544K 4WD Loader Operation and Test

(PIN: 1DW544KZ_ _E642665—)

OPERATION & TEST TECHNICAL MANUAL

544K 4WD Loader (PIN: 1DW544KZ_ _E642665—)

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Prevent Battery Explosions

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).

TS204 —UN—15APR13

DX,SPARKS -19-03MAR93-1/1

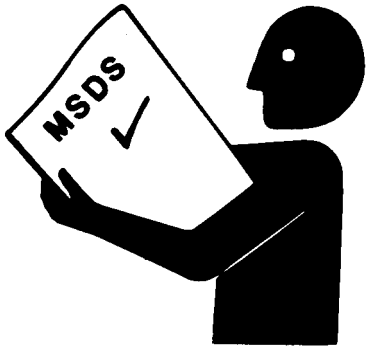
Handle Chemical Products Safely

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

(See your John Deere dealer for MSDS's on chemical products used with John Deere equipment.)



TS1132 —UN—15APR13

DX,MSDS,NA -19-03MAR93-1/1

Section 9001
Diagnostics

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3 Short Circuit Check	Ignition OFF. Disconnect circuits E02 WHT and R93 BLK from start relay (K3). See Load Center Harness (W3) Component Location. (Group 9015-10.) Disconnect engine control unit (ECU) connector (X73). See Engine Interface Harness (W9) Component Location. (Group 9015-10.) Check circuits E02 WHT and R93 BLK for ground on pins 26 and 30 of ECU connector (X73). Is ground present?	**YES:** Circuit is grounded. Repair or replace harness. See Load Center Harness (W3) Wiring Diagram or see Engine Interface Harness (W9) Wiring Diagram. (Group 9015-10.) **NO:** Go to Harness Check.

BE7856,0000F91 -19-12JAN12-5/6

4 Harness Check	Ignition OFF. Disconnect circuits E02 WHT and R93 BLK from start relay (K3). See Load Center Harness (W3) Component Location. (Group 9015-10.) Disconnect engine control unit (ECU) connector (X71, X72, and X73). See Engine Interface Harness (W9) Component Location. (Group 9015-10.) Check for continuity between pin 26 (circuit R93 BLK) and ECU connectors (X71, X72, and X73). Check for continuity between pin 30 (circuit E02 WHT) and ECU connectors (X71, X72, and X73). Is continuity indicated?	**YES:** Repair circuit with continuity or replace harness. See Load Center Harness (W3) Wiring Diagram and see Engine Interface Harness (W9) Wiring Diagram. (Group 9015-10.) **NO:** Program Controller.

BE7856,0000F91 -19-12JAN12-6/6

001321.09 — Starter Signal Invalid

Start relay (K3) circuit receiving an invalid start signal from engine control unit (ECU).

BE7856,0000F92 -19-12JAN12-1/6

Starter Signal Invalid Diagnostic Procedure

Alarm Level:

No Warning Lamp

BE7856,0000F92 -19-12JAN12-2/6

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Start Relay Check.

Continued on next page

BE7856,0000F92 -19-12JAN12-3/6

❸ **Controller Sensors Check**	Ignition ON. View ECU monitored sensor outputs by accessing the DIAGNOSTICS/ENGINE SENSORS submenu on the advanced display unit (ADU). See Display Unit—Main Menu—Diagnostics—Engine Sensors. (Operator's Manual.) Are all values for the engine sensors displayed?	**YES:** Go to Program Engine Control Unit. **NO:** Go to CAN Circuit Check.

BE7856,00019C1 -19-16JAN12-5/7

❹ **CAN Circuit Check**	Perform CAN circuit test. See CAN Circuit Test. (Group 9015-20.) Does CAN circuit test good?	**YES:** Go to Program Engine Control Unit. **NO:** Repair CAN circuit.

BE7856,00019C1 -19-16JAN12-6/7

❺ **Program Engine Control Unit**	Program ECU. Check for active transmission control unit (TCU) codes. Is code 000513.09 present?	**YES:** Replace controller. **NO:** Checks complete.

BE7856,00019C1 -19-16JAN12-7/7

000514.02 — Friction Invalid

Controller area network (CAN) message EEC3 is invalid.

BE7856,00019C2 -19-16JAN12-1/7

Friction Invalid Diagnostic Procedure

Alarm Level:

No Warning Lamp

BE7856,00019C2 -19-16JAN12-2/7

❶ **Intermittent Check**	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Code Check.

BE7856,00019C2 -19-16JAN12-3/7

❷ **Code Check**	Ignition ON. Check for engine control unit (ECU) codes. See Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application. (Group 9015-20.) Are any ECU codes present?	**YES:** Diagnose other codes. See 6.8L OEM Diesel Engines Below 130kW—Interim Tier 4/Stage III B Platform. (CTM104619.) **NO:** Go to Controller Sensors Check.

Continued on next page

BE7856,00019C2 -19-16JAN12-4/7

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Controller Sensors Check.

BE7856,00019CD -19-11JAN12-3/10

2 Controller Sensors Check	Ignition ON.	
	View VCU monitored outputs by accessing the DIAGNOSTICS/HYDRAULIC SENSORS submenu on the advanced display unit (ADU). See Display Unit—Main Menu—Diagnostics—Hydraulic Sensors. (Operator's Manual.)	**YES:** Replace TCU.
	Does the monitor show a reading for all sensors?	**NO:** Go to Fuse Check.

BE7856,00019CD -19-11JAN12-4/10

3 Fuse Check	Ignition OFF.	
	Remove fuses (F15, F20, and F21). See Fuse and Relay Specifications. (Group 9015-10.)	
	Check continuity of fuses (F15, F20, and F21).	**YES:** Go to Ignition Relay Check.
	Is continuity indicated?	**NO:** Replace fuse(s).

BE7856,00019CD -19-11JAN12-5/10

4 Ignition Relay Check	Ignition OFF.	
	Disconnect ignition relay (K4). See Load Center Harness (W3) Component Location. (Group 9015-10.)	
	Apply 24 volts and ground to coil of ignition relay (K4).	
	Check for continuity between remaining pins on ignition relay (K4).	**YES:** Go to Power Circuit Check.
	Is continuity indicated?	**NO:** Replace ignition relay (K4).

Continued on next page

BE7856,00019CD -19-11JAN12-6/10

Transmission Control Unit (TCU) Valve Power Supply 1 Short Circuit Diagnostic Procedure

Alarm Level:

No Warning Lamp

BE7856,00019D9 -19-11JAN12-2/5

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Component Check.

BE7856,00019D9 -19-11JAN12-3/5

2 Component Check	Perform Transmission Control Valve Solenoid Check. (Group 9015-20.)	**YES:** Go to Harness Check.
	Are all solenoids within specification?	**NO:** Replace solenoid with resistance not within specification. See Transmission Hydraulic Control Valve Remove and Install. (Group 0360.)

BE7856,00019D9 -19-11JAN12-4/5

3 Harness Check	Turn battery disconnect OFF.	
	Disconnect transmission harness-to-transmission control valve harness connector (X36). See Transmission Harness (W10) Component Location. (Group 9015-10.)	
	Disconnect TCU connector (X23). See Load Center Harness (W3) Component Location. (Group 9015-10.)	
	Check for continuity between pins 12 and 13 (circuit P78 RED) and all other pins on TCU connector (X23).	**YES:** Circuit P78 RED is short to circuit with continuity indicated. Repair circuit. See Load Center Harness (W3) Wiring Diagram and see Transmission Harness (W10) Wiring Diagram. (Group 9015-10.)
	Is continuity indicated?	**NO:** Checks complete.

BE7856,00019D9 -19-11JAN12-5/5

522373.03 — Power Supply High Voltage

Transmission control unit (TCU) supply voltage is above 32.5 volts.

BE7856,00019DA -19-11JAN12-1/5

Power Supply High Voltage Diagnostic Procedure

Alarm Level:

No Warning Lamp

Continued on next page

BE7856,00019DA -19-11JAN12-2/5

4 Harness Check	Turn battery disconnect OFF. Disconnect wires from backup alarm (H3). See Rear Frame Harness (W13) Component Location. (Group 9015-10.) Disconnect transmission control unit (TCU) connector (X23). See Load Center Harness (W3) Component Location. (Group 9015-10.) Check for continuity between pin 7 (circuit M28 PUR) and all other pins on TCU connector (X23). Is continuity indicated?	**YES:** Circuit M28 PUR is short to circuit with continuity indicated. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram, see Engine Frame Harness (W5) Wiring Diagram, and see Rear Frame Harness (W13) Wiring Diagram. (Group 9015-10.) **NO:** Checks complete.

BE7856,00019E4 -19-11JAN12-6/6

522383.02 — Transmission Clutch KR Slippage

Transmission control unit (TCU) detects that reverse clutch KR is slipping.

BE7856,00019E5 -19-11JAN12-1/9

Transmission Clutch KR Slippage Diagnostic Procedure

Alarm Level:

Caution Indicator Light

BE7856,00019E5 -19-11JAN12-2/9

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Code Check.

BE7856,00019E5 -19-11JAN12-3/9

2 Code Check	Check for active DTCs. See Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application. (Group 9015-20.) Are TCU codes 522383.03, 522383.04 or 522383.05 present?	**YES:** Correct problem causing active TCU code(s). **NO:** Go to Power Train System Pressure Check.

BE7856,00019E5 -19-11JAN12-4/9

3 Power Train System Pressure Check	Check transmission system pressure. See Transmission System Pressure Test. (Group 9020-25.) Is pressure within specification?	**YES:** Go to Clutch Pressure Check. **NO:** See Transmission Clutch Slippage. (Group 9020-15.)

Continued on next page

BE7856,00019E5 -19-11JAN12-5/9

522389.02 — Transmission Clutch K4 Slippage

Transmission control unit (TCU) detects that clutch K4 is slipping.

BE7856,00019ED -19-11JAN12-1/9

Transmission Clutch K4 Slippage Diagnostic Procedure

Alarm Level:

Caution Indicator Light

BE7856,00019ED -19-11JAN12-2/9

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically "go away"?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Code Check.

BE7856,00019ED -19-11JAN12-3/9

2 Code Check	Check for active DTCs. See Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application. (Group 9015-20.) Are TCU codes 522389.03, 522389.04, or 522389.05 present?	**YES:** Correct problem causing other active TCU code(s). **NO:** Go to Power Train System Pressure Check.

BE7856,00019ED -19-11JAN12-4/9

3 Power Train System Pressure Check	Check transmission system pressure. See Transmission System Pressure Test. (Group 9020-25.) Is pressure within specification?	**YES:** Go to Clutch Pressure Check. **NO:** Transmission system malfunction. See Transmission Clutch Slippage. (Group 9020-15.)

BE7856,00019ED -19-11JAN12-5/9

4 Clutch Pressure Check	Check pressure of clutch K4. See Transmission Clutch Pressure Test. (Group 9020-25.) Is clutch pressure within specification?	**YES:** Go to Control Valve Solenoid Check. **NO:** Repair transmission.

Continued on next page

BE7856,00019ED -19-11JAN12-6/9

4	**Clutch Pressure Check**	Check pressure of clutch K2. See Transmission Clutch Pressure Test. (Group 9020-25.) Is clutch pressure within specification?	**YES:** Go to Control Valve Solenoid Check. **NO:** Repair transmission.

BE7856,00019F5 -19-11JAN12-6/9

5	**Control Valve Solenoid Check**	Ignition OFF. Remove transmission harness-to-transmission control valve harness connector (X36). See Transmission Harness (W10) Component Location. (Group 9015-10.) Check resistance between pins 6 and 7 on transmission control valve harness side of connector (X36). See Transmission Control Valve Solenoid Check. (Group 9015-20.) Is resistance within specification?	 **YES:** Go to Clutch Internal Speed Sensor Check. **NO:** Transmission control solenoid 6 (Y6) malfunction. Replace solenoid. See Transmission Hydraulic Control Valve Disassemble and Assemble. (Group 0360.)

BE7856,00019F5 -19-11JAN12-7/9

6	**Clutch Internal Speed Sensor Check**	Ignition OFF. Disconnect internal clutch speed sensor (B30). See Transmission Harness (W10) Component Location. (Group 9015-10.) Verify clutch internal speed sensor (B30) is installed with correct gap and torque. See Transmission Speed Sensors Remove and Install. (Group 350.) Measure resistance between pins A and B on internal clutch speed sensor (B30). Compare resistance to specification. See Electrical Component Specifications. (Group 9015-20.) Is resistance within specification?	 **YES:** Go to Transmission Output Shaft Speed Sensor Check. **NO:** Internal clutch speed sensor (B30) malfunction. Replace sensor.

BE7856,00019F5 -19-11JAN12-8/9

7	**Transmission Output Shaft Speed Sensor Check**	Ignition OFF. Disconnect transmission output shaft speed sensor (B31). See Transmission Harness (W10) Component Location. (Group 9015-10.) Verify transmission output shaft speed sensor (B31) is installed with correct gap and torque. See Transmission Speed Sensors Remove and Install. (Group 350.) Connect transmission output shaft speed sensor (B31). Start machine and operate under load. Check for active codes. Is TCU code 522395.02 present?	 **YES:** Transmission output shaft speed sensor (B31) malfunction. Replace sensor. **NO:** Checks complete.

BE7856,00019F5 -19-11JAN12-9/9

3 Fuse Check	Ignition OFF.	
	Remove fuse (F40). See Fuse and Relay Specifications. (Group 9015-10.)	
	Check fuse (F40) for continuity.	**YES:** Go to Open Circuit Check.
	Is continuity indicated?	**NO:** Replace fuse (F40).

BE7856,00019FE -19-11JAN12-5/8

4 Open Circuit Check	Turn battery disconnect OFF.	
	Disconnect transmission output shaft speed sensor (B31) connector. See Transmission Harness (W10) Component Location. (Group 9015-10.)	
	Disconnect transmission control unit (TCU) connector (X23). See Load Center Harness (W3) Component Location. (Group 9015-10.)	
	Remove transmission output speed sensor 5 A fuse (F40).	
	Check circuit R40 BLK for continuity between pin A on transmission output shaft speed sensor (B31) connector and pin 4 on TCU connector (X23).	
	Check circuit M10 PUR for continuity between pin B on transmission output shaft speed sensor (B31) connector and pin 62 on TCU connector (X23).	
	Check circuit P40 RED for continuity between pin C on transmission output shaft speed sensor (B31) connector and fuse (F40) socket.	**YES:** Go to Harness Check.
	Is continuity indicated in all circuits?	**NO:** Repair circuit(s) without continuity indicated or replace harness. See Load Center Harness (W3) Wiring Diagram and see Transmission Harness (W10) Wiring Diagram. (Group 9015-10.)

Continued on next page

BE7856,00019FE -19-11JAN12-6/8

2 Open Circuit Check	Ignition OFF. Disconnect torque converter input speed sensor (B28) connector. See Transmission Harness (W10) Component Location. (Group 9015-10.) Disconnect transmission control unit (TCU) connector (X23). See Load Center Harness (W3) Component Location. (Group 9015-10.) Check circuit M07 PUR for continuity between pin A on torque converter input speed sensor (B28) connector and pin 19 on TCU connector (X23). Check circuit R09 BLK for continuity between pin B on torque converter input speed sensor (B28) connector and pin 3 on TCU connector (X23). Is continuity indicated in both circuits?	**YES:** Go to Short Circuit Check. **NO:** Repair circuit(s) without continuity indicated or replace harness. See Load Center Harness (W3) Wiring Diagram and see Transmission Harness (W10) Wiring Diagram. (Group 9015-10.)

BE7856,0001A08 -19-11JAN12-4/6

3 Short Circuit Check	Ignition OFF. Disconnect torque converter input speed sensor (B28) connector. See Transmission Harness (W10) Component Location. (Group 9015-10.) Ignition ON. Check circuit M07 PUR for voltage between pin A on torque converter input speed sensor (B28) connector and machine ground. Is system voltage (approximately 24 volts) present?	**YES:** Circuit M07 PUR is short to power. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Transmission Harness (W10) Wiring Diagram. (Group 9015-10.) **NO:** Go to Harness Check.

BE7856,0001A08 -19-11JAN12-5/6

4 Harness Check	Turn battery disconnect OFF. Disconnect torque converter input speed sensor (B28) connector. See Transmission Harness (W10) Component Location. (Group 9015-10.) Disconnect transmission control unit (TCU) connector (X23). See Load Center Harness (W3) Component Location. (Group 9015-10.) Check for continuity between pin 19 (circuit M07 PUR) on TCU connector (X23) and all other pins on TCU connector (X23). Is continuity indicated?	**YES:** Circuit M07 PUR is short to circuit with continuity indicated. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Transmission Harness (W10) Wiring Diagram. (Group 9015-10.) **NO:** Checks complete.

BE7856,0001A08 -19-11JAN12-6/6

2nd FNR (Pilot Control Joystick FNR) Multiple Inputs Diagnostic Procedure

BE7856,0001A10 -19-11JAN12-2/10

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Component Check.

BE7856,0001A10 -19-11JAN12-3/10

2 Component Check

Ignition OFF.

Disconnect joystick loader FNR switch and gear select switches connector (X27). See Load Center Harness (W3) Component Location. (Group 9015-10.)

Check right joystick forward, neutral, reverse (FNR) shifter switch (S9) for continuity at joystick loader FNR switch and gear select switches connector (X27) as indicated by the following table:

Check continuity of switch in all positions.

Right Joystick Forward, Neutral, Reverse (FNR) Shifter Switch (S9) Continuity Table

Switch Position	Continuity Between Pins on Joystick Loader FNR Switch and Gear Select Switches Connector (X27)
Forward (up)	4 and 5
Neutral (middle)	2 and 5
Reverse (down)	2 and 3

Is continuity indicated between specified pins in the three switch positions?

YES: Go to Short Circuit Check—Short to Power.

NO: Right joystick FNR shifter switch (S9) malfunction. Replace switch.

Continued on next page

BE7856,0001A10 -19-11JAN12-4/10

Manual Downshift Disabled Diagnostic Procedure

BE7856,0001A15 -19-11JAN12-2/5

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Code Check.

BE7856,0001A15 -19-11JAN12-3/5

2 Code Check	Ignition ON. Check for active vehicle control unit (VCU) codes. See Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application. (Group 9015-20.) Are any VCU codes present?	 **YES:** Correct problem causing VCU codes. **NO:** Go to CAN Circuit Check.

BE7856,0001A15 -19-11JAN12-4/5

3 CAN Circuit Check	Perform CAN circuit test. See CAN Circuit Test. (Group 9015-20.) Does CAN circuit test good?	**YES:** Replace transmission control unit (TCU). **NO:** Repair CAN circuit.

BE7856,0001A15 -19-11JAN12-5/5

522421.02 — Automatic to 1st Disabled

Controller area network (CAN) signal for automatic downshift is not communicating correctly.

BE7856,0001A16 -19-11JAN12-1/5

Automatic to 1st Disabled Diagnostic Procedure

BE7856,0001A16 -19-11JAN12-2/5

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Code Check.

BE7856,0001A16 -19-11JAN12-3/5

2 Code Check	Ignition ON. Check for active vehicle control unit (VCU) codes.See Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application. (Group 9015-20.) Are any VCU codes present?	 **YES:** Correct problem causing VCU codes. **NO:** Go to CAN Circuit Check.

Continued on next page

BE7856,0001A16 -19-11JAN12-4/5

4 Harness Check	Turn battery disconnect OFF.	
	Disconnect 12 V center tap 1-pin connector (X68). See Engine Frame Harness (W5) Component Location. (Group 9015-10.)	
	Disconnect VCU connector (J3) (X42). See Load Center Harness (W3) Component Location. (Group 9015-10.)	
	Check for continuity between pin 39 (circuit B05 RED) on VCU connector (J3) (X42) and all other pins on VCU connector (J3) (X42).	**YES:** Circuit B05 RED is short to circuit with continuity indicated. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Engine Frame Harness (W5) Wiring Diagram. (Group 9015-10.)
	Is continuity indicated?	**NO:** Program controller.

BE7856,000158A -19-10JAN12-6/6

000444.18 — Battery Voltage Imbalance

Battery No. 2 voltage is low.

BE7856,000158B -19-10JAN12-1/5

Battery Voltage Imbalance Diagnostic Procedure

Alarm Level:

No Warning Lamp

BE7856,000158B -19-10JAN12-2/5

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Battery Check.

BE7856,000158B -19-10JAN12-3/5

2 Battery Check	Ignition OFF.	
	Check batteries for voltage separately. See Handling, Checking, and Servicing Batteries Carefully. (Operator's Manual.)	**YES:** Go to Voltage Check.
	Do batteries test good?	**NO:** Charge batteries individually or replace batteries.

Continued on next page

BE7856,000158B -19-10JAN12-4/5

5 Short Circuit Check	Ignition OFF. Disconnect pilot enable solenoid (Y14). See Engine Frame Harness (W5) Component Location. (Group 9015-10.) Ignition ON. Pilot enable switch OFF. Check circuit H24 GRN for voltage between pin B on pilot enable solenoid (Y14) connector and machine ground. Is voltage present?	**YES:** Circuit H24 GRN is short to power. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Engine Frame Harness (W5) Wiring Diagram. (Group 9015-10.) **NO:** Go to Harness Check.

BE7856,0001597 -19-10JAN12-7/8

6 Harness Check	Turn battery disconnect OFF. Disconnect pilot enable solenoid (Y14) and boom down accumulator solenoid (Y15). See Engine Frame Harness (W5) Component Location. (Group 9015-10.) Disconnect vehicle control unit (VCU) connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43). See Load Center Harness (W3) Component Location. (Group 9015-10.) Check for continuity between pin D4 (circuit H24 GRN) on VCU connector (J1) (X40) and all other pins on VCU connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43). Is continuity indicated?	**YES:** Circuit H24 GRN is short to circuit with continuity indicated. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Engine Frame Harness (W5) Wiring Diagram. (Group 9015-10.) **NO:** Program controller.

BE7856,0001597 -19-10JAN12-8/8

000785.06 — Pilot Solenoid High Current

Pilot enable solenoid (Y14) and boom down accumulator solenoid (Y15) circuit current is high.

BE7856,0001598 -19-10JAN12-1/7

Pilot Solenoid High Current Diagnostic Procedure

Alarm Level:

No Warning Lamp

BE7856,0001598 -19-10JAN12-2/7

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Component Check—Pilot Enable Solenoid.

Continued on next page

BE7856,0001598 -19-10JAN12-3/7

3 Open Circuit Check	Ignition OFF.	
	Disconnect proportional fan solenoid (Y37) connector. See Rear Frame Harness (W13) Component Location. (Group 9015-10.)	
	Disconnect vehicle control unit (VCU) connector (J1) (X40). See Load Center Harness (W3) Component Location. (Group 9015-10.)	
	Check circuit H35 GRN for continuity between pin A on proportional fan solenoid (Y37) connector and pin J1 on VCU connector (J1) (X40).	**YES:** Go to Short Circuit Check.
	Is continuity indicated?	**NO:** Circuit(s) without continuity indicated is open. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram, see Engine Frame Harness (W5) Wiring Diagram, and see Rear Frame Harness (W13) Wiring Diagram. (Group 9015-10.)

BE7856,00015A1 -19-10JAN12-5/7

4 Short Circuit Check	Ignition OFF.	
	Disconnect proportional fan solenoid (Y37) connector. See Rear Frame Harness (W13) Component Location. (Group 9015-10.)	
	Ignition ON.	
	Check circuit H35 GRN for voltage at pin A on proportional fan solenoid (Y37) connector.	**YES:** Circuit H35 GRN is short to power. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram, see Engine Frame Harness (W5) Wiring Diagram, and see Rear Frame Harness (W13) Wiring Diagram. (Group 9015-10.)
	Is system voltage (approximately 24 V) present?	**NO:** Go to Harness Check.

Continued on next page

BE7856,00015A1 -19-10JAN12-6/7

7 Short to Ground Check—Signal Circuits	Ignition OFF.	
	Disconnect joystick steering arm position switches 4-pin connector (X59). See Joystick Steering Harness (W22) Component Location—If Equipped. (Group 9015-10.)	
	Check circuit H10 GRN for ground at pin 2 on joystick steering harness side of joystick steering arm position switches 4-pin connector (X59).	
	Check circuit H11 GRN for ground at pin 3 on joystick steering harness side of joystick steering arm position switches 4-pin connector (X59).	**YES:** Circuit with ground present is short to ground. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Joystick Steering Harness (W22) Wiring Diagram—If Equipped. (Group 9015-10.)
	Is ground present on either circuit?	**NO:** Go to Harness Check.

BE7856,00015AA -19-17MAY17-9/10

8 Harness Check	Turn battery disconnect switch OFF.	
	Disconnect joystick steering arm position switches 4-pin connector (X59). See Joystick Steering Harness (W22) Component Location—If Equipped. (Group 9015-10.)	
	Disconnect VCU connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43). See Load Center Harness (W3) Component Location. (Group 9015-10.)	
	Check for continuity between pin 16 (circuit H10 GRN) on VCU connector (J3) (X42) and all other pins on VCU connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43).	
	Check for continuity between pin 27 (circuit H11 GRN) on VCU connector (X42) and all other pins on VCU connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43).	**YES:** Circuit with continuity indicated to another pin is short. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Joystick Steering Harness (W22) Wiring Diagram—If Equipped. (Group 9015-10.)
	Is continuity indicated between either circuit and any pin?	**NO:** Program controller.

BE7856,00015AA -19-17MAY17-10/10

001550.03 — Air Conditioner Clutch Short to Power

Air conditioner compressor clutch circuit is short to power.

BE7856,00015AB -19-10JAN12-1/4

Air Conditioner Clutch Short to Power Diagnostic Procedure

Continued on next page

BE7856,00015AB -19-10JAN12-2/4

001639.13 — Fan Speed Sensor Out of Calibration

For calibration procedure, see Advanced Display Unit (ADU)—Fan Speed. (Group 9015-16.)

Fan speed sensor (B76) out of calibration.

BE7856,00015B5 -19-02FEB12-1/1

001713.01 — Hydraulic Oil Filter Restricted

Hydraulic oil filter is restricted.

BE7856,00015B6 -19-23OCT13-1/6

Hydraulic Oil Filter Restricted Diagnostic Procedure

Alarm Level:

Filter Restriction Indicator

BE7856,00015B6 -19-23OCT13-2/6

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Component Check.

BE7856,00015B6 -19-23OCT13-3/6

2 Component Check	Remove hydraulic oil return filter. See Ride Control, Pin Disconnect, and Hydraulic Filter Circuit Component Location. (Group 9025-15.) Is filter clogged with excessive debris?	**YES:** Hydraulic oil filter is restricted. Replace filter. See Replace Hydraulic System Return Filter. (Operator's Manual.) **NO:** Go to Switch Check.

BE7856,00015B6 -19-23OCT13-4/6

3 Switch Check	Ignition OFF. Disconnect hydraulic oil filter restriction switch (B21) connector. See Engine Frame Harness (W5) Component Location. (Group 9015-10.) Check for continuity between pins 1 and 2 on hydraulic oil filter restriction switch (B21) connector. Is continuity indicated?	 **YES:** Go to Harness Check. **NO:** Hydraulic oil filter restriction switch (B21) is open. Replace switch.

Continued on next page

BE7856,00015B6 -19-23OCT13-5/6

5 Harness Check	Turn battery disconnect OFF.	
	Disconnect blackout drive light (E30). See Loader Frame Harness (W2) Component Location. (Group 9015-10.)	
	Disconnect blackout tail lights (E31 and E32). See Rear Frame Harness (W13) Component Location. (Group 9015-10.)	
	Disconnect vehicle control unit (VCU) connectors (X40, X41, X42, and X43). See Load Center Harness (W3) Component Location. (Group 9015-10.)	
	Check for continuity between pin 53 (circuit L24 BRN) on VCU connector (X42) and all other pins on connectors (X40, X41, X42, and X43). See Load Center Harness (W3) Wiring Diagram. (Group 9015-10.)	**YES:** Circuit L24 BRN is short to circuit with continuity indicated. Repair circuit or replace harness. See Loader Frame Harness (W2) Wiring Diagram, see Load Center Harness (W3) Wiring Diagram, see Engine Frame Harness (W5) Wiring Diagram, and see Rear Frame Harness (W13) Wiring Diagram. (Group 9015-10.)
	Is continuity indicated?	**NO:** Program VCU.

BE7856,00015BE -19-10JAN12-7/7

002000.09 — Controller Area Network (CAN) Communication Lost for Engine Control Unit (ECU)

CAN communication error; vehicle control unit (VCU) has lost communication with ECU.

BE7856,00015BF -19-10JAN12-1/10

Controller Area Network (CAN) Communication Lost for Engine Control Unit (ECU) Diagnostic Procedure

Alarm Level:

No Warning Lamp

BE7856,00015BF -19-10JAN12-2/10

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Controller Sensors Check.

BE7856,00015BF -19-10JAN12-3/10

2 Controller Sensors Check	View ECU monitored sensor outputs, by accessing the DIAGNOSTICS/ENGINE SENSORS submenu on the advanced display unit (ADU). See Display Unit—Main Menu—Diagnostics—Engine Sensors. (Operator's Manual.)	**YES:** Go to Program Controller.
	Are all engine sensor values displayed on ADU?	**NO:** Go to Fuse Check.

Continued on next page

BE7856,00015BF -19-10JAN12-4/10

8 Program Controller	Program VCU. Check for active VCU codes. Is code 002141.09 present?	 **YES:** Replace VCU. **NO:** Checks complete.

BE7856,00015C7 -19-10JAN12-10/10

002169.09 — Controller Area Network (CAN) Communication Lost for Ground Speed Radar (RDR)

CAN communication error; vehicle control unit (VCU) has lost communication with the RDR.

BE7856,00015C8 -19-19JUL17-1/8

Controller Area Network (CAN) Communication Lost for Ground Speed Radar (RDR) Diagnostic Procedure

BE7856,00015C8 -19-19JUL17-2/8

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Fuse Check.

BE7856,00015C8 -19-19JUL17-3/8

2 Fuse Check	Ignition OFF. Remove fuse (F41). See Fuse and Relay Specifications. (Group 9015-10.) Check fuse (F41) for continuity. Is continuity indicated?	 **YES:** Go to Voltage Check. **NO:** Replace fuse (F41).

BE7856,00015C8 -19-19JUL17-4/8

3 Voltage Check	Ignition OFF. Disconnect RDR connector (X100). See Engine Frame Harness (W5) Component Location. (Group 9015-10.) Ignition ON. Check circuit P41 RED for voltage at pin 1 on RDR connector (X100). Is system voltage (approximately 24 V) present?	 **YES:** Go to Ground Circuit Check. **NO:** Circuit P41 RED is open. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Engine Frame Harness (W5) Wiring Diagram. (Group 9015-10.)

Continued on next page

BE7856,00015C8 -19-19JUL17-5/8

3 Short Circuit Check	Ignition OFF. Disconnect left front work light (E24) and right front work light (E25) connector. See Cab Roof Harness (W19) Component Location. (Group 9015-10.) Ignition ON. Verify front work lights are off. Check circuit L28 BRN for voltage between pin 1 on left front work light (E24) connector and machine ground. Is voltage present?	**YES:** Circuit L28 BRN is short to power. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Cab Roof Harness (W19) Wiring Diagram. (Group 9015-10.) **NO:** Go to Harness Check.

BE7856,00015D0 -19-10JAN12-5/6

4 Harness Check	Turn battery disconnect OFF. Disconnect left front work light (E24) and right front work light (E25) connector. See Cab Roof Harness (W19) Component Location. (Group 9015-10.) Disconnect vehicle control unit (VCU) connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43). See Load Center Harness (W3) Component Location. (Group 9015-10.) Check for continuity between pin L3 (circuit L28 BRN) on VCU connector (J1) (X40) and all other pins on VCU connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43). Is continuity indicated?	**YES:** Circuit L28 BRN is short to circuit with continuity indicated. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Cab Roof Harness (W19) Wiring Diagram. (Group 9015-10.) **NO:** Program controller.

BE7856,00015D0 -19-10JAN12-6/6

002356.03 — Front Work Lights Short to Power

Left and right front work lights (E20 and E21) circuit is short to power.

BE7856,00015D1 -19-10JAN12-1/5

Front Work Lights Short to Power Diagnostic Procedure

BE7856,00015D1 -19-10JAN12-2/5

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Short Circuit Check.

Continued on next page

BE7856,00015D1 -19-10JAN12-3/5

4 Short Circuit Check	Ignition OFF. Disconnect and remove left rear work light (E22) and right rear work light (E23) connectors. See Cab Roof Harness (W19) Component Location. (Group 9015-10.) Ignition ON. Verify rear work lights are off. Check circuit L26 BRN for voltage between pin 1 on left rear work light (E22) connector and machine ground. Is voltage present?	 **YES:** Circuit L26 BRN is short to power. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Cab Roof Harness (W19) Wiring Diagram. (Group 9015-10.) **NO:** Go to Harness Check.

BE7856,00015DA -19-10JAN12-6/7

5 Harness Check	Turn battery disconnect OFF. Disconnect and remove left rear work light (E22) and right rear work light (E23) connectors. See Cab Roof Harness (W19) Component Location. (Group 9015-10.) Disconnect VCU connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43). See Load Center Harness (W3) Component Location. (Group 9015-10.) Check for continuity between pin 1 (circuit L26 BRN) on VCU connector (J3) (X42) and all other pins on VCU connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43). Is continuity indicated?	 **YES:** Circuit L26 BRN is short to circuit with continuity indicated. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Cab Roof Harness (W19) Wiring Diagram. (Group 9015-10.) **NO:** Program controller.

BE7856,00015DA -19-10JAN12-7/7

002362.06 — Rear Work Lights High Current

Left and right rear work lights (E22 and E23) is short to ground.

BE7856,00015DB -19-10JAN12-1/6

Rear Work Lights High Current Diagnostic Procedure

Alarm Level:

No Warning Lamp

BE7856,00015DB -19-10JAN12-2/6

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Component Check.

Continued on next page

BE7856,00015DB -19-10JAN12-3/6

4 Short Circuit Check	Ignition OFF. Disconnect and remove right front turn light (E4) and right rear turn light (E5) connectors. See Loader Frame Harness (W2) Component Location and see Rear Frame Harness (W13) Component Location. (Group 9015-10.) Ignition ON. Verify left turn lights are off. Check circuit L12 BRN for voltage between pin B on right front turn light (E4) connector and machine ground. Is voltage present?	**YES:** Circuit L12 BRN is short to power. Repair circuit or replace harness. See Loader Frame Harness (W2) Wiring Diagram, see Load Center Harness (W3) Wiring Diagram, see Engine Frame Harness (W5) Wiring Diagram, and see Rear Frame Harness (W13) Wiring Diagram. (Group 9015-10.) **NO:** Go to Harness Check.

BE7856,00015E3 -19-10JAN12-6/7

5 Harness Check	Turn battery disconnect OFF. Disconnect and remove right front turn light (E4) and right rear turn light (E5) connectors. See Loader Frame Harness (W2) Component Location and see Rear Frame Harness (W13) Component Location. (Group 9015-10.) Disconnect vehicle control unit (VCU) connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43). See Load Center Harness (W3) Component Location. (Group 9015-10.) Check for continuity between pin 42 (circuit L12 BRN) on VCU connector (J3) (X42) and all other pins on VCU connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43). Is continuity indicated?	**YES:** Circuit L12 BRN is short to circuit with continuity indicated. Repair circuit or replace harness. See Loader Frame Harness (W2) Wiring Diagram, see Load Center Harness (W3) Wiring Diagram, see Engine Frame Harness (W5) Wiring Diagram, and see Rear Frame Harness (W13) Wiring Diagram. (Group 9015-10.) **NO:** Program controller.

BE7856,00015E3 -19-10JAN12-7/7

002370.06 — Right Turn Lights High Current

Right front and right rear turn lights (E4 and E5) circuit is short to ground.

BE7856,00015E4 -19-10JAN12-1/6

Right Turn Lights High Current Diagnostic Procedure

Alarm Level:

No Warning Lamp

Continued on next page

BE7856,00015E4 -19-10JAN12-2/6

3 Harness Check	Turn battery disconnect OFF.	
	Disconnect pilot controller 8-pin connector (X29) and vehicle control unit (VCU) connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43). See Load Center Harness (W3) Component Location. (Group 9015-10.)	
	Check for continuity between pin 47 (circuit H34 GRN) on VCU connector (J2) (X41) and all other pins on VCU connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43).	**YES:** Circuit H34 GRN is short to circuit with continuity indicated. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram. (Group 9015-10.)
	Is continuity indicated?	**NO:** Program controller.

BE7856,00015EC -19-10JAN12-5/5

002680.05 — Return-to-Carry (RTC)/Float Detent Open or Short

RTC/float detent coil (Y48) circuit is open or short to power.

BE7856,00015ED -19-10JAN12-1/7

Return-to-Carry (RTC)/Float Detent Open or Short Diagnostic Procedure

BE7856,00015ED -19-10JAN12-2/7

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Component Check.

BE7856,00015ED -19-10JAN12-3/7

2 Component Check	Ignition OFF.	
	Disconnect pilot controller 8-pin connector (X29). See Load Center Harness (W3) Component Location. (Group 9015-10.)	
	Check resistance of RTC/float detent coil (Y48) between pins 2 and 7 on pilot controller 8-pin connector (X29).	
	Compare resistance to specification. See Electrical Component Specifications. (Group 9015-20.)	**YES:** Go to Open Circuit Check.
	Is resistance within specification?	**NO:** Replace RTC/float detent coil (Y48). See Pilot Control Valve Disassemble and Assemble. (Group 3160.)

Continued on next page

BE7856,00015ED -19-10JAN12-4/7

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Voltage Check.

BE7856,00015F7 -19-10JAN12-3/6

2 Voltage Check	Ignition OFF. Disconnect fan speed sensor (B76). See Rear Frame Harness (W13) Component Location. (Group 9015-10.) Ignition ON. Check circuit P68 RED for voltage between pin A on fan speed sensor (B76) connector and machine ground. Is voltage less than 4 V?	 **YES:** Go to Open Circuit Check. **NO:** Program Controller.

BE7856,00015F7 -19-10JAN12-4/6

3 Open Circuit Check	Ignition OFF. Disconnect fan speed sensor (B76) connector. See Rear Frame Harness (W13) Component Location. (Group 9015-10.) Disconnect VCU connector (J1) (X40). See Load Center Harness (W3) Component Location. (Group 9015-10.) Check circuit P68 RED for continuity between pin A on fan speed sensor (B76) connector and pin E1 on VCU connector (J1) (X40). Check circuit R68 BLK for continuity between pin B on fan speed sensor (B76) connector and pin F1 on VCU connector (J1) (X40). Is continuity indicated in both circuits?	 **YES:** Go to Short Circuit Check. **NO:** Repair circuit(s) without continuity indicated or replace harness. See Load Center Harness (W3) Wiring Diagram, see Engine Frame Harness (W5) Wiring Diagram, and see Rear Frame Harness (W13) Wiring Diagram. (Group 9015-10.)

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BE7856,00015F7 -19-10JAN12-5/6

4 Harness Check	Turn battery disconnect switch OFF.	
	Disconnect left and right heated mirrors (E13 and E14) connector. See Cab Roof Harness (W19) Component Location. (Group 9015-10.)	
	Disconnect VCU connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43). See Load Center Harness (W3) Component Location. (Group 9015-10.)	
	Check for continuity between pin J4 (circuit A31 ORG) on VCU connector (J1) (X40) and all other pins on VCU connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43).	**YES:** Circuit A31 ORG is short to circuit with continuity indicated. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Cab Roof Harness (W19) Wiring Diagram. (Group 9015-10.)
	Is continuity indicated?	**NO:** Program controller.

BE7856,0001604 -19-10JAN12-6/6

522426.04 — Rear Wiper Park Short to Ground

Rear wiper park circuit is short to ground.

BE7856,0001605 -19-10JAN12-1/6

Rear Wiper Park Short to Ground Diagnostic Procedure

BE7856,0001605 -19-10JAN12-2/6

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Component Check.

BE7856,0001605 -19-10JAN12-3/6

2 Component Check	Ignition OFF.	
	Disconnect rear wiper motor (M5). See Cab Roof Harness (W19) Component Location. (Group 9015-10.)	
	Apply 24 V to pin 6 and ground to pin 2 on rear wiper motor (M5).	**YES:** Go to Short Circuit Check.
	Does motor activate?	**NO:** Replace rear wiper motor (M5).

Continued on next page

BE7856,0001605 -19-10JAN12-4/6

3 Open Circuit Check	Ignition OFF.	
	Disconnect front wiper motor (M3) connector. See Load Center Harness (W3) Component Location. (Group 9015-10.)	
	Disconnect vehicle control unit (VCU) connector (J2) (X41). See Load Center Harness (W3) Component Location. (Group 9015-10.)	
	Check circuit A08 ORG for continuity between pin 4 on front wiper motor (M3) connector and pin 30 on VCU connector (J2) (X41).	**YES:** Go to Short Circuit Check.
	Is continuity indicated?	**NO:** Circuit A08 ORG is open. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram. (Group 9015-10.)

BE7856,000160F -19-10JAN12-5/7

4 Short Circuit Check	Ignition OFF.	
	Disconnect front wiper motor (M3). See Load Center Harness (W3) Component Location. (Group 9015-10.)	
	Ignition ON.	
	Verify front wipers are off.	
	Check circuit A08 ORG for voltage between pin 4 on front wiper motor (M3) connector and machine ground.	**YES:** Circuit A08 ORG is short to power. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram. (Group 9015-10.)
	Is system voltage (approximately 24 V) present?	**NO:** Go to Harness Check.

BE7856,000160F -19-10JAN12-6/7

5 Harness Check	Turn battery disconnect OFF.	
	Disconnect front wiper motor (M3). See Load Center Harness (W3) Component Location. (Group 9015-10.)	
	Disconnect vehicle control unit (VCU) connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43). See Load Center Harness (W3) Component Location. (Group 9015-10.)	
	Check for continuity between pin 30 (circuit A08 ORG) on VCU connector (J2) (X41) and all other pins on VCU connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43).	**YES:** Circuit A08 ORG is short to circuit with continuity indicated. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram. (Group 9015-10.)
	Is continuity indicated?	**NO:** Program controller.

BE7856,000160F -19-10JAN12-7/7

522434.06 — Front Wiper Low Speed High Current

Front wiper low speed circuit is short to ground.

Continued on next page

BE7856,0001610 -19-10JAN12-1/6

522438.06 — Pin Disconnect Solenoid High Current

Pin disconnect solenoid (Y20) circuit is short to ground.

BE7856,0001619 -19-10JAN12-1/6

Pin Disconnect Solenoid High Current Diagnostic Procedure

Alarm Level:

No Warning Lamp

BE7856,0001619 -19-10JAN12-2/6

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Component Check.

BE7856,0001619 -19-10JAN12-3/6

2 Component Check	Ignition OFF. Disconnect pin disconnect solenoid (Y20). See Loader Frame Harness (W2) Component Location. (Group 9015-10.) Measure resistance across pins A and B on pin disconnect solenoid (Y20). Compare resistance to specification. See Electrical Component Specifications. (Group 9015-20.) Is resistance within specification?	**YES:** Go to Short Circuit Check. **NO:** Pin disconnect solenoid (Y20) malfunction. Replace solenoid.

BE7856,0001619 -19-10JAN12-4/6

3 Short Circuit Check	Ignition OFF. Disconnect pin disconnect solenoid (Y20). See Loader Frame Harness (W2) Component Location. (Group 9015-10.) Ignition ON. Verify pin disconnect is off. Check circuit H15 GRN for voltage between pin B on pin disconnect solenoid (Y20) connector and machine ground. Is system voltage (approximately 24 V) present?	**YES:** Circuit H15 GRN is short to power. Repair circuit or replace harness. See Loader Frame Harness (W2) Wiring Diagram and see Load Center Harness (W3) Wiring Diagram. (Group 9015-10.) **NO:** Go to Harness Check.

Continued on next page

BE7856,0001619 -19-10JAN12-5/6

2 Component Check	Ignition OFF. Disconnect rear washer pump (M4). See Engine Frame Harness (W5) Component Location. (Group 9015-10.) Apply 24 V to pin 2 and ground to pin 1 on rear washer pump (M4). Does pump run?	**YES:** Go to Short Circuit Check. **NO:** Rear washer pump (M4) malfunction. Replace pump.

BE7856,0001622 -19-10JAN12-4/6

3 Short Circuit Check	Ignition OFF. Disconnect rear washer pump (M4) connector. See Engine Frame Harness (W5) Component Location. (Group 9015-10.) Ignition ON. Verify rear washer pump (M4) is off. Check circuit A05 ORG for voltage between pin 2 on rear washer pump (M4) and machine ground. Is system voltage (approximately 24 V) present?	**YES:** Circuit A05 ORG is short to power. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Engine Frame Harness (W5) Wiring Diagram. (Group 9015-10.) **NO:** Go to Harness Check.

BE7856,0001622 -19-10JAN12-5/6

4 Harness Check	Turn battery disconnect OFF. Disconnect rear washer pump (M4) connector. See Engine Frame Harness (W5) Component Location. (Group 9015-10.) Disconnect vehicle control unit (VCU) connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43). See Load Center Harness (W3) Component Location. (Group 9015-10.) Check for continuity between pin K4 (circuit A05 ORG) on VCU connector (J1) (X40) and all other pins on VCU connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43). Is continuity indicated?	**YES:** Circuit A05 ORG is short to circuit with continuity indicated. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Engine Frame Harness (W5) Wiring Diagram. (Group 9015-10.) **NO:** Program controller.

BE7856,0001622 -19-10JAN12-6/6

522797.03 — Front Washer Pump Short to Power

Front washer pump (M2) circuit is short to power.

BE7856,0001623 -19-10JAN12-1/5

Front Washer Pump Short to Power Diagnostic Procedure

Continued on next page

BE7856,0001623 -19-10JAN12-2/5

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Voltage Check.

BE7856,0001629 -19-10JAN12-3/7

2 Voltage Check	Ignition OFF. Disconnect VCU connector (J1) (X40). See Load Center Harness (W3) Component Location. (Group 9015-10.) Check circuit P21 RED for voltage at pin L1 VCU connector (J1) (X40). Is system voltage (approximately 24 V) present?	 **YES:** Program Controller. **NO:** Go to Fuse Check.

BE7856,0001629 -19-10JAN12-4/7

3 Fuse Check	Ignition OFF. Remove fuse (F21). See Fuse and Relay Specifications. (Group 9015-10.) Check fuse (F21) for continuity. Is continuity indicated?	 **YES:** Go to Open Circuit Check. **NO:** Replace fuse (F21).

BE7856,0001629 -19-10JAN12-5/7

4 Open Circuit Check	Ignition OFF. Disconnect VCU connector (J1) (X40) and vehicle electrical center (VEC) 8-pin BLK connector (X12). See Load Center Harness (W3) Component Location. (Group 9015-10.) Check circuit P21 RED for continuity between pin L1 VCU connector (J1) (X40) and pin H on VEC 8-pin BLK connector (X12). Is continuity indicated?	 **YES:** Go to Short Circuit Check. **NO:** Circuit P21 RED is open. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram. (Group 9015-10.)

BE7856,0001629 -19-10JAN12-6/7

5 Short Circuit Check	Ignition OFF. Remove fuse (F21). See Fuse and Relay Specifications. (Group 9015-10.) Disconnect VCU connector (J1) (X40). See Load Center Harness (W3) Component Location. (Group 9015-10.) Check circuit P21 RED for ground at pin L1 VCU connector (J1) (X40). Is ground present?	 **YES:** Circuit P21 RED is short to ground. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram. (Group 9015-10.) **NO:** Program controller.

BE7856,0001629 -19-10JAN12-7/7

❷ **Calibrate Sensor**	Perform Boom Height Kickout/Return-to-Carry (BHKO/RTC) Position Sensor Calibration. (Group 9015-20.) Has analog BHKO/RTC position sensor (B45) been calibrated?	**YES:** Checks complete. **NO:** Go to Program Controller.

BE7856,0001633 -19-10JAN12-4/5

❸ **Program Controller**	Program VCU. Check for active VCU codes. Is code 523786.13 present?	 **YES:** Replace VCU. **NO:** Checks complete.

BE7856,0001633 -19-10JAN12-5/5

523795.03 — Joystick Steering Valve (JSV) Power Short to Power

Power supply circuit to JSV is short to power.

BE7856,0001634 -19-10JAN12-1/5

JSV Power Short to Power Diagnostic Procedure

BE7856,0001634 -19-10JAN12-2/5

❶ **Intermittent Check**	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Short Circuit Check.

BE7856,0001634 -19-10JAN12-3/5

❷ **Short Circuit Check**	Ignition OFF. Disconnect JSV 4-pin connector (X61). See Load Center Harness (W3) Component Location. (Group 9015-10.) Ignition ON. Check Circuit P66 RED for voltage at pin 3 of JSV 4-pin connector (X61). Is system voltage (approximately 24 V) present?	 **YES:** Circuit P66 RED is short to power. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram. (Group 9015-10.) **NO:** Go to Harness Check.

Continued on next page

BE7856,0001634 -19-10JAN12-4/5

4 Harness Check	Turn battery disconnect OFF. Disconnect vehicle control unit (VCU) connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43) and counter switch (S18). See Load Center Harness (W3) Component Location. (Group 9015-10.) Check for continuity between pin 39 (circuit A85 ORG) on VCU connector (J2) (X41) and all other pins on VCU connectors (J1, J2, J3, and J4) (X40, X41, X42, and X43). Is continuity indicated between pin 39 and any pins?	**YES:** Circuit A85 ORG is short to circuit with continuity indicated. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram. (Group 9015-10.) **NO:** Program controller.

BE7856,000163F -19-10JAN12-6/6

523948.03 — Ride Control Solenoid Short to Power

Ride control on/off solenoids 1 and 2 (Y18 and Y34) circuit is short to power.

BE7856,0001647 -19-10JAN12-1/5

Ride Control Solenoid Short to Power Diagnostic Procedure

BE7856,0001647 -19-10JAN12-2/5

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Short Circuit Check.

BE7856,0001647 -19-10JAN12-3/5

2 Short Circuit Check	Ignition OFF. Disconnect ride control on/off solenoids 1 and 2 (Y18 and Y34). See Loader Frame Harness (W2) Component Location. (Group 9015-10.) Ignition ON. Check circuit H02 GRN for voltage at pin A on ride control on/off solenoid 1 (Y18) connector. Is system voltage (approximately 24 V) present?	**YES:** Circuit H02 GRN is short to power. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram and see Loader Frame Harness (W2) Wiring Diagram. (Group 9015-10.) **NO:** Go to Harness Check.

Continued on next page

BE7856,0001647 -19-10JAN12-4/5

2 Reset Controller	*NOTE: Sealed switch module (SSM) will not store diagnostic trouble codes; when ignition is cycled, SSM will reset and all codes will be lost.* Document all diagnostic codes. Ignition OFF. Wait 20 seconds. Ignition ON. Is SSM code 520752.09 present?	**YES:** Go to Controller Area Network (CAN) Circuit Check. **NO:** Checks complete.

BE7856,0001BC9 -19-11JAN12-4/9

3 Controller Area Network (CAN) Circuit Check	Perform CAN circuit test. See CAN Circuit Test. (Group 9015-20.) Does CAN circuit test good?	**YES:** Go to Controller Sensors Check. **NO:** Repair CAN circuit.

BE7856,0001BC9 -19-11JAN12-5/9

4 Controller Sensors Check	Ignition ON. View VCU monitored sensors by accessing the DIAGNOSTICS/HYDRAULIC SENSORS submenu on the advanced display unit (ADU). See Display Unit—Main Menu—Diagnostics—Hydraulic Sensors. (Operators Manual.) Does ADU show a reading for all sensors?	**YES:** Go to Component Check. **NO:** Go to Program Vehicle Control Unit.

BE7856,0001BC9 -19-11JAN12-6/9

5 Component Check	Perform SSM test to verify keypad is malfunctioning. See Display Unit—Main Menu—Diagnostics—Switch Module. (Operator's Manual.) Does SSM test good?	**YES:** Go to Program Sealed Switch Module. **NO:** Replace SSM.

BE7856,0001BC9 -19-11JAN12-7/9

6 Program Vehicle Control Unit	Program VCU. Check for active codes. Is SSM code 520752.09 present?	**YES:** Replace VCU. **NO:** Checks complete.

BE7856,0001BC9 -19-11JAN12-8/9

7 Program Sealed Switch Module	Program SSM. Check for active codes. Is SSM code 520752.09 present?	**YES:** Replace SSM. **NO:** Checks complete.

BE7856,0001BC9 -19-11JAN12-9/9

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Reset Controller.

BE7856,0001BD5 -19-11JAN12-3/9

2 Reset Controller	*NOTE: Sealed switch module (SSM) will not store diagnostic trouble codes; when ignition is cycled, SSM will reset and all codes will be lost.* Document all diagnostic codes. Ignition OFF. Wait 20 seconds. Ignition ON. Is SSM code 523339.09 present?	 **YES:** Go to Controller Area Network (CAN) Circuit Check. **NO:** Checks complete.

BE7856,0001BD5 -19-11JAN12-4/9

3 Controller Area Network (CAN) Circuit Check	Perform CAN circuit test. See CAN Circuit Test. (Group 9015-20.) Does CAN circuit test good?	**YES:** Go to Controller Sensors Check. **NO:** Repair CAN circuit.

BE7856,0001BD5 -19-11JAN12-5/9

4 Controller Sensors Check	Ignition ON. View VCU monitored sensors by accessing the DIAGNOSTICS/HYDRAULIC SENSORS submenu on the advanced display unit (ADU). See Display Unit—Main Menu—Diagnostics—Hydraulic Sensors. (Operators Manual.) Does the monitor show a reading for all sensors?	 **YES:** Go to Component Check. **NO:** Go to Program Vehicle Control Unit.

BE7856,0001BD5 -19-11JAN12-6/9

5 Component Check	Perform SSM test to verify keypad is malfunctioning. See Display Unit—Main Menu—Diagnostics—Switch Module. (Operator's Manual.) Does SSM test good?	**YES:** Go to Program Sealed Switch Module. **NO:** Replace SSM.

BE7856,0001BD5 -19-11JAN12-7/9

6 Program Vehicle Control Unit	Program VCU. Check for active codes. Is SSM code 523339.09 present?	 **YES:** Replace VCU. **NO:** Checks complete.

Continued on next page

BE7856,0001BD5 -19-11JAN12-8/9

2 Reset Controller	*NOTE: SSM will not store diagnostic trouble codes; when ignition is cycled, SSM will reset and all codes will be lost.* Document all diagnostic codes. Ignition OFF. Wait 20 seconds. Ignition ON. Is SSM code 523855.04 present?	**YES:** Go to Component Check. **NO:** Checks complete.

BE7856,0001BE0 -19-11JAN12-4/6

3 Component Check	Perform SSM test to verify keypad is malfunctioning. See Display Unit—Main Menu—Diagnostics—Switch Module. (Operator's Manual.) Does SSM test good?	**YES:** Program controller. **NO:** Go to Controller Area Network (CAN) Circuit Check.

BE7856,0001BE0 -19-11JAN12-5/6

4 Controller Area Network (CAN) Circuit Check	Perform CAN circuit test. See CAN Circuit Test. (Group 9015-20.) Does CAN circuit test good?	**YES:** Program controller. **NO:** Repair CAN circuit.

BE7856,0001BE0 -19-11JAN12-6/6

523855.09 — Lost Return To Carry Light-Emitting Diode (LED) Message

Return to carry LED signal missing from vehicle control unit (VCU).

BE7856,0001BE1 -19-11JAN12-1/9

Lost Return To Carry Light-Emitting Diode (LED) Message Diagnostic Procedure

Alarm Level:

No Warning Lamp

BE7856,0001BE1 -19-11JAN12-2/9

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Reset Controller.

Continued on next page

BE7856,0001BE1 -19-11JAN12-3/9

4 Controller Sensors Check	Ignition ON. View VCU monitored sensors by accessing the DIAGNOSTICS/HYDRAULIC SENSORS submenu on the advanced display unit (ADU). See Display Unit—Main Menu—Diagnostics—Hydraulic Sensors. (Operators Manual.) Does the monitor show a reading for all sensors?	**YES:** Go to Component Check. **NO:** Go to Program Vehicle Control Unit.

BE7856,0001BEB -19-11JAN12-6/9

5 Component Check	Perform SSM test to verify keypad is malfunctioning. See Display Unit—Main Menu—Diagnostics—Switch Module. (Operator's Manual.) Does SSM test good?	**YES:** Go to Program Sealed Switch Module. **NO:** Replace SSM.

BE7856,0001BEB -19-11JAN12-7/9

6 Program Vehicle Control Unit	Program VCU. Check for active codes. Is SSM code 523861.09 present?	 **YES:** Replace VCU. **NO:** Checks complete.

BE7856,0001BEB -19-11JAN12-8/9

7 Program Sealed Switch Module	Program SSM. Check for active codes. Is SSM code 523861.09 present?	 **YES:** Replace SSM. **NO:** Checks complete.

BE7856,0001BEB -19-11JAN12-9/9

523862.04 — Park Brake Keypad Stuck

Park brake keypad on the sealed switch module (SSM) is stuck.

BE7856,0001BEC -19-11JAN12-1/6

Park Brake Keypad Stuck Diagnostic Procedure

Alarm Level:

No Warning Lamp

BE7856,0001BEC -19-11JAN12-2/6

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Reset Controller.

Continued on next page

BE7856,0001BEC -19-11JAN12-3/6

7 Program Sealed Switch Module	Program SSM. Check for active codes. Is SSM code 523868.09 present?	 **YES:** Replace SSM. **NO:** Checks complete.

BE7856,0001BF6 -19-11JAN12-9/9

2 Voltage Check	Ignition OFF. Disconnect advanced display unit (ADU) (H2) connector. See Load Center Harness (W3) Component Location. (Group 9015-10.) Ignition ON. Check circuit M12 YEL for voltage at pin J on ADU (H2) connector. Is voltage less than 1 volt?	**YES:** Perform CAN circuit test. See CAN Circuit Test. (Group 9015-10.) Repair CAN circuit. **NO:** Program controller.

BE7856,000110A -19-02DEC11-4/4

523774.03 — CAN LOW Voltage High

Controller area network (CAN) low circuit voltage is above 3 volts.

BE7856,000110B -19-02DEC11-1/4

CAN LOW Voltage High Diagnostic Procedure

Alarm Level:

No Warning Lamp

BE7856,000110B -19-02DEC11-2/4

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Voltage Check.

BE7856,000110B -19-02DEC11-3/4

2 Voltage Check	Ignition OFF. Disconnect advanced display unit (ADU) (H2) connector. See Load Center Harness (W3) Component Location. (Group 9015-10.) Ignition ON. Check circuit M13 GRN for voltage at pin B on ADU (H2) connector. Is voltage more than 3 volts?	**YES:** Perform CAN Circuit test. See CAN Circuit Test. (Group 9015-10.) Repair CAN circuit. **NO:** Program controller.

BE7856,000110B -19-02DEC11-4/4

523774.04 — CAN LOW Voltage Low

Controller area network (CAN) low circuit voltage is below 1 volt.

BE7856,000110C -19-02DEC11-1/4

CAN LOW Voltage Low Diagnostic Procedure

Continued on next page

BE7856,000110C -19-02DEC11-2/4

1 **Program Controller**	Program vehicle control unit (VCU).	
	Check for active codes.	**YES:** Replace JSV. See Joystick Steering Valve Remove and Install. (Group 0960.) If JSV code 298971.02 continues to occur, replace VCU.
	Is joystick steering valve (JSV) code 298971.02 active?	**NO:** Checks complete.

BE7856,000111F -19-02DEC11-3/3

298972.02 — Invalid Valve State

Illegal valve state.

BE7856,0001120 -19-02DEC11-1/3

Invalid Valve State Diagnostic Procedure

BE7856,0001120 -19-02DEC11-2/3

1 **Program Controller**	Program vehicle control unit (VCU).	
	Check for active codes.	**YES:** Replace JSV. See Joystick Steering Valve Remove and Install. (Group 0960.) If JSV code 298972.02 continues to occur, replace VCU.
	Is joystick steering valve (JSV) code 298972.02 active?	**NO:** Checks complete.

BE7856,0001120 -19-02DEC11-3/3

298973.02 — Port Flow Greater Than 100%

Port flow command is greater than 100%.

BE7856,0001121 -19-02DEC11-1/3

Port Flow Greater Than 100% Diagnostic Procedure

BE7856,0001121 -19-02DEC11-2/3

1 **Program Controller**	Program vehicle control unit (VCU).	
	Check for active codes.	**YES:** Replace JSV. See Joystick Steering Valve Remove and Install. (Group 0960.) If JSV code 298973.02 continues to occur, replace VCU.
	Is joystick steering valve (JSV) code 298973.02 active?	**NO:** Checks complete.

BE7856,0001121 -19-02DEC11-3/3

Software Error Diagnostic Procedure

BE7856,000113E -19-02DEC11-2/4

1 Valve Pressure Check	Perform Joystick Steering Valve Pressure Test. (Group 9025-25.) Does joystick steering valve test good?	**YES:** Go to Ignition ON/OFF Check. **NO:** Repair joystick steering valve.

BE7856,000113E -19-02DEC11-3/4

2 Ignition ON/OFF Check	Cycle ignition OFF then ON. Wait 20 seconds. Cycle ignition OFF then ON. Check for active codes. Is joystick steering valve (JSV) code 299004.11 active?	 **YES:** Replace joystick steering valve (JSV) controller (A7). See Joystick Steering Valve Disassemble and Assemble. (Group 0960.) **NO:** Checks complete.

BE7856,000113E -19-02DEC11-4/4

299006.12 — Software Error

Not Applicable

BE7856,000113F -19-02DEC11-1/1

299007.12 — Memory Test Failure

Joystick steering valve (JSV) controller internal RAM malfunction.

BE7856,0001140 -19-02DEC11-1/3

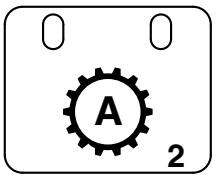
Memory Test Failure Diagnostic Procedure

BE7856,0001140 -19-02DEC11-2/3

1 Ignition ON/OFF Check	Cycle ignition OFF then ON. Wait 20 seconds. Cycle ignition OFF then ON. Check for active codes. Is joystick steering valve (JSV) code 299007.12 active?	 **YES:** Replace joystick steering valve (JSV) controller (A7). See Joystick Steering Valve Disassemble and Assemble. (Group 0960.) **NO:** Checks complete.

BE7856,0001140 -19-02DEC11-3/3

Transmission Gear Shift Switch Checks—Hydraulic Control Lever Mount Only



TX1028750 —UN—30AUG07

Automatic Transmission Switch

Push automatic transmission switch to OFF position (LEDs off).

Put gear shift switch in forward (F), neutral (N), and reverse (R) positions.

LISTEN/LOOK: Does switch move into forward, neutral, and reverse positions?
Does switch stay in detented positions?
Does backup alarm sound when in reverse?

YES: Go to next check.

Push upshift button and downshift button on hydraulic control lever.

NO: If gear shift switch does not move properly or stays in detented position, replace switch.

LOOK: Does monitor display indicate neutral position (N) and correct gear (1, 2, 3, and D)?

NO: If gear selection does not change on monitor, check gear shift circuit. See Transmission Control Unit (TCU) Circuit Theory of Operation. (Group 9015-15.)

WC20922,0004393 -19-13JUN16-14/47

Neutral Start Check

Put steering column FNR/gear select switch in first gear forward (1F) or first gear reverse (1R) position, then press engine start switch.

LOOK/LISTEN: Does engine start?
Does display unit indicate a neutral gear selection?

LISTEN: Does audible alarm beep?

YES: Go to next check.

NOTE: F or R will not appear in gear display until gear shift switch is cycled back to neutral and park brake is released.

NO: See Start and Charge Circuits Theory of Operation. (Group 9015-15.)

WC20922,0004393 -19-13JUN16-15/47

Operational Checks—Ignition ON, Engine ON Checks

WC20922,0004393 -19-13JUN16-16/47

Hydraulic and Transmission Oil Warmup Procedure

NOTE: For following checks, all systems must be warmed up to operating range to get accurate test results.

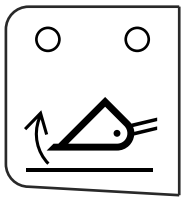
See Hydraulic Oil Warmup Procedure. (Group 9025-25.)

See Transmission Oil Warmup Procedure. (Group 9020-25.)

YES: Go to next check.

Continued on next page

WC20922,0004393 -19-13JUN16-17/47

Return-to-Dig (RTD) Check	 T194314 —UN—11SEP03 *Return-to-Dig Enable Switch* Raise boom to about eye level. Fully dump bucket. Enable return-to-dig function by pushing return-to-dig enable switch on sealed switch module (SSM) (one LED on). Put hydraulic control lever in bucket curl (RTD) detent position. *LOOK/FEEL: Does hydraulic control lever stay in detent position?* *LOOK: Does bucket travel stop upon reaching dig position?* *LOOK: Does hydraulic control lever return to neutral upon reaching dig position?*	**YES:** Go to next check. **NO:** Verify that RTD switch is adjusted correctly. See Return-to-Dig Adjustment—Z-Bar Linkage or see Return-to-Dig Adjustment—Powerllel Linkage. (Group 9015-20.) If sensor is adjusted correctly, check return-to-dig circuit. See Vehicle Control Unit (VCU) Circuit Theory of Operation. (Group 9015-15.)

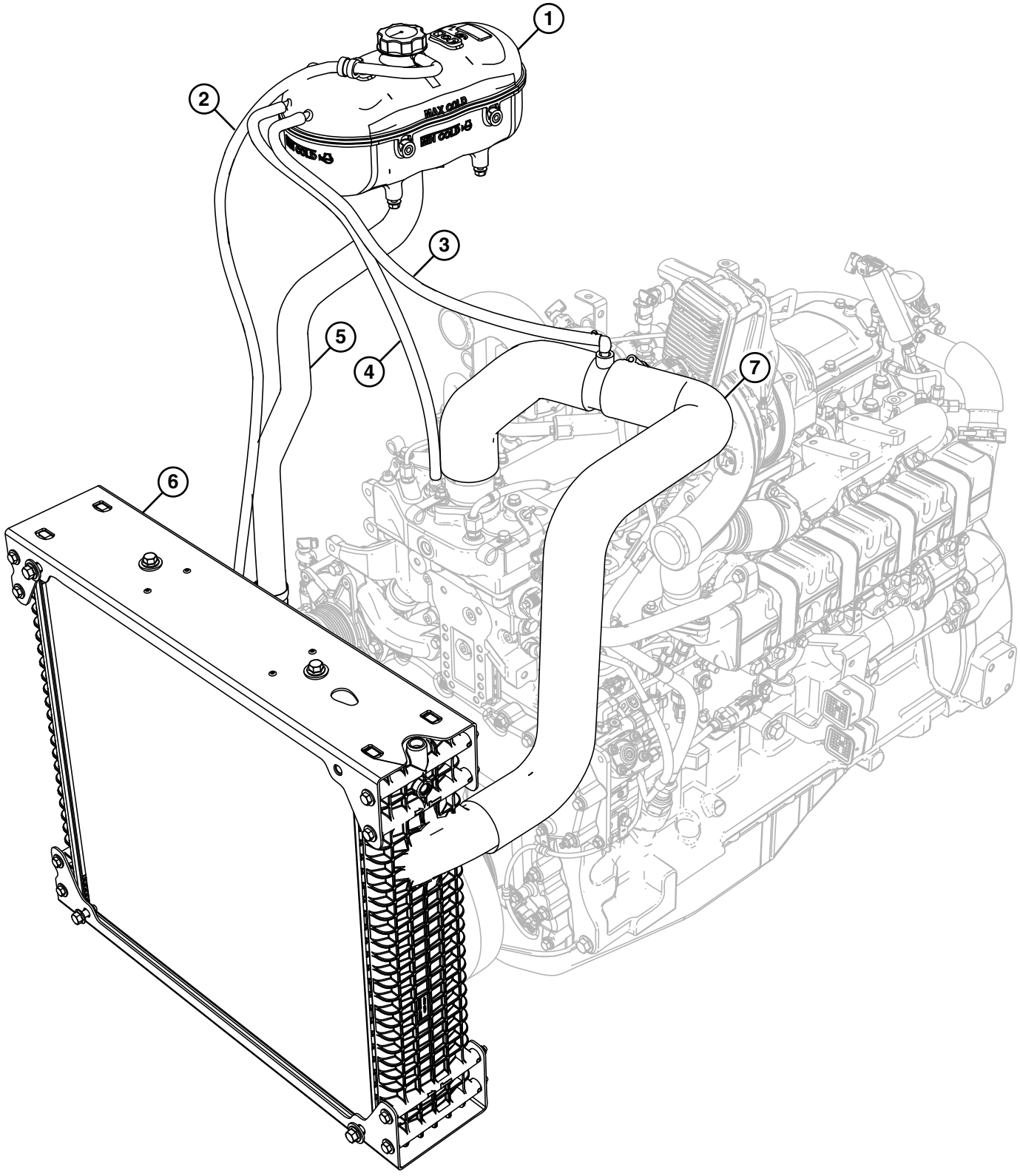
Continued on next page

WC20922,0004393 -19-13JUN16-33/47

Section 9010
Engine

Contents

Engine Cooling System Component Location



TX1097879 —UN—12JUN12

TX1097879

Engine Cooling System Component Location

Continued on next page

BE7856,00000B4 -19-22SEP11-1/2

4. While holding cap probe line inside the bottle, press and hold the cap probe to the valve to release the sample fluid into the bottle that is still secured within the plastic bag.
5. Fill the sample bottle about 3/4 full of fluid.

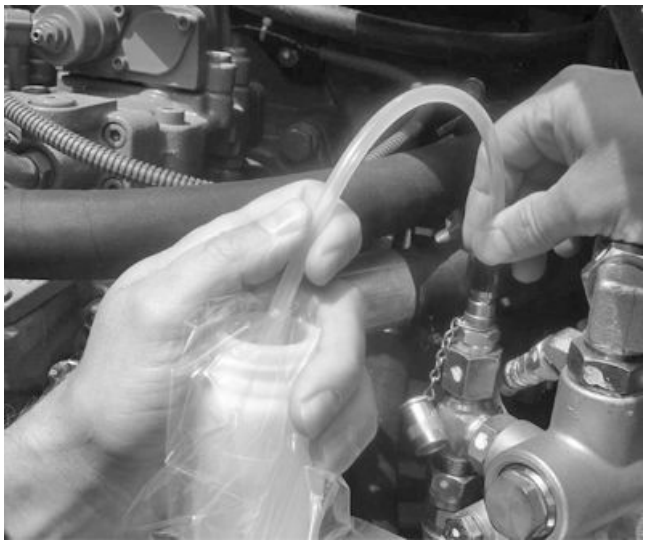
Specification	
Fluid Sample—Volume (approximate)	75 mL 2.5 oz

6. After a representative sample is obtained, remove the tube and return the lid to the container. Leave the lid and bottle inside the plastic bag and the protective sheet attached underneath the lid (if applicable).

   When properly performed, sample oil is warm, indicating that all stagnant fluid was removed during the purge process and not sent to the lab.

NOTE: Cap probes are to be used for only one sampling procedure.

7. Install the dust cap to the sample valve, and properly dispose of the cap probe.



TX1024515A —UN—01JUN07

Collect Sample Fluid (excavator shown)

8. Fill out the sample information form completely, and submit the form and sample to the designated regional lab for testing.

Fluid Analysis Sampling Materials Summary	
Part Number	**Description**
AT317904	Engine Test Kit
AT303189	Hydraulic and Power Train Test Kit
AT180344	Diesel Fuel Test Kit
AT183016	Coolant Test Kit
TY26349	6 mm (0.25 in) Suction Pump Tubing, 30 m (100 ft)
AT308579	120 mL (4 oz) Sample Bottle
AT315231	Poly Cap Probe
AT321211	Probe Style Sample Valve with Attached Cap, -4 SAE O-ring
AT306111	Probe Style Sample Valve with Attached Cap, -6 SAE O-ring
TY26363	Probe Style Sample Valve with Attached Cap, 1/4-20 NPT
AT306133	Probe Style Sample Valve with Attached Cap, 1/8-27 NPT
AT320593	Probe Style Sample Valve with Attached Cap, -6 ORFS Female
AT312932	Probe Style Sample Valve with Attached Cap, -8 ORFS Female
TY26364	90° Push-Button Sample Valve with attached Cap, 1/8-27 NPT
TY26365	Sample Valve Actuator Tubing Adaptor Fitting, KST Series Probe
Non-Applicable	Plastic Bag

Continued on next page

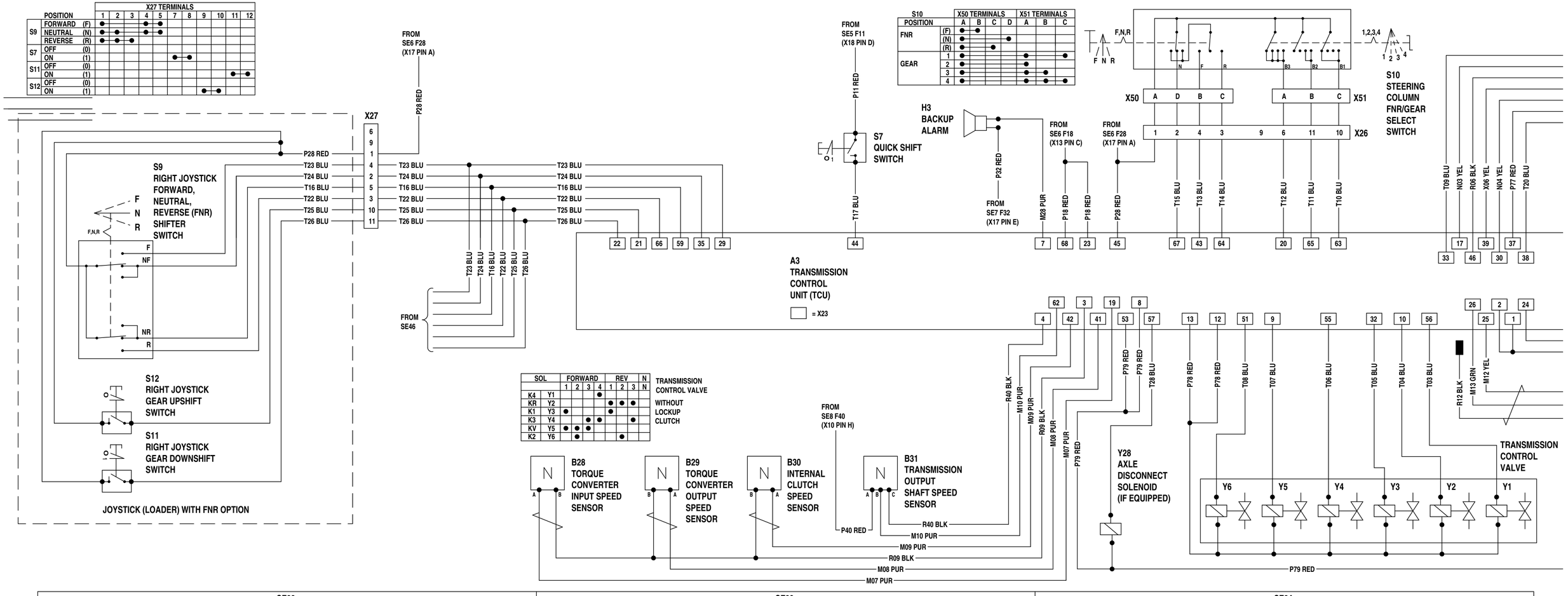
DX,FLUID,SAMPLE -19-12FEB16-5/6

F65— Glow Plugs 50 Amp Fuse (in-line)
G1—Batteries
G2—Emergency Starting Terminal
G4—Alternator
K3—Start Relay
K4—Ignition Relay
K5—Glow Plugs Relay
M1—Starter Motor
R11— Glow Plug (cylinder 1)
R12— Glow Plug (cylinder 2)
R13— Glow Plug (cylinder 3)
R14— Glow Plug (cylinder 4)
R15— Glow Plug (cylinder 5)
R16— Glow Plug (cylinder 6)
S2—Battery Disconnect Switch
V1—Starter Coil Suppression 5 A Diode
V6—Glow Plug Relay Suppression Diode
W25—Ground at Starter Motor
W26—Ground at Right Front Cab Leg
W27—Ground at Engine Frame (near starter)

Continued on next page

BJ21193,0000014 -19-05MAR18-2/34

TX1139197 —UN—23JUL13



TX1139197

Continued on next page

544K SYSTEM FUNCTIONAL SCHEMATIC

544K System Functional Schematic (SE22—SE24) (8 of 16)

CONTINUE NEXT PAGE

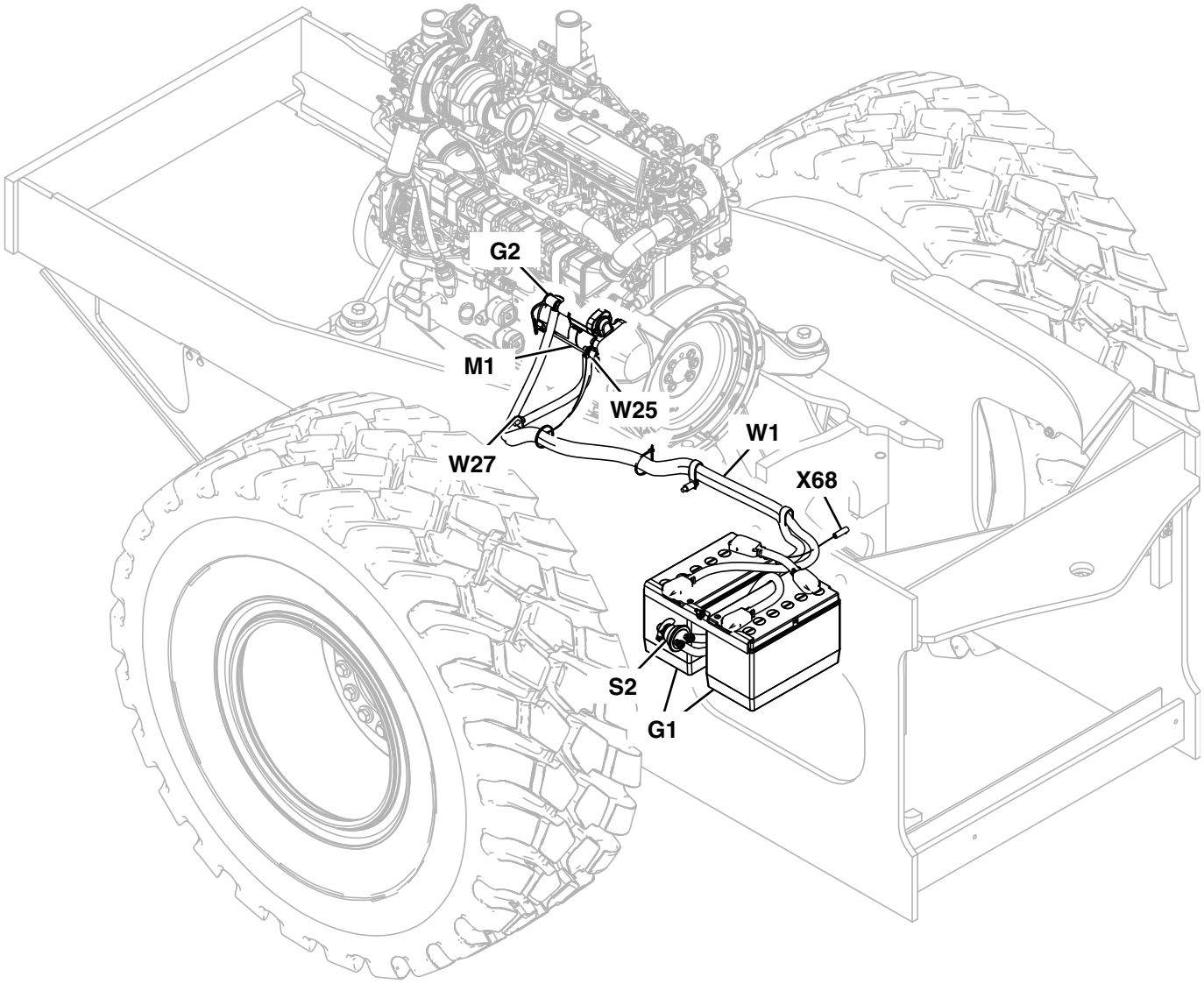
BJ21193,0000014 -19-05MAR18-15/34

A1—Engine Control Unit (ECU)
B14— Analog Throttle Position Sensor
B67— Engine Coolant Loss Switch
B5100—Fuel Rail Pressure Sensor
B5101—Engine Oil Pressure Sensor
B5102—Exhaust Manifold Pressure Sensor
B5103—Exhaust Gas Recirculation (EGR) Delta Pressure Sensor
B5104—Intake Manifold Air Pressure Sensor
B5105—Crankcase Pressure Sensor
B5301—Crankshaft Position Sensor
B5302—Camshaft Position Sensor
B5500—Intake Air Sensor
B5600—Water-in-Fuel (WIF) Sensor
S5002—Engine Coolant Level Switch
R6—Fuel Pump Voltage Reducing Resistor
R8—Engine CAN Termination Resistor
W28—Ground at Engine Block
X71— Engine Control Unit (ECU) Connector
X72— Engine Control Unit (ECU) Connector
X73— Engine Control Unit (ECU) Connector
Y5002—Suction Control Valve
Y5400—Exhaust Gas Recirculation (EGR) Actuator
Y5401—Air Throttle Valve
Y5501—Low-Pressure Fuel Pump
Y5500—Variable Geometry Turbocharger Actuator

Continued on next page

BJ21193,0000014 -19-05MAR18-28/34

Power and Ground Cables (W1) Component Location



TX1097670 —UN—07OCT11

TX1097670

Power and Ground Cables (W1) Component Location

G1—Batteries
G2—Emergency Starting Terminal
M1—Starter Motor
S2—Battery Disconnect Switch
W1—Power and Ground Cables
W25—Ground at Starter Motor
W27—Ground at Engine Frame (near starter)
X68—12-Volt Center Tap 1-Pin Connector

DP27668,0000045 -19-02NOV11-1/1

TX1098992 —UN—05OCT11

END #1	NUMBER	COLOR	END #2
X18	P41A	RED	X561
X561	P41B	RED	X4
X1	P49	RED	X11
X11	P49A	RED	X5
X12	P49B	RED	X4
X544	P55	RED	M3
X544	P55A	RED	X10
X544	P55B	RED	X5
X104	P56	RED	X10
X41	P66	RED	X61
X4	P68	RED	X583
X4	P68A	RED	X583
X67	P68B	RED	X583
X583	P68C	RED	X40
X539	P69	RED	S18
X539	P69A	RED	X40
X539	P69B	RED	X4
B27	P69C	RED	X539
X87	P69D	RED	X539
X67	P70	RED	X40
B14	P74	RED	X3
X23	P77	RED	B33
X23	P78	RED	X553
X23	P78A	RED	X553
X553	P78B	RED	X22
X23	P79	RED	X515
X23	P79A	RED	X515
X515	P79B	RED	X4
X515	P79C	RED	X22
G5	P83A	RED	X582
X582	P83B	RED	X5
G6	P83C	RED	X582
X582	P83D	RED	X11
X582	P83E	RED	X17
X579	P84	RED	X5
X579	P84A	RED	X91
G6	P84B	RED	X579
X23	R06	BLK	X22
X23	R09	BLK	X549
X549	R09A	BLK	X22
X549	R09B	BLK	X22
X549	R09C	BLK	X22
X533	R12	BLK	X53 (SHIELD)
X589	R12A	BLK	X48 (SHIELD)
X589	R12B	BLK	R2
X546	R12C	BLK	R1
X1 (SHIELD)	R12D	BLK	X519
X546	R12E	BLK	X31
X512	R12F	BLK	X689
X23 (SHIELD)	R12G	BLK	X550
X510	R12H	BLK	X105
X32	R12J	BLK	X664
X571	R12K	BLK	X61 (SHIELD)
X533	R12L	BLK	X546
X533	R12M	BLK	X519
X571	R12N	BLK	X519
X512	R12P	BLK	X550
X510	R12Q	BLK	X512
X510	R12R	BLK	X664
X589	R12S	BLK	X550

END #1	NUMBER	COLOR	END #2
X571	R12T	BLK	X664
X510	R12V	BLK	X109
X575	R19	BLK	X1 (SHIELD)
X522	R19A	BLK	X103 (SHIELD)
X506	R19B	BLK	X104
X506	R19C	BLK	X40 (SHIELD)
R4	R19D	BLK	X506
X506	R19E	BLK	X4
X575	R19F	BLK	X506
X506	R19G	BLK	X522
X575	R19H	BLK	X522
X506	R19J	BLK	X109
X105	R19K	BLK	X506
X4	R22	BLK	X40
X101	R34	BLK	X48
X4	R35	BLK	X40
X23	R40	BLK	X22
X4	R68	BLK	X559
X559	R68A	BLK	X40
X67	R68B	BLK	X559
X4	R68C	BLK	X559
X4	R68D	BLK	X559
X568	R69	BLK	S18
X568	R69A	BLK	X4
X568	R69B	BLK	X40
B27	R69C	BLK	X568
X87	R69D	BLK	X568
X23	R77	BLK	B33
X67	R86	BLK	X41
X67	R87	BLK	X41
X67	R88	BLK	X41
X518	R91	BLK	B14
X518	R91A	BLK	X4
X518	R91B	BLK	X3
X3	R93	BLK	K3
X4	T01	BLU	X40
X42	T02	BLU	S13
X23	T03	BLU	X22
X23	T04	BLU	X22
X23	T05	BLU	X22
X23	T06	BLU	X22
X23	T07	BLU	X22
X23	T08	BLU	X22
X23	T09	BLU	X4
X23	T10	BLU	X26
X23	T11	BLU	X26
X23	T12	BLU	X26
X23	T13	BLU	X26
X23	T14	BLU	X26
X23	T15	BLU	X26
X527	T16	BLU	X27
X527	T16A	BLU	X31
X527	T16B	BLU	X23
X529	T17	BLU	X29 (Y46, Y47, Y48)
X529	T17A	BLU	X27
X529	T17B	BLU	X23
X23	T20	BLU	B33
X531	T22	BLU	X27
X531	T22A	BLU	X31
X531	T22B	BLU	X23

END #1	NUMBER	COLOR	END #2
X540	T23	BLU	X27
X540	T23A	BLU	X31
X540	T23B	BLU	X23
X538	T24	BLU	X27
X538	T24A	BLU	X31
X538	T24B	BLU	X23
X536	T25	BLU	X27
X536	T25A	BLU	X31
X536	T25B	BLU	X23
X534	T26	BLU	X27
X534	T26A	BLU	X31
X534	T26B	BLU	X23
X23	T27	BLU	X22
X23	T28	BLU	X22
X42	X01	YEL	X4
X23	X06	YEL	X22
X42	X08	YEL	X563
X4	X08A	YEL	X563
X67	X08B	YEL	X563
X42	X09	YEL	X4
X42	Y02	YEL	X4
X41	Z06	GRY	H1
X23	Z12	GRY	X2
X23	Z13	GRY	X2
X23	Z14	GRY	X2

TX1098992

Continued on next page

Load Center Harness (W3) Wiring Diagram (2 of 8) (S.N. —659435)

2 OF 8

DD00738,00001F9 -19-19NOV15-2/28

Load Center Harness (W3) Wiring Diagram (S.N. 659436—)

TX1160277 —UN—08MAY14

END #1	NUMBER	COLOR	END #2
W26	5040	BLK	X3
X10	5042	RED	X3
W26	5060	BLK	X3
X12	5062	RED	X3
X4	5437	PUR	X3
X4	5474	YEL	X3
X4	5783	ORG	X3
X4	5785	GRN	X3
X4	5786	BLU	X3
X541	A01	ORG	X41
X31	A01A	ORG	X541
X541	A01B	ORG	X26
X67	A03	ORG	X42
X4	A04	ORG	X40
X4	A05	ORG	X40
X8	A06	ORG	X3
X41	A07	ORG	M3
X41	A08	ORG	M3
X42	A09	ORG	M3
X41	A11	ORG	X6
X41	A12	ORG	X6
X42	A13	ORG	X6
X578	A15	ORG	S21
X578	A15A	ORG	X42
X578	A15B	ORG	X8
X578	A15C	ORG	M7
X9	A16	ORG	S21
X9	A17	ORG	S21
X9	A18	ORG	S21
X8	A20	ORG	X41
X562	A23	ORG	X16
X562	A23A	ORG	X99
X562	A23B	ORG	X105
X88, S33	A24	ORG	X47, E32, E33
X5	A31	ORG	X40
X17	A32	ORG	X91
X101	A33	ORG	X11
X101	A34	ORG	X48
X16	A35	ORG	X4
X41	A85	ORG	S18
X41	A86	ORG	S18
X41	A87	ORG	S18
X555	B02	RED	M1
X555	B02A	RED	K4
X555	B02B	RED	K3
X555	B02C	RED	X14
X53	B03	RED	X12
K4	B04	RED	X18
K4	B04A	RED	X11
X42	B05	RED	X4
X584	B10	RED	K4
X584	B10A	RED	X15
X584	B10B	RED	X15
K3	E01	WHT	X688
V1	E01A	WHT	X688
X3	E01B	WHT	V1
X125	E01C	WHT	X688
X516	E02	WHT	X18
X516	E02A	WHT	K3
X516	E02B	WHT	X3

B14	E12	WHT	X3
X622	E24	WHT	X17
X622	E24A	WHT	X4
X622	E24B	WHT	X3
X23	G01	BLK	X503
X23	G01A	BLK	X503
X48	G01B	BLK	X503
X53	G01C	BLK	X525
X27	G01D	BLK	X525
X1	G01E	BLK	X525
X558	G01F	BLK	X503
X31	G01H	BLK	X525
X503	G01J	BLK	X2
X41	G01K	BLK	X525
X40	G01L	BLK	X525
X61	G01M	BLK	X525
X503	G01N	BLK	X525
X40	G01P	BLK	X525
X40	G01Q	BLK	X525
X525	G01R	BLK	X689
X532	G04	BLK	X29 (Y46, Y47, Y48)
X532	G04A	BLK	X29 (Y46, Y47, Y48)
X532	G04B	BLK	X29 (Y46, Y47, Y48)
X532	G04C	BLK	X33, S32
X576	G04D	BLK	V1
X576	G04E	BLK	X5
X576	G04F	BLK	X5
X577	G04G	BLK	X9
X577	G04H	BLK	X8
X577	G04J	BLK	X21
X576	G04M	BLK	K4
X576	G04N	BLK	X18
W26	G04R	BLK	X576
W26	G04S	BLK	X577
X577	G04T	BLK	M7
X576	G04U	BLK	G6
X576	G04V	BLK	X532
X532	G04W	BLK	X47, E32, E33
X88, S33	G04X	BLK	X532
X577	G04Y	BLK	X6
W26	G05	BLK	X67
W26	G05A	BLK	X67
X572	G06A	BLK	G5
X572	G06B	BLK	X5
X572	G06C	BLK	X91
X572	G06D	BLK	G6
X101	G06E	BLK	X572
X26	G08	BLK	X642
M3	G08A	BLK	X642
X109	G08B	BLK	X642
X109	G08C	BLK	X642
X642	G08E	BLK	W26
X116	G08F	BLK	X642
X99	G08G	BLK	X642
X557	G15	BLK	R2
X557	G15A	BLK	R1
X557	G21	BLK	X4
X557	G21A	BLK	X104
X557	G21B	BLK	X567
X557	G21C	BLK	X558
X557	G21D	BLK	X103
X567	G21E	BLK	X101

X558	G22	BLK	W25
W26	G23	BLK	X105
X67	H02	GRN	X42
X67	H04	GRN	X42
X67	H05	GRN	X42
X643	H08	GRN	X116
X643	H08A	GRN	X99
X67	H08B	GRN	X643
X67	H09	GRN	X116
X31	H10	GRN	X42
X31	H11	GRN	X42
X31	H12	GRN	X42
X42	H13	GRN	X4
X67	H15	GRN	X40
X41	H22	GRN	X4
X40	H23	GRN	X29 (Y46, Y47, Y48)
X4	H24	GRN	X40
X42	H26	GRN	X4
X67	H28	GRN	X41
X41	H33	GRN	X29 (Y46, Y47, Y48)
X41	H34	GRN	X29 (Y46, Y47, Y48)
X4	H35	GRN	X40
X42	H36	GRN	X4
X42	H37	GRN	X4
X67	H085	GRN	X103
X10	J08	TAN	X3
X580	L02	BRN	X5
X580	L02A	BRN	X40
X580	L02B	BRN	X40
X41	L04	BRN	X4
X565	L06	BRN	X4
X565	L06A	BRN	X42
X67	L06B	BRN	X565
X42	L07	BRN	X26
X566	L09	BRN	X4
X67	L09A	BRN	X566
X566	L09B	BRN	X42
X42	L10	BRN	X26
X564	L12	BRN	X4
X67	L12A	BRN	X564
X564	L12B	BRN	X42
X67	L19	BRN	X40
X53	L20	BRN	X41
X41	L21	BRN	X4
X42	L22	BRN	X5
X42	L26	BRN	X5
X5	L28	BRN	X40
X42	L30	BRN	X4
X23	M07	PUR	X22
X23	M08	PUR	X22
X23	M09	PUR	X22
X23	M10	PUR	X22
X537	M12	YEL	X53
X591	M12A	YEL	X48
X591	M12B	YEL	R2
X548	M12C	YEL	R1
X1	M12D	YEL	X521
X548	M12E	YEL	X31
X514	M12F	YEL	X40
X23	M12G	YEL	X552
X508	M12H	YEL	X105
X32	M12J	YEL	X662

X569	M12K	YEL	X61
X537	M12L	YEL	X548
X537	M12M	YEL	X521
X569	M12N	YEL	X521
X552	M12P	YEL	X514
X508	M12Q	YEL	X514
X508	M12R	YEL	X662
X591	M12S	YEL	X552
X569	M12T	YEL	X662
X535	M13	GRN	X53
X590	M13A	GRN	X48
X590	M13B	GRN	R2
X547	M13C	GRN	R1
X1	M13D	GRN	X520
X547	M13E	GRN	X31
X513	M13F	GRN	X40
X23	M13G	GRN	X551
X509	M13H	GRN	X105
X32	M13J	GRN	X663
X570	M13K	GRN	X61
X535	M13L	GRN	X547
X535	M13M	GRN	X520
X570	M13N	GRN	X520
X551	M13P	GRN	X513
X509	M13Q	GRN	X513
X509	M13R	GRN	X663
X590	M13S	GRN	X551
X570	M13T	GRN	X663
X573	M22	YEL	X1
X524	M22A	YEL	X103
X504	M22B	YEL	X104
X40	M22C	YEL	X500
R4	M22D	YEL	X500
X504	M22E	YEL	X4
X573	M22F	YEL	X500
X504	M22G	YEL	X524
X573	M22H	YEL	X524
X105	M22K	YEL	X504
X574	M23	GRN	X1
X523	M23A	GRN	X103
X505	M23B	GRN	X104
X501	M23C	GRN	X40
R4	M23D	GRN	X501
X505	M23E	GRN	X4
X574	M23F	GRN	X501
X505	M23G	GRN	X523
X574	M23H	GRN	X523
X105	M23K	GRN	X505
X23	M28	PUR	X644
X4	M28A	PUR	X644
X99	M28B	PUR	X644
X41	M89	PUR	X4
X42	M90	PUR	X4
X42	N01	YEL	X4
X23	N03	YEL	X22
X23	N04	YEL	X4
X42	N05	YEL	X4
B27	N06	YEL	X42
X42	N08	YEL	X4
X4	N11	YEL	X3
X87	N12	YEL	X42
X42	N14	YEL	X4

X4	N16	YEL	X3
X67	N076	YEL	X103
X67	N077	YEL	X103
X67	N86	YEL	X41
X67	N87	YEL	X41
X105	P01	RED	X13
X53	P02	RED	X13
X517	P03	RED	X3
X517	P03A	RED	X3
X517	P03B	RED	X3
X517	P03C	RED	X3
X517	P03D	RED	X13
G6	P04	RED	X13
S21	P05	RED	V12
X14	P05A	RED	V12
X530	P08	RED	X33, S32
X88, S33	P08A	RED	X530
X530	P08B	RED	X10
G6	P09	RED	X18
X18	P10	RED	X3
X528	P11	RED	X29 (Y46, Y47, Y48)
X528	P11A	RED	X27
X560	P11B	RED	X116
X528	P11C	RED	X18
X560	P11D	RED	X18
X67	P11E	RED	X560
X542	P13	RED	X48
X542	P13A	RED	X26
X542	P13B	RED	S18
X542	P13C	RED	H1
X542	P13D	RED	X17
X16	P15	RED	X40
X16	P16	RED	X20
X16	P16A	RED	X99
X13	P17	RED	X19
X13	P17A	RED	X99
X23	P18	RED	X581
X23	P18A	RED	X581
X581	P18B	RED	X13
X11	P20	RED	X42
X12	P21	RED	X40
X543	P23	RED	X4
X543	P23A	RED	S13
X543	P23B	RED	X10
X67	P23C	RED	X543
X526	P28	RED	X23
X526	P28A	RED	X27
X526	P28B	RED	X27
X526	P28C	RED	X27
X526	P28D	RED	X26
X526	P28E	RED	X2
X526	P28F	RED	X17
X31	P29	RED	X17
X105	P31	RED	X17
X4	P32	RED	X507
X101	P32A	RED	X507
X507	P32B	RED	X17
X48	P33	RED	X12
X10	P38	RED	X3
X22	P40	RED	X10
X103	P41	RED	X561

TX1160277

Continued on next page

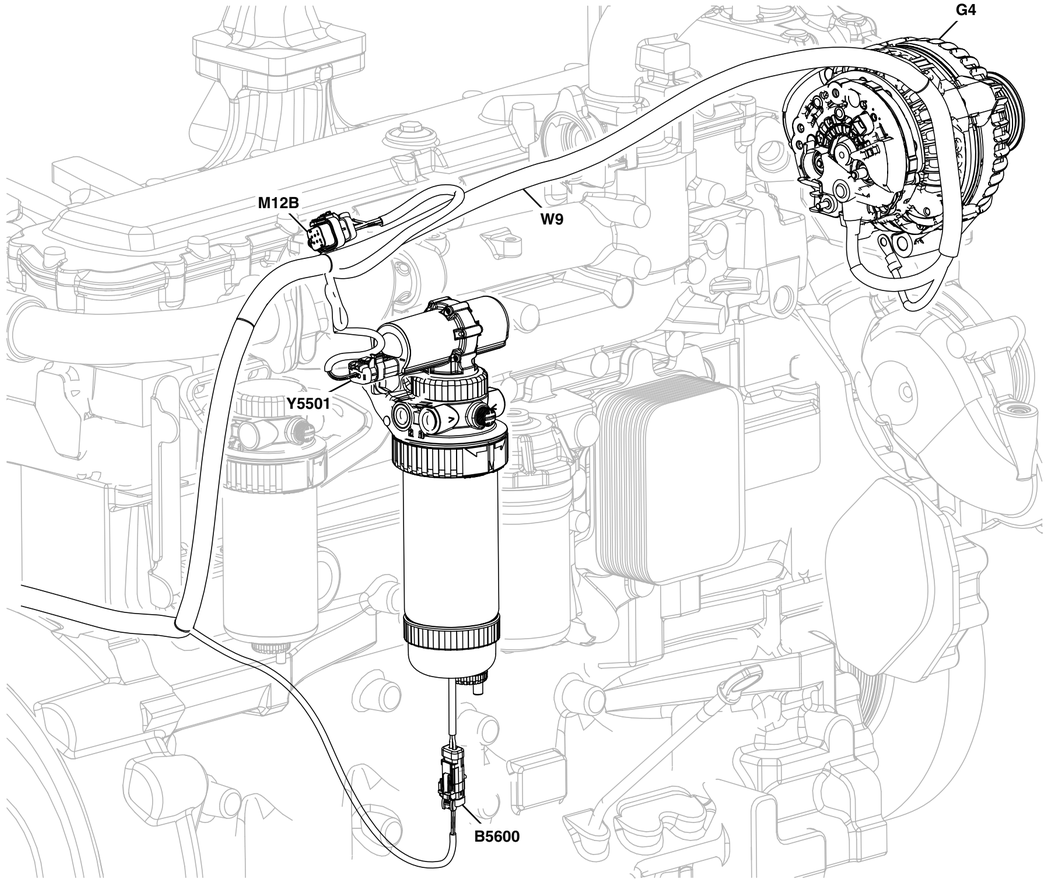
Load Center Harness (W3) Wiring Diagram (1 of 8) (S.N. 659436—)

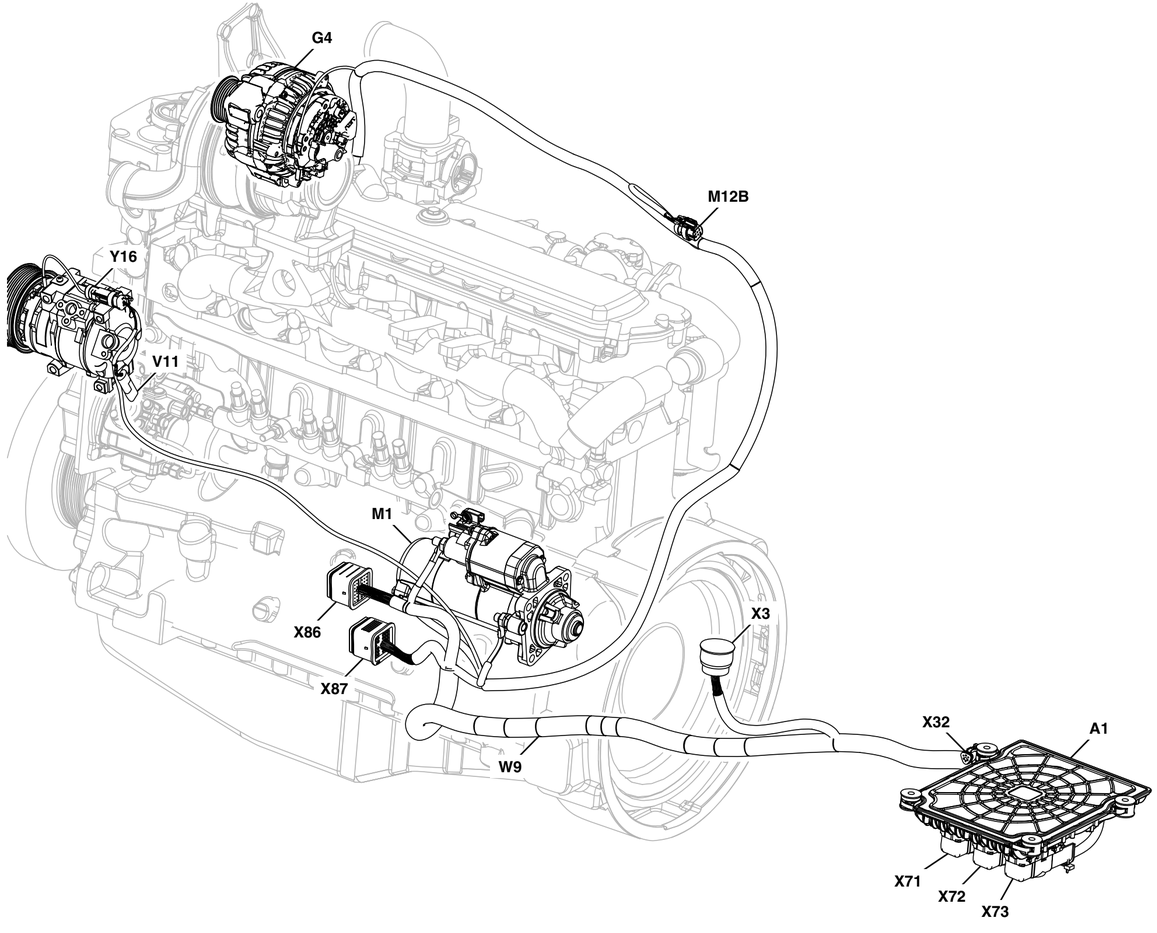
5— Continued on Sheet 4
G5—12 V Power Outlet
H1—Monitor Alarm
S21— Blower Speed Switch
S33— Seat Heater Switch (if equipped)
X1—Service ADVISOR™ Diagnostic Connector
X88— Heated Seat Switch 10-Pin Connector
X572— G06 BLK Splice
X573— M22 YEL Splice
X574— M23 LT GRN Splice
X575— R19 BLK Splice

DD00738,00001F9 -19-19NOV15-28/28

Engine Interface Harness (W9) Component Location (S.N 661438—)

XJ1201227 —UN—25SEP15





XJ1201227

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Engine Interface Harness (W9) Component Location (S.N 661438—)

BJ21193,000001D -19-19OCT15-3/4

B5208—Engine Coolant Temperature Sensor
B5301—Crankshaft Position Sensor
B5302—Camshaft Position Sensor
X5010—Engine Harness-to-Front Engine Harness 8-Pin Connector
Y5002—Suction Control Valve

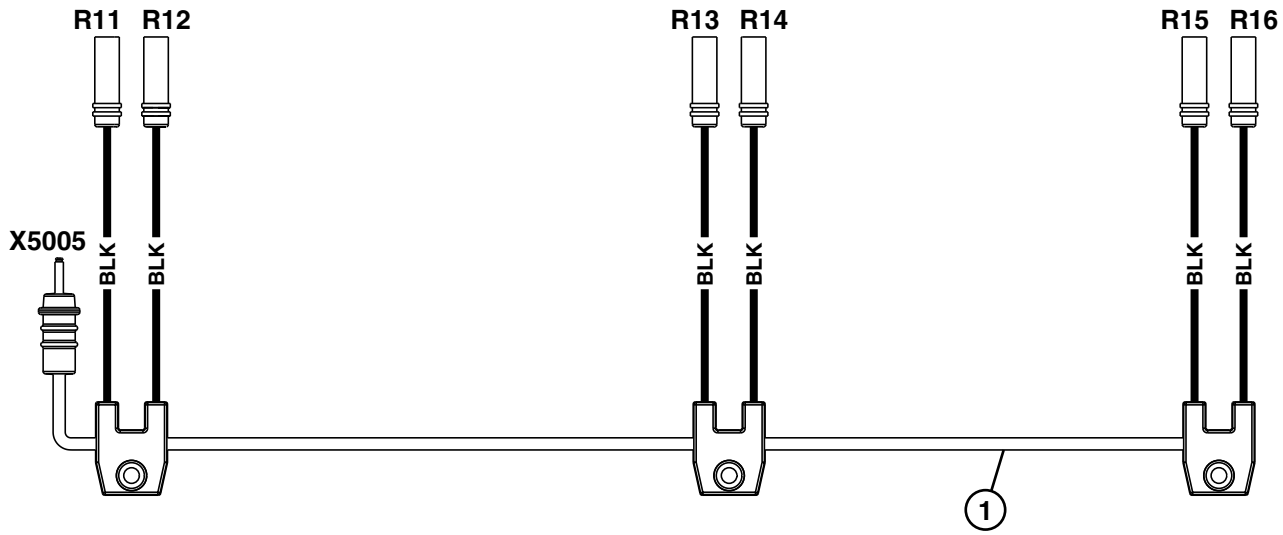
BJ21193,0000017 -19-13OCT15-2/2

Glow Plug Harness (W12) Component Location

For glow plug harness (W12) component location, See Engine Harness (W6) Component Location. (Group 9015-10.)

CW08338,0000F83 -19-05AUG13-1/1

Glow Plug Harness (W12) Wiring Diagram



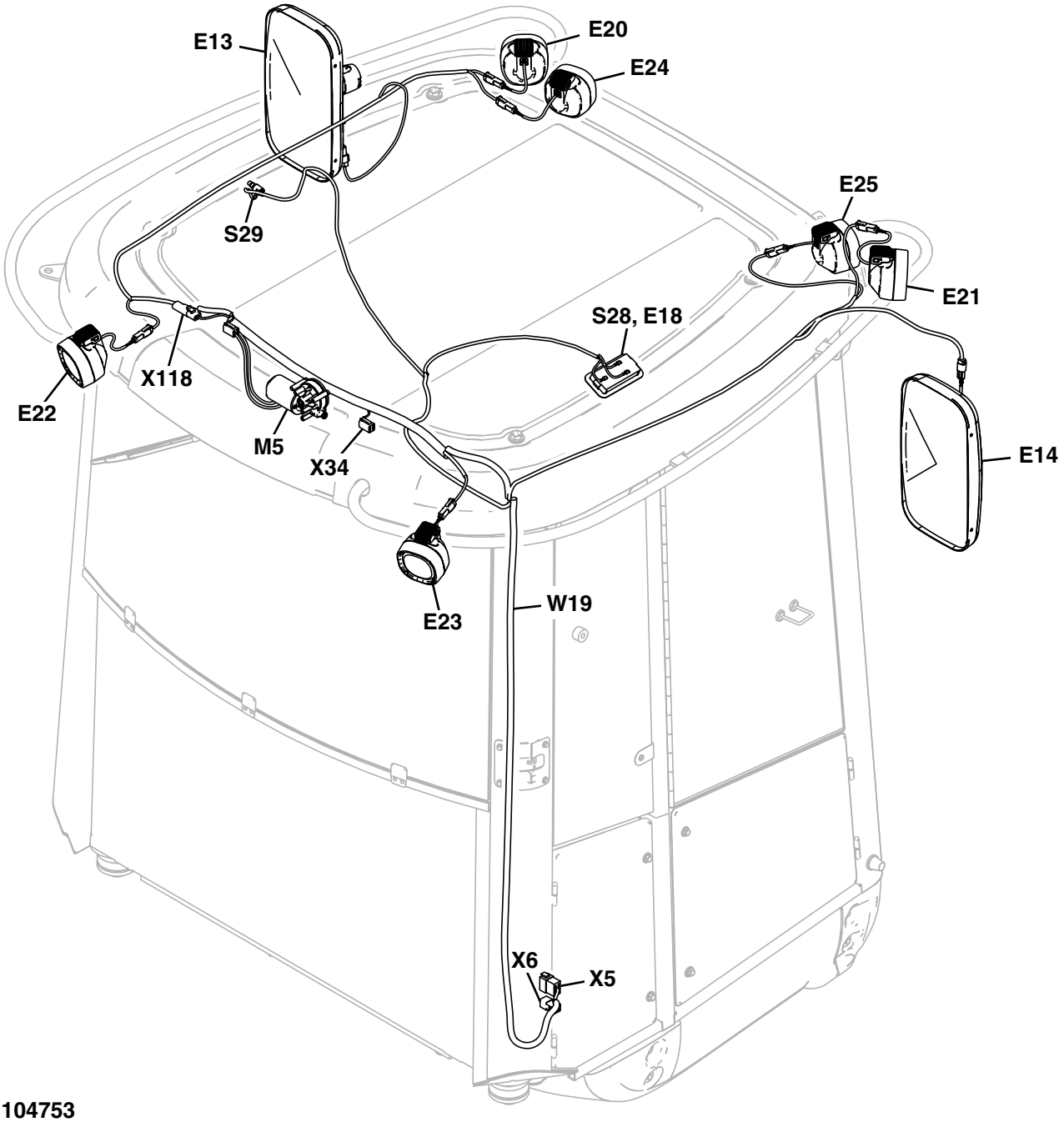
TX1142067

Glow Plug Harness (W12) Wiring Diagram

1— Buss Bar
R11— Glow Plug
R12— Glow Plug
R13— Glow Plug
R14— Glow Plug
R15— Glow Plug
R16— Glow Plug
X5005—Cold Start Harness-to-Glow Plug Harness 1-Pin Connector

CW08338,0000F84 -19-09AUG13-1/1

Cab Roof Harness (W19) Component Location



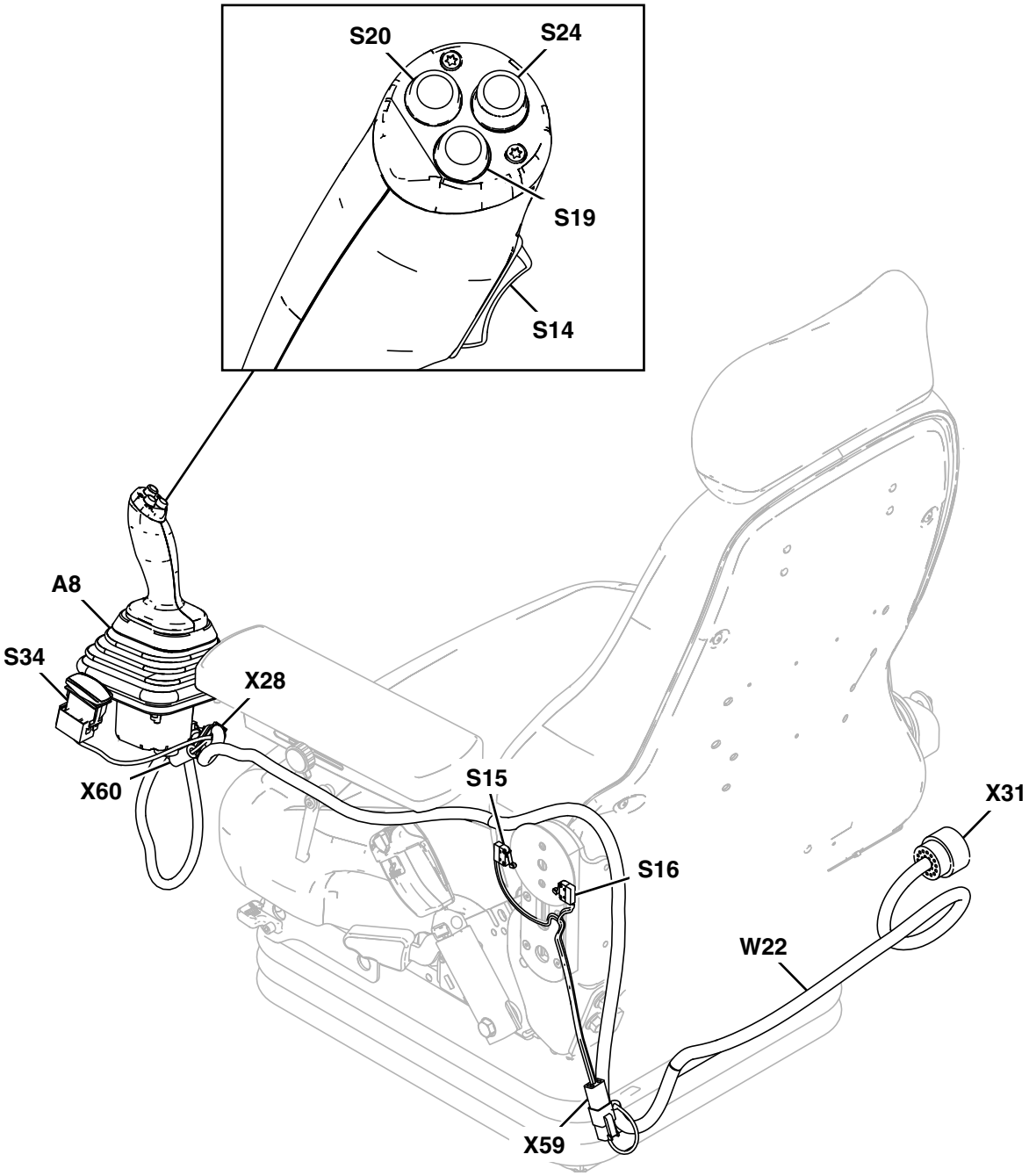
TX1104753

Cab Roof Harness (W19) Component Location

E13— Left Heated Mirror (if equipped)
E14— Right Heated Mirror (if equipped)
E18— Dome Light
E20— Left Front Work Light
E21— Right Front Work Light
E22— Left Rear Work Light
E23— Right Rear Work Light
E24— Left Front Auxiliary Light
E25— Right Front Auxiliary Light
M5—Rear Wiper Motor
S28— Dome Light Switch
S29— Door Switch
W19—Cab Roof Harness
X5— Load Center Harness-to-Cab Roof Harness 12-Pin Connector
X6— Load Center Harness-to-Cab Roof Harness 4-Pin Connector
X34— Cab Roof Harness-to-Radio Harness 6-Pin Connector
X118— Cab Roof Harness-to-Beacon Light Harness Connector

DP27668,0000051 -19-04JAN12-1/1

Joystick Steering Harness (W22) Component Location



TX1123378

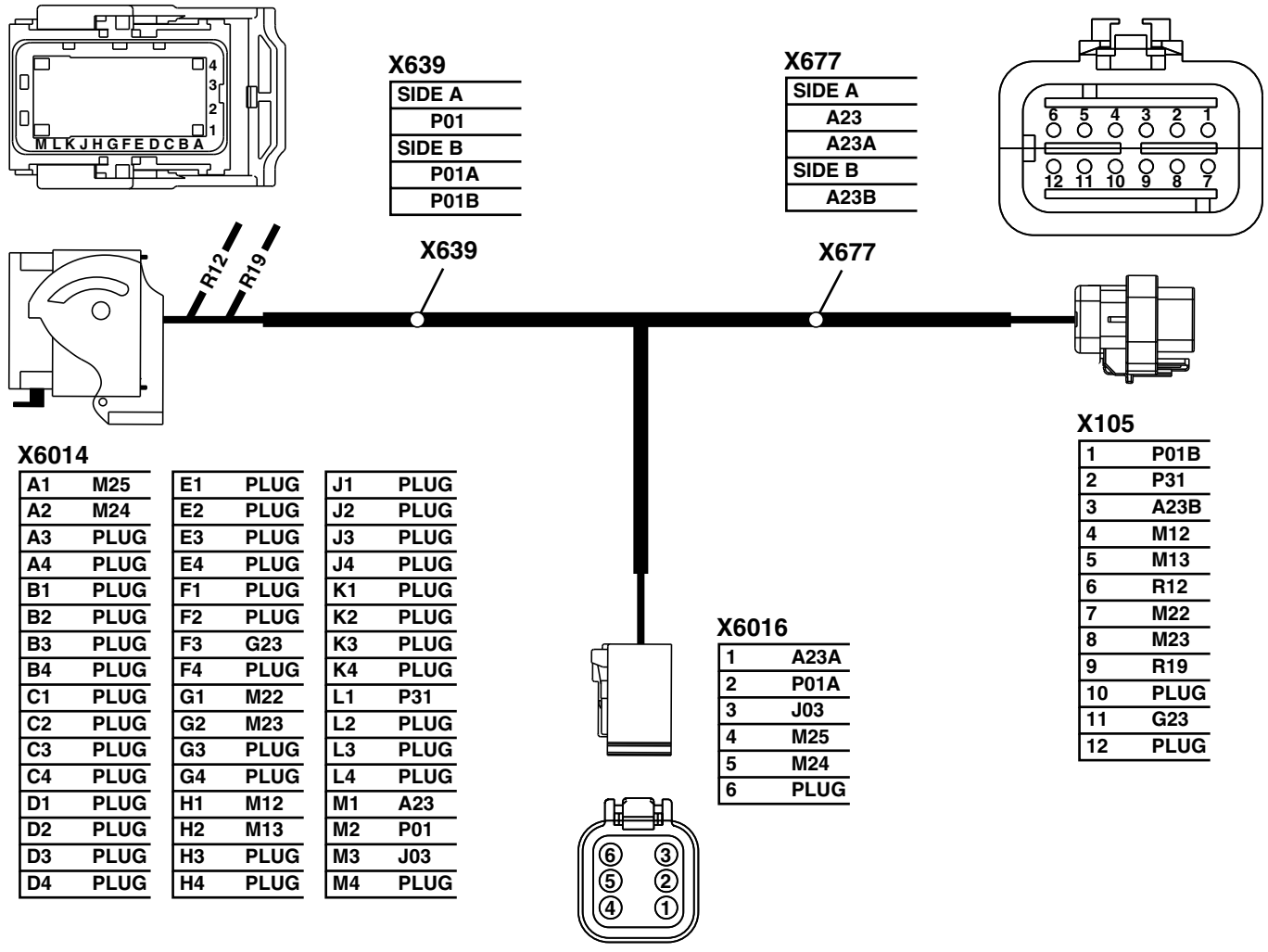
Joystick Steering Harness (W22) Component Location (if equipped)

A8— Joystick Steering Controller (JSC) (if equipped)
S14— Joystick Steering Forward, Neutral, Reverse (FNR) Switch
S15— Joystick Steering Arm Up Switch
S16— Joystick Steering Arm Down Switch
S19— Joystick Steering Gear Downshift Switch
S20— Joystick Steering Gear Upshift Switch
S24— Horn Switch (joystick steering lever)
S34— Joystick Steering Enable Switch
W22— Joystick Steering Harness (if equipped)
X28— Joystick Steering FNR Switch and Gear Select Switches Connector
X31— Load Center Harness-to-Joystick Steering Harness 23-Pin Connector
X59— Joystick Steering Arm Position Switches 4-Pin Connector
X60— Joystick Steering Controller (JSC) 6-Pin Connector

ML82895,000073A -19-04FEB16-1/1

Modular Telematics Gateway (MTG) Harness (W6002) Wiring Diagram—If Equipped

END #1	NUMBER	COLOR	END #2
X677	A23	ORG	X6014
X677	A23A	ORG	X6016
X677	A23B	ORG	X105
X6014	G23	BLK	X105
X6014	J03	TAN	X6016
X6014	M12	TEL	X105
X6014	M13	LT GRN	X105
X6014	M22	YEL	X105
X6014	M23	LT GRN	X105
X6014	M24	PUR	X6016
X6014	M25	PUR	X6016
X639	P01	RED	X6014
X639	P01A	RED	X6016
X639	P01B	RED	X105
X6014	P31	RED	X105
X6014	R12	BLK	X105
X6014	R19	BLK	X105



TX1105561

Modular Telematics Gateway (MTG) Harness (W6002) Wiring Diagram (if equipped)

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RG80575,00009F0 -19-24OCT11-1/2

NOTE: Pushing the ignition ON/engine START switch after the first push of the ignition OFF/engine STOP switch (S36) will cancel the shutdown mode.

- When machine ground speed is equal to or more than 0.5 km/h (0.3 mph) and the ignition OFF/engine STOP switch (S36) is pushed and held for more than 1 second, or if pushed twice, the ignition relay de-energizes immediately, stopping the engine and applying the park brake.

Glow Plug Circuit—When ignition ON/engine START switch is pushed once, ECU receives information from charge air cooler outlet temperature sensor (B5205) and determines if temperature is below a set point indicated in the following table.

Charge Air Cooler Outlet Temperature	Glow Plug Preheat Time In Seconds	Glow Plug Reheat Time In Seconds
5°C (41°F)	2*	10
0°C (32°F)	5*	10
-5°C (23°F)	5*	10
-10°C (14°F)	10*	10
-15°C (5°F)	15*	10

Glow Plug Preheat and Reheat Time Table

** Preheat continues an additional 5 seconds after WAIT TO START pop-up goes off.*

NOTE: At temperatures above 5°C (41°F), ADU will not display WAIT TO START pop-up.

For more information on charge air cooler outlet temperature sensor, see Engine Control Unit (ECU) Circuit Theory of Operation. (Group 9015-15.)

If charge air cooler outlet temperature is below a set point, ECU transmits a message across CAN data line to VCU requesting ADU to display WAIT TO START pop-up. VCU forwards message to ADU, which then displays pop-up.

Simultaneously, ECU energizes glow plugs relay (K5) by sending current from terminal 46 of ECU connector (X71) to coil of glow plugs relay.

NOTE: ECU will not energize glow plugs relay (K5) if battery voltage is less than 18 volts or more than 28 volts.

While glow plugs relay is energized, unswitched battery current flows through glow plugs 50 A fuse (in-line) (F65) to glow plugs located at each engine cylinder. Current also flows from glow plugs relay to terminal 49 of ECU connector (X72) to provide glow plug diagnostics to ECU.

When glow plugs relay has been energized for length of time indicated in glow plug preheat and reheat time table, ECU de-energizes glow plugs relay and transmits a message across CAN data line to VCU requesting ADU to cease displaying WAIT TO START pop-up. VCU forwards message to ADU, which then ceases displaying pop-up.

If charge air cooler outlet temperature is 5°C (41°F) or lower, ECU will continue preheat an additional 5 seconds after WAIT TO START pop-up goes off to allow operator time to notice pop-up has gone off and begin cranking engine before preheat ends.

If engine cranks, but does not start, ignition must be cycled OFF and ON to activate glow plug heating process again.

Turbocharger Cool Down Timer—To ensure the turbochargers have sufficient time to cool, if necessary, before the engine shuts down the VCU shall implement a shutdown delay. The ECU transmits a turbocharger cool down timer value via the CAN to the VCU. This value is calculated based upon engine load and engine speed with a minimum shutdown time of 0 seconds and a maximum time of 120 seconds. For each minute the loader operates above the counter upper threshold, 27 seconds are added to the timer. For each minute the loader operates below the counter lower threshold, 22 seconds are subtracted from the timer.

TURBOCHARGER COOL DOWN THRESHOLD	
Lower Threshold	Upper Threshold
65%	90%

If the VCU implements a shutdown delay, the engine will continue to run after the engine stop switch has been pressed on the sealed switch module (SSM) for less than 0.5 seconds until the cool down timer expires. The operator will receive a popup message on the advanced display unit (ADU) displaying the time remaining for the cool down timer.

Bypassing Turbocharger Cool Down—An immediate engine shutdown can be performed that bypasses the turbocharger cool down mode. This is accomplished by pushing and holding the engine stop switch for longer than 0.5 seconds or pushing and releasing the engine stop switch twice. A diagnostic trouble code (DTC) will be generated when turbocharger cool down is bypassed.

Charge Circuit—Alternator (G4) provides power to all machine circuits and charges the batteries when the engine is running.

Terminal B+ of the alternator is connected to battery positive (+) at all times.

When the ignition is ON, current flows from terminal 29 of ECU connector (X73) to the D+C terminal of the alternator. The current then flows through the alternator field windings, causing excitation of the windings. For more information, see Alternator Test. (Group 9015-20.)

Battery Voltage Monitoring—The VCU measures voltage from the 12-volt center tap (front battery) at terminal 39 of VCU connector (X42). The VCU also measures the 24-volt system voltage at terminals L1 and M1 of VCU connector (X41). The VCU sends the measured 12-volt and 24-volt information across the CAN data line to the ADU. The ADU calculates the voltage level of the rear battery by subtracting the measured 12-volt information from measured 24-volt information.

Continued on next page

Vehicle Control Unit (VCU) Circuit Theory of Operation

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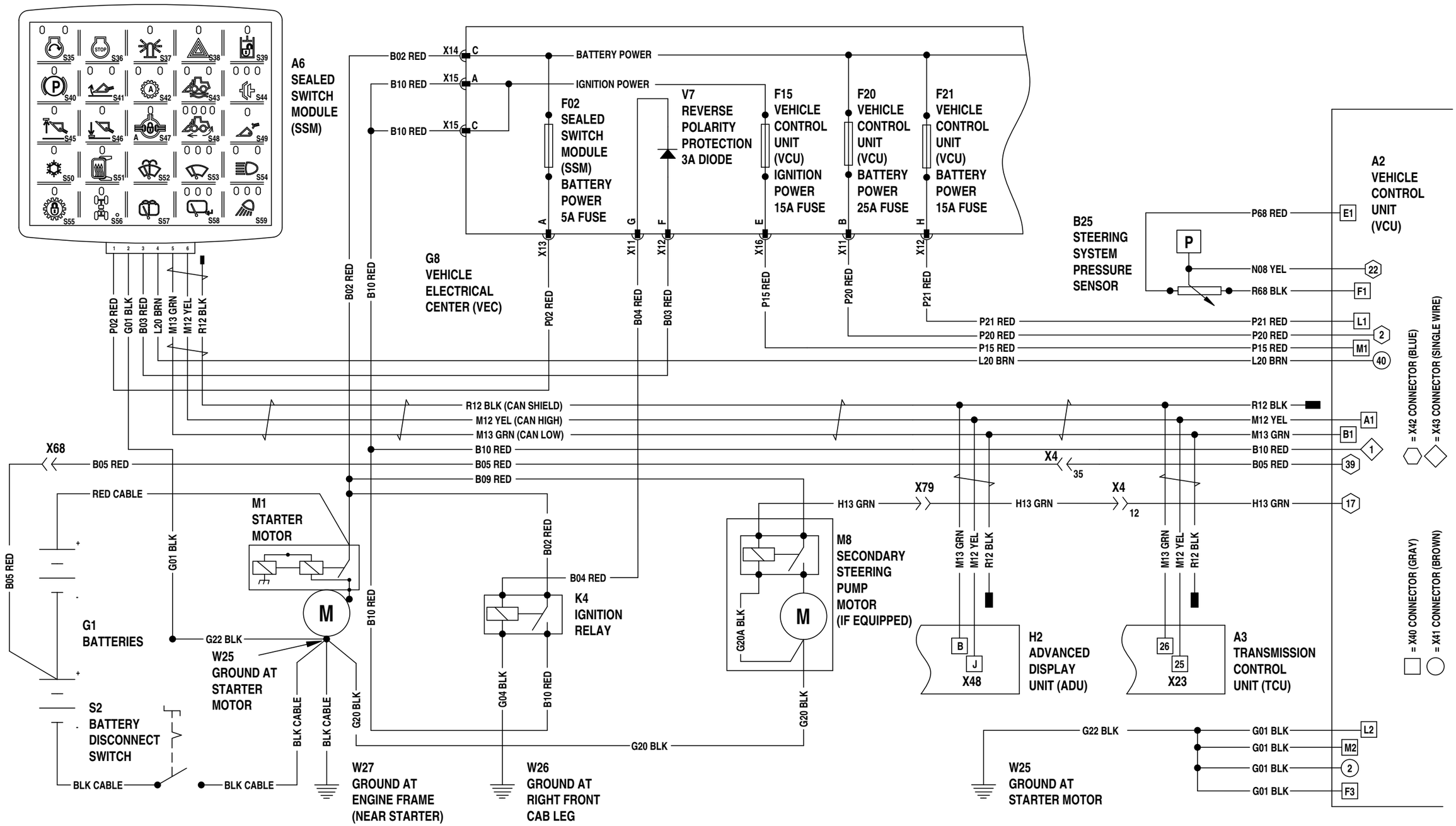

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Vehicle Control Unit (VCU) Circuit Schematic (1 of 6)

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The VCU also considers the axle oil temperature per the front and rear axle oil temperature sensors.

The following table shows approximate fan speed when ambient air temperature is 25°C (77°F) and the front and rear axle oil temperature is as indicated.

Axle temp values will have a 30-second time constant to help filter high temperature transient conditions that can occur in the axle cooling system.

Fan Speed	Axle Temperature
350 rpm (0%)	90°C 194°F
1350 rpm (100%)	100°C 212°F

The proportional fan speed can be read as a percentage in the DIAGNOSTICS/MACHINE SENSORS submenu of the ADU menu structure. See Display Unit—Main Menu—Diagnostics—Machine Sensors. (Operator's Manual.)

The proportional fan speed can be manually set from 0% to 100% for diagnostic purposes by accessing the MACHINE CONFIGURATION/FAN SPEED submenu of the ADU menu structure. See Advanced Display Unit (ADU)—Fan Speed. (Group 9015-16.)

Reversing Fan (If Equipped)—The reversing fan function reverses the fan direction to purge the cooling system of debris. The reversing fan function can be operated in manual or automatic mode. Automatic mode is the default mode and automatically reverses fan direction every 30 minutes unless the cycle time is changed or if manual mode is activated.

The reversing fan circuit must be enabled in the ADU menu structure for the reversing fan to function. The following reversing fan settings can be performed by accessing the appropriate submenu in the ADU menu structure.

- The reversing fan can be enabled or disabled by accessing the MACHINE CONFIGURATION/ENABLE OPTIONS submenu. See Advanced Display Unit (ADU)—Enable Options. (Group 9015-16.)
- The manual reverse mode can be activated by accessing the MACHINE SETTINGS/ACTIVATE REVERSING FAN submenu. See Display Unit—Main Menu—Settings. (Operator's Manual.)
- The reversing fan cycle time can be changed by accessing the MACHINE SETTINGS/REVERSING FAN CYCLE submenu. See Display Unit—Main Menu—Settings—Reverse Fan Cycle. (Operator's Manual.)

When the reversing fan timer in the VCU reaches full count or if manual mode is selected, the VCU begins the reversing sequence as follows:

1. The VCU ramps up the current of proportional fan solenoid (Y37) to slow the fan to minimum fan speed (approximately 500 rpm or 50%).
2. When fan speed is at minimum, the VCU sends current out terminal 30 of VCU connector (X42) to the reversing fan solenoid (Y38), energizing the solenoid. This causes the fan to reverse direction.
3. With the fan now operating in the reverse direction, the VCU ramps down the current applied to the proportional fan solenoid (Y37) until maximum fan speed (approximately 1350 rpm or 100%) is reached.
4. The VCU operates the fan at maximum speed in reverse direction for 15 seconds, then ramps up the proportional fan solenoid current until the fan is at minimum speed.
5. When the fan slows to minimum speed, the VCU stops sending current to the reversing fan solenoid (Y38), causing the fan to change back to forward direction.
6. With the fan operating in the forward direction, the VCU ramps down the proportional fan solenoid current until the normal operating fan speed is obtained.

When the reversing fan has completed a cycle, the reversing sequence cannot be activated again for 1 minute. If the reversing fan is in the automatic mode when the manual mode is activated, the reversing fan timer is stopped and then started again after the reversing fan sequence is completed.

When a manual reverse cycle is complete, the function returns to the automatic mode.

For hydraulic operation of the reversing fan circuit, see Hydraulic Reversing Fan Operation—If Equipped. (Group 9025-05.)

Continued on next page

A2—Vehicle Control Unit (VCU)
A6—Sealed Switch Module (SSM)
B38—Horn
E13—Left Heated Mirror (if equipped)
E14—Right Heated Mirror (if equipped)
E15—Rotary Beacon Light (if equipped)
E20—Left Front Work Light
E21—Right Front Work Light
E22—Left Rear Work Light
E23—Right Rear Work Light
E24—Left Front Auxiliary Light
E25—Right Front Auxiliary Light
F49—Service ADVISOR™ Engine and Dome Light Battery Power 5 A Fuse
G8—Vehicle Electrical Center (VEC)
S23—Horn Switch (steering column)
W26—Ground at Right Front Cab Leg
W27—Ground at Engine Frame (near starter)
X12—Vehicle Electrical Center 8-Pin BLK Connector
X40—Vehicle Control Unit (VCU) Connector
X41—Vehicle Control Unit (VCU) Connector
X42—Vehicle Control Unit (VCU) Connector
X43—Vehicle Control Unit (VCU) Connector
X230—Engine Compartment Light Switch 3-Pin Connector (not used)
X231—Engine Compartment Light 2-Pin Connector (not used)

Work Lights—The work light switch on the sealed switch module (SSM) (A6) has four modes:

- OFF (no LEDs on)
- Front Work Lights (left LED on)
- Front and Rear Work Lights (left and center LEDs on)
- All Work Lights (all LEDs on) (not used)

NOTE: Recycling the ignition power will not cause the work light mode to change. That is, if the work light function is set to Front Work Lights mode (left LED on) when ignition power is turned OFF, then the front work lights will come back on when the ignition power is turned ON again.

Holding the work light switch down for more than 1 second turns off all lights, regardless of which mode the work light function is in.

Front Work Lights Mode: When the work light switch on the SSM is pushed so only the left LED is on, the VCU sends current out terminals G1 and K1 of VCU connector (X40) to left and right front work lights (E20 and E21), causing the front work lights to come on. When in this mode, the VCU also causes the marker and tail lights to come on.

Front and Rear Work Lights Mode: When the left and center LEDs are on, the VCU sends current out terminal 1 of VCU connector (X42) to left and right front work lights (E20 and E21) and terminals G1 and K1 of VCU connector (X41) to left and right rear work lights (E22 and E23), causing the front and rear work lights to come on.

The VCU will also send current out terminal L3 of VCU connector (X40) to turn on left and right front auxiliary lights (E24 and E25).

When in this mode, the VCU causes the marker and tail lights to come on.

All Work Lights Mode: This mode is not available.

Horn (B38)—Pushing the horn switch (S23) on the steering column provides a ground to terminal 28 of VCU connector (X41). When the VCU detects ground at terminal 28, it sends current out terminal 3 of VCU connector (X42) to horn (B38), activating the horn.

Rotary Beacon Light (If Equipped) (E15)—The rotary beacon light circuit must be enabled in the ADU menu structure for the beacon light to function.

The rotary beacon light can be enabled or disabled by accessing the MACHINE CONFIGURATION/ENABLE OPTIONS submenu of the ADU menu structure. See Advanced Display Unit (ADU)—Enable Options. (Group 9015-16.)

When the beacon light switch on the SSM is pushed (LED on), the sealed switch module (SSM) (A6) transmits a message to the VCU to activate the rotary beacon light. The VCU then sends current out terminal 5 of VCU connector (X42) to rotary beacon light (E15).

Left and Right Heated Mirrors (If Equipped) (E13 and E14)—The heated mirrors circuit must be enabled in the ADU menu structure for the heated mirrors to function.

The heated mirrors can be enabled or disabled by accessing the MACHINE CONFIGURATION/ENABLE OPTIONS submenu of the ADU menu structure. See Advanced Display Unit (ADU)—Enable Options. (Group 9015-16.)

When the heated mirror switch on the SSM is pushed (LED on), the sealed switch module (SSM) (A6) transmits a message to the VCU to activate the heated mirrors. The VCU then sends current out terminal J4 of VCU connector (X40) to left heated mirror (E13) and right heated mirror (E14).

When the heated mirrors are activated, the heated mirrors will remain active for 15 minutes and then shut off automatically. Pushing the heated mirrors switch during the 15 minutes the heated mirrors circuit is active, turns off the circuit.

If ignition power is cycled when the heated mirrors are active, the circuit will turn off and will not reactivate when ignition power is turned back on. To reactivate the heat function, the heated mirror switch on the SSM must be pushed again.

Continued on next page

A1—Engine Control Unit (ECU)
A2—Vehicle Control Unit (VCU)
A3—Transmission Control Unit (TCU)
A6—Sealed Switch Module (SSM)
A12— Rear Camera (if equipped)
F02— Sealed Switch Module (SSM) Battery Power 5 A Fuse
F13— ADU, Monitor Alarm, Turn Signal, and Counter Switch Ignition Power 5 A Fuse
F33— Advanced Display Unit (ADU) Battery Power 5 A Fuse
G1—Batteries
G8—Vehicle Electrical Center (VEC)
H2—Advanced Display Unit (ADU)
K4—Ignition Relay
M1—Starter Motor
S2—Battery Disconnect Switch
S35— Engine Start Switch
V7—Reverse Polarity Protection 3 A Diode
W25—Ground at Starter Motor
W26—Ground at Right Front Cab Leg
W27—Ground at Engine Frame (near starter)
X11— Vehicle Electrical Center 8-Pin RED Connector
X12— Vehicle Electrical Center 8-Pin BLK Connector
X13— Vehicle Electrical Center 8-Pin ORG Connector
X14— Vehicle Electrical Center 2-Pin GRY Connector
X15— Vehicle Electrical Center 2-Pin BLK Connector
X17— Vehicle Electrical Center 8-Pin GRN Connector
X23— Transmission Control Unit (TCU) Connector
X40— Vehicle Control Unit (VCU) Connector
X41— Vehicle Control Unit (VCU) Connector
X48— Advanced Display Unit (ADU) 10-Pin Connector
X53— Sealed Switch Module (SSM) 6-Pin Connector
X72— Engine Control Unit (ECU) Connector
X101— Load Center Harness-to-Radar Object Detection Harness 6-Pin Connector

Advanced Display Unit (ADU) (H2)—The ADU uses the controller area network (CAN) 1 to communicate with the machine's electronic controllers through terminals 5 and 6 of ADU connector (X53). The ADU communicates mostly with the vehicle control unit (VCU) (A2), but also communicates with the engine control unit (ECU) (A1), transmission control unit (TCU) (A3), and sealed switch module (SSM) (A6).

ADU screen navigation is performed by using the five buttons near the top of the ADU. The ADU transmits a message across the CAN 1 data line to the VCU, informing the VCU of the status of the buttons. When a button is pushed, a message is sent to the VCU. The VCU will then communicate the appropriate response back to the ADU.

For more information on the CAN, see Controller Area Network (CAN) Circuit Theory of Operation. (Group 9015-15.)

NOTE: The hardware part number, serial number, software part number, and software version for the ADU can be accessed in the DIAGNOSTICS/MACHINE ID/ADU - ADVANCED DISPLAY UNIT submenu of the ADU menu structure. See Display Unit—Main Menu—Diagnostics—Machine ID. (Operator's Manual.)

ADU Power-Up (Power and Ground)—Unswitched power is supplied to the following components:

- Starter Motor (M1)
- Ignition Relay (K4)
- Sealed Switch Module (SSM) (A6) (terminal 1) [from sealed switch module (SSM) battery power 5 A fuse (F02)]
- Advance Display Unit (ADU) (H2) [from advanced display unit (ADU) battery power 5 A fuse (F33)]

The ADU receives unswitched battery power from ADU battery power 5 A fuse (F33) at terminal F of ADU connector (X48). Ground is provided at terminal C of ADU connector (X48).

Unswitched battery power is also available to engine control unit (ECU) (A1), vehicle control unit (VCU) (A2), and transmission control unit (TCU) (A3). For power-up information on the ECU, TCU, and VCU, see the theory of operation of specific component:

- Engine Control Unit (ECU) Circuit Theory of Operation. (Group 9015-15.)
- Vehicle Control Unit (VCU) Circuit Theory of Operation. (Group 9015-15.)
- Transmission Control Unit (TCU) Circuit Theory of Operation. (Group 9015-15.)

When the engine start switch (S35) is pushed once, current flows from terminal 3 of SSM connector (X53), through reverse polarity protection diode (V7), to the coil of ignition relay (K4), energizing the relay. With the ignition relay energized, current flows through ADU, monitor alarm, turn signal, and counter switch ignition power 5 A fuse (F13), to terminal H of ADU connector (X48), powering up the ADU.

When powered up, the ADU activates the appropriate lights and icons in the monitor display window, and moves the gauge pointers to the appropriate locations per machine status. For more information on the monitor warning indicators and gauges, see Advanced Display Unit (ADU) and see Display Unit Functions. (Operator's Manual.)

ADU Menu Structure—The ADU contains menus designed for monitoring certain machine functions for operational and/or diagnostic purposes. It also provides a means for viewing and clearing diagnostic trouble codes, enabling and disabling options, and adjusting certain machine and monitor settings. For more information on the ADU menu structure, see Advanced Display Unit (ADU)—Service Mode. (Group 9015-16.)

Anti-Theft Security—If the anti-theft security system is enabled, a security screen will appear requiring a valid PIN to be entered. For information on entering the PIN, see Display Unit—Main Menu—Security. (Operator's Manual.)

If a valid PIN is not entered within 5 minutes after ignition power-up, the VCU will turn off ignition power. For more information on anti-theft security system, see Start and Charge Circuits Theory of Operation. (Group 9015-15.)

Continued on next page

RG80575,0000A67 -19-15SEP16-2/3

Various information on the auto-differential lock system, such as beam request, beam status, and differential lock solenoid status, can be monitored by accessing the DIAGNOSTICS/AUTO DIFF LOCK menu in the ADU menus. See Display Unit—Main Menu—Diagnostics—Auto Diff Lock. (Operator's Manual.)

Radar Operation—The ground speed radar unit is an ultra high-frequency (microwave) transmitter/receiver that measures doppler frequency shift. The doppler frequency shift is based on the doppler effect.

An example of the doppler effect is the sound that a moving train makes as it approaches and subsequently passes an observer. To the observer, the pitch (frequency) of the train whistle is higher as the train approaches and lower after the train passes.

The higher pitch sound created as the train comes toward the observer occurs because the sound waves are compressed (closer together). The lower pitch sound created as the train moves away from the observer occurs because the sound waves are stretched (farther apart). The faster the train is moving, the greater the shift in frequency.

The radar transmitter emits low-powered microwave energy that bounces off the ground. The bounced wave, known as an echo, is detected by the radar receiver. The radar unit compares the difference between the transmitted wave frequency and the received (echo) frequency to determine how fast the vehicle is moving relative to the ground. The ground speed information is then transmitted across the CAN 2 data line to the VCU.

The doppler frequency shift is affected by the mounting angle of the radar unit. Vehicle loading and ground contour will affect radar-to-ground angle, which results in varying vehicle ground speed calculations, even though vehicle speed remains constant. This effect is overcome by using two transmitter/receiver antennas (dual-beams), one pointing forward and one pointing to the rear of the machine. As the machine pitches downward, the forward antenna will give a result that is slower than actual speed, while the one pointing to the rear will give a result that is faster than actual speed. The actual vehicle speed is obtained by averaging the signals from forward and rear beams.

RG80575,0000A64 -19-14AUG12-3/3

Advanced Display Unit (ADU)—Enable Options

This menu enables and disables installed machine options.

The enable options menu is a function of service mode. See Advanced Display Unit (ADU)—Service Mode. (Group 9015-16.)

To select enable options:

1. Push and hold the SELECT button for approximately 5 seconds to access service mode.
2. From the MAIN MENU, push the DOWN button until MACHINE CONFIGURATION is highlighted, then push the SELECT button.
3. ENABLE OPTIONS will be highlighted. Push the SELECT button.
4. Push the DOWN button until desired option is highlighted.
5. Push the SELECT button to ENABLE or DISABLE highlighted option.

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Advanced Display Unit (ADU)—Tire Size

This menu allows to select the appropriate machine tire size.

The tire size menu is a function of service mode. See Advanced Display Unit (ADU)—Service Mode. (Group 9015-16.)

To select tire size:

1. Push and hold the SELECT button for approximately 5 seconds to access service mode.
2. From the MAIN MENU, push the DOWN button until MACHINE CONFIGURATION is highlighted, then push the SELECT button.
3. Push the DOWN button until TIRE SIZE is highlighted. Push SELECT button.
4. Push the DOWN button until desired tire size is highlighted.
5. Push the SELECT button to store setting.

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Advanced Display Unit (ADU)—Fan Speed

NOTE: When fan speed menu is active, the proportional fan is controlled by the manual setting, even if any of the control temperatures are at the maximum limit.

The machine cooling fan speed is displayed as a percentage of maximum speed. When fan speed is set, it will override the calculated fan speed and remain at this setting until ignition is OFF. For additional information, see Vehicle Control Unit (VCU) Circuit Theory of Operation. (Group 9015-05.)

The fan speed menu is a function of service mode. See Advanced Display Unit (ADU)—Service Mode. (Group 9015-16.)

To select fan speed:

1. Push and hold the SELECT button for approximately 5 seconds to access service mode.
2. From the MAIN MENU, push the DOWN button until MACHINE CONFIGURATION is highlighted, then push the SELECT button.
3. Push the DOWN button until FAN SPEED is highlighted. Push SELECT button.

NOTE: At the next ignition power up, the fan will return to automatic control.

4. Push the UP or DOWN button until desired fan speed is displayed.

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5. Select Connect to Model on the Connection Options dialog box, and click OK.

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Connections Options Dialog Box

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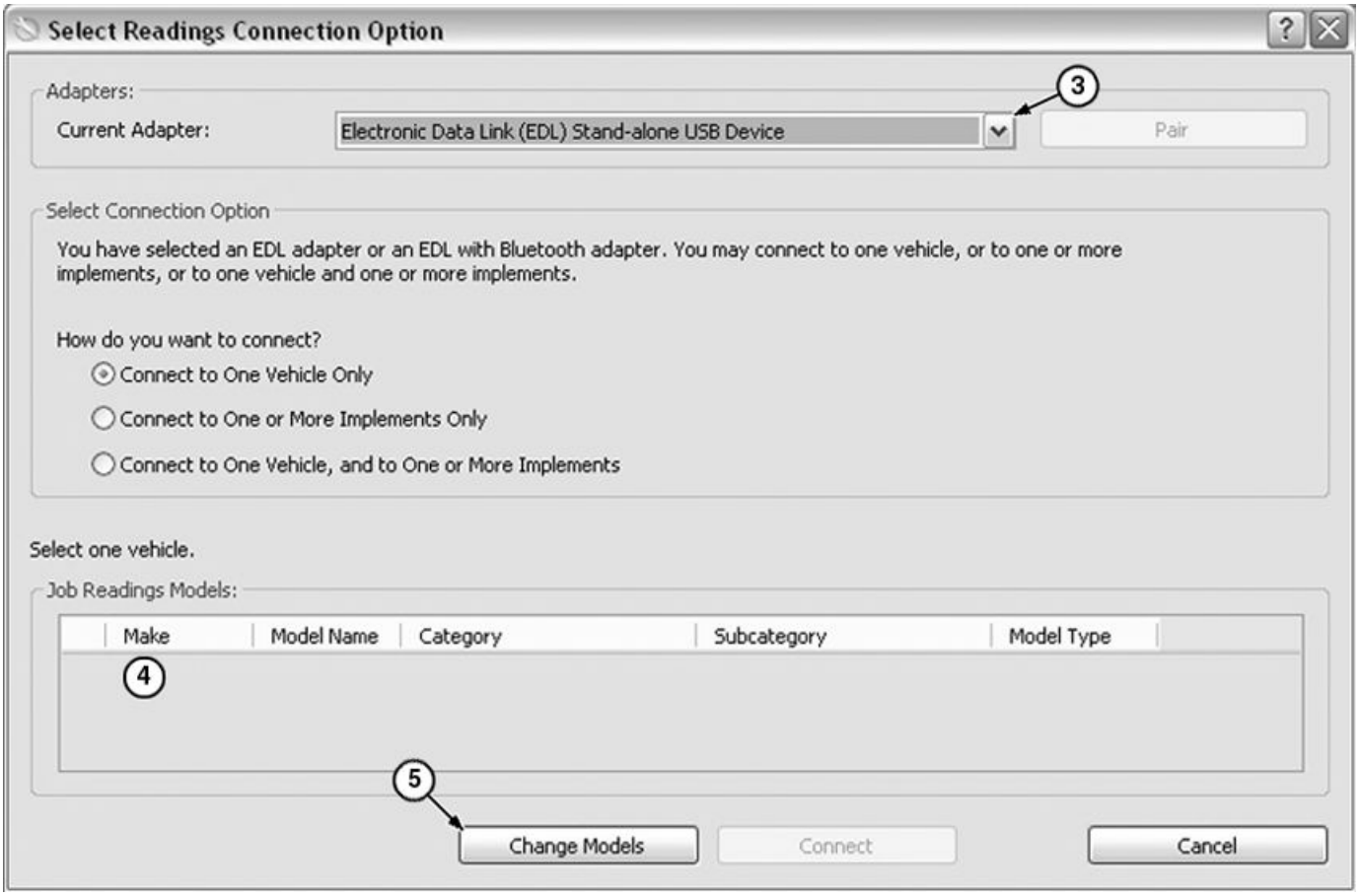

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Select Readings Connection Option Dialog Box

3— Adapter Drop-Down List **4— Selected Models List** **5— Change Models Button**

6. On the Select Readings Connection Option dialog box, make sure that the appropriate adapter is displayed. If not, select correct adapter from Current Adapter drop-down list (3). Options include:
   - Electronic Data Link (EDL) Stand-alone USB Device
   - Electronic Data Link (EDL) Using Bluetooth
   - Parallel Data Module (PDM)
   - Parallel Data Module (PDM) With USB Adapter
7. Make sure the correct machine to connect to displays in selected models list (4). If not, click Change Models button (5).
8. Click Connect to connect to machine.

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BE7856,00001B3 -19-03NOV11-3/4

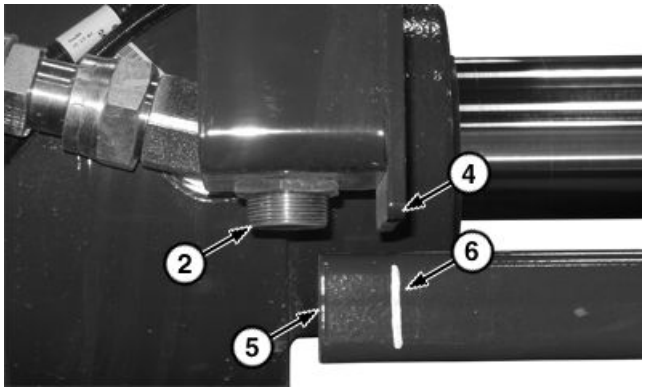
Return-to-Dig (RTD) Adjustment—Z-Bar Linkage

SPECIFICATIONS	
RTD Bar Adjustment Cap Screw Torque	121 N·m 89 lb.-ft.
Air Gap (RTD switch-to-RTD bar) Distance	5—8 mm 0.20—0.32 in.
RTD Switch Nut Torque	75 N·m 55 lb.-ft.

OTHER MATERIAL
PM37509 Cure Primer
PM37477 Thread Lock and Sealer (medium strength)

NOTE: The machine hydraulic system must be at operating temperature before making the adjustment. Cycle the bucket cylinder through full travel at least four times to ensure oil in the cylinder is warm.

1. Warm hydraulic oil. See Hydraulic Oil Warm-Up Procedure. (Group 9025-25.)
2. Raise boom to allow clearance for full bucket dump position.
3. Push and release return-to-dig (RTD) button on SSM to enable RTD (LED on).
4. Move loader control lever to return-to-dig detent position and release. Bucket will roll back and stop at current RTD setting.
5. After control lever returns to neutral, install an alignment mark (6) on RTD bar (5) at edge of switch bracket (4).



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Alignment Mark

2— Return-to-Dig (RTD) Switch
4— Edge of Switch Bracket
5— Return-to-Dig (RTD) Bar
6— Alignment Mark

NOTE: RTD switch operates by sensing the RTD bar moving out of view of the RTD switch. Use the alignment mark to properly adjust RTD stopping point.

6. Using hydraulic control lever, move the boom and bucket in the desired return-to-dig position. Stop engine.

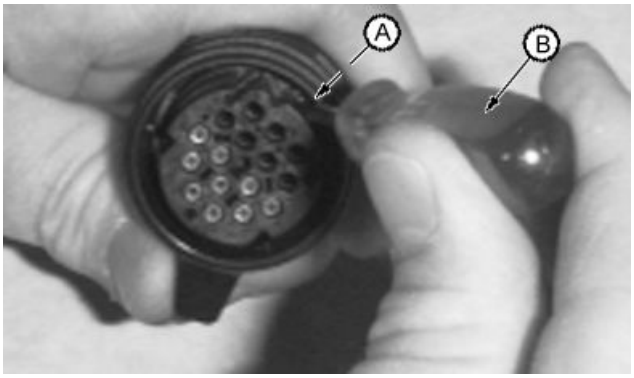
Continued on next page

BE7856,00001BD -19-07FEB13-1/3

Replace Metri-Pack® Connectors

1. A small locking tab (A) is located inside the Metri-Pack® connector. Use a small screwdriver (B) to move tab outward to the first detent position; the tab will “click.”

A—Tab **B—Screwdriver**



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Metri-Pack is a trademark of Delphi Connection Systems

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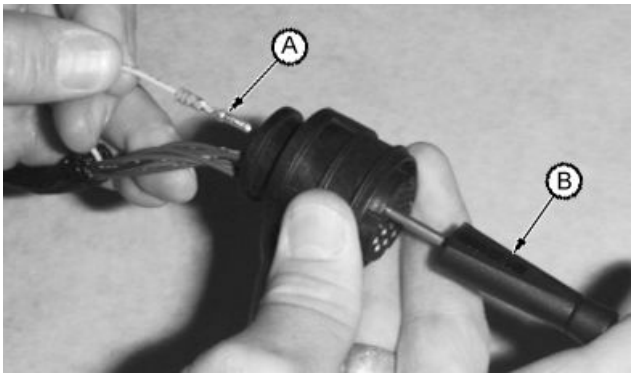
2. Slide JDG939 Metri-Pack® Extractor Tool (B) into connector body until it is positioned over terminal contact.
3. Pull wire out of connector body.

IMPORTANT: Install contact in proper location using correct size grommet.

4. Push contact straight into connector body until positive stop is felt.
5. Pull on wire slightly to be certain contact is locked in place.
6. Transfer remaining wires to correct terminal in new connector.



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A—Wire **B—Extractor Tool**

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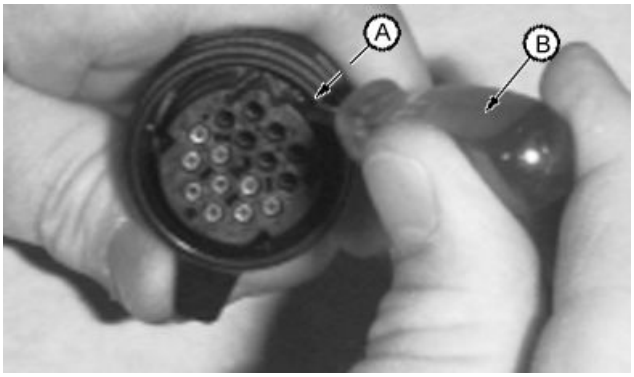
7. Use a small screwdriver (B) to move tab (A) inward to the first detent position; the tab will “click” and lock the wires in the connector body.

A—Tab **B—Screwdriver**



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TeamMate™ Axles

For additional information on TeamMate™ IV axles and components:

- For front axle, see TeamMate™ IV 1200 Series Inboard Planetary Axles. (CTM140119.)
- For rear axle, see TeamMate™ IV 1200 Series Inboard Planetary Axles. (CTM140119.)

TeamMate is a trademark of Deere & Company

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Power Train Operation

NOTE: For location of components, see Power Train Component Location. (Group 9020-10.)

The power train consists of the following components:

- Drive damper
- Drive shaft (engine to torque converter)
- Torque converter
- Transmission
- Front and rear drive shafts (transmission to axle)
- Park brake
- Front and rear axles
- Differential lock

Engine power is transferred from the drive damper on the engine flywheel, through an external drive shaft containing universal joints, to the torque converter.

The torque converter hydraulically transfers power to the transmission. For information on how the torque converter operates, see Torque Converter Operation. (Group 9020-05.)

Power is routed through the transmission to an output shaft containing a front yoke and a rear yoke. How the power is routed through the transmission depends on gear selection. For information on gear selection and transmission operation, see the following stories:

- Transmission Clutch Pack Engagement and Solenoids Activated. (Group 9020-05.)
- Transmission Operation—First Gear Forward. (Group 9020-05.)

From the rear output yoke of the transmission, power flow through a telescoping drive shaft assembly that connects to the rear axle.

From the front output yoke of the transmission, power flow through a telescoping drive shaft assembly that connects to the front axle. The front driveline contains a multiple wet-disk park brake that also functions as a bearing support for the front driveline. For information on how the park brake operates, see Park Brake Operation. (Group 9020-05.)

The front axle is mounted directly to the loader frame and is equipped with a hydraulic locking differential.

The rear axle is mounted on an oscillating pivot. The rear axle can be equipped with either the standard non-locking differential or the optional hydraulic locking differential.

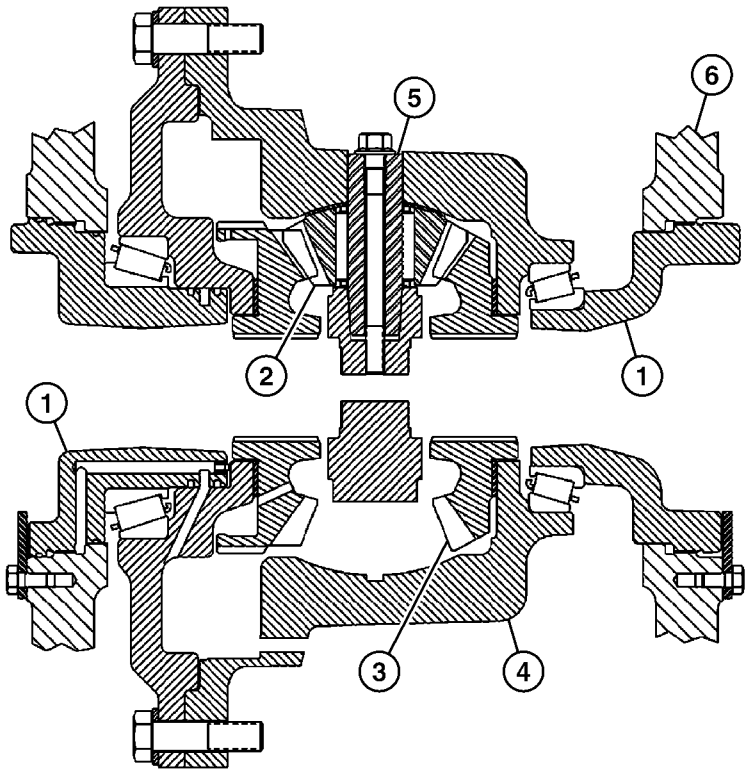
For information on how the standard differential operates, see Standard Differential Operation. (Group 9020-05.)

For information on how the locking differential operates, refer to the following stories:

- Differential Lock Operation. (Group 9020-05.)
- Auto-Differential Lock Circuit Theory of Operation. (Group 9015-05.)

BE7856,0000116 -19-08APR14-1/1

Standard Differential Operation



TX1026946 —UN—03AUG07

TX1026946

1— Bearing Quill (2 used)
2— Bevel Pinion Gear (4 used)
3— Bevel Side Gear (2 used)
4— Differential Housing
5— Bevel Pinion Shaft (3 used)
6— Differential Gear Case

The standard differential uses bevel pinion gears (2) and bevel side gears (3) that rotate with the differential housing (4) as one unit.

Each axle receives the same rotation; therefore each wheel turns at the same speed when moving in a straight forward direction.

When the machine enters a turn, the inside wheel turns slower than the outside wheel. The bevel pinion gears are forced to rotate on their own bevel pinion shaft axis (5) and “walk around” the slower bevel side gear.

The rotating differential housing and bevel pinion shafts let the differential bevel pinion gears rotate around the slow-moving bevel side gear. While the opposite bevel side gear rotates at a faster speed.

For additional information on TeamMate™ IV axles and components:

- For front axle, see TeamMate™ IV 1200 Series Inboard Planetary Axles. (CTM140119.)
- For rear axle, see TeamMate™ IV 1200 Series Inboard Planetary Axles. (CTM140119.)

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JW40272,0000165 -19-13JUN16-1/1

11— Hydraulic Pump Manifold
21— Axle Cooling Filter (if equipped) (2 used)
22— Axle Circulation Pump (if equipped)
23— Axle Oil Cooler (if equipped) (2 used)
39— Transmission Oil Cooler
41— Rear Axle-to-Axle Circulation Pump Line (if equipped)
42— Front Axle-to-Axle Circulation Pump Line (if equipped)
43— Park Brake
53— Front Axle Cooler-to-Front Axle Line
54— Rear Axle Cooler-to-Rear Axle Line
105— Axle Circulation Pump-to-Front Axle Oil Filter Line (if equipped)
106— Axle Circulation Pump-to-Rear Axle Oil Filter Line (if equipped)
107— Front Axle Oil Filter-to-Front Axle Oil Cooler Line (if equipped)
108— Rear Axle Oil Filter-to-Rear Axle Oil Cooler Line (if equipped)
109— Park Brake-to-Hydraulic Pump Manifold Line
110— Front Axle Dipstick
111— Front Service Brake Inspection Port (2 used)
112— Front Axle Breather
113— Park Brake Breather
114— Front Differential Lock-to-Hydraulic Pump Manifold Line
115— Front Axle Service Brake Line
116— Rear Axle Service Brake Line
117— Thermal Bypass Valve
118— Rear Axle Differential Lock-to-Hydraulic Pump Manifold Line
119— Rear Axle Breather
120— Rear Service Brake Inspection Port (2 used)
121— Thermal Bypass Valve-to-Transmission Oil Cooler Line
122— Rear Axle Dipstick
123— Transmission Oil Cooler-to-Thermal Bypass Valve Line
124— Torque Converter
125— Hydraulic Pump Drive
126— Transmission Oil Filter Manifold
127— Transmission Oil Filter
128— Clutch K2 Test Port (with quick coupler)
129— Forward Clutch KV Test Port (with quick coupler)
130— Clutch K3 Test Port
131— Output Shaft (front axle)
132— Sight Gauge
133— Transmission Control Valve
134— Clutch K1 Test Port (with quick coupler)
135— Reverse Clutch KR Test Port (with quick coupler)
136— Clutch K4 Test Port
B28— Torque Converter Input Speed Sensor
B29— Torque Converter Output Speed Sensor
B30— Internal Clutch Speed Sensor
B73A— Front Axle Oil Temperature Sensor
B73B— Front Axle Oil Temperature Sensor (if equipped)
B74— Rear Axle Oil Temperature Sensor (if equipped)

BE7856,0000172 -19-13OCT11-2/2

Transmission Clutch Slippage

BE7856,0000126 -19-23JAN12-1/12

Transmission Clutch Slippage Diagnostic Procedure

BE7856,0000126 -19-23JAN12-2/12

1 Diagnostic Trouble Code Check	Check for active diagnostic trouble codes (DTC) using one of the following methods: • Monitor Menus: See Display Unit—Main Menu—Codes—Active Codes. (Operator's Manual.) • Service ADVISOR™ Application: See Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application. (Group 9015-15.) Are any diagnostic trouble codes present?	**YES:** Repair malfunction causing codes. **NO:** Go to Oil Level Check.

BE7856,0000126 -19-23JAN12-3/12

2 Oil Level Check	Check oil level. See Check Transmission Oil Level. (Operator's Manual.) Is oil level to specification?	**YES:** Go to Oil Type or Viscosity Check. **NO:** Add recommended oil. See Transmission, Park Brake, and Axle Oil. (Operator's Manual.)

Continued on next page

BE7856,0000126 -19-23JAN12-4/12

9 Transmission Control Valve Orifice Check	Inspect transmission control valve orifices. See Transmission Hydraulic Control Valve Disassemble and Assemble. (Group 0360.) Are transmission control valve orifices plugged?	**YES:** Clean transmission control valve orifices. **NO:** Go to Transmission Manifold Plate Check.

BE7856,000012B -19-27JAN12-11/12

10 Transmission Manifold Plate Check	Remove transmission manifold plate and check for plugged screens. See Transmission Hydraulic Control Valve Remove and Install. (Group 0360.) Is screen plugged with debris?	**YES:** Clean or replace screen. **NO:** Checks complete.

BE7856,000012B -19-27JAN12-12/12

Transmission Shifts Too Fast

BE7856,000012C -19-23JAN12-1/7

Transmission Shifts Too Fast Diagnostic Procedure

BE7856,000012C -19-23JAN12-2/7

1 Diagnostic Trouble Code Check	Check for active diagnostic trouble codes (DTC) using one of the following methods: • Monitor Menus: See Display Unit—Main Menu—Codes. (Operator's Manual.) • Service ADVISOR™ Application: See Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application. (Group 9015-15.) Are any diagnostic trouble codes (DTC) present?	**YES:** Repair malfunction causing diagnostic trouble code. **NO:** Go to Oil Type and Viscosity Check.

BE7856,000012C -19-23JAN12-3/7

2 Oil Type or Viscosity Check	Check transmission oil. See Transmission, Park Brake, and Axle Oil. (Operator's Manual.) Is correct oil used?	**YES:** Go to Transmission System Pressure Check. **NO:** Replace transmission oil with correct oil. See Transmission, Park Brake, and Axle Oil. (Operator's Manual.)

BE7856,000012C -19-23JAN12-4/7

3 Transmission System Pressure Check	Check transmission system pressure. Perform Transmission System Pressure Test. (Group 9020-25.) Is transmission system pressure to specification?	**YES:** Go to Transmission Control Valve Check. **NO:** Repair or replace transmission pressure regulating valve. See Transmission Hydraulic Control Valve Disassemble and Assemble. (Group 0360.)

Continued on next page

BE7856,000012C -19-23JAN12-5/7

6 Transmission Clutch Pack Check	Check transmission clutch packs for warped disks and plates. See Clutches and Input and Output Shafts Remove. (Group 0350.) Are clutch pack disks and plates warped or damaged?	**YES:** Replace clutch packs as needed. **NO:** Checks complete.

BE7856,0000135 -19-23JAN12-8/8

Torque Converter Stall RPM

BE7856,0000136 -19-27JAN12-1/8

Torque Converter Stall RPM Diagnostic Procedure

BE7856,0000136 -19-27JAN12-2/8

1 Transmission Oil Level Check	Check transmission oil level. See Check Transmission Oil Level. (Operator's Manual.) Is oil at correct level?	**YES:** Go to Transmission Oil Type Check. **NO:** Add recommended oil. See Transmission, Park Brake, and Axle Oil. (Operator's Manual.)

BE7856,0000136 -19-27JAN12-3/8

2 Transmission Oil Type Check	Check transmission oil type. See Transmission, Park Brake, and Axle Oil. (Operator's Manual.) Is transmission oil correct type?	**YES:** Go to Transmission Oil Temperature Check. **NO:** Change transmission oil to correct type. See Drain and Refill Transmission Oil and Replace Filter. (Operator's Manual.)

BE7856,0000136 -19-27JAN12-4/8

3 Transmission Oil Temperature Check	Check transmission oil temperature by accessing the DIAGNOSTICS / TRANSMISSION/AXLE submenu in the ADU menu structure. See Display Unit—Main Menu—Diagnostics—Transmission/Axle. (Operator's Manual.) Is transmission oil temperature at operating specification?	**YES:** Go to Aerated Oil Check. **NO:** See Transmission Oil Warm-Up Procedure. (Group 9020-25.)

BE7856,0000136 -19-27JAN12-5/8

4 Aerated Oil Check	Check if oil is aerated. Is oil aerated?	**YES:** See Oil Aerated. (Group 9020-15.) **NO:** Go to Torque Converter Relief Valve Check.

Continued on next page

BE7856,0000136 -19-27JAN12-6/8

3 Axle Oil Check	Check axle oil. See Transmission, Park Brake, and Axle Oil. (Operator's Manual.) Is correct oil used?	**YES:** Go to Air in Service Brake System Check. **NO:** Drain incorrect oil and fill to proper level with correct oil. See Transmission, Park Brake, and Axle Oil. (Operator's Manual.)

BE7856,0000142 -19-23JAN12-5/8

4 Air in Service Brake System Check	Check service brake system for air. See Service Brake Bleeding Procedure. (Group 9020-20.) Is air in service brake system?	**YES:** Bleed air out of service brake system. **NO:** Go to Service Brake Disk Check.

BE7856,0000142 -19-23JAN12-6/8

5 Service Brake Disk Check	Check for worn service brake disks. See External Service Brake Inspection. (Group 9020-20.) Are service brake disks worn?	**YES:** Replace service brake pack. See Service Brake Assembly Remove and Install. (Group 1011.) **NO:** Go to Service Brake Piston Check.

BE7856,0000142 -19-23JAN12-7/8

6 Service Brake Piston Check	Check service brake piston for wear or damage. See Service Brake Assembly Remove and Install. (group1011.) Is service brake piston worn or damaged?	**YES:** Replace service brake piston. **NO:** Checks complete.

BE7856,0000142 -19-23JAN12-8/8

Service Brake Warning Light On

JW40272,000016F -19-13JUN16-1/8

Service Brake Warning Light On Diagnostic Procedure

JW40272,000016F -19-13JUN16-2/8

1 Diagnostic Trouble Code Check	Check for active diagnostic trouble codes (DTC). See Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application (Group 9015-20.) or see Display Unit—Main Menu—Codes—Active Codes. (Operator's Manual.) Are any diagnostic trouble codes (DTC) present?	**YES:** Repair malfunctions causing codes. **NO:** Go to Hydraulic Leak Check.

JW40272,000016F -19-13JUN16-3/8

2 Hydraulic Leak Check	Check for any external leaks. Are any leaks visible?	**YES:** Repair leaks. **NO:** Go to Service Brake Accumulator Check.

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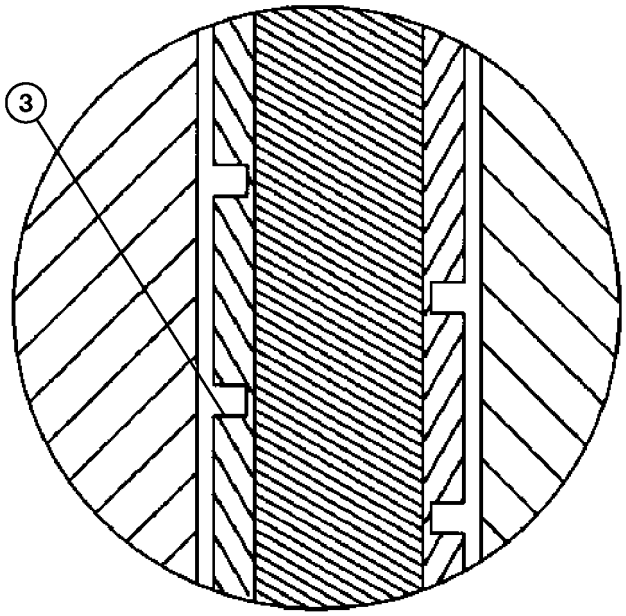
JW40272,000016F -19-13JUN16-4/8

3. If the oil grooves (3) are no longer visible or do not meet the minimum specification, replace brake disks.

Specification	
Oil Groove—Minimum—Depth	0.99 mm 0.039 in.
New Brake Disk—Thickness	7.57 mm 0.298 in.

For additional information on TeamMate™ axles and components, see TeamMate™ IV 1200 Series Inboard Planetary Axles. (CTM140119.)

3— Oil Groove



TX1014608 —UN—08NOV06

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SW03989,00003E8 -19-05AUG08-2/2

Transmission Lube Pressure Test

SPECIFICATIONS	
Transmission Oil Temperature	74—86°C 166—186°F
Engine Speed	Fast Idle
Transmission Position	Neutral
Transmission Lube Pressure	50—400 kPa 0.5—4 bar 7—58 psi

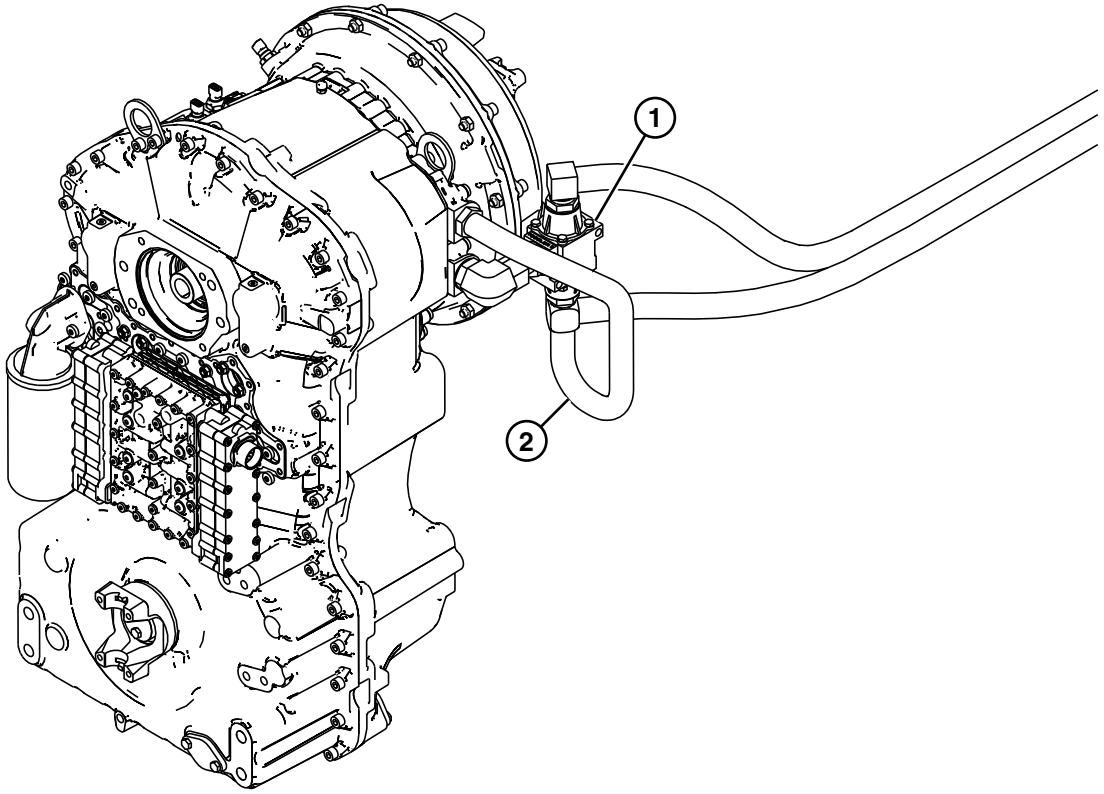
ESSENTIAL TOOLS
JT02158 Digital Pressure and Temperature Analyzer
JT02161 Transducer 3500 kPa (35 bar) (500 psi)

SERVICE EQUIPMENT AND TOOLS
Test Hose
Barb Tee Fitting
JT03481 Male Quick Coupler

The purpose of this test is to check that the lube pressure and flow is correct for proper operation of the transmission.

CAUTION: Prevent possible injury from unexpected machine movement. Install frame articulation lock bar to both frames before working in frame pivot area.

1. Install frame articulation lock bar.



TX1045135 —UN—03JUL08

TX1045135

Transmission Lube Pressure Test Connection

1— Thermal Bypass Valve **2— Return Hose**

2. Disconnect return hose (2) from thermal bypass valve (1). Install test hose, barb tee fitting, reducer, and JT03481 Male Quick Coupler.
3. Connect JT02161 Transducer 3500 kPa (35 bar) (500 psi) and JT02158 Digital Pressure and Temperature Analyzer to quick coupler. See JT02156A Digital Pressure and Temperature Analyzer Kit Installation. (Group 9025-25.)
4. Check transmission oil level. See Check Transmission Oil Level. (Operator's Manual.)
5. View engine rpm and transmission oil temperature. See Display Unit—Normal Display and See Display Unit—Main Menu—Diagnostics—Transmission/Axle. (Operator's Manual.)
6. Warm transmission oil to specification. See Transmission Oil Warm-Up Procedure. (Group 9020-25.)

Specification

Transmission
Oil—Temperature.....74—86°C
166—186°F

Continued on next page

BE7856,0000166 -19-30JAN12-1/2

6. Measure temperature at the transmission oil cooler outlet (3). As oil passes through the transmission oil cooler, a temperature differential should be observed between the transmission oil cooler inlet and outlet.

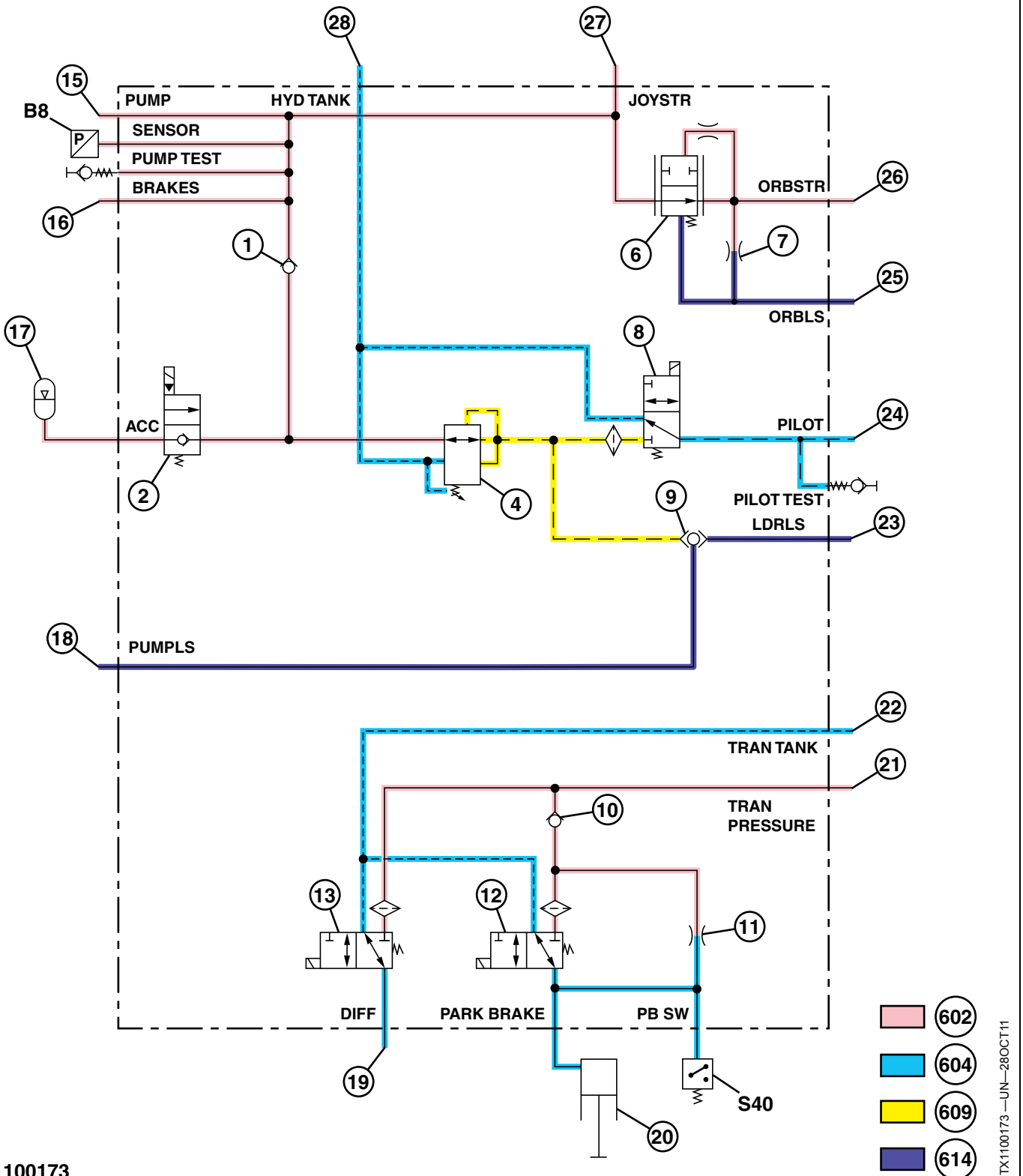
Observations:

- If the thermal bypass valve is stuck in the open position, the temperature measured at the transmission oil cooler inlet will be below the thermal bypass valve opening temperature. In this condition, it will take a relatively long period of time to warm the transmission oil.
- If the thermal bypass valve is stuck in the closed position, the temperature measured at the thermal bypass valve will rise above the thermal bypass valve full-open temperature. In this condition, it will take a relatively short period of time to warm the transmission oil.

If thermal bypass valve does not meet specifications, repair or replace as necessary and repeat test.

BE7856,000016C -19-05OCT16-2/2

Hydraulic Pump Manifold Operation



Hydraulic Pump Manifold

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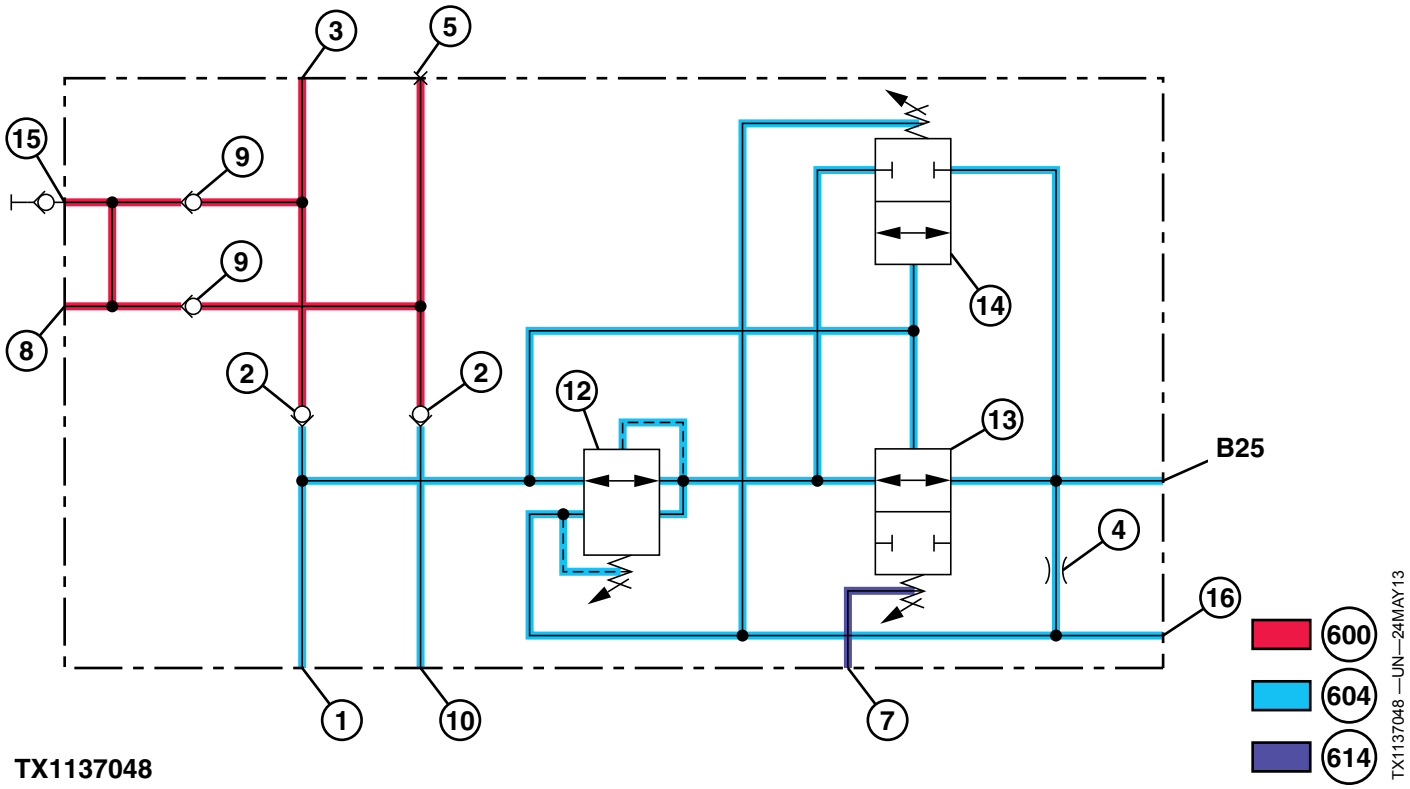


Secondary Steering Valve—Secondary Steering Pump Operation (S.N. —654411)

1— Orbital Steering Inlet Port From Hydraulic System
2— Hydraulic System Isolation Check Valve (2 used)
3— Orbital Steering Outlet Port to Orbital Steering Valve
4— Orifice
5— Joystick Steering Outlet Port to Joystick Steering Valve (if equipped)
7— Steering Load Sense Pressure Port
8— Secondary Steering Pump Inlet Port
9— Secondary Steering Pump Isolation Check Valve (2 used)
10— Joystick Steering Inlet Port From Hydraulic System (if equipped)
12— Pressure Relief Valve
13— Hydraulic Pressure Valve
14— Hydraulic Pressure Valve
15— Secondary Steering Pump Test Port
16— To Hydraulic Reservoir
600— High Pressure Oil
604— Return Oil
614— Load Sense Oil
B25— Steering System Pressure Sensor

If hydraulic system pressure oil is not available, the vehicle control unit (VCU) activates the electric-drive motor pump and alerts the operator through the advanced display unit (ADU). The secondary steering pump isolator check valves (9) allow priority oil flow from the secondary steering pump to the orbital steering valve. The hydraulic system isolation check valves (2) prevent secondary steering pump flow from entering the main hydraulic system circuit.

Continued on next page

DI77374,00007BF -19-19NOV13-2/4

The main hydraulic pump discharge pressure builds, and the pressure compensator opens until the higher pressure overcomes the load check valve. As the load check valve opens, oil flows through the passage to the boom work port. Flow through the work port causes the work cylinder to retract. The returning oil from the head end of the cylinder flows through the boom raise work port (8), across the shuttle spool valve metering notches, and into the hydraulic reservoir return passage.

If the flow required to meet the rod demand exceeds the flow being supplied, the anticavitation check valve will open and allow oil from the return passage to make up the difference. The metering notches of the shuttle spool valve control the oil flow to regulate the function speed in a boom down operation.

When boom raise is put into operation, the function is like the boom down operation, except the work port flows are reversed.

During a boom down and steering operation, the following occurs. As commanded, the pilot oil (609) shifts the boom spool to the right. High-pressure oil flow from the main hydraulic pump is directed across the spool center. Metered load sense flows past LS check valve C1 and the oil from the passage exerts a force to open the pressure compensator. As the orbital steering valve is activated, the steering load sense is routed to the outlet section of the loader control valve and to the load sense shuttle valves.

The higher load sense pressure from the loader control valve and steering load sense is determined and routed back to the hydraulic pump manifold. Since the steering load sense oil pressure is typically greater than the boom down work port load sense oil pressure, the steering compensator valve meters steering pressure oil flow to the boom down work port. As long as the pump capacity is not reached, the flow to the boom down work port is still controlled by the boom spool even though the steering compensator valve provides flow priority to the orbital steering valve.

During a boom down, two load sense oil pressures are generated. One load sense oil pressure passes the LS check valve C1 (7) and is for the main hydraulic pump control valve. The second load sense oil pressure exits past the pressure compensator and LS check valve C2 (4) to the shuttle in the outlet section of the loader control valve. When the loader boom control valve system is at maximum pressure, load sense oil pressure from LS check valve C2 is reduced by the load sense relief valve and causes the pressure compensator (6) to fully shift open. During an orbital steering operation, the steering load sense is resolved with both of these signals.

In combined operation in the loader control valve, the highest work port pressure is determined by the check valve logic network made up of the LS check valve C1 and LS check valve C2 for each loader control valve section. The highest loader control valve load sense pressure is compared with the steering load sense pressure through the shuttles in the loader control valve outlet section.

DI77374,0000A23 -19-01FEB12-2/2

If boom raise function is activated and boom pressure demand becomes greater than the orbital steering system, the boom load sense pressure will still be limited by the steering compensator valve in the hydraulic pump manifold, limiting its demand until the orbital steering operation has stopped. The load sense pressure in the loader control valve is balanced by both the main hydraulic pump control valve and the pressure compensator valve in the boom section.

DI77374,0000A2B -19-01FEB12-2/2

Ride Control Operation—If Equipped

The ride control function will equalize pressure within the cylinders of the boom during load transportation. This will assist in load stabilization.

Ride control switch (S43) is located on the sealed switch module (SSM). The ride control function, manual or automatic, is indicated by the ride control switch LEDs. One LED will indicate manual mode is enabled. To enable auto mode, push the ride control switch again so two LEDs are on.

While in auto mode, ride control will remain off until machine ground speed is at or above ride control set point. Ride control set point is adjustable in the advance display unit (ADU) from 1.5—24.0 km/h (1.0—15.0 mph). The default ride control set point value is 5.5 km/h (3.5 mph) stored in the vehicle control unit (VCU). Ride control will turn off when machine ground speed drops below ride control set point minus 0.2 km/h (0.1 mph). To adjust ride control set point, see Display Unit—Main Menu—Settings—Ride Control—If Equipped. (Operator's Manual.)

TX1084177A —UN—10NOV10

Sealed Switch Module (SSM)

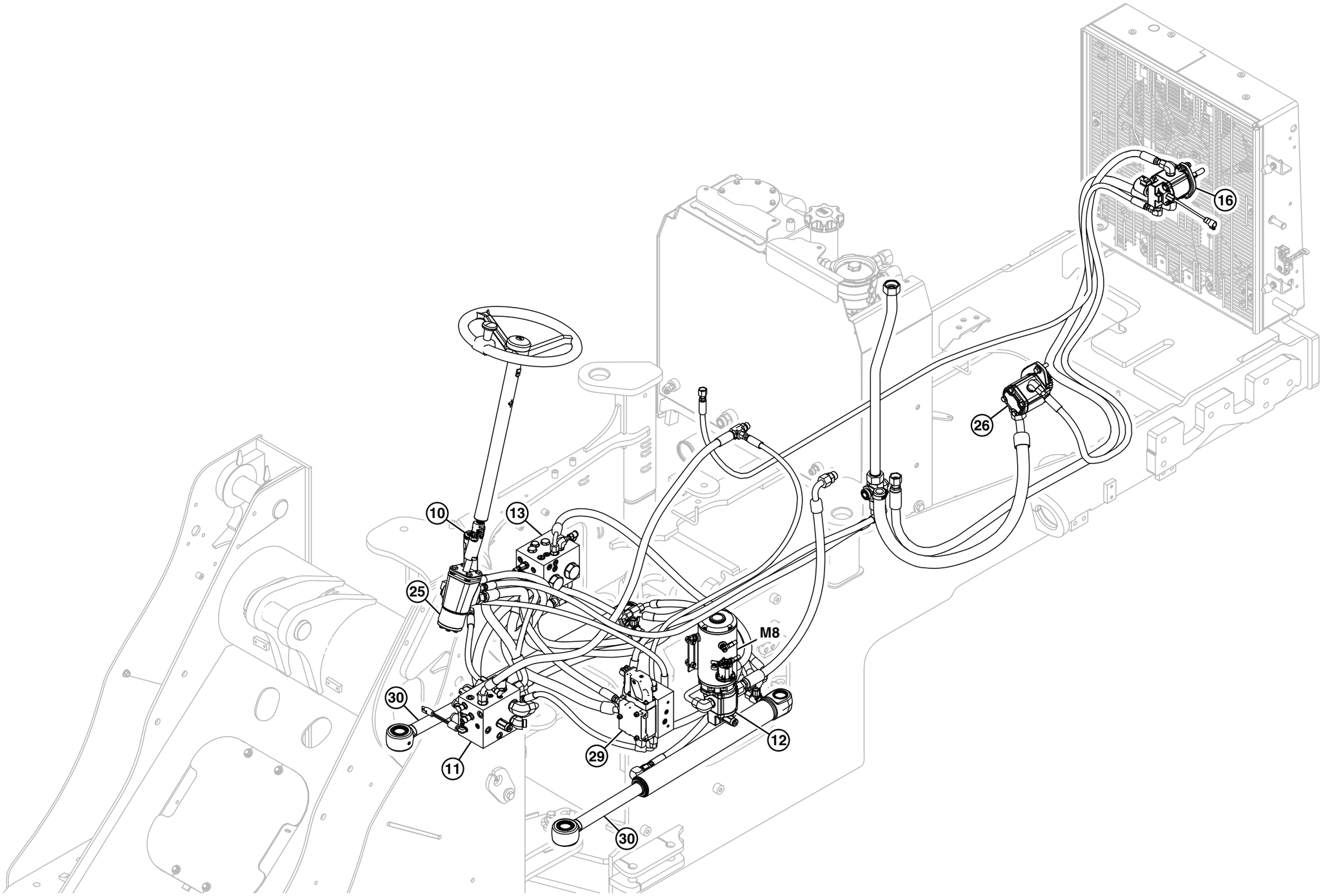
S43— Ride Control Switch

Continued on next page

AD32822,00001F8 -19-10NOV14-1/4

Steering and Hydraulic Cooling Fan Circuit Component Location (S.N. 654412—)

TX1146117 —UN—06NOV13



TX1146117

Steering and Hydraulic Cooling Fan Circuit Component Location—Standard Fan (S.N. 654412—)

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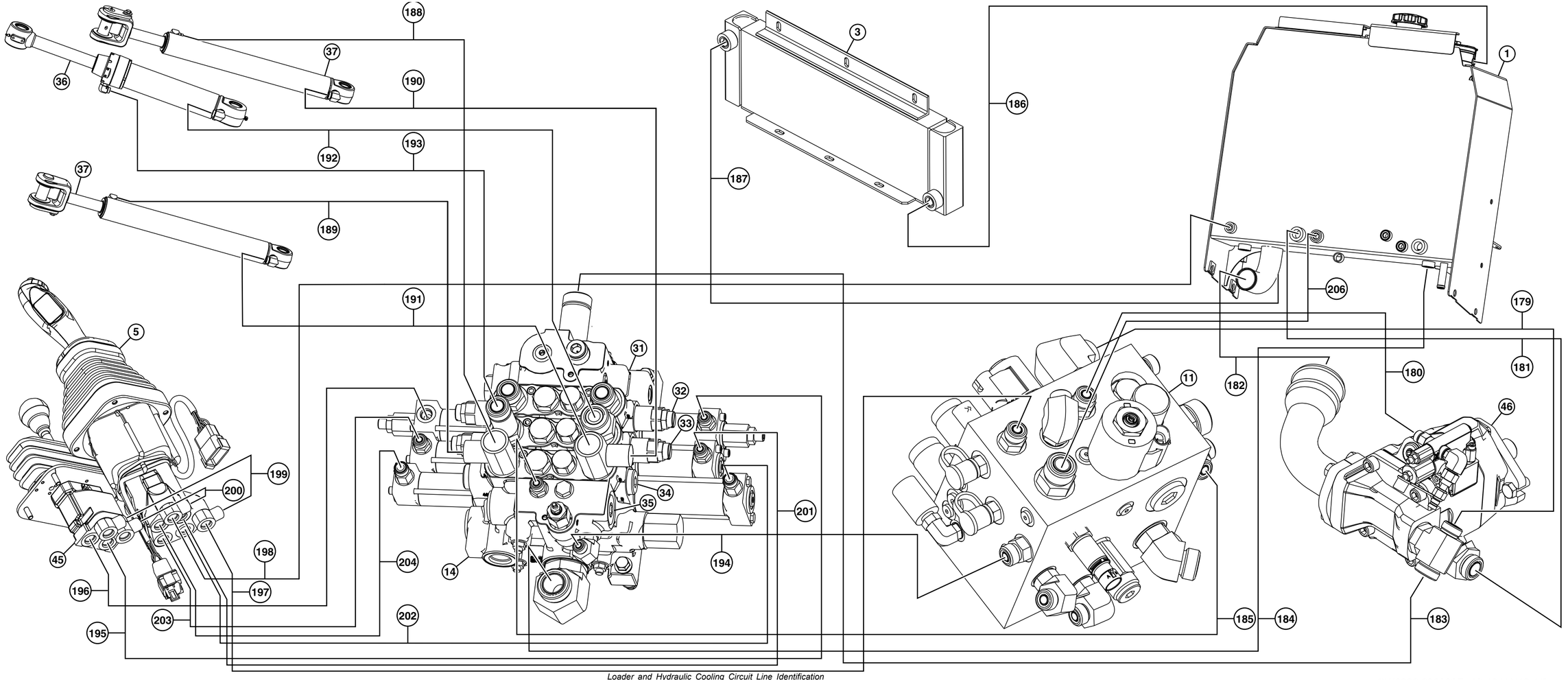
DI77374,0000A46 -19-26NOV13-3/6

Diagnostic Information

Loader and Hydraulic Cooling Circuit Line Identification

TX1099930 —UN—10NOV11



TX1099930

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Loader and Hydraulic Cooling Circuit Line Identification

CW0833,000003E -19-19JAN12-1/2

5 Pilot Accumulator Precharge Check	Check pilot accumulator precharge. See Pilot Accumulator Gas Precharge Test. (Group 9025-25.) Is pilot accumulator precharge to specification?	**YES:** Checks complete. **NO:** Replace pilot accumulator (not serviceable).

DI77374,0000911 -19-27JAN12-7/7

Ride Control Not Working

DI77374,0000912 -19-27JAN12-1/8

Ride Control Not Working Diagnostic Procedure

DI77374,0000912 -19-27JAN12-2/8

1 Ride Control Not Working Check	Check diagnostic trouble codes. See Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application. (Group 9015-20.) Are diagnostic trouble codes displayed?	**YES:** Correct problem causing diagnostic trouble code. **NO:** Go to Ride Control Enabled Check.

DI77374,0000912 -19-27JAN12-3/8

2 Ride Control Enabled Check	Check that function is enabled in the ADU machine configuration menu. See Advanced Display Unit (ADU)—Enable Options. (Group 9015-16.) Is ride control enabled?	**YES:** Go to Electrical Circuit Check. **NO:** Enable ride control.

DI77374,0000912 -19-27JAN12-4/8

3 Electrical Circuit Check	Check ride control electrical circuit. See Vehicle Control Unit (VCU) Circuit Theory of Operation. (Group 9015-15.) Is electrical circuit malfunctioning?	**YES:** Repair or replace component. See System Functional Schematic. (Group 9015-10.) **NO:** Go to Ride Control Function Check.

DI77374,0000912 -19-27JAN12-5/8

4 Ride Control Function Check	Check ride control function. See Ride Control Check (If Equipped). (Group 9005-10.) Is ride control functioning properly?	**YES:** Checks complete. **NO:** Go to Ride Control Accumulator Charge Pressure Check.

DI77374,0000912 -19-27JAN12-6/8

5 Ride Control Accumulator Charge Pressure Check	Check ride control accumulator charge pressure. See Ride Control Accumulator Gas Charge Procedure—If Equipped. (Group 9025-20.) Is ride control accumulator charge pressure to specification?	**YES:** Go to Ride Control Valve Check Valve, Solenoid Valve, or Pilot Valve Stuck Open. **NO:** Charge accumulator to specification.

Continued on next page

DI77374,0000912 -19-27JAN12-7/8

❸	**Fan Proportional/Relief Solenoid Valve Check**	Check fan proportional/relief solenoid valve for sticking, blockage, or damage. See Hydraulic Fan Operation. (Group 9025-05.) Is fan proportional/relief solenoid valve sticking, blocked, or damaged?	**YES:** Clean or replace as necessary. **NO:** Go to Fan Reversing Valve Return Line Check.

DI77374,0000924 -19-27JAN12-5/6

❹	**Fan Reversing Valve Return Line Check**	Check return line from fan reversing valve to hydraulic return filter for crimped hose or blockage. See Steering and Hydraulic Cooling Fan Circuit Component Location and see Steering and Hydraulic Cooling Fan Circuit Line Identification. (Group 9025-15.) Is fan reversing valve return line crimped or blocked?	**YES:** Repair or replace fan reversing valve return line as necessary. **NO:** Checks complete.

DI77374,0000924 -19-27JAN12-6/6

Hydraulic Fan Does Not Spin

DI77374,0000925 -19-27JAN12-1/9

Hydraulic Fan Does Not Spin Diagnostic Procedure

DI77374,0000925 -19-27JAN12-2/9

❶	**Hydraulic Fan Does Not Spin Check**	Check diagnostic trouble codes. See Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application. (Group 9015-20.) Are diagnostic trouble codes displayed?	**YES:** Correct problem causing diagnostic trouble code. **NO:** Go to Electrical Signal Check.

DI77374,0000925 -19-27JAN12-3/9

❷	**Electrical Signal Check**	Check for correct electrical signals. See Hydraulic Fan Operation. (Group 9025-05.) Are the correct electrical signals present?	**YES:** Go to Fan Reversing Solenoid Valve Check. **NO:** Diagnose electrical malfunction. See Vehicle Control Unit (VCU) Circuit Theory of Operation. (Group 9015-15.)

DI77374,0000925 -19-27JAN12-4/9

❸	**Fan Reversing Solenoid Valve Check**	Check fan reversing solenoid valve for sticking, blockage, or damage. See Hydraulic Fan Operation. (Group 9025-05.) Is fan reversing solenoid valve sticking, blocked, or damaged?	**YES:** Clean or replace as necessary. **NO:** Go to Fan Reversing Spool Valve Check.

DI77374,0000925 -19-27JAN12-5/9

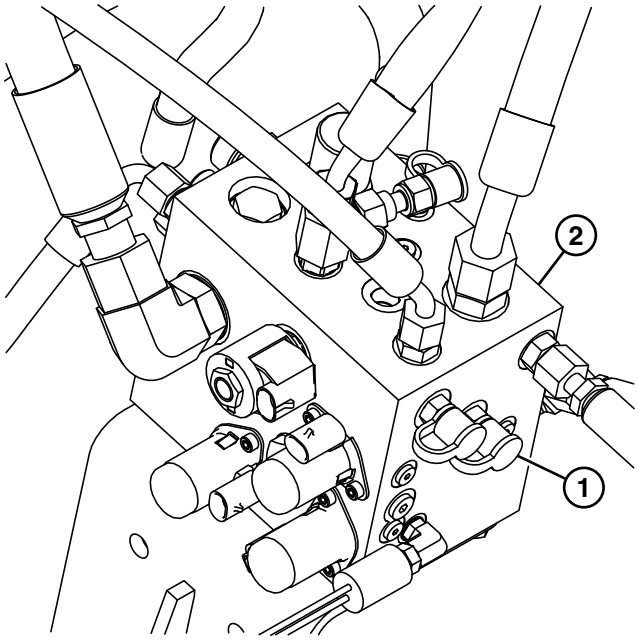
❹	**Fan Reversing Spool Valve Check**	Check fan reversing spool valve for sticking, blockage, or damage. See Hydraulic Fan Operation. (Group 9025-05.) Is fan reversing spool valve sticking, blocked, or damaged?	**YES:** Clean or replace fan reversing spool valve as necessary. **NO:** Go to Hydraulic Fan Pump Coupling Check.

Continued on next page

DI77374,0000925 -19-27JAN12-6/9

6. Install JT02158 Digital Pressure and Temperature Analyzer and connect a JT02162 Transducer to hydraulic system pressure test port (1). See JT02156A Digital Pressure and Temperature Analyzer Kit Installation. (Group 9025-25.)

1— Hydraulic System Pressure Test Port **2— Hydraulic Pump Manifold**



TX1099452 —UN—13OCT11

Hydraulic Pump Manifold

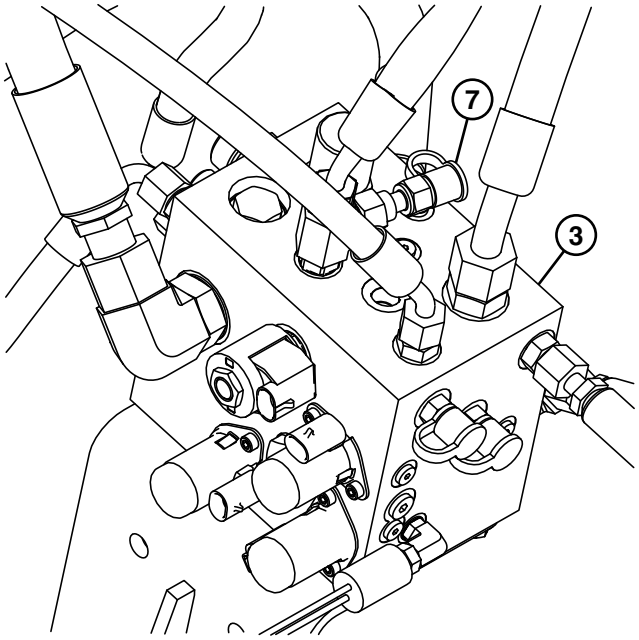
BE7856,00001AB -19-23MAR15-2/5

7. Install a JT02162 Transducer to differential pressure test port (7). See JT02156A Digital Pressure and Temperature Analyzer Kit Installation. (Group 9025-25.)

⚠ CAUTION: Prevent possible burn injury from hot exhaust components. Disable exhaust filter auto cleaning.

8. Disable exhaust filter auto cleaning. See Advanced Display Unit (ADU)—Auto Cleaning Settings. (Group 9015-16.)

3— Hydraulic Pump Manifold **7— Differential Pressure Test Port**



TX1099713 —UN—26OCT11

Hydraulic Pump Manifold

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BE7856,00001AB -19-23MAR15-3/5

Circuit Relief With Anticavitation Valve Pressure Test

SPECIFICATIONS	
Hydraulic Oil Temperature (minimum)	40°C 104°F
Bucket Curl Circuit Relief With Anticavitation Valve Pressure	28 613—29 992 kPa 286—300 bar 4150—4350 psi
Bucket Dump Circuit Relief With Anticavitation Valve Pressure	17 237—18 616 kPa 172—186 bar 2500—2700 psi
Bucket Dump Circuit Relief With Anticavitation Valve (high lift) Pressure	15 513—16 892 kPa 155—169 bar 2250—2450 psi
Auxiliary Circuit Relief With Anticavitation Valve Pressure	28 613—29 992 kPa 286—300 bar 4150—4350 psi

ESSENTIAL TOOLS
JT07192 Electric/Hydraulic Pump

SERVICE EQUIPMENT AND TOOLS
JT02162 Transducer 34 000 kPa (350 bar) (5000 psi)
JT02158 Digital Pressure and Temperature Analyzer

This test is to determine the pressure settings of the loader control valve circuit relief with anticavitation valves using a remote hydraulic pump.

1. Park and prepare machine for service. See Park and Prepare for Service Safely. (Group 9000-01.)

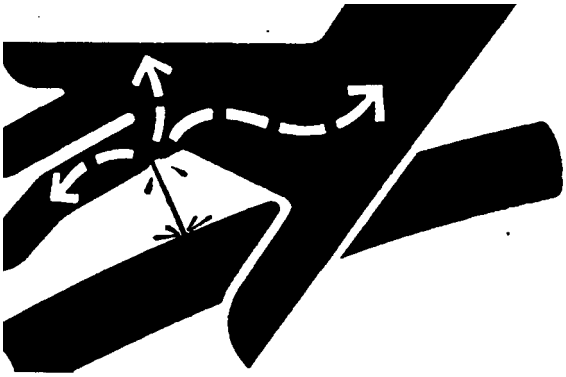
CAUTION: Prevent possible burn injury from hot exhaust components. Disable exhaust filter auto cleaning.

2. Disable exhaust filter auto cleaning. See Advanced Display Unit (ADU)—Auto Cleaning Settings. (Group 9015-16.)
3. Perform hydraulic oil warm-up procedure. See Hydraulic Oil Warm-Up Procedure. (Group 9025-25.)

Specification

Hydraulic Oil—Temperature (minimum)..... 40°C 104°F

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury.



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Escaping Fluid

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

4. Stop engine and relieve hydraulic pressure. See Hydraulic System Pressure and Accumulators Discharge. (Group 9025-25.)

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