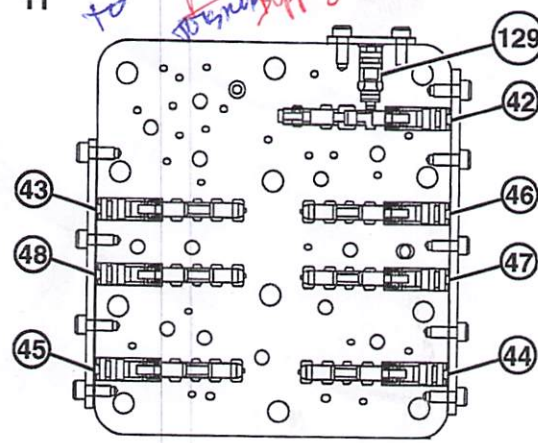
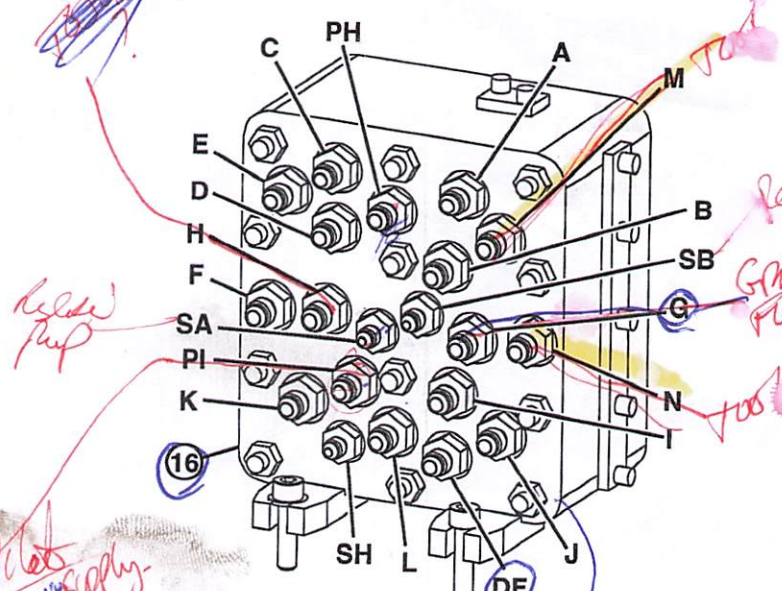
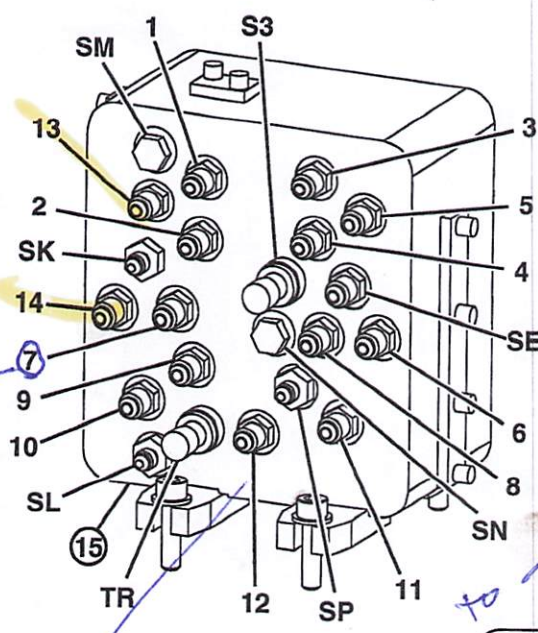


Theory of Operation



Pilot Signal Manifold Pilot Valves and Ports—Valve in Head Grapple Log Loader

- | | | | |
|--|---|--|---|
| 1, A— Boom Up | 15— Control Valve Side of Pilot Signal Manifold | 47— Pump 2 Flow Rate Pilot Valve (port SB) | SH—To Swing Park Brake |
| 2, B— Boom Down | 16— Pilot Control Valve Side of Pilot Signal Manifold | 48— Pump 1 Flow Rate Pilot Valve (port SA) | SK—To Valve in Head Grapple Flow Rate Control Valve |
| 3, C— Arm Out | 42— Boom Down Shockless Valve | 129— Orifice | SL—To Travel Flow Combiner Valve |
| 4, D— Arm In | 43— Arm 1 Flow Rate Pilot Valve (port SE) | DF—To Hydraulic Oil Tank | SM—Plug (not used) |
| 5, E— Swing Left | 44— Travel Flow Combiner Pilot Valve (port SL) | TR—Travel Pressure Sensor | SN—Plug (not used) |
| 6, F— Swing Right | 45— Swing Park Brake Release Pilot Valve (port SH) | S3—Swing Pressure Sensor | SP—To Solenoid Valve Manifold (port DP) |
| 7, G— Valve in Head Flow | 46— Valve in Head Grapple Flow Rate Pilot Valve (port SK) | SA—To Pump 1 Regulator Remote Control Spool | PH—From Pilot Shutoff Valve |
| 8— Not Used | | SB—To Pump 2 Regulator Remote Control Spool | PI— From Pilot Shutoff Valve |
| H—To Solenoid Valve Manifold (port DM) | | SE—To Arm 1 (Swing Priority) Flow Rate Control Valve | |
| 9, I— Left Travel Forward | | | |
| 10, J— Left Travel Reverse | | | |
| 11, K— Right Travel Forward | | | |
| 12, L— Right Travel Reverse | | | |
| 13, M— Tilt In | | | |
| 14, N— Tilt Out | | | |

NOTE: The numbers 1—14 and letters A—N, DF, TR, S3, SA, SB, SE, SH, SK, SL, SM, SN, SP, PH, and PI are next to the respective ports on the pilot signal manifold.

Ports SA and SB are located on the pilot control valve side of pilot signal manifold but, for simplification of the schematic, are shown schematically on the control valve side of pilot signal manifold.

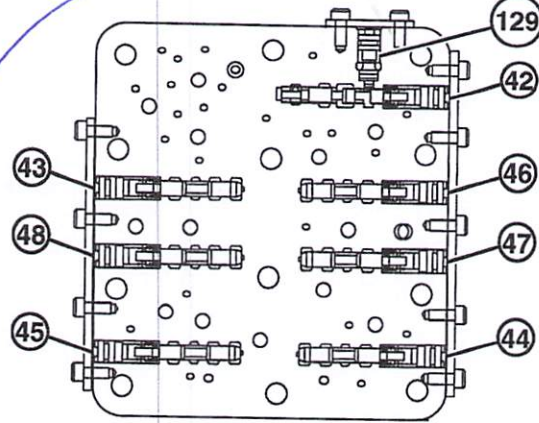
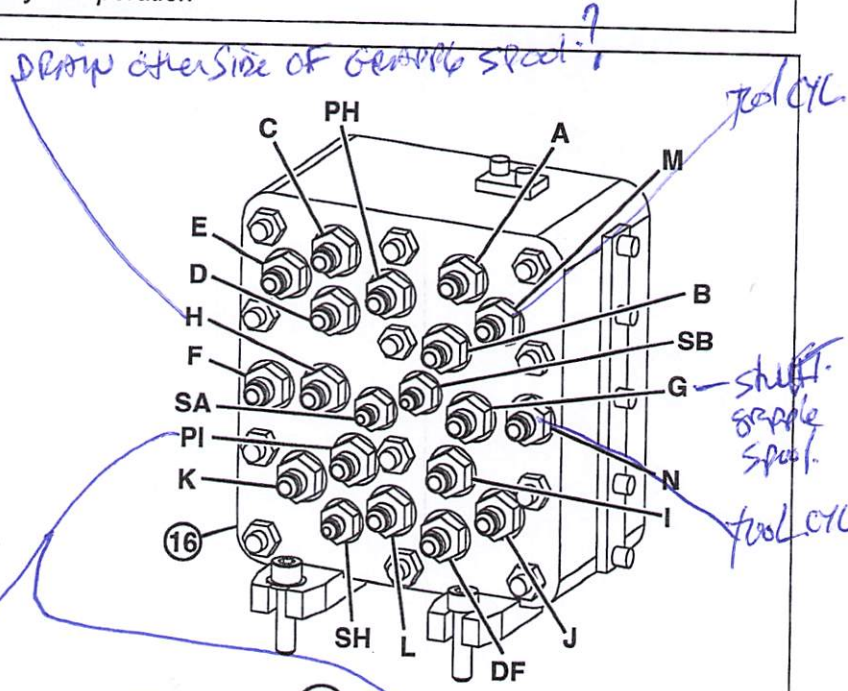
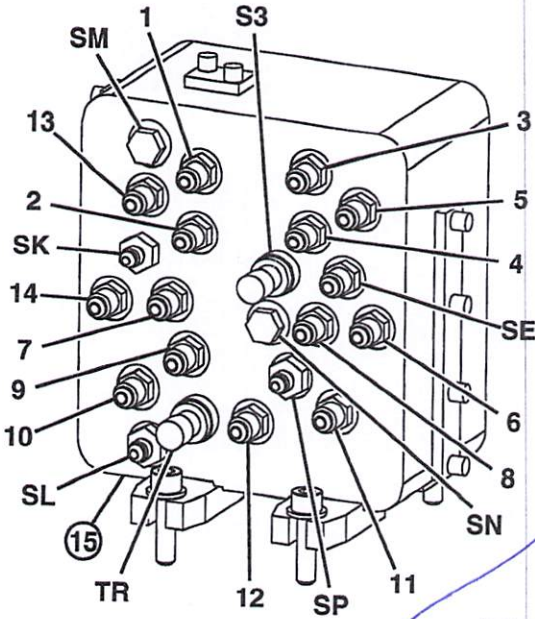
The pilot signal manifold is in the pilot system between the left and right pilot control valves, travel pilot control valve, control valve, and pump 1 and 2 regulators.

Actuating a pilot control valve sends control pilot oil through the manifold to the pilot caps to shift the control valve spools. At the same time the control pilot oil is routed directly or by the shuttle valves to shift the pilot valves (43—48) and to actuate the swing and/or travel pressure sensors.

Continued on next page

TP97644,0000046 -19-10AUG10-2/15

TX1021550—UN—04MAY07



TO CAB
pilot PSE
supply

Need pilot oil supply
to Grapple?
Run a jump
hose & Tee
in direct
away.

TX1021550

Pilot Signal Manifold Pilot Valves and Ports—Valve in Head Grapple Log Loader

- | | | | |
|-----------------------------|---|--|---|
| 1, A— Boom Up | 15— Control Valve Side of Pilot Signal Manifold | 47— Pump 2 Flow Rate Pilot Valve (port SB) | SH—To Swing Park Brake |
| 2, B— Boom Down | 16— Pilot Control Valve Side of Pilot Signal Manifold | 48— Pump 1 Flow Rate Pilot Valve (port SA) | SK—To Valve in Head Grapple Flow Rate Control Valve |
| 3, C— Arm Out | 42— Boom Down Shockless Valve | 129— Orifice | SL—To Travel Flow Combiner Valve |
| 4, D— Arm In | 43— Arm 1 Flow Rate Pilot Valve (port SE) | DF—To Hydraulic Oil Tank | SM—Plug (not used) |
| 5, E— Swing Left | 44— Travel Flow Combiner Pilot Valve (port SL) | TR—Travel Pressure Sensor | SN—Plug (not used) |
| 6, F— Swing Right | 45— Swing Park Brake Release Pilot Valve (port SH) | S3—Swing Pressure Sensor | SP—To Solenoid Valve Manifold (port DP) |
| 7, G— Valve in Head Flow | 46— Valve in Head Grapple Flow Rate Pilot Valve (port SK) | SA—To Pump 1 Regulator Remote Control Spool | PH—From Pilot Shutoff Valve |
| 8—Not Used | | SB—To Pump 2 Regulator Remote Control Spool | PI— From Pilot Shutoff Valve |
| 9, I— Left Travel Forward | | SE—To Arm 1 (Swing Priority) Flow Rate Control Valve | |
| 10, J— Left Travel Reverse | | | |
| 11, K— Right Travel Forward | | | |
| 12, L— Right Travel Reverse | | | |
| 13, M— Tilt In | | | |
| 14, N— Tilt Out | | | |

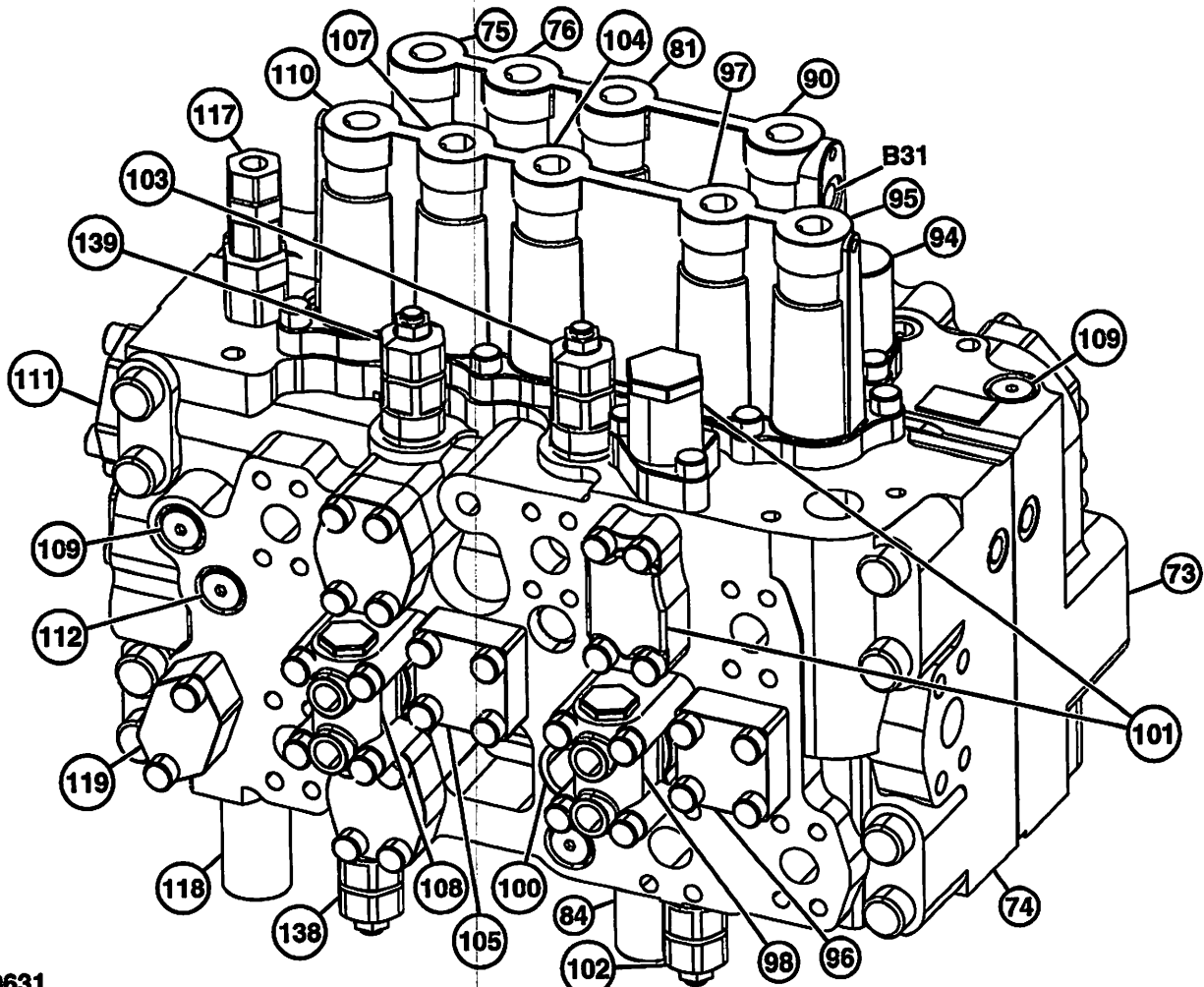
NOTE: The numbers 1—14 and letters A—N, DF, TR, S3, SA, SB, SE, SH, SK, SL, SM, SN, SP, PH, and PI are next to the respective ports on the pilot signal manifold.

Ports SA and SB are located on the pilot control valve side of pilot signal manifold but, for simplification of the schematic, are shown schematically on the control valve side of pilot signal manifold.

The pilot signal manifold is in the pilot system between the left and right pilot control valves, travel pilot control valve, control valve, and pump 1 and 2 regulators.

Actuating a pilot control valve sends control pilot oil through the manifold to the pilot caps to shift the control valve spools. At the same time the control pilot oil is routed directly or by the shuttle valves to shift the pilot valves (43—48) and to actuate the swing and/or travel pressure sensors.

GRAPPLE PSE



TX1020631—JUN—08MAY07

TX1020631

Component Identification—Left

- | | | | |
|---|--|---|---|
| <p>73— Right Control Valve (4-spool)
 74— Left Control Valve (5-spool)
 75— Right Travel Spool
 76— Grapple Cylinders Spool
 — Valve in Head Grapple Spool with Limiter Stop Fitting in End Cap
 81— Boom 1 Spool
 84— Not Used
 90— Arm 2 Spool
 94— Arm Regenerative Valve
 95— Swing Spool
 96— Check Valve (lift check)—Swing Neutral Passage</p> | <p>97— Arm 1 Spool
 98— Arm 1 Flow Rate Control Valve (switch valve and poppet)
 100— Not Used
 101— Arm Reduced Leakage Valve (switch valve and poppet)
 102— Arm In Circuit Relief and Anticavitation Valve
 103— Arm Out Circuit Relief and Anticavitation Valve
 104— Boom 2 Spool
 105— Check Valve (lift check)—Boom 2 Power Circuit</p> | <p>107— Heel Cylinder Spool
 — Grapple Tilt Cylinder Spool
 108— Not Used
 109— Plug
 110— Left Travel Spool
 111— Check Valve (lift check)—Left Travel Neutral Passage
 112— Check Valve (lift check)—Left Travel Power Passage
 117— Main Relief and Power Boost Valve
 118— Not Used
 119— Not Used
 138— Heel Retract Circuit Relief and Anticavitation Valve</p> | <p>— Grapple Tilt Out Circuit Relief and Anticavitation Valve
 139— Heel Extend Circuit Relief and Anticavitation Valve
 — Grapple Tilt In Circuit Relief and Anticavitation Valve
 B31— Arm In Pressure Sensor</p> |
|---|--|---|---|

Continued on next page

TP97644,000004A -19-11JUL08-2/15

Galena Shop

From: Nick Garratt <ngarratt@brandt.ca>
Sent: November 3, 2021 4:32 PM
To: Galena Shop
Subject: LOG LOADER PILOT LINES

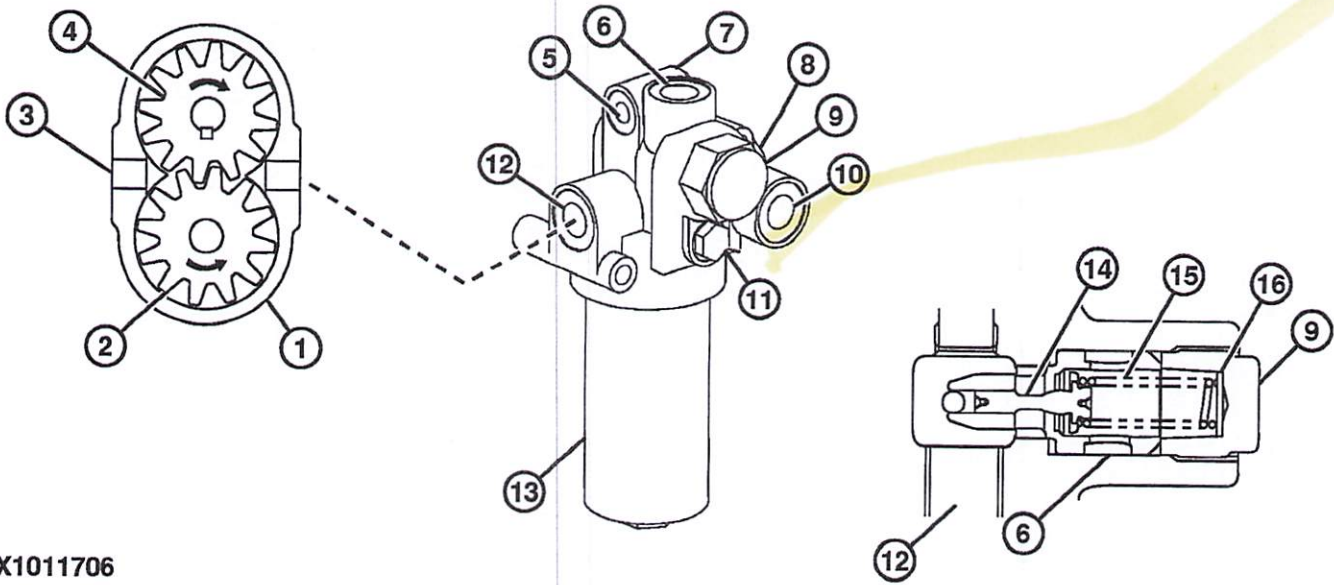
- 1 - Port 1 to Right Control Valve—Bottom (boom up)
- 2 - Port 2 to Right Control Valve—Top (boom down)
- 2A - From Rear of Left Control Valve (boom 1 to boom 2 pilot oil through boom lower meter-in cut valve)
- 3 - Port 3 to Left Control Valve—Bottom (arm in)
- 4 - Port 4 to Left Control Valve—Top (arm out)
- 5 - Port 5 to Left Control Valve—Bottom (swing left)
- 6 - Port 6 to Left Control Valve—Top (swing right)
- 7 - Port 7 to Right Control Valve—Top (grapple close)
- 8 - Port 8 to Right Control Valve—Bottom (grapple open)
- 9 - Port 9 to Left Control Valve—Bottom (left travel forward)
- 10 - Port 10 to Left Control Valve—Top (left travel reverse)
- 11 - Port 11 to Right Control Valve—Bottom (right travel forward)
- 12 - Port 12 to Right Control Valve—Top (right travel reverse)
- 13 - Port 13 to Left Control Valve—Bottom (heel out) *→ 7002 CYC*
- 14 - Port 14 to Left Control Valve—Top (heel in)
- 37 - Solenoid Valve Manifold
- 41 - Pilot Signal Manifold
- 73 - Right Control Valve (4-spool)
- 74 - Left Control Valve (5-spool)
- 80 - Plug (port SM)
- 81 - Grapple Cylinder Flow Rate Pilot Valve (port SK) to Grapple Cylinder Flow Rate Control Valve (switch valve)
- 82 - Travel Flow Combiner Pilot Valve (port SL) to Travel Flow Combiner Valve
- 83 - Port SP to Solenoid Valve Manifold (port DP)
- 84 - Plug (port SN)
- 85 - Arm 1 Flow Rate Pilot Valve (port SE) to Arm 1 Flow Rate Control Valve (switch valve)
- B33 - Swing Pressure Sensor (port S3)
- B34 - Travel Pressure Sensor (port TR)
- Y23 - Arm Regenerative Solenoid Valve (port SC)
- Y24 - Power Boost Solenoid Valve (port SG)
- Y25 - Travel Speed Solenoid Valve (port SI)

Galena Shop

From: Nick Garratt <ngarratt@brandt.ca>
Sent: November 4, 2021 4:25 PM
To: Galena Shop
Subject: Sent from Snipping Tool

1, A - Boom Up
2, B - Boom Down
3, C - Arm Out
4, D - Arm In
5, E - Swing Left
6, F - Swing Right
7, G - Valve in Head Flow — TO CONTROL BANK SPOOL PSI TO U/H.
8 - Not Used
H - To Solenoid Valve Manifold (port DM)
9, I - Left Travel Forward
10, J - Left Travel Reverse
11, K - Right Travel Forward
12, L - Right Travel Reverse
13, M - Tilt In — TOOL CYL
14, N - Tilt Out
15 - Control Valve Side of Pilot Signal Manifold
16 - Pilot Control Valve Side of Pilot Signal Manifold
42 - Boom Down Shockless Valve
43 - Arm 1 Flow Rate Pilot Valve (port SE)
44 - Travel Flow Combiner Pilot Valve (port SL)
45 - Swing Park Brake Release Pilot Valve (port SH)
46 - Valve in Head Grapple Flow Rate Pilot Valve (port SK)
47 - Pump 2 Flow Rate Pilot Valve (port SB)
48 - Pump 1 Flow Rate Pilot Valve (port SA)
129 - Orifice
DF - To Hydraulic Oil Tank
TR - Travel Pressure Sensor
S3 - Swing Pressure Sensor
SA - To Pump 1 Regulator Remote Control Spool
SB - To Pump 2 Regulator Remote Control Spool
SE - To Arm 1 (Swing Priority) Flow Rate Control Valve
SH - To Swing Park Brake
SK - To Valve in Head Grapple Flow Rate Control Valve
SL - To Travel Flow Combiner Valve
SM - Plug (not used)
SN - Plug (not used)
SP - To Solenoid Valve Manifold (port DP)
PH - From Pilot Shutoff Valve — PILOT oil Supply.
PI - From Pilot Shutoff Valve

Pilot Pump, Pressure Regulating Valve and Filter Operation



TX1011706

Pilot Pump, Pressure Regulating Valve, and Filter

- | | | | |
|---|---|---|--|
| 1—Pilot Pump | 6—Return Oil (port TA) to Hydraulic Return Manifold | 10—Regulated Pilot Oil (port PD) to Solenoid Valve Manifold | 13—Pilot Filter Element |
| 2—Driven Gear | 7—Plug (port PC) | 11—Test Port (port PF) | 14—Pilot Pressure Regulating Valve Spool |
| 3—From Hydraulic Pump Suction Line | 8—Plug (port PG) | 12—From Pilot Pump Outlet (port PA) | 15—Spring |
| 4—Drive Gear | 9—Pilot Pressure Regulating Valve | | 16—Shim (as required) |
| 5—Regulated Pilot Oil (port PE) to Pump 1 and 2 | | | |

Pilot filter element (13), bypass valve, and pilot pressure regulating valve (9) are incorporated into one assembly.

Pilot filter bypass valve senses differential pressure between inlet side and outlet side of filter element. During normal operation, bypass valve is held closed by a spring and pilot oil flows through filter element to pilot pressure regulating valve (9) and out to pilot circuit. When the filter element becomes plugged, pressure on inlet side increases forcing bypass valve open. Pilot oil now bypasses the filter element and unfiltered oil flows to pilot pressure regulating valve spool (14) and out to the pilot circuit.

The pilot pressure regulating valve is a relief valve that is used to regulate pilot oil pressure to a constant pressure

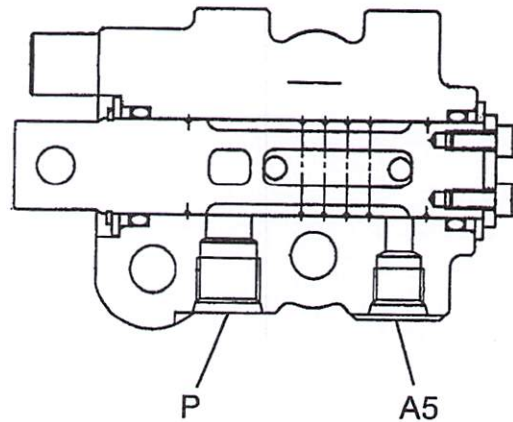
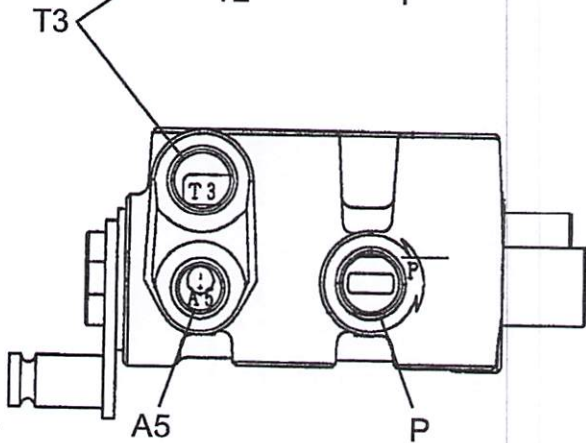
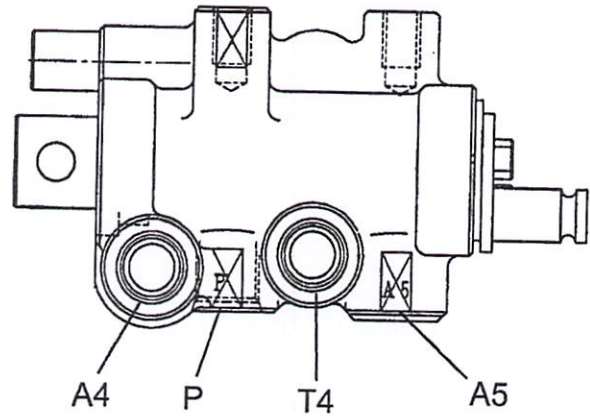
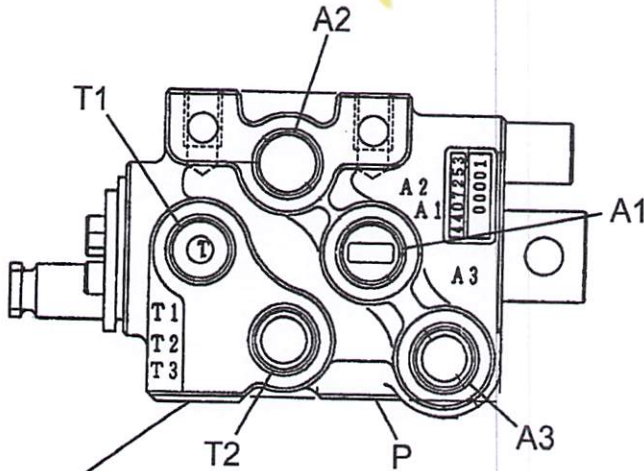
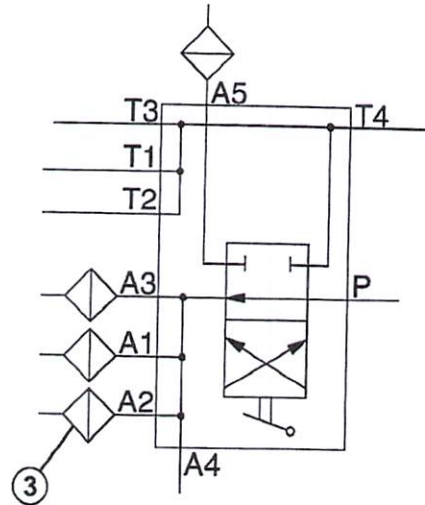
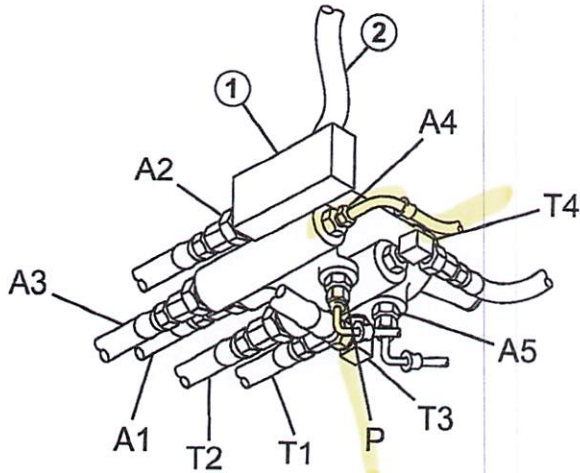
in pilot oil circuit. When pressure in pilot circuit increases to pressure setting of spring (15), spool is pushed against spring. Regulated pilot oil flows from port PD to solenoid valve manifold (10) and from port PC to pump 1 and 2 servo pistons and regulators (5). Oil not needed to maintain pressure in pilot circuit flows out port TA to hydraulic return manifold (7).

See Hydraulic System Schematic for pilot filter, bypass valve, and pilot pressure regulating valve in Pilot Control Valves and Pilot Signal Manifold Schematic (Group 9025-15.)

TX1011706 —JUN—14NOV06

TP97644,000003F -19-11JUL08-1/1

Pilot Control Shutoff Valve Operation



T147547

T147547—JUN—14DEC01

Pilot Control Shutoff Valve

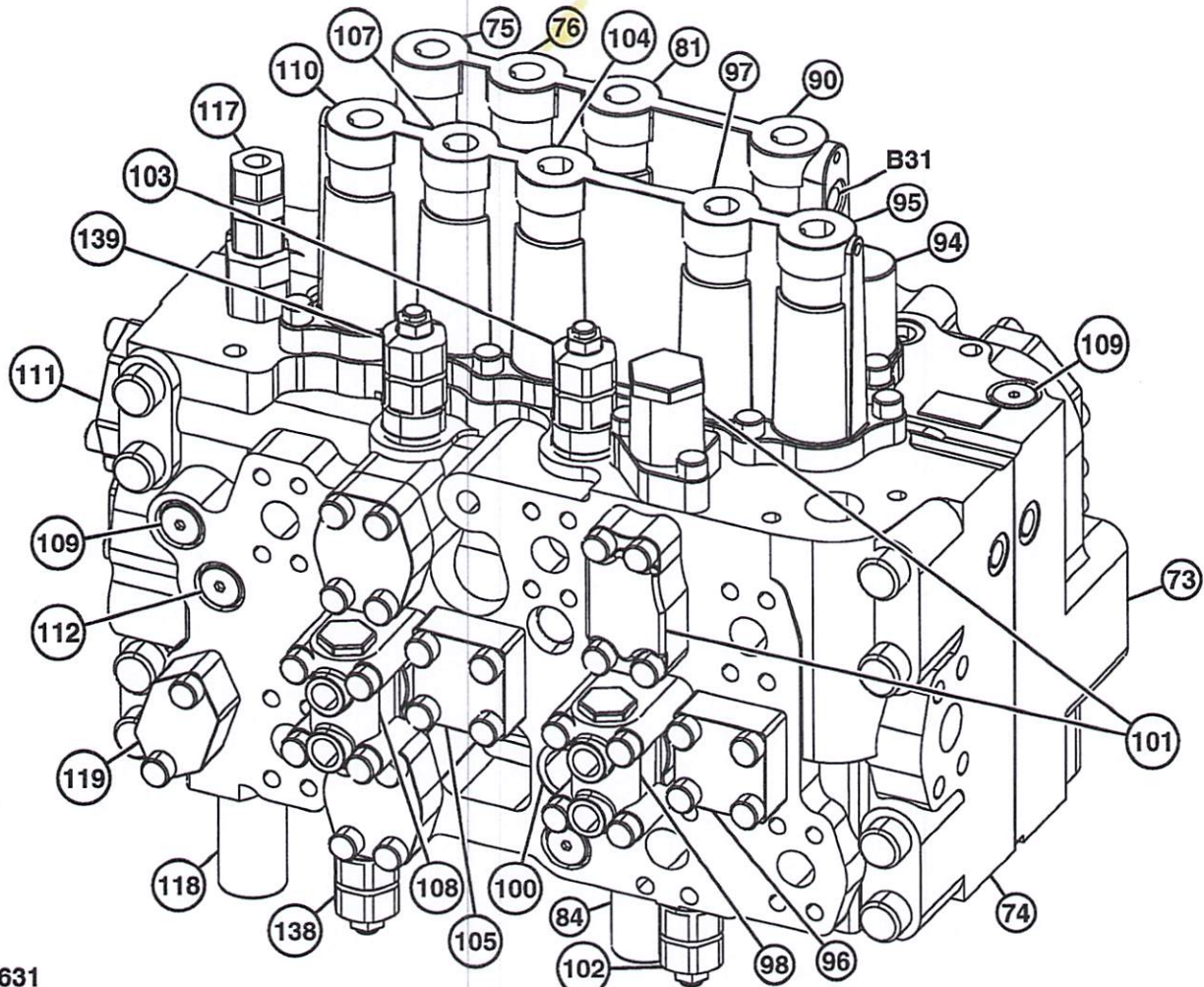
- | | | | |
|----------------------------------|-------------------------------|---------------------------------|--------------------------------|
| 1—Pilot Control Shutoff Valve | A2—To Travel Pilot Controller | A5—Plugged | T3—From Right Pilot Controller |
| 2—Pilot Control Shutoff Valve | Port P | P—From Solenoid Valve Manifold | Port T |
| 3—Filter (3 used) | A3—To Left Pilot Controller | Port PF | T4—To Hydraulic Oil Tank |
| A1—To Right Pilot Controller | Port P | T1—From Travel Pilot Controller | |
| A4—To Pilot Signal Manifold Port | Port PI | Port T | |
| | | T2—From Left Pilot Controller | |
| | | Port T | |

The pilot control shutoff valve (1) is a manual-operated, no-position, three-way rotary valve. The valve is rotated

by pushing or pulling the pilot control shutoff lever (2). The valve is located under the cab.

Continued on next page

TP97644,0000040 -19-10AUG10-1/2



TX1020631—UN—08MAY07

TX1020631

Component Identification—Left

- | | | | |
|--|---|---|--|
| 73— Right Control Valve (4-spool) | 97— Arm 1 Spool | 107— Heel Cylinder Spool | — Grapple Tilt Out Circuit Relief and Anticavitation Valve |
| 74— Left Control Valve (5-spool) | 98— Arm 1 Flow Rate Control Valve (switch valve and poppet) | 108— Not Used | 139— Heel Extend Circuit Relief and Anticavitation Valve |
| 75— Right Travel Spool | 100— Not Used | 109— Plug | — Grapple Tilt In Circuit Relief and Anticavitation Valve |
| 76— Grapple Cylinders Spool | 101— Arm Reduced Leakage Valve (switch valve and poppet) | 110— Left Travel Spool | B31— Arm In Pressure Sensor |
| — Valve in Head Grapple Spool with Limiter Stop Fitting in End Cap | 102— Arm In Circuit Relief and Anticavitation Valve | 111— Check Valve (lift check)—Left Travel Neutral Passage | |
| 81— Boom 1 Spool | 103— Arm Out Circuit Relief and Anticavitation Valve | 112— Check Valve (lift check)—Left Travel Power Passage | |
| 84— Not Used | 104— Boom 2 Spool | 117— Main Relief and Power Boost Valve | |
| 90— Arm 2 Spool | 105— Check Valve (lift check)—Boom 2 Power Circuit | 118— Not Used | |
| 94— Arm Regenerative Valve | | 119— Not Used | |
| 95— Swing Spool | | 138— Heel Retract Circuit Relief and Anticavitation Valve | |
| 96— Check Valve (lift check)—Swing Neutral Passage | | | |

Continued on next page

TP97644,000004A -19-11JUL08-2/15

Galena Shop

From: Nick Garratt <ngarratt@brandt.ca>
Sent: November 3, 2021 4:32 PM
To: Galena Shop
Subject: LOG LOADER PILOT LINES

- 1 - Port 1 to Right Control Valve—Bottom (boom up)
- 2 - Port 2 to Right Control Valve—Top (boom down)
- 2A - From Rear of Left Control Valve (boom 1 to boom 2 pilot oil through boom lower meter-in cut valve)
- 3 - Port 3 to Left Control Valve—Bottom (arm in)
- 4 - Port 4 to Left Control Valve—Top (arm out)
- 5 - Port 5 to Left Control Valve—Bottom (swing left)
- 6 - Port 6 to Left Control Valve—Top (swing right)
- 7 - Port 7 to Right Control Valve—Top (grapple close)
- 8 - Port 8 to Right Control Valve—Bottom (grapple open)
- 9 - Port 9 to Left Control Valve—Bottom (left travel forward)
- 10 - Port 10 to Left Control Valve—Top (left travel reverse)
- 11 - Port 11 to Right Control Valve—Bottom (right travel forward)
- 12 - Port 12 to Right Control Valve—Top (right travel reverse)
- 13 - Port 13 to Left Control Valve—Bottom (heel out)
- 14 - Port 14 to Left Control Valve—Top (heel in)
- 37 - Solenoid Valve Manifold
- 41 - Pilot Signal Manifold
- 73 - Right Control Valve (4-spool)
- 74 - Left Control Valve (5-spool)
- 80 - Plug (port SM)
- 81 - Grapple Cylinder Flow Rate Pilot Valve (port SK) to Grapple Cylinder Flow Rate Control Valve (switch valve)
- 82 - Travel Flow Combiner Pilot Valve (port SL) to Travel Flow Combiner Valve
- 83 - Port SP to Solenoid Valve Manifold (port DP)
- 84 - Plug (port SN)
- 85 - Arm 1 Flow Rate Pilot Valve (port SE) to Arm 1 Flow Rate Control Valve (switch valve)
- B33 - Swing Pressure Sensor (port S3)
- B34 - Travel Pressure Sensor (port TR)
- Y23 - Arm Regenerative Solenoid Valve (port SC)
- Y24 - Power Boost Solenoid Valve (port SG)
- Y25 - Travel Speed Solenoid Valve (port SI)

Monitor Service Mode Operation

information shown in the Monitored Result column will show on the display screen.

NOTE: These items can be read from monitor display, without using Service ADVISOR. Only the

Sequence Order	Description	Monitored Result	Unit	Remarks
1	Hour Meter	0.0 h	h	h = hours
2	Trip 1	0.0 h	h	h = hours
3	Trip 2	0.0 h	h	h = hours
4	Actual Engine Speed	USER n 0 min ⁻¹	min ⁻¹	min ⁻¹ = rpm
5	Hydraulic Oil Temperature	USER 23 °C	°C	Oil temperature in hydraulic oil tank in Centigrade
6 Not used.	—	USER L1 E t	—	Not used.
7 Not used.	—	USER L2 E %	%	Not used.
8	Diagnostic Trouble Code	0 0	—	See Main Controller (MCX) Diagnostic Trouble Codes. (Group 9001-10.)
9 Not used.	ML Switch	1 0	0: Switch Off 1: Switch On	Not used.
10	Pump 1 Delivery Pressure	2 0.0	MPa	MPa x 145.04 = psi
11	Pump 2 Delivery Pressure	3 0.0	MPa	MPa x 145.04 = psi
12	Pump 1 Control Pressure	4 0.0	MPa	MPa x 145.04 = psi
13	Pump 2 Control Pressure	5 0.0	MPa	MPa x 145.04 = psi
14	Target Engine Speed	6 700	rpm	700 = slow idle 1600 = fast idle in P mode
15 Not used.	EC Angle	7 0.2	V	Not used.
16	Engine RPM Dial Voltage	8 0.5	V	0.5 at slow idle 4.4 at fast idle
17	Boom Up Pilot Pressure	9 0.0	MPa	MPa x 145.04 = psi
18	Arm In Pilot Pressure	A 0.0	MPa	MPa x 145.04 = psi
19	Swing Pilot Pressure	b 0.0	MPa	MPa x 145.04 = psi
20	Travel Speed Pilot Pressure	c 0.0	MPa	MPa x 145.04 = psi
21	Dig and Swing Pilot Pressure	d 0	0 = Off 1 = On	
22	Attachment Control Pressure	E 0.0	MPa	MPa x 145.04 = psi
23	Work Mode	F 0	0 = Dig Mode 0 = Dig Mode II (Not Used) 1 = Attachment (Not Used)	

The monitor display can be switched from standard mode to USER mode to display diagnostic trouble codes and some monitored data item.

USER Mode Access: Push the SET switch and then turn the key switch ON. The monitor goes through the bulb check and then displays the hour meter. The SET switch can be released as soon as the monitor is into the bulb check.

Diagnostic Display Operation: Push the DISPLAY SELECT switch to display each Monitored Result in the

sequence order shown in the Monitor Display Diagnostic System Chart.

The Monitored Result column in the Monitor Display Diagnostic System Chart is representative of the display. The letters and numbers on the left are for identification and the readings are shown on the right.

Continued on next page

JL45346,0000044 -19-01JUL08-1/2

Monitor Operation

NOTE: Monitored results in the Monitor Display Diagnostic System Chart are shown with key switch ON and engine stopped.

Diagnostic trouble codes, if present, are displayed in the eighth sequence order. Push the DISPLAY

SELECT switch seven times to go to 0 (diagnostic trouble codes). More than one diagnostic trouble code is displayed at 1 second intervals. After the malfunction has been repaired, the diagnostic trouble code(s) are automatically cleared.

JL45346,0000044 -19-01JUL08-2/2

Diagnostic Display Unit (DDU) Operation

For information on using the diagnostic display unit, see the following:

- See Using Diagnostic Gauge to Access Engine Information. (Operator's Manual.)
- See Main Menu Navigation. (Operator's Manual.)
- See Engine Configuration Data. (Operator's Manual.)
- See Accessing Stored Trouble Codes. (Operator's Manual.)

- See Accessing Active Trouble Codes. (Operator's Manual.)
- See Adjusting Backlighting. (Operator's Manual.)
- See Adjusting Contrast. (Operator's Manual.)
- See Selecting Units of Measurement. (Operator's Manual.)
- See Setup 1-Up Display. (Operator's Manual.)
- See Setup 4-Up Display. (Operator's Manual.)

JL45346,0000043 -19-20JUN08-1/1

Reading Diagnostic Trouble Codes With Monitor Display

information shown in the Monitored Result column will show on the display screen.

TE: These items can be read from monitor display, without using Service ADVISOR. Only the

Sequence Order	Description	Monitored Result	Unit	Remarks
1	Hour Meter	0.0 h	h	h = hours
2	Trip 1	0.0 h	h	h = hours
3	Trip 2	0.0 h	h	h = hours
4	Actual Engine Speed	USER n 0 min ⁻¹	min ⁻¹	min ⁻¹ = rpm
5	Hydraulic Oil Temperature	USER 23 °C	°C	Oil temperature in hydraulic oil tank in Centigrade
6 Not used.	—	USER L1 E t	—	Not used.
7 Not used.	—	USER L2 E %	%	Not used.
8	Diagnostic Trouble Code	0 0	—	See Main Controller (MCX) Diagnostic Trouble Codes. (Group 9001-10.)
9 Not used.	ML Switch	1 0	0: Switch Off 1: Switch On	Not used.
10	Pump 1 Delivery Pressure	2 0.0	MPa	MPa x 145.04 = psi
11	Pump 2 Delivery Pressure	3 0.0	MPa	MPa x 145.04 = psi
12	Pump 1 Control Pressure	4 0.0	MPa	MPa x 145.04 = psi
13	Pump 2 Control Pressure	5 0.0	MPa	MPa x 145.04 = psi
14	Target Engine Speed	6 800	rpm	slow idle= 800 fast idle= 2000
15 Not used.	EC Angle	7 0.2	V	Not used.
16	Engine Speed Dial Voltage	8 0.5	V	0.5 at slow idle 4.4 at fast idle
17	Boom Up Pilot Pressure	9 0.0	MPa	MPa x 145.04 = psi
18	Arm In Pilot Pressure	A 0.0	MPa	MPa x 145.04 = psi
19	Swing Pilot Pressure	b 0.0	MPa	MPa x 145.04 = psi
20	Travel Speed Pilot Pressure	C 0.0	MPa	MPa x 145.04 = psi
21	Dig and Swing Pilot Pressure	d 0	0 = Off 1 = On	
22	Attachment Control Pressure	E 0.0	MPa	MPa x 145.04 = psi
23	Work Mode	F 0	0 = Dig Mode 0= Dig Mode II 1 = Attachment	

The monitor display can be switched from standard mode to USER mode to display diagnostic trouble codes and some monitored data item. To access the USER mode, See Monitor Service Mode Operation. (Group 9015-16.)

1. Press the DISPLAY SELECT switch seven times (display sequence 8) to display diagnostic trouble codes.

If no diagnostic trouble codes are present, monitor will display 0.

If diagnostic trouble codes are present, the code will display on the monitor. If more than one code is present, codes will be displayed at one second intervals.

For more information on specific diagnostic trouble codes, See Main Controller (MCX) Diagnostic Trouble Codes. (Group 9001-10.)

2. Repair or replace necessary parts to correct problem indicated by diagnostic trouble code.

Continued on next page

JH38101.0000030 -19-25JUN08-1/2

3. Turn key switch to OFF to exit USER mode.

JH38101,0000030 -19-25JUN08-2/2

Reading Diagnostic Trouble Codes With Diagnostic Display Unit (DDU)

The DDU (located in the air filter compartment) will show only diagnostic trouble codes produced by sensors on the engine and connected to the engine control unit. See Using Diagnostic Gauge to Access Engine Information. (Operator's Manual.)

See Engine Control Unit (ECU) Diagnostic Trouble Codes. (Group 9001-20.)

Diagnostic trouble codes (DTCs) are displayed according to J1939 standard as a two part code.

The first part of the code is a two—four digit Suspect Parameter Number (SPN), indicating the system or component having a failure; for example SPN 110 indicates a failure in the engine coolant temperature circuit.

The second part of the code is a two digit Failure Mode Identifier (FMI), indicating the type of failure that has

occurred; for example FMI 3 indicates value above or below normal.

Code SPN 110 FMI 3 indicates engine coolant temperature too high.

The DDU will show active codes and stored codes, and can clear codes from memory after a repair has been made.

To access menu options See Diagnostic Gauge Data Parameters Viewing Instructions. (CTM320.)

To view active DTCs See Diagnostic Gauge Active DTC Viewing Instructions. (CTM320.)

To view stored DTCs See Diagnostic Gauge Stored DTC Viewing Instructions. (CTM320.)

To clear stored DTCs See Diagnostic Gauge Stored DTC Clearing Instructions. (CTM320.)

JH38101,0000031 -19-05DEC08-1/1

Service ADVISOR™ Diagnostic Application

The Service ADVISOR application is what technicians use to diagnose and troubleshoot equipment. The application allows technicians to quickly and easily find information and solve equipment problems.

The Service ADVISOR application provides access to manuals, the Dealer Technical Assistance Center (DTAC), real-time diagnostics, and system readings. The application also allows technicians to perform calibrations, run tests, and program controllers, when possible.

The Connection - Readings shortcut bar within Service ADVISOR is used to connect to a machine. A connection allows a technician to take live system readings, create recordings, diagnose problems, calibrate, interactively test, and program controllers. With a connection established, the Readings menu allows a technician to add or remove a reading, set a readings baseline, and create and check recording triggers.

With Service ADVISOR connected to a machine, the Diagnostics shortcut bar can be used to read machine diagnostic trouble codes. The diagnostic codes can then be reviewed by code number for specific details. When a diagnostic trouble code is opened, code information displays in a window similar to the way a manual would. The details of a diagnostic trouble code often are in a procedural format with links so the technician can work to correct the problem with the equipment while following the step-by-step process in the diagnostic trouble code details.

See Service ADVISOR™ Connection Procedure To 9-Pin Diagnostic Connector. (Group 9015-20.)

See Reading Engine Diagnostic Trouble Codes With Service ADVISOR™ Diagnostic Application. (Group 9015-20.)

JH38101,0000032 -19-09JUL08-1/1

Travel Motor Crossover Relief Valve Test and Adjustment

3156G Machines (S.N. —316199)

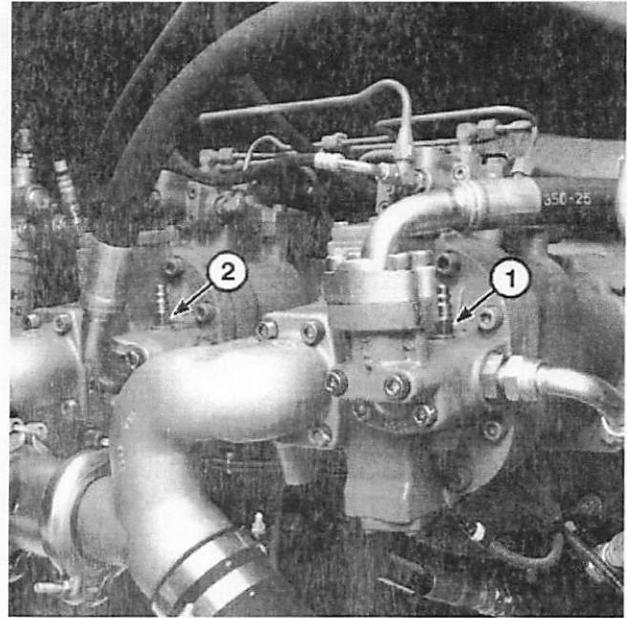
SPECIFICATIONS	
Hydraulic Oil Temperature	45—55°C 113—131°F
Engine Speed (approximate)	1300 rpm
Work Mode Switch Position	Bucket Mode
Work Mode Switch Position (processor only)	Thumb Mode
Power Mode Button Position	PWR (power) Mode
Auto-Idle Switch Position	OFF
Travel Motor Crossover Relief Valve Pressure	35.5—37.5 MPa 355—375 bar 5148—5438 psi
Crossover Relief Valve Shim Pressure Change (approximate per 0.5 mm [0.02 in])	0.9 MPa 9 bar 131 psi
Crossover Relief Valve Torque	310 N·m 229 lb·ft

SERVICE EQUIPMENT AND TOOLS	
Adapter (1/4 M BSPP ORB x 7/16-20 M 37°)	
Gauge 70 000 kPa (700 bar) (10 000 psi)	
JT02156A Digital Pressure/Temperature Analyzer	
JT02160 Transducer 70 000 kPa (700 bar) (10 000 psi)	
Pin (76.2 mm [3 in] outside diameter) or Round Bar Stock	

This procedure is to verify that the travel motor crossover relief valve pressure is within specification.

- Connect one of the following test equipment to monitor pump 1 and 2 delivery pressure, hydraulic oil temperature, and actual engine speed.
 - Monitor application. For instructions to actuate the service menu on monitor in cab, see [Service Menu](#). (Group 9015-16.)
Select the following items from monitoring list:
 - Pump 1 Delivery Pressure
 - Pump 2 Delivery Pressure
 - Hydraulic Oil Temperature
 - Actual Engine Speed
 - Service ADVISOR™ application. For instructions, see [Service ADVISOR™ Connection Procedure](#). (Group 9015-20.)
Select the following items from the menu:
 - Pump 1 Delivery Pressure
 - Pump 2 Delivery Pressure
 - Hydraulic Oil Temperature
 - Actual Engine Speed
 - MPDr application. For instructions, see [MPDr Application](#). (Group 9015-20.)
Select the following items from the monitor display:
 - Pump 1 Delivery Pressure
 - Pump 2 Delivery Pressure
 - Hydraulic Oil Temperature

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Pump 1 and 2 Test Ports

- 1— Pump 1 Test Port 2— Pump 2 Test Port

- Actual Engine Speed
- Verify work mode configuration. See [Work Mode Setup Procedure](#). (Group 9015-20.)
- Release hydraulic oil tank pressure. See [Hydraulic Oil Tank Pressure Release Procedure](#). (Group 9025-25.)
- Remove plug from pump 1 test port (1) and pump 2 test port (2).
- Install adapter.
- Connect JT02156A Digital Pressure/Temperature Analyzer and JT02160 Transducer or 70 000 kPa (700 bar) (10 000 psi) gauge to adapter.
- Turn the second adjusting plug of the main relief and power boost valve in 1/2 turn to increase pressure setting. For adjustment procedure, see [Main Relief and Power Boost Valve Test and Adjustment](#). (Group 9025-25.)
- Warm hydraulic oil to specification. See [Hydraulic Oil Warm-Up Procedure](#). (Group 9025-25.)

Specification

Hydraulic	
Oil—Temperature.....	45—55°C 113—131°F

TX1253640A—UN—12MAR18

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TW62213,00010EF -19-11JUL19-1/8

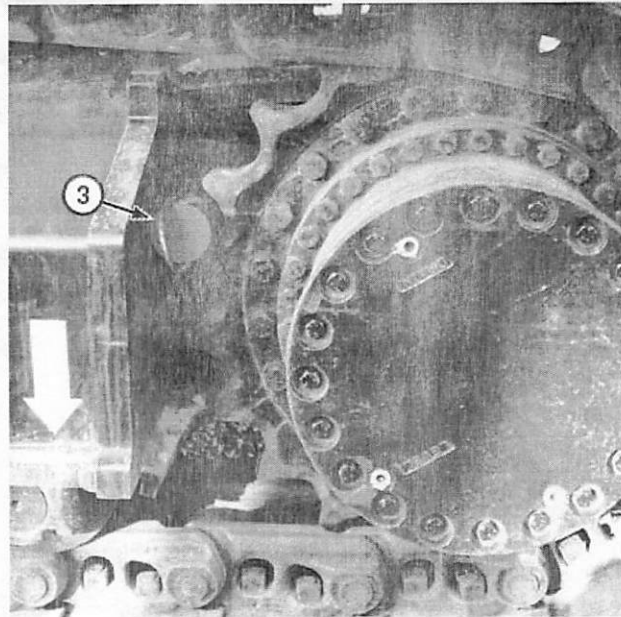
9. Install 76.2 mm (3 in) outside diameter pin (3) or round bar stock between the sprocket and track frame to stall travel motor.

10. Run machine at specifications.

Specification

Engine—Speed
(approximate)..... 1300 rpm
Work Mode
Switch—Position..... Bucket Mode
Work Mode
Switch—Position
(processor only)..... Thumb Mode
Power Mode
Button—Position..... PWR (power) Mode
Auto-Idle
Switch—Position..... OFF

3— Pin



Travel Motor Stalled Using Pin

TW62213,00010EF -19-11JUL19-2/8

TX1277822A—UN—07MAY19

⚠ CAUTION: Prevent possible injury from machine movement. Clear the area of all bystanders before doing the procedure.

11. Slowly actuate the travel function for the crossover relief valve (68A or 68B) being checked. Record the pressure reading. Make adjustments as necessary.

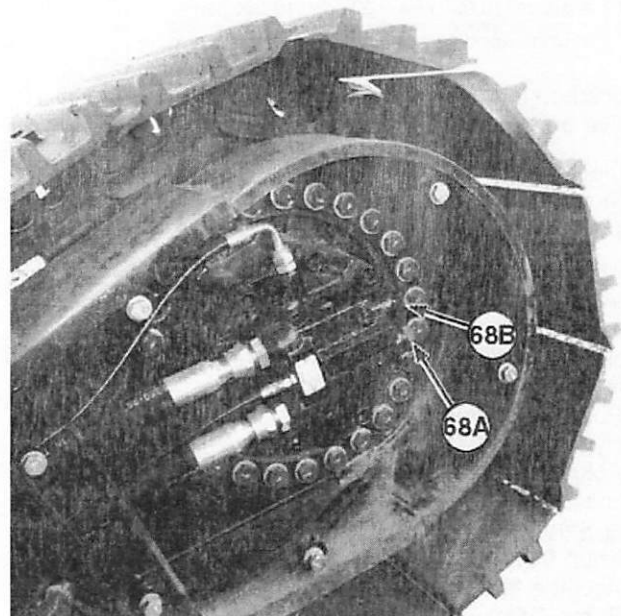
Specification

Travel Motor Crossover
Relief Valve—Pressure..... 35.5—37.5 MPa
355—375 bar
5148—5438 psi

12. Stop engine. Release hydraulic oil tank pressure.

68A— Forward Crossover
Relief Valve

68B— Reverse Crossover
Relief Valve

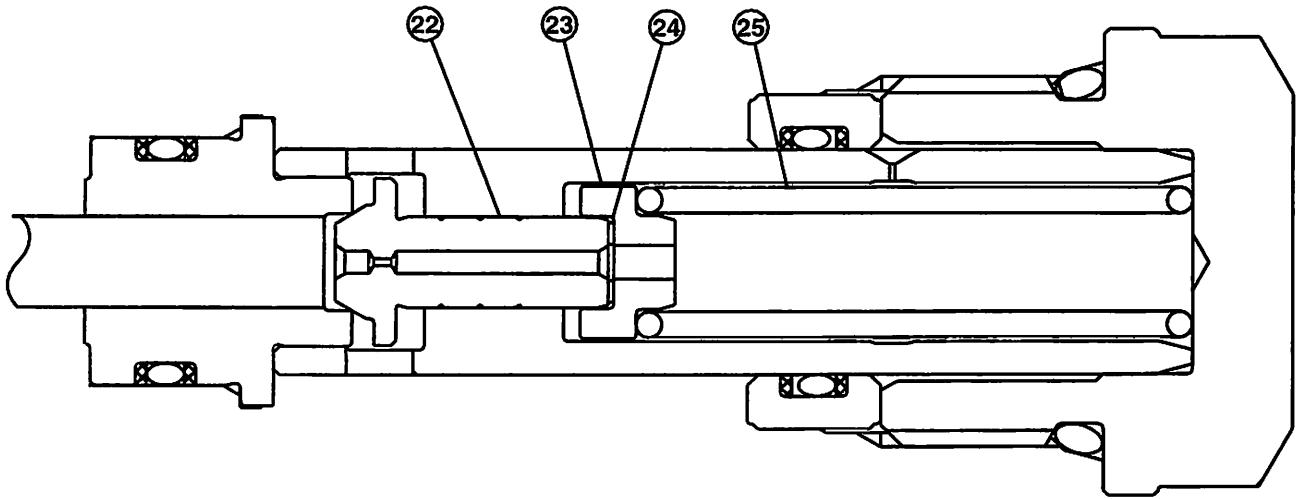


Travel Motor Crossover Relief Valve Locations

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TW62213,00010EF -19-11JUL19-3/8

TX1089491A—UN—16MAR11



TX1000689 —UN—29NOV05

TX1000689

Travel Motor Crossover Relief Valve Shims

22— Poppet
23— Spring Seat

24— Shim (as needed)

25— Spring

13. Remove crossover relief valve. Add or remove shims (24) to adjust pressure.

Specification

Crossover Relief Valve Shim—Pressure Change (approximate per 0.5 mm [0.02 in]).....0.9 MPa
9 bar
131 psi

14. Install crossover relief valve. Tighten to specification.

Specification

Crossover Relief Valve—Torque.....310 N·m
229 lb·ft

15. Actuate the travel function at stall to check adjustment.

16. Turn the second adjusting plug of the main relief and power boost valve out to its original setting. Check main pressure setting. For adjustment procedure, see Main Relief and Power Boost Valve Test and Adjustment. (Group 9025-25.)

3156G Machines (S.N. 316200—) and 3156GLC Machines

SPECIFICATIONS	
Hydraulic Oil Temperature	45—55°C 113—131°F
Engine Speed (approximate)	1300 rpm
Work Mode Switch Position	Bucket Mode
Work Mode Switch Position (processor only)	Thumb Mode
Power Mode Button Position	PWR (power) Mode
Auto-Idle Switch Position	OFF
Travel Motor Crossover Relief Valve Pressure (approximate)	36.8 MPa 368 bar 5336 psi
Travel Motor Crossover Relief Valve Pressure Change (approximate per 1/4 turn)	1.96 MPa 19.6 bar 284 psi
Nut (19 mm) Torque (approximate)	38 N·m 28 lb·ft

SERVICE EQUIPMENT AND TOOLS
Adapter (1/4 M BSPP ORB x 7/16-20 M 37°)
Gauge 70 000 kPa (700 bar) (10 000 psi)
JT02156A Digital Pressure/Temperature Analyzer
JT02160 Transducer 70 000 kPa (700 bar) (10 000 psi)
Pin (76.2 mm [3 in] outside diameter) or Round Bar Stock

Continued on next page

TW62213.00010EF -19-11JUL19-4/8

This procedure is to verify that the travel motor crossover relief valve pressure is within specification.

1. Connect one of the following test equipment to monitor pump 1 and 2 delivery pressure, hydraulic oil temperature, and actual engine speed.
 - Monitor application. For instructions to actuate the service menu on monitor in cab, [see Service Menu](#). (Group 9015-16.)
Select the following items from monitoring list:
 - Pump 1 Delivery Pressure
 - Pump 2 Delivery Pressure
 - Hydraulic Oil Temperature
 - Actual Engine Speed
 - Service ADVISOR™ application. For instructions, [see Service ADVISOR™ Connection Procedure](#). (Group 9015-20.)

Select the following items from the menu:

- Pump 1 Delivery Pressure
- Pump 2 Delivery Pressure
- Hydraulic Oil Temperature
- Actual Engine Speed

- MPDr application. For instructions, [see MPDr Application](#). (Group 9015-20.)

Select the following items from the monitor display:

- Pump 1 Delivery Pressure
- Pump 2 Delivery Pressure
- Hydraulic Oil Temperature
- Actual Engine Speed

2. Verify work mode configuration. [See Work Mode Setup Procedure](#). (Group 9015-20.)
3. Release hydraulic oil tank pressure. [See Hydraulic Oil Tank Pressure Release Procedure](#). (Group 9025-25.)

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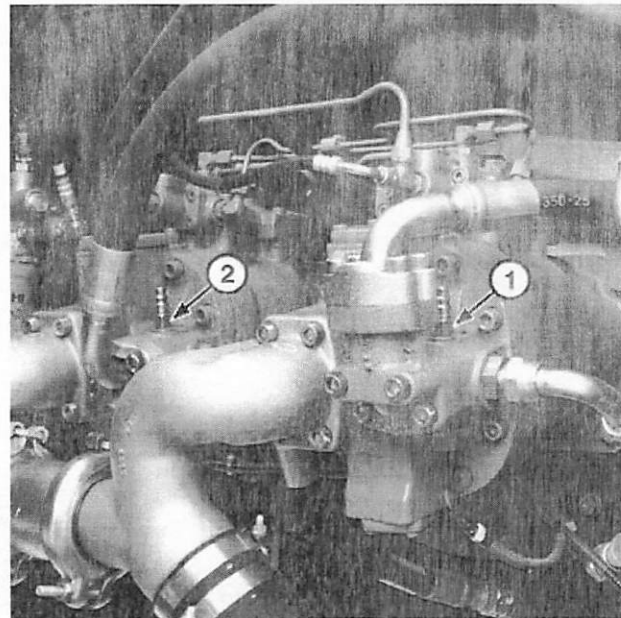
4. Remove plug from pump 1 test port (1) and pump 2 test port (2).
5. Install adapter.
6. Connect JT02156A Digital Pressure/Temperature Analyzer and JT02160 Transducer or 70 000 kPa (700 bar) (10 000 psi) gauge to adapter.
7. Turn the second adjusting plug of the main relief and power boost valve in 1/2 turn to increase pressure setting. For adjustment procedure, [see Main Relief and Power Boost Valve Test and Adjustment](#). (Group 9025-25.)
8. Warm hydraulic oil to specification. [See Hydraulic Oil Warm-Up Procedure](#). (Group 9025-25.)

Specification

Hydraulic	
Oil—Temperature.....	45—55°C
	113—131°F

1— Pump 1 Test Port

2— Pump 2 Test Port



Pump 1 and 2 Test Ports

TX1253640A—UN—12MAR18

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TW62213,00010EF -19-11JUL19-6/8

12. If adjustment is necessary, loosen nut (6) and turn the adjusting screw (7) on the reverse or forward crossover relief valve (4 or 5) to change pressure to specification.

Specification

Travel Motor Crossover Relief Valve—Pressure Change (approximate per 1/4 turn).....	1.96 MPa 19.6 bar 284 psi
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13. Tighten nut to specification.

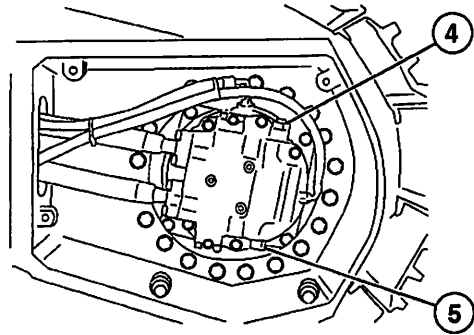
Specification

Nut (19 mm)—Torque (approximate).....	.38 N-m 28 lb-ft
---------------------------------------	---------------------

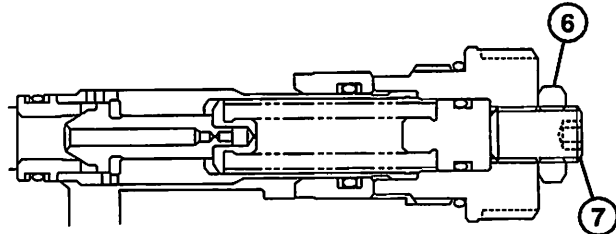
14. Actuate the travel function at stall to check adjustment.

15. Adjust the main relief and power boost valve back to original position by turning the second adjusting plug of the main relief and power boost valve back out 1/2 turn to decrease pressure setting. See Main Relief and Power Boost Valve Test and Adjustment. (Group 9025-25.)

- | | |
|-----------------------------------|--------------------|
| 4— Reverse Crossover Relief Valve | 6— Nut |
| 5— Forward Crossover Relief Valve | 7— Adjusting Screw |



Travel Motor Crossover Relief Valves



Travel Motor Crossover Relief Valve

TX1090467 —JUN—07APR11

TX1190393 —JUN—16APR15

TW62213,00010EF -19-11JUL19-8/8

Tigercat Model 875													
SERVICE AND LUBRICATION POINTS													
REFER TO Tigercat OPERATOR'S MANUAL FOR FURTHER INFORMATION													
ITEM NO.	DESCRIPTION	SERVICE EVERY						CAPACITY			REMARKS/LUBRICANT		
		88	125	250	500	1000	1500	2000	LITRE	USG		QTY	
1	COOLING SYSTEM	CHK	CHANGE COOLANT EVERY 2 YEARS						30	8		50% ANTIFREEZE ** 40% DISTILLED WATER	
2	ENGINE OIL/FILTER	CHK	REP									* SEE ENGINE MANUFACTURER'S OPERATION AND MAINTENANCE MANUAL FOR PROCEDURES AND CAPACITIES	
3	CRANKCASE VENTILATION FILTER					REP					1		
4	FUEL FILTER, ENGINE				REP						1		
5	FUEL/WATER SEPARATOR	DRN			REP						1		
6	DEF SUPPLY MODULE FILTER - T4F ONLY	CHANGE FILTER EVERY 2 YEARS										1	REFER TO SECTION 3 OF THIS MANUAL FOR DETAILS.
7	FUEL FILL STRAINER		CHK										CLEAN AS NECESSARY.
8	IN-TANK FUEL STRAINER					CHK							CLEAN OR REPLACE AS NECESSARY.
9	AIR INTAKE PRECLEANER	CHK						CHK			1		CLEAN AS REQUIRED AND CHECK FOR LOOSE CLAMPS. SEE SECTION 3 OF MANUAL FOR DETAILS ON 2000 HOUR CHECK.
10	AIR INTAKE PRIMARY ELEMENT	CHK									1		CHECK FILTER RESTRICTION INDICATOR. REFER TO 8 HOUR SCHEDULED MAINTENANCE IN SECTION 3 OF MANUAL FOR DETAILS.
11	AIR INTAKE SAFETY ELEMENT	CHK									1		CHECK FILTER RESTRICTION INDICATOR. REFER TO 8 HOUR SCHEDULED MAINTENANCE IN SECTION 3 OF MANUAL FOR DETAILS.
12	AIR CLEANER UNLOADER VALVE	CHK				REP					1		REFER TO SECTION 3 IN MANUAL.
13	AIR INTAKE AREA IN DOOR	CHK											CLEAN AS REQUIRED.
14	AIR INTAKE CONNECTIONS	CHK						REP					CHECK FOR LOOSE CLAMPS AND DAMAGED RUBBER COMPONENTS. REPLACE DAMAGED COMPONENTS IMMEDIATELY. REPLACE ALL RUBBER COMPONENTS EVERY 2000 HOURS.
15	HYDRAULIC TANK	CHK						D/R	265	70	1		DRAIN AND REFILL AT SEASONAL OIL CHANGE. SEE APPROVED HYDRAULIC OILS. REGULAR USE OF AN OIL ANALYSIS PROGRAM IS RECOMMENDED.
16	HYDRAULIC OIL RETURN FILTERS, 1 BLUE WATER ABSORBING ELEMENT 5 WHITE HIGH PERFORMANCE ELEMENTS		CHK		REP						6		CHECK RESTRICTION INDICATOR ON COMPUTER DISPLAY IN CAB WITH ENGINE RUNNING AT FULL RPM AND WITH FLOW. SEE SECTION 3 OF MANUAL FOR DETAILS.
17	HYDRAULIC TANK BREATHER							REP			1		
18	SWING CHARGE FILTER				REP						1		
19	PILOT FILTER				REP						1		
20	TRACK DRIVE GEARBOX		CHK	D/R					6	1.5	2		FILL WITH API GL-5, 75W-90, SYNTHETIC GEAR OIL IS RECOMMENDED FOR SEVERE DUTY APPLICATIONS. †† CHECK OIL WITH LEVEL PLUGS AT 6 AND 9 O'CLOCK POSITIONS.
21	TRACK ROLLERS AND IDLERS CHECK FOR LUBRICANT LEAKAGE				CHK				7.6	2	1		IF LEAKING REMOVE AND REPAIR FILL WITH SAE 75W-90 HT OR 80W-140 HT OIL. REFER TO 500 HOUR SCHEDULED MAINTENANCE IN SECTION 3 OF MANUAL FOR DETAILS.
22	SWING BEARING	LUB							5 SHOTS		4		GREASE EVERY 24 HOURS LITHIUM BASE EP2 GREASE ♦
23	SWING PINION	LUB							15 SHOTS		1		GREASE WHILE SWINGING LITHIUM BASE EP2 GREASE ♦
24	SWING GEARBOX LOWER BEARING			LUB					5 SHOTS EACH FITTING		4		LITHIUM BASE EP2 GREASE ♦ *REFER TO 250 HOUR SCHEDULED MAINTENANCE IN SECTION 3 OF MANUAL FOR DETAILS.
25	ROTARY MANIFOLD TOP SEAL			LUB					2 SHOTS		1		LITHIUM BASE EP2 GREASE ♦ *REFER TO 250 HOUR SCHEDULED MAINTENANCE IN SECTION 3 OF MANUAL FOR DETAILS.
26	SWING GEARBOX UPPER GEARING	CHK		D/R					35	9.25	2		FILL WITH API GL-5, 75W-90 OR 80W-140 GEAR OIL TO MAINTAIN HALF FULL LEVEL IN BOTTLE WHEN OIL IS HOT.
27	BOOM JOINTS, HOIST, STICK AND TILT	LUB							PURGE		6		LITHIUM BASE EP2 GREASE ♦
28	CYLINDERS; HOIST, STICK & TILT	LUB							PURGE		8		LITHIUM BASE EP2 GREASE ♦
29	CAB TILT, DOOR AND ROOF HINGES				LUB				1 SHOT		18		LITHIUM BASE EP2 GREASE ♦
30	CAB TILT, CYLINDER PINS				LUB				1 SHOT		2		LITHIUM BASE EP2 GREASE ♦
31	ROOF AND DOOR CYLINDER PINS				LUB				LUB		6		APPLY OIL LIBERALLY.
32	ATTACHMENT								SEE MANUFACTURER'S MAINTENANCE SCHEDULE.				

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