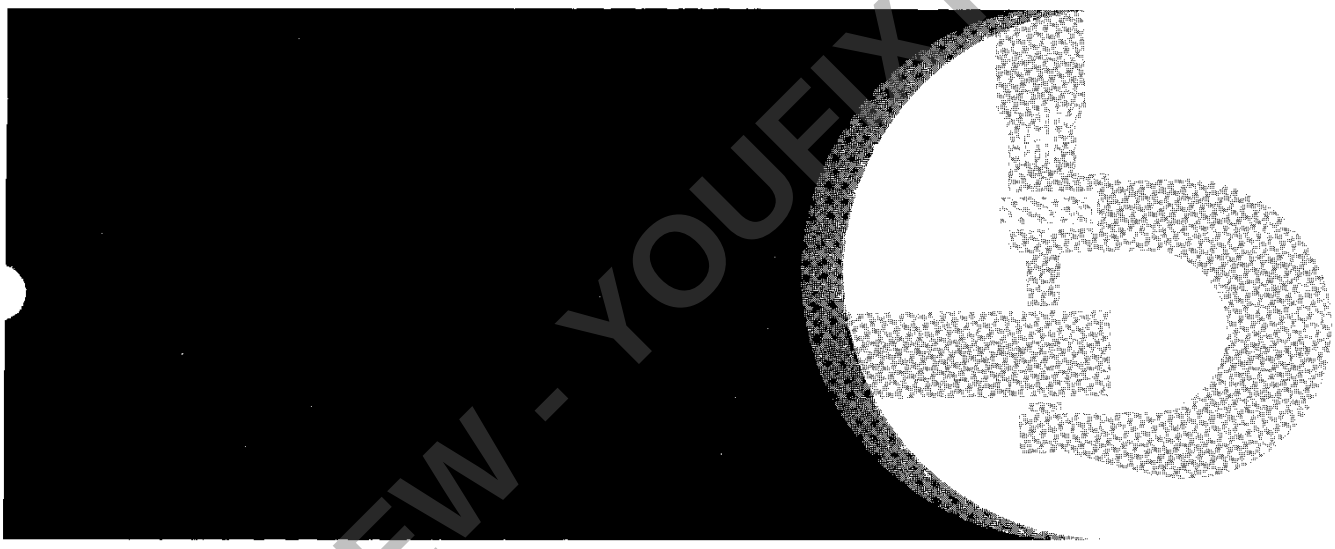
John Deere 444D, 544D and 644D Loader Operation and Tests



TECHNICAL MANUAL

TM-1341 (Oct-87)

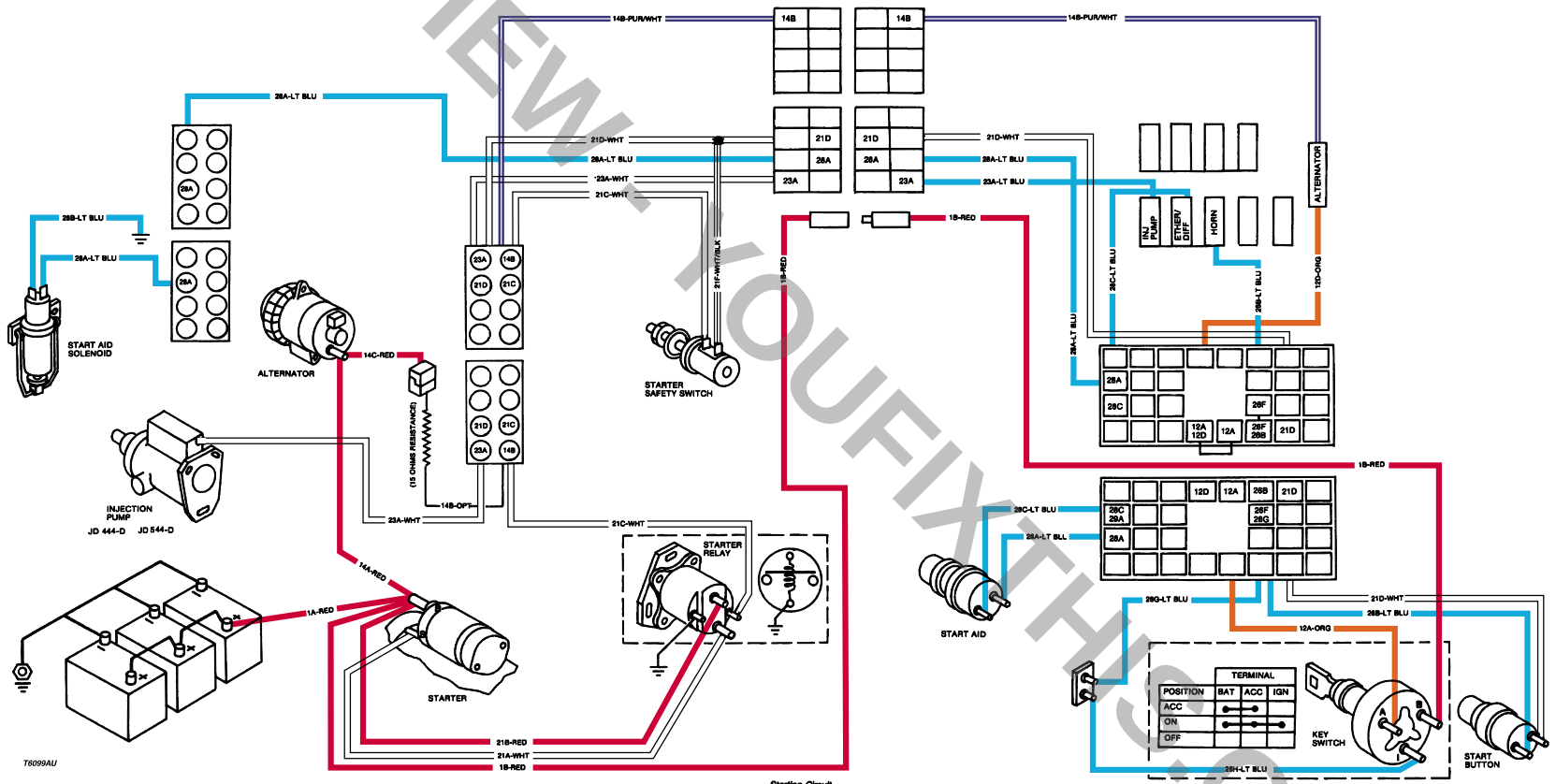
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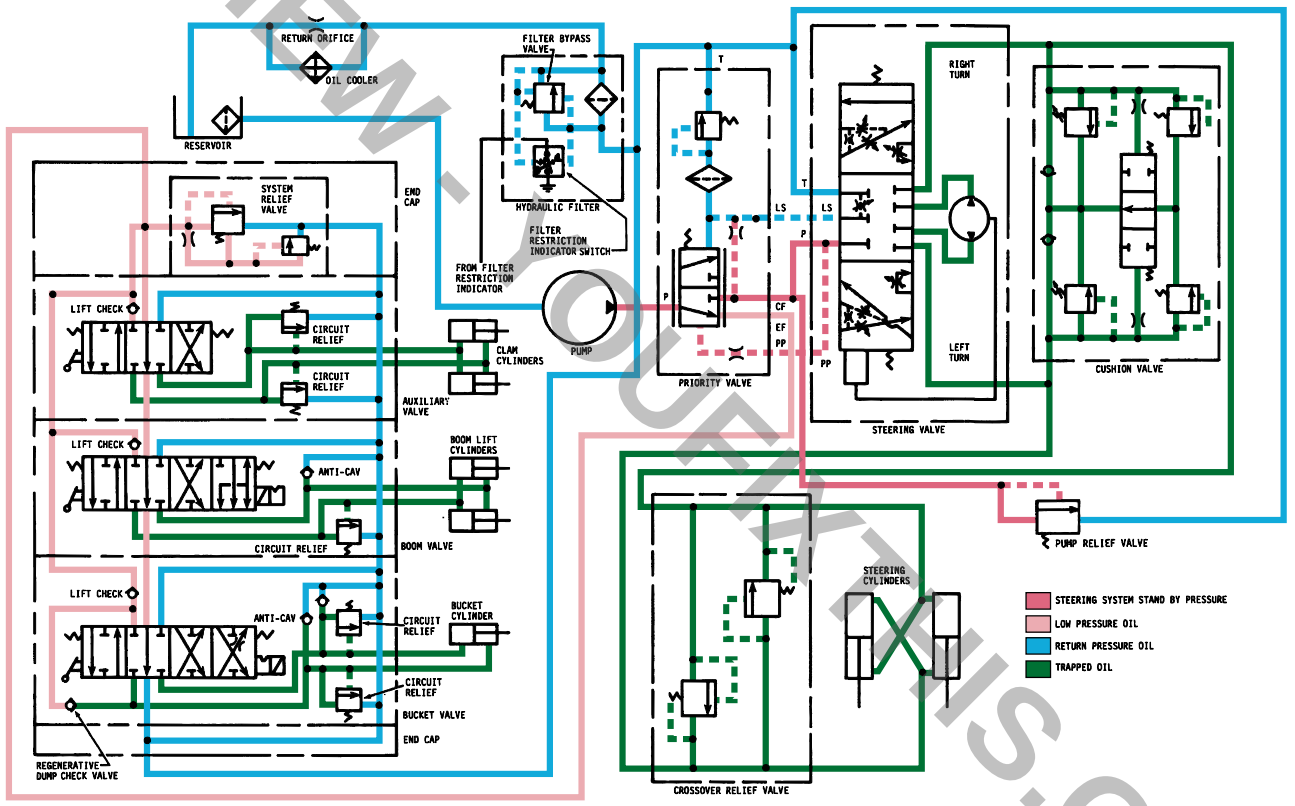
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Starting Circuit



Hydraulic System Schematic

T6203a

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HARDWARE TORQUE SPECIFICATIONS

Check cap screws and nuts to be sure they are tight. If hardware is loose, tighten to torque shown on the following charts unless a special torque is specified.

T82;SKMA AT 270286

NOTE: Torques shown are for dry (no lubrication on threads) hardware.

NOTE: Torque wrench tolerance is ± 10 per cent of specified torque.

Customary Hardware

Cap Screw Size-Inches	Grade B lb-ft.	Grade B (N-m)	Grade D lb-ft.	Grade D (N-m)	Grade F lb-ft.	Grade F (N-m)
1/4	----	----	10	(14)	14	(19)
5/16	----	----	20	(27)	30	(41)
3/8	----	----	35	(47)	50	(68)
7/16	35	(47)	55	(75)	80	(108)
1/2	55	(75)	85	(115)	120	(163)
9/16	75	(102)	130	(176)	175	(237)
5/8	105	(142)	170	(230)	240	(325)
3/4	185	(251)	300	(407)	425	(576)
7/8	160	(217)	445	(603)	685	(929)
1	250	(339)	670	(908)	1030	(1396)
1-1/8	330	(447)	910	(1234)	1460	(1979)
1-1/4	480	(651)	1250	(1695)	2060	(2793)

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WHEEL RETAINER CAP SCREWS

Tighten cap screws to 410 ± 40 N·m (300 ± 30 lb-ft).

05T;115 C74 140886

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USE THESE SEVEN BASIC STEPS TO DIAGNOSE AND TEST MACHINE

1. Know the system. In other words 'Do your homework." Study this manual to know how the individual components work and what their function is in the over-all system.

Keep up with the latest service information. Read and then file in a handy place. Information received today may have the cause and remedy of a problem being encountered.

2. Ask the operator. Question the operator as to how the machine acted when it started to fail. Find out what was unusual about it.

Also find out if any do-it-yourself service was performed. (You may find out later that the trouble is somewhere else, but you should know if any components were tampered with.) Ask how the machine is used and when it is serviced. Many problems can be traced to poor maintenance or abuse.

3. Operate the machine. Get on the machine and operate it. Warm it up and put it through its paces. Don't completely rely on the operator's story; check it yourself.

Are the gauges reading normal? (If not, it may be that the component being monitored is not functioning correctly or it may mean that the gauge is faulty.)

How's the performance? Is the action slow, erratic, or nil? Do the controls feel solid or "spongy"? Do they seem to be "sticking"?

Smell anything? Any signs of smoke? Hear any unusual sounds? Where? At what speeds or during what cycles?

4. Inspect the machine. Get off the machine and make a visual check. Use your eyes, ears, and nose to spot signs of trouble.

Look closely at the components. Inspect for cracked welds, loose tie bolts, damaged linkages, worn or broken lines, etc.

During the inspection, make a note of all the trouble signs.

5. List the possible causes. With the information obtained during steps 1 through 4, make a list of the possible causes.

What were the signs you found while inspecting the machine? What is the most likely cause?

6. Reach a conclusion. Look over the list of possible causes and decide which are the most likely and which are the easiest to verify.

"Diagnosing Malfunctions" given in the following groups will be a helpful guide.

Reach your decision on the leading causes and plan to check the first.

7. Test your conclusion. Before repairing components in the system, test your conclusions to make sure they are correct.

Some of the possible causes can be verified without further testing. Check these possibilities first.

Test will soon narrow the remaining list of possible causes and soon the actual source of trouble will be pin pointed.

With the trouble accurately located, it is now a simple matter to remove and repair the component at fault.

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DIAGNOSE ENGINE MALFUNCTIONS

NOTE: Diagnose malfunction charts are arranged from most probable and simplest to verify, to least likely more difficult to verify. Remember the following steps when trouble shooting a problem
Step 1. Operational Check Out Procedure (See Section 9005)
Step 2. Engine Operational Checkout Procedure (See Group 10).
Step 3. Diagnose Malfunctions Charts (See Group 15)
Step 4. Test and/or Adjustments (See Group 20 and/or 25)

Problem	Possible Cause	Verification/Solution
Engine Will Not Start Or Starts Hard	Fuel tank empty	Check fuel quantity
	Fuel tank vent plugged	Loosen cap and listen for air entering tank. Clean or replace vent hose.
	Water in fuel or water trap in fuel frozen in line	Drain filters and water tank. Remove fuel cap and strainer. Have someone hold accelerator pedal down and crank engine. Make sure fuel flows from lower port in filler neck.
	Fuel filters plugged	Remove fuel cap and strainer. Have someone hold accelerator pedal down and crank engine. Make sure fuel flows from lower port in filler neck. Change filters.
	Improper type of fuel	Check fuel.
	Air leak on suction side of fuel system	Remove fuel cap and strainer. Have someone hold accelerator pedal down and crank engine. Make sure fuel flows from lower port in filler neck. Tighten connections. Check fuel lines for damage.
	Fuel shut-off cable not properly adjusted (644D)	Push fuel shut-off knob down. Fuel shut-off lever must be against run stop on injection pump.
	Stuck injection pump metering valve (444D, 544D)	Lightly tap injection pump housing. If engine now starts, repair metering valve.*
	Faulty electric shut-off (444D, 544D)	Test solenoid. (See Group 9015-25.)

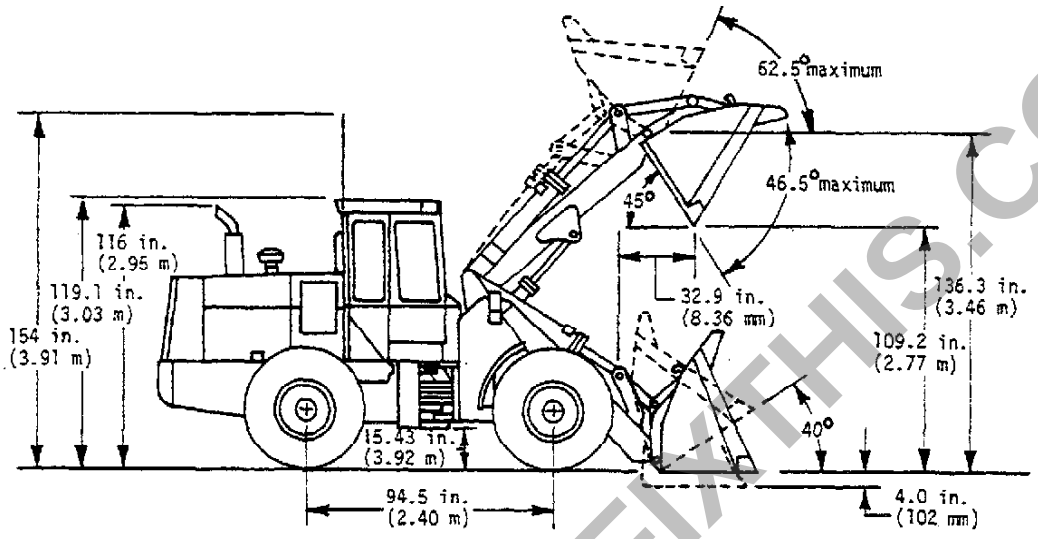
**For 444D with 6329 or 544D, see Section 04A*
For 444D with 6359, see CTM-4
For 644D, see CTM-1

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444D LOADER



Engine:
- John Deere 6-cylinder turbocharger diesel ..... 90 SAE hp (67 kw)
- Bore and stroke
  - Pin (—511476) ..... 4.02 x 4.33 in. (102 x 110 mm)
  - Pin (511477—) ..... 4.19 x 4.33 in. (106 x 110 mm)
- Piston displacement
  - Pin (—511476) ..... 3.29 cu. in. (5.392 L)
  - Pin (511477—) ..... 3.59 cu. in. (5.833 L)
- Lubrication ..... Pressure system with full-flow filter
- Cooling ..... Pressurized with thermostat and controlled bypass
- Fan ..... Blower
- Dual-stage air cleaner with restriction indicator ..... Dry
- Electrical system ..... 12-volt with alternator
- Batteries (one 12-volt)
  - Cold cranking capacity at 0°F (—18°C) ..... 625 amps
  - Reserve capacity ..... 170 min. ea.
- Alternator: standard ..... 42 amps
  - optional with cab ..... 90 amps

Differentials:
- Front and rear ..... Standard
- Front hydraulic differential lock with capture circuit ..... Optional
- Front No Spin ..... Optional

Drive Axles:
- Inboard-mounted planetary gears to each wheel.
- Front axle fixed.
- Rear axle oscillates 22° total (15.6 in (396 mm) vertical travel at center of tire).

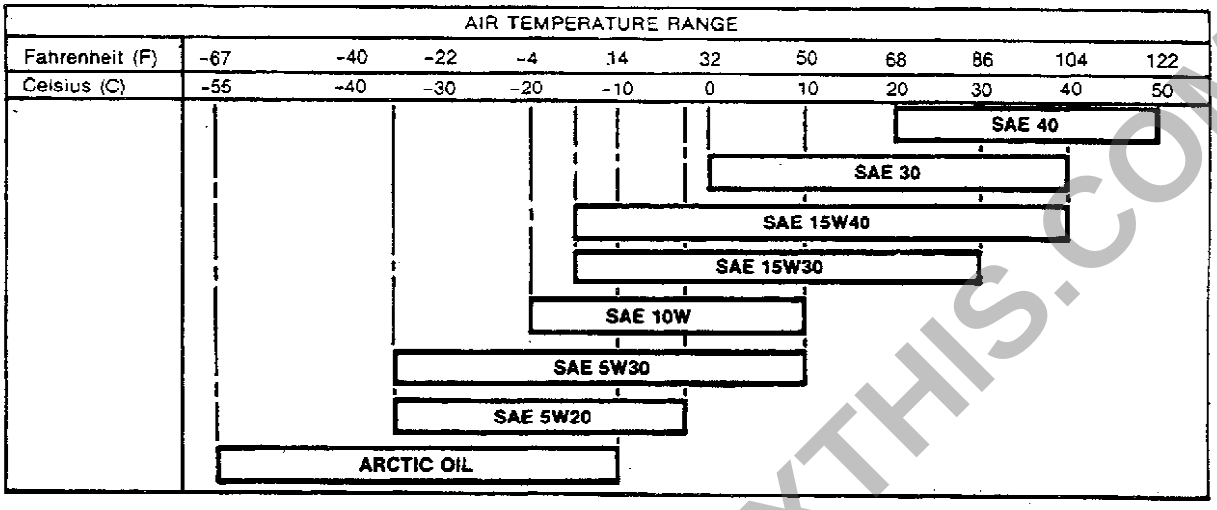
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ENGINE OIL



Depending upon the expected air temperature range between oil changes, use oil viscosity shown on the temperature chart above.

Additives are not required nor recommended.

John Deere TORQ-GARD SUPREME® engine oil is recommended. If other oils are used, they must have one of the following specifications:

Oil Specification	Use
API Service: CD/SF, CD/SE, CD/SD, CD/SC, or MIL-L-2104C, MIL-L-2104D	Recommended
*API Service CC/SF, CC/SE, CC/SD, CC/SC or *MIL-L-46152, *MIL-L-46152B	For SAE 5W20, SAE 5W30 and arctic oil only, use if recommended oil is not available.
*MIL-L-46167A	For arctic oil only

**Change oil at one-half the normal drain interval.*

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TURBOCHARGER OPERATION—444D, 544D, 644D

The turbocharger provides additional air to burn more fuel and produce more power without increasing the size of the engine. In the thinner air of high altitudes, the turbocharger turbine wheel may turn as fast as 125,000 rpm to maintain power.

Exhaust gases from the engine pass through the turbine housing (B) causing the shaft (F) to rotate before the exhaust gas is discharged.

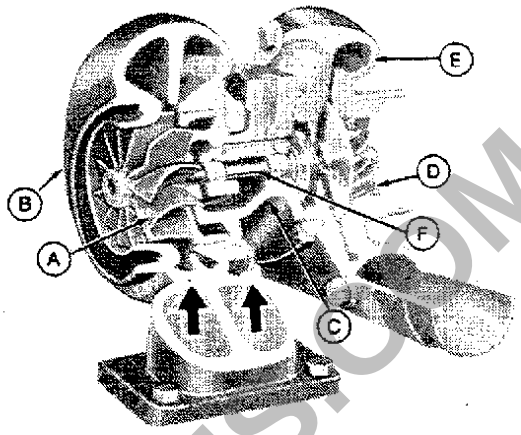
The compressor wheel (D) also mounted on shaft (F) rotates in the compressor housing (E). Inlet air is drawn into the housing, where it is compressed and delivered to engine cylinders.

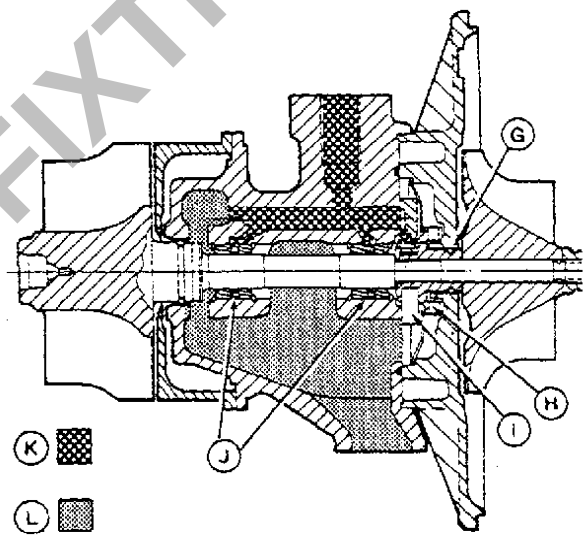
Pressure oil (K) from the engine lubrication system is pumped through passages in the center housing and directed to bearings (J) and thrust washer (I) through passages in the center housing and thrust collar (H). Oil is sealed from the compressor and turbine by a piston ring (G) at both ends of the center housing.

The turbocharger contains two floating bearings that have a clearance between the bearing O.D. and housing wall as well as a clearance between the bearing I.D. and the shaft O.D.

These clearances are lubricated by the oil supply and the bearings are protected by a cushion of oil.

The pressure-free oil (L) drains by gravity from the center housing to the engine crankcase.





A—Turbine Wheel
B—Turbine Housing
C—Center Housing
D—Compressor Wheel
E—Compressor Housing
F—Shaft
G—Piston Ring
H—Thrust Collar
I—Thrust Washer
J—Bearings
K—Pressure Oil
L—Pressure-Free Oil

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DIAGNOSE ENGINE MALFUNCTIONS—Continued

Problem	Possible Cause	Verification/Solution
Slow Acceleration	Improper fuel	Use correct grade of fuel.
	Fuel injection pump	Remove and test fuel injection pump.*
	Injection nozzle(s)	Remove and test nozzles.*
Detonation	Starting aid solenoid stuck open	Inspect and repair.
	Incorrect injection pump timing	Time injection pump. (See Group 9010-20.)
	Incorrect injection pump advance	Repair advance.
Abnormal Engine Noise	Low or incorrect engine oil	Add correct oil to proper level.
	Loose or worn dampener drive	Inspect. Repair.
	Engine oil fuel dilution	Inspect engine oil. Inspect fuel transfer pump spindle, seal, and housing.
	Incorrect fuel injection pump timing	Time injection pump. (See Group 9010-20.)
	Turbocharger failure	Remove air intake hose and check compressor wheel clearance between housing and wheel. Spin compressor wheel and check for failed bearings. Repair turbocharger.
	Excessive valve clearance	Adjust valve clearance. (See Group 9010-20.)
	Bent push rods	Replace.
	Worn rocker arm shafts	Replace.
	Loose connecting rod caps	Inspect, tighten connecting rod cap screws.*
	Loose main bearing caps	Inspect, tighten main bearing cap screws.*
	Worn main bearing	Replace bearings.*

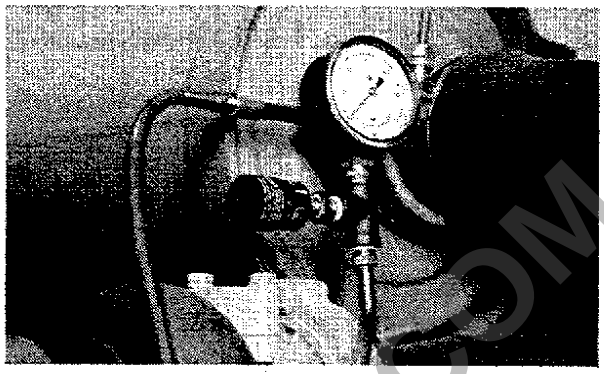
**For 444D with 6329 or 544D, see Section 04A*
For 444D with 6359, see CTM-4
For 644D, see CTM-1

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AIR FILTER RESTRICTION INDICATOR TEST—644D



SPECIFICATIONS

Restriction indicator must show red at ..... 6.2 ± 0.6 kPa (62 ± 6 mbar) (25 ± 2.3 in. water)

SERVICE EQUIPMENT AND TOOLS

0—15 kPa (0—150 m bar) (0—60 in. water) vacuum gauge

1. Remove air restriction indicator.

2. Connect gauge and indicator to tee. Connect tube to air cleaner using hosed fittings from water vacuum gauge kit.

3. Start engine and slowly cover the air cleaner inlet with a piece of paper or cardboard.

4. Restriction indicator must show red at 6.2 ± 0.6 kPa (62 ± 6 mbar) (25 ± 2.3 in. water).

If reading is not within specifications, install a new indicator.

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Clutch Cut-Off Circuit

The purpose of the clutch cut-off circuit is to disengage the reverser without moving the reverser lever. This is used so engine rpm can be increased to allow hydraulic functions to operate quicker.

Clutch cut-off circuit operation is dependent on the operation of two single pole, single throw switches, in series, to activate the clutch cut-off solenoid.

One switch is on the right instrument panel and is detented in on and off.

The second switch is located above the right brake pedal but is activated only by the left brake pedal.

Both switch must be closed (instrument panel switch on and left brake pedal depressed) to activate the clutch cut-off solenoid.

Power is routed from the brake/clutch fuse through tan wire 44B, right brake switch, tan wire 44D to the positive terminal of the left pedal. When the pedal is engaged power flows from the left brake pedal through light blue wire 25A, 28 contact connector, light blue wire 25A, to the positive terminal of the switch on the dash. When the switch on the dash is "ON" power is routed through light blue wire 25E, 28 contact connector (25E—25C connector), light blue wire 25E, light blue wire 25F (which is spliced to 25E) to the clutch disconnect solenoid. The clutch cut-off solenoid is grounded to the loader frame through light blue wire 25G and the solenoid will become energized.

With the clutch cut-off solenoid (and its valve) activated, pressure oil is directed to one end of the clutch cut-off valve spool in the transmission control valve housing. The spool is moved, allowing oil from the high, low reverse range clutch pack (depending on gear selection position) to "dump" to sump. At the same time, pressure oil to the range selector valve is blocked by the clutch cut-off valve.

If either switch is off, (left brake pedal released or selector switch off) the loader transmission will stay in the range determined by the position of the shift lever.

NOTE: Clutch cut-off solenoid is engaged when the park brake is on.

With the park brake "ON, power flows to the park brake light as well as the clutch cut-off solenoid. Power is routed from brake/clutch fuse through tan wire 44B, tan wire 44D, tan wire 44C to the park brake switch. When the park brake is "ON", power is routed from park brake switch through light blue wire 25B, one way diode, light blue wire 25C, 28 contact connector (25C—25E), light blue wire 25E, light blue wire 25F (which is spliced to 25E) to the clutch disconnect solenoid.

The diode located between 25C and 25B allows the clutch disconnect switch and pedal to be used without power flowing back to and energizing the park brake light.

Differential Lock Switch Circuit

Power is routed from the ether/differential lock fuse through pink wire 65A to the differential lock switch located on the floor. When the foot operated switch is depressed, power is routed to orange wire 65B, 8 contact connector, pink wire 65B to the differential lock solenoid. The differential lock solenoid is grounded to the frame through wire 65E, therefore, the solenoid valve will be energized.

The solenoid valve permits pressure oil to flow to the differential lock piston.

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Power for the defroster, wipers, dome light, radio and beacon comes from the accessory relay, through a 30-amp (1st) circuit breaker, to the upper cab wiring harness.

Defroster

The defroster is an adjustable fan and motor located in the upper right corner of the cab. It has a built-in ON/OFF switch.

Wipers

Front and rear wiper switches are located in the upper right cab panel. The three position switches have three wires to the wiper motor. In LOW, current flows through the "L" terminal, in HIGH, through the "H" terminal. When returned to the PARK position, current flows through the "P" terminal.

Dome Light

The dome light is located in the upper cab panel. It has a self-contained ON/OFF switch.

Radio and Beacon

Connectors for the radio and beacon are found behind the radio knockout plug in the upper cab panel.

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AUXILIARY CIRCUIT OPERATION

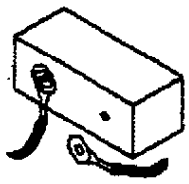
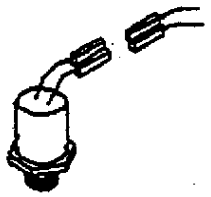
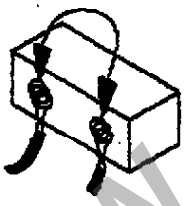
Power for the auxiliary circuit comes from the accessory relay, then through the 4th fuse.

The P11 red wire is taped to the wiring harness under the right access panel in the area of the loader valve.

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5J RETURN-TO-DIG SWITCH CHECK **Hydraulic control lever will not kick out of rollback detent.**		Roll bucket fully forward. Lower bucket to ground. Engine OFF. Key ON. Pull hydraulic control lever into rollback detent. Remove one wire from R-T-D switch.	*LOOK/LISTEN: As wire is removed, solenoid "clicks" and control lever comes out of detent.*	**OK: Adjust R-T-D switch.** **IF OK:** Replace R-T-D switch. **NOT OK:** Go to 5K 029;T6528BJ 10T;9015 M62 020387
5K RETURN-TO-DIG SOLENOID CHECK. **Hydraulic control lever will not kick out of rollback detent.**		Roll bucket fully forward. Lower bucket to ground. Engine OFF. Key ON. Pull hydraulic control lever into rollback detent. Disconnect wires from R-T-D solenoid.	*LOOK/LISTEN: As wires are disconnected, solenoid "clicks" and control lever comes out of detent.*	**OK: Go to Circuit Test, Group 9015-25. Check wiring from solenoid to switch for shorted condition.** **NOT OK:** Solenoid "clicks" but lever does not come out of detent. **GO TO: HYDRAULIC SYSTEM—REPAIR VALVE DETENT, GROUP 3100.** 029;T6528BK 10T;9015 M63 280287
5L BOOM HEIGHT KICK-OUT SWITCH CHECK. **Hydraulic control lever will not stay in boom raise detent.**		Set bucket flat on ground. Key ON. Engine OFF. Connect a wire between switch terminals. Pull control lever into boom raise detent.	*LOOK/LISTEN: Solenoid must "click". Control lever must remain in boom raise detent.*	**OK: Adjust switch** **IF OK: Replace switch.** **NOT OK:** Go To 5M. 029;T6528BH 10T;9015 M64 270287

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DIAGNOSE MALFUNCTIONS OF LIGHT CIRCUIT—Continued

Symptom	Problem	Solution
Front Work Lights Do NOT Work, Rear Work Lights Work	Blown front work light bulbs	Inspect and replace if necessary.
	Wire harness or connector from 8-way connector on left side of unit to front work lights	Connect a jumper wire from the "S" terminal of light switch to one of the front work lights.
Rear Work Lights Do NOT Work, Front Work Lights Work	Blown rear work light bulbs	Inspect and replace if necessary.
	Harness or 3-way connector	Connect a jumper wire from "S" terminal of light switch to one of the rear work lights.
Tail Lights Do NOT Work, Front Drive Lights Work	Blown tail light bulbs	Inspect and replace if necessary.
	Loose or corroded ground connection	Check ground connections, mounting bolts for tail lights, clean if necessary.
	Wire harness	Connect a jumper wire from the battery to wire 41T or 41U attached to tail lights.
Brake Lights Do NOT Work, Tail Lights Work	Blown brake/clutch fuse (in fuse block under dash)	Check and replace if necessary.
	Blown front work light bulbs	Inspect and replace if necessary.
	Brake light switch	Connect a jumper wire between the two connectors on brake light switch.
	Connector or wire harness	Connect a jumper wire from the battery to wire 44A or 44B attached to tail lights.
Turn Signal/Hazard Lights Do NOT Work	Blown turn signal fuse (in fuse block under dash)	Check and replace if necessary.
	Flasher unit	Connect a jumper wire between two wires attached to flasher.
	Turn signal switch	Connect a jumper wire between "B" and "L" or "R" terminals of turn signal switch.
	Wire harness or connector	Connect a jumper wire from "B" terminal on turn signal switch to one of the front turn signals.

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Symptom	Problem	Solution
Brake Pressure Indicator and Buzzer Do Not Work With Key Switch "ON"—Continued	Power wire from key switch	Connect a jumper wire from "B" terminal of key switch to brake pressure switch. Connect a jumper wire from "B" terminal of key switch to brake pressure buzzer.
	Brake pressure switch	Connect a jumper wire from yellow wire at pressure switch to ground. If buzzer and light operate, sender is bad.
	Wiring harness	Connect a jumper wire from sender to light socket terminal.
Hydraulic Oil Filter Restriction Light Does Not Work, Key "ON", Engine "OFF"	Blown bulb	Inspect bulb in indicator and replace if necessary
	Light socket	Try a light bulb from a socket that works (park brake light)
	Hydraulic oil filter restriction test light sender	Connect a jumper wire from yellow wire attached to sender and ground. If light works, replace switch.
	Wiring harness (sending wire) or connector	Connect a jumper wire from sender, yellow wire to light socket terminal with yellow wire attached.
Hydraulic Oil Filter Restriction Indicator Light Stays On All The Time	Cold hydraulic oil	Warm up hydraulics by cycling a hydraulic function. *NOTE: It is normal for indicator light to come on when hydraulic oil is cold.*

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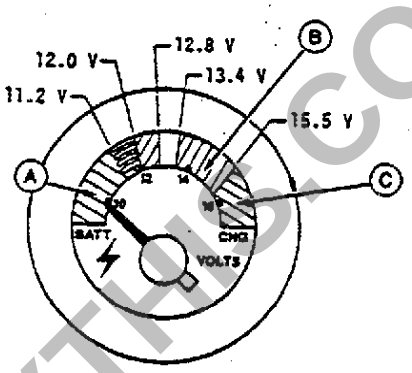
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VOLTMETER GAUGE OPERATION

The voltmeter is divided into three (3) zones:
(A) Orange (B) Green (C) Orange.

Voltage is measured by a signal sent from the engine oil pressure gauge wire.

The voltage gauge is powered from the engine oil pressure gauge and is case ground. It is back-lighted whenever the light switch is "ON".



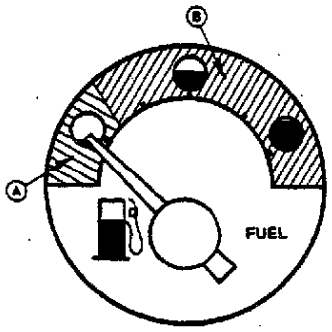
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FUEL GAUGE OPERATION

The fuel gauge is divided into two (2) zones: Orange (A), and Light Green (B) and four (4) quarter divisions. A float and potentiometer mechanism causes fuel lever sender resistance to increase as level decreases. If the fuel gauge indicates "EMPTY" all the time, a broken wire or loose connection to the fuel gauge sender could be the cause. If the fuel gauge indicates "FULL" all the time, a shorted fuel gauge sender wire could be the cause.

The fuel gauge is powered by the gauges fuse and is case grounded. It is back-lighted whenever the light switch is "ON".

Gauge Position	Resistance
"E"	240 ohms
"F"	33.4 ohms



A—Orange Zone **B—Light Green Zone**

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Machine condition for test:

Lower equipment to ground.

Key switch ON.

Initial Voltage Measurement is test points 1—2.

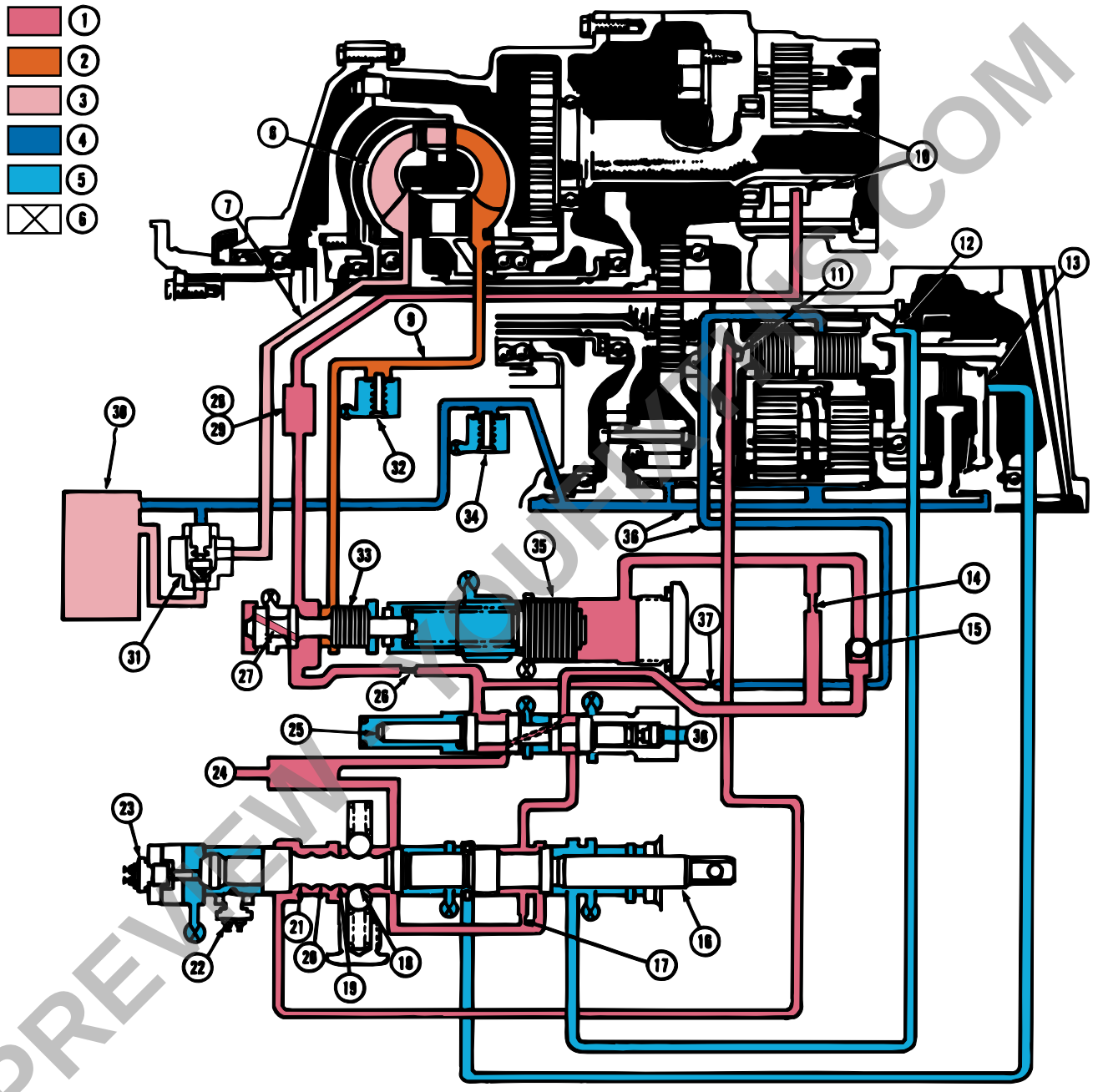
Test Location		Maximum Difference From Initial Reading
1—2	Battery Voltage	11.5—12.6V
3—4	Battery Voltage	0.5
5	Alternator "B+" Terminal	0.5
6	Alternator "S" Terminal	0.5
7	Alternator Exite Terminal	0.5

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TRANSMISSION CONTROL CIRCUIT IN REVERSE



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DIAGNOSE MALFUNCTIONS OF SERVICE BRAKES

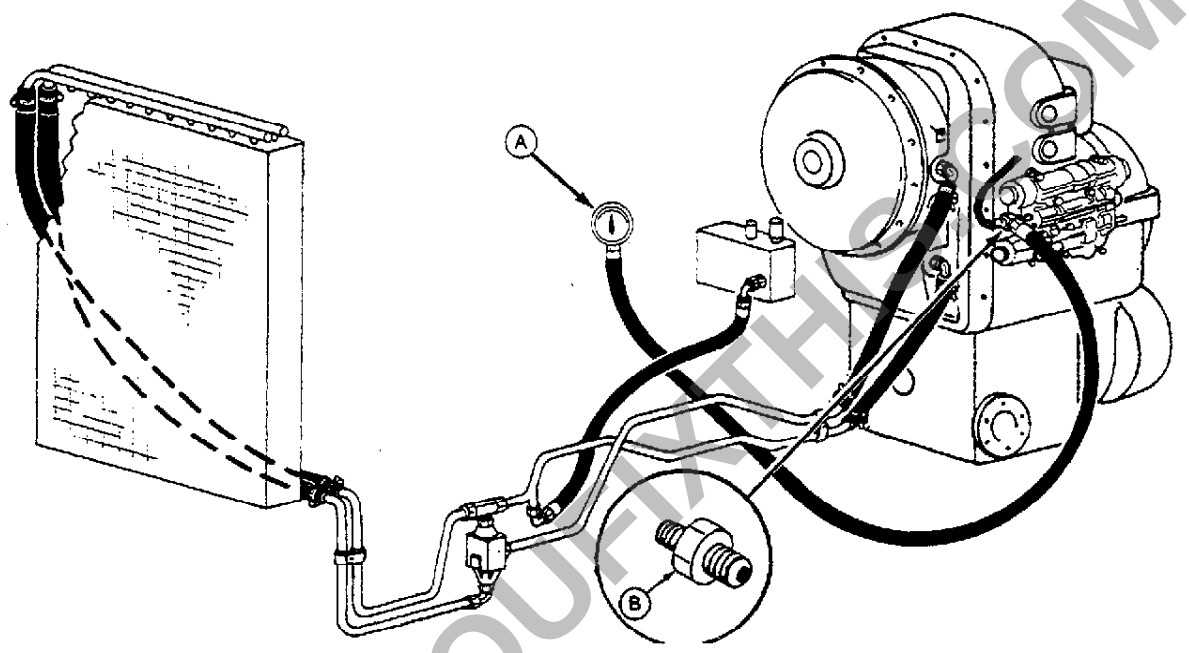
Problem	Possible Cause	Verification/Solution
Poor or No Brakes	Air in system	Do Brake Bleed Procedure in Group 9020-20.
	Worn brake pads	See Inspect Brake pads in Group 9020-20.
	Low unloading valve pressure setting	Do Unloading Valve Pressure Test in Group 9020-25.
	Brake valve return seat not closing	Do Brake Valve Leakage Test in Group 9020-25.
	Brake warm-up circuit check valve installed backwards or stuck open	Do Brake Warm-Up Circuit Check Valve Leakage Test in Group 9020-25.
	Brake piston seal leakage	Check for an over filled differential. Remove differential check plug. Apply brakes and check for leakage from check plug.
	Internal restriction in circuit	Remove lines and components.
Aggressive Brakes	Clutch cut-off switch out of adjustment	Adjust switch in Group 9020-20.
	Brake warm-up circuit check valve stuck closed or restriction in lines	Remove and inspect.
	Broken spring in brake valve	Do Brake Valve Modulation Check in Group 9020-10.
Brakes Drag	Stuck brake piston	Do Brake Drag Check in Group 9020-10.
	Brake valve linkage out of adjustment	Adjust linkage in Group 9020-20.
	Debris holding pressure seat open in brake valve	Do Brake Valve Leakage Test in Group 9020-25.
Brakes Chatter	Air in brake system	Do Brake Bleed procedure in Group 9020-20.
	Worn brake pads	See Inspect Brake Pads in Group 9020-20.

Continued on next page

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TRANSMISSION ELEMENT LEAKAGE TEST USING SYSTEM PRESSURE (GAUGE METHOD)



SPECIFICATIONS

Oil Temperature	66 ± 6°C (150 ± 10°F)
Engine Speed	Slow Idle
Normal Transmission System Pressure	965 ± 172 kPa (9.7 ± .3 bar) (140 ± 5 psi)
Pressure Difference Between Neutral and High (Maximum)	138 kPa (1.38 bar) (20 psi)
Pressure Difference Between Low, Neutral and Reverse (Maximum)	70 kPa (.69 kPa) (10 psi)

ESSENTIAL TOOLS

A—JT03107 Adapter (7/16 —20 M 37° x 1/8 F NPT)

SERVICE EQUIPMENT AND TOOLS

0—2060 kPa (0—21 bar) (0—300 psi) Gauge
Tachometer/Temperature Reader

1. Check transmission oil level.

2. Make test connections as shown.

3. Connect tachometer/temperature reader. (See Tachometer/Temperature Reader Installation in this group.)

4. Heat transmission oil to test specifications. (See Transmission Oil Warm-Up Procedure in this group.)

5. Clutch disconnect switch must be off.

6. Park brake must be off.

7. Apply the service brakes and run the engine at slow idle. Move the transmission control lever into each range position to measure transmission pressure. Excessive pressure difference between neutral and any range indicates leakage in that circuit.

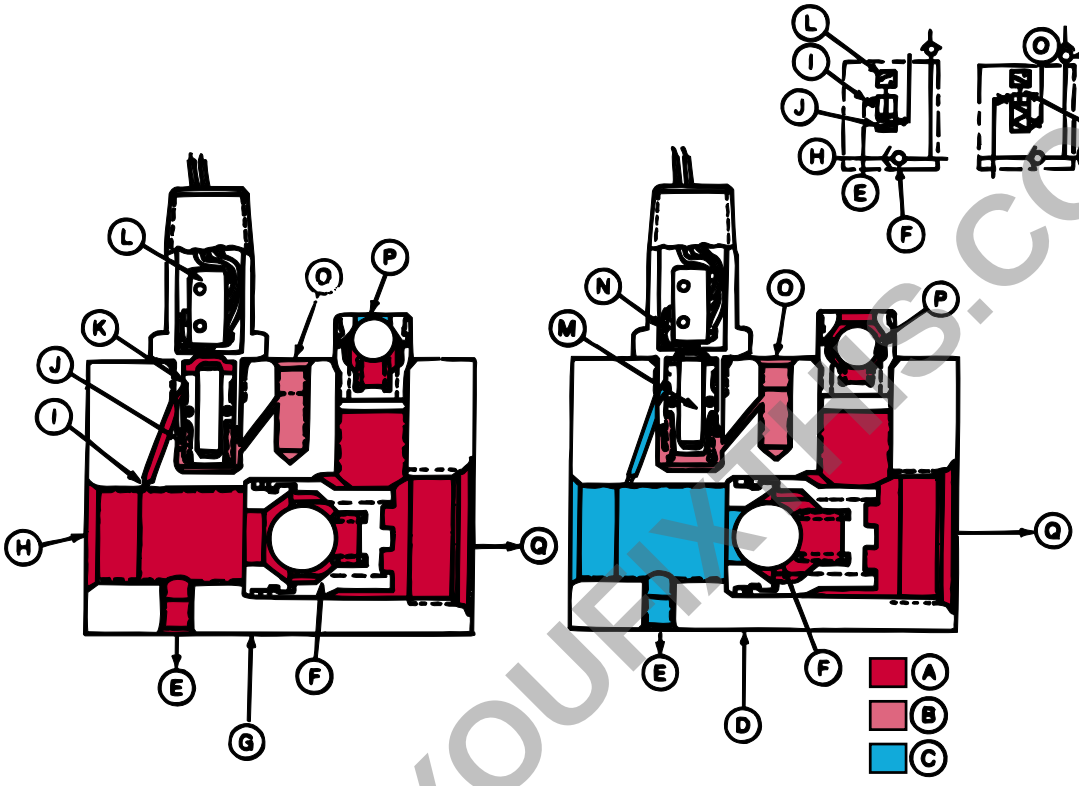
High element leakage can be caused by:

A. Control valve gasket leakage. (Remove and inspect in Group 0360.)
B. Control valve leakage. (Remove and inspect in Group 0360.)
C. Worn high range clutch seal ring, remove front cover and inspect seal ring.
D. Worn clutch piston seals. (Disassemble and inspect in Group 0360.)

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INLET MANIFOLD OPERATION



A—Steering Pressure
B—LS-Pressure
C—Return Pressure
D—Secondary Steering Operation
E—PP-Port
F—Primary Check Valve
G—Normal Operation
H—From Priority Valve
I—Orifice
J—Spring
K—Piston
L—Switch
M—Magnet
N—Lever
O—LS-Port
P—Secondary Check Valve
Q—To Steering Valve

The inlet manifold isolates the main steering system, provides a signal to the controller to warn of low steering pressure and provide a pilot pressure signal to the priority valve.

During normal steering operation, pump flow enters from the priority valve (H) unseating the primary check valve (F) and flowing to the steering valve (Q). Inlet pressure is sensed on the top of piston (K) through orifice (I) to move the piston down against the spring (J) and load-sensing pressure. With the steering and loader pump supplying flow, the steering system inlet pressure is higher than load-sensing pressure. This keeps the switch (L) in the open position.

If steering and loader pump flow is lost, the primary check valve seats. The pressure in the pilot pressure circuit, PP-port (E), drops causing the spool in the priority valve to open to the full steering position. The pressure through the orifice drops causing the spring, plus load-sensing pressure through the LS-port (O), to move the piston up. The magnet (M) pulls lever (N) which closes the switch.

When the switch closes, signalling the controller which energizes the secondary steering relay. The relay activates the secondary steering motor which drives the pump. Pump flow unseats the secondary check valve (P) providing temporary steering flow.

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HYDRAULIC OIL CLEAN-UP PROCEDURE USING PORTABLE FILTER CADDY

ESSENTIAL TOOLS

JT03011 Reducer (1/2 M NPT x 3/4 M NPT)

SERVICE EQUIPMENT AND TOOLS

Portable Filter Caddy
Two 3658 mm (12 ft) x 3/4 in. I.D. 100R1 Hoses with 3/4 M NPT Ends
Quick Disconnect Fittings
Discharge Wand

1. If hydraulic system is contaminated due to a major component failure, remove and disassemble steering cylinders to clean debris from cylinders.

2. Install a new return filter element. Clean filter housing before installing new element.

NOTE: For a failure that creates a lot of debris, remove access cover from reservoir. Drain reservoir and connect filter caddy suction line to drain port. Add a minimum of 19 L (5 gal) of oil to reservoir. Operate filter caddy and wash out the reservoir.

IMPORTANT: To prevent cavitation of filter caddy pump, the minimum I.D. of connector is 1/2 in.

3. To minimize oil loss, pull a vacuum in reservoir using a vacuum pump. Connect filter caddy suction line to drain port at bottom of reservoir using connector and quick disconnect fitting . Check to be sure debris has not closed drain port.

4. Put filter caddy discharge line into reservoir filler hole so end is as far away from drain port as possible to obtain a thorough cleaning of oil.

5. Start the filter caddy. Check to be sure oil is flowing through the filters.

Operate filter caddy approximately 6 minutes (444D, 544D) or 9 minutes (644D) so oil in reservoir is circulated through filter a minimum of four times.

NOTE: Filtering time for reservoir is 0.089 minute X number of liters (0.33 minute X number of gallons). Reservoir capacity is 61 L (16 gal) on 444D and 544D, and 95 L (25 gal) on 644D.

Leave filter caddy operating for the next steps.

6. Start the engine and run it at fast idle.

IMPORTANT: For the most effective results, cleaning procedure must start with the smallest capacity circuit then proceed to the next largest capacity circuit.

7. Operate all functions, one at a time, through a complete cycle in the following order: clam, steering bucket, and boom. Also include all auxiliary hydraulic functions.

Repeat procedure until the total system capacity has circulated through filter caddy seven times, approximately 18 minutes (444D, 544D) or 26 minutes (644D). Each function must go through a minimum of three complete cycles for a thorough cleaning of oil.

NOTE: Filtering time for complete hydraulic system is 0.158 minute X number of liters (0.6 minute X number of gallons). Complete hydraulic system capacity is 110 L (29 gal) on 444D and 544D, and 159 L (42 gal) on 644D. Filtering time for units with auxiliary hydraulic functions must be increased because system capacity is larger.

8. Stop the engine. Remove the filter caddy.

9. Install a new return filter element.

10. Check oil level in reservoir; add oil if necessary. (See Fuels and Lubricants in Section I, Group IV.)

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