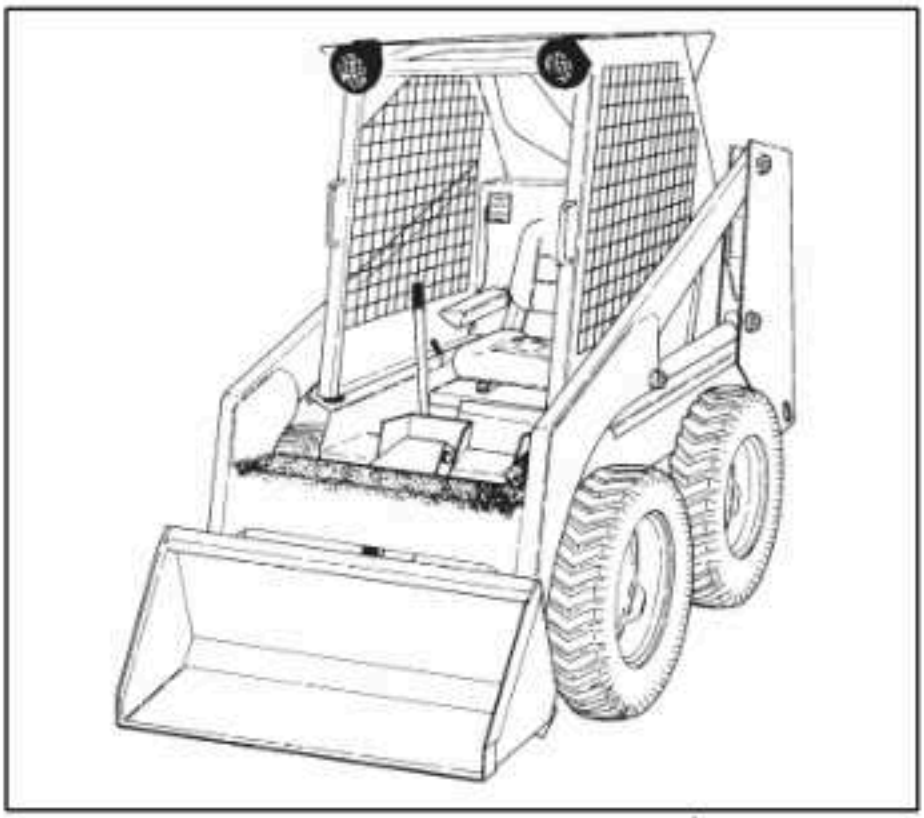
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Service Manual



MELROE
INGERSOLL-RAND

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bobcat

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FOREWORD

This manual provides instruction for proper routine servicing and adjustment of the Bobcat, and detailed overhaul instructions of the drive system, loader hydraulic/hydrostatic system and general main frame components.

Refer to the Owner's Manual for general operating instructions (Starting Procedure, Daily Checks, Bucket Operation, Minor Maintenance, etc.).

A general inspection of the following items should be made whenever the machine has had service or repair:

1. Check hydraulic fluid level, engine oil level and fuel supply.
2. Inspect for any sign of fuel, oil or hydraulic fluid leaks.
3. Lubricate the machine.
4. Check battery condition and cables.
5. Inspect air cleaner system for damage or leaks. Check element and make replacement, if necessary.
6. Check electrical charging system.
7. Check indicator lamps.
8. Check tires for wear and pressure.
9. Check the Bob–Tach attachment for condition. Inspect the wedges for damage or wear.
10. Inspect safety items for condition (Operator Guard, Seat Belt, Safety Treads, Lamps, etc.).
11. Make a visual inspection for loose or broken parts or connections.
12. Operate the loader, checking all functions.

Advise the owner if any of the above items are in need of repair.

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PROBLEM: BATTERY OVERCHARGE

TEST	TEST RESULT	POSSIBLE CAUSE & REMEDY
Test 1.0 With engine running at full RPM, check battery voltage W/DC voltmeter.	1.1 If voltage is over 15.0.	1.1 Regulator not functioning properly. Replace module.
	1.2 If voltage is under 15.0.	1.2 Alternator functioning properly. Check battery condition.

PROBLEM: LOW/NO CHARGE

Test 1.0 With engine running at full RPM, check battery W/DC meter. If voltage is greater than 14 volts, put load on battery to reduce voltage below 14 volts.	1.1 If the charge rate increases–	1.1 Alternator functioning properly. Battery was fully charged.
	1.2 If the charge rate does not increase–	1.2 Proceed with Test 2.0.
Test 2.0 Conditions and procedures the same as Test 1.0 except the regulator module is disconnected.	2–1 If the charge rate increases–	2.1 Regulator was at fault. Replace the module.
	2.2 If the charge rate does not increase–	2.2 Regulator is not a fault. Continue with Test 3.0.
Test 3.0 Test conditions and procedure the same as 1.0 except with new rectifier module plugged in.	3.1 If the charge rate increases–	3.1 Rectifier module at fault. Permanently install new rectifier module.
	3.2 If the charge rate does not increase–	3.2 Continue with Test 4.0.
Test 4.0 With engine stopped, unplug all connectors between modules and stator. Start engine and run at 2400 RPM. With AC voltmeter check voltage between each of the black stator leads and ground.	4.1 If one of the two voltages is zero or they are over 10% apart–	4.1 Te stator is faulty and must be replaced.

6–2.2 To Check The Stator

METER PROBE CONNECTIONS + (Red)	– (Black)	METER VALUE	REPLACE STATOR IF . . .
Black #1	to Black #2	0.40 ohm	
Black #1	to Eng. Gnd.	0.02 ohm	
Black #2	to Eng. Gnd.	0.02 ohm	00 Indicates Open Circuit
Black #1	to Red	3.20 ohms	
Black #2	to Red	2.80 ohms	

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3. With the ignition switch off, turn the engine with an auxiliary starter switch while reading the voltage loss.

4. If the voltage loss is 0.4 volt or less, the starting ignition circuit is good.

5. If the voltage loss is greater than 0.4 volt, clean and tighten the connections in the circuit or make replacement of the wiring as necessary.

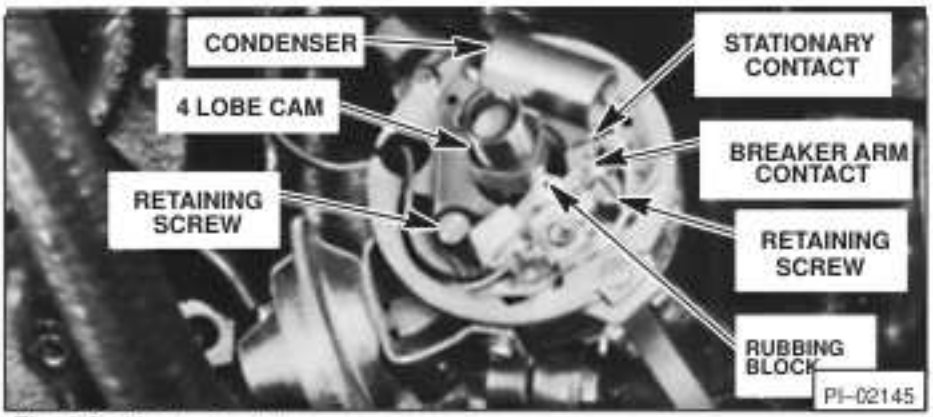


Fig. 7C–13 Point Gap Adjustment

Breaker Point Gap Adjustment

1. Turn the engine until the rubbing block is on the high point of the cam lobe.

Insert the correct thickness blade of a clean feeler gauge between the breaker points (Fig. 7C–13). Make adjustment of the points to correct gap and tighten the screws.

Clean the cam area, then put a light film cam lubricant on the cam when new points are installed. Do not use engine oil as lubricant.

7C–2.7 Ignition Timing

Timing Mark Locations

The timing marks and their locations are shown in figure 7C–14.

Initial Ignition Timing

1. Disconnect vacuum advance hose from distributor and put plug in hose.

2. Clean and mark the specified timing mark with chalk or white paint.

3. Connect a timing light to the No. 1 cylinder spark plug wire. Connect a tachometer to the engine.

4. Start the engine and decrease the idle speed to 600 RPM to be sure that the centrifugal advance is not operating. Make adjustment of the initial ignition timing to 12° by loosening clamp and rotating the distributor in the correct direction.

5. Check the centrifugal advance for correct operation by starting the engine and running it at 2000 RPM. If the ignition timing advances, the centrifugal advance mechanism is operating correctly. Note the engine speed when the advance starts and the amount of total advance. Stop the engine.

6. Connect vacuum hose.

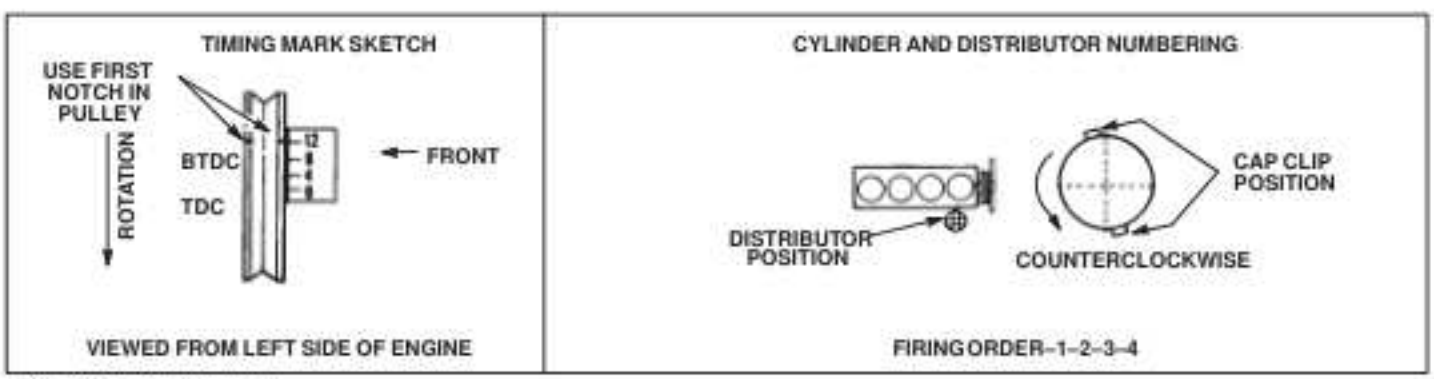


Fig. 7C–14 Timing Marks

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8B–1.7 Torque Specifications (Deutz Engine)

ITEM	PRELOADING	TIGHTENING*	TOTAL
Cylinder Head Bolts	21.5 ft.–lbs. (29 Nm)	30° 60° 60°	150°
Cylinder Head Brass Plug	59 ft.–lbs. (80 Nm)	– – –	59 ft.–lbs. (80 Nm)
Injector Hold–Down	21.5 ft.–lbs. (29 Nm)	60° 60° –	120°
Connecting Rod	21.5 ft.–lbs. (29 Nm)	30° 60° –	90°
Camshaft Bearing Flange	–	– – –	25 ft.–lbs. (34 Nm)
Bearing Support	21.5 ft.–lbs. (29 Nm)	30° 60° –	60°
Blower Mounting Bolts	–	– – –	25 ft.–lbs. (34 Nm)
V–Belt Pulley	21.5 ft.–lbs. (29 Nm)	90° – –	90°
Intake Manifold	–	– – –	11 ft.–lbs. (15 Nm)
Crankshaft Gear	21.5 ft.–lbs. (29 Nm)	30° 30° –	60°
Oil Suction Pipe	–	– – –	36 ft.–lbs. (49 Nm)
Flywheel	21.5 ft.–lbs. (29 Nm)	60° 30° –	90°
Rocker Arm Bolts	21.5 ft.–lbs. (29 Nm)	45° – –	45°
Balance Weight	21.5 ft.–lbs. (29 Nm)	30° 30° –	60°

* One flat on hex head equals 60°.

8B–1.8 Special Tools (Deutz)

100020	Compression checking tool
100030	Compression checking tool
101900	Angle of turn gauge for head bolts
101910	Angle of turn gauge for other bolts
110030	Tool for nozzle removal (Use with 150800)
121100	Valve spring tool
122100	Valve service tools
122230	Valve service tools
122800	Valve service tools
122970	Valve service tools
123310	Valve service tools
123830	Valve service tools
124020	Valve service tools
130300	Piston ring tool
130510	Piston ring compressor
131000	Wrist pin mandrel
139000	Heater for piston
141000	Puller for end cover and gears
143620	Tool for installing camshaft bearings
150010	Tool for reconditioning cylinder face on crankcase
150800	Puller tool

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ROPS WIRING DIAGRAM

WIRE LEGEND

#'s	COLOR	GAUGE
1	White	16
2	Orange	12
3	Black	16
4	Black	16
5	Orange	16
6	Orange and Yellow	16
7	Light Blue	16
8	Purple	18
9	Yellow	18
10	Orange and Green	16
11	Yellow and Black	18
12	White and Purple	18
13	Light Blue and Black	16
14	Purple	18
15	Yellow	18
16	Black	16
17	Black	16
18	Black	16
19	Black	16
20	Orange and Black	16
21	Yellow	16
22	Purple	16
23	White	16
24	Light Blue	16
25	Red	16
26	Orange (Not Used)	16
27	Grey (Not Used)	16
28	Brown (Not Used)	16
29	Orange	16
30	Orange	16
31	White and Orange	16
32	Orange and Dark Blue	16
33	Orange	18
34	Orange	18
35	Orange	18
36	Dark Green and Yellow	16
37	Orange	18
38	Black	16
39	Orange and Black	16
40	Orange and Dark Blue	16
41	Orange and Dark Blue	16
42	Dark Blue and White	16
43	Pink	16
44	Brown	16
45	Dark Blue	16
46	Dark Blue	16
47	Black	16
48	Brown	16
49	Brown	16
50	Black	16

PARTS LEGEND

1. ROPS Harness Connector
2. ROPS Ground
3. Fuel Sender (631)
4. Back-up Alarm (Optional)
5. Rear Lamp
6. Tail Lamp
7. Left Flasher Lamp (Optional)
8. Left Front Lamp
9. Wiper (Optional)
10. Flasher (Optional)
11. Right Front Lamp
12. Right Flasher Lamp (Optional)
13. Hourmeter
14. Light Switch
15. Access Fuse
16. Wiper Switch (Optional)
17. Fuel Gauge (631)
18. Transmission Warning Lamp
19. Engine Warning Lamp
20. Voltmeter
21. Ignition Fuse
22. Ignition Switch
23. Glow Plug Indicator (533 Only)
24. Shut-down Module (Optional)

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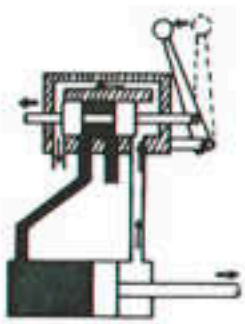
SYSTEM OPERATIONS

630, 631, 632 HYDRAULIC/HYDROSTATIC SYSTEM
(Closed Center System)
(Chart # PI 2483, 2485, 2488, 2505, 2506 or 2507)

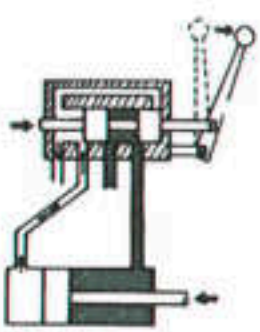


The oil flows by gravity from the reservoir (1) to the port block (6) which is on top of the hydraulic pump (4). Return oil from the cold weather bypass valve (10) and the oil cooler (15) join with reservoir oil to supply oil to the hydraulic pump (4). "Case drain" oil from the hydrostatic pumps (18) flows through the bearing of the hydrostatic pump (18) and also supplies oil to the hydraulic pump (4).

The hydraulic pump (4) is a "vane type" pump and is driven by a shaft through the hydrostatic pumps (18). The oil goes from the hydraulic pump (4) to the hydraulic control valve (11).



The hydraulic control valve (11) has a adjustable relief valve (12). When all three spools are in neutral position, the oil goes through the control valve (11) and back to the port block (6). If one of the spools is activated, the oil goes out the respective port and to either the base end, or the rod end of the hydraulic cylinder(s). As the oil goes into one end of the cylinder(s), return oil comes from the opposite end of the cylinder(s) and back into the control valve (11). When the cylinder(s) reaches the end of the stroke, the oil flow stops and causes hydraulic pressure to increase. When the pressure reaches the setting of the relief valve (12), it will open and let the oil bypass the hydraulic circuit (internally) and go back to the port block (6). If you let the spool go back to the neutral position, then there is oil available for the other sections. Two sections of the control valve (11) can be used at the same time if the main relief valve (12) is not open.

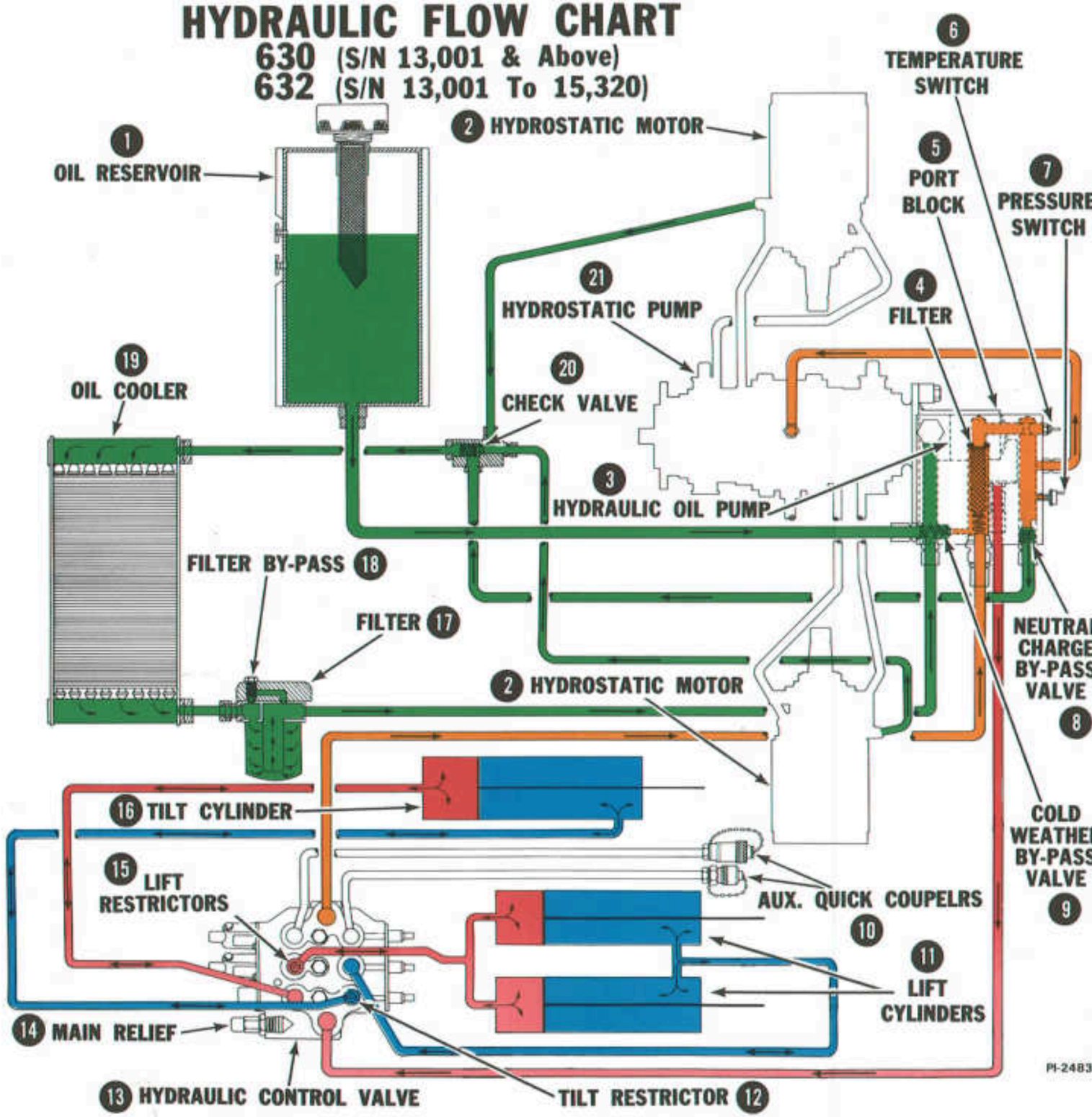


The oil which goes back to the port block (6) goes through a 40 micron filter (5). The normal flow of the oil is through the 40 micron filter (5) and to the hydrostatic pumps (18). But if the oil is cold or

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HYDRAULIC FLOW CHART

630 (S/N 13,001 & Above)
632 (S/N 13,001 To 15,320)



1. OIL RESERVOIR, System Cap.: 5 Gal. [19 L]
2. HYDROSTATIC MOTOR
3. HYDRAULIC OIL PUMP, 11 GPM [41,6 L/m] at 2500 RPM
4. FILTER, 40 micron
5. PORT BLOCK
6. TEMPERATURE SWITCH, 225°F [108°C]
7. PRESSURE SWITCH, 23-27 PSI [158-186 kPa]
8. NEUTRAL CHARGE BY-PASS VALVE, 78-97 PSI [537-668 kPa]
9. COLD WEATHER BY-PASS VALVE, 182-217 PSI [1254-1496 kPa]
10. AUX. QUICK COUPLERS
11. LIFT CYLINDERS
12. TILT RESTRICTOR
13. HYDRAULIC CONTROL VALVE
14. MAIN RELIEF, 1750 PSI [12066 kPa] At Valve (1900-2000 PSI [13100-13790 kPa] Measured at Aux. Quick Couplers)
15. LIFT RESTRICTORS
16. TILT CYLINDER
17. FILTER, 10 Micron
18. FILTER BY-PASS, 30 PSI [206 kPa] (630—S/N 15300 & Below) (632—S/N 15403 & Below), 72 PSI [496 kPa] (630—S/N 15301 & Above) (632—S/N 15404 & Above)
19. OIL COOLER
20. CHECK VALVE, 16-20 PSI [110-137 kPa)
21. HYDROSTATIC PUMP

RED - - - - - - - High Pressure
BLUE - - - - - - Low Pressure
GREEN - - - - - Case Drain & Reservoir
ORANGE - - - -Charge Pressure

PI-2483

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