850 GENERAL-PURPOSE CRAWLER

Hydraulic System: Open-center (optional)
Control ..... Single-lever, two-function control
Pump ..... Vane, 38 gpm (2.40 L/s) @ rated engine speed
Pressure ..... 2250 psi (15 514 kPa) (158.2 kg/cm²)

Tracks: 6-roller track frame w/front guide. DURA-TRAX™ deep-heat-treated sealed track links and through-hardened sealed rollers provide maximum wear resistance.
Grouser ..... 20 in. (508 mm)
Track shoes, each side 37
Grounded contact area ..... 3800 sq. in. (24 516 cm²)
Ground pressure ..... 8.58 psi (59.1 kPa) (0.60 kg/cm²)
Length of track on ground ..... 95 in. (2.41 m)
Track gauge ..... 74 in. (1.88 mm)
Oscillation ..... 10 in. (254 mm)
Carrier rollers ..... 2 each side
Adjustment ..... Hydraulic
Minimum ground clearance ..... 16.4 in. (417 mm)

Capacities:	U.S.	Liters
Cooling system	9 gal.	34.0
Fuel tank	82 gal.	310.4
Crankcase	32 qt.	30.3
Crankcase, including filter	34 qt.	32.2
Splitter drive	1.5 gal.	5.7
Final drive, each		
Inner compartment	5.5 gal.	20.8
Outer compartment	3.5 gal.	13.2
Hydraulic system (optional)	35 gal.	132.5
Hydrostatic drives	40 gal.	151.4

SAE Operating Weight w/ROPS ..... 32,600 lb. (14 790 kg)

850/6540 ANGLEDOZER

Hydraulic System: Open-center
Control ..... Single-lever, two function control
Pump ..... Vane, 38 gpm (2.40 L/s) @ rated engine speed
Pressure ..... 2250 psi (15 514 kPa) (158.2 kg/cm²)

Hydraulic Cylinders:	Bore	Stroke
Lift, two	4.25 in. (108 mm)	33.82 in. (859 mm)
Tilt, two	5.5 in. (140 mm)	4.33 in. (110 mm)
Cylinder rods	Ground, heat-treated, chrome-plated, polished	

Tracks: 6-roller track frame w/front and rear track guides and sprocket guard. DURA-TRAX™ deep-heat-treated sealed track links and through-hardened sealed rollers provide maximum wear resistance.
Grouser ..... 20 in. (508 mm)
Track shoes, each side 37
Ground contact area ..... 3800 sq. in. (24 516 cm²)
Ground pressure ..... 9.77 psi (67.4 kPa) (0.69 kg/cm²)
Length of track on ground ..... 95 in. (2.41 m)
Track gauge ..... 74 in. (1.88 m)
Oscillation ..... 10 in. (254 mm)
Carrier rollers ..... 2 each side
Adjustment ..... Hydraulic
Minimum ground clearance ..... 16.4 in. (417 mm)

Blade:
Cutting edge 3-piece
Center section ..... 0.75 in. (19 mm)
End bits, boron steel ..... 0.75 in. (19 mm)

Capacities:	U.S.	Liters
Cooling system	9 gal.	34.0
Fuel tank	82 gal.	310.4
Crankcase	32 qt.	30.3
Crankcase, including filter	34 qt.	32.2
Splitter drive	1.5 gal.	5.7
Final drive, each:		
Inner compartment	5.5 gal.	20.8
Outer compartment	3.5 gal.	13.2
Hydraulic system (optional)	35 gal.	132.5
Hydrostatic drives	40 gal.	151.4

SAE Operating Weight w/ROPS ..... 37,120 lb. (16 840 kg)

850/6545 BULLDOZER

Hydraulic System: Open-center
Control ..... Single-lever, two function control
Pump ..... Vane, 38 gpm (2.40 L/s) @ rated engine speed
Pressure ..... 2250 psi (15 514 kPa) (158.2 kg/cm²)

Hydraulic Cylinders:	Bore	Stroke
Lift, two	4.25 in. (108 mm)	34.41 in. (874 mm)
Tilt, two	6.25 in. (159 mm)	4.41 in. (112 mm)
Cylinder rods	Ground, heat-treated, chrome-plated, polished	
Cylinder pivot pins	Hardened steel (replaceable bushings)	

Tracks: 6-roller track frame w/front and rear track guides and sprocket guard. DURA-TRAX™ deep-heat-treated sealed track links and through-hardened sealed rollers provide maximum wear resistance.
Grouser ..... 20 in. (508 mm)
Track shoes, each side 37
Ground contact area ..... 3800 sq. in. (24 516 cm²)
Ground pressure ..... 9.68 psi (66.7 kPa) (0.68 kg/cm²)
Length of track on ground ..... 95 in. (2.41 m)
Track gauge ..... 74 in. (1.88 m)
Oscillation ..... 10 in. (254 mm)
Carrier rollers ..... 2 each side
Adjustment ..... Hydraulic
Minimum ground clearance ..... 16.4 in. (417 mm)

Blade:
Cutting edge 3-piece
Center section ..... 0.75 in. (19 mm)
End bits, boron steel ..... 0.75 in. (19 mm)

Capacities:	U.S.	Liters
Cooling system	9 gal.	34.0
Fuel tank	82 gal.	310.4
Crankcase	32 qt.	30.3
Crankcase, including filter	34 qt.	32.2
Splitter drive	1.5 gal.	5.7
Final drive, each:		
Inner compartment	5.5 gal.	20.8
Outer compartment	3.5 gal.	13.2
Hydraulic system	35 gal.	132.5
Hydrostatic drives	40 gal.	151.4

SAE Operating Weight w/ROPS ..... 36,785 lb. (16 690 kg)

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Group IV
PREDELIVERY, DELIVERY, AND AFTER-SALE SERVICES

TEMPORARY STORAGE

After receiving your crawler from the factory and before putting the machine into temporary storage perform the following checks:

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

2. Check coolant level in the radiator. The coolant should be maintained at a level midway between the radiator core and filler neck.

3. Fill the fuel tank.

4. Check crankcase oil level. Oil should be at top mark of dipstick after crawler has been shut down for 10 minutes.

5. Relieve hydraulic pressure by stopping engine, lowering all equipment and operating control levers until system fails to respond.

PREDELIVERY SERVICE

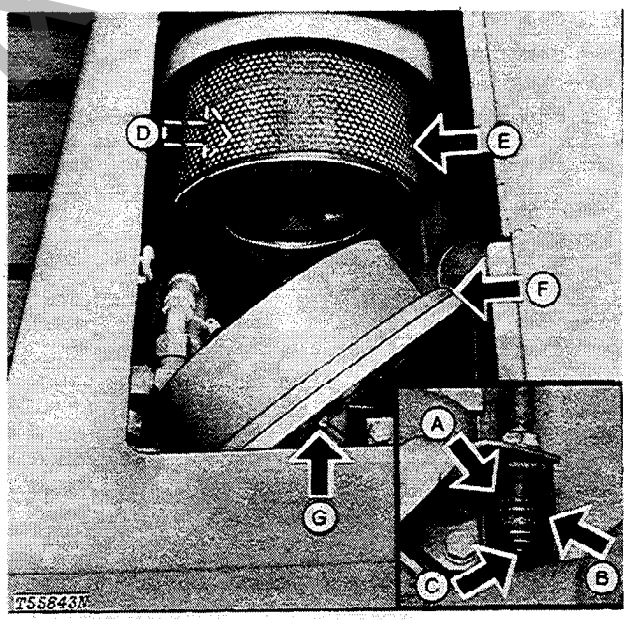
Because of the shipping factors involved, plus extra finishing touches that are necessary to promote customer satisfaction, proper predelivery service is of prime importance to the dealer and the customer.

If adjustments are required, procedures are found in the After-Sale section.

Install blade before starting the following predelivery points.

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

1. Air Cleaner



A—Red Signal
B—Restriction Indicator
C—Reset Button
D—Safety Element
E—Primary Element
F—Cover
G—Wing Nut

Fig. 1-Air Cleaner

Check air filter restriction indicator. If red signal locks in full view, look for restriction or blockage in air intake system.

Air cleaner elements checked	*Yes*	*No*
Restriction in system	*Yes*	*No*

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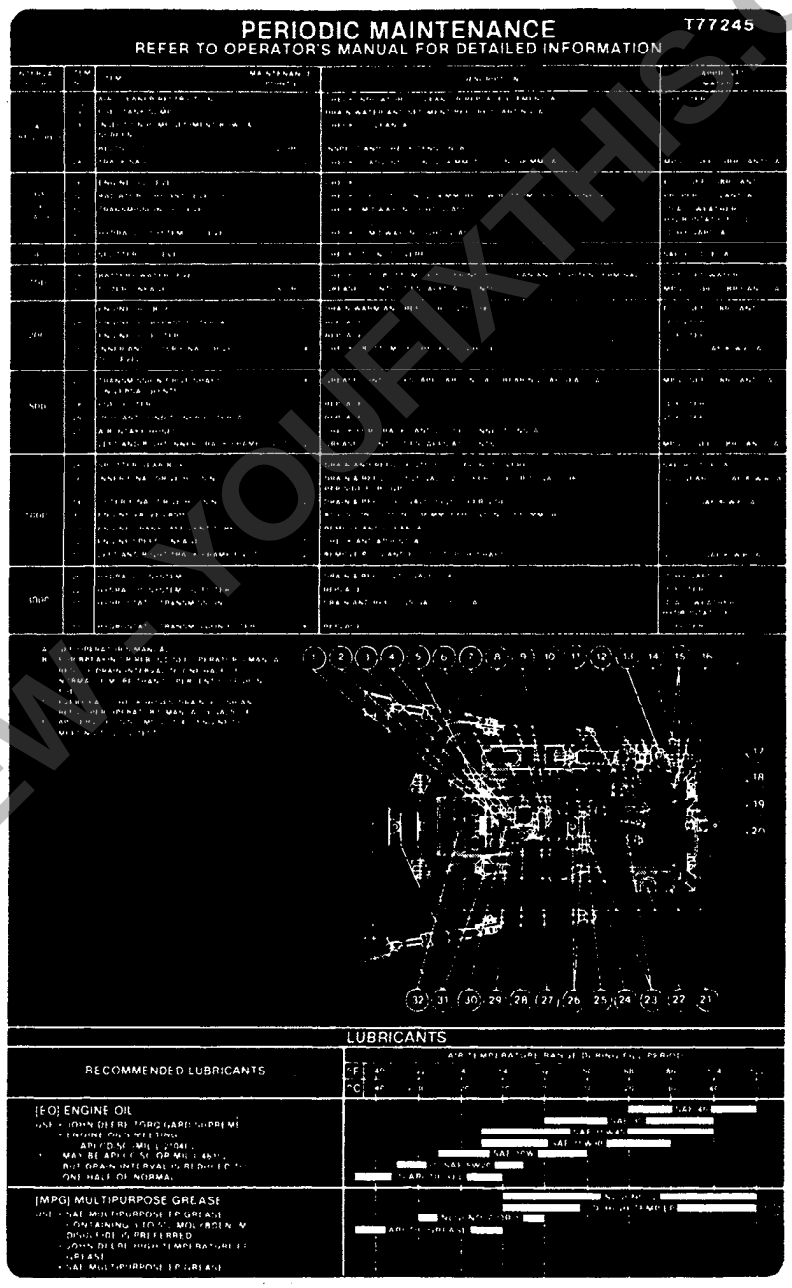
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Group V
FUELS AND LUBRICANTS

GENERAL INFORMATION

Illustrated below is a periodic service chart mounted on the outside of the left console (without cab) or outside the left side of the cab. More detailed information on servicing the crawler can be found in the current operator's manual.

Use the operator's manual and periodic service chart as references when servicing the crawler. Remind your customer to thoroughly read the operator's manual before attempting to service or operate the crawler.



T94325

Fig. 1-Periodic Service Chart

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TRACK ROLLERS

GENERAL INFORMATION

850 Bulldozer has six track rollers on each side to support the load of the crawler. The first, fourth and sixth rollers are single flanged. The second, third and fifth rollers are double flanged.

850 Low Ground Pressure Bulldozer has seven track rollers, spaced irregularly. Single and double flange rollers are used alternately, beginning and ending with a single flange roller.

MEASURING TRACK ROLLER WEAR

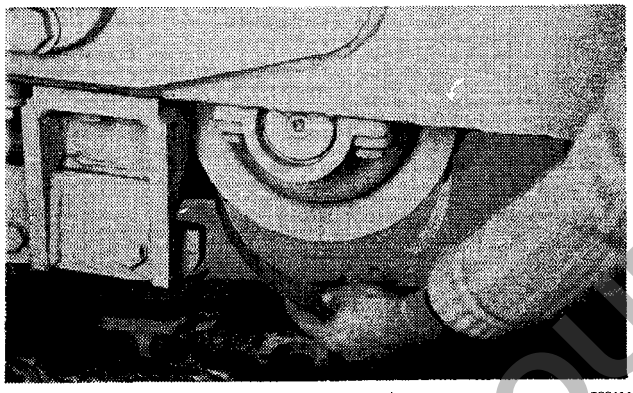

T96414

Fig. 7-Track Roller Wear Measurement

Raise unit off the ground and block it for support. Release track tension by turning ball check valve one turn counterclockwise to allow grease to escape from track adjusting cylinder. Clean track roller to be measured.

Measure track roller using roller calipers and scale from JT05518 or JT05523 Undercarriage Inspection Service Tool Kit. Measure inside and outside tread diameters of the roller at the area of most wear using the calipers; then measure caliper tip spread with the scale to the nearest 0.020 in. (0.5 mm).

TRACK ROLLER WEAR SPECIFICATION

O.D. of new track roller	8.27 in. (210 mm)
Minimum recommended O.D.	7.40 in. (188 mm)

NOTE: For additional information on measuring track roller wear, refer to UNDERCARRIAGE APPRAISAL MANUAL SP-326.

REMOVAL

Release track tension by turning the ball check valve one turn counterclockwise to allow grease to escape from the track adjusting cylinder. Place a piece of pipe between the sprocket and the track chain and rotate the track to retract the adjusting cylinder if required.

CAUTION: High pressure may be present in the track adjuster cylinder. Do not visually inspect the grease escape passage.

Remove inner and outer rock guards.

Raise crawler high enough to remove rollers and block under crawler securely.

Remove roller attaching cap screws and remove rollers.

REPAIR

NOTE: Single flange rollers and double flange rollers are of the same design. Disassembly and assembly procedures are the same for both types of rollers.

Remove snap rings (9, Fig. 8) from track roller shaft (10).

Remove inner collar (2) and outer collar (13) from track roller shaft.

Remove O-rings (11) from shaft.

Pull metal face seal (4) from bushing case (5) and from inner and outer collars.

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Power is transmitted from the transmissions to the drive sprocket by a double reduction final drive. A spur gear and planetary system provide a 32.2 speed reduction. The final drive shaft pinion and final drive gear make up the spur system while the planetary system is contained in the outer planet housing.

NOTE: It is not necessary to remove the final drive housing when servicing the planet housing with pinions and shafts or the final drive housing cover with gears and shafts. These assemblies can be removed separately or as a unit.

PLANET HOUSING WITH PINIONS AND SHAFTS

REMOVAL

Refer to Group 0130 and disconnect track chain.

Position crawler with planet housing drain plug (Fig. 2) at bottom.

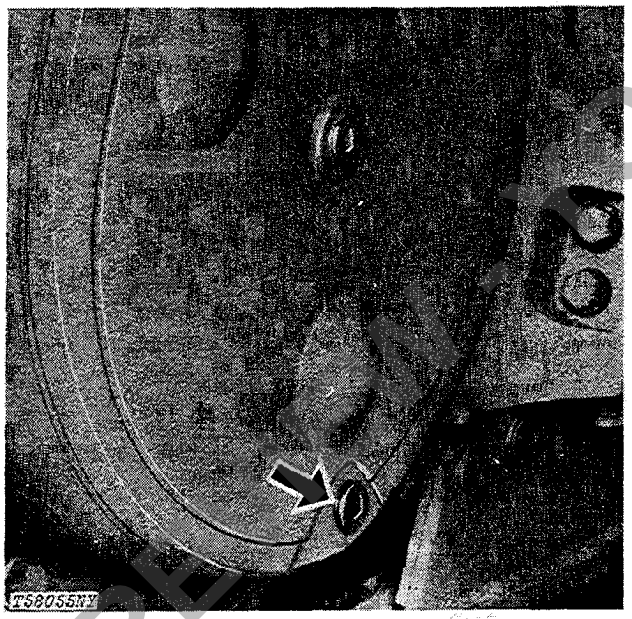


Fig. 2-Planet Housing Drain Plug

Drain oil from planet housing at drain plug (Fig. 2).

Raise crawler high enough to disengage sprocket from track chain. Securely block under crawler.

Remove outer sprocket shield and sprocket (Fig. 3).

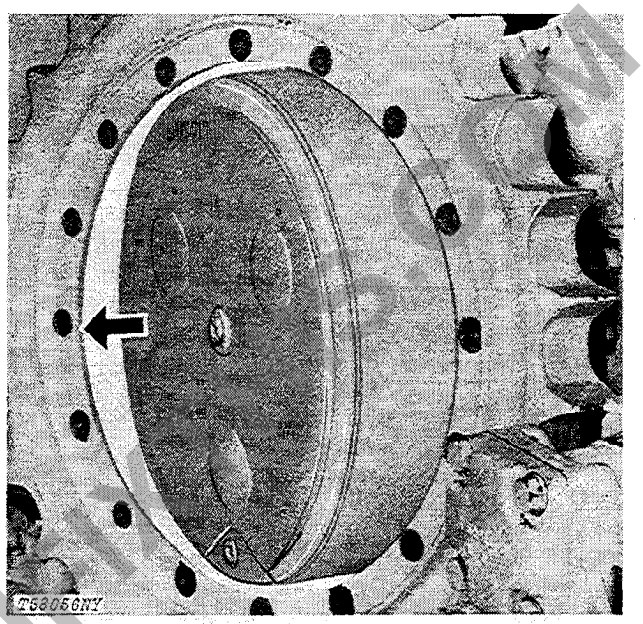
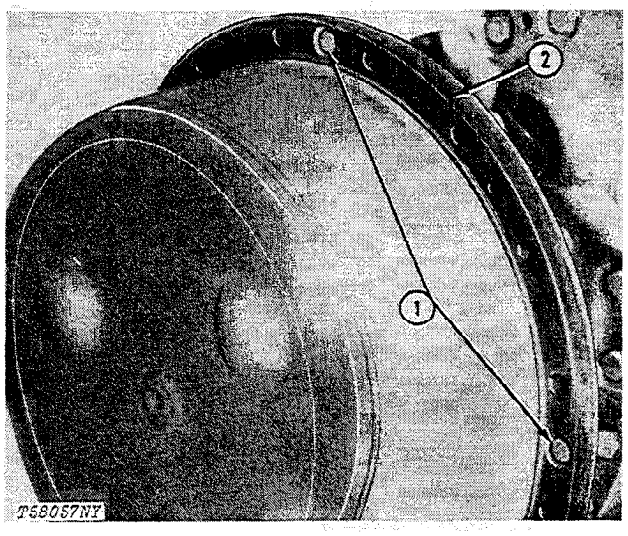


Fig. 3-Removal of Sprocket



1—Cap Screw (4 used) **2—Planet Housing Flange**

Fig. 4-Cap Screws in Recessed Pockets

Remove four cap screws (1, Fig. 4) from recessed pockets in planet housing flange (2).

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Group 0315
CONTROLS

GENERAL INFORMATION

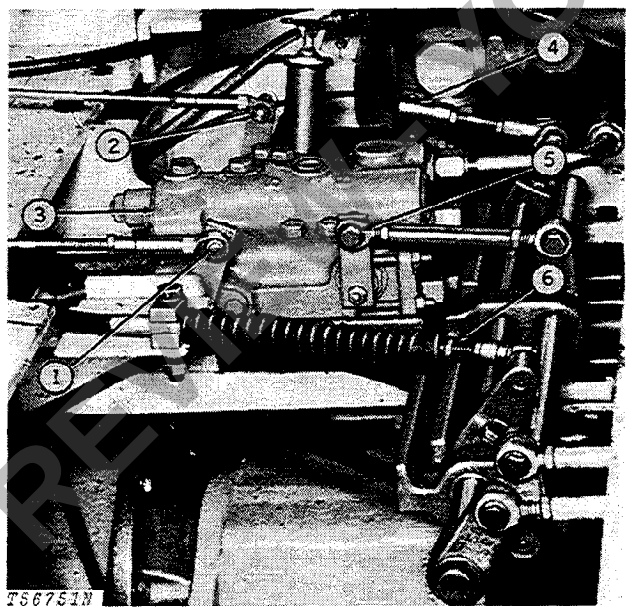
The transmission controls include the controls for steering, direction, and automatic speed control.

The steering pedals, or levers, are linked to the two levers (1 and 2, Fig. 1) at the front of the transmission control valve (3).

The forward and reverse speed control lever (2, Fig. 2), located on the left console in the operator's station, is linked to the FNR valve lever (5, Fig. 1) on the left side of the transmission control valve (3).

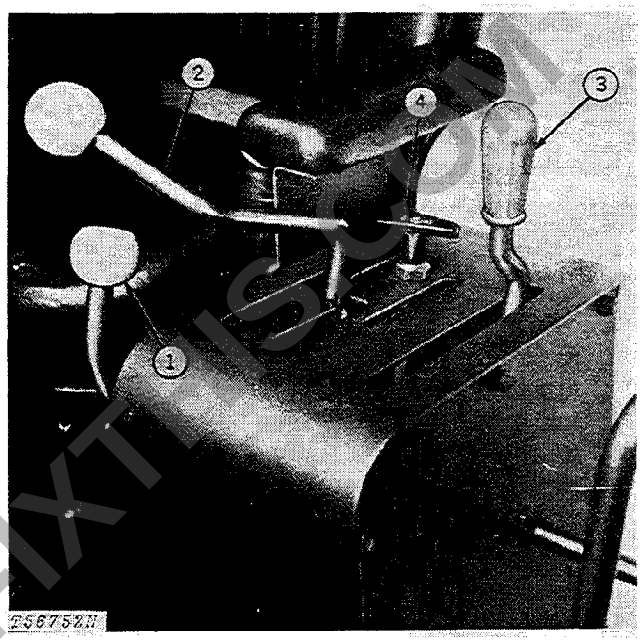
The throttle lever (3, Fig. 2) located on the left console in the operator's station, is linked to the automatic control valve variable orifice lever (4, Fig. 1) and to the engine speed cable (6).

The automatic control valve shut off handle (4, Fig. 2) is located on the left console between the throttle lever and the forward and reverse speed control lever. This cable shuts off the automatic control valve and allows the transmission to be operated during cold weather warm-up.



1—L.H. Steering Valve Lever
2—R.H. Steering Valve Lever
3—Transmission Control Valve
4—Automatic Control Valve Variable Orifice Lever
5—FNR Valve Lever
6—Engine Speed Cable

Fig. 1-Transmission Controls



1—Neutral Lock Lever
2—Forward and Reverse Speed Control Lever
3—Throttle Lever
4—Automatic Control Valve Shut off Handle

Fig. 2-Transmission Control Levers

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Group 0400
ENGINE REMOVAL AND INSTALLATION

REMOVAL

Lower blade to ground.

Disconnect battery negative (−) cable at battery or turn battery disconnect switch to "OFF".

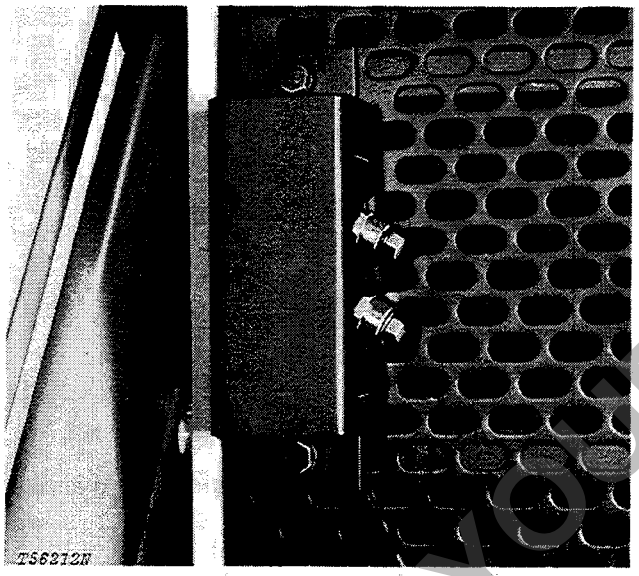


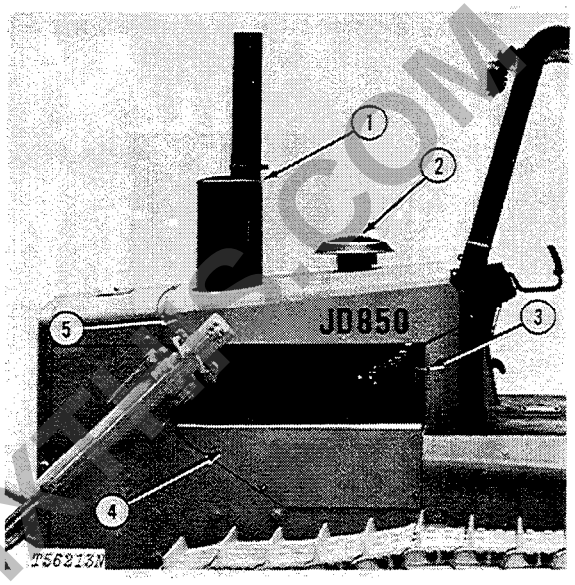
Fig. 1-Fitting Guard

Remove the fitting guard.

Remove grille and baffle.

Drain cooling system.

Drain the hydraulic system oil cooler. A drain cock is provided at the front of the oil cooler.



1—Muffler
2—Pre-Cleaner
3—Brush Shield
4—Engine Side Shield
5—Hood

Fig. 2-Sheet Metal Removal

Remove brush shields and engine side shields (Fig. 2).

Remove the hood.

Disconnect aspirator hose at the muffler. Remove muffler at exhaust elbow.

Remove air cleaner.

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Group 0510
COOLING SYSTEMS

GENERAL INFORMATION

The engine cooling system consists of the radiator, a coolant filter/conditioner, fan, and transmission system oil cooler.

The radiator is located at the front of the crawler and is of the tube and fin type core construction. The pressure type radiator cap is located on the top of the radiator to maintain pressure in the cooling system.

The coolant filter/conditioner is located on the left side of the engine.

REMOVAL

Radiator

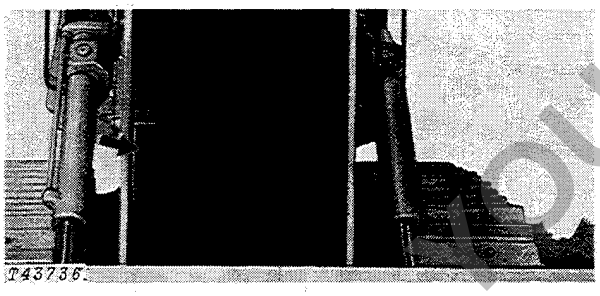


Fig. 1-Fitting Guard

Remove fitting guard (Fig. 1). Remove grille screen and baffle.

Drain radiator.

Disconnect hydraulic hoses (Fig. 2) for removal of grille housing.

Remove engine side shields, muffler, pre-cleaner, hood and hood extension.

Remove blade lift cylinders at points shown in Fig. 3. Use a hoist as cylinders are heavy.

Remove upper radiator support to allow clearance to remove radiator.

Remove grille housing using a 1-ton (907 kg) minimum capacity hoist.

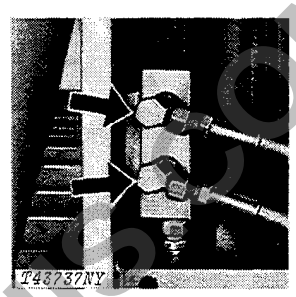


Fig. 2-Hydraulic Hose Connections

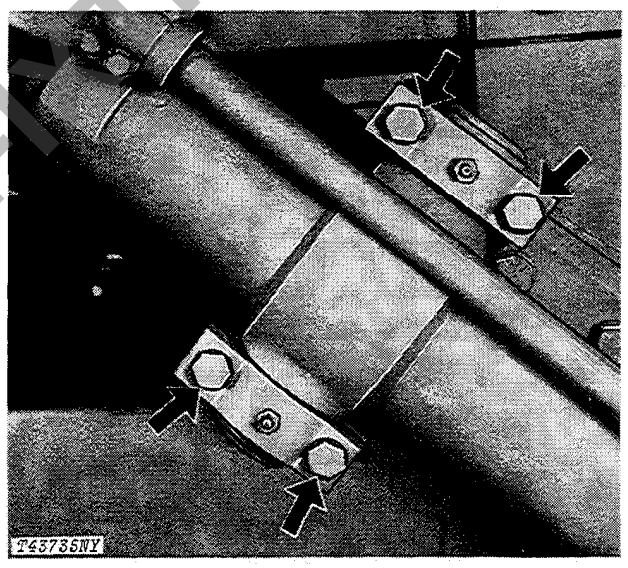


Fig. 3-Blade Lift Cylinders Removal

Detach the transmission system oil cooler from the radiator and fan shroud. Support the cooler.

NOTE: Do not disconnect the oil lines to the cooler. Disconnect only the coolant hoses.

Remove the radiator.

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Group 0899
SPECIFICATIONS AND SPECIAL TOOLS
GEARS, SHAFTS, BEARINGS
SPECIFICATIONS AND TORQUE VALUES

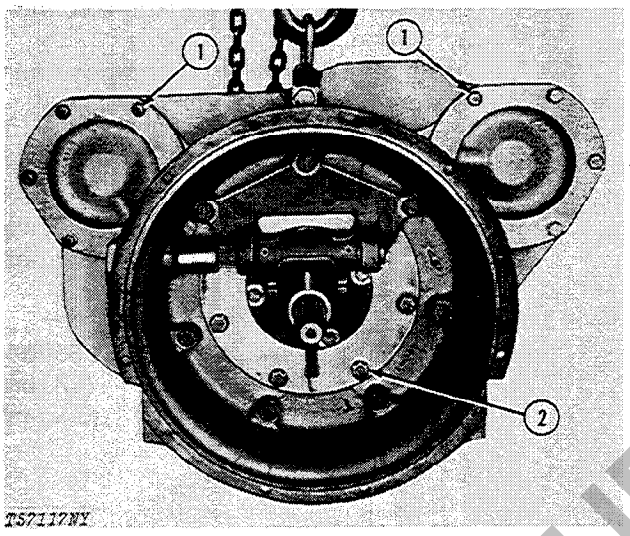


Fig. 1-Front of Splitter Housing

1 - Output shaft bearing quill cap screws ..... 35 lb-ft (47 Nm) (5 kg-m)

2 - Input shaft bearing quill cap screws ..... 85 lb-ft (115 Nm) (12 kg-m)

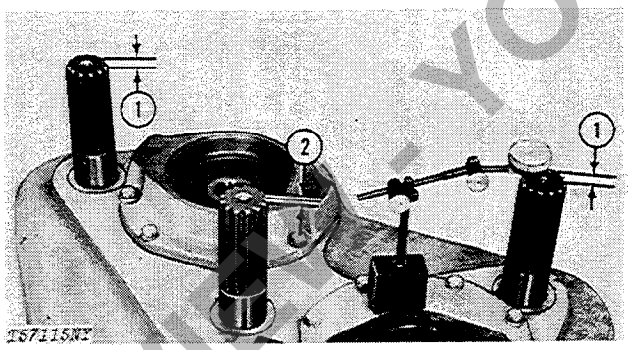


Fig. 2-Input and Output Shafts

1 - Output shaft end play ..... 0.001 to 0.004 in. (0.03 to 0.10 mm)

2 - Input shaft end play ..... 0.001 to 0.004 in. (0.03 to 0.10 mm)

NOTE: End play must be measured with the shafts in a vertical position.

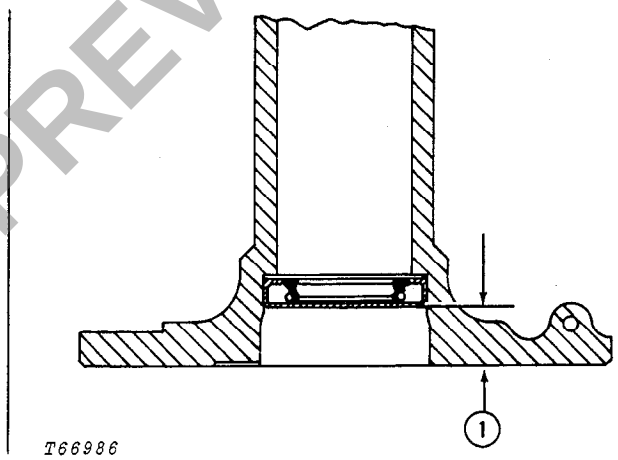


Fig. 3-Pump Cover Oil Seal

1 - Distance oil seal is pressed below surface of pump cover ..... 0.276 ± 0.020 in. (7.01 ± 0.51 mm)

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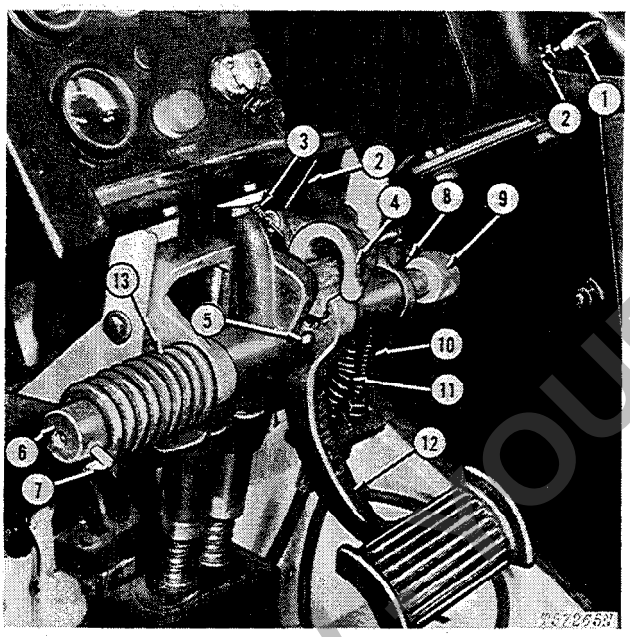
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Group 1115
CONTROLS LINKAGE

GENERAL INFORMATION

The brake pedal and lock are mounted on the steering lever support. The brake control cable and return-to-neutral cable are connected to the brake arm which is rotated by depressing the brake pedal.

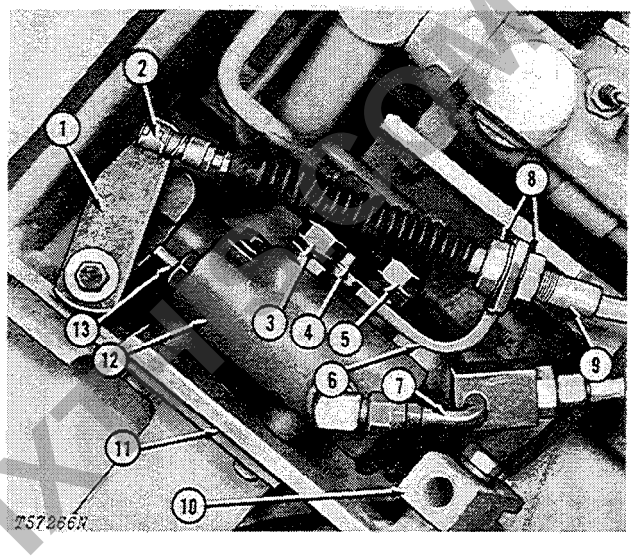
REMOVAL



1—Release Rod Knob
2—Brake Lock Rod
3—Spring
4—Brake Latch
5—Pin (2 used)
6—Pedal Shaft
7—Groove Pin
8—Groove Pin
9—Brake Arm
10—Brake Control Cable
11—Return to Neutral Cable
12—Brake Pedal
13—Spring

Fig. 1-Brake Pedal and Lock

Disconnect brake control cable (10, Fig. 1) and return-to-neutral cable (11) from the brake arm (9). Use pliers or vise grips on the brake arm (9) to rotate the shaft (6) so pins (5) can be removed.



1—Brake Lever
2—Ball Joint
3—Brake Drain Tube
4—Brake Line
5—Bypass Pressure Tube
6—Cable Anchor
7—Brake Valve Supply Line
8—Bulkhead Nuts
9—Brake Control Cable
10—Brake Release Pump Handle
11—Lever Mounting Bracket
12—Brake Valve
13—Brake Valve Plunger

Fig. 2-Brake Valve

Drive groove pin (8, Fig. 1) out of brake arm (9) and pull shaft (6) from bracket.

Remove spring (3) and disconnect brake lock rod (2) from brake latch (4). Remove pin from latch (4) and remove latch.

Remove knob (1) and jam nut from rod (2) and remove rod.

Loosen bulkhead nuts on cable (10) and remove ball joint (2, Fig. 2) from brake lever (1).

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Group 1672
ALTERNATOR, REGULATOR AND CHARGING SYSTEM WIRING

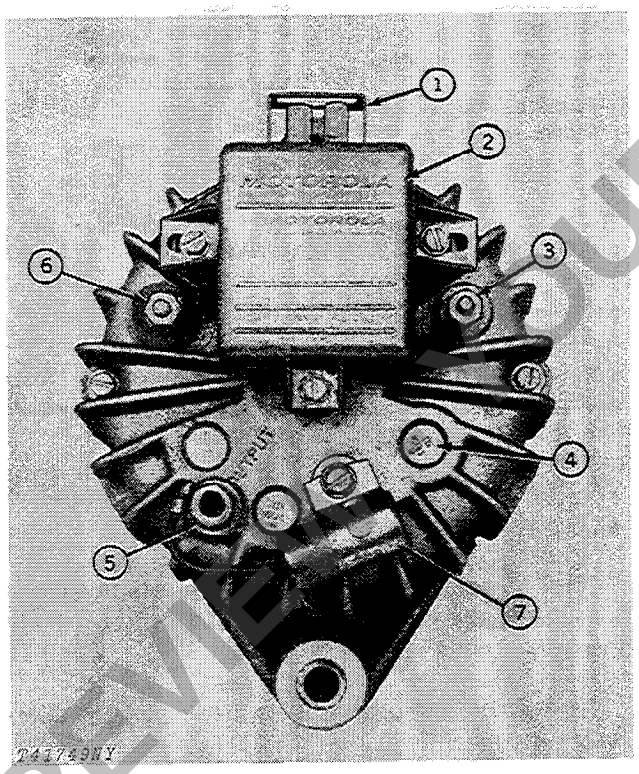
16

GENERAL INFORMATION

Two alternators are available for use on the JD850 Crawler Bulldozer. Generally a 16 amp alternator is supplied with units without cab and a 50 amp alternator is supplied for those units with cab.

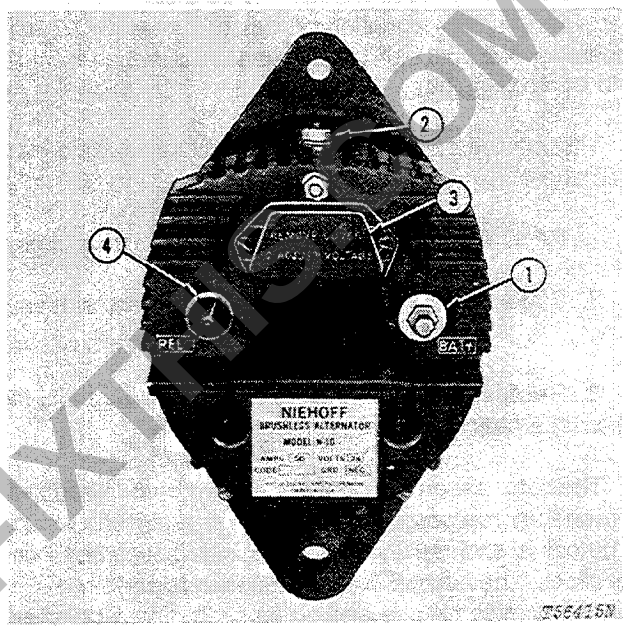
Alternator repair stories will be covered in the following pages:

16 Amp Alternator 1672-2
50 Amp Alternator 1672-14



1—Regulator Wire Connector
2—Voltage Regulator
3—Ground Terminal
4—Negative Diodes
5—Output Terminal
6—Regulator Terminal
7—Capacitor

Fig. 1-16 Amp Alternator



1—Output Terminal
2—Ground Terminal
3—Voltage Adjust
4—Relay Terminal

Fig. 2-50 Amp Alternator

The 16 amp alternator is connected to the electrical system by connections directly to the engine wiring harness. The 50 amp alternator is not connected directly to the engine wiring harness. A separate lead is connected from the 50 amp alternator output terminal to the starter solenoid "BAT" terminal. The unused engine harness connector is taped back to the engine harness.

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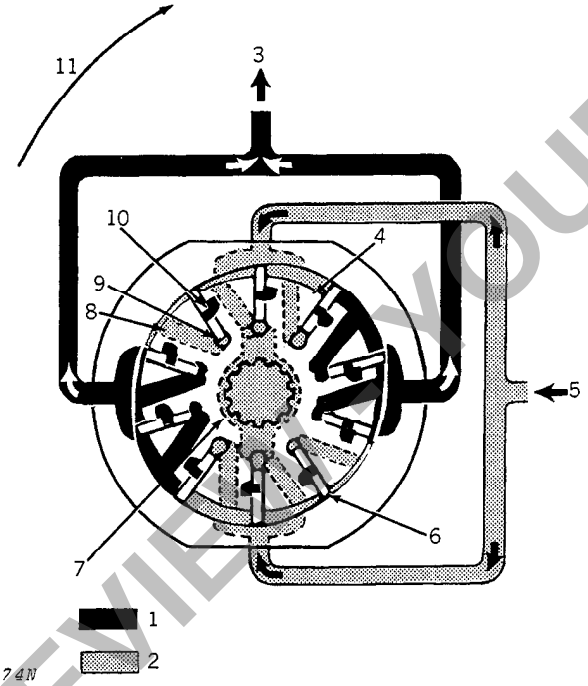
Group 3260
HYDRAULIC SYSTEM

DOZER PUMP

GENERAL INFORMATION

The dozer hydraulic pump is of the balanced, single-cartridge, intra-vane design, with the pump inlet port located in the body. Principal pump parts are: body, cover, pump cartridge, drive shaft, and bearings.

Inlet flow of oil from the reservoir is ported through the cover to the pump cartridge. The cartridge then discharges the oil through porting in the pressure plate and pump body to the main hydraulic system (Fig. 1).



1—High Pressure Oil (Outlet)
2—Low Pressure Oil (Inlet)
3—Outlet
4—Rotor
5—Inlet
6—Vane
7—Drive Shaft
8—Drilled Holes in Rotor
9—Insert
10—Force Between Vane and Insert
11—Rotation

Fig. 1-Hydraulic Pump Oil Flow

The principal components of the cartridge are an elliptical cam ring, a slotted rotor splined to the drive shaft, and inlet and outlet support plate fitted with four special seal packs, two flex side plates, and ten vanes and inserts fitted to the rotor slots.

Fluid enters the cartridge through the inlet port in the cover and is discharged through the outlet flex side plate and support plate to the outlet port in the body.

REMOVAL

Before removing hydraulic pump, release pressure in reservoir and hydraulic system.

Drain reservoir and disconnect pump inlet and outlet lines. Remove pump from splitter housing.

Clamp the pump body in a vise as shown in Fig. 2. When clamping the pump in a vise be careful not to damage machined surfaces.

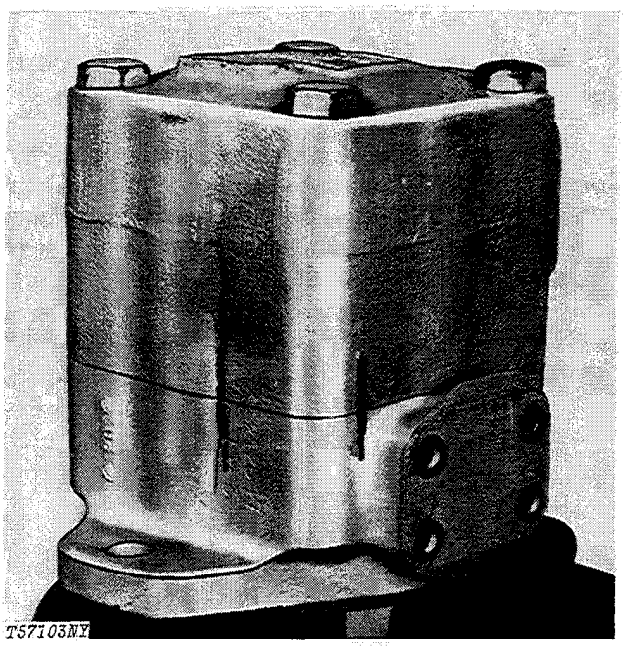


Fig. 2-Dozer Pump

32

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Group 9010
ENGINE

GENERAL INFORMATION

The crawler uses a 619 cu. in. (3 993 cm²) diesel-fueled, valve-in-head, vertical in-line six-cylinder turbo charged engine.

Engine Lubrication System

The components of the lubrication system are the oil pump, oil cooler, oil filter, and oil pressure regulating valve.

The oil pump draws lubricant from the oil pan through a system of gears and sends it through an internal passage through the oil cooler.

As the oil moves through the cooler, the oil temperature is lowered by coolant flow. If the cooler becomes restricted, the cooler bypass valve routes oil directly to the oil filter.

The oil pressure control valve is used to maintain and regulate oil pressure. From the control valve the oil goes to the oil filter.

The oil filter is a spin-on replaceable element. The filter removes contaminants from the engine oil. From the filter the oil goes to the gallery and is dispersed to lubricate the internal moving parts of the engine and the turbocharger.

Engine Cooling System

The components of the cooling system are the radiator, water pump, coolant filter/conditioner, and fan.

The radiator is equipped with a pressure cap which acts as a relief valve to keep pressure at a specified level in the system.

The water pump draws coolant from the radiator and sends it into the coolant gallery and engine oil cooler. Coolant from the gallery circulates through the engine to cool the cylinder block, cylinder liners, and cylinder head, and then flows into the water manifold. Coolant for the oil cooler flows from the cylinder block to cooler and then returns to the inlet side of the water pump.

The coolant filter/conditioner is located on the engine left side. It receives coolant from the cylinder block, filters out impurities (rust, scale, lime particles, etc.), and conditions the coolant in the cooling system. The spin-on type filter element must be serviced periodically. A shut-off valve on each side of the filter permits replacement of the coolant filter without draining the cooling system.

Fuel System

The components of the fuel system are the fuel tank, fuel transfer pump, fuel filter, fuel injection pump and the fuel injection nozzles.

The fuel transfer pump operates off a cam lobe of the injection pump. It draws fuel from the tank and delivers it to the fuel injection pump through the fuel filters.

The injection pump pressurizes the fuel and sends it through high-pressure lines to the injection nozzles.

The injection nozzles open when the fuel reaches a specified pressure and inject the fuel into the combustion chambers.

Air Intake System

The components of the air intake system are the air cleaner, turbocharger, and intake manifold.

The air enters through the air cleaner. The air cleaner element removes impurities from the air. The air cleaner has a restriction indicator, accessible through the service opening in the hood. The indicator warns the operator of excessive restriction in the system.

The turbocharger receives air from the air cleaner, pressurizes it and sends it through the intake manifold to the combustion chambers. During engine operation, exhaust gases enter the turbine housing of the turbocharger rotating the turbine wheel and compressor. The compressor draws in and compresses air. As engine fuel delivery increases, the flow of exhaust gases increases, and the speed of the rotating assembly increases; thus the amount of air entering the intake manifold increases.

Speed Control Linkage

The speed control linkage consists of various linkages which are connected to the injection pump. Through common movement of the throttle lever and linkage, speed control is maintained. Any repair or adjustment of the engine speed control linkage requires re-synchronization of engine speed with the transmission automatic control valve. See Group 9026.

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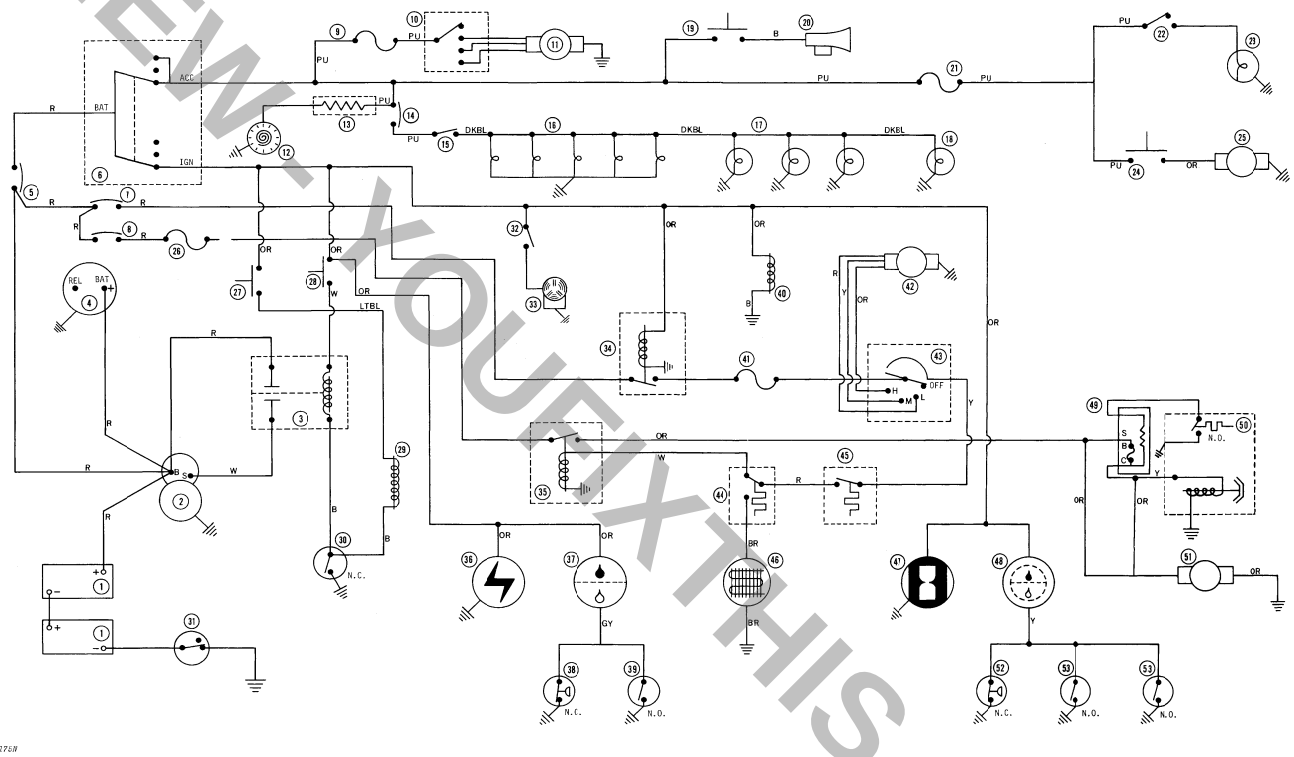
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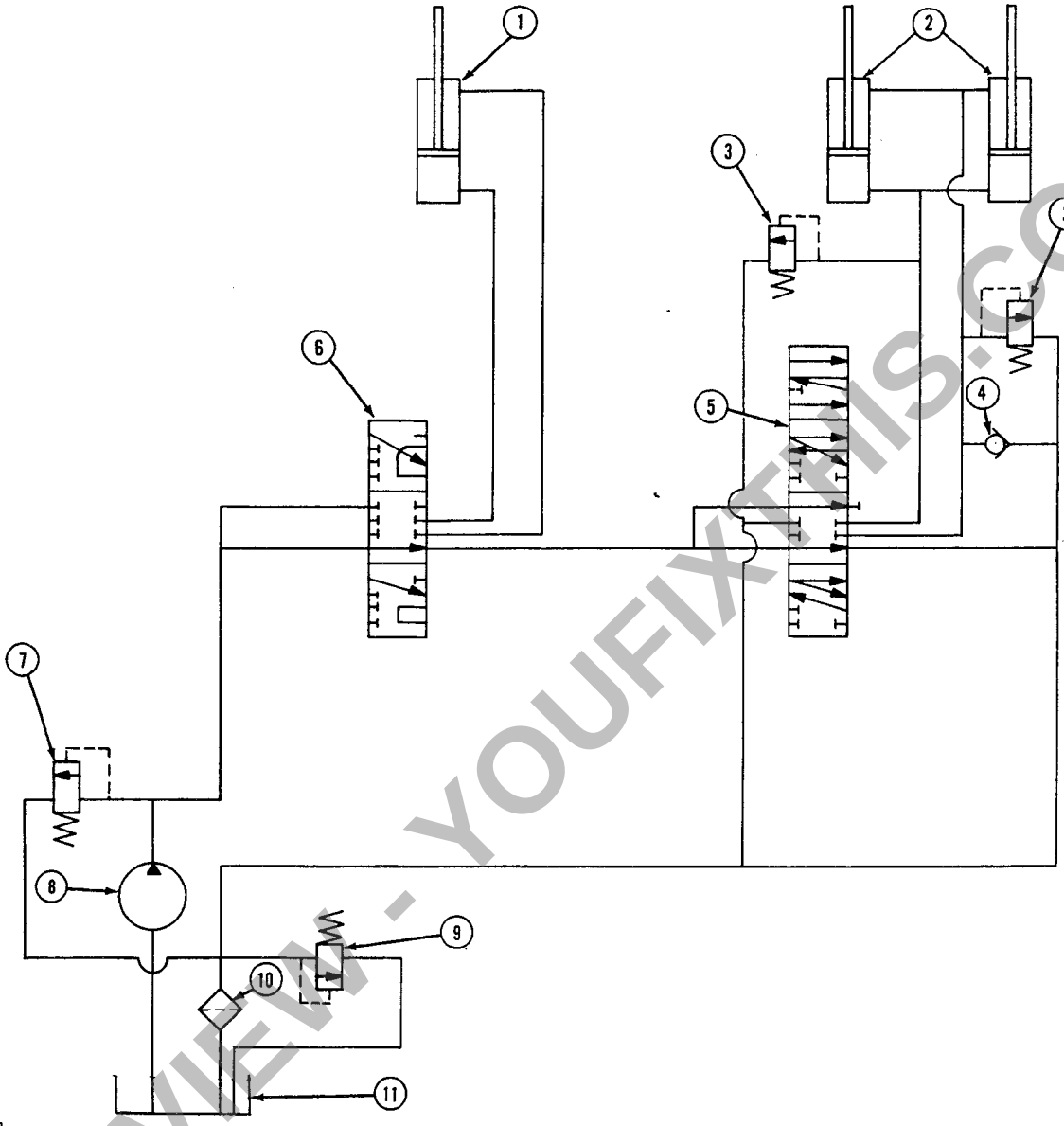
1—12 Volt Battery (2 used)
2—Starting Motor and Solenoid
3—Start Circuit Relay
4—50 Amp Alternator
5—Main Circuit Breaker
6—Key Switch
7—Cab Circuit Breaker
8—Air Conditioning Circuit Breaker
9—Front Wiper Fuse
10—Front Wiper Switch
11—Front Wiper Motor
12—Cigar Lighter
13—Resistor
14—Light Circuit Breaker
15—Light Switch
16—Gauge Back Lights
17—Canopy Work Lights
18—Cabin Light
19—Horn Switch
20—Vehicle Horn
21—Accessory Fuse
22—Dome Light Switch
23—Dome Light
24—Rear Wiper Switch
25—Rear Wiper Motor
26—Air Conditioning Fuse
27—Starting Aid Switch
28—Start Switch
29—Starting Aid Solenoid
30—Neutral Start Safety Switch
31—Battery Disconnect Switch
32—Reverse Warning Switch
33—Reverse Warning Alarm
34—Cab Relay
35—Air Conditioning Relay
36—Voltmeter
37—Equipment Hydraulic Oil Filter Indicator
38—Service Check Switch
39—Filter Indicator Pressure Switch
40—Fuel Shut-off Solenoid
41—Pressurizer Fuse
42—Pressurizer Motor
43—Pressurizer Switch
44—High Temperature Switch
45—Thermostat
46—Plugged Condenser Indicator
47—Hour Meter
48—Transmisssion Filter Indicator
49—Thermal Fuse
50—Compressor Clutch and Superheat Switch
51—Condenser Fan Motors
52—Service Check Switch (2 used)
53—Filter Indicator Pressure Switch

Legend for Fig. 22



T56175N

Fig. 22-Electrical System Schematic



1—Tilt Cylinder
2—Lift Cylinders
3—Circuit Relief Valve
4—Anti-Cavitation Valve
5—Lift Control Valve Section
6—Tilt Control Valve Section
7—System Relief Valve
8—Hydraulic Pump
9—Sump Filter Bypass Valve
10—Sump Filter
11—Reservoir

Fig. 7-Bulldozer Hydraulic Schematic (Tilt Dozer Shown)

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HYDROSTATIC TRANSMISSION OPERATION

The hydrostatic system can be divided into three circuits:

a. High pressure circuit (high pressure loop)-used to operate the pump and motor.
b. Charge pressure circuit (low pressure loop)-used to control the pump and motor servo cylinders, to provide cooling and for brake operation.
c. Control pressure circuit - used to control the pump and motor displacement control valves.

The high pressure circuit consists of the transmission pump (44), transmission motor (11), bypass valve (46), high pressure relief valves (51 and 55) and manifold valve assembly shuttle valve (53).

The charge pressure circuit consists of the charge pumps (49), check valves (57), transmission pump (44), transmission motor (11), pump servo cylinder (58), motor servo cylinder (56), bypass valve (46), manifold valve assembly shuttle valve (53), operating charge relief valve (54), neutral charge relief valve (14), operating pressure valve (45), brake valve (37) and parking brake (10).

The control pressure circuit consists of the control pump (13), overpressure relief valve (24), variable orifice (27), pressure regulating valve (25), speed control valve (23), automatic control valve (21), automatic control valve shut-off valve (22), FNR valve (20), steering valves (17 and 29), pump displacement control valve (15) and motor displacement control valve (12).

Suction oil (3) flows from the reservoir (30) through four filters (31) to the inlet of the charge pumps (49) and control pump (13).

Charge oil (8) from the charge pumps flows to the low pressure side of the closed loop to the transmission pump (44) and motor (11) by one of two check valves (57).

The second check valve is held closed by high pressure oil (9) in the high pressure closed loop. Charge oil in the low pressure closed loop also flows to the manifold valve assembly (52) and around the bypass valve (46).

Charge oil also flows through the pump displacement control valve (16) and moves the forward servo cylinder piston (58) to increase pump swashplate angle. At the same time, charge oil flows through the motor displacement control valve (12) and moves the low speed servo cylinder piston (56) to hold the motor swashplate at the maximum angle. Return oil in the reverse and high speed servo cylinders flows to reservoir (30).

External charge oil flows to the operating pressure valve (45), The operating pressure valve senses both charge pump pressures. The higher charge pressure moves the valve spool and allows lower charge pressure to flow to the brake valve (37) and to the transmission oil pressure gauge (35). From the brake valve, charge oil flows to the parking brake (10) and moves the brake piston to disengage the brake elements. Charge oil from the brake valve also flows to the bypass valves (46) and moves the spool to close the passage between the high and low pressure closed loop. The bypass valves stop the flow of high pressure oil from the transmission pump to the transmission motor by equalizing pressure in both closed loops when the parking brakes are applied.

As pressure increases in the high pressure closed loop, high pressure oil (9) moves the shuttle valve spool (53) and allows charge oil to flow from the low pressure closed loop to the operating charge relief valve (54) in forward or reverse. Excess charge oil opens the operating charge relief valve and provides cooling for the transmission pump and motor. During neutral, excess charge oil opens the neutral charge reief valve. The operating charge relief valve opens at a lower pressure than the neutral charge relief valve.

High pressure oil (9) flows from the tranmsission pump (44) to the transmission motor (11). The quantity of high pressure oil flow to the motor is determined by pump speed and swashplate angle. During forward operation, the bypass valve is closed separating the high and low pressure closed loops. High pressure oil also flows to the high pressure relief valves (51 and 55) and shuttle valve (53). During forward operation when the high pressure side of the closed loop exceeds system pressure setting, the forward pressure relief valve (51) opens. All excess oil flows to the low pressure closed loop. High pressure oil flows around the reverse pressure relief valve (55) to the shuttle valve.

P1 control oil (7) from the control pump (13) flows to the transmission control valve (16) inlet port. From the inlet port, P1 control oil flows to the over pressure relief valve (24), variable orifice (27) and automatic control valve (21). P2 control oil (6) from the variable orifice flows to the pressure regulating valve (25), speed control valve (23) and automatic control valve. P3 control oil (5) from the speed control valve flows to the automatic control valve and automatic control valve shut off valve (22). P4 control oil (4) from the automatic control valve flows to the FNR valve (20), steering valves (17 and 29) and pump (15) and motor (12) displacement control valves. P4 control oil moves the pump and motor displacement control valve spools to allow charge oil to flow to the pump forward servo cylinder and motor low speed servo cylinder.

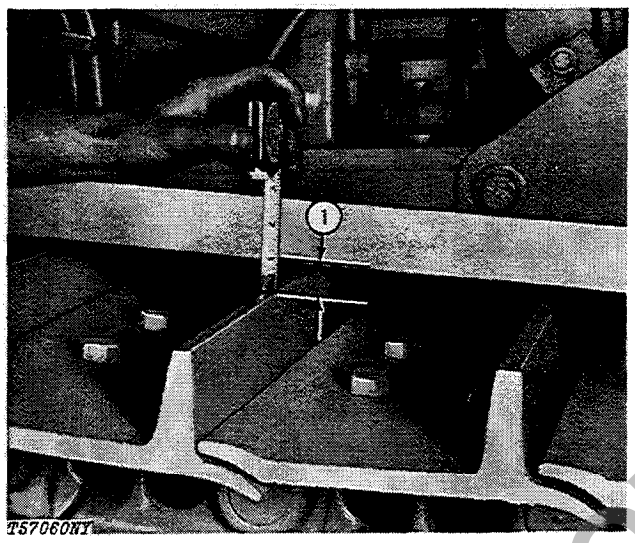
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ADJUSTMENT

Track Tension

Track tension is determined by measuring the sag in the track between the front carrier roller and the front idler. Tension of each track is adjusted by a hydraulic track adjuster.



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1—1 to 1-1/2 in. Sag (25 to 38 mm) (Sealed Track)

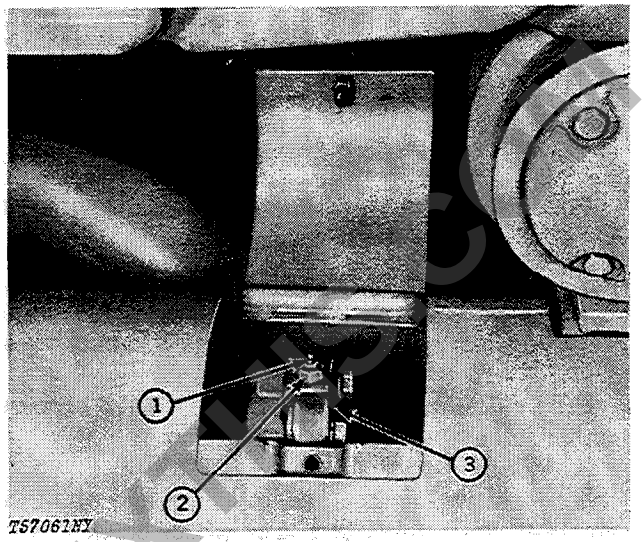
1-1/2 to 2 in. Sag (38 to 51 mm) (Lubricated Track)

Fig. 1-Measuring Track Sag

Sealed track chain tension is adjusted so there is 1 to 1-1/2 inch (28 to 38 mm) sag. Lubricated track chain tension is adjusted so there is 1-1/2 to 2 in. (38 to 51 mm) sag. When measuring sag, a pin and bushing must be lined up over the center of the front carrier roller.

Adjust track tension by fastening a grease gun to the grease fitting on the track adjuster. Use a grease gun that has a maximum capacity of 8000 psi (552 bar) (562 kg/cm²).

IMPORTANT: Never, at any time, use a grease gun having a capacity higher than 8000 psi (552 bar) (562 kg/cm²) to adjust track. Break the line, fit in connector, and put in a pressure gauge (0 to 10,000 psi [0 to 689 bar] [0 to 703 kg/cm²] capacity) in grease gun tube to check pressure. If piston cannot be moved with this type of grease gun, disassemble track adjuster and release seized parts.



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1—Grease Fitting
2—Check Valve
3—Vent Hole

Fig. 2-Track Adjuster Fitting

To tighten track, apply grease with gun to the correct tension.

To loosen track, turn the check valve one to three turns counterclockwise. This will allow grease to flow out through the vent hole.

CAUTION: There may be high pressure in the track adjuster cylinder. Do not visually inspect the check valve. Always note track tension. If grease does not immediately flow out the vent hole, drive the unit forward and backward slowly, then tighten check valve.

IMPORTANT: Never lubricate fitting on hydraulic track adjusting cylinder unless track is in need of adjustment.

When operating track in conditions where dirt is pushed into the track system, check track tension as much as necessary. Tension may increase when dirt is pushed into the track. Check coils of recoil springs too. Dirt in the recoil spring can cause slowdown of the idler travel and recoil action. This slowdown can result in too much load on the track link assemblies, recoil unit and final drive components.

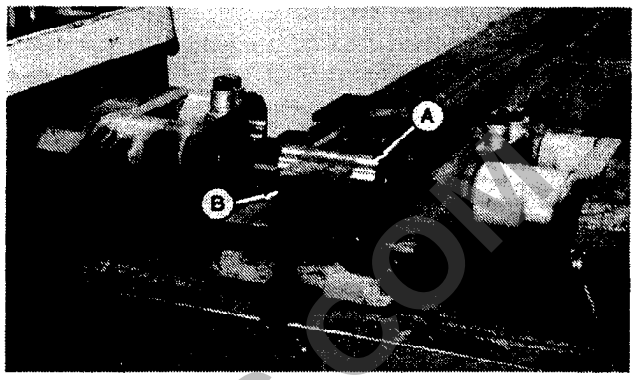
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NOTE: The pin end halves of master split link must be temporarily assembled to bushing end halves of link for proper positioning on plungers. Pin end halves will later have to be separated for installation at end of chain.



3. Assemble master split link halves using master shoe bolts and washers (as required). Tighten bolts just enough to hold links together.

4. Install assembled split links on ram plungers.

5. Install bushing (A) in front seat of saddle (B) so the mark is 180° opposite original location to expose a new wear surface.

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6. Adjust track press pressure relief valve setting.

TRACK PRESS RELIEF VALVE SETTING

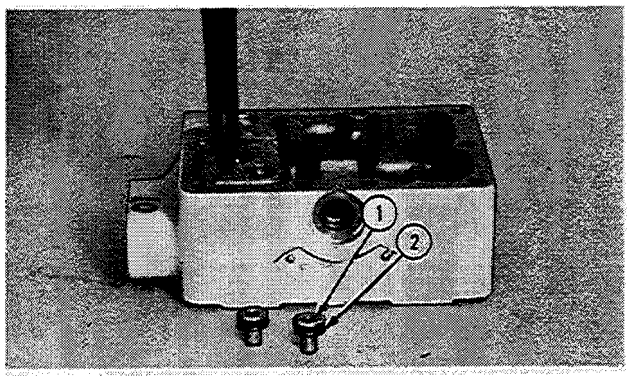
Pressure (maximum)	21 602 kPa (216 bar) (3133 psi)
Force (maximum)	444 800 N (100 000 lb force)

7. Advance left ram until left split link contacts the saddle. Advance right ram until it stops to press split link and bushing assembly together.



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1—Filter Screen (3 used) **2—O-Ring (3 used)**

Fig. 64J-Remove Filter Screens

Remove filter screens (1, Fig. 64J).

Remove O-rings (2).

NOTE: For transmissions through Serial No. (-12ZZ99999), filter screens are in the pump housing.

Cleaning and Inspection

IMPORTANT: DO NOT disassemble link assembly or feedback linkage for cleaning.

Wash all parts in diesel fuel.

Dry with compressed air.

Inspect all parts for wear or damage. Replace as necessary.

Replace the pump displacement control valve if any non-field service parts are worn or damaged.

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NOTE: If the crankshaft flange was filed, use a LIGHT coat of Permatex or an equivalent on the flange before installing wear sleeve. Be sure that excess Permatex is removed and no Permatex comes in contact with new oil seal. Also use a light film of Permatex or equivalent on inside of wear sleeve and outside of seal. Clean thoroughly after installation.

Use JDE-3 Driver to install new crankshaft front wear sleeve on crankshaft.

Coat rubber lip of crankshaft front seal and outside of wear sleeve with light oil.

Using a new gasket, install the timing gear cover being careful not to invert the crankshaft front oil seal rubber lip.

IMPORTANT: Trim timing gear cover gasket flush with cylinder block oil pan rail.

Front crankshaft oil seal bore must be concentric with crankshaft within 0.010 inch (0.25 mm) total indicated run out after installation of oil pan.

Tighten timing gear cover cap screws to 20 + 3 − 8 lb-ft (27 + 4 − 11 Nm) (3 + 0.4 − 1 kg-m).

Vibration Damper

IMPORTANT: Handle dampers with care. They are sensitive to impacts such as being dropped or hammered on. Impact damage can impair the "tuning effect" of the damper, which prevents torsional damage to the engine.

Assemble vibration damper to the crankshaft pulley with the sharp edges facing toward the engine or with the radius outside diameter facing away from the engine. Tighten cap screws to 35 + 5 − 14 lb-ft (47 + 7 − 19 Nm) (5 + 0.7 − 2 kg-m).

Position damper and pulley on front of crankshaft with Woodruff key and keyway in alignment. Install crankshaft pulley plate and cap screws. Tighten cap screws to 170 ± 27 lb-ft (230 ± 36 Nm) (24 ± 4 kg-m) torque.

Install connecting rod caps (Group 0403).

Install engine oil pump and oil pan (Group 0407).

Install flywheel and flywheel housing (Group 0433).

Install engine in machine (Group 0400).

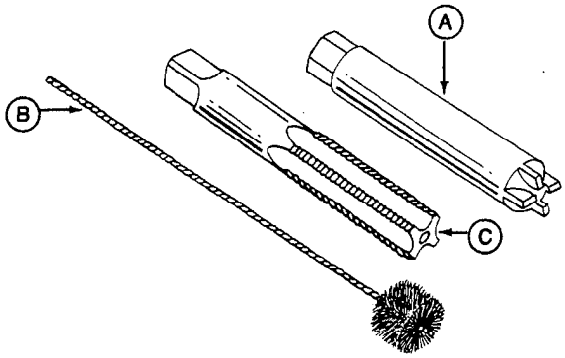
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FUEL INJECTION SYSTEM

SPECIAL TOOLS—Continued

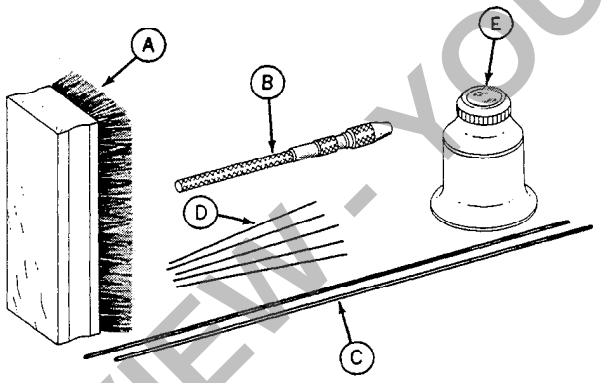
Essential Tools—Continued



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Fig. 73-Special Tools

Tool	Tool Number	Use
A	JDE-99	Nozzle Seat Reamer - To clean nozzle seat in cylinder head.
B	D-17030BR	Thread Cleaning Brush - To clean nozzle bore threads in cylinder head.
C	JDF-5	M28 x 1.5 Tap - To restore threads in cylinder head.

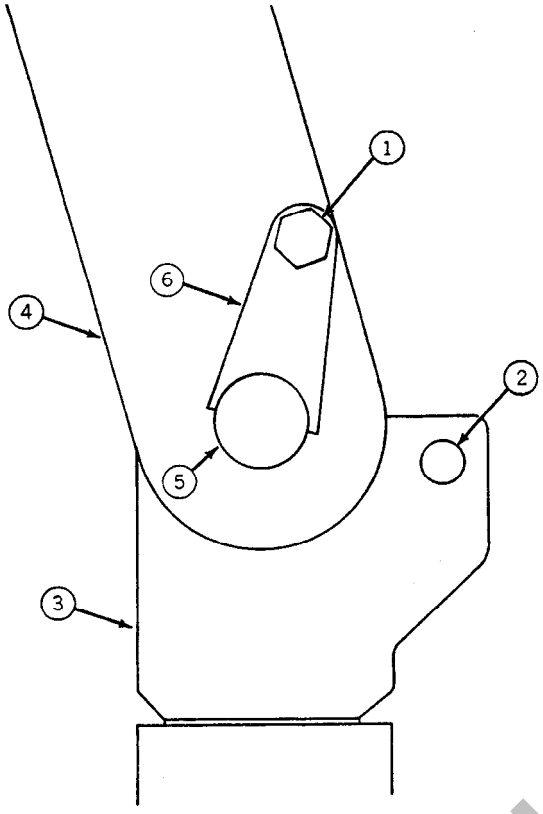


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Fig. 74-Nozzle Cleaning Kit

	JDE-105	Nozzle Cleaning Kit - To clean injection nozzles Kit consists of: A-Brass Wire Brush B-Pin Vise C-Sac Hole Cleaning Drill D-Cleaning Needles F-Inspection Magnifier

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1—Cap Screw
2—Locking Hole
3—ROPS Lower Member
4—ROPS Front Member
5—Pin (2 used)
6—Pin Retainer

Fig. 4-ROPS Locking Hole

REPAIR

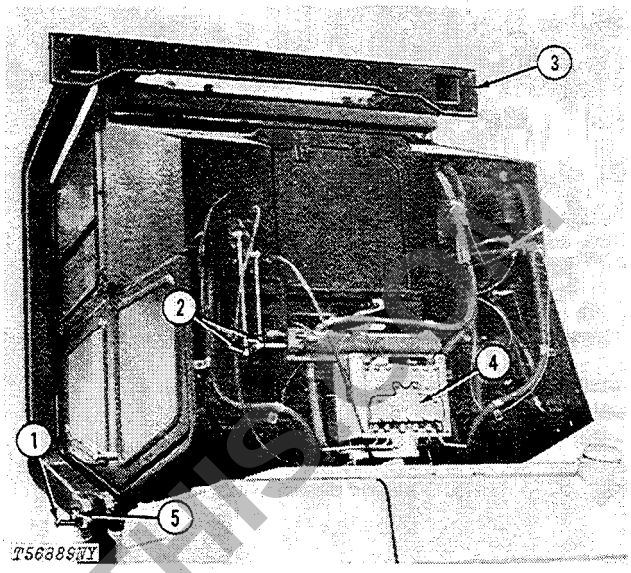
Examine cab parts for damage and repair or replace damaged components as necessary.

Refer to Fig. 6 for correct installation of window molding when replacing windows.

NOTE: Molding (3, Fig. 6) is installed on the left and right side windows, excluding the door windows. Molding (5) is installed on all other windows.

Install window molding on window frame with window molding ends meeting at the bottom center of the window frame.

Carefully install window into window molding and secure with window molding filler strip (4 Fig. 6) or molding locking tab.



T56888WY

1—Locking Cap Screw
2—Transmission Control Valve Linkage
3—ROPS Rear Support Plate
4—Transmission Control Valve
5—Pin (2 used)

Fig. 5-Removing Cab

INSTALLATION

Carefully lower cab in place so pin (5, Figs. 4 and 5), can be installed.

With pins installed, tilt cab forward and lock it in this position.

Install transmission control valve (4, Fig. 5) and reconnect control valve linkage.

Remove locking pins and lower cab.

Reverse removal procedure to complete installation of cab.

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ACTION: (Hydraulic Pump General Performance Check)

a. Operate engine at slow idle
b. Raise boom from ground, to maximum height and record cycle time.

LOOK: Maximum cycle time must be less than 17 seconds.

NOTE: Take the average cycle time of 3 complete cycles the average cycle time will give a general indication of hydraulic pump performance. For hydraulic pump test, see Group 9025.

ACTION: (Boom and Bucket Drift)

a. Position bucket at 45· angle to the ground at about 50 mm (2 in.) off the ground.
b. Stop engine and wait for 1 minute.

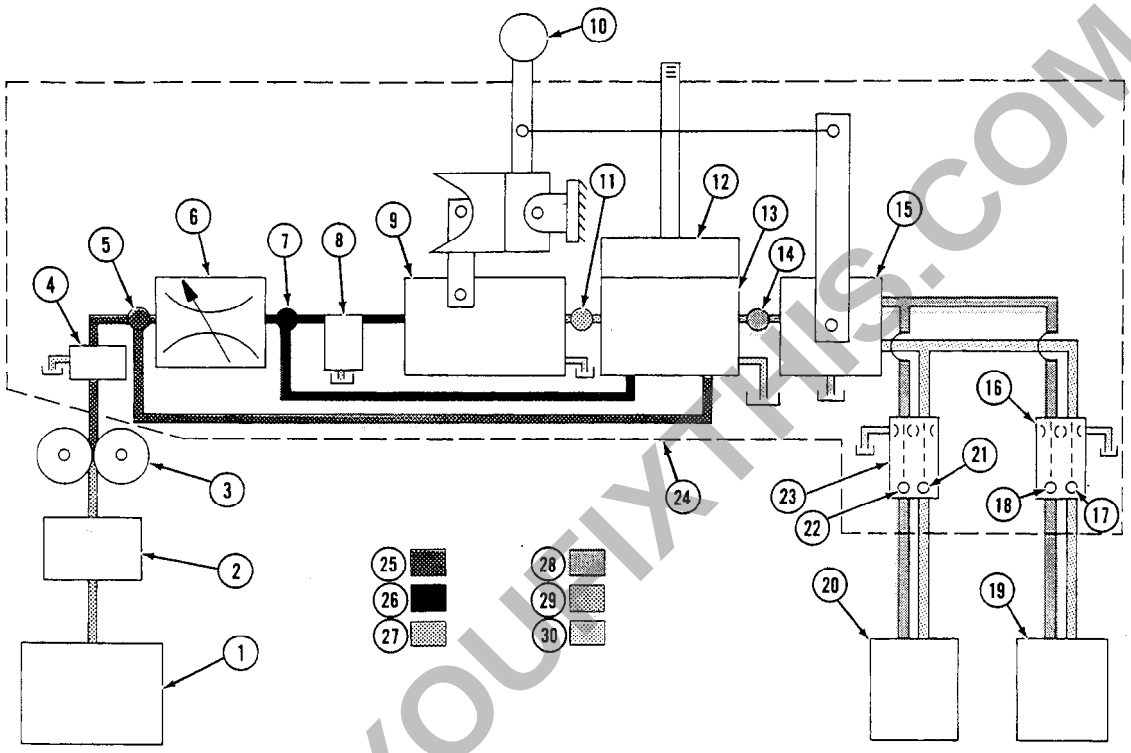
LOOK: Bucket teeth must NOT touch ground.

NOTE: Use good judgement in determing if the amount of drift is ofjectionable for the type of operation the unit is performing. For drift test see Group 9025.

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1—Hydrostatic Reservoir
2—Hydrostatic Filters
3—Control Pump
4—P1 Overpressure Relief Valve
5—P1 Pressure Test Port
6—Variable Orifice
7—P2 Pressure Test Port
8—P2 Pressure Regulating Valve
9—Speed Control Valve
10—FNR Speed Control Handle
11—P3 Pressure Test Port
12—Automatic Control Valve Shut-Off Valve
13—Automatic Control Valve
14—P4 Pressure Test Port
15—FNR Valve
16—Right Steering Valve
17—P8 Pressure Test Port (Reverse)
18—P7 Pressure Test Port (Forward)
19—Right Transmission
20—Left Transmission
21—P6 Pressure Test Port (Reverse)
22—P5 Pressure Test Port (Forward)
23—Left Steering Valve
24—Transmission Control Valve
25—P1 Control Oil
26—P2 Control Oil
27—P3 Control Oil
28—P4 Control Oil
29—Suction Oil
30—Reservoir Oil

Transmission Control Valve Box Diagram with Test Ports

The control pressures at any point in the system are all numbered. The identification of these pressures is particularly important during testing and troubleshooting. P1 through P9 indicate the control pressures of each point inside the transmission control valve.

There are nine pressure test points in the transmission control valve (24). P1 (5) is the pressure between the outlet of the control pump (3) and variable orifice (6). P2 (7) is the pressure after the variable orifice, which is set by the P2 pressure regulating valve (8). P3 (11) is the pressure set by the speed control valve (9). P4 (14) is the pressure after the automatic control valve (13).

P5 (22) and P6 (21) are the forward and reverse control pressures for the left transmission (20). P7 (18) and P8 (17) are the forward and reverse control pressures for the right transmission (19). P9 is an internal pressure of the automatic control valve (13).

With the machine in neutral P5, P6, P7, and P8 are at the same pressure. However in forward or reverse two lines, P5 and P7 for forward, or P6 and P8 for reverse, will be pressurized at any one time. In forward P6 and P8 will be at return pressure. In reverse P5 and P7 will be at return pressure.

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