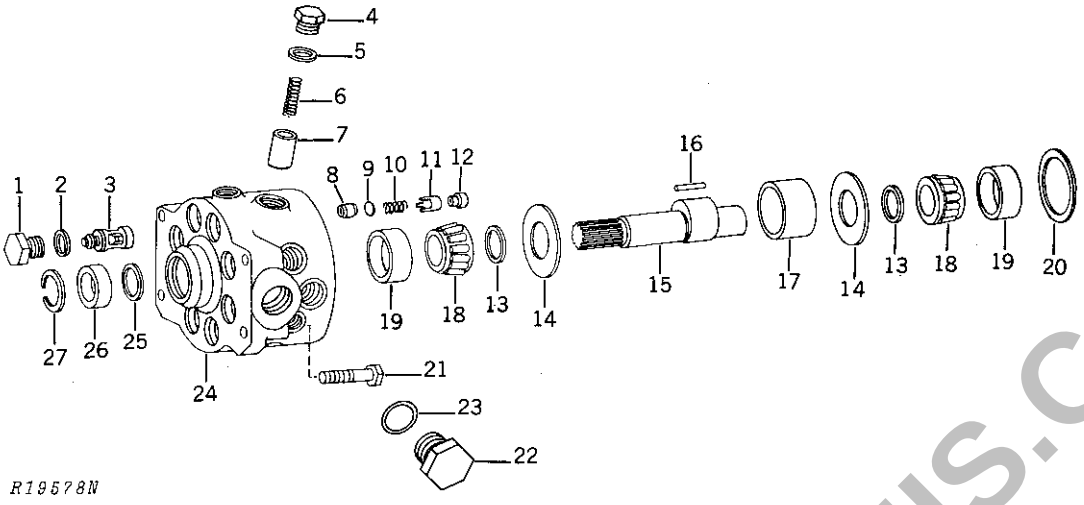


Fig. 15-PTO Operating Lever Adjustment

Place screw drivers under each of the PTO clutch operating levers as shown in Fig. 15 to hold the PTO clutch disk in the engaged position. Use "4020" side of special gauge JDE-19. Adjust each lever to just touch the gauge. When each lever is correctly adjusted, tighten jam nut. Recheck the adjustment.

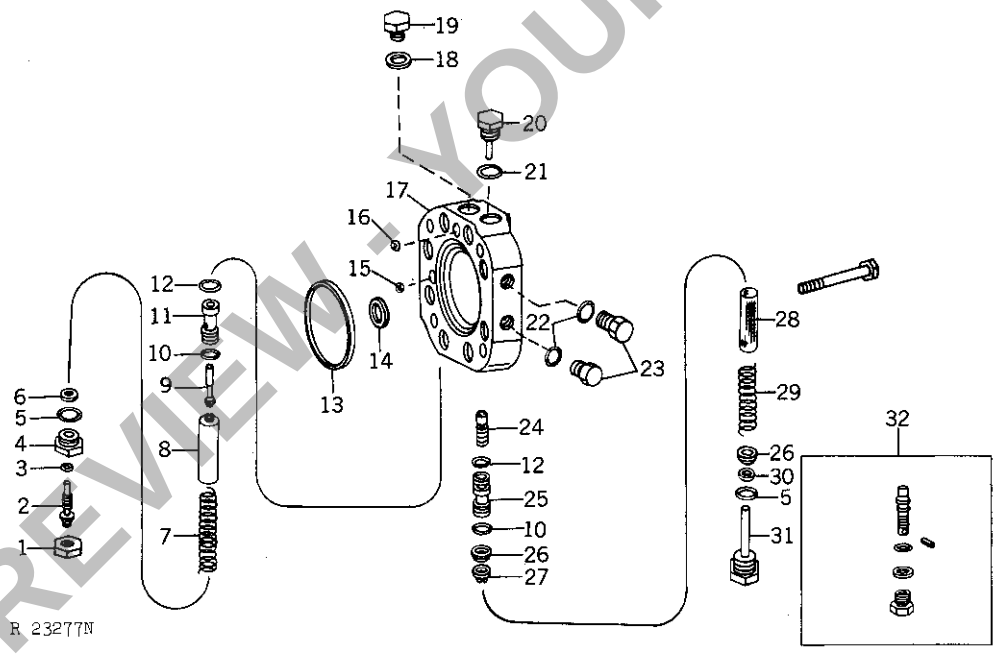
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1—Plug (8 used)
2—O-Ring (8 used)
3—Inlet Valve (8 used)
4—Piston Plug (8 used)
5—O-Ring (8 used)
6—Spring (8 used)
7—Pump Piston (8 used)
8—Seat (8 used)
9—Discharge Valve (8 used)
10—Spring
11—Guide
12—Stop
13—Spacer
14—Thrust Washer
15—Pump Shaft
16—Roller Bearing
17—Race
18—Cone
19—Bearing Cup
20—Shim
21—Cap Screw
22—Plug
23—O-Ring
24—Housing
25—Packing
26—Oil Seal
27—Snap Ring

Fig. 8-3.0 Cu. In. Main Pump



1—Nut
2—Adjusting Screw
3—O-Ring
4—Bushing
5—O-Ring (2 used)
6—Washer
7—Spring
8—Spring Guide
9—Stroke Control Valve
10—O-Ring (2 used)
11—Sleeve
12—O-Ring (2 used)
13—O-Ring
14—Packing (2 used)
15—O-Ring
16—O-Ring
17—Housing
18—O-Ring
19—Plug
20—Plug with Pin
21—O-Ring
22—O-Ring (2 used)
23—Plug (2 used)
24—Crankcase Outlet Valve
25—Sleeve
26—Packing (2 used)
27—Guide
28—Filter
29—Spring
30—Washer
31—Plug with Pin
32—Pump Shut-Off Assembly

Fig. 9-Stroke Control Valve

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