

250D and 300D Series II Articulated Dump Truck Operation and Test

(PIN: 1DW250DX__E642001—)

(PIN: 1DW300DX__E642001—)

OPERATION & TEST TECHNICAL MANUAL

250D and 300D Series II Articulated Dump Truck

TM12402 01MAY18 (ENGLISH)

**Worldwide Construction
And Forestry Division**
PRINTED IN U.S.A.

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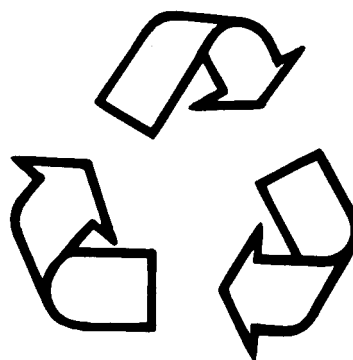
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Decommissioning — Proper Recycling and Disposal of Fluids and Components

Safety and environmental stewardship measures must be taken into account when decommissioning a machine and/or component. These measures include the following:

- Use appropriate tools and personal protective equipment such as clothing, gloves, face shields or glasses, during the removal or handling of objects and materials.
- Follow instructions for specialized components.
- Release stored energy by lowering suspended machine elements, relaxing springs, disconnecting the battery or other electrical power, and releasing pressure in hydraulic components, accumulators, and other similar systems.
- Minimize exposure to components which may have residue from agricultural chemicals, such as fertilizers and pesticides. Handle and dispose of these components appropriately.
- Carefully drain engines, fuel tanks, radiators, hydraulic cylinders, reservoirs, and lines before recycling components. Use leak-proof containers when draining fluids. Do not use food or beverage containers.
- Do not pour waste fluids onto the ground, down a drain, or into any water source.
- Observe all national, state, and local laws, regulations, or ordinances governing the handling or disposal of waste fluids (example: oil, fuel, coolant, brake fluid);



TS1133 —UN—15APR13

filters; batteries; and, other substances or parts. Burning of flammable fluids or components in other than specially designed incinerators may be prohibited by law and could result in exposure to harmful fumes or ashes.

- Service and dispose of air conditioning systems appropriately. Government regulations may require a certified service center to recover and recycle air conditioning refrigerants which could damage the atmosphere if allowed to escape.
- Evaluate recycling options for tires, metal, plastic, glass, rubber, and electronic components which may be recyclable, in part or completely.
- Contact your local environmental or recycling center, or your John Deere dealer for information on the proper way to recycle or dispose of waste.

DX,DRAIN -19-01JUN15-1/1

Exhaust Filter Ash Handling and Disposal

CAUTION: Under federal, state, and local laws or regulations, exhaust filter ash can be classified as a hazardous waste. Hazardous waste must be disposed of in accordance with all applicable federal, state, and local laws or regulations

governing hazardous waste disposal. Only a qualified service provider should remove ash from the exhaust filter. Personal protective equipment and clothing, maintained in a sanitary and reliable condition, should be used when handling and cleaning exhaust filter. See your authorized dealer for exhaust filter ash handling and disposal.

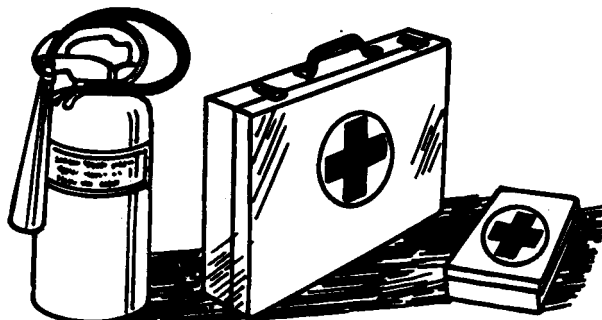
TX,ASH,DISP -19-20JAN11-1/1

Prepare for Emergencies

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



TS291 —UN—15APR13

DX,FIRE2 -19-03MAR93-1/1

Page	Page		
Tire Pressure Very Low Diagnostic Procedure.....	9001-30-10	Tire Sensor Fault Diagnostic Procedure.....	9001-30-26
000241.16 — Tire Pressure Moderately High.....	9001-30-11	001045.04 — Brake Light Switch Voltage Low.....	9001-30-27
Tire Pressure Moderately High Diagnostic Procedure.....	9001-30-12	Brake Light Switch Voltage Low Diagnostic Procedure.....	9001-30-27
000241.18 — Tire Pressure Moderately Low.....	9001-30-13	001071.03 — Fan Solenoid Voltage High.....	9001-30-28
Tire Pressure Moderately Low Diagnostic Procedure.....	9001-30-13	Fan Solenoid Voltage High Diagnostic Procedure.....	9001-30-28
000242.16 — Tire Temperature Moderately High.....	9001-30-14	001071.05 — Fan Solenoid Current Low.....	9001-30-29
Tire Temperature Moderately High Diagnostic Procedure.....	9001-30-14	Fan Solenoid Current Low Diagnostic Procedure.....	9001-30-29
000444.04 — Invalid App Config.....	9001-30-15	001071.06 — Fan Solenoid Current High.....	9001-30-30
Invalid App Config Diagnostic Procedure.....	9001-30-15	Fan Solenoid Current High Diagnostic Procedure.....	9001-30-30
000619.03 — Park Brake Actuator Voltage High.....	9001-30-16	001071.16 — Fan Solenoid Current Moderately High.....	9001-30-31
Park Brake Actuator Voltage High Diagnostic Procedure.....	9001-30-16	Fan Solenoid Current Moderately High Diagnostic Procedure.....	9001-30-32
000619.05 — Park Brake Actuator Current Low.....	9001-30-16	001071.17 — Fan Solenoid Voltage Slightly Low.....	9001-30-33
Park Brake Actuator Current Low Diagnostic Procedure.....	9001-30-17	Fan Solenoid Voltage Slightly Low Diagnostic Procedure.....	9001-30-33
000619.06 — Park Brake Actuator Current High.....	9001-30-18	001071.18 — Fan Solenoid Voltage Moderately Low.....	9001-30-34
Park Brake Actuator Current High Diagnostic Procedure.....	9001-30-18	Fan Solenoid Voltage Moderately Low Diagnostic Procedure.....	9001-30-34
000628.12 — Controller Not Programmed.....	9001-30-19	001120.03 — Articulation Sensor Voltage High.....	9001-30-35
Controller Not Programmed Diagnostic Procedure.....	9001-30-19	Articulation Sensor Voltage High Diagnostic Procedure.....	9001-30-35
000629.12 — Controller Fault.....	9001-30-20	001120.04 — Articulation Sensor Voltage Low.....	9001-30-37
Controller Fault Diagnostic Procedure.....	9001-30-20	Articulation Sensor Voltage Low Diagnostic Procedure.....	9001-30-37
000639.12 — CAN Lost Message.....	9001-30-20	001121.04 — EBS Voltage Low.....	9001-30-38
CAN Lost Message Diagnostic Procedure.....	9001-30-20	EBS Voltage Low Diagnostic Procedure.....	9001-30-38
000639.14 — CAN BUS Off.....	9001-30-21	001121.12 — EBS Brake Switch Bad Device.....	9001-30-40
CAN BUS Off Diagnostic Procedure.....	9001-30-21	EBS Brake Switch Bad Device Diagnostic Procedure.....	9001-30-40
000880.03 — Stop Lamp Circuit Voltage High.....	9001-30-21	001231.12 — CAN 2 Lost Message.....	9001-30-41
Stop Lamp Circuit Voltage High Diagnostic Procedure.....	9001-30-22	CAN 2 Lost Message Diagnostic Procedure.....	9001-30-41
000880.04 — Stop Lamp Circuit Voltage Low.....	9001-30-23	001231.14 — CAN BUS Off.....	9001-30-41
Stop Lamp Circuit Voltage Low Diagnostic Procedure.....	9001-30-23	CAN BUS Off Diagnostic Procedure.....	9001-30-42
000880.05 — Stop Lamp Circuit Current Low.....	9001-30-24	001547.04 — Air Conditioning Thermal Switch Voltage Low.....	9001-30-42
Stop Lamp Circuit Current Low Diagnostic Procedure.....	9001-30-25	Air Conditioning Thermal Switch Voltage Low Diagnostic Procedure.....	9001-30-42
000929.12 — Tire Sensor Fault.....	9001-30-26		

Continued on next page

Transmission Control Unit (TCU) Diagnostic Trouble Codes

1 Intermittent Check	Does DTC periodically “go away”?	<p>YES: DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.)</p> <p>NO: Go to Component Check.</p>
WS68074,0003E4E -19-26JAN12-3/6		

2 Component Check	<p>Ignition OFF.</p> <p>Test clutch A solenoid (Y18). See Transmission Solenoids, Speed Sensors, Sump Temperature Sensor, and Retarder Resistor Tests.</p> <p>Is solenoid to specification?</p>	<p>YES: Go to Open Circuit Check.</p> <p>NO: Go to Circuit Check—Control Valve Harness.</p>
WS68074,0003E4E -19-26JAN12-4/6		

3 Circuit Check—Control Valve Harness	<p>Turn battery disconnect switch OFF.</p> <p>Disassemble transmission control valve. See Shift Control Valve Disassemble and Assemble. (Group 0350.)</p> <p>Disconnect clutch A solenoid (Y18). See Transmission Valve Control Module Harness (W6) Component Location. (Group 9015-10.)</p> <p>Measure resistance across pins 1 and 2 on solenoid (Y18).</p> <p>Compare resistance to specification. See Electrical Component Specifications. (Group 9015-20.)</p> <p>Is resistance to specification?</p>	<p>YES: Open circuit in transmission valve control module harness. Repair or replace harness.</p> <p>NO: Clutch A solenoid malfunction. Replace solenoid.</p>
WS68074,0003E4E -19-26JAN12-5/6		

4 Open Circuit Check	<p>Ignition OFF.</p> <p>Disconnect transmission control unit (TCU) (A5). See Transmission Control Harness (W4) Wiring Diagram. (Group 9015-10.)</p> <p>Disconnect transmission harness-to-transmission valve control harness connector (X64). See Transmission Harness (W5) Wiring Diagram. (Group 9015-10.)</p> <p>Check circuit 410 WHT for continuity between pin 10 on TCU connector and pin 13 on transmission harness side of connector (X64).</p> <p>Is continuity indicated?</p>	<p>YES: Checks complete.</p> <p>NO: Circuit 410 WHT is open. Repair circuit or replace harness.</p> <p>See Transmission Control Harness (W4) Wiring Diagram. (Group 9015-10.)</p> <p>See Transmission Harness (W5) Wiring Diagram. (Group 9015-10.)</p>
WS68074,0003E4E -19-26JAN12-6/6		

Transmission Control Unit (TCU) Diagnostic Trouble Codes

4 Short Circuit Check

Ignition OFF.

Disconnect transmission harness-to-transmission valve control harness connector (X64). [See Transmission Harness \(W5\) Component Location.](#) (Group 9015-10.)

Check circuit 409 WHT for ground at pin 22 on transmission harness side of connector (X64).

Is ground present?

YES: Circuit 409 WHT is short to ground. Repair circuit or replace harness.

[See Transmission Control Harness \(W4\) Wiring Diagram.](#) (Group 9015-10.)

[See Transmission Harness \(W5\) Wiring Diagram.](#) (Group 9015-10.)

NO: Go to Harness Check.

WS68074,0003E56 -19-22DEC11-6/7

5 Harness Check

Turn battery disconnect switch OFF.

Disconnect transmission control unit (TCU) (A5). [See Transmission Control Harness \(W4\) Component Location.](#) (Group 9015-10.)

Disconnect transmission harness-to-transmission valve control harness connector (X64). [See Transmission Harness \(W5\) Component Location.](#) (Group 9015-10.)

Check for continuity between pin 9 (409 WHT) on TCU connector and all other pins on TCU connector.

Is continuity indicated?

YES: Circuit 409 WHT is short to circuit that indicated continuity. Repair circuit or replace harness.

[See Transmission Control Harness \(W4\) Wiring Diagram.](#) (Group 9015-10.)

[See Transmission Harness \(W5\) Wiring Diagram.](#) (Group 9015-10.)

NO: Checks complete.

WS68074,0003E56 -19-22DEC11-7/7

005024.05 — Valve D Solenoid Current Low

Valve D solenoid circuit is open.

WS68074,0003E57 -19-22DEC11-1/6

Valve D Solenoid Open Circuit Diagnostic Procedure

Alarm Level:

Caution Indicator (yellow)

Additional References:

For additional information, [see Transmission Control Unit \(TCU\) and Retarder Circuits Theory of Operation.](#) (Group 9025-15.)

Continued on next page

WS68074,0003E57 -19-22DEC11-2/6

005027.04 — Valve G Solenoid Voltage Low

Valve G solenoid circuit is short to ground.

WS68074,0003E5F -19-22DEC11-1/7

Valve G Solenoid Short to Ground Diagnostic Procedure

Alarm Level:

Caution Indicator (yellow)

Additional References:

For additional information, see Transmission Control Unit (TCU) and Retarder Circuits Theory of Operation. (Group 9025-15.)

WS68074,0003E5F -19-22DEC11-2/7

1 Intermittent Check

Does DTC periodically "go away"?

YES: DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.)

NO: Go to Component Check.

WS68074,0003E5F -19-22DEC11-3/7

2 Component Check

Ignition OFF.

Test clutch G solenoid (Y12). See Transmission Solenoids, Speed Sensors, Sump Temperature Sensor, and Retarder Resistor Tests.

Is solenoid to specification?

YES: Go to Short Circuit Check.

NO: Go to Circuit Check—Control Valve Harness.

WS68074,0003E5F -19-22DEC11-4/7

3 Circuit Check—Control Valve Harness

Turn battery disconnect switch OFF.

Disassemble transmission control valve. See Shift Control Valve Disassemble and Assemble. (Group 0350.)

Disconnect clutch G solenoid (Y12). See Transmission Valve Control Module Harness (W6) Component Location. (Group 9015-10.)

Measure resistance across pins 1 and 2 on solenoid (Y12).

Compare resistance to specification. See Electrical Component Specifications. (Group 9015-20.)

Is resistance to specification?

YES: Short circuit in transmission valve control module harness. Repair or replace harness.

NO: Clutch G solenoid malfunction. Replace solenoid.

Continued on next page

WS68074,0003E5F -19-22DEC11-5/7

Transmission Control Unit (TCU) Diagnostic Trouble Codes

1 Intermittent Check	Does DTC periodically “go away”?	YES: DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics . (Group 9015-20.) NO: Go to Component Check.
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WS68074,0003E64 -19-03JAN12-3/6

2 Component Check	Ignition OFF. Test throttle pressure D1 solenoid (Y20). See Transmission Solenoids, Speed Sensors, Sump Temperature Sensor, and Retarder Resistor Tests . Is solenoid to specification?	YES: Go to Harness Check . NO: Go to Circuit Check—Control Valve Harness .
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WS68074,0003E64 -19-03JAN12-4/6

3 Circuit Check—Control Valve Harness	Turn battery disconnect switch OFF. Disassemble transmission control valve. See Shift Control Valve Disassemble and Assemble . (Group 0350.) Disconnect throttle pressure D1 solenoid (Y20). See Transmission Valve Control Module Harness (W6) Component Location . (Group 9015-10.) Measure resistance across pins 1 and 2 on solenoid (Y20). Compare resistance to specification. See Electrical Component Specifications . (Group 9015-20.) Is resistance to specification?	YES: Open circuit in transmission valve control module harness. Repair or replace harness. See Transmission Valve Control Module Harness (W6) Wiring Diagram . (Group 9015-10.) NO: Clutch throttle pressure D1 solenoid malfunction. Replace solenoid.
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WS68074,0003E64 -19-03JAN12-5/6

Transmission Control Unit (TCU) Diagnostic Trouble Codes

1 Ignition ON/OFF Check

Ignition OFF.

Ignition ON.

Check for active TCU diagnostic trouble codes (DTCs). See [Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application](#). (Group 9015-20.)

Is TCU code 005052.11 present?

YES: Replace TCU.

NO: Checks complete.

WS68074,0003E6E -19-04JAN12-3/3

005053.12 — Multiple CAN Errors Bad Device

Multiple CAN errors present; CAN bus fault or possible bad device.

WS68074,0003E6F -19-22JUN12-1/5

Multiple CAN Errors Bad Device Diagnostic Procedure

Alarm Level:

Stop Indicator (red)

Additional References:

For additional information, see [Transmission Control Unit \(TCU\) and Retarder Circuits Theory of Operation](#). (Group 9025-15.)

WS68074,0003E6F -19-22JUN12-2/5

1 Intermittent Check

Does DTC periodically "go away"?

YES: DTC is intermittent. See [Intermittent Diagnostic Trouble Code \(DTC\) Diagnostics](#). (Group 9015-20.)

NO: Go to Code Check.

WS68074,0003E6F -19-22JUN12-3/5

2 Code Check

Ignition on.

Check for transmission control unit (TCU) codes. See [Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application](#). (Group 9015-20.)

Are any TCU codes present?

YES: Diagnose other codes.

NO: Go to CAN Circuit Check.

WS68074,0003E6F -19-22JUN12-4/5

3 CAN Circuit Check

Test controller area network (CAN) circuit. See [Perform Controller Area Network \(CAN\) Circuit Test](#). (Group 9015-20.)

Does CAN circuit test good?

YES: Replace TCU.

NO: Repair CAN circuit.

WS68074,0003E6F -19-22JUN12-5/5

005054.09 — Bad Update Rate

The CAN data update rate is slow or data is not plausible.

Continued on next page

WS68074,0003E70 -19-22JUN12-1/5

Transmission Control Unit (TCU) Diagnostic Trouble Codes

6 Harness Check

Turn battery disconnect switch OFF.

Disconnect transmission control unit (TCU) (A5). [See Transmission Control Harness \(W4\) Component Location](#). (Group 9015-10.)

Disconnect transmission harness-to-transmission valve control harness connector (X64). [See Transmission Harness \(W5\) Component Location](#). (Group 9015-10.)

Check for continuity between pin 49 (449 WHT) on TCU connector and all other pins on TCU connector.

Is continuity indicated?

YES: Circuit 449 WHT is short to circuit that indicated continuity. Repair circuit or replace harness.

[See Transmission Control Harness \(W4\) Wiring Diagram](#). (Group 9015-10.)

[See Transmission Harness \(W5\) Wiring Diagram](#). (Group 9015-10.)

NO: Checks complete.

WS68074,0003E78 -19-04JAN12-8/8

005062.04 — Retarder Resistor Short to Ground

Retarder resistor circuit is short to ground.

WS68074,0003E79 -19-04JAN12-1/7

Retarder Resistor Short to Ground Diagnostic Procedure

Alarm Level:

Check Service Code Indicator

Additional References:

For additional information, [see Transmission Control Unit \(TCU\) and Retarder Circuits Theory of Operation](#). (Group 9025-15.)

WS68074,0003E79 -19-04JAN12-2/7

1 Intermittent Check

Does DTC periodically "go away"?

YES: DTC is intermittent. [See Intermittent Diagnostic Trouble Code \(DTC\) Diagnostics](#). (Group 9015-20.)

NO: Go to Component Check.

WS68074,0003E79 -19-04JAN12-3/7

2 Component Check

Ignition OFF.

Test retarder resistor (R10). [See Transmission Solenoids, Speed Sensors, Sump Temperature Sensor, and Retarder Resistor Tests](#). (Group 9015-20.)

Is resistance to specification?

YES: [Go to Short Circuit Check](#).

NO: Go to Circuit Check—Control Valve Harness.

Continued on next page

WS68074,0003E79 -19-04JAN12-4/7

Engine Control Unit (ECU) Diagnostic Trouble Codes

3 Open Circuit Check

Ignition OFF.

Disconnect accelerator pedal position sensor (B18). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Disconnect engine control unit (ECU) connector (X13). [See Engine Interface Harness \(W17\) Component Location.](#) (Group 9015-10.)

Check circuit E09 WHT for continuity between pin A on accelerator pedal position sensor (B18) harness connector and pin 10 on ECU connector (X13).

Check circuit E08 WHT for continuity between pin C on accelerator pedal position sensor (B18) harness connector and pin 49 on ECU connector (X13).

Check circuit E07 WHT for continuity between pin B on accelerator pedal position sensor (B18) harness connector and pin 33 on ECU connector (X13).

Is continuity indicated?

YES: Go to Short Circuit Check.

NO: Circuit without continuity indicated is open. Repair circuit or replace harness.

[See Cab Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

[See Engine Interface Harness \(W17\) Wiring Diagram.](#) (Group 9015-10.)

MP01188,000015E -19-06NOV15-5/7

4 Short Circuit Check

Ignition OFF.

Disconnect accelerator pedal position sensor (B18). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit E09 WHT for ground at pin A on accelerator pedal position sensor (B18) harness connector.

Is ground present?

YES: Circuit E09 WHT is short to ground. Repair circuit or replace harness.

[See Cab Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

[See Engine Interface Harness \(W17\) Wiring Diagram.](#) (Group 9015-10.)

NO: Go to Harness Check.

Continued on next page

MP01188,000015E -19-06NOV15-6/7

Engine Control Unit (ECU) Diagnostic Trouble Codes

1 Intermittent Check

Does DTC periodically "go away"?

YES: DTC is intermittent.
[See Intermittent Diagnostic Trouble Code \(DTC\) Diagnostics.](#) (Group 9015-20.)
NO: Go to Component Check.

AA95137,00000D1 -19-26JAN12-3/6

2 Component Check

Ignition OFF.

Disconnect starter relay (K2). [See Engine Interface Harness \(W17\) Component Location.](#) (Group 9015-10.)

Apply 24 V to the coil and ground of starter relay (K2).

Check continuity across pins 30 and 87 of starter relay (K2).

Is continuity indicated?

YES: Go to Harness Check.

NO: Starter relay (K2) malfunction. Replace relay.

AA95137,00000D1 -19-26JAN12-4/6

3 Short Circuit Check

Ignition off.

Disconnect starter relay (K2) from harness. [See Engine Interface Harness \(W17\) Component Location.](#) (Group 9015-10.)

Ignition on.

Check circuit E04 WHT for ground at pin 30 of starter relay (K1) harness connector.

Is ground present?

YES: Circuit E04 WHT is short to ground. Repair circuit or replace harness.

[See Engine Interface Harness \(W17\) Wiring Diagram.](#) (Group 9015-10.)

NO: Go to Harness Check.

AA95137,00000D1 -19-26JAN12-5/6

4 Harness Check

Ignition OFF.

Disconnect starter relay (K2) and engine control unit (ECU) connectors (X11, X12, and X13). [See Engine Interface Harness \(W17\) Component Location.](#) (Group 9015-10.)

Check for continuity between pin 30 (circuit E04 WHT) on ECU connector (X13) and all other pins on ECU connectors (X11, X12, and X13).

Is continuity indicated?

YES: Circuit E04 WHT is short to circuit that indicated continuity. Repair circuit or replace harness. [See Engine Interface Harness \(W17\) Wiring Diagram.](#) (Group 9015-10.)

NO: Engine control unit malfunction. Reprogram engine control unit.

AA95137,00000D1 -19-26JAN12-6/6

001321.05 — Starter Relay Current Low

The starter relay current is too low.

Continued on next page

AA95137,00000B1 -19-26JAN12-1/5

Chassis Control Unit (CCU) Diagnostic Trouble Codes

4 Short Circuit Check

For machines with (S.N. —645103)

Ignition OFF.

Disconnect system air pressure sensor (B2). See Cab Harness (W3) Component Location. (Group 9015-10.)

Ignition ON.

Check circuit N16 YEL for voltage at ring terminal on sensor (B2) harness connector.

Is voltage more than 5 V?

For machines equipped with pneumatic control valve or (S.N. 645104—)

Ignition OFF.

Disconnect system air pressure sensor (B2). See Cab Harness (W3) Component Location With Pneumatic Control Valve—If Equipped. (Group 9015-10.)

Ignition ON.

Check circuit N18A YEL for voltage at ring terminal on sensor (B2) harness connector. See Pneumatic Control Valve Harness (W40) Wiring Diagram—If Equipped. (Group 9015-10.)

Is voltage more than 5 V?

YES: Circuit is short to power. Repair circuit or replace harness. See Cab Harness (W3) Component Location or see Cab Harness (W3) Wiring Diagram With Pneumatic Control Valve—If Equipped. (Group 9015-10.)

NO: Go to Harness Check.

NS73742,000019E -19-24DEC15-6/7

5 Harness Check

Turn battery disconnect switch OFF.

Disconnect system air pressure sensor (B2). See Cab Harness (W3) Component Location (Group 9015-10) or see Cab Harness (W3) Component Location With Pneumatic Control Valve—If Equipped. (Group 9015-10.)

Disconnect chassis control unit (CCU) connectors (X21, X22, and X23). See Cab Harness (W3) Component Location or see Cab Harness (W3) Component Location With Pneumatic Control Valve—If Equipped. (Group 9015-10.)

Check for continuity between pin 52 on CCU connector (X23) and all other pins on CCU connectors (X21, X22, and X23).

Is continuity indicated?

YES: Circuit is short to circuit that indicated continuity. Repair circuit or replace harness.

See Cab Harness (W3) Wiring Diagram or see Cab Harness (W3) Component Location With Pneumatic Control Valve—If Equipped. (Group 9015-10.)

NO: Program chassis control unit (CCU).

NS73742,000019E -19-24DEC15-7/7

000046.04 — Pneumatic Pressure Sensor Voltage Low

The pneumatic pressure sensor circuit is short to ground.

Continued on next page

NS73742,000019F -19-24DEC15-1/6

Chassis Control Unit (CCU) Diagnostic Trouble Codes

2 Code Check

Check for active CCU codes.

Is CCU code 000639.12 active?

YES: Correct active CCU code 000639.12—See [Controller Area Network \(CAN\) Communication Lost Message](#). (Group 9001-30.)

NO: CCU has incorrect configuration stored. Upload newest software to CCU. Cycle ignition ON and OFF to broadcast configuration to other controllers.

BP63692,0000379 -19-09DEC15-4/4

000619.03 — Park Brake Actuator Voltage High

The park brake actuator circuit is short to power.

WS68074,000441F -19-08MAR12-1/5

Park Brake Actuator Voltage High Diagnostic Procedure

Alarm Level:

Caution Indicator (yellow)

Additional References:

For additional information, see [Chassis Control Unit \(CCU\) Circuits Theory of Operation](#). (Group 9015-15.)

WS68074,000441F -19-08MAR12-2/5

1 Intermittent Check

Does DTC periodically “go away”?

YES: DTC is intermittent. See [Intermittent Diagnostic Trouble Code \(DTC\) Diagnostics](#). (Group 9015-20.)

NO: Go to Voltage Check.

WS68074,000441F -19-08MAR12-3/5

2 Voltage Check

NOTE: All wiring must remain connected. Pull back protective cover to access terminal on park brake relay.

Start engine.

Check circuit H47 GRN for voltage between pins 1 and 2 on park brake solenoid (Y46). See [Cab Harness \(W3\) Component Location](#). (Group 9015-10.)

Are 31 volts or more present?

YES: Go to Alternator Check.

NO: Program chassis control unit (CCU).

WS68074,000441F -19-08MAR12-4/5

3 Alternator Check

Perform Alternator Test. (Group 9015-20.)

Does alternator test good?

YES: Program chassis control unit (CCU).

NO: Replace alternator.

WS68074,000441F -19-08MAR12-5/5

000619.05 — Park Brake Actuator Current Low

The park brake actuator circuit is open.

Continued on next page

MP01188,000017A -19-06AUG15-1/7

Chassis Control Unit (CCU) Diagnostic Trouble Codes

3 Harness Check

Ignition OFF.

Disconnect left side fan speed solenoid (Y9). [See Engine Harness \(W17\) Component Location](#). (Group 9015-10.)

Disconnect chassis control unit (CCU) connectors (X21, X22, and X23). [See Cab Harness \(W3\) Component Location](#). (Group 9015-10.)

Check for continuity between pin D4 of CCU connector (X21) and all other pins on CCU connectors (X21, X22, and X23).

Is continuity indicated?

YES: Circuit H40 GRN is short to circuit with continuity indicated. Repair or replace harness.

[See Engine Harness \(W17\) Wiring Diagram](#). (Group 9015-10.)

[See Cab Harness \(W3\) Wiring Diagram](#). (Group 9015-10.)

NO: Go to Code Check.

MP01188,0000173 -19-11AUG15-5/6

4 Code Check

Ignition ON.

Is code 001071.03 still present?

YES: Left side fan speed solenoid (Y9) malfunction. Replace solenoid. [See Engine Harness \(W17\) Component Location](#). (Group 9015-10.) Program chassis control unit (CCU).

NO: Check complete.

MP01188,0000173 -19-11AUG15-6/6

001071.05 — Fan Solenoid Current Low

Left side fan speed solenoid high side driver circuit is open.

WS68074,0004C1C -19-25JUL12-1/5

Fan Solenoid Current Low Diagnostic Procedure

Alarm Level:

Stop Indicator (red)

Additional References:

For additional information, [see Chassis Control Unit \(CCU\) Circuits Theory of Operation](#). (Group 9025-15.)

WS68074,0004C1C -19-25JUL12-2/5

1 Intermittent Check

Does 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

WS68074,0004C1C -19-25JUL12-3/5

CAN BUS Off Diagnostic Procedure

Alarm Level:

Stop Indicator (red)

Additional References:

For additional information, see Chassis Control Unit (CCU) Circuits Theory of Operation. (Group 9015-15.)

WS68074,000442B -19-22JUN12-2/4

1 Diagnostic Trouble Code Check

Check diagnostic trouble codes. See Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application. (Group 9015-20.)

YES: Correct other diagnostic trouble codes and recheck.

Are other CAN communication diagnostic trouble codes present?

NO: Go to CAN Circuit Check.

WS68074,000442B -19-22JUN12-3/4

2 CAN Circuit Check

Ignition OFF.

Perform Controller Area Network (CAN) Circuit Test. (Group 9015-20.)

YES: See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.)

Does CAN circuit test good?

NO: Repair CAN circuit.

WS68074,000442B -19-22JUN12-4/4

001547.04 — Air Conditioning Thermal Switch Voltage Low

The air conditioning freeze control switch circuit is short to ground.

WS68074,000442C -19-08MAR12-1/5

Air Conditioning Thermal Switch Voltage Low Diagnostic Procedure

Alarm Level:

Stop Indicator (red)

Additional References:

For additional information, see Chassis Control Unit (CCU) Circuits Theory of Operation. (Group 9015-15.)

Continued on next page

WS68074,000442C -19-08MAR12-2/5

Chassis Control Unit (CCU) Diagnostic Trouble Codes

Check circuit M20 PUR for continuity between pin C on left side fan speed sensor (B7) and pin 27 on CCU connector (X22).
Is continuity indicated?

YES: Program chassis control unit (CCU).
NO: Circuit that does not indicate continuity is open. Repair or replace harness.
[See Cab Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)
[See Front Frame Harness \(W2\) Wiring Diagram.](#) (Group 9015-10.)

WS68074.0004C30 -19-25JUL12-7/7

001697.04 — Tire Sensor Batteries Low

The tire pressure monitoring (TPM) system batteries are low.

WS68074.0004433 -19-08MAR12-1/4

Tire Sensor Batteries Low Diagnostic Procedure

Alarm Level:
Stop Indicator (red)

Additional References:
For additional information, [see Chassis Control Unit \(CCU\) Circuits Theory of Operation.](#) (Group 9015-15.)

WS68074.0004433 -19-08MAR12-2/4

1 Pressure Check

Ignition ON.

Identify tire with low sensor battery level using the CAN Monitor Unit (CMU). [See CAN Monitor Unit \(CMU\)—Machine Options.](#) (Group 9015-16.)

Check battery voltage on faulty sensor.

Is battery voltage low on specified sensor?

YES: Replace faulty battery and program sensor.
[See TPM—Programming Sensors with SmartWave® Advanced Maintenance Tool.](#) (Group 9015-20.)
NO: Go to Clear Codes and Retest.

WS68074.0004433 -19-08MAR12-3/4

2 Clear Codes and Retest

Clear codes. [See CAN Monitor Unit \(CMU\)—Codes.](#) (Group 9015-16.)

Operate machine for 5 minutes and check codes.

Is code 001697.04 still present?

YES: Replace malfunctioning sensor and program new sensor. [See TPM—Tire Pressure Sensor Remove and Install,](#) and [See TPM—Programming Sensors with SmartWave® Advanced Maintenance Tool.](#) (Group 9015-20.)
NO: Checks complete.

WS68074.0004433 -19-08MAR12-4/4

Chassis Control Unit (CCU) Diagnostic Trouble Codes

1 OC4 Sensor Check	<p>Turn battery disconnect to OFF. Wait 5 seconds and turn battery disconnect to ON.</p> <p>Ignition ON. Activate blower motor function on 15-button SSM (OC4).</p> <p>Does the blower motor function properly?</p>	<p>YES: Program chassis control unit (CCU).</p> <p>NO: Go to Fuse Check.</p> <p style="text-align: right; font-size: small;">WS68074,0004439 -19-22JUN12-3/7</p>
2 Fuse Check	<p>Ignition OFF.</p> <p>Disconnect fuse (F22). <u>See Fuse and Relay Specifications.</u> (Group 9015-10.) Check fuse (F22) for continuity. Is continuity indicated?</p>	<p>YES: Go to Voltage Check.</p> <p>NO: Replace fuse (F22) without continuity indicated.</p> <p style="text-align: right; font-size: small;">WS68074,0004439 -19-22JUN12-4/7</p>
3 Voltage Check	<p>Ignition OFF.</p> <p>Disconnect 15-button sealed switch module (SSM) (OC4) connector. <u>See Cab Harness (W3) Component Location.</u> (Group 9015-10.) Ignition ON. Check circuit P67 RED for voltage at pin 1 on 15-button SSM (OC4) connector.</p> <p>Is system voltage (approximately 24 volts) present?</p>	<p>YES: Go to Ground Circuit Check.</p> <p>NO: Circuit P67 RED is open. Repair wire or replace harness. <u>See Cab Harness (W3) Wiring Diagram.</u> (Group 9015-10.)</p> <p style="text-align: right; font-size: small;">WS68074,0004439 -19-22JUN12-5/7</p>
4 Ground Circuit Check	<p>Ignition OFF.</p> <p>Disconnect 15-button SSM (OC4) connector. <u>See Cab Harness (W3) Component Location.</u> (Group 9015-10.) Check circuit G08 BLK for ground at pin P on 15-button SSM (OC4) harness connector.</p> <p>Is ground present?</p>	<p>YES: Circuit G08 BLK is open. Repair circuit or replace harness. <u>See Cab Harness (W3) Wiring Diagram.</u> (Group 9015-10.)</p> <p>NO: Go to CAN Circuit Check.</p> <p style="text-align: right; font-size: small;">WS68074,0004439 -19-22JUN12-6/7</p>
5 CAN Circuit Check	<p><u>Perform Controller Area Network (CAN) Circuit Test.</u> (Group 9015-20.)</p> <p>Does CAN circuit test good?</p>	<p>YES: Reprogram the 15-button sealed switch module (SSM) (OC4).</p> <p>NO: Repair CAN circuit.</p> <p style="text-align: right; font-size: small;">WS68074,0004439 -19-22JUN12-7/7</p>

Chassis Control Unit (CCU) Diagnostic Trouble Codes

3 Open Circuit Check

Ignition OFF.

Disconnect left work light (E28) and right work light (E29). [See Work Light Harness \(W12\) Component Location.](#) (Group 9015-10.)

Disconnect chassis control unit (CCU) connector (X22). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit L14 BRN for continuity between pin 1 on right and left work lights (E28 and E29) harness connectors and pin 18 on CCU connector harness (X22).

Check circuit G31 BLK for continuity between pin 2 on right and left work lights (E28 and E29) harness connectors and frame ground.

Is continuity indicated?

YES: Program chassis control unit.

NO: Repair circuit(s) without continuity indicated or replace harness.

[See Cab Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

[See Work Light Harness \(W12\) Wiring Diagram.](#) (Group 9015-10.)

WS68074,0004443 -19-08MAR12-5/5

002355.06 — Work Lights Voltage Low

The work lights circuit is short to ground.

WS68074,0004444 -19-08MAR12-1/6

Work Lights Voltage Low Diagnostic Procedure

Alarm Level:

Check Service Code

Additional References:

For additional information, [see Chassis Control Unit \(CCU\) Circuits Theory of Operation.](#) (Group 9015-15.)

WS68074,0004444 -19-08MAR12-2/6

1 Intermittent Check

Does DTC periodically “go away”?

YES: DTC is intermittent. [See Intermittent Diagnostic Trouble Code \(DTC\) Diagnostics.](#) (Group 9015-20.)

NO: Go to Component Check.

WS68074,0004444 -19-08MAR12-3/6

2 Component Check

Ignition OFF.

Disconnect left work light (E28) and right work light (E29). [See Work Light Harness \(W12\) Component Location.](#) (Group 9015-10.)

Apply 24 volts to pin 1 and ground to pin 2 on malfunctioning light (E28 or E29).

Do light(s) come on?

YES: Go to Short Circuit Check.

NO: Replace light that does not come on.

Continued on next page

WS68074,0004444 -19-08MAR12-4/6

Chassis Control Unit (CCU) Diagnostic Trouble Codes

❶ Intermittent Check

Does DTC periodically "go away"?

YES: DTC is intermittent.
See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.)
NO: Go to Component Check.

WS68074.000444C -19-08MAR12-3/5

❷ Component Check

Ignition OFF.

Disconnect rotating beacon (H21). See Cab Harness (W3) Component Location. (Group 9015-10.)

Apply 24 volts to pin 1 and ground to pin 2 on rotating beacon light (H21).

Does rotating beacon come on?

YES: Go to Open Circuit Check.
NO: Replace rotating beacon light.

WS68074.000444C -19-08MAR12-4/5

❸ Open Circuit Check

Turn battery disconnect switch OFF.

Disconnect rotating beacon (H21). See Cab Harness (W3) Component Location. (Group 9015-10.)

Disconnect chassis control unit (CCU) connector (X21). See Cab Harness (W3) Component Location. (Group 9015-10.)

Check circuit L06 BRN for continuity between pin 1 on rotating beacon (H21) and pin H4 on CCU connector (X23).

Check circuit G30 BLK for continuity between pin 2 on rotating beacon (H21) and frame ground.

Is continuity indicated?

YES: Program chassis control unit (CCU).
NO: Circuit without continuity indicated is open. Repair circuit or replace harness.

See Cab Harness (W3) Wiring Diagram. (Group 9015-10.)

WS68074.000444C -19-08MAR12-5/5

002386.06 — Rotating Beacon Current High

The rotating beacon is short to ground.

WS68074.000444D -19-08MAR12-1/6

Rotating Beacon Current High Diagnostic Procedure

Alarm Level:

Caution Indicator (yellow)

Additional References:

For additional information, see Chassis Control Unit (CCU) Circuits Theory of Operation. (Group 9015-15.)

Continued on next page

WS68074.000444D -19-08MAR12-2/6

Chassis Control Unit (CCU) Diagnostic Trouble Codes

4 Harness Check

Turn battery disconnect switch OFF.

Disconnect articulation backup light (E14). [See Cab Harness \(W3\) Component Location](#). (Group 9015-10.)

Disconnect chassis control unit (CCU) connectors (X21, X22, and X23). [See Cab Harness \(W3\) Component Location](#). (Group 9015-10.)

Check for continuity between pin L4 (circuit L27 BRN) on CCU connector (X21) and all other pins on CCU connectors (X21, X22, and X23).

Is continuity indicated?

YES: Circuit L27 BRN is short to circuit that indicated continuity. Repair circuit or replace harness.

[See Cab Harness \(W3\) Wiring Diagram](#). (Group 9015-10.)

NO: Program chassis control unit (CCU).

WS68074,0004455 -19-08MAR12-6/6

002641.03 — Horn Voltage High

The electric horn circuit is short to power.

WS68074,0004456 -19-08MAR12-1/6

Horn Voltage High Diagnostic Procedure

Alarm Level:

Check Service Code

Additional References:

For additional information, [see Chassis Control Unit \(CCU\) Circuits Theory of Operation](#). (Group 9015-15.)

WS68074,0004456 -19-08MAR12-2/6

1 Intermittent Check

Does DTC periodically "go away"?

YES: DTC is intermittent. [See Intermittent Diagnostic Trouble Code \(DTC\) Diagnostics](#). (Group 9015-20.)

NO: Go to Component Check.

WS68074,0004456 -19-08MAR12-3/6

2 Component Check

Ignition OFF.

Disconnect electric horn (B3). [See Front Frame Harness \(W2\) Component Location](#). (Group 9015-10.)

Apply 24 volts and ground to electric horn (B3).

Does electric horn function?

YES: Go to Short Circuit Check.

NO: Replace electric horn.

Continued on next page

WS68074,0004456 -19-08MAR12-4/6

Chassis Control Unit (CCU) Diagnostic Trouble Codes

4 Harness Check

Turn battery disconnect switch OFF.

Disconnect dump body control lever position sensor (B25). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Disconnect chassis control unit (CCU) connectors (X21, X22, and X23). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check for continuity between pin E1 (circuit P50 RED) on CCU connector (X21) and all other pins on CCU connectors (X21, X22, and X23).

Is continuity indicated?

YES: Circuit P50 RED is short to circuit that indicated continuity. Repair circuit or replace harness.

[See Cab Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

NO: Program chassis control unit (CCU).

MP01188,0000165 -19-05AUG15-6/6

003510.03 — Sensor Supply 2 Voltage High

The 5-volt reference number 2 circuit is short to power.

MP01188,0000164 -19-05AUG15-1/6

Sensor Supply 2 Voltage High Diagnostic Procedure

Alarm Level:

Check Service Code Indicator

Additional References:

For additional information, [see Chassis Control Unit \(CCU\) Circuits Theory of Operation.](#) (Group 9015-15.)

MP01188,0000164 -19-05AUG15-2/6

1 Intermittent Check

Does DTC periodically "go away"?

YES: DTC is intermittent. [See Intermittent Diagnostic Trouble Code \(DTC\) Diagnostics.](#) (Group 9015-20.)

NO: Go to Component Check.

MP01188,0000164 -19-05AUG15-3/6

2 Diagnostic Trouble Code Check

Check diagnostic trouble codes. [See Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application.](#) (Group 9015-20.)

Are other dump body lever diagnostic trouble codes present?

YES: Correct other diagnostic trouble codes and recheck.

[See 520913.03 - Body Lever Position Sensor Voltage High.](#) (Group 9001-30.)

[See 520913.04 - Body Lever Position Sensor Voltage Low.](#) (Group 9001-30.)

NO: Program chassis control unit (CCU).

Continued on next page

MP01188,0000164 -19-05AUG15-4/6

Chassis Control Unit (CCU) Diagnostic Trouble Codes

1 Intermittent Check	Does DTC periodically "go away"?	YES: DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics . (Group 9015-20.) NO: Go to Component Check.
2 Component Check	Ignition OFF. Disconnect right side reversing fan solenoid (Y51). See Engine Harness (W17) Component Location . (Group 9015-10.) Measure resistance between terminals 1 and 2 on right side reversing fan solenoid (Y51). See Electrical Component Specifications . (Group 9015-20.) Is solenoid within specification?	YES: Go to Short Circuit Check. NO: Right side reversing fan solenoid (Y51) malfunction. Replace solenoid.
3 Short Circuit Check	Ignition OFF. Disconnect right side reversing fan solenoid (Y51). See Engine Harness (W17) Component Location . (Group 9015-10.) Disconnect chassis control unit (CCU) connector (X21). See Cab Harness (W3) Component Location . (Group 9015-10.) Check circuit H38 GRN for ground at pin 1 on right side reversing fan solenoid (Y51) harness connector. Is ground present?	YES: Circuit H38 GRN is short to ground. Repair circuit or replace harness. See Engine Harness (W17) Wiring Diagram . (Group 9015-10.) See Cab Harness (W3) Wiring Diagram . (Group 9015-10.) NO: Go to Harness Check.

Continued on next page

Chassis Control Unit (CCU) Diagnostic Trouble Codes

3 Open Circuit Check

Ignition OFF.

Disconnect 24V to 12V DC Converter (U1) connector (X55). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Disconnect chassis control unit (CCU) connector (X23). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Verify fuse (F33) is present and has continuity.

Check circuit P73 RED for continuity between pin 5 on converter (U1) connector (X55) and pin 8 on chassis control unit (CCU) connector (X23).

Check circuit G09 BLK for continuity between pin 3 on converter (U1) connector (X55) and frame ground.

Is continuity indicated?

YES: Go to Short Circuit Check.

NO: Circuit without continuity indicated is open. Repair or replace harness.

[See Cab Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

WS68074,0004463 -19-08MAR12-5/7

4 Short Circuit Check

Ignition OFF.

Disconnect 24V to 12V DC Converter (U1) connector (X55). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Disconnect chassis control unit (CCU) connector (X23). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Verify fuse (F33) is present and has continuity.

Ignition ON.

Check circuit P73 RED for voltage at pin 8 on chassis control unit (CCU) connector (X23).

Is 15.8 volts or more present?

YES: Circuit P73 RED is short to power. Repair circuit or replace harness.

[See Cab Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

NO: Go to Harness Check.

WS68074,0004463 -19-08MAR12-6/7

5 Harness Check

Turn battery disconnect switch OFF.

Disconnect 24V to 12V DC converter (U1) connector (X55). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Disconnect chassis control unit (CCU) connector (X23). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Verify fuse (F33) is present and has continuity.

Check for continuity between pin 8 (circuit P73 RED) on CCU connector (X23) and all other pins on CCU connectors (X21, X22, and X23).

Is continuity indicated?

YES: Circuit P73 RED is short to circuit that indicated continuity. Repair circuit or replace harness.

[See Cab Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

NO: Program chassis control unit (CCU).

WS68074,0004463 -19-08MAR12-7/7

Chassis Control Unit (CCU) Diagnostic Trouble Codes

2 Component Check	<p>Ignition OFF.</p> <p>Disconnect circuit 3 WHT and 4 WHT at blower motor resistor/thermofuse (R11). See Air Conditioner Unit Harness (W15) Component Location. (Group 9015-10.)</p> <p>Check for continuity between circuit 3 WHT terminal on resistor R1 and circuit 4 WHT terminal on resistor R1.</p> <p>Is continuity indicated?</p>	<p>YES: Go to Open Circuit Check.</p> <p>NO: Replace blower motor resistor/thermofuse.</p> <p style="text-align: right; font-size: small;">WS68074,000446C -19-08MAR12-4/5</p>
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3 Open Circuit Check	<p>Ignition OFF.</p> <p>Disconnect circuit 3 WHT at blower motor resistor/thermofuse (R11). See Air Conditioner Unit Harness (W15) Component Location. (Group 9015-10.)</p> <p>Disconnect cab harness-to-air conditioner harness connector (X46). See Cab Harness (W3) Component Location. (Group 9015-10.)</p> <p>Check circuit 3 WHT for continuity between pin 3 on harness connector (X46) and circuit 3 WHT terminal at blower motor resistor/thermofuse (R11).</p> <p>Is continuity indicated?</p>	<p>YES: Continue to next check.</p> <p>NO: Circuit without continuity indicated is open. Repair circuit or replace harness.</p> <p>See Air Conditioner Unit Harness (W15) Wiring Diagram. (Group 9015-10.)</p>
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	<p>Ignition OFF.</p> <p>Disconnect cab harness-to-air conditioner harness connector (X46). See Cab Harness (W3) Component Location. (Group 9015-10.)</p> <p>Disconnect chassis control unit (CCU) connector (X23). See Cab Harness (W3) Component Location. (Group 9015-10.)</p> <p>Check circuit A03 ORG for continuity between pin 3 on harness connector (X46) and pin 4 on CCU connector (X23).</p> <p>Is continuity indicated?</p>	<p>YES: Program chassis control unit (CCU).</p> <p>NO: Circuit without continuity indicated is open. Repair circuit or replace harness.</p> <p>See Cab Harness (W3) Wiring Diagram. (Group 9015-10.)</p> <p style="text-align: right; font-size: small;">WS68074,000446C -19-08MAR12-5/5</p>
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520820.06 — HVAC Blower Low Speed Current High

The HVAC blower low speed circuit is short to ground.

WS68074,000446D -19-08MAR12-1/6

HVAC Blower Low Speed Current High Diagnostic Procedure

Alarm Level:

Check Service Code Indicator

Additional References:

For additional information, [see Chassis Control Unit \(CCU\) Circuits Theory of Operation.](#) (Group 9015-15.)

Continued on next page

WS68074,000446D -19-08MAR12-2/6

Chassis Control Unit (CCU) Diagnostic Trouble Codes

2 Component Check	<p>Ignition OFF.</p> <p>Disconnect the mid axle filter restriction switch (B68). See Rear Frame Harness (W12) Component Location. (Group 9015-10.)</p> <p>Check for continuity between pins A and B on restriction switch (B68).</p> <p>Is continuity indicated?</p>	<p>YES: Problem intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.)</p> <p>NO: Mid axle filter restriction switch (B68) malfunction. Replace switch.</p>
<small>WS68074.0004C85 -19-21MAR16-4/4</small>		

520838.01 — Rear Axle Oil Filter Restricted

The rear axle oil filter is restricted.

WS68074.0004C86 -19-21MAR16-1/5

Rear Axle Oil Filter Restricted Diagnostic Procedure

Alarm Level:

Caution Icon (yellow)

Additional References:

For additional information, [see Axle Cooling and Lubrication Circuits Theory of Operation.](#) (Group 9015-15.)

WS68074.0004C86 -19-21MAR16-2/5

1 Intermittent Check	<p>Does diagnostic trouble code (DTC) periodically “go away”?</p>	<p>YES: DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.)</p> <p>NO: Go to Component Check.</p>
<small>WS68074.0004C86 -19-21MAR16-3/5</small>		

2 Component Check	<p>Ignition OFF.</p> <p>Disconnect the rear axle filter restriction switch (B69). See Rear Frame Harness (W12) Component Location. (Group 9015-10.)</p> <p>Check for continuity between pins A and B on restriction switch (B69).</p> <p>Is continuity indicated?</p>	<p>YES: Go to Hydraulic Oil Filter Check.</p> <p>NO: Rear axle filter restriction switch (B69) malfunction. Replace switch.</p>
<small>Continued on next page</small>		
<small>WS68074.0004C86 -19-21MAR16-4/5</small>		

Chassis Control Unit (CCU) Diagnostic Trouble Codes

2 Component Check

NOTE: The dump body lever connector contains wiring for the bin lever detent magnet (Y30) and dump body control lever position sensor (B25). For location of magnet (Y30) and sensor (B25), see Cab Harness (W3) Component Location. (Group 9015-10.)

Ignition OFF.

Disconnect bin lever detent magnet (Y30). See Cab Harness (W3) Component Location. (Group 9015-10.)

Measure bin lever detent magnet resistance between terminals 5 and 6 on dump body lever connector.

Compare resistance to specification. See Electrical Component Specifications. (Group 9015-20.)

Is resistance to specification?

YES: Go to Open Circuit Check.

NO: Bin lever detent magnet (Y30) malfunction. Replace bin lever detent magnet.

ML82895,000086B -19-15JAN14-4/5

3 Open Circuit Check

Ignition OFF.

Disconnect bin lever detent magnet (Y30). See Cab Harness (W3) Component Location. (Group 9015-10.)

Disconnect chassis control unit (CCU) connector (X22). See Cab Harness (W3) Component Location. (Group 9015-10.)

Check for continuity between pin 6 (circuit H43 GRN) on bin lever detent magnet (Y30) and pin 42 (circuit H42 GRN) on CCU connector (X22).

Is continuity indicated?

YES: Program chassis control unit (CCU).

NO: Circuit that does not indicate continuity is open. Repair circuit or replace harness.

See Cab Harness (W3) Wiring Diagram. (Group 9015-10.)

ML82895,000086B -19-15JAN14-5/5

520855.06 — Body Lever Solenoid Current High

The body lever solenoid circuit is short to ground.

ML82895,000086C -19-15JAN14-1/6

Body Lever Solenoid Current High Diagnostic Procedure

Alarm Level:

Check Service Code Indicator

Additional References:

For additional information, see Dump Body Control and Gear Limit Circuits Theory of Operation. (Group 9015-15.)

ML82895,000086C -19-15JAN14-2/6

1 Intermittent Check

Does 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

ML82895,000086C -19-15JAN14-3/6

Chassis Control Unit (CCU) Diagnostic Trouble Codes

2 Component Check

Ignition OFF.

Disconnect on board weighing (OBW) lights connector (X25). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Apply 12 volts to terminals 3 and ground to terminal 4 to on board weighing (OBW) lights connector (X25).

Does light function? (Group 9015-20.)

YES: Go to Open Circuit Check.

NO: On board weighing (OBW) light (H14) malfunction. Replace on board weighing (OBW) light.

WS68074.000447E -19-08MAR12-4/5

3 Open Circuit Check

Ignition OFF.

Disconnect on board weighing (OBW) lights connector (X25). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Disconnect chassis control unit (CCU) connector (X22). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit L15 BRN for continuity between pin 3 on OBW lights connector (X25) and pin 47 on CCU connector (X22).

Check circuit G34 BLK for continuity between pin 4 on OBW lights connector (X25) and frame ground.

Is continuity indicated?

YES: Program chassis control unit (CCU).

NO: Circuit without continuity indicated is open. Repair circuit or replace harness.

[See Cab Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

WS68074.000447E -19-08MAR12-5/5

520877.06 — Red OBW Light Current High

The red on board weighing (OBW) light circuit is short to ground.

WS68074.000447F -19-08MAR12-1/6

Red OBW Light Current High Diagnostic Procedure

Alarm Level:

Check Service Code Indicator

Additional References:

For additional information, [see Chassis Control Unit \(CCU\) Circuits Theory of Operation.](#) (Group 9015-15.)

WS68074.000447F -19-08MAR12-2/6

1 Intermittent Check

Does 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

WS68074.000447F -19-08MAR12-3/6

Chassis Control Unit (CCU) Diagnostic Trouble Codes

4 Harness Check

Turn battery disconnect switch OFF.

Disconnect chassis control unit (CCU) connectors (X21, X22, and X23). See [Articulation Harness \(W9\) Component Location](#). (Group 9015-10.)

Disconnect load holding pilot solenoid circuit (Y25). See [Cab Harness \(W3\) Component Location](#). (Group 9015-10.)

Check for continuity between pin 29 (circuit H21 GRN) on CCU connector (X22) and all other pins on CCU connectors (X21, X22, and X23).

Is continuity indicated?

YES: Circuit H21 GRN is short to circuit with continuity indicated. Repair or replace circuit.

see [Articulation Harness \(W9\) Wiring Diagram](#). (Group 9015-10.)

See [Cab Harness \(W3\) Wiring Diagram](#). (Group 9015-10.)

NO: Program chassis control unit (CCU).

WS68074,0004CB2 -19-25JUL12-6/6

520900.03 — Body Pressure Reducing Solenoid Voltage High

The body dump reduction solenoid high side driver circuit is short to power.

WS68074,0004CB7 -19-25JUL12-1/5

Body Pressure Reducing Solenoid Voltage High Diagnostic Procedure

Alarm Level:

Check Service Code Indicator

Additional References:

For additional information, see [Chassis Control Unit \(CCU\) Circuits Theory of Operation](#). (Group 9025-15.)

WS68074,0004CB7 -19-25JUL12-2/5

1 Intermittent Check

Does 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

WS68074,0004CB7 -19-25JUL12-3/5

Chassis Control Unit (CCU) Diagnostic Trouble Codes

3 Open Circuit Check

Ignition OFF.

Disconnect dump body position sensor (B6). [See Hydraulic Harness \(W7\) Component Location](#). (Group 9015-10.)

Disconnect chassis control unit (CCU) connector (X21). [See Cab Harness \(W3\) Component Location](#). (Group 9015-10.)

Check circuit M05 PUR for continuity between pin B on dump body position sensor (B6) connector and pin 33 on CCU connector (X23).

Check circuit P10 RED for continuity between pin C on dump body position sensor (B6) connector and pin E2 on CCU connector (X21).

Check circuit R06 BLK for continuity between pin A on dump body position sensor (B6) connector and pin F2 on CCU connector (X21).

Is continuity indicated?

YES: Go to Short Circuit Check.

NO: Circuit without continuity indicated is open. Repair circuit or replace harness.

[See Cab Harness \(W3\) Wiring Diagram](#). (Group 9015-10.)

[See Hydraulic Harness \(W7\) Wiring Diagram](#). (Group 9015-10.)

[see Articulation Harness \(W9\) Wiring Diagram](#). (Group 9015-10.)

WS68074,0004482 -19-27AUG12-5/8

4 Short Circuit Check

Ignition OFF.

Disconnect dump body position sensor (B6). [See Hydraulic Harness \(W7\) Component Location](#). (Group 9015-10.)

Ignition ON.

Check circuit M05 PUR for voltage at pin B on dump body position sensor (B6) connector.

Is voltage present?

YES: Circuit M05 PUR is short to power. Repair circuit or replace harness.

[See Cab Harness \(W3\) Wiring Diagram](#). (Group 9015-10.)

[See Hydraulic Harness \(W7\) Wiring Diagram](#). (Group 9015-10.)

[see Articulation Harness \(W9\) Wiring Diagram](#). (Group 9015-10.)

NO: Go to Harness Check.

Continued on next page

WS68074,0004482 -19-27AUG12-6/8

Chassis Control Unit (CCU) Diagnostic Trouble Codes

1 Intermittent Check	Does DTC periodically "go away"?	YES: DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics . (Group 9015-20.) NO: Go to Component Check.
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WS68074.0004CC3 -19-24APR13-3/6

2 Component Check	Ignition OFF. Disconnect left strut up solenoid (Y40) and left strut down solenoid (Y41). See Articulation Harness (W9) Component Location . (Group 9015-10.) Check solenoids. See Electrical Component Specifications . (Group 9015-20.) Are solenoids within specification?	YES: Go to Short Circuit Check. NO: Replace solenoids not within specification.
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WS68074.0004CC3 -19-24APR13-4/6

3 Short Circuit Check	Ignition OFF. Disconnect left strut up solenoid (Y40). See Articulation Harness (W9) Component Location . (Group 9015-10.) Check circuit H29 GRN for ground at pin 1 of left strut up solenoid (Y40) harness connector. Is ground present?	YES: Wire H29 GRN is short to ground. Repair circuit or replace harness. See Articulation Harness (W9) Wiring Diagram . (Group 9015-10.) See Cab Harness (W3) Wiring Diagram . (Group 9015-10.) NO: Go to Harness Check.
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Continued on next page

WS68074.0004CC3 -19-24APR13-5/6

Chassis Control Unit (CCU) Diagnostic Trouble Codes

<p>4 Harness Check</p>	<p>Ignition OFF.</p> <p>Disconnect right strut up solenoid (Y38). <u>See Articulation Harness (W9) Component Location.</u> (Group 9015-10.)</p> <p>Disconnect chassis control unit (CCU) connectors (X21, X22, and X23). <u>See Cab Harness (W3) Component Location.</u> (Group 9015-10.)</p> <p>Check for continuity between pin 53 of CCU connector (X22) and all other pins on CCU connectors (X21, X22, and X23).</p> <p>Is continuity indicated?</p>	<p>YES: Circuit H27 GRN is short to circuit with continuity indicated. Repair or replace circuits.</p> <p><u>see Articulation Harness (W9) Wiring Diagram.</u> (Group 9015-10.)</p> <p><u>See Cab Harness (W3) Wiring Diagram.</u> (Group 9015-10.)</p> <p>NO: Program chassis control unit (CCU).</p>
<small>WS68074.0004CCC -19-25JUL12-6/6</small>		

520953.16 — Right Strut Raise Solenoid Moderately High

The right strut up solenoid low side driver circuit is short to ground.

WS68074.0004CCD -19-25JUL12-1/6

Right Strut Raise Solenoid Moderately High Diagnostic Procedure

Alarm Level:

Check Service Code Indicator

Additional References:

For additional information, see Chassis Control Unit (CCU) Circuits Theory of Operation. (Group 9025-15.)

WS68074.0004CCD -19-25JUL12-2/6

<p>1 Intermittent Check</p>	<p>Does DTC periodically “go away”?</p>	<p>YES: DTC is intermittent. <u>See Intermittent Diagnostic Trouble Code (DTC) Diagnostics.</u> (Group 9015-20.)</p> <p>NO: Go to Component Check.</p>
<small>WS68074.0004CCD -19-25JUL12-3/6</small>		

<p>2 Component Check</p>	<p>Ignition OFF.</p> <p>Disconnect right strut up solenoid (Y38). <u>See Articulation Harness (W9) Component Location.</u> (Group 9015-10.)</p> <p>Check solenoid. <u>See Electrical Component Specifications.</u> (Group 9015-20.)</p> <p>Is solenoid within specification?</p>	<p>YES: Go to Short Circuit Check.</p> <p>NO: Right strut up solenoid (Y38) malfunction. Replace solenoid.</p>
<small>Continued on next page</small>		
<small>WS68074.0004CCD -19-25JUL12-4/6</small>		

Chassis Control Unit (CCU) Diagnostic Trouble Codes

3 Short Circuit Check	<p>Ignition OFF.</p> <p>Disconnect steering column switch (S2). <u>See Cab Harness (W3) Component Location.</u> (Group 9015-10.)</p> <p>Check circuit L18 BRN for ground and pin 5 of steering column switch (S2) harness connector.</p> <p>Is ground present?</p>	<p>YES: Circuit L18 BRN is short to ground. Repair circuit or replace harness.</p> <p><u>See Cab Harness (W3) Wiring Diagram.</u> (Group 9015-10.)</p> <p>YES: Circuit L18 BRN is short to ground. Repair circuit or replace harness.</p> <p><u>See Cab Harness (W3) Wiring Diagram.</u> (Group 9015-10.)</p> <p>NO: Go to Harness Check.</p>
	<p>Check wire L18 BRN and for ground at pin 3 of steering column switch (S2) harness connector.</p>	<p>NO: Go to Harness Check.</p>

WS68074.0004489 -19-08MAR12-5/6

4 Harness Check	<p>Turn battery disconnect switch OFF.</p> <p>Disconnect steering column switch (S2). <u>See Cab Harness (W3) Component Location.</u> (Group 9015-10.)</p> <p>Disconnect chassis control unit (CCU) connectors (X21, X22, and X23). <u>See Cab Harness (W3) Component Location.</u> (Group 9015-10.)</p> <p>Check for continuity between pin 36 (circuit L18 BRN) on CCU connector (X23) and all other pins on CCU connectors (X21, X22, and X23).</p> <p>Is continuity indicated?</p>	<p>YES: Circuit L18 BRN is short to circuit that indicated continuity. Repair circuit or replace harness.</p> <p><u>See Cab Harness (W3) Wiring Diagram.</u> (Group 9015-10.)</p> <p>NO: Program chassis control unit (CCU).</p>
	<p>Check for continuity between pin 13 (circuit L18 BRN) on CCU connector (X23) and all other pins on CCU connectors (X21, X22, and X23).</p> <p>Is continuity indicated?</p>	<p>YES: Circuit L18 BRN is short to circuit that indicated continuity. Repair circuit or replace harness.</p> <p><u>See Cab Harness (W3) Wiring Diagram.</u> (Group 9015-10.)</p> <p>NO: Program chassis control unit (CCU).</p>

WS68074.0004489 -19-08MAR12-6/6

521157.04 — Hazard Lamp Enable Voltage Low

The hazard lamp enable circuit is short to ground.

Continued on next page

WS68074.000448A -19-08MAR12-1/5

Hydraulic Cut Sol Current High Diagnostic Procedure

Alarm Level:

Check Service Code Indicator

Additional References:

For additional information, see Chassis Control Unit (CCU) Circuits Theory of Operation. (Group 9015-15.)

WS68074,0004491 -19-08MAR12-2/6

1 Intermittent Check

Does DTC periodically "go away"?

YES: DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.)

NO: Go to Component Check.

WS68074,0004491 -19-08MAR12-3/6

2 Component Check

Ignition OFF.

Disconnect hydraulic cut-off solenoid (Y11). See Hydraulic Harness (W7) Component Location. (Group 9015-10.)

Measure resistance between terminals 1 and 2 on hydraulic cut-off solenoid (Y11).

Compare resistance to specification. See Electrical Component Specifications. (Group 9015-20.)

Is resistance to specification?

YES: Go to Short Circuit Check.

NO: Hydraulic cut-off solenoid (Y11) malfunction. Replace solenoid.

WS68074,0004491 -19-08MAR12-4/6

3 Short Circuit Check

Ignition OFF.

Disconnect hydraulic cut-off solenoid (Y11). See Hydraulic Harness (W7) Component Location. (Group 9015-10.)

Check circuit H08 GRN for ground at pin 1 on hydraulic cut-off solenoid (Y11) connector.

Is voltage present?

YES: Circuit H08 GRN is short to ground. Repair circuit or replace harness.

See Cab Harness (W3) Wiring Diagram. (Group 9015-10.)

See Hydraulic Harness (W7) Wiring Diagram. (Group 9015-10.)

NO: Go to Harness Check.

Continued on next page

WS68074,0004491 -19-08MAR12-5/6

Chassis Control Unit (CCU) Diagnostic Trouble Codes

2 Component Check

Using the CAN monitor unit (CMU) or Service ADVISOR™, check voltage reading from middle axle temperature sensor (B62). For sensor location, [see Rear Frame Harness \(W12\) Component Location](#). (Group 9015-10.)

Compare sensor voltage to specification. [See Electrical Component Specifications](#). (Group 9015-20.)

Is sensor voltage to specification?

YES: Diagnose cause of high axle oil temperature. [See Axle Oil Overheating](#). (Group 9020-15.) [See Axle Operation](#). (Group 9020-05.)

NO: Middle axle temperature sensor (B62) malfunction. Replace sensor.

Service ADVISOR is a trademark of Deere & Company

WS68074,0004CE9 -19-21MAR16-4/4

521923.03 — Mid Brake Temperature Sensor Voltage High

The middle axle temperature sensor circuit is open or short to power.

WS68074,0004CEA -19-21MAR16-1/7

Mid Brake Temperature Sensor Voltage High Diagnostic Procedure

Alarm Level:

Caution Icon (yellow)

Additional References:

For additional information, [see Axle Cooling and Lubrication Circuits Theory of Operation](#). (Group 9015-15.)

WS68074,0004CEA -19-21MAR16-2/7

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.

WS68074,0004CEA -19-21MAR16-3/7

2 Component Check

Using the CAN monitor unit (CMU) or Service ADVISOR™, check voltage reading from middle axle temperature sensor (B62). For sensor location, [see Rear Frame Harness \(W12\) Component Location](#). (Group 9015-10.)

Compare sensor voltage to specification. [See Electrical Component Specifications](#). (Group 9015-20.)

Is sensor voltage to specification?

YES: Go to Open Circuit Check.

NO: Middle axle temperature sensor (B62) malfunction. Replace sensor.

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WS68074,0004CEA -19-21MAR16-4/7

Chassis Control Unit (CCU) Diagnostic Trouble Codes

3 Open Circuit Check

Ignition OFF.

Disconnect secondary steering pressure switch (B36). [See Hydraulic Harness \(W7\) Component Location.](#) (Group 9015-10.)

Disconnect chassis control unit (CCU) connector (X23). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit N14 YEL for continuity between pin 1 on sensor harness connector and pin 15 on CCU connector (X23).

Check circuit G12 BLK for continuity between pin 2 on sensor harness connector and frame ground.

Is continuity indicated?

YES: [Perform Secondary Steering Check.](#) (Group 9005-10.)

NO: Circuit that did not indicate continuity is open. Repair or replace harness.

[See Cab Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

[See Hydraulic Harness \(W7\) Wiring Diagram.](#) (Group 9015-10.)

AP88438,0000543 -19-28JUL15-5/5

522176.03 — Secondary Steering Pressure Switch Voltage High

The secondary steering pressure is low with engine running.

AP88438,0000541 -19-28JUL15-1/7

Secondary Steering Pressure Switch Voltage High Diagnostic Procedure

Alarm Level:

Stop Indicator (red)

Additional References:

For additional information, [see Chassis Control Unit \(CCU\) Circuits Theory of Operation.](#) (Group 9015-15.)

AP88438,0000541 -19-28JUL15-2/7

1 Intermittent Check

Does 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

AP88438,0000541 -19-28JUL15-3/7

Chassis Control Unit (CCU) Diagnostic Trouble Codes

3 Short Circuit Check

Ignition OFF.

Disconnect washer pump motor (M5). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit A04 ORG for ground at pin A on washer pump motor (M5) harness connector.

Is continuity indicated?

YES: Go to Harness Check.

NO: Circuit without continuity indicated is open. Repair or replace harness.

[See Cab Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

WS68074,0004497 -19-04JAN16-5/6

4 Harness Check

Turn battery disconnect switch OFF.

Disconnect washer pump motor (M5). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Disconnect chassis control unit (CCU) connector (X21). [See Cab Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit A04 ORG for continuity between pin A on pump motor (M5) harness connector and pin G4 on chassis control unit (CCU) connector (X21).

Check for continuity between pin 7 (circuit Y01 YEL) on CCU connector (23) and all other pins on CCU connectors (X21, X22, and X23).

Is continuity indicated?

YES: Circuit Y01 YEL is short to circuit that indicated continuity. Repair circuit or replace harness.

[See Front Frame Harness \(W2\) Wiring Diagram.](#) (Group 9015-10.)

[See Cab Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

NO: Program chassis control unit (CCU).

WS68074,0004497 -19-04JAN16-6/6

522312.16 — Windshield Washer Pump Voltage Moderately High

The windshield washer pump circuit is short to power.

BJ21193,0000008 -19-04JAN16-1/6

Windshield Washer Pump Current High Diagnostic Procedure

Alarm Level:

Check Service Code Indicator

Additional References:

For additional information, [See Chassis Control Unit \(CCU\) Circuits Theory of Operation.](#) (Group 9015-15.)

Continued on next page

BJ21193,0000008 -19-04JAN16-2/6

TC Stall Protection Very High Diagnostic Procedure

Alarm Level:

Check Service Code Indicator

Additional References:

For additional information, see Chassis Control Unit (CCU) Circuits Theory of Operation. (Group 9015-15.)

WS68074.000449F -19-08MAR12-2/4

1 Intermittent Check

Does DTC periodically "go away"?

YES: DTC is intermittent.
See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.)

NO: Go to Diagnostic Trouble Code Check.

WS68074.000449F -19-08MAR12-3/4

2 Code Check

Ignition ON.

Clear codes from the chassis control unit (CCU). See Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application. (Group 9015-20.)

Check for active DTCs.

Is DTC 522517.31 still active?

YES: Program chassis control unit (CCU).

NO: Checks complete.

WS68074.000449F -19-08MAR12-4/4

523217.04 — VP3 Supply Voltage Low

VP3 supply voltage is short to ground.

WS68074.00044A0 -19-08MAR12-1/5

VP3 Supply Voltage Low Diagnostic Procedure

Alarm Level:

Check Service Code Indicator

Additional References:

For additional information, see Chassis Control Unit (CCU) Circuits Theory of Operation. (Group 9015-15.)

WS68074.00044A0 -19-08MAR12-2/5

1 Fuse Check

Ignition OFF.

Remove fuse (F7). See Fuse and Relay Specifications. (Group 9015-10.)

Check fuse (F7) for continuity.

Is continuity indicated?

YES: Go to Ground Circuit Check.

NO: Replace fuse(s) without continuity indicated.

Continued on next page

WS68074.00044A0 -19-08MAR12-3/5

Operator Exit Light Current Low Diagnostic Procedure

Alarm Level:

Check Service Code Indicator

Additional References:

For additional information, see Chassis Control Unit (CCU) Circuits Theory of Operation. (Group 9015-15.)

WS68074.0004D12 -19-03MAY13-2/5

1 Intermittent Check

Does DTC periodically "go away"?

YES: DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.)
NO: Go to Component Check.

WS68074.0004D12 -19-03MAY13-3/5

2 Component Check

Ignition OFF.

Disconnect left stairwell light (E19). See Cab Harness (W3) Component Location. (Group 9015-10.)

Apply 24 volts to pin 1 and ground to pin 2 on left stairwell light (E19).

Does light (E19) illuminate?

YES: Go to Harness Check.
NO: Left stairwell light (E19) malfunction. Replace light.

WS68074.0004D12 -19-03MAY13-4/5

3 Harness Check

Turn battery disconnect switch OFF.

Disconnect left stairwell light (E19). See Cab Harness (W3) Component Location. (Group 9015-10.)

Disconnect chassis control unit (CCU) connectors (X21, X22, and X23). See Cab Harness (W3) Component Location. (Group 9015-10.)

Check for continuity between pin 30 (circuit L25 BRN) on CCU connector (X23) and pin 1 on left stairwell light (E14).

Check for continuity between pin 2 (circuit G48 BLK) on left stairwell light (E19) and machine ground.

Is continuity indicated?

YES: Circuit that does not indicate continuity is open. Repair circuit or replace harness.
See Cab Harness (W3) Wiring Diagram. (Group 9015-10.)
NO: Program chassis control unit (CCU).

WS68074.0004D12 -19-03MAY13-5/5

523757.06 — Operator Exit Light Current High

The left stairwell light high side driver circuit is short to ground.

Continued on next page

WS68074.0004D13 -19-03MAY13-1/6

25-Button Sealed Switch Module (SSM) (OC3) Diagnostic Trouble Codes

1 Reset Controller

NOTE: The 25-button sealed switch module (SSM) (OC3) will not store diagnostic trouble codes; when ignition is cycled, the 25-button SSM (OC3) will reset and all codes will be lost.

Document all diagnostic codes.

Ignition OFF.

Wait 20 seconds.

Ignition ON.

Push gear hold switch.

Is DTC 520754.09 present?

YES: Go to CAN Circuit Check.

NO: Checks complete.

CS33148,0004482 -19-21JUN12-3/6

2 CAN Circuit Check

Perform Controller Area Network (CAN) Circuit Test. (Group 9015-20).

Does CAN circuit test good?

YES: Go to Controller Check.

NO: Repair CAN circuit.

CS33148,0004482 -19-21JUN12-4/6

3 Controller Check

Ignition ON.

View coolant temperature and fuel level values on the CAN monitor unit (CMU).

Are correct values displayed in the CMU?

YES: Reprogram 25-button SSM (OC3).

NO: Go to Reprogram Controller.

CS33148,0004482 -19-21JUN12-5/6

4 Reprogram Controller

Reprogram chassis control unit (CCU).

Push gear hold switch.

Is DTC 520754.09 present?

YES: Replace 25-button SSM (OC3).

NO: Checks complete.

CS33148,0004482 -19-21JUN12-6/6

520755.04 — Button 20 Voltage Low

Dump body UP switch is stuck closed.

CS33148,0004483 -19-26JAN12-1/4

Button 20 Voltage Low Diagnostic Procedure

Alarm Level:

Check Service Code

Additional References:

For additional information, see CAN Monitor Unit (CMU) and Sealed Switch Modules (SSM) Circuits Theory of Operation. (Group 9015-15.)

Continued on next page

CS33148,0004483 -19-26JAN12-2/4

Button 15 Voltage Low Diagnostic Procedure

Alarm Level:

Check Service Code

Additional References:

For additional information, see CAN Monitor Unit (CMU) and Sealed Switch Modules (SSM) Circuits Theory of Operation. (Group 9015-15.)

CS33148,0004491 -19-26JAN12-2/4

1 Reset Controller	<p><i>NOTE: The 25-button sealed switch module (SSM) (OC3) will not store diagnostic trouble codes; when ignition power is cycled, the 25-button SSM (OC3) will reset and all codes will be lost.</i></p> <p>Document all diagnostic codes. Ignition OFF. Wait 20 seconds. Ignition ON.</p> <p>Is DTC 523850.04 present?</p>	<p>YES: Go to Program Controller.</p> <p>NO: Go to next step in this check.</p>
	<p>Push reverse gear select switch.</p> <p>Is DTC 523850.04 present?</p>	<p>YES: Go to Program Controller.</p> <p>NO: Check complete.</p>

CS33148,0004491 -19-26JAN12-3/4

2 Program Controller	<p>Reprogram 25-button SSM (OC3).</p> <p>Is DTC 523850.04 present?</p>	<p>YES: Replace 25-button SSM (OC3).</p> <p>NO: Go to next step in this check.</p>
	<p>Push reverse gear select switch.</p> <p>Is DTC 523850.04 present?</p>	<p>YES: Replace 25-button SSM (OC3).</p> <p>NO: Check complete.</p>

CS33148,0004491 -19-26JAN12-4/4

523850.09 — Button 15 Bad Update Rate

The 25-button sealed switch module (SSM) (OC3) did not receive LED control message from chassis control unit (CCU) after the reverse gear select switch was pushed.

CS33148,0004492 -19-21JUN12-1/6

Button 15 Bad Update Rate Diagnostic Procedure

Alarm Level:

Check Service Code

Additional References:

For additional information, see CAN Monitor Unit (CMU) and Sealed Switch Modules (SSM) Circuits Theory of Operation. (Group 9015-15.)

Continued on next page

CS33148,0004492 -19-21JUN12-2/6

Button 8 Bad Update Rate Diagnostic Procedure

Alarm Level:

Check Service Code

Additional References:

For additional information, see CAN Monitor Unit (CMU) and Sealed Switch Modules (SSM) Circuits Theory of Operation. (Group 9015-15.)

CS33148,00044A0 -19-21JUN12-2/6

1 Reset Controller

NOTE: The 25-button sealed switch module (SSM) (OC3) will not store diagnostic trouble codes; when ignition is cycled, the 25-button SSM (OC3) will reset and all codes will be lost.

Document all diagnostic codes.
 Ignition OFF.
 Wait 20 seconds.
 Ignition ON.
 Push auto dump body settings switch.

 Is DTC 523860.09 present?

YES: Go to CAN Circuit Check.
NO: Checks complete.

CS33148,00044A0 -19-21JUN12-3/6

2 CAN Circuit Check

Perform Controller Area Network (CAN) Circuit Test. (Group 9015-20).

Does CAN circuit test good?

YES: Go to Controller Check.
NO: Repair CAN circuit.

CS33148,00044A0 -19-21JUN12-4/6

3 Controller Check

Ignition ON.

 View coolant temperature and fuel level values on the CAN monitor unit (CMU).

 Are correct values displayed in the CMU?

YES: Reprogram 25-button SSM (OC3).
NO: Go to Reprogram Controller.

CS33148,00044A0 -19-21JUN12-5/6

4 Reprogram Controller

Reprogram chassis control unit (CCU).

 Push auto dump body settings switch.

 Is DTC 523860.09 present?

YES: Replace 25-button SSM (OC3).
NO: Checks complete.

CS33148,00044A0 -19-21JUN12-6/6

523861.04 — Button 7 Voltage Low

Descent control switch is stuck closed.

Continued on next page

CS33148,00044A1 -19-26JAN12-1/4

25-Button Sealed Switch Module (SSM) (OC3) Diagnostic Trouble Codes

2 CAN Circuit Check

Perform Controller Area Network (CAN) Circuit Test. (Group 9015-20).

Does CAN circuit test good?

YES: Go to Controller Check.

NO: Repair CAN circuit.

CS33148,00044AE -19-21JUN12-4/6

3 Controller Check

Ignition ON.

View coolant temperature and fuel level values on the CAN monitor unit (CMU).

Are correct values displayed in the CMU?

YES: Reprogram 25-button SSM (OC3).

NO: Go to Reprogram Controller.

CS33148,00044AE -19-21JUN12-5/6

4 Reprogram Controller

Reprogram chassis control unit (CCU).

Push engine start switch.

Is DTC 523868.09 present?

YES: Replace 25-button SSM (OC3).

NO: Checks complete.

CS33148,00044AE -19-21JUN12-6/6

15-Button Sealed Switch Module (SSM) (OC4) Diagnostic Trouble Codes

4 Reprogram Controller	Reprogram chassis control unit (CCU).	YES: Replace 15-button SSM (OC4). NO: Checks complete.
	<p>Push feet control switch.</p> <p>Is DTC 523857.09 present?</p>	

CS33148,00044BC -19-22JUN12-6/6

523858.04 — Button 9 Voltage Low

Air conditioner switch is stuck closed.

CS33148,00044BD -19-26JAN12-1/4

Button 9 Voltage Low Diagnostic Procedure

Alarm Level:
Check Service Code

Additional References:
For additional information, see CAN Monitor Unit (CMU) and Sealed Switch Modules (SSM) Circuits Theory of Operation. (Group 9015-15.)

CS33148,00044BD -19-26JAN12-2/4

1 Reset Controller	<p><i>NOTE: The 15-button sealed switch module (SSM) (OC4) will not store diagnostic trouble codes; when ignition power is cycled, the 15-button SSM (OC4) will reset and all codes will be lost.</i></p> <p>Document all diagnostic codes.</p> <p>Ignition OFF.</p> <p>Wait 20 seconds.</p> <p>Ignition ON.</p> <p>Is DTC 523858.04 present?</p>	YES: Go to Program Controller. NO: Go to next step in this check.
	<p>Push air conditioner switch.</p> <p>Is DTC 523858.04 present?</p>	

CS33148,00044BD -19-26JAN12-3/4

2 Program Controller	Reprogram 15-button SSM (OC4).	YES: Replace 15-button SSM (OC4). NO: Go to next step in this check.
	<p>Is DTC 523858.04 present?</p> <p>Push air conditioner switch.</p> <p>Is DTC 523858.04 present?</p>	

CS33148,00044BD -19-26JAN12-4/4

523858.09 — Button 9 Bad Update Rate

The 15-button sealed switch module (SSM) (OC4) did not receive LED control message from chassis control unit (CCU) after the air conditioner switch was pushed.

Continued on next page

CS33148,00044BE -19-22JUN12-1/6

15-Button Sealed Switch Module (SSM) (OC4) Diagnostic Trouble Codes

2 Program Controller	Reprogram 15-button SSM (OC4).	YES: Replace 15-button SSM (OC4).
	Is DTC 523867.04 present?	NO: Go to next step in this check.
	Push rotary beacon light switch.	YES: Replace 15-button SSM (OC4).
	Is DTC 523867.04 present?	NO: Check complete.

CS33148,00044CB -19-26JAN12-4/4

523867.09 — Button 2 Bad Update Rate

The 15-button sealed switch module (SSM) (OC4) did not receive LED control message from chassis control unit (CCU) after the rotary beacon light switch was pushed.

CS33148,00044CC -19-22JUN12-1/6

Button 2 Bad Update Rate Diagnostic Procedure

Alarm Level:

Check Service Code

Additional References:

For additional information, see [CAN Monitor Unit \(CMU\) and Sealed Switch Modules \(SSM\) Circuits Theory of Operation](#). (Group 9015-15.)

CS33148,00044CC -19-22JUN12-2/6

1 Reset Controller	<i>NOTE: The 15-button sealed switch module (SSM) (OC4) will not store diagnostic trouble codes; when ignition is cycled, the 15-button SSM (OC4) will reset and all codes will be lost.</i>	
	Document all diagnostic codes. Ignition OFF. Wait 20 seconds. Ignition ON. Push rotary beacon light switch.	YES: Go to CAN Circuit Check. NO: Checks complete.
	Is DTC 523867.09 present?	

CS33148,00044CC -19-22JUN12-3/6

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

CS33148,00044CC -19-22JUN12-4/6

3 Controller Check	Ignition ON.	
	View coolant temperature and fuel level values on the CAN monitor unit (CMU).	YES: Reprogram 15-button SSM (OC4).
	Are correct values displayed in the CMU?	NO: Go to Reprogram Controller.

Continued on next page

CS33148,00044CC -19-22JUN12-5/6

Operational Checkout Procedure

<p>Keyless Ignition Engine Start and Engine Stop Checks</p>	<p>With ignition ON, push and hold engine start switch on 25-button sealed switch module (SSM) (OC3) to start engine.</p> <p><i>LISTEN/LOOK: Does engine crank and start?</i></p>	<p>YES: Go to next step in this check.</p> <p>NO: For engine start theory, see <u>Start and Charge Circuits Theory of Operation</u>. (Group 9015-15.)</p> <p>If engine cranks but does not start, see <u>Engine Cranks/Won't Start</u>. (Group 9010-15.)</p> <p>If engine does not crank, see <u>Engine Will Not Crank</u>. (Group 9010-15.)</p>
	<p>Push and immediately release engine stop switch on 25-button SSM (OC3).</p> <p><i>NOTE: Depending on operating conditions and engine temperatures, the machine may enter turbo spin down mode.</i></p> <p><i>LOOK/LISTEN: Does engine shut down?</i></p> <p><i>LOOK: If the machine enters turbo spin down mode, does the monitor display show a countdown for turbo spin down?</i></p> <p><i>LOOK/LISTEN: Does engine shut down when countdown reaches 0?</i></p>	<p>YES: Check complete.</p> <p>NO: See <u>Start and Charge Circuits Theory of Operation</u>. (Group 9015-15.)</p>

Continued on next page

NM00125,0000D69 -19-27JAN12-17/34

Operational Checkout Procedure

Exhaust Smoke Check	<p>With engine at normal operating temperature, operate machine under full load at fast engine speed.</p> <p>Observe exhaust.</p> <p><i>NOTE: No smoke is normal, but black smoke can occur during the lag before the turbocharger boosts air supply to match the fuel usage, such as in the early stages of acceleration and during gear changes. Moderate turbo lag smoke may be acceptable; otherwise, black smoke should be hardly visible in a correctly running engine.</i></p> <p>Black smoke is caused by incomplete combustion of the fuel.</p> <p>White or gray smoke is caused by coolant or raw, unburned fuel passing into the exhaust stream.</p> <p>Blue smoke is caused by burning engine lubricating oil.</p> <p><i>LOOK: Is engine exhaust normal?</i></p>	<p>YES: Check complete.</p> <p>NO: Diagnose problem according to color of smoke.</p> <p>For white smoke, <u>see Engine Emits Excessive White Exhaust Smoke.</u> (Group 9010-15.)</p> <p>For black or gray smoke, <u>see Engine Emits Excessive Black or Gray Exhaust Smoke.</u> (Group 9010-15.)</p>
NM00125,0000D69 -19-27JAN12-33/34		

Cycle Times Check	<p>Warm hydraulic oil. <u>See Warming Hydraulic System.</u> (Operator's Manual.)</p> <p>Use a stopwatch to record cycle times.</p> <p><i>LOOK: Are cycle times to specification?</i></p> <p>Dump Body Cycle Time Specifications</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"></th> <th style="text-align: center;">Specification</th> </tr> </thead> <tbody> <tr> <td>Hydraulic Oil—Temperature</td> <td style="text-align: right;">45—55° C 110—130° F</td> </tr> <tr> <td>Engine—Speed</td> <td style="text-align: right;">2640 rpm</td> </tr> <tr> <td>Dump Body Raise (new pump)—Cycle Time</td> <td style="text-align: right;">12 sec.</td> </tr> <tr> <td>Dump Body Raise (used pump)—Cycle Time</td> <td style="text-align: right;">15 sec.</td> </tr> </tbody> </table> <p>Steering Cycle Time Specifications</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"></th> <th style="text-align: center;">Specification</th> </tr> </thead> <tbody> <tr> <td>Engine—Speed</td> <td style="text-align: right;">800 rpm</td> </tr> <tr> <td>Steering Wheel Stop-to-Stop—Cycle Time</td> <td style="text-align: right;">7—8 sec.</td> </tr> </tbody> </table>		Specification	Hydraulic Oil—Temperature	45—55° C 110—130° F	Engine—Speed	2640 rpm	Dump Body Raise (new pump)—Cycle Time	12 sec.	Dump Body Raise (used pump)—Cycle Time	15 sec.		Specification	Engine—Speed	800 rpm	Steering Wheel Stop-to-Stop—Cycle Time	7—8 sec.	<p>YES: Checks complete.</p> <p>NO: <u>See All Hydraulic Functions Slow.</u> Group (9025-15.)</p>
	Specification																	
Hydraulic Oil—Temperature	45—55° C 110—130° F																	
Engine—Speed	2640 rpm																	
Dump Body Raise (new pump)—Cycle Time	12 sec.																	
Dump Body Raise (used pump)—Cycle Time	15 sec.																	
	Specification																	
Engine—Speed	800 rpm																	
Steering Wheel Stop-to-Stop—Cycle Time	7—8 sec.																	
NM00125,0000D69 -19-27JAN12-34/34																		

Diagnostic Information

- | | | | |
|---|-----------------------------|--|-------------------------|
| 1— Secondary Fuel Filter | 4— High Pressure Fuel Pump | 9— Fuel Tank | 14— Dosing Injector |
| 2— High Pressure Common Rail | 5— Fuel Cooler | 10— Fuel Cap | 15— Primary Fuel Filter |
| 3— High Pressure Common
Rail-to-Injector Line (6 used) | 6— Fuel Dosing Pump | 11— Fuel Tank Drain | B37— Fuel Level Sensor |
| | 7— Fuel Dosing Unit | 12— Fuel Tank-to-Primary Fuel
Filter Line | |
| | 8— Fuel Cooler-to-Tank Line | 13— Fuel Dosing Pump-to-
Dosing Injector Line | |

WC20922.00040C0 -19-30NOV11-2/2

Excessive Fuel Consumption Diagnostic Procedure

SW29608,0004070 -19-27JAN12-2/7

1 Fuel Quality Check

Check that fuel tank is full of quality clean fuel. [See Testing Diesel Fuel.](#) (CTM104819.)

Is the tank filled with quality clean fuel?

YES: Go to Air Intake Restriction Check.

NO: Drain fuel and fill with quality clean fuel.

SW29608,0004070 -19-27JAN12-3/7

2 Air Intake Restriction Check

Check air filter, precleaner and intake inlet for obstructions.

Is the air intake system restricted?

YES: Clean or replace engine air filter elements. [See Service Engine Air Intake System.](#) (Operator's Manual.)

NO: Go to Fuel Supply System Check.

SW29608,0004070 -19-27JAN12-4/7

3 Fuel Supply System Check

Check fuel supply lines. [See Engine Fuel System Component Location.](#) (Group 9010-15.)

Are fuel lines leaking or damaged?

YES: Repair or replace leaking and damaged fuel lines.

NO: Go to Fuel Tank Check.

SW29608,0004070 -19-27JAN12-5/7

4 Fuel Tank Check

Check fuel tank. [See Engine Fuel System Component Location.](#) (Group 9010-15.)

Is fuel tank damaged or leaking?

YES: Repair or replace fuel tank.

NO: Go to Fuel in Oil Check.

SW29608,0004070 -19-27JAN12-6/7

5 Fuel in Oil Check

Check engine oil. [See Check Engine Oil Level.](#) (Operator's Manual.)

Does engine oil smell like fuel or is it overfilled?

YES: [See Fuel in Oil](#) (Group 9010-15.)

NO: For further diagnostic information, [see Excessive Fuel Consumption.](#) (CTM104819.)

SW29608,0004070 -19-27JAN12-7/7

Fuel in Oil

SW29608,0004071 -19-27JAN12-1/4

Fuel in Oil Diagnostic Procedure

Continued on next page

SW29608,0004071 -19-27JAN12-2/4

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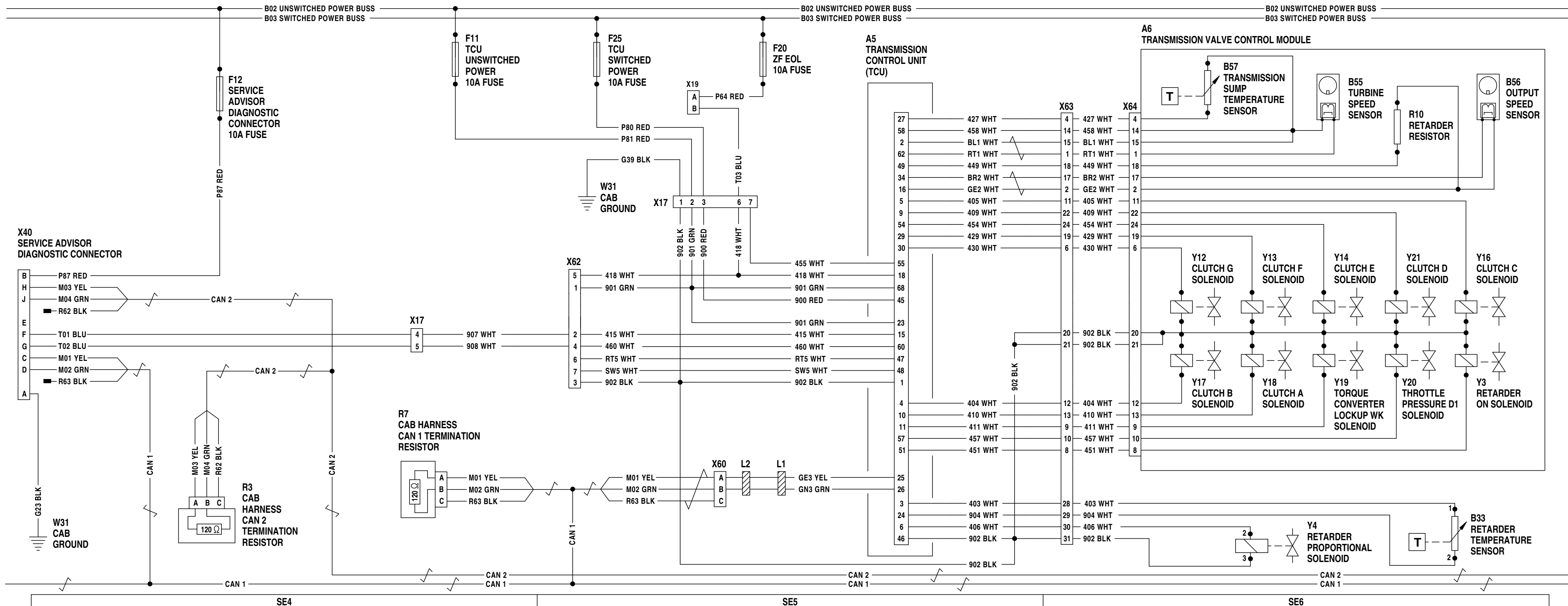
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Section 9015 Electrical System

Contents

	Page		Page
Group 05—System Information			
Electrical Diagram Information	9015-05-1	Hydraulic Harness (W7)	
Electrical Schematic Symbols	9015-05-7	Component Location	9015-10-174
Group 10—System Diagrams			
Fuse and Relay Specifications	9015-10-1	Hydraulic Harness (W7) Wiring	
System Functional Schematic,		Diagram	9015-10-175
Component Location, and Wiring		Transfer Case Extension Harness	
Diagram Master Legend	9015-10-3	(W8) Component Location.....	9015-10-178
System Functional Schematic and		Transfer Case Extension Harness	
Section Legend.....	9015-10-8	(W8) Wiring Diagram	9015-10-179
System Functional Schematic,		Articulation Harness (W9)	
Component Location, and Wiring		Component Location	9015-10-180
Diagram Master Legend With		Articulation Harness (W9) Wiring	
Pneumatic Control Valve—If		Diagram	9015-10-181
Equipped	9015-10-56	Rear Frame Harness (W10)	
System Functional Schematic and		Component Location	9015-10-182
Section Legend With Pneumatic		Rear Frame Harness (W10) Wiring	
Control Valve—If Equipped	9015-10-61	Diagram	9015-10-183
Power and Ground Component		On Board Weighing (OBW)	
Location	9015-10-111	and Tire Pressure Monitoring	
Battery Compartment Harness		(TPM) System Harness (W11)	
(W1) Component Location.....	9015-10-114	Component Location	9015-10-187
Battery Compartment Harness		On Board Weighing (OBW) and	
(W1) Wiring Diagram	9015-10-115	Tire Pressure Monitoring (TPM)	
Front Frame Harness (W2)		System Harness (W11) Wiring	
Component Location	9015-10-118	Diagram	9015-10-191
Front Frame Harness (W2) Wiring		Work Light Harness (W12)	
Diagram	9015-10-119	Component Location	9015-10-194
Cab Harness (W3) Component		Work Light Harness (W12) Wiring	
Location	9015-10-123	Diagram	9015-10-195
Cab Harness (W3) Component		AM/FM Radio Harness (W13)	
Location With Pneumatic Control		Component Location	9015-10-196
Valve—If Equipped	9015-10-127	AM/FM Radio Harness (W13)	
Cab Harness (W3) Wiring		Wiring Diagram	9015-10-197
Diagram	9015-10-131	Air Conditioner Unit Harness (W15)	
Cab Harness (W3) Wiring Diagram		Component Location	9015-10-198
With Pneumatic Control		Air Conditioner Unit Harness (W15)	
Valve—If Equipped	9015-10-147	Wiring Diagram	9015-10-201
Transmission Control Harness		Engine Harness (W16) Component	
(W4) Component Location.....	9015-10-162	Location	9015-10-208
Transmission Control Harness		Engine Harness (W16) Wiring	
(W4) Wiring Diagram	9015-10-163	Diagram	9015-10-211
Transmission Harness (W5)		Engine Interface Harness (W17)	
Component Location	9015-10-165	Component Location	9015-10-218
Transmission Harness (W5) Wiring		Engine Interface Harness (W17)	
Diagram	9015-10-167	Wiring Diagram	9015-10-221
Transmission Valve Control Module		Air Throttle and Temperature	
Harness (W6) Component		Sensors Harness (W18)	
Location	9015-10-170	Component Location	9015-10-228
Transmission Valve Control Module		Air Throttle and Temperature	
Harness (W6) Wiring Diagram.....	9015-10-171	Sensors Harness (W18) Wiring	
		Diagram	9015-10-229

Continued on next page



System Diagrams

A8—Chassis Control Unit (CCU)	M2—Heater Control Valve Actuator	X21— Chassis Control Unit (CCU) 48-Pin Connector (J1)	X84— Air Conditioner Actuator Control Unit 8-Pin Connector
A16— Air Conditioner Actuator Control Unit	M4—Blower Motor	X22— Chassis Control Unit (CCU) 53-Pin Connector (J2)	X85— Air Conditioner Actuator Control Unit 6-Pin Connector
B28— Air Conditioner Freeze Control Switch	M6—Recirculation Vent Actuator	X23— Chassis Control Unit (CCU) 53-Pin Connector (J3)	
B29— Air Conditioner Evaporator Temperature Sensor	M7—Defrost and Middle Vent Actuator	X32— Air Conditioner High/Low Pressure Switch 1-Pin Connector (A)	Y22— Air Conditioner Compressor Clutch
B30— Air Conditioner Evaporator Inlet Sensor	M8—Floor Vent Actuator Resistor/Thermofuse	X33— Air Conditioner High/Low Pressure Switch 1-Pin Connector (B)	
B31— Air Conditioner High/Low Pressure Switch	R11— Blower Motor Resistor/Thermofuse	X46— Cab Harness-to-Air Conditioner Actuator Harness 12-Pin Connector	
F29— Air Conditioner Unit (ACU) 5-Amp Fuse	V4— Air Conditioner Compressor Clutch Diode		
	W30—Front Frame Main Ground		
	W35—Air Conditioner Ground		
	X6— Cab Harness-to-Front Frame Harness 23-Pin Connector		

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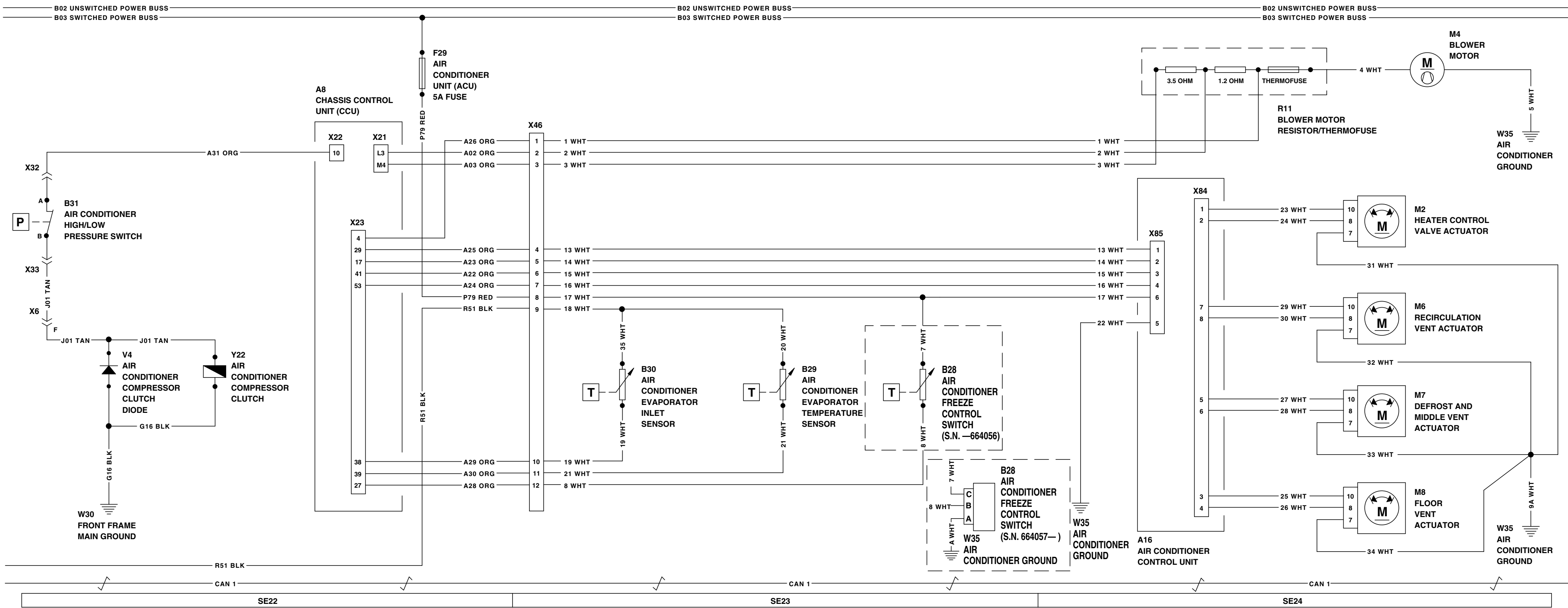
MP01188,0000152 -19-03MAR16-17/25

System Diagrams

<p>A1— 15-Button Sealed Switch Module (SSM) (OC4)</p> <p>A2— 25-Button Sealed Switch Module (SSM) (OC3)</p> <p>A7— CAN Monitor Unit (CMU)</p> <p>A15— Coolant Heater Control Module</p> <p>E9— Interior Light</p> <p>E13— Coolant Heater Unit</p> <p>F1— 25-Button SSM and Interior Light 10-Amp Fuse</p> <p>F8— CMU Unswitched Power 10-Amp Fuse</p> <p>F22— CMU and 15-Button SSM Switched Power 5-Amp Fuse</p> <p>F44— Coolant Heater Control Unswitched 15-Amp Fuse (in-line)</p>	<p>F45— Coolant Heater Control Return (ground) 5-Amp Fuse (in-line)</p> <p>F46— Coolant Heater Module Switched 5-Amp Fuse (in-line)</p> <p>F50— Main 60-Amp Circuit Breaker</p> <p>F51— Pneumatic Blow-Off Valve Heater 20-Amp Circuit Breaker</p> <p>G1— Battery (2 used)</p> <p>G3— Alternator</p> <p>H22— Buzzer</p> <p>K1— Ignition Relay</p> <p>K2— Starter Relay</p> <p>M1— Starter Motor</p> <p>S1— Battery Disconnect Switch</p> <p>V1— Ignition Relay Diode</p>	<p>V2— Starter Relay Diode</p> <p>V3— Starter Motor Diode</p> <p>W30— Front Frame Main Ground</p> <p>W31— Cab Ground</p> <p>W32— Starter Motor Ground</p> <p>W36— Machine Frame-to-Cab Frame Ground Cable</p> <p>W37— Engine Block-to-Machine Frame Ground Cable</p> <p>X1— Front Frame Harness-to-Battery Compartment Harness 9-Pin Connector</p> <p>X7— Coolant Heater Control Module Harness-to-Coolant Heat Unit Harness 4-Pin Connector</p>	<p>X29— Fuse Block Unswitched Power Terminal (marked as stud 1)</p> <p>X30— Fuse Block Switched Power Terminal (marked as stud 2)</p> <p>X52— Cab Harness-to-Front Frame Harness 9-Pin Connector</p> <p>X70— Remote Battery Positive Charge Post</p> <p>X71— Remote Battery Negative Charge Post</p> <p>Y47— Coolant Heater Fuel Pump</p>
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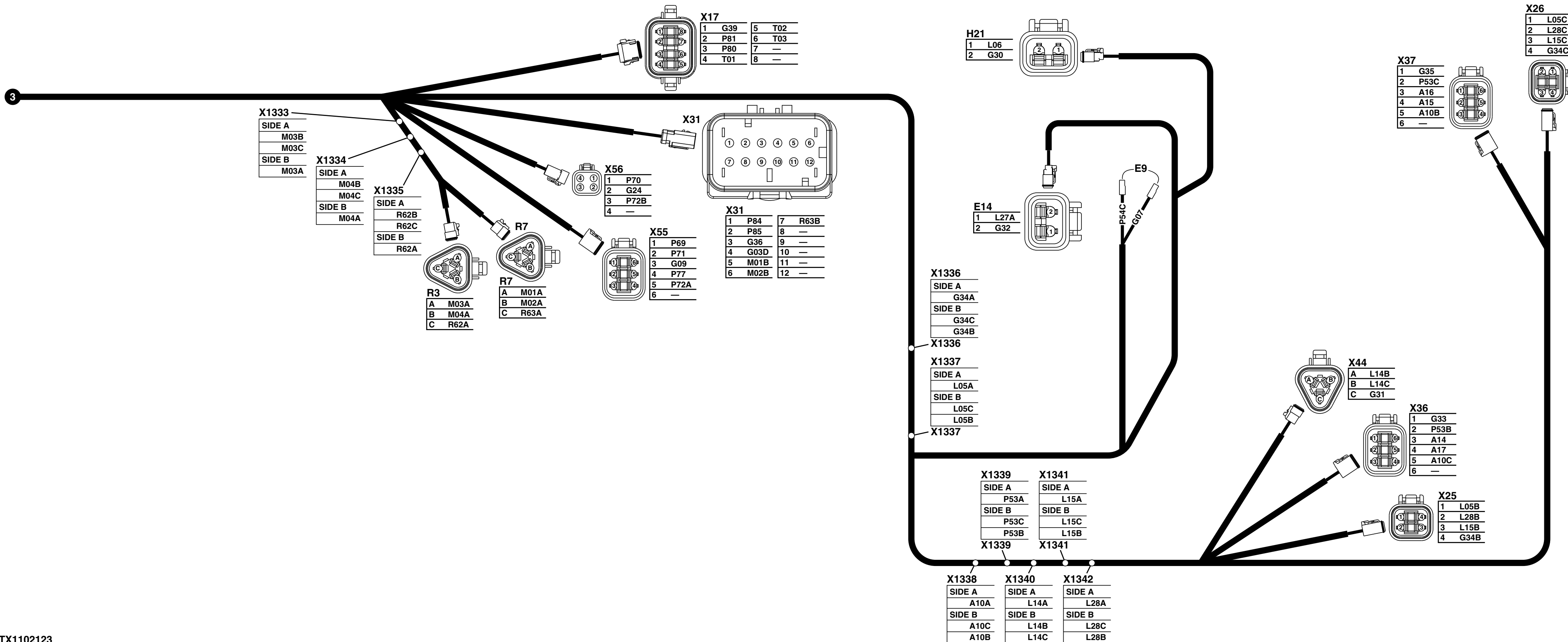
NS73742,000019C -19-03MAR16-3/25



System Diagrams

F50— Main 60-Amp Circuit Breaker	K1—Ignition Relay	V5— Air System Drain Solenoid Diode	Y2— Air System Drain Solenoid
F51— Pneumatic Blow-Off Valve Heater 20-Amp Circuit Breaker	R9—Pneumatic Blow-Off Valve Heater	X1— Front Frame Harness- to-Battery Compartment Harness Connector	
F52— JDLINK™ Return (Ground) 5-Amp Fuse (inline)	S1— Battery Disconnect Switch		
	V1— Ignition Relay Diode		

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System Diagrams

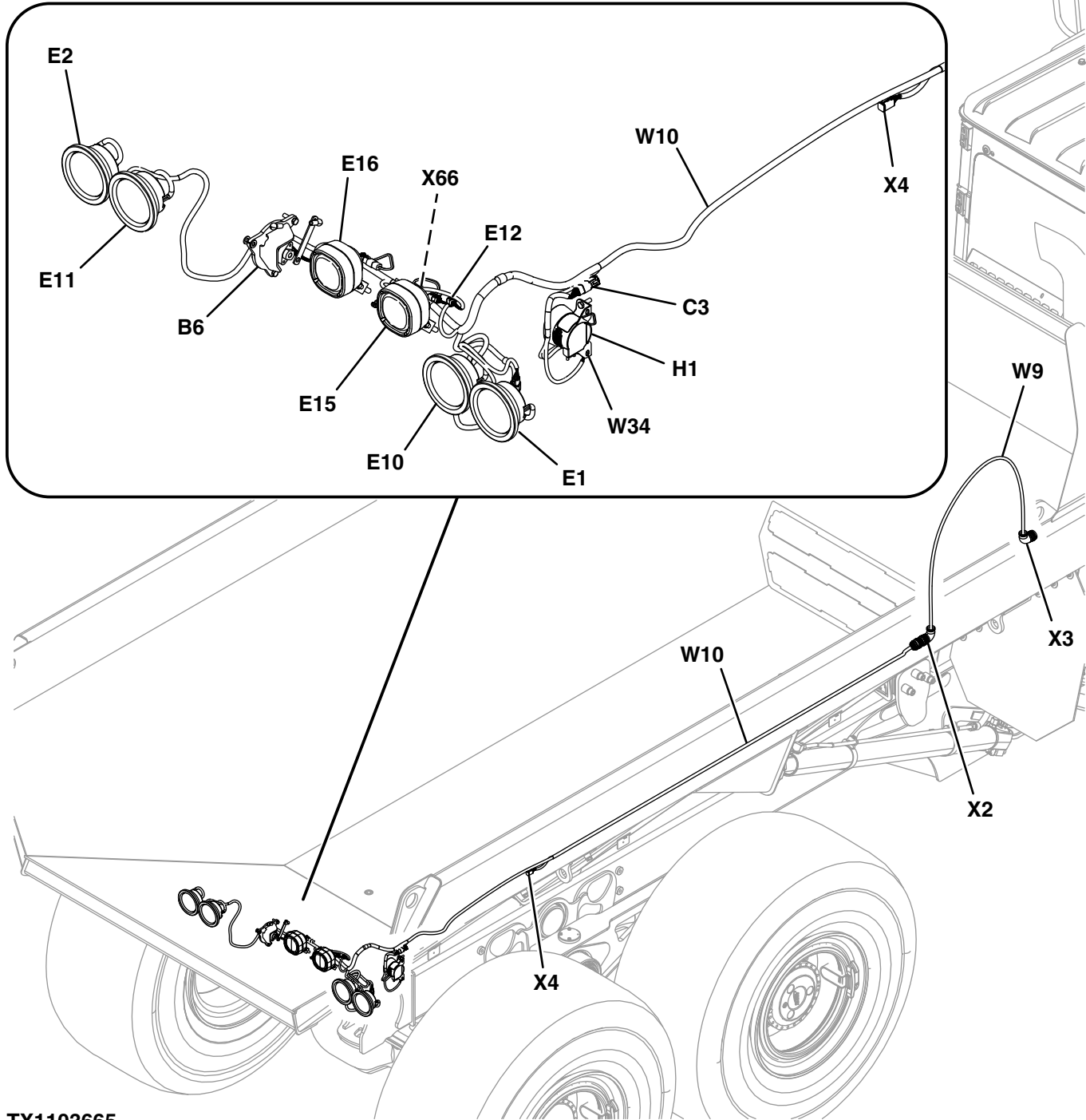
**B33— Retarder Temperature
Sensor**
**X63— Transmission Control
Harness-to-Transmission
Harness 31-Pin Connector**

**X64— Transmission
Harness-to-Transmission
Valve Control Module
Harness 24-Pin Connector**

**Y4— Retarder Proportional
Solenoid**

CS33148.00040AE -19-13OCT11-2/2

Rear Frame Harness (W10) Component Location



TX1103665

Rear Frame Harness (W10) Component Location

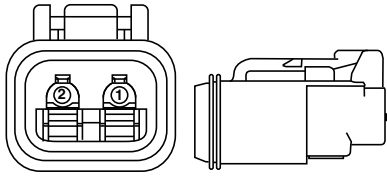
- | | | | |
|----------------------------------|--|--|---------------------------------|
| B6—Dump Body Position Sensor | E12— License Plate Light (if equipped) | X2— Articulation Harness-to-Rear Frame Harness 21-Pin Connector | X66— 2-Pin Connector (not used) |
| C3—Backup Alarm Filter | E15— Right Backup Light | X3—Hydraulic Harness-to-Articulation Harness 21-Pin Connector | |
| E1—Right Rear Turn Light | E16— Left Backup Light | X4—Rear Frame Harness-to-On Board Weighing (OBW) and Tire Pressure Monitoring (TPM) System Harness 6-Pin Connector | |
| E2—Left Rear Turn Light | H1—Backup Alarm | | |
| E10— Right Rear Park/Brake Light | W9—Articulation Harness | | |
| E11— Left Rear Park/Brake Light | W10—Rear Frame Harness | | |
| | W34—Rear Frame Ground | | |

TX1103665—UN—20DEC11

CS33148,00040B7 -19-19DEC11-1/1

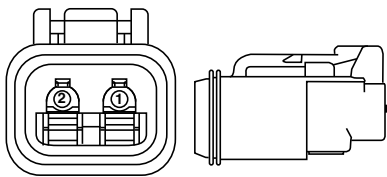
Work Light Harness (W12) Wiring Diagram

END #1	COLOR	END #2
E28	BLK	X1150
E29	BLK	X1150
X1150	BLK	X44
E28	RED/WHT	X44
E29	RED/WHT	X44



E28

1	RED/WHT
2	BLK



E29

1	RED/WHT
2	BLK

X44

A	RED/WHT
B	RED/WHT
C	BLK

X1150

SIDE A	BLK
	BLK
SIDE B	BLK
	BLK

TX1099324

Work Light Harness (W12) Wiring Diagram

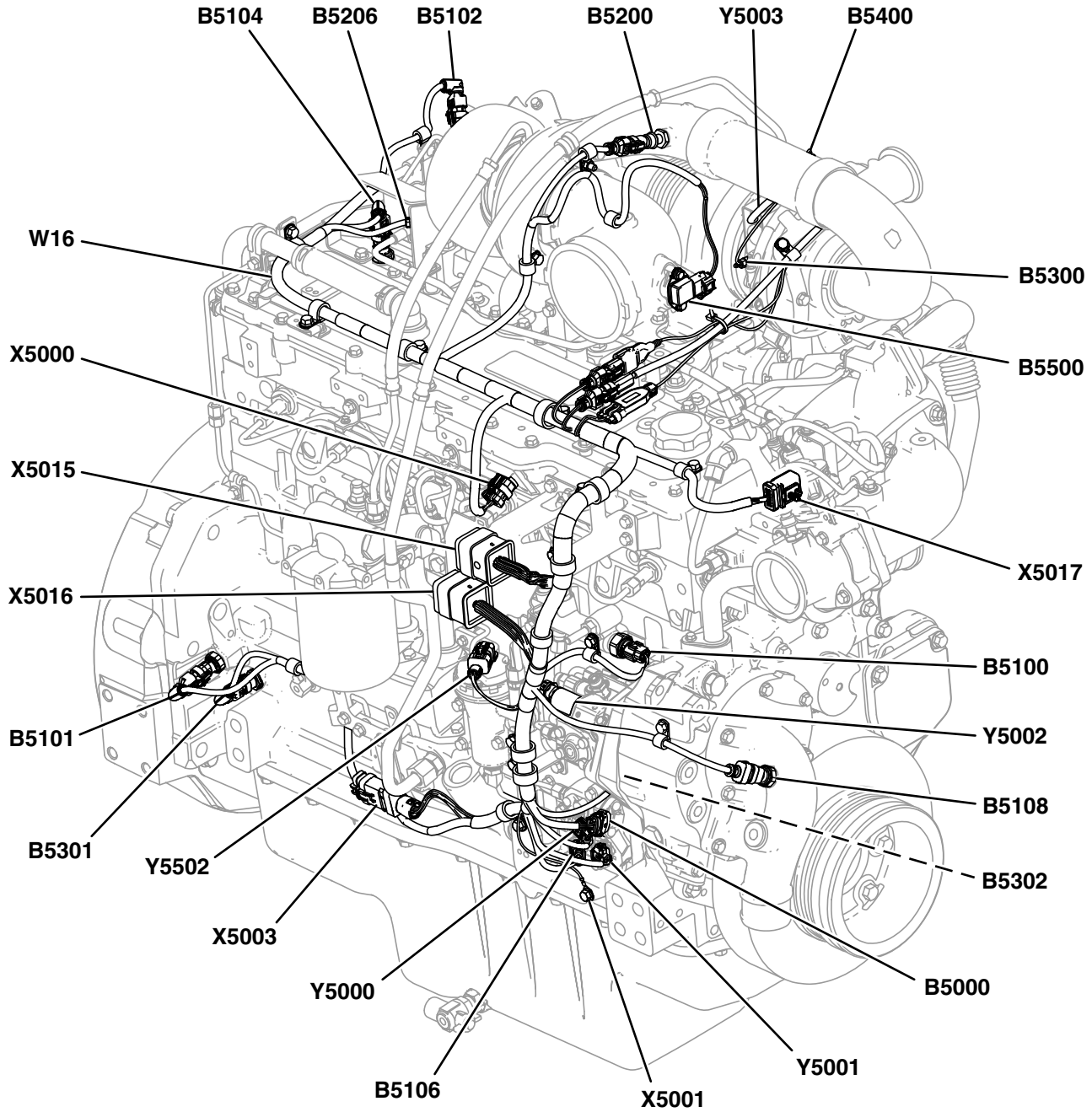
E28— Left Work Light
E29— Right Work Light

X44— Cab Harness-to-Work Light Harness 3-Pin Connector
X1150—Splice BLK

CS33148.00040BC -19-08OCT11-1/1

TX1099324 —UN—10OCT11

Engine Harness (W16) Component Location



TX1105266

Engine Harness (W16) Component Location (right-side view)

TX1105266—UN—13JAN12

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MP01188,000016E -19-25JUN15-1/3

Engine Interface Harness (W17) Wiring Diagram

TX1101385 —UN—06DEC11

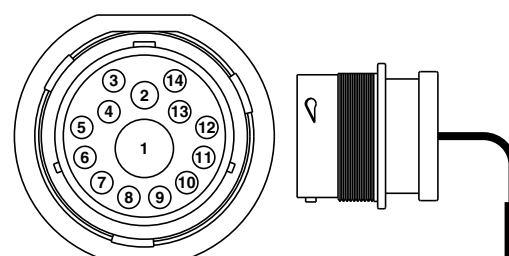
END #1	NUMBER	COLOR	END #2
X5015	5001	BRN	X11
X11	5003	ORG	Y5001
X5015	5004	YEL	X11
X5015	5008	GRY	X11
X12	5009	WHT	X5016
X5016	5010	BLK	X12
X5015	5011	BRN	X11
X5015	5013	ORG	X11
X5016	5021	BRN	X12
X5015	5030	BLK	X11
X5016	5031	BRN	X12
X5016	5033	ORG	X12
X5016	5043	ORG	X12
X5016	5051	BRN	X12
X5016	5060	BLK	W30
X5016	5062	RED	X16
X5015	5065	GRN	X11
X5016	5067	PUR	X12
X5015	5410	BLK	X11
X5016	5411	BRN	X12
X5015	5414	YEL	X11
X5015	5416	BLU	X11
X5015	5417	PUR	X11
X5015	5419	WHT	X11
X5015	5421	BRN	X11
X5015	5423	ORG	X11
X5015	5424	YEL	X11
X5016	5425	GRN	X12
X12	5427	PUR	X5016
X12	5428	GRY	B5209
X11	5429	WHT	Y15
X5015	5435	GRN	X11
X5016	5441	BRN	X12
X5015	5443	ORG	X11
X5015	5444	YEL	X11
X5015	5445	GRN	X11
X5016	5446	BLU	X12
X5015	5447	PUR	X11
X5015	5448	GRY	X11
X5015	5449	ORG	X11
X11	5453	ORG	B5600
X5016	5455	GRN	X12
X5016	5456	BLU	X12
X11	5459	WHT	B5600
X5016	5461	BRN	X12
X5016	5463	ORG	X12
X5016	5465	GRN	X12
X5015	5466	BLU	X11
X5016	5467	PUR	X12
X5016	5468	GRY	X12
X11	5469	WHT	B5107
X12	5475	GRN	X5016
X5016	5485	GRN	X12
X5015	5491	BRN	X11

END #1	NUMBER	COLOR	END #2
X5015	5493	ORG	X11
X5015	5494	YEL	X11
X5015	5495	GRN	X11
X5015	5496	BLU	X11
X5015	5497	PUR	X11
X5015	5498	GRY	X11
X5015	5499	WHT	X11
X12	5509	WHT	X5016
X5016	5514	YEL	X12
X5015	5773	ORG	X11
X5016	5774	YEL	X12
X5016	5775	GRN	X12
X20	5783	GRY	X11
X20	5786	BLU	X11
X12	5946	BLU	X5016
X1366	5437A	PUR	X12
X20	5437B	PUR	X1366
X1366	5437C	PUR	X5016
X1367	5474A	YEL	X12
X20	5474B	YEL	X1367
X1367	5474C	YEL	X5016
X1368	5478A	GRY	X11
B5107	5478B	GRY	X1368
X1368	5478C	GRY	X5015
B5209	5479A	WHT	X1369
X1369	5479B	WHT	X12
X1369	5479C	WHT	X5016
X1370	5484A	YEL	X11
B5107	5484B	YEL	X1370
X1370	5484C	YEL	X5015
X20	5785A	GRN	X12
X1371	5804A	YEL	X5015
X1371	5804B	YEL	X11
Y5501	5804C	YEL	X1371
X1372	5805A	GRN	X5015
X1372	5805B	GRN	X11
Y5501	5805C	GRN	X1372
G03	B01C	RED	M1
K2	B01D	RED	M1
X1374	E01A	WHT	X13
Y5005	E01B	WHT	X1374
R2	E01C	WHT	X1374
X1378	E04	WHT	X13
K2	E04A	WHT	X1378
V2	E04B	WHT	X1378
X1377	E05	WHT	X13
K2	E05A	WHT	X1377
V2	E05B	WHT	X1377
X1376	E06A	WHT	K2
X1376	E06B	WHT	V3
X51 (M1)	E06C	WHT	X1376
X13	E07	WHT	X1364
X1364	E07A	WHT	X16
X1373	E07C	WHT	X1364

END #1	NUMBER	COLOR	END #2
Y5005	E07D	WHT	X1373
R2	E07E	WHT	X1373
X13	E08	WHT	X1365
X1365	E08A	WHT	X16
Y5005	E08C	WHT	X1365
X13	E09	WHT	X16
X13	E10	WHT	Y5005
G3	G02E	BLK	M1
X1375	G17A	BLK	X13
X1375	G17B	BLK	X13
W30	G17C	BLK	X1375
X1375	G17D	BLK	X13
V3	G17E	BLK	X1375
Y5005	G17F	BLK	X1375
B19	G18A	BLK	W30
B20	G18B	BLK	W30
Y15	G18C	BLK	W30
Y5501	G18D	BLK	W30
X13	J03	TAN	G3
X1361	M01T	YEL	X16
X13	M01U	YEL	X1361
R1	M01V	YEL	X1361
X1362	M02T	GRN	X16
X13	M02U	GRN	X1362
R1	M02V	GRN	X1362
X1360	P09A	RED	X16
X13	P09B	RED	X1360
X13	P09C	RED	X1360
X13	P09D	RED	X1360
X13	P09E	RED	X1360
Y5501	P23	RED	X16
X13	P24C	RED	X16
X1363	R63T	BLK	X16
X13	R63U	BLK	X1363
R1	R63V	BLK	X1363
X13	Y02	YEL	B19
X13	Y03	YEL	B20

X16

1	—	8	M01T
2	5062	9	M02T
3	P09A	10	R63T
4	E07A	11	—
5	E08A	12	P23
6	E09	13	P24C
7	—	14	—



B19

1	Y02
2	G18A



B20

1	Y03
2	G18B

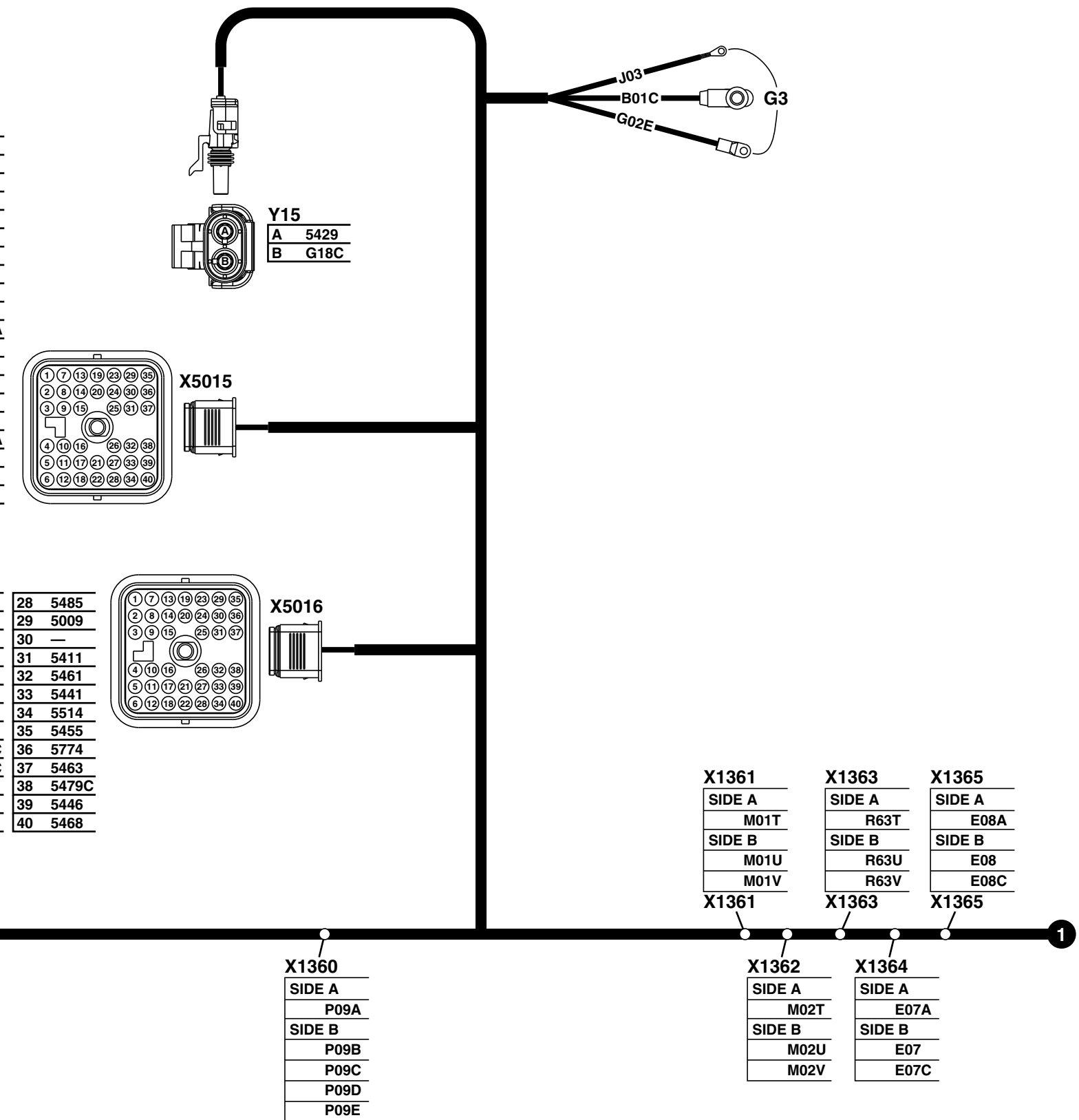


X5015

1	5417	21	5419
2	5478C	22	5424
3	5414	23	5004
4	5491	24	5008
5	5493	25	—
6	5494	26	5423
7	5435	27	5421
8	5484C	28	5449
9	5416	29	5445
10	5495	30	5443
11	5497	31	5805A
12	5498	32	5013
13	—	33	5011
14	5065	34	5773
15	—	35	5447
16	5499	36	5448
17	5496	37	5804A
18	5410	38	5030
19	5444	39	—
20	5466	40	5001

X5016

1	5051	15	5509	28	5485
2	—	16	5010	29	5009
3	5467	17	5060	30	—
4	5021	18	5062	31	5411
5	—	19	5427	32	5461
6	5031	20	5946	33	5441
7	5425	21	—	34	5514
8	—	22	—	35	5455
9	5465	23	5474C	36	5774
10	5033	24	5437C	37	5463
11	—	25	5775	38	5479C
12	5043	26	—	39	5446
13	5456	27	5067	40	5468
14	5475	—	—	—	—



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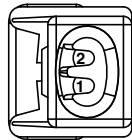
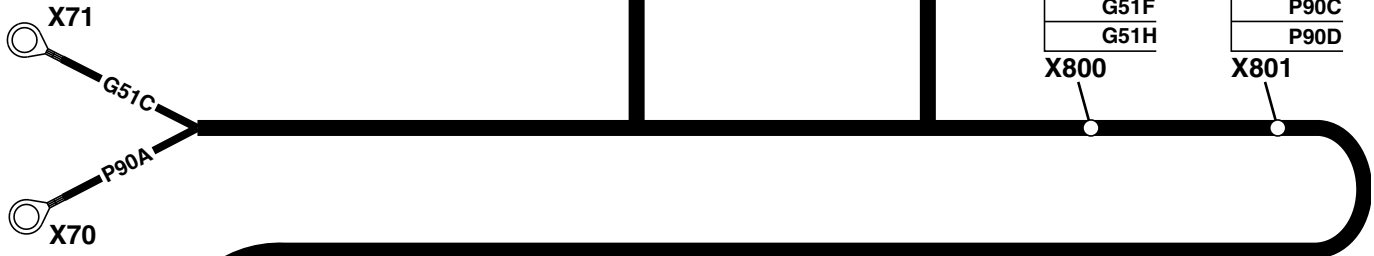
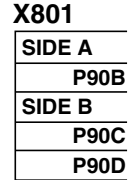
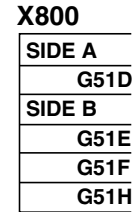
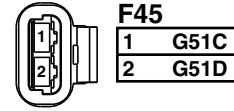
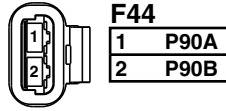
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Engine Interface Harness (W17) Wiring Diagram (1 of 2)

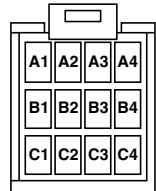
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Diesel Fired Coolant Heater (DFCH) Harness (W23) Wiring Diagram

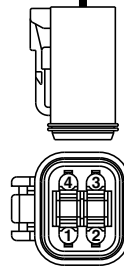
END #1	NUMBER	COLOR	END #2
F456	G51C	BLK	X71
X800	G51D	BLK	F45
X800	G51E	BLK	E13
X800	G51F	BLK	Y47
X800	G51H	BLK	X7
X7	M26B	PUR	E13
Y47	M27	GRN	E13
X7	N16E	YEL	E13
F44	P90A	RED	X70
F44	P90B	RED	X801
X801	P90C	RED	E13
X801	P90D	RED	X7



Y47	
1	M27
2	G51F



E13	
A1	M27
A2	G51E
A3	P90C
A4	—
B1	—
B2	—
B3	—
B4	M26B
C1	—
C2	—
C3	—
C4	N16E



TX1104980

Diesel Fired Coolant Heater (DFCH) Harness (W23) Wiring Diagram

TX1104980—UN—09JAN12

Continued on next page

CS33148,00043BC -19-15JAN12-1/2

A2—25-Button Sealed Switch Module (SSM) (OC3)	F13— JDLINK™ Unswitched Power 10-Amp Fuse	F26— Auto Greasing Indicator and Rear View Monitor 5-Amp Fuse	W31—Cab Ground
A8—Chassis Control Unit (CCU)	F14— Engine Control Unit (ECU) Unswitched Power 20-Amp Fuse	F27— JDLINK™ Switched Power 5-Amp Fuse	W32—Starter Motor Ground
E9—Interior Light	F15— Fuel Dosing Pump 15-Amp Fuse	F28— Engine Control Unit (ECU) Switched Power 5-Amp Fuse	W33—Front Frame Under Cab Ground
F1—SSM-25 and Interior Light 10-Amp Fuse	F16— Low Pressure Fuel Pump 15-Amp Fuse	F29— Air Conditioner Unit (ACU) 5-Amp Fuse	W34—Rear Frame Ground
F2— Spare 10-Amp Fuse	F17— Headlights, Tail Lights, and Turn Lights 15-Amp Fuse	F30— Park Brake Pressure Switch 10-Amp Fuse	W35—Air Conditioner Control Unit Ground
F3—Horn 10-Amp Fuse	F18— Wiper Motor 10-Amp Fuse	F50— Main 60-Amp Circuit Breaker	W36—Machine Frame-to-Cab Frame Ground Cable
F4— Brake Light Switch 10-Amp Fuse	F19— Mirror Switch 10-Amp Fuse	F51— Pneumatic Blow-Off Valve Heater 20-Amp Circuit Breaker	W37—Engine Block-to-Machine Frame Ground Cable
F5— Spare 10-Amp Fuse	F20— ZF EOL 10-Amp Fuse	F52— JDLINK Return (Ground) 5-Amp Fuse (inline)	X1—Front Frame Harness-to-Battery Compartment Harness 9-Pin Connector
F6— Chassis Control Unit (CCU) VP2 10-Amp Fuse	F21— Chassis Control Unit (CCU) VELX 5-Amp Fuse	G1—Battery (2 used)	X29— Fuse Block Unswitched Power Terminal
F7— Chassis Control Unit (CCU) VP3 20-Amp Fuse	F22— CMU and SSM-15 Switched Power 5-Amp Fuse	G3—Alternator	X30— Fuse Block Switched Power Terminal
F8— CAN Monitor Unit (CMU) Unswitched Power 10-Amp Fuse	F23— 24V/12V Converter Switch Power 10-Amp Fuse	K1—Ignition Relay	X52— Cab Harness-to-Front Frame Harness 9-Pin Connector
F9— 24V/12V Converter (15A) Unswitched Power 15-Amp Fuse	F24— On Board Weighing (OBW) and Tire Pressure Monitor System (TPMS) 10-Amp Fuse	K2—Starter Relay	X70— Remote Positive Battery Charge Post
F10— 24V/12V Converter (25A) Unswitched Power 25-Amp Fuse	F25— Transmission Control Unit (TCU) Switched Power 10-Amp Fuse	M1—Starter Motor	X71— Remote Negative Battery Charge Post
F11— Transmission Control Unit (TCU) Unswitched Power 10-Amp Fuse		S1— Battery Disconnect Switch	
F12— Service ADVISOR™ Diagnostic Connector Unswitched Power 10-Amp Fuse		V1— Ignition Relay Diode	
		V3— Starter Motor Diode	
		W30—Front Frame Main Ground	

Battery (G1)—The machine's electrical system is powered by two 12-volt batteries connected in series to provide 24 volts of power. The 24-volt electrical system consists of an unswitched power circuit and a switched power circuit.

Unswitched Power—is power available directly from the battery to a device whether the ignition is ON or OFF.

Unswitched power from the battery is supplied to the following components via remote positive battery charge post (X70):

NOTE: The remote battery charge posts (X70) (positive) and (X71) (negative) provide a convenient location for jump starting the machine using a 24-volt boost pack or charging the batteries using a 24-volt battery charger.

- Starter Motor (M1)
- Alternator (G3) (B+ terminal)
- Starter Relay (K2) (contacts)
- Main 60-Amp Circuit Breaker (F50)

From the main 60-amp circuit breaker (F50), unswitched power is supplied to the contacts of ignition relay (K1) and to terminal (X29) (stud 1) on the fuse block.

From terminal (X29), unswitched power is supplied to the following fuses:

- F1—SSM-25 and Interior Light 10-Amp Fuse
- F2—Spare 10-Amp Fuse
- F3—Horn 10-Amp Fuse
- F4—Brake Light Switch 10-Amp Fuse
- F5—Spare 10-Amp Fuse
- F6—CCU VP2 10-Amp Fuse
- F7—CCU VP3 20-Amp Fuse

- F8—CMU Unswitched Power 10-Amp Fuse
- F9—24V/12V Converter (15-Amp) Unswitched Power 15-Amp Fuse
- F10—24V/12V Converter (25-Amp) Unswitched Power 25-Amp Fuse
- F11—TCU Unswitched Power 10-Amp Fuse
- F12—Service ADVISOR™ Diagnostic Connector Unswitched Power 10-Amp Fuse
- F13—JDLINK™ Unswitched Power 10-Amp Fuse
- F14—ECU Unswitched Power 20-Amp Fuse
- F15—Fuel Dosing Pump 15-Amp Fuse
- F16—Low Pressure Fuel Pump 15-Amp Fuse

Fuse (F1) provides unswitched power to the interior light (E9) and to pin 1 on the 25-button sealed switch module (SSM) (OC3) (A2).

Switched Power—is power available to a device only when the ignition is ON.

When the engine start button on SSM (A2) is pushed and released, current available at pin 1 of the SSM flows out of the SSM at pin 3 to the coil (pin C1) on ignition relay (K1), energizing the relay. With the ignition relay energized, switched power is now available to the pneumatic blow-off valve heater 20-amp circuit breaker (F51) and to terminal (X30) (stud 2) on the fuse block.

From terminal (X30), switched power is supplied to the VP1 connector (X24) on the chassis control unit (CCU) (A8) and to the following fuses:

- F17—Headlights, Tail Lights, and Turn Lights 15-Amp Fuse
- F18—Wiper Motor 10-Amp Fuse
- F19—Mirror Switch 10-Amp Fuse
- F20—ZF-EOL 10-Amp Fuse

A2—25-Button Sealed Switch Module (SSM) (OC3)	B19— Engine Coolant Loss Service Switch	X13— Engine Control Unit (ECU) 54-Pin Connector	X31— Cab Harness-to-JDLink™ Harness 12-Pin Connector
A3—Engine Control Unit (ECU)	B20— Engine Coolant Loss Alarm Switch	X16— Cab Harness-to-Engine Harness 14-Pin Connector	X60— Cab Harness-to-Transmission Control Harness 3-Pin CAN Connector
A5—Transmission Control Unit (TCU)	F14— ECU Unswitched Power 20-Amp Fuse	X21— Chassis Control Unit (CCU) 48-Pin Connector (J1)	Y5005—Variable Speed Fan
A7—CAN Monitor Unit (CMU)	F28— ECU Switched Power 5-Amp Fuse	X29— Fuse Block Unswitched Power Terminal (marked as Stud 1)	
A8—Chassis Control Unit (CCU)	G3—Alternator	X30— Fuse Block Switched Power Terminal (marked as Stud 2)	
A6000—Modular Telematics Gateway (MTG)	K2—Starter Relay		
B18— Accelerator Pedal Position Sensor	R2—Engine Cooling Fan Resistor		
	W30—Front Frame Main Ground		

NOTE: Whenever the engine control unit (ECU) is replaced, the new controller must be programmed according to the machine serial number to ensure correct software is installed.

NOTE: The software version, software part number, and hardware part number for the ECU can be accessed in the DIAGNOSTICS / PARTS INFO / STANDARD PARTS / ECU sub-menu of the CMU menu structure. See CAN Monitor Unit (CMU)—Main Menu—Diagnostics—Part Info. (Operator’s Manual.)

Engine Control Unit (ECU) (A3)—The ECU uses information received from various sensors to determine the correct amount of fuel and injection timing based on load, temperatures, and operator input. Some of the data calculated by the ECU is broadcast on the controller area network (CAN) to the transmission control unit (TCU) (A5), chassis control unit (CCU) (A8), and MTG controller (A6000). The CCU forwards much of the information across the CAN data line to the CAN monitor unit (CMU) (A7), where it is displayed.

For CAN operation, see Controller Area Network (CAN) Circuit Theory of Operation. (Group 9015-15.)

The ECU also detects malfunctions in the sensors and sensor circuits, or abnormal operating conditions. When this happens, the ECU generates a diagnostic trouble code (DTC). For a list of engine diagnostic trouble codes see the following:

- Engine Control Unit (ECU) Diagnostic Trouble Codes. (Group 9001-20.)
- Diagnostic Trouble Code (DTC) Group Locator. (CTM104819.)

When an engine DTC occurs, the information is captured and recorded in the ECU. The captured information is called a snapshot. For more information, see Snapshot Instructions. (CTM104819.)

ECU Power-Up (Power and Ground)—Unswitched power from fuse (F14) is available at pins 13, 14, 23, and 24 on ECU connector (X13). Front frame main ground (W30) provides ground to the ECU at pins 27, 43, and 44 on ECU connector (X13).

When ignition is ON, current flows through fuse (F28) to pin 7 on ECU connector (X13), causing the ECU to power up.

NOTE: The voltage at pin 7 can be viewed as live data by accessing the MAIN MENU / DIAGNOSTICS / READINGS / ECU / OTHER INPUTS sub-menu in the CMU menu structure. See CAN Monitor Unit (CMU)—ECU Readings. (Group 9015-16.)

NOTE: For switched power and unswitched power circuit information between the battery and the fuses, see 24-Volt Power and Ground Circuits Theory of Operation. (Group 9015-15.)

NOTE: For information and power-up of the other electronic controllers and the CAN monitor unit (CMU), see the theory of operation of specific component in Group 9015-15.

Accelerator Pedal Position Sensor (B18)—The accelerator pedal position sensor is a Hall effect sensor that is attached to the accelerator pedal.

The ECU supplies a 5-volt reference voltage to the accelerator pedal position sensor at pin 49 on ECU connector (X13). The ECU provides a return ground for the sensor at pin 33 on ECU connector (X13).

The accelerator pedal position sensor sends an analog voltage signal representing throttle request to pin 10 on ECU connector (X13).

The throttle self-calibrates by automatically adjusting the throttle dead-band with every full range sweep of the accelerator pedal from slow idle to fast idle positions. For more information on self-calibration, see Throttle Self-Calibration. (CTM104819.)

The ECU will self-calibrate after each power cycle to learn the valid limits of the throttle. If the throttle signal is out-of-range (OOR), the throttle will be set to zero.

For more information, see Throttle Adjustments. (CTM104819.)

NOTE: The accelerator pedal position can be viewed as a percentage by accessing the MAIN MENU / DIAGNOSTICS / READINGS / ECU / INPUTS SENSORS sub-menu in the CMU menu structure. See CAN Monitor Unit (CMU)—ECU Readings. (Group 9015-16.)

DPF Differential Pressure Sensor (B5109)—The ECU sends a 5-volt reference voltage to the sensor at pin 41 on ECU connector (X12). The ECU provides return ground for the sensor at pin 31 on ECU connector (X12).

The sensor sends a signal representing DPF differential pressure to the ECU at pin 3 on ECU connector (X12).

- For operation of sensor, [see B5109 - DPF Differential Pressure Sensor](#). (CTM104819.)
- For component location, [see Exhaust Aftertreatment Harness \(W19\) Component Location](#). (Group 9015-10.)

The DPF differential pressure sensor is part of the exhaust filter regeneration process. For more information, [see Exhaust Aftertreatment Circuits Theory of Operation](#). (Group 9015-15.)

Fixed Turbocharger Compressor Outlet Temperature Sensor (B5200)—The ECU sends 5 volts to the fixed turbocharger compressor outlet temperature sensor, monitors voltage drop across the sensor at pins 16 and 29 on ECU connector (X12), then compares the voltage drop to preprogrammed values.

For operation of the fixed turbocharger compressor outlet temperature sensor, [see B5200 - Fixed Turbocharger Compressor Outlet Temperature Sensor](#). (CTM104819.)

For general sensor information, [see Measuring Temperature](#). (CTM104819.)

For engine protection and derate programs, [see Engine Derate and Shutdown Protection](#). (CTM104819.)

Exhaust Filter Temperature Module (B5204)—The exhaust filter temperature module is an interface between the ECU and the following sensors located on the exhaust filter assembly:

- DOC inlet temperature sensor (B5511)
- DOC outlet temperature sensor (B5512)
- DPF outlet temperature sensor (B5513)

Connections between the ECU and exhaust filter temperature module are as follows:

- From pin 20 on ECU connector (X11), the ECU provides 12-volt power to pin 3 on the module.
- From pin 31 on ECU connector (X12), the ECU provides a ground to pin 2 on the module.
- From pin 41 on ECU connector (X12), the ECU sends a 5-volt reference voltage to pin 1 on the module.
- The ECU communicates with the module through a data line connected to pin 10 on ECU connector (X11) and pin 4 on the module.
- For operation of module, [see B5204 - Exhaust Filter Temperature Module](#). (CTM104819.)
- For component location, [see Exhaust Aftertreatment Harness \(W19\) Component Location](#). (Group 9015-10.)

The exhaust filter temperature module is part of the exhaust filter regeneration process. For more information, [see Exhaust Aftertreatment Circuits Theory of Operation](#). (Group 9015-15.)

Charge Air Cooler Outlet Temperature Sensor (B5205)—The ECU sends 5 volts to the charge air cooler outlet temperature sensor, monitors voltage drop across the sensor at pins 19 and 28 on ECU connector (X12), then compares the voltage drop to preprogrammed values.

For operation of the charge air cooler outlet temperature sensor, [see B5205 - Charge Air Cooler Outlet Temperature Sensor](#). (CTM104819.)

For sensor specifications and characteristics, [see Manifold Air Temperature Sensor and Charged Air Cooler Outlet Temperature Sensor Characteristics](#). (CTM104819.)

For general sensor information, [see Measuring Temperature](#). (CTM104819.)

For engine protection and derate programs, [see Engine Derate and Shutdown Protection](#). (CTM104819.)

Manifold Air Temperature (MAT) Sensor (B5206)—The ECU sends 5 volts to the MAT sensor, monitors voltage drop across the sensor at pins 23 and 28 on ECU connector (X12), then compares the voltage drop to preprogrammed values.

For operation of the MAT sensor, [see B5206 - MAT Sensor](#). (CTM104819.)

For sensor specifications and characteristics, [see Manifold Air Temperature Sensor and Charged Air Cooler Outlet Temperature Sensor Characteristics](#). (CTM104819.)

For general sensor information, [see Measuring Temperature](#). (CTM104819.)

For engine protection and derate programs, [see Engine Derate and Shutdown Protection](#). (CTM104819.)

Exhaust Gas Recirculation (EGR) Temperature Sensor (B5207)—The ECU sends 5 volts to the EGR temperature sensor, monitors voltage drop across the sensor at pins 9 and 28 on ECU connector (X12), then compares the voltage drop to preprogrammed values.

For operation of the EGR temperature sensor, [see B5207 - EGR Temperature Sensor](#). (CTM104819.)

For sensor specifications and characteristics, [see EGR Temperature Sensor Characteristics](#). (CTM104819.)

For general sensor information, [see Measuring Temperature](#). (CTM104819.)

For engine protection and derate programs, [see Engine Derate and Shutdown Protection](#). (CTM104819.)

Engine Coolant Temperature Sensor (B5208)—The ECU sends 5 volts to the engine coolant temperature sensor, monitors voltage drop across the sensor at pins 26 and 48 on ECU connector (X12), then compares the voltage drop to preprogrammed values.

For operation of the engine coolant temperature sensor, [see B5208 - Engine Coolant Temperature Sensor](#). (CTM104819.)

Sub-System Diagnostics

If the transmission sump temperature sensor (B57) detects that transmission oil temperature is equal to or greater than 105°C (221°F), or retarder temperature sensor (B33) detects that retarder oil temperature is equal to or greater than 160°C (320°F), the TCU will generate a

DTC and send the information to the CMU. The CMU will then display the code. If the retarder is engaged, the TCU will decrease current to retarder proportional solenoid (Y4) as necessary to reduce oil flow to the retarder.

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Dump Body Lever (if equipped)—The dump body lever contains the dump body control lever position sensor (B25) and the dump body lever detent magnet (Y30).

NOTE: The dump body lever is an option that must be enabled in the monitor menus for it to function. The dump body lever can be enabled or disabled by accessing the MAIN MENU / SETUP / OPTIONS / CAB OPTIONS sub-menu in the CMU menu structure. See CAN Monitor Unit (CMU)—Machine Options. (Group 9015-16.)

Dump Body Control Lever Position Sensor (B25): The CCU provides a 5-volt reference signal and ground to the dump body control lever position sensor at pins E1 and F1, respectively, on CCU connector (X21). The CCU monitors the signal from the dump body control lever position sensor at terminal 21 on CCU connector (X23).

NOTE: The status of the dump body control lever position sensor input signal can be viewed as a voltage and a percentage by accessing the MAIN MENU / DIAGNOSTICS / READINGS / CCU / INPUT SENSORS sub-menu in the CMU menu structure. See CAN Monitor Unit (CMU)—CCU Readings. (Group 9015-16.)

The dump body lever position and operation is as follows:

Dump Body Status	Lever Position	Voltage at Pin 21 (approximate)
Lower	Full Forward (0%)	0.5 volts
Neutral	Center (50%)	2.101—2.899 volts
Raise	Full Rearward (100%)	4.5 volts

When the CCU receives a request from the dump body lever to raise the dump body and determines that all required conditions are met, the CCU will then activate the dump body up solenoid (Y24). For more information, see Dump Body Up Solenoid (Y24) (using dump body lever) later in this theory.

When the CCU receives a request from the dump body lever to lower the dump body and determines that all required conditions are met, the CCU will then activate the dump body down solenoid (Y23). For more information, see Dump Body Down Solenoid (Y23) (using dump body lever) later in this theory.

Dump Body Lever Detent Magnet: When energized, the dump body lever detent magnet (Y30) creates a latching mechanism for the dump body lever. The dump body lever will latch when the engine is running and the following conditions occur:

- When driveline assist is activated (all conditions are met) and the dump body is moved rearward to raise the dump body. For more information, see Auto Dump Body Operation later in this theory.

- Anytime the dump body lever is moved fully forward and the dump body position is more than 5%.

NOTE: The status of the dump body lever detent output can be viewed as a live value by accessing the MAIN MENU / DIAGNOSTICS / READINGS / CCU / OUTPUTS sub-menu in the CMU menu structure. See CAN Monitor Unit (CMU)—CCU Readings. (Group 9015-16.)

For sensor specifications, see Electrical Component Specifications. (Group 9015-20.)

Dump Body Position Sensor (B6)—The CCU provides a 5-volt reference signal and ground to the dump body position sensor at pins E2 and F2, respectively, on CCU connector (X21). The CCU monitors the signal from the dump body position sensor at terminal 33 on CCU connector (X23).

Calibration of the dump body position sensor must be performed whenever the sensor is removed or replaced. Calibration of the sensor is performed by accessing the MAIN MENU / DIAGNOSTICS / CALIBRATIONS / BODY sub-menu in the CMU menu structure. See CAN Monitor Unit (CMU)—Calibrations. (Group 9015-16.)

NOTE: The status of the dump body position sensor input signal can be viewed as a voltage and a percentage by accessing the MAIN MENU / DIAGNOSTICS / READINGS / CCU / INPUT SENSORS sub-menu in the CMU menu structure. See CAN Monitor Unit (CMU)—CCU Readings. (Group 9015-16.)

For sensor specifications, see Electrical Component Specifications. (Group 9015-20.)

Dump Body Up Solenoid (Y24) (using 25-button SSM)—When the CCU receives the raise dump body message from the SSM, the CCU enables the high-side and low-side drivers at pins H2 and B4, respectively, on CCU connector (X21). The CCU then sends a pulse width modulated (PWM) signal with a 100% duty cycle from pin H2 to the dump body up solenoid (Y24), energizing the solenoid. The speed of the dump body is controlled by engine speed.

For information on hydraulic control of the dump body up circuit, see Dump Body Control Valve Operation. (Group 9025-05.)

NOTE: The status of the dump body up solenoid output can be viewed as a live value by accessing the MAIN MENU / DIAGNOSTICS / READINGS / CCU / OUTPUTS sub-menu in the CMU menu structure. See CAN Monitor Unit (CMU)—CCU Readings. (Group 9015-16.)

A1—15-Button Sealed Switch Module (SSM) (OC4)	E11— Left Rear Brake/Tail Light	X3—Hydraulic Harness-to-Articulation Harness 21-Pin Connector	X22— Chassis Control Unit (CCU) 53-Pin Connector (J2)
A7—CAN Monitor Unit (CMU)	E12— License Plate Light		X23— Chassis Control Unit (CCU) 53-Pin Connector (J3)
A8—Chassis Control Unit (CCU)	F17— Headlights, Tail Lights, and Turn Lights 15-Amp Fuse	X6— Cab Harness-to-Front Frame Harness 23-Pin Connector	X30— Fuse Block Switched Power Terminal (marked as Stud 2)
E4—Right Front Park Light	S2—Steering Column Switch	X10— Cab Harness-to-Hydraulic Harness 31-Pin Connector	
E5—Right Headlight	W30—Front Frame Main Ground	X21— Chassis Control Unit (CCU) 48-Pin Connector (J1)	
E7—Left Front Park Light	W33—Front Frame Under Cab Ground		
E8—Left Headlight	X2—Articulation Harness-to-Rear Frame Harness 21-Pin Connector		
E10— Right Rear Brake/Tail Light			

Headlights and Park Lights Overview—The headlights and park lights are controlled by the 15-button sealed switch module (SSM) (OC4) (A1) and chassis control unit (CCU) (A8).

Further control of the headlights is provided by the steering column switch (S2), which is used to switch between low beams, high beams, and momentary high beams (DIPS). The CAN monitor unit (CMU) (A7) provides a high beam indicator to inform the operator when the high beam headlights are on.

The 15-button SSM, CMU, and CCU communicate data across the controller area network (CAN).

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

For more information on the CCU circuit, see Chassis Control Unit (CCU) Circuits Theory of Operation. (Group 9015-15.)

For more information on the SSM and CMU, see CAN Monitor Unit (CMU) and Sealed Switch Modules (SSM) Circuits Theory of Operation. (Group 9015-15.)

Headlight Switch on 15-Button SSM—When ignition power is ON and the headlight switch on the 15-button SSM is pushed, the SSM transmits the switch status across the CAN data line to the CCU. When the CCU determines that the input is valid, the CCU transmits a message back to the SSM, causing the switch LED to come on. The switch LED (when lit) indicates the CCU has enabled the headlight and park light circuit.

NOTE: The on/off state of the headlight and park lights is stored in the CCU memory at power down.

NOTE: The CCU uses power from VP1 input to provide power to the headlights and park lights circuits. For more information on the VP1 input and CCU outputs, see Chassis Control Unit (CCU) Outputs. (Group 9015-20.)

Park Lights—When the headlight and park light circuit is enabled, the CCU sends current out pin 5 on CCU connector (X22) to pin C on the right rear brake/tail light (E10) and left rear brake/tail light (E11), causing the left and right tail lights to come on.

Current also flows to the license plate light (E12) (if equipped), causing this light to come on.

NOTE: The license plate light is an option that must be enabled in the monitor menus for it to function. If equipped, the feature is enabled and disabled by accessing the MAIN MENU / SETUP / OPTIONS / LIGHTING OPTIONS submenu in the CMU menu structure. See CAN Monitor Unit (CMU)—Machine Options. (Group 9015-16.)

Ground for the tail lights and license plate light is provided by front frame under cab ground (W33).

Current from pin 5 also flows to the right and left front park lights (E4 and E7), causing these lights to come on.

Ground for the front park lights is provided by front frame main ground (W30).

NOTE: The status of the park lights output can be viewed as a live value by accessing the MAIN MENU / DIAGNOSTICS / READINGS / CCU / OUTPUTS submenu in the CMU menu structure. See CAN Monitor Unit (CMU)—CCU Readings. (Group 9015-16.)

Headlights—The left and right headlight assemblies contain a low beam light and a high beam light. The low and high beams are controlled by the steering column switch (S2).

Low Beams: When the steering column switch lever is in the detented (middle) position 0, the steering column switch directs system voltage from fuse (F17) to the CCU as follows:

- Voltage at pin 36 on CCU connector (X23).
- No voltage at pin 13 on CCU connector (X23).

NOTE: For switched power and unswitched power circuit information between the battery and the fuses, see 24-Volt Power and Ground Circuits Theory of Operation. (Group 9015-15.)

NOTE: The status of the steering column switch low beams input can be viewed as a live value by accessing the MAIN MENU / DIAGNOSTICS / READINGS / CCU / INPUT SWITCHES submenu in the CMU menu structure. See CAN Monitor Unit (CMU)—CCU Readings. (Group 9015-16.)

NOTE: For switched power and unswitched power circuit information between the battery and the fuses, see 24-Volt Power and Ground Circuits Theory of Operation. (Group 9015-15.)

Unswitched power from fuse (F3) is available to the horn switch at pin 12 of the steering column switch (S2). Pushing the horn switch causes current to flow to chassis control unit (CCU) (A8) at pin 28 of connector (X22).

NOTE: The status of the horn switch can be viewed by accessing the MAIN MENU / DIAGNOSTICS / READINGS / CCU / INPUT SWITCHES submenu in the CMU menu structure. See CAN Monitor Unit (CMU)—CCU Readings. (Group 9015-16.)

When the CCU detects current at pin 28, the CCU sends current from pin 3 on CCU connector (X23) to the electric horn (B3), activating the horn. Current from pin 3 also flows to the air horn solenoid (Y44), energizing the solenoid and activating the air horn. The horn activates when ignition power is ON or OFF.

NOTE: The status of the horn output can be viewed by accessing the MAIN MENU / DIAGNOSTICS

/ READINGS / CCU / OUTPUTS submenu in the CMU menu structure. See CAN Monitor Unit (CMU)—CCU Readings. (Group 9015-16.)

For more information on the CCU circuit, see Chassis Control Unit (CCU) Circuits Theory of Operation. (Group 9015-15.)

The following features can be enabled to provide automatic horn activation:

- Auto horn at engine start.
- Full load horn alert.
- Body up alert.
- Inter-axle differential lock (IDL) alert.

NOTE: These features can be enabled or disabled by accessing the MAIN MENU / SETUP / OPTIONS / ALERT OPTIONS submenu in the CMU menu structure. See CAN Monitor Unit (CMU)—Machine Options. (Group 9015-16.)

OUC1010,0001770 -19-02AUG12-2/2

- A1—15-Button Sealed Switch Module (SSM) (OC4)
- A8—Chassis Control Unit (CCU)
- F19— Mirror Switch 10-Amp Fuse
- M9—Left Mirror Servo Motors
- M10— Right Mirror Servo Motors
- R12— Left Mirror Defroster
- R13— Right Mirror Defroster
- S21— Mirror Positioning Switch
- W31—Cab Ground
- X21— Chassis Control Unit (CCU) 48-Pin Connector (J1)
- X30— Fuse Block Switched Power Terminal (marked as Stud 2)
- X36— Cab Harness-to-Left Mirror Harness 6-Pin Connector
- X37— Cab Harness-to-Right Mirror Harness 6-Pin Connector

NOTE: The electric mirrors are an option that must be enabled in the monitor menus for it to function. The electric mirrors can be enabled or disabled by accessing the MAIN MENU / SETUP / OPTIONS / CAB OPTIONS submenu in the CMU menu structure. See CAN Monitor Unit (CMU)—Machine Options. (Group 9015-16.)

Mirror Positioning Circuit—Movement of the electric mirrors is controlled by mirror positioning switch (S21). The mirror positioning switch is a multi-functional switch consisting of a mirror selector switch and a mirror direction switch.

Mirror Selector Switch: The mirror selector switch enables the circuitry of the mirror to be adjusted. Moving the switch to the left detent allows the left mirror to be adjusted. Moving the switch to the right detent allows the right mirror to be adjusted. Moving the switch to the center detent disables both mirrors.

Mirror Direction Switch: The mirror direction switch is a four-way switch that operates two servo motors in each mirror. One servo motor controls the mirror up-and-down movement. The other servo motor controls the mirror side-to-side movement.

Power and Ground—When ignition power is ON, switched power is available to pin 2 on the mirror positioning switch. Ground for the mirror positioning switch is provided by the cab ground (W31) at pin 1.

NOTE: For switched power and unswitched power circuit information between the battery and the fuses, see 24-Volt Power and Ground Circuits Theory of Operation. (Group 9015-15.)

Mirror Up/Down and Left/Right Power and Ground Distribution

Left Mirror Up/Down Positioning		
Mirror Position Switch	Connector (X36)	Power/Ground
pin 3	pin 5	Ground
pin 5	pin 3	24V
pin 8	pin 4	Ground

Left Mirror Left/Right Positioning		
Mirror Position Switch	Connector (X36)	Power/Ground
pin 3	pin 5	Ground
pin 5	pin 3	Ground
pin 8	pin 4	24V

Right Mirror Up/Down Positioning		
Mirror Position Switch	Connector (X37)	Power/Ground
pin 3	pin 5	Ground
pin 7	pin 3	24V
pin 6	pin 4	Ground

Right Mirror Left/Right Positioning		
Mirror Position Switch	Connector (X37)	Power/Ground
pin 3	pin 5	Ground
pin 7	pin 3	Ground
pin 6	pin 4	24V

Left Mirror Up/Down and Left/Right Operation—The following discusses the operation of the left mirror. Operation of right mirror is similar.

Up/Down Positioning: When the mirror selector switch is at position L and the mirror direction switch is moved to the UP position, ground is supplied to the left mirror servo motors (M9) at pins 4 and 5 on connector (X36). At the same time, current flows to the up/down motor of the left mirror servo motors (M9) via pin 3 on connector (X36). This activates the up/down motor, causing the mirror lens to rotate upward. The side-to-side motor of the left mirror servo motors (M9) does not activate because ground is supplied to both sides of the motor during this time.

When the mirror selector switch is at position L and the mirror direction switch is moved to the DOWN position, ground is supplied to left mirror servo motors (M9) at pin 3 on connector (X36). At the same time, power is available at pins 4 and 5 of connector (X36). The current flows through the up/down motor of the left mirror servo motors (M9), but in the opposite direction. This causes the motor to activate in reverse, which rotates the mirror lens downward. The side-to-side motor of the left mirror servo motors (M9) does not activate because power is supplied to both sides of the motor during this time.

Left/Right Positioning: When the mirror selector switch is at position L and the mirror direction switch is moved to the LEFT, ground is supplied to the left mirror servo motors (M9) at pins 3 and 5 on connector (X36). At the same time, current flows to the side-to-side motor of the left mirror servo motors (M9) via pin 4 on connector (X36). This activates the side-to-side motor, causing the mirror lens to rotate to the left. The up/down motor of left mirror servo motors (M9) does not activate because ground is supplied to both sides of the motor during this time.

When the calculated payload is less than 8000 kg (17 640 lb.), the CCU recognizes this condition as unloaded. The CCU communicates the unloaded condition via the CAN 1 data line to all other controllers. The CCU turns OFF the unloaded condition when the payload is above 10 000 kg (22 050 lb.) and will stay OFF until the payload goes below 8000 kg (17 640 lb.).

The transmission control unit (TCU) (A5) sends speed and direction information via the CAN 1 data line to the CCU. When the transmission is shifted to reverse, the CCU starts a 30-second timer. The last calculated weight will be displayed on the CMU. After the 30 seconds has elapsed, the CCU will continue the weight calculation.

When the signal from the dump body position sensor (B6) indicates the dump body position is more than 2%, the CCU stops the weight calculation and the last calculated weight will be displayed on the CMU. If the dump body position did not exceed 50%, the CCU will continue the calculation when the dump body position returns to below 2%.

When the dump body position exceeds 50%, the CCU will recognize this as a tipping condition. When the CCU detects a tipping condition and the dump body position is then lowered to below 2%, the payload weight is zeroed and the offset (carryback) calculation is recalculated. For more information on the dump body position sensor, see [Dump Body Control and Gear Limit Circuits Theory of Operation](#). (Group 9015-15.)

Offset (Carryback) Calculation: The offset (carryback) calculation is the calculated zeroed weight of an empty dump body. The offset (carryback) calculation is measured whenever ignition is turned ON or after the dump body is raised above 50%, then lowered below the 2% position. The CCU will calculate the offset (carryback) calculation for 30 seconds before it will automatically begin measuring mode. While the offset (carryback) calculation is taking place, all load lights will flash 1/2 second ON and 1/2 second OFF.

OBW Lights (H12, H13, and H14)—The CCU provides outputs to the following OBW lights:

- **Dump Body Under-Loaded Light (Yellow) (H12):** When the payload is less than 75% of the rated payload of the truck, the CCU sends pulsing current out pin D4 on CCU connector (X21) to the yellow OBW light (H12), causing the yellow light to flash at 1/2 second ON and 1/2 second OFF. All other OBW lights are off. When the ground speed is above 5 km/h (3 mph), the CCU turns off the yellow OBW light. When the payload is between 75—90%, the CCU sends continuous current to the yellow OBW light, causing the yellow light to be on continuously. All other OBW lights are off.
- **Dump Body Fully-Loaded Light (Green) (H13):** When the payload is between 90—110%, the CCU sends continuous current out pin C4 on CCU connector (X21)

to the green OBW light, causing the green light to be on continuously. All other OBW lights are off.

- **Dump Body Over-Loaded Light (Red) (H14):** When the payload exceeds 110%, the CCU sends continuous current out pin 47 on CCU connector (X22) to the red OBW light, causing the red light to be on continuously. All other OBW lights are off.

NOTE: The status of the OBW lights outputs can be viewed as a live value by accessing MAIN MENU / DIAGNOSTICS / READINGS / CCU / OUTPUTS submenu in the CMU menu structure. See [CAN Monitor Unit \(CMU\)—CCU Readings](#). (Group 9015-16.)

NOTE: The CCU uses power from VP1 input to provide power to the OBW lights. For more information on the VP1 input and CCU outputs, see [Chassis Control Unit \(CCU\) Outputs](#). (Group 9015-20.)

Weigh System Factors—The efficiency and accuracy of the OBW system can be affected by the following:

- **Load Position:** Weight distribution on the strain gauges is less accurate when the payload is loaded too far forward or too far to the rear of the dump body. The payload must be distributed evenly. For payload distribution information, see [Using On Board Weighing \(OBW\) System](#). (Operator's Manual.)
- **Operating on a Slope:** As ground slope increases or decreases from a level condition, distribution of weight is affected, thus resulting in a less accurate payload weight. When the machine is on an incline, while the offset (carryback) calculation is being measured, the weight of the dump body is not evenly distributed across the strain gauges. The greater the incline, the less accurate the offset (carryback) calculation will be. Offset (carryback) calculation is more accurate when the machine is on flat, level ground. When an incline of 5% or more is detected, the CCU will stop calculating the weight. It resumes calculating when the incline is less than 5%. For more information, see [Using On Board Weighing \(OBW\) System](#). (Operator's Manual.)
- **Calibrated Versus Actual Payload:** Actual payloads should be approximately equal to the calibrated payload for greatest accuracy. For example, if the truck is hauling a smaller payload than the calibrated payload, system accuracy will be reduced, and recalibration of the OBW system will be necessary to maintain accuracy. To recalibrate the OBW system, see [On Board Weighing \(OBW\) Calibration](#). (Group 9015-20.)
- **Material Change:** When material of different densities is being loaded in the dump body other than what the OBW system has been calibrated for, the accuracy of the OBW system will be affected. To recalibrate the OBW system, see [On Board Weighing \(OBW\) Calibration](#). (Group 9015-20.)

CAN Monitor Unit (CMU)—Codes

From DIAGNOSTICS menu, push NEXT button to highlight CODES menu. Push SELECT button to display CODES menu. Submenus on display include:

1. ACTIVE CODES
2. STORED CODES

ACTIVE CODES—Displays up to twenty currently active diagnostic trouble codes (DTCs). When a DTC becomes inactive, it will be removed from active code list. Active codes are displayed in order of last occurrence, with most recent active code displayed first.

For each active DTC, the following will be displayed:

- Suspect Parameter Number (SPN)
- Failure Mode Indicator (FMI)
- Text description of DTC
- Source controller of fault (ECU, TCU, CMU, CCU, etc.)

STORED CODES—Displays up to twenty of the most recent diagnostic trouble codes (DTCs) stored in CAN Monitor Unit (CMU).

NOTE: Diagnostic trouble codes (DTC) are immediately stored in CMU upon becoming active, and

therefore will appear in both ACTIVE CODES and STORED CODES lists.

For each stored DTC, the following will be displayed:

- Suspect Parameter Number (SPN)
- Failure Mode Indicator (FMI)
- Text description of DTC
- Source controller fault (ECU, TCU, CMU, CCU, etc.)
- Hour meter reading at first occurrence
- Hour meter reading at last occurrence
- Total number of occurrences

CLEAR CODES—Allows the technician to clear all active and stored codes.

Push NEXT button to highlight CLEAR CODES menu. Push SELECT button. A screen will appear stating:

SELECT TO CLEAR
BACK TO CANCEL

Push SELECT button to clear all active and stored codes. A screen will appear stating:

CODES CLEARED

References

Item	Measurement	Specification
B5301—Crankshaft Position Sensor	Resistance	2.7—3.4 kilo-ohms
B5302—Camshaft Position Sensor	Resistance	2.7—3.4 kilo-ohms
B5600—Water-In-Fuel (WIF) Sensor	Resistance	209—231 kilo-ohms
K1—Ignition Relay	Resistance	141 Ω at pins 1 and 2
R1—Engine Harness CAN 1 Termination Resistor	Resistance	120 Ω
R3—Cab CAN 2 Termination Resistor	Resistance	120 Ω
R4—OBW/TPMS CAN 2 Termination Resistor	Resistance	120 Ω
R6—Transmission CAN 1 Termination Resistor	Resistance	120 Ω
R7—Cab CAN 1 Termination Resistor	Resistance	120 Ω
R10—Retarder Resistor	Resistance	63—71 Ω at 20°C 63—71 Ω at 68°F
Y7—Dump Body Heat Solenoid	Resistance	28.5 Ω at 20°C (68°F)
Y12—Transmission Clutch G Solenoid	Resistance	63—71 Ω at 20°C (68°F)
Y13—Transmission Clutch F Solenoid	Resistance	63—71 Ω at 20°C (68°F)
Y14—Transmission Clutch E Solenoid	Resistance	63—71 Ω at 20°C (68°F)
Y15—Cold-Weather Start Aid Solenoid	Resistance	36.4 Ω at 20°C (68°F)
Y16—Transmission Clutch C Solenoid	Resistance	63—71 Ω at 20°C (68°F)
Y17—Transmission Clutch B Solenoid	Resistance	63—71 Ω at 20°C (68°F)
Y18—Transmission Clutch A Solenoid	Resistance	63—71 Ω at 20°C (68°F)
Y19—Transmission Clutch WK Solenoid	Resistance	63—71 Ω at 20°C (68°F)
Y20—Transmission Throttle Pressure D1 Solenoid	Resistance	8.1—9.1 Ω at 20°C (68°F)
Y21—Transmission Clutch D Solenoid	Resistance	63—71 Ω at 20°C (68°F)
Y22—Air Conditioner Compressor Clutch	Resistance	12.6—15.4 Ω at 20°C (68°F)
Y23—Dump Body Down Control Solenoid	Amperage	720 mA (fully raised position) 0 mA (fully lowered position)
Y24—Dump Body Up Control Solenoid	Amperage	720 mA (fully raised position) 0 mA (fully lowered position)

MP01188,0000156 -19-04APR17-4/4

References

<p>4 CAN High Wire Voltage Check</p>	<p>IMPORTANT: Avoid connector and connector terminal damage. Inserting test leads into harness connectors without using spare mating terminal can damage harness.</p>	<p>YES: Go to CAN Low Wire Voltage Check. NO: Go to next step in this check.</p>
<p>Switched power ON. Using a multimeter, measure voltage from pin C (CAN 1 high) to pin A (ground) and pin H (CAN 2 high) to pin A (ground) of Service ADVISOR connector (X1). Is voltage between 2.5 and 3.5 volts?</p>		<p>YES: A short circuit exists on CAN high wire. Check CAN high voltage one controller at a time to locate short circuit. NO: Go to next step in this check.</p>
	<p>Is system voltage present between pin C (CAN 1 high) to pin A (ground) and pin H (CAN 2 high) to pin A (ground) of Service ADVISOR connector?</p>	<p>YES: <u>Go to CAN High Wire Circuit Check.</u> NO: Remove one controller at a time and check voltage. When voltage is in range, check harness of disconnected controller for short circuits. Repair or replace harness as necessary.</p>

ML82895,00006D4 -19-10OCT12-6/13

<p>5 CAN Low Wire Voltage Check</p>	<p>Using a multimeter, measure voltage from pin D (CAN 1 low) to pin A (ground) and pin J (CAN 2 low) to pin A (ground) of Service ADVISOR connector.</p>	<p>YES: Go to CAN High Wire Circuit Check.</p>
<p>Is voltage between 2 and 3 volts?</p>		<p>NO: Go to next step in this check.</p>
<p>Is system voltage present between pin D (CAN 1 low) and pin A (ground) or pin J (CAN 2 low) and pin A (ground) of Service ADVISOR connector?</p>		<p>YES: A short circuit exists on CAN low wire. Check CAN low voltage one controller at a time to locate short circuit. Repair or replace harness as necessary. NO: Go to next step in this check.</p>
<p>Is zero voltage present between pin D (CAN 1 low) and pin A (ground) or pin J (CAN 2 low) and pin A (ground) of Service ADVISOR connector?</p>		<p>YES: <u>Go to CAN Low Wire Circuit Check.</u> NO: Remove one controller at a time and check voltage. When voltage is in range, check harness of disconnected controller for short circuits. Repair or replace harness as necessary.</p>

Continued on next page

ML82895,00006D4 -19-10OCT12-7/13

Steering Column Switch Test

POSITION			1	2	3	4	5	9	10	11	12
TURN INDICATORS	LEFT	L						●	—	●	
	OFF	0									
	RIGHT	R							●	—	●
HORN				●							●
DRIVE LIGHTS	HIGH	1			●	—	●				
	LOW	0					●	—	●		
	MOMENTARY HIGH	2	●	—	●	—	●				

TX1011490

1. Remove steering column switch assembly.
2. While operating switch functions, check for continuity across terminals as identified in the switch legend.
3. Repair or replace as necessary.
4. Replace switch assemble if continuity is not according to the switch legend.



CS33148,00009DE -19-22AUG06-1/1

TX1011490 —UN—25AUG06

TX1011488A —UN—25AUG06

TPM—SmartWave® Advanced Maintenance Tool Diagnostics

See JDG10928 SmartWave Advanced Maintenance Tool User Manual for more information.

ESSENTIAL TOOLS

JDG10928 SmartWave® Advanced Maintenance Tool

Troubleshooting with JDG10928 SmartWave Advanced Maintenance Tool

The tool does not power up or turn off when the INITIATION button is pushed.	Replace batteries.
No tire pressure sensor data is received.	Make sure antenna is held within 559 mm (22 in.) of the tire pressure sensor in position before the INITIATION button is momentarily selected and make sure tool is held in that position for at least 4 to 5 seconds. Try to initiate and receive tire pressure sensor data from another tire pressure sensor.
The SETUP MENU button does not work.	Be sure to push and hold the button for at least 2 seconds.
The tool does not receive a sensor transmission after a sensor has been initiated into the system.	Make sure the tool's antenna is held within 152 cm (6 in.) of the sensor when initiating sensor. This process may need to be repeated up to three times. If a sensor still will not respond, refer to the machine's service manual for further diagnostic or repair information.

SmartWave is a trademark of Bendix CVS

SH03936,000501A -19-07DEC11-1/1

Install WEATHER PACK® Contact

NOTE: Cable seals are color coded for three sizes of wire:

- Green—18 to 20 gauge wire
- Gray—14 to 16 gauge wire
- Blue—10 to 12 gauge wire

1. Slip correct size cable seal on wire.
2. Strip insulation from wire to expose 6 mm (1/4 in.) and align cable seal with edge of insulation.

NOTE: Contacts have numbered identification for two sizes of wire:

- #15 for 14 to 16 gauge wire
- #19 for 18 to 20 gauge wire

3. Put proper size WEATHER PACK® contact on wire and crimp in place with a “W” type crimp, using JDG783 Packard Crimping Tool.



Correct Size Cable



Strip Insulation

WEATHER PACK is a trademark of Packard Electric

CS33148,0002A8D -19-08JUL08-1/2

TS0136—UN—23AUG88

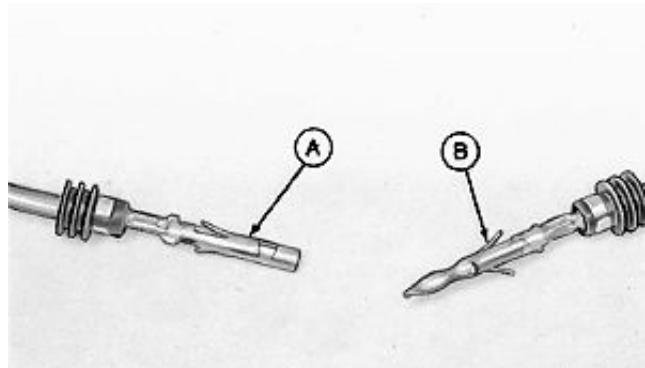
TS1623—UN—02NOV94

NOTE: Proper contact installation for sleeve (A) and pin (B) is shown.

4. Fasten cable seal to contact using JDG783 Packard Crimping Tool.

A—Sleeve

B—Pin



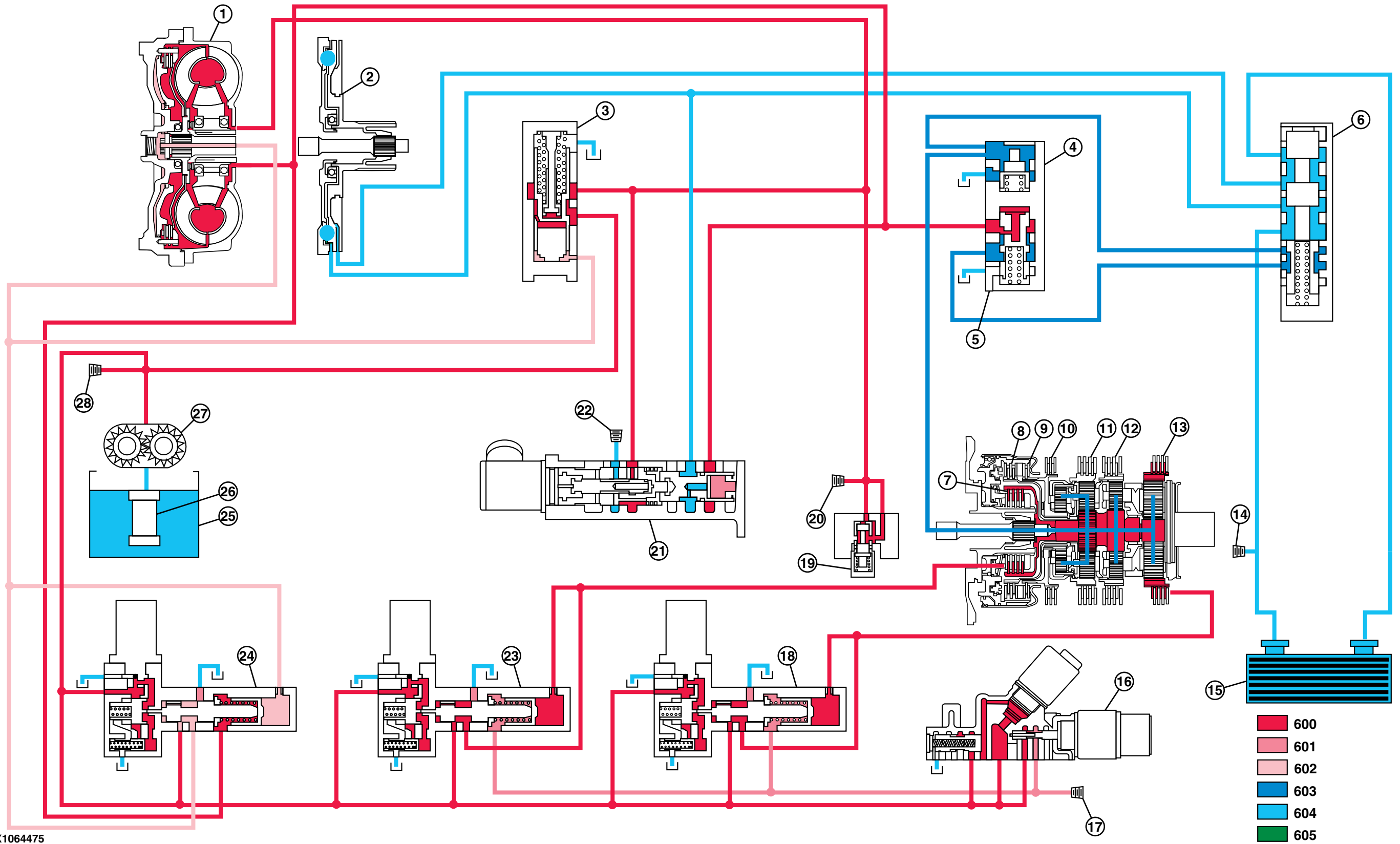
Contact Installation

CS33148,0002A8D -19-08JUL08-2/2

TS0139—UN—02DEC88

Transmission Clutch Engagement

TX1064475 —UN—15SEP09

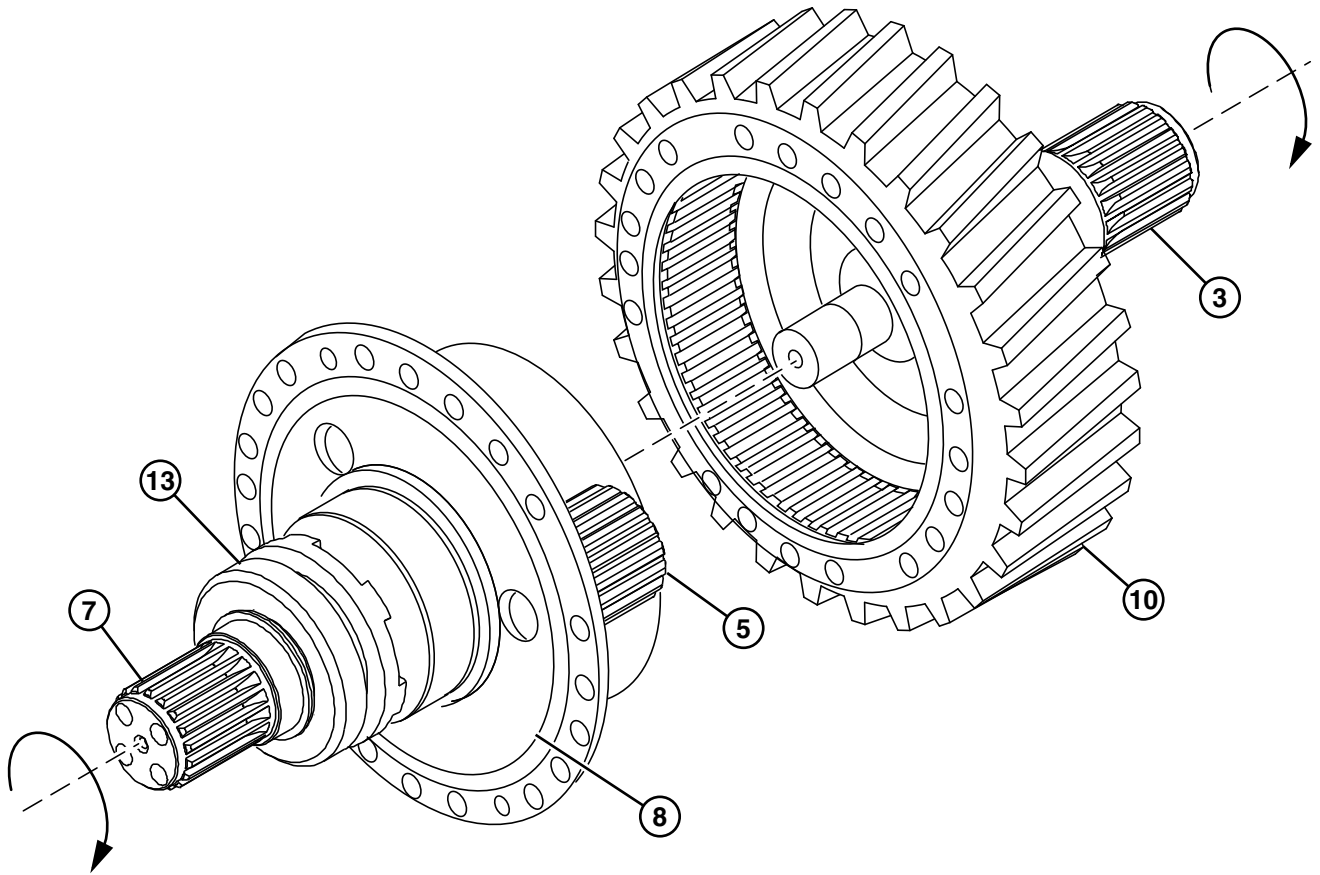


TX1064475

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First Gear Engaged—Retarder Activated

WC20922,00040E9 -19-11OCT11-1/4



TX1090817

Transfer Case Differential—Lockup Engaged

- | | | |
|---------------------------|----------------------|---------------------------|
| 3—Rear Output Shaft | 7—Front Output Shaft | 10—Output Gear |
| 5—Planetary Gear (3 used) | 8—Planetary Carrier | 13—Inter-Axle Lock Collar |

Power Distribution (IDL Activated)—When the inter-axle differential is in lockup mode, the planetary gears (5) and the front output shaft (7) are locked to the planetary carrier

(8), preventing the sun gear from turning. This causes the front output shaft (7) and rear output shaft (3) to turn at the same speed, and equal power is sent to all three axles.

JW40272,00000D6 -19-12MAY11-4/4

TX1090817—UN—03MAY11

Diagnostic Information

5 Service Brake Valve Check

Check service brake valve function. [See Service Brake Valve Test.](#) (Group 9025-25.)

Does service brake valve function within specifications?

YES: Go to Service Brake Lines Blocked or Restricted Check.

NO: Repair or replace service brake valve. [Perform Service Brake Valve Remove and Install](#) and [see Service Brake Valve Disassemble and Assemble.](#) (Group 1060.)

SW03989,0000853 -19-01OCT09-7/9

6 Service Brake Lines Blocked or Restricted Check

Check service brake lines for blockage or restrictions. [See Hydraulic System Component Location.](#) (Group 9025-15.)

Are service brake lines blocked or restricted?

YES: Repair or replace service brake lines as necessary.

NO: Go to Service Brake Disk Check.

SW03989,0000853 -19-01OCT09-8/9

7 Service Brake Disk Check

Check service brake disks for warping or wear. [See Service Brake Disk Remove and Install.](#) (Group 1011.)

Are service brake disks warped or worn?

YES: Replace service brake disks. [See Service Brake Disk Remove and Install.](#) (Group 1011.)

NO: Checks complete.

SW03989,0000853 -19-01OCT09-9/9

Poor or No Service Brakes

SW03989,0000854 -19-30OCT09-1/10

Poor or No Service Brakes Diagnostic Procedure

SW03989,0000854 -19-30OCT09-2/10

1 Service Brake Pedal Check

Check service brake pedal for obstructions around and under pedal. Check for full pedal stroke in both directions.

Is service brake pedal clear of obstructions and allowing full stroke in both directions?

YES: Go to Service Brake Pad Wear Check.

NO: Clean area around pedal to achieve full pedal stroke.

SW03989,0000854 -19-30OCT09-3/10

2 Service Brake Pad Wear Check

Check service brake pad wear indicators. [See Check Dry Caliper Service Brake Pad Wear.](#) (Operator's Manual.)

Are service brake pads to specifications?

YES: Go to Service Brake Line Blocked or Restricted Check.

NO: Replace service brake pads. [Perform Service Brake Pad Remove and Install.](#) (Group 1011.)

Continued on next page

SW03989,0000854 -19-30OCT09-4/10

Diagnostic Information

2 Transmission Oil Level Check

Check transmission oil level. [See Check Transmission Oil Level.](#) (Operator's Manual.)

Is transmission oil at correct level?

YES: Go to Transmission Solenoids Check.

NO: Adjust transmission oil to correct level.

SW29608,00040AE -19-05JAN12-4/7

3 Transmission Solenoids Check

Check transmission solenoids. [Perform Transmission Solenoids, Speed Sensors, Sump Temperature Sensor, and Retarder Resistor Tests.](#) (Group 9015-20)

Are solenoid resistances within specification?

YES: Go to Transmission Pressure Check.

NO: Replace failed solenoid.

SW29608,00040AE -19-05JAN12-5/7

4 Transmission Pressure Check

Check transmission pressures. [See Transmission Pressure Test.](#) (Group 9020-25.)

Are transmission pressures to specifications?

YES: Go to Shift Control Valve Check.

NO: Replace main pressure regulator and/or transmission charge pump. [Perform Shift Control Valve Disassemble and Assemble](#) and/or [perform Input Carrier and Oil Control Body Disassemble and Assemble.](#) (Group 0350.)

SW29608,00040AE -19-05JAN12-6/7

5 Shift Control Valve Check

Check shift control valve for obstruction or damage. [See Oil Pan and Shift Control Valve Remove and Install](#) and [see Shift Control Valve Disassemble and Assemble.](#) (Group 0350.)

Is shift control valve obstructed or damaged?

YES: Clean, repair, or replace shift control valve.

NO: Checks complete.

SW29608,00040AE -19-05JAN12-7/7

Excessive Clutch Slippage and Chatter

SW29608,00040AF -19-05JAN12-1/8

Excessive Clutch Slippage and Chatter Diagnostic Procedure

SW29608,00040AF -19-05JAN12-2/8

1 Diagnostic Trouble Code Check

Check for active diagnostic trouble codes (DTCs) using one of the following methods:

- Monitor Menus: [See CAN Monitor Unit \(CMU\)—Main Menu—Diagnostics—Codes.](#) (Operator's Manual.)
- Service ADVISOR™ Application: [See Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application.](#) (Group 9015-20.)

Are any DTCs present?

YES: Repair malfunction causing DTC(s).

NO: Go to Transmission Oil Check.

Continued on next page

SW29608,00040AF -19-05JAN12-3/8

Transmission Warmup Procedure

SPECIFICATIONS	
Transmission Oil Operating Temperature	80—90°C 176—194°F

⚠ CAUTION: Avoid personal injury from unexpected machine movement. Perform procedure in an open area away from other people and machines.

IMPORTANT: Never stall torque converter for more than 15 seconds. Do not allow transmission temperature to exceed 100°C (212°F). Transmission damage will result if temperature is allowed to exceed the specification.

NEVER stall torque converter in reverse. Drive shaft, transfer case, or differential damage may result. Reverse gear ratio is lower than 1st gear ratio, and excessive torque will be transferred to the drive shaft, transfer case, or differential.

NOTE: Monitor transmission temperature at all times during warmup.

1. Start engine.
2. Verify the park brake is released. Select F (forward) on the 25-button sealed switch module (SSM) (OC3) and apply the park brake (park brake indicator on).

NOTE: Dump body position can be observed on the CAN Monitor Unit (CMU). See CAN Monitor Unit (CMU)—Default Display Screen. (Operator's Manual.)

3. Observe transmission oil temperature and tachometer display on the CMU.

NOTE: Low air pressure alarm will remain on until air pressure reaches normal operating pressure.

4. Allow air pressure to increase until audible alarm turns off.
5. Push and hold service brake pedal during transmission warmup procedure.

NOTE: The system will automatically reduce engine speed to 780—820 rpm after 15 seconds have elapsed.

6. Increase engine speed to 1500 rpm and hold for approximately 12—15 seconds.
7. Release accelerator pedal and select N (neutral) on the 25-button SSM (OC3).
8. Push down on accelerator pedal. Engine will only accelerate to 960 rpm until cool-down period of 50 seconds has elapsed.
9. Repeat steps 6—10 until transmission oil operating temperature reaches specification.

Specification

Transmission Oil Operating—Temperature.....	80—90°C 176—194°F
---	----------------------

WC20922,00040E4 -19-29NOV11-1/1

Front and Rear Service Brake Apply Accumulators Pressure Test and Charge Procedure

SPECIFICATIONS

Service Brake Accumulator Charge Pressure	7650—8350 kPa 76.5—83.5 bar 1110—1210 psi
---	---

ESSENTIAL TOOLS

JT05711 High Pressure Nitrogen Accumulator Charging Regulator
JT05420 Nitrogen Accumulator Charging Kit
JT01735 Gas Cock

The purpose of this test is to measure the dry nitrogen charge pressure in each individual front and rear service brake accumulator and charge with additional dry nitrogen if necessary.

CAUTION: Prevent possible injury from high pressure fluid. Relieve oil pressure from accumulators before servicing components. Hydraulic oil in accumulators can be stored at pressures equal to or above system relief pressures.

1. With engine OFF, apply and release service brake approximately 35—40 times to relieve pressure from system
2. Remove service brake accumulator charge valve guard and cap.

IMPORTANT: Only dry nitrogen should be used to charge accumulators. Do not use compressed air or any combustible gas as these will cause oxidation and condensation in the accumulator.

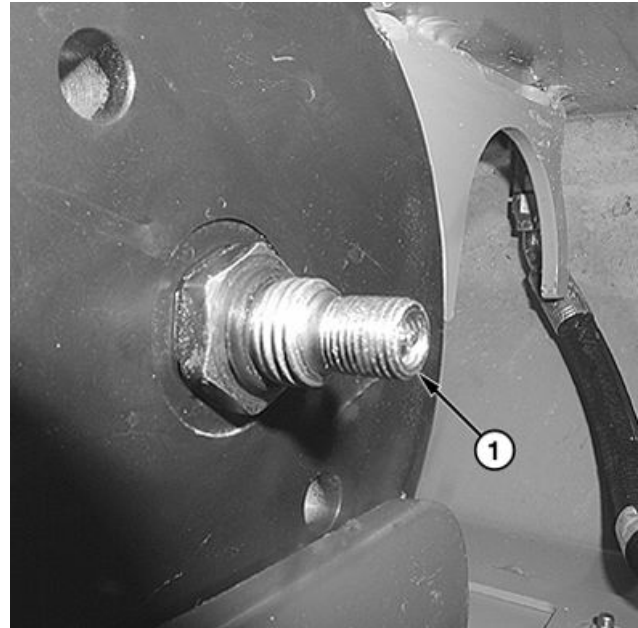
3. Close valve on dry nitrogen container and install JT05711 High Pressure Nitrogen Accumulator Charging Regulator. Turn T-handle on regulator out until no resistance is felt. Open valve on dry nitrogen container. There should be no dry nitrogen escaping from regulator. If there is, turn T-handle out until it stops.
4. Connect JT05420 Nitrogen Accumulator Charging Kit with JT01735 Gas Cock to charging regulator.

CAUTION: Prevent possible injury from high pressure gas. Turn T-handle on JT01735 Gas Cock fully out before installing gas cock to accumulator charge valve.

5. Connect gas cock to the service brake accumulator charge valve (1).

IMPORTANT: Do not turn gas cock T-handle in fully. Damage to charge valve core will occur.

6. Close regulator bleed valve and turn gas cock T-handle in until accumulator pressure shows on gauge.



Service Brake Accumulator Charge Valve

1— Service Brake Accumulator Charge Valve

NOTE: After charging an accumulator, allow gas temperature to stabilize for 10 to 15 minutes before recording charge pressure again.

7. Record service brake accumulator charge pressure. Charge accumulator to specification if necessary. Turn regulator T-handle in to increase pressure to specification. If charge pressure is beyond specification, release pressure by slowly opening bleed valve until pressure is to specification.

Specification

Service Brake Accumulator Charge—Pressure.....	7650—8350 kPa 76.5—83.5 bar 1110—1210 psi
--	---

8. Turn gas cock T-handle out. Close valve on dry nitrogen container. Slowly open bleed valve until both regulator gauges return to zero. Turn regulator T-handle out.
9. Remove gas cock from service brake accumulator charge valve.
10. Install charge valve cap and guard.
11. Apply and release service brake pedal approximately 3—4 times to relieve any pressure buildup in system.
12. Repeat procedure for each service brake accumulator.

Continued on next page

SW03989,0000886 -19-25SEP09-1/2

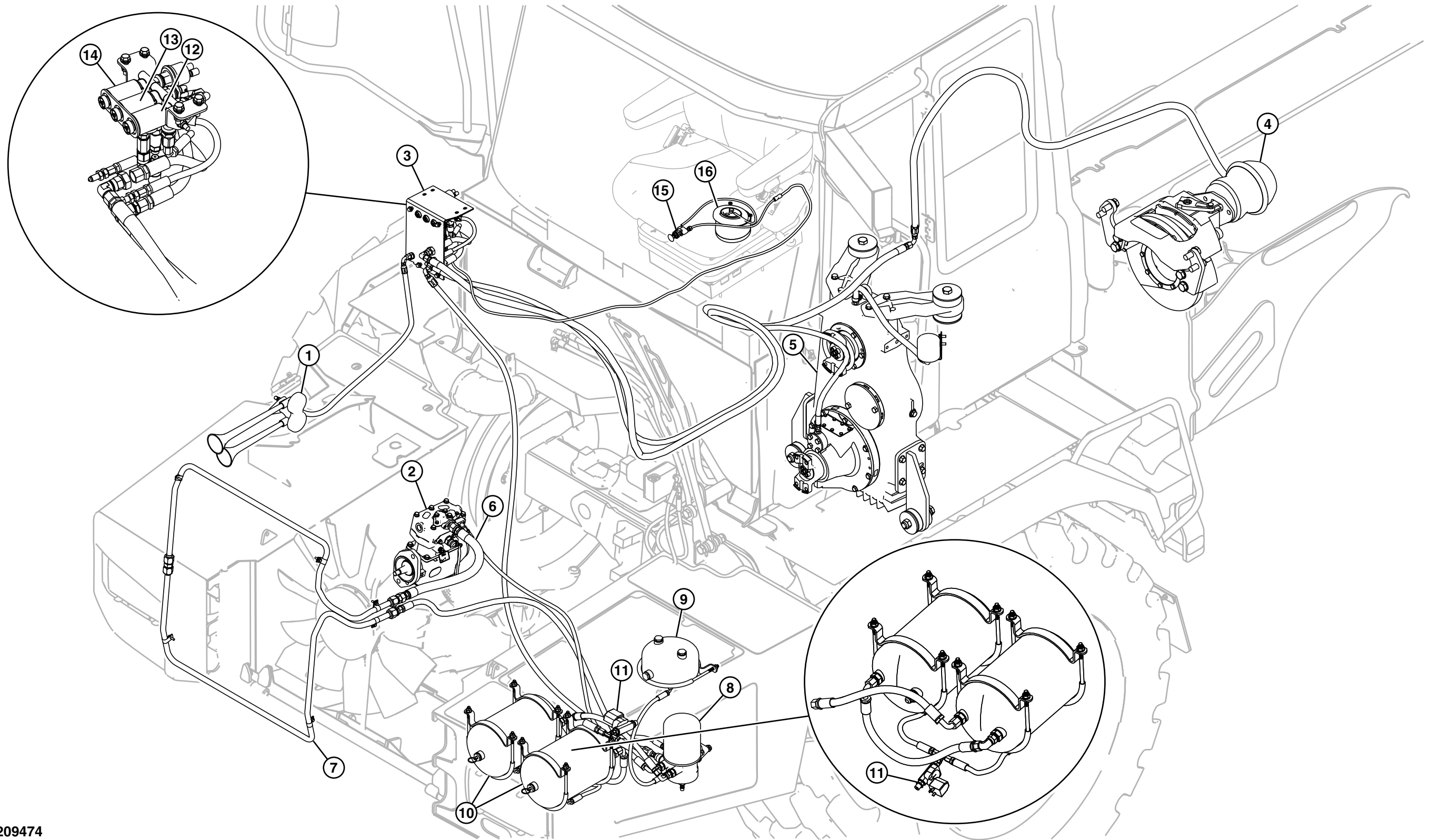
Section 9022 Pneumatic System

Contents

	Page
Group 05—Theory of Operation	
Pneumatic System Operation.....	9022-05-1
Pneumatic System Operation With Pneumatic Control Valve—If Equipped	9022-05-4
Air Pressure Supply Circuit Operation.....	9022-05-7
Air Dryer and Pneumatic Blow-Off Valve.....	9022-05-8
Group 15—Diagnostic Information	
Pneumatic System Schematic.....	9022-15-1
Pneumatic System Schematic With Pneumatic Control Valve—If Equipped	9022-15-5
Pneumatic System Component Location	9022-15-9
Pneumatic System Component Location With Pneumatic Control Valve—If Equipped	9022-15-17
Pneumatic Manifold Component Location	9022-15-19
Pneumatic System Will Not Reach Operating Pressure	9022-15-11
Pneumatic System Will Not Reach Operating Pressure Diagnostic Procedure.....	9022-15-11
Park Brake Will Not Release	9022-15-12
Park Brake Will Not Release Diagnostic Procedure.....	9022-15-12
Inter-Axle Differential Lock (IDL) Will Not Operate.....	9022-15-13
Inter-Axle Differential Lock (IDL) Will Not Operate Diagnostic Procedure.....	9022-15-13
Air Horn Will Not Operate	9022-15-14
Air Horn Will Not Operate Diagnostic Procedure.....	9022-15-14
Group 25—Tests	
Pneumatic System Main Pressure Test and Adjustment.....	9022-25-1
Park Brake Pressure Test.....	9022-25-1

Pneumatic System Component Location With Pneumatic Control Valve—If Equipped

TX1209474 —UN—25JAN16



Pneumatic System Component Location With Pneumatic Control Valve (if equipped)

Continued on next page

TX1209474

AD32822,00001BE -19-21JAN16-1/2

	Page
Service Brake Accumulator Charge Valve Test and Adjustment	9025-25-8
Service Brake Low Pressure Switch Test	9025-25-9
Front and Rear Service Brake Apply Accumulators Pressure Test and Charge Procedure.....	9025-25-9
Service Brake Valve Test.....	9025-25-9
Steering Relief Valve Pressure Test and Adjustment.....	9025-25-10
Steering Cylinder Leakage Test.....	9025-25-12
Secondary Steering Pump Residual and Compensator Valves Test and Adjustment	9025-25-13
Dump Body Lower Circuit Relief Valve Test	9025-25-15
Dump Body Heat Diverter Valve Pressure Test.....	9025-25-16
Pilot Pressure Regulating Valve Test and Adjustment	9025-25-17

- | | | | |
|---|--|--------------------------|-----------------|
| 1— In Neutral | 5— Sleeve | 11— Inlet Check Valve | 16— Trapped Oil |
| 2— Steering Cylinder | 6— Spool | 12— Anticavitation Valve | 17— Return Oil |
| 3— Gerotor | 7— Steering Shaft | 13— Relief Valve | |
| 4— Load Sense Port to Hydraulic System Manifold Port L3 | 8— Return | 14— Supply Oil | |
| | 9— Make-Up Check Valve | 15— Work Pressure Oil | |
| | 10— From Hydraulic System Manifold Port P3 | | |

The steering valve is a variable-displacement (flow amplification), closed-center valve. Main valve components are the spool (6), sleeve (5), and the gerotor (3). Also included are the inlet check valve (11), make-up check valve (9), anticavitation valves (12), and relief valves (13).

When the steering wheel is not being turned, the valve is in neutral (1). In neutral, the spool and sleeve are held in alignment by the centering spring blocking the flow of supply oil (14) through the sleeve to the spool and gerotor. Oil at the left and right work ports to the steering cylinders is trapped (16) by the sleeve holding the machine frames stationary.

Turning the steering wheel and shaft (7) left or right turns the spool relative to the sleeve, opening passages so supply oil flows from the hydraulic system manifold port P3 (10) through the sleeve into the spool. From the spool, work pressure oil (15) flows to the gerotor, causing the gerotor gear and sleeve to turn. Work pressure oil flow is metered by the gerotor back into the spool. There it is routed through the sleeve and out the left or right work port to the respective ends of the steering cylinders, turning the machine. Work pressure oil also flows out the load sense port (4), sending a load sense signal back through the hydraulic system manifold port L3 to the main hydraulic pump regulator valve to regulate pump flow. A load sense signal also goes to the spring chamber of the priority valve and to the steering load sense relief valve.

Return oil (17) flows back from steering cylinders, through the right or left work port, through the sleeve and spool to the return circuit (8).

As steering operation is stopped, the centering spring and gerotor continue to turn the sleeve until the sleeve and spool are in alignment, stopping the flow of oil through the spool to the gerotor. At this point, the valve is in neutral and remains there until the steering wheel and shaft are turned again.

The valve's variable displacement (flow amplification) is proportional to the speed at which the steering wheel is turned. When the steering wheel is turned slowly, the valve meters oil only through the gerotor to the steering cylinders and, thus, the effective displacement is equal to the gerotor displacement. When the steering wheel is turned rapidly, the spool moves more, relative to the sleeve opening passages. As a result, additional oil is allowed to bypass the gerotor. This increases the effective valve displacement, and flow amplification occurs.

Relief valves are used to relieve high-pressure oil from a pressure spike created in the steering cylinders while steering is in neutral. In neutral, the steering valve blocks the flow of oil to and from the cylinders. A pressure spike, created by the impact of the front or rear wheels against an obstacle, is transmitted to the steering cylinders, causing slight cylinder movement.

The cylinder movement that caused the pressure spike also causes a pressure drop and a void in the opposite end of the cylinders. Because of the pressure differential across the anticavitation valve, the pressure in the return passage pushes the valve open and oil flows into the void, preventing cavitation. Oil not used flows out port T and then back to the hydraulic reservoir.

QUO1020,00019F3 -19-09NOV09-2/2

Theory of Operation

For the electrical theory of operation for this circuit, see
Chassis Control Unit (CCU) Circuits Theory of Operation.
(Group 9015-15.)

AA95137,0000004 -19-10APR12-2/2

Diagnostic Information

1— Steering Valve
2— Right Steering Cylinder
3— Left Steering Cylinder

4— Case Drain Hose (to reservoir) 6— Suction Hose (from reservoir) 8— Return Line (to reservoir)
5— Secondary Steering Pump 7— Hydraulic System Manifold

Continued on next page

AA95137,0000002 -19-01DEC11-6/9

Service Brake Pads Excessive Wear

See [Service Brake Pads Excessive Wear](#). (Group 9020-15.)

OUO1020,00019DC -19-22SEP09-1/1

Service Brakes Do Not Fully Release

See [Service Brakes Do Not Fully Release](#). (Group 9020-15.)

TX04577,000004A -19-30SEP10-1/1

Time Between Service Brake Accumulator Charging Cycles Too Short

See [Time Between Service Brake Accumulator Charging Cycles Too Short](#). (Group 9020-15.)

OUO1020,00019DD -19-27OCT10-1/1

Slow or No Steering Function

OUO1020,0001D9F -19-27JAN12-1/11

Slow or No Steering Function Diagnostic Procedure

OUO1020,0001D9F -19-27JAN12-2/11

1 Articulation Locking Bar Check

Check if locking bar is installed.

Is locking bar installed?

YES: Remove locking bar and install in storage position.

NO: Go to Diagnostic Trouble Code Check.

OUO1020,0001D9F -19-27JAN12-3/11

2 Diagnostic Trouble Code Check

Check for active diagnostic trouble codes (DTCs). See [Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application](#). (Group 9015-20.)

Are any diagnostic trouble codes (DTC) present?

YES: Repair malfunction causing diagnostic trouble code.

NO: Go to Hydraulic Oil Level Check.

OUO1020,0001D9F -19-27JAN12-4/11

3 Hydraulic Oil Level Check

Check hydraulic oil level in reservoir. See [Hydraulic Oil](#). (Operator's Manual.)

Is oil at correct level?

YES: Go to Steering Relief Valve Check.

NO: Add oil as necessary.

OUO1020,0001D9F -19-27JAN12-5/11

4 Steering Relief Valve Check

Check steering relief valve. Perform [Steering Relief Valve Pressure Test and Adjustment](#). (Group 9025-25.)

Is steering pressure to specification?

YES: Go to Steering Lines Check.

NO: Adjust steering relief valve as necessary.

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OUO1020,0001D9F -19-27JAN12-6/11

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