

**524K 4WD Loader  
Engine 6068HDW74 (T3)  
Operation and Test  
(S.N. —642245)**

**OPERATION & TEST TECHNICAL  
MANUAL**

**524K 4WD Loader  
Engine 6068HDW74 (T3)  
(S.N. —642245)**

**TM10686 07JAN19 (ENGLISH)**

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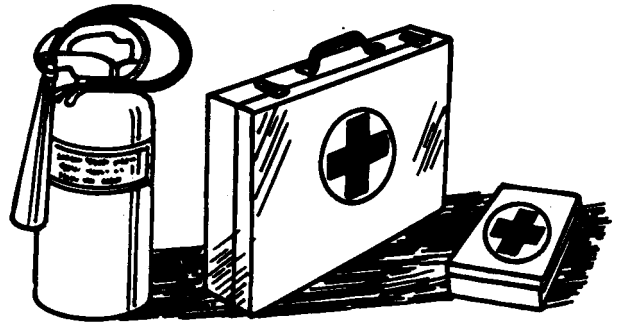
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## Prepare for Emergencies

Be prepared if an emergency occurs or 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.



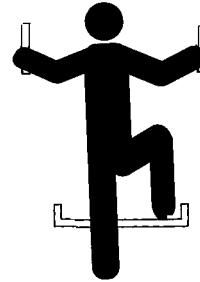
TS291 —UN—15APR13

TX03679,000174B -19-03NOV08-1/1

## Use Steps and Handholds Correctly

Prevent falls by facing the machine when getting on and off. Maintain 3-point contact with steps and handrails. Never use machine controls as handholds.

Use extra care when mud, snow, or moisture present slippery conditions. Keep steps clean and free of grease or oil. Never jump when exiting machine. Never mount or dismount a moving machine.



T133468 —UN—15APR13

TX03679,00016F2 -19-24APR13-1/1

## Start Only From Operator's Seat

Avoid unexpected machine movement. Start engine only while sitting in operator's seat. Ensure all controls and working tools are in proper position for a parked machine.

Never attempt to start engine from the ground. Do not attempt to start engine by shorting across the starter solenoid terminals.



T133715 —UN—15APR13

TX03679,0001799 -19-22APR10-1/1

## Use and Maintain Seat Belt

**Use seat belt when operating machine.** Remember to fasten seat belt when loading and unloading from trucks and during other uses.

Examine seat belt frequently. Be sure webbing is not cut or torn. Replace seat belt immediately if any part is damaged or does not function properly.

**The complete seat belt assembly should be replaced every 3 years, regardless of appearance.**



**USE  
SEAT  
BELT**

T133716 —19—17APR13

TX03679,00016DD -19-03NOV08-1/1

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## Engine Control Unit (ECU) Diagnostic Trouble Codes

### ❶ Connector Check

Key switch OFF.

Check engine control unit (ECU) J1 connector (X71), J2 connector (X72) and ambient air temperature sensor (B10) connector for corrosion, loose fit, bent/pushed out terminals or crimp malfunctions. [See Load Center Harness \(W3\) Component Location](#) and [see Engine Harness \(W6\) Component Location](#). (Group 9015-10.)

Are connectors in good condition?

**YES:** Go to Wire Harness Check.

**NO:** Repair or replace connector(s) or terminal(s) as needed.

DD00738,000021A -19-10APR18-3/5

### ❷ Wire Harness Check

Key switch OFF.

Disconnect ECU J1 connector (X71) and J2 connector (X72).

Disconnect ambient air temperature sensor (B10).

Using a multimeter, check continuity of wire X07 YEL between pin B4 of ECU J2 connector (X72) and ambient air temperature sensor (B10) connector.

Check continuity of wire R73M BLK between pin D2 of ECU J1 connector (X71) and ambient air temperature sensor (B10) connector.

Is continuity indicated?

**YES:** Go to next step in this check.

**NO:** Open circuit in wire harness. Repair or replace harness. [See Load Center Harness \(W3\) Component Location](#) and [see Engine Harness \(W6\) Component Location](#). (Group 9015-10.)

DD00738,000021A -19-10APR18-4/5

### ❸ Component Check

Turn key switch OFF.

Check resistance through ambient air temperature sensor (B10). [See Electrical Component Specifications](#). (Group 9015-20.)

Is sensor resistance within specifications?

**YES:** Checks complete.

**NO:** Replace ambient air temperature sensor (B10).

DD00738,000021A -19-10APR18-5/5

## 000171.04 — Ambient Air Temperature Out of Range Low

*Short to ground in signal circuit from ambient air temperature sensor (B10) or sensor malfunction.*

DD00738,000021B -19-10APR18-1/5

## Ambient Air Temperature Out of Range Low Diagnostic Procedure

Continued on next page

DD00738,000021B -19-10APR18-2/5

# Transmission Control Unit (TCU) Diagnostic Trouble Codes

## Group 20

### Transmission Control Unit (TCU) Diagnostic Trouble Codes

The diagnostic trouble code number is indicated by a Suspect Parameter Number (SPN) and a Failure Mode Indicator (FMI) number. In the example **000744.04**, 744 is the SPN and 04 is the FMI number.

Diagnostic trouble codes can be displayed using the advanced display unit (ADU) or by using Service ADVISOR™.

Service ADVISOR is a trademark of Deere & Company

- See [Display Unit—Main Menu—Codes](#). (Operator's Manual.)
- See [Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application](#). (Group 9015-20.)

*Note: For in-depth diagnostics on all TCU diagnostic trouble codes, see specific code diagnostic procedure in this group.*

AA95137,00019CC -19-31JUL08-1/1

### 000091.09 — Timeout EEC2 Message

*Accelerator pedal position sensor status signal not received by transmission control unit (TCU).*

AA95137,0001B01 -19-24JUL08-1/7

### Timeout EEC2 Message Diagnostic Procedure

#### Alarm Level:

No Warning Lamp

AA95137,0001B01 -19-24JUL08-2/7

#### 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 Code Check](#).

AA95137,0001B01 -19-24JUL08-3/7

#### 2 Code Check

Ignition ON, engine OFF.

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

Are ECU codes 000091.03, 000091.04, or 000091.14 present?

**YES:** Diagnose other codes first. See specific code diagnostic procedure in [CTM502](#).  
**NO:** [Go to Controller Sensors Check](#).

AA95137,0001B01 -19-24JUL08-4/7

#### 3 Controller Sensors Check

Ignition ON, engine OFF.

View ECU monitored sensor outputs by accessing the [DIAGNOSTICS / ENGINE SENSORS](#) submenu on the advanced display unit (ADU). See [Display Unit—Main Menu—Diagnostics—Engine Sensors](#). (Operators Manual.)

Are all values for the engine sensors displayed?

**YES:** Replace transmission control unit (TCU). See [Transmission Control Unit \(TCU\) Remove and Install](#).  
**NO:** [Go to CAN Circuit Check](#).

Continued on next page

AA95137,0001B01 -19-24JUL08-5/7

## Transmission Control Unit (TCU) Diagnostic Trouble Codes

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1 Intermittent Check</b>  | <p>Does DTC periodically “go away”?</p> <p>Disconnect lockup torque converter solenoid (Y27). <u>See Transmission Harness (W10) Component Location.</u> (Group 9015-10.)</p> <p>Measure resistance between pins A and B on lockup torque converter solenoid (Y27).</p> <p>Compare resistance to specification. <u>See Electrical Component Specifications.</u> (Group 9015-20.)</p> <p>Is resistance within specification?</p>                                                                       | <p><b>YES:</b> DTC is intermittent. <u>See Intermittent Diagnostic Trouble Code (DTC) Diagnostics.</u> (Group 9015-20.)</p> <p><b>NO:</b> <u>Go to Component Check.</u></p>                                                                                                                                                                                                                                               |
| <b>2 Component Check</b>     | <p>Ignition OFF.</p> <p>Disconnect lockup torque converter solenoid (Y27). <u>See Transmission Harness (W10) Component Location.</u> (Group 9015-10.)</p> <p>Measure resistance between pins A and B on lockup torque converter solenoid (Y27).</p> <p>Compare resistance to specification. <u>See Electrical Component Specifications.</u> (Group 9015-20.)</p> <p>Is resistance within specification?</p>                                                                                          | <p><b>YES:</b> <u>Go to Short Circuit Check.</u></p> <p><b>NO:</b> Replace lockup torque converter solenoid.</p>                                                                                                                                                                                                                                                                                                          |
| <b>3 Short Circuit Check</b> | <p>Ignition OFF.</p> <p>Disconnect lockup torque converter solenoid (Y27). <u>See Transmission Harness (W10) Component Location.</u> (Group 9015-10.)</p> <p>Check circuit T27 BLU for ground at pin A on solenoid (Y27) connector.</p> <p>Is ground present?</p>                                                                                                                                                                                                                                    | <p><b>YES:</b> Circuit T27 BLU is short to ground. Repair circuit or replace harness.</p> <p><b>NO:</b> <u>Go to Harness Check.</u></p>                                                                                                                                                                                                                                                                                   |
| <b>4 Harness Check</b>       | <p>Turn battery disconnect switch OFF.</p> <p>Disconnect lockup torque converter solenoid (Y27). <u>See Transmission Harness (W10) Component Location.</u> (Group 9015-10.)</p> <p>Disconnect transmission control unit (TCU) connector (X23). <u>See Load Center Harness (W3) Component Location.</u> (Group 9015-10.)</p> <p>Check for continuity between pin 50 (circuit T27 BLU) on TCU connector (X23) and all other pins on connector (X23).</p> <p>Is continuity indicated with any pins?</p> | <p><b>YES:</b> Circuit T27 BLU is short to circuit with continuity indicated. Repair circuit or replace harness.</p> <p><u>See Load Center Harness (W3) Wiring Diagram.</u> (Group 9015-10.)</p> <p><u>See Transmission Harness (W10) Wiring Diagram.</u> (Group 9015-10.)</p> <p><b>NO:</b> Replace transmission control unit (TCU). <u>See Transmission Control Unit (TCU) Remove and Install.</u> (Group 9015-20.)</p> |

AA95137,000197A -19-09JUL08-3/6

AA95137,000197A -19-09JUL08-4/6

AA95137,000197A -19-09JUL08-5/6

AA95137,000197A -19-09JUL08-6/6

## Transmission Control Unit (TCU) Diagnostic Trouble Codes

### 2 Calibrate Transmission Control Unit (TCU) Control Clutch

Ignition ON, engine OFF.

Calibrate the electronic clutch solenoids. [See Transmission Control Unit \(TCU\)—Electronic Clutch Calibration.](#) (Group 9020-20.)

Is transmission calibration successful?

**YES:** Checks complete.

**NO:** [Go to Component Check.](#)

AA95137,0001983 -19-24SEP18-4/6

### 3 Component Check

[Perform Transmission Control Valve Solenoid Check.](#) (Group 9015-20.)

Are all control solenoids within resistance specification?

**YES:** [Go to Code Check.](#)

**NO:** Transmission control solenoid malfunction. Replace solenoid with resistance out of specification.

AA95137,0001983 -19-24SEP18-5/6

### 4 Code Check

Ignition ON, engine OFF.

Check for active transmission control unit (TCU) codes within the following range: 522383.02—522399.05.

Are any TCU codes active within the range?

**YES:** Correct problem causing codes.

**NO:** Replace transmission control unit (TCU). [See Transmission Control Unit \(TCU\) Remove and Install.](#) (Group 9015-20.)

AA95137,0001983 -19-24SEP18-6/6

## 522364.13 — Transmission Clutch Calibration Fault

*Transmission control unit (TCU) is not able to read clutch adjustment parameters.*

AA95137,0001984 -19-09JUL08-1/4

### Transmission Clutch Calibration Fault Diagnostic Procedure

#### Alarm Level:

No Warning Lamp

AA95137,0001984 -19-09JUL08-2/4

### 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 Reconfigure Transmission Control Unit \(TCU\).](#)

Continued on next page

AA95137,0001984 -19-09JUL08-3/4

## Transmission Control Unit (TCU) Diagnostic Trouble Codes

### 2 Component Check

Ignition OFF.

Disconnect clutch cut-off sensor (B33) connector. [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Measure resistance between pins A and B on clutch cut-off sensor (B33).

Measure resistance between pins A and C on clutch cut-off sensor (B33).

Compare resistance to specification. [See Electrical Component Specifications.](#) (Group 9015-10.)

Is resistance within specification?

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

**NO:** Clutch cut-off sensor (B33) malfunction. Replace sensor.

AA95137,000198F -19-09JUL08-4/6

### 3 Short Circuit Check

Turn battery disconnect OFF.

Disconnect clutch cut-off sensor (B33) connector and transmission control unit (TCU) connector (X23). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit P77 RED for ground at pin 37 on TCU connector (X23).

Is ground present?

**YES:** Circuit P77 RED is short to ground. Repair or replace harness. [See Load Center Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

**NO:** [Go to Harness Check.](#)

AA95137,000198F -19-09JUL08-5/6

### 4 Harness Check

Turn battery disconnect OFF.

Disconnect clutch cut-off sensor (B33) connector and transmission control unit (TCU) connector (X23). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check for continuity between pin 37 (circuit P77 RED) on TCU connector (X23) and remaining pins on TCU connector (X23).

Is continuity indicated?

**YES:** Circuit P77 RED is short to circuit with continuity indicated. Repair or replace harness. [See Load Center Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

**NO:** Replace transmission control unit (TCU). [See Transmission Control Unit \(TCU\) Remove and Install.](#) (Group 9015-20.)

AA95137,000198F -19-09JUL08-6/6

## 522375.00 — Transmission Oil Filter Restricted

*Transmission control unit (TCU) detects that the transmission oil filter is restricted.*

AA95137,0001990 -19-06SEP18-1/9

### Transmission Oil Filter Restricted Diagnostic Procedure

Continued on next page

AA95137,0001990 -19-06SEP18-2/9

**6 Clutch Internal Speed Sensor Check**

Ignition OFF.

Disconnect internal clutch speed sensor (B30). [See Transmission Harness \(W10\) Component Location.](#) (Group 9015-10.)

Verify internal clutch speed sensor (B30) is installed to correct torque specification to ensure correct gap distance.

**Specification**

Internal Clutch Speed Sensor

(B30)—Torque.....30 N·m  
22 lb·ft

Measure resistance between pins A and B on internal clutch speed sensor (B30).

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

Is resistance within specification?

**YES:** [Go to Transmission Output Speed Sensor Check.](#)**NO:** Internal clutch speed sensor (B30) malfunction. Replace sensor.

AA95137,0001997 -19-06OCT08-8/9

**7 Transmission Output Speed Sensor Check**

Ignition OFF.

Disconnect transmission output speed sensor (B31). [See Transmission Harness \(W10\) Component Location.](#) (Group 9015-10.)

Verify transmission output speed sensor (B31) is installed to correct torque specification to ensure correct gap distance.

**Specification**

Transmission Output Speed Sensor

(B31)—Torque.....30 N·m  
22 lb·ft

Connect transmission output speed sensor (B31).

Start machine and operate under load.

Check for active codes.

Is transmission control unit (TCU) code 522383.02 present?

**YES:** Transmission output speed sensor (B31) malfunction. Replace sensor.**NO:** Replace transmission control unit (TCU). [See Transmission Control Unit \(TCU\) Remove and Install.](#) (Group 9015-20.)

AA95137,0001998 -19-06OCT08-9/9

**522383.03 — Clutch Reverse Solenoid Short to Power***Transmission reverse clutch KR solenoid circuit is short to power.*

AA95137,0001998 -19-24SEP18-1/7

**Clutch Reverse Solenoid Short to Power Diagnostic Procedure****Alarm Level:**

No Warning Lamp

Continued on next page

AA95137,0001998 -19-24SEP18-2/7

## Transmission Control Unit (TCU) Diagnostic Trouble Codes

### 3 Circuit Check—Control Valve Harness

Turn battery disconnect OFF.

Disassemble transmission control valve. [See Transmission Hydraulic Control Valve Disassemble and Assemble.](#) (Group 0360.)

Disconnect transmission control solenoid (Y5).

Measure resistance between pins 1 and 2 on transmission control solenoid (Y5).

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

Is resistance within specification?

**YES:** Open circuit in transmission control valve harness. Repair or replace harness.

**NO:** Transmission control solenoid (Y5) malfunction. Replace solenoid.

AA95137,000199E -19-07SEP08-5/6

### 4 Open Circuit Check

Ignition OFF.

Disconnect transmission harness-to-transmission control valve harness connector (X36). [See Transmission Harness \(W10\) Component Location.](#) (Group 9015-10.)

Disconnect transmission control unit (TCU) connector (X23). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit T07 BLU for continuity between pin 5 on transmission harness side of connector (X36) and pin 9 on TCU connector (X23).

Is continuity indicated?

**YES:** Replace transmission control unit (TCU). [See Transmission Control Unit \(TCU\) Remove and Install.](#) (Group 9015-20.)

**NO:** Circuit T07 BLU is open. Repair circuit or replace harness. [See Load Center Harness \(W3\) Wiring Diagram](#) and [see Transmission Harness \(W10\) Wiring Diagram.](#) (Group 9015-10.)

AA95137,000199E -19-07SEP08-6/6

## 522389.02 — Transmission Clutch K4 Slippage

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

AA95137,000199F -19-07SEP08-1/9

### Transmission Clutch K4 Slippage Diagnostic Procedure

#### Alarm Level:

Caution Indicator Light

AA95137,000199F -19-07SEP08-2/9

### 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.](#)

Continued on next page

AA95137,000199F -19-07SEP08-3/9

## Transmission Control Unit (TCU) Diagnostic Trouble Codes

|                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1 Intermittent Check</b>                    | <p>Does DTC periodically “go away”?</p>                                                                                                                                                                                                                                                                                                                                                                                                       | <p><b>YES:</b> DTC is intermittent. See <a href="#">Intermittent Diagnostic Trouble Code (DTC) Diagnostics</a>. (Group 9015-20.)</p> <p><b>NO:</b> <a href="#">Go to Component Check</a>.</p> <p style="text-align: right;">AA95137,00019A5 -19-07SEP08-3/7</p>                                                                                                    |
| <b>2 Component Check</b>                       | <p>Ignition OFF.</p> <p>Disconnect transmission harness-to-transmission control valve harness connector (X36). See <a href="#">Transmission Harness (W10) Component Location</a>. (Group 9015-10.)</p> <p>Check resistance between pins 4 and 7 on transmission control valve harness side of connector (X36). See <a href="#">Transmission Control Valve Solenoid Check</a>. (Group 9015-20.)</p> <p>Is resistance within specification?</p> | <p><b>YES:</b> <a href="#">Go to Short Circuit Check—Solenoid Circuits</a>.</p> <p><b>NO:</b> Transmission control solenoid 4 (Y4) malfunction. Replace solenoid. See <a href="#">Transmission Hydraulic Control Valve Disassemble and Assemble</a>. (Group 0360.)</p> <p style="text-align: right;">AA95137,00019A5 -19-07SEP08-4/7</p>                           |
| <b>3 Short Circuit Check—Solenoid Circuits</b> | <p>Ignition OFF.</p> <p>Disconnect transmission harness-to-transmission control valve harness connector (X36). See <a href="#">Transmission Harness (W10) Component Location</a>. (Group 9015-10.)</p> <p>Check for resistance between pin 4 (circuit T06 BLU) on transmission control valve harness side of connector (X36) and all other pins on connector (X36).</p> <p>Is resistance with any wire less than 5 ohms?</p>                  | <p><b>YES:</b> Circuit T06 BLU is short to wire with resistance less than 5 ohms. Replace transmission control valve harness.</p> <p><b>NO:</b> <a href="#">Go to Short Circuit Check—Short to Ground</a>.</p> <p style="text-align: right;">AA95137,00019A5 -19-07SEP08-5/7</p>                                                                                   |
| <b>4 Short Circuit Check—Short to Ground</b>   | <p>Ignition OFF.</p> <p>Disconnect transmission harness-to-transmission control valve harness connector (X36). See <a href="#">Transmission Harness (W10) Component Location</a>. (Group 9015-10.)</p> <p>Check circuit T06 BLU for ground at pin 4 on transmission harness side of connector (X36).</p> <p>Is ground present?</p>                                                                                                            | <p><b>YES:</b> Circuit T06 BLU is short to ground. Repair circuit or replace harness. See <a href="#">Load Center Harness (W3) Wiring Diagram</a> and see <a href="#">Transmission Harness (W10) Wiring Diagram</a>. (Group 9015-10.)</p> <p><b>NO:</b> <a href="#">Go to Harness Check</a>.</p> <p style="text-align: right;">AA95137,00019A5 -19-07SEP08-6/7</p> |

Continued on next page

## 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.

AA95137,00019AC -19-24SEP18-3/7

### 2 Component Check

Ignition OFF.

Disconnect transmission harness-to-transmission control valve harness connector (X36). See Transmission Harness (W10) Component Location. (Group 9015-10.)

Check resistance between pins 3 and 7 on transmission control valve harness side of connector (X36). See Transmission Control Valve Solenoid Check. (Group 9015-20.)

Is resistance within specification?

**YES:** Go to Short Circuit Check—Solenoid Circuits.  
**NO:** Transmission control solenoid 3 (Y3) malfunction. Replace solenoid. See Transmission Hydraulic Control Valve Disassemble and Assemble. (Group 0360.)

AA95137,00019AC -19-24SEP18-4/7

### 3 Short Circuit Check—Solenoid Circuits

Ignition OFF.

Disconnect transmission harness-to-transmission control valve harness connector (X36). See Transmission Harness (W10) Component Location. (Group 9015-10.)

Check for resistance between pin 3 (circuit T05 BLU) on transmission control valve harness side of connector (X36) and all other pins on connector (X36).

Is resistance with any wire less than 5 ohms?

**YES:** Circuit T05 BLU is short to wire with resistance less than 5 ohms. Replace transmission control valve harness.  
**NO:** Go to Short Circuit Check—Short to Power.

Continued on next page

AA95137,00019AC -19-24SEP18-5/7

**2 Open Circuit Check**

Ignition OFF.

Disconnect internal clutch speed sensor (B30) connector. [See Transmission Harness \(W10\) Component Location.](#) (Group 9015-10.)Disconnect transmission control unit (TCU) connector (X23). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit M09 PUR for continuity between pin A on internal clutch speed sensor (B30) connector and pin 42 on TCU connector (X23).

Check circuit R09 BLK for continuity between pin B on internal clutch speed sensor (B30) connector and pin 3 on TCU connector (X23).

Is continuity indicated in both circuits?

**YES:** Go to Short Circuit Check.**NO:** Repair circuit(s) without continuity indicated or replace harness. [See Load Center Harness \(W3\) Wiring Diagram](#) and [see Transmission Harness \(W10\) Wiring Diagram.](#) (Group 9015-10.)

ML82895,0000807 -19-03JUN14-4/5

**3 Short Circuit Check**

Ignition OFF.

Disconnect internal clutch speed sensor (B30) connector. [See Transmission Harness \(W10\) Component Location.](#) (Group 9015-10.)

Check circuit M09 PUR for voltage between pin A on internal clutch speed sensor (B30) connector and machine ground.

Is system voltage (approximately 24 volts) present?

**YES:** Circuit M09 PUR is short to power. Repair circuit or replace harness. [See Load Center Harness \(W3\) Wiring Diagram](#) and [see Transmission Harness \(W10\) Wiring Diagram.](#) (Group 9015-10.)**NO:** Replace transmission control unit (TCU).

ML82895,0000807 -19-03JUN14-5/5

**522402.04 — Clutch Speed Sensor Short to Ground***Clutch internal speed sensor circuit is short to ground.*

AA95137,00019B5 -19-09JUL08-1/6

**Clutch Speed Sensor Short to Ground Diagnostic Procedure****Alarm Level:**

No Warning Lamp

AA95137,00019B5 -19-09JUL08-2/6

**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

AA95137,00019B5 -19-09JUL08-3/6

**Transmission Oil Temperature Sensor Open or Short Diagnostic Procedure****Alarm Level:**

No Warning Lamp

AA95137,00019BD -19-24SEP18-2/8

**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.

AA95137,00019BD -19-24SEP18-3/8

**2 Component Check**

Ignition OFF.

Disconnect transmission harness-to-transmission control valve harness connector (X36). See Transmission Harness (W10) Component Location. (Group 9015-10.)

Measure resistance between pins 8 and 9 on transmission control valve harness side of connector (X36).

Compare resistance to specification. See Electrical Component Specifications. (Group 9015-10.)

Is resistance within specification?

**YES:** Go to Open Circuit Check.

**NO:** Go to Circuit Check—Control Valve Harness.

AA95137,00019BD -19-24SEP18-4/8

**3 Circuit Check—Control Valve Harness**

Battery disconnect OFF.

Disassemble transmission control valve. See Transmission Hydraulic Control Valve Disassemble and Assemble. (Group 0360.)

Disconnect transmission oil temperature sensor (B32) connector.

Measure resistance across sensor pins.

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

Is resistance within specification?

**YES:** Open or short circuit in transmission control valve harness. Repair circuit or replace harness.

**NO:** Transmission oil temperature sensor (B32) malfunction. Replace sensor.

Continued on next page

AA95137,00019BD -19-24SEP18-5/8

**3 Short Circuit Check—Short to Power**

Ignition OFF.

Disconnect joystick (steering) FNR switch connector (X28).

Ignition ON, engine OFF.

Check circuit T16 BLU for voltage at pin 5 on joystick steering harness side of connector (X28).

Check circuit T22 BLU for voltage at pin 3 on joystick steering harness side of connector (X28).

Check circuit T23 BLU for voltage at pin 4 on joystick steering harness side of connector (X28).

Check circuit T24 BLU for voltage at pin 2 on joystick steering harness side of connector (X28).

Is system voltage (approximately 24 volts) present?

**YES:** Circuit with system voltage present is short to power. Repair circuit or replace harness.

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

**NO:** Go to Short Circuit Check—FNR Circuits.

AA95137,0001B06 -19-25SEP18-10/11

**4 Short Circuit Check—FNR Circuits**

Ignition OFF.

Disconnect joystick (steering) FNR switch connector (X28).

Disconnect transmission control unit (TCU) connector (X23). See Load Center Harness (W3) Component Location. (Group 9015-10.)

Check for continuity between pin 5 (T16 BLU) and pins 2, 3, and 4 on joystick harness side of connector (X28).

Check for continuity between pin 3 (T22 BLU) and pins 2, 4, and 5 on joystick harness side of connector (X28).

Check for continuity between pin 4 (T23 BLU) and pins 2, 3, and 5 on joystick harness side of connector (X28).

Check for continuity between pin 2 (T24 BLU) and pins 3, 4, and 5 on joystick harness side of connector (X28).

Is continuity indicated between any pins?

**YES:** Circuits with continuity indicated are short. Repair circuits or replace harness.

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

**NO:** Replace controller. See Transmission Control Unit (TCU) Remove and Install. (Group 9015-20.)

AA95137,0001B06 -19-25SEP18-11/11

**522411.05 — 1st FNR Open Circuit**

*steering column FNR this trouble code is caused by the pilot control joystick FNR.*

*Primary forward, neutral, reverse (FNR) switch circuit is open.*

**NOTE:** Diagnostic trouble code is caused by the steering column FNR. If machine is not equipped with

Continued on next page

AA95137,00019C3 -19-09JUL08-1/11

**Transmission Input Torque Exceeded Diagnostic Procedure****Alarm Level:**

No Warning Lamp

AA95137,00019CA -19-24SEP18-2/4

**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 Code Check.

AA95137,00019CA -19-24SEP18-3/4

**2 Code Check**

Ignition ON, engine OFF.

Check for active engine control unit (ECU) codes.

Are any ECU codes present?

**YES:** Correct problem causing ECU code(s).  
**NO:** Replace transmission control unit (TCU). See Transmission Control Unit (TCU) Remove and Install. (Group 9015-20.)

AA95137,00019CA -19-24SEP18-4/4

**524287.00 — Configure Machine Model***Machine is not configured for the correct model.*

AA95137,00019CB -19-24SEP18-1/4

**Configure Machine Model Diagnostic Procedure****Alarm Level:**

No Warning Lamp

AA95137,00019CB -19-24SEP18-2/4

**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 Ignition ON/OFF Check.

Continued on next page

AA95137,00019CB -19-24SEP18-3/4

## Flex Load Controller (FLC) Diagnostic Trouble Codes

### 2 Brake Pedal Voltage Check

Ignition ON, engine OFF.

Check voltage from the clutch cut-off sensor by accessing the Diagnostics / Transmission/Axle submenu on the advanced display unit (ADU). See Display Unit—Main Menu—Diagnostics—Transmission Sensors. (Operator's Manual.)

Is voltage 1.2 volts or higher?

**YES:** Replace brake pedal. See Service Brake Pedal and Linkage Disassemble and Assemble. (Group 1011.)

**NO:** Go to Program Controller.

AA95137,00019D6 -19-24SEP18-4/5

### 3 Program Controller

Program flex load controller (FLC).

Check for active FLC codes.

Is code 000521.00 present?

**YES:** Replace controller. See Flex Load Controller (FLC) Remove and Install. (Group 9015-20.)

**NO:** Checks complete.

AA95137,00019D6 -19-24SEP18-5/5

## 000628.12 — Controller Not Programmed

*Flex load controller (FLC) is not programmed.*

AA95137,00019D7 -19-09JUL08-1/4

### Controller Not Programmed Diagnostic Procedure

**Alarm Level:**

No Warning Lamp

AA95137,00019D7 -19-09JUL08-2/4

### 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 Program Controller.

AA95137,00019D7 -19-09JUL08-3/4

### 2 Program Controller

Program flex load controller (FLC).

Check for active FLC codes.

Is code 000628.12 present?

**YES:** Replace controller. See Flex Load Controller (FLC) Remove and Install. (Group 9015-20.)

**NO:** Checks complete.

AA95137,00019D7 -19-09JUL08-4/4

## 000629.12 — FLC Watchdog Time Out

*Flex load controller (FLC) watchdog has timed out.*

Continued on next page

AA95137,00019D8 -19-09JUL08-1/4

### 3 Short Circuit Check

Ignition OFF.

Disconnect brake light assembly (E16 or 17). [See Rear Frame Harness \(W13\) Component Location.](#) (Group 9015-10.)

Disconnect flex load controller (FLC) connector (X40). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit L04 BRN for ground at pin F3 on FLC connector (X40).

Is ground present?

**YES:** Circuit L04 BRN is short to ground. Repair circuit or replace harness. [See Load Center Harness \(W3\) Wiring Diagram](#), [see Engine Frame Harness \(W5\) Wiring Diagram](#), and [see Rear Frame Harness \(W13\) Wiring Diagram.](#) (Group 9015-10.)

**NO:** [Go to Harness Check.](#)

AA95137,00019E0 -19-09JUL08-5/7

### 4 Harness Check

Turn battery disconnect OFF.

Disconnect left brake light (E16) and right brake light (E17) assemblies. [See Rear Frame Harness \(W13\) Component Location.](#) (Group 9015-10.)

Disconnect flex load controller (FLC) connectors (X40, X41, and X42). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check for continuity between pin F3 (circuit L04 BRN) on FLC connector (X40) and all other pins on connectors (X40, X41, and X42).

Is continuity indicated?

**YES:** Circuit L04 BRN is short to circuit with continuity indicated. Repair circuit or replace harness. [See Load Center Harness \(W3\) Wiring Diagram](#), [see Engine Frame Harness \(W5\) Wiring Diagram](#), and [see Rear Frame Harness \(W13\) Wiring Diagram.](#) (Group 9015-10.)

**NO:** [Go to Program Controller.](#)

AA95137,00019E0 -19-09JUL08-6/7

### 5 Program Controller

Program flex load controller (FLC).

Check for active FLC codes.

Is code 000880.06 present?

**YES:** Replace controller. [See Flex Load Controller \(FLC\) Remove and Install.](#) (Group 9015-20.)

**NO:** Checks complete.

AA95137,00019E0 -19-09JUL08-7/7

## 000977.05 — Reverse Fan Solenoid Open or Short

*Reverse fan solenoid circuit is open or short to power.*

Continued on next page

AA95137,00019E1 -19-24SEP18-1/8

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                               |
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| <p><b>5 Open Circuit Check</b></p> | <p>Ignition OFF.</p> <p>Disconnect VEC connector (X17) and flex load controller (FLC) connectors (X40 and X42). <u>See Load Center Harness (W3) Component Location.</u> (Group 9015-10.)</p> <p>Disconnect joystick steering arm position switches connector (X59).</p> <p>Check circuit P29 RED for continuity between pin H on VEC connector (X17) and pins 1 and 4 on joystick steering harness side of connector (X59).</p> <p>Check circuit H10 GRN for continuity between pin 2 on joystick steering harness side of connector (X59) and pin F2 on FLC connector (X42).</p> <p>Check circuit H11 GRN for continuity between pin 3 on joystick steering harness side of connector (X59) and pin D4 on FLC connector (X40).</p> <p>Is continuity indicated for all circuits?</p> | <p><b>YES:</b> <u>Go to Harness Check.</u></p> <p><b>NO:</b> Circuit without continuity indicated is open. Repair circuit or replace harness.</p> <p><u>See Load Center Harness (W3) Wiring Diagram.</u> (Group 9015-10.)</p> |
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AA95137,0001AF9 -19-24JUL08-7/11

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| <p><b>6 Short to Power Check</b></p> | <p>Ignition OFF.</p> <p>Disconnect joystick steering arm position switches connector (X59).</p> <p>Check circuit H10 GRN for voltage at pin 2 on joystick steering harness side of connector (X59).</p> <p>Check circuit H11 GRN for voltage at pin 3 on joystick steering harness side of connector (X59).</p> <p>Ignition ON, engine OFF.</p> <p>Is voltage more than 5 volts for either circuit?</p> | <p><b>YES:</b> Circuit with voltage higher than 5 volts is short to power. Repair circuit or replace harness.</p> <p><u>See Load Center Harness (W3) Wiring Diagram.</u> (Group 9015-10.)</p> <p><b>NO:</b> <u>Go to Short to Ground Check—Signal Circuits.</u></p> |
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AA95137,0001AF9 -19-24JUL08-8/11

|                                                       |                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                 |
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| <p><b>7 Short to Ground Check—Signal Circuits</b></p> | <p>Ignition OFF.</p> <p>Disconnect joystick steering arm position switches connector (X59).</p> <p>Check circuit H10 GRN for ground at pin 2 on joystick steering harness side of connector (X59).</p> <p>Check circuit H11 GRN for ground at pin 3 on joystick steering harness side of connector (X59).</p> <p>Is ground present on either circuit?</p> | <p><b>YES:</b> Circuit with ground present is short to ground. Repair circuit or replace harness.</p> <p><u>See Load Center Harness (W3) Wiring Diagram.</u> (Group 9015-10.)</p> <p><b>NO:</b> <u>Go to Harness Check.</u></p> |
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AA95137,0001AF9 -19-24JUL08-9/11

## Flex Load Controller (FLC) Diagnostic Trouble Codes

### 2 Controller Sensors Check

View engine control unit (ECU) monitored sensor outputs, by accessing the Diagnostics / Engine Sensors submenu on the advanced display unit (ADU). See Display Unit—Main Menu—Diagnostics—Engine Sensors. (Operators Manual.)

Are all engine sensor values displayed on the ADU?

**YES:** Go to Program Flex Load Controller.

**NO:** Go to Fuse Check.

AA95137,00019EF -19-24SEP18-4/10

### 3 Fuse Check

Ignition OFF.

Remove fuses (F3 and F10). See Fuse and Relay Specifications. (Group 9015-10.)

Check fuses (F3 and F10) for continuity.

Is continuity indicated in both fuses?

**YES:** Go to Voltage Check.

**NO:** Replace fuse(s) without continuity indicated.

AA95137,00019EF -19-24SEP18-5/10

### 4 Voltage Check

Ignition OFF.

Disconnect engine control unit (ECU) connector (X72). See Load Center Harness (W3) Component Location. (Group 9015-10.)

Ignition ON, engine OFF.

Check for voltage at the following pins on ECU connector (X72):

- B2—circuit P10 RED
- L1—circuit P03 RED
- L4—circuit P03 RED
- M1—circuit P03 RED
- M4—circuit P03 RED

Is voltage present at all pins?

**YES:** Go to Ground Circuit Check.

**NO:** Circuit(s) without voltage is open. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram. (Group 9015-10.)

AA95137,00019EF -19-24SEP18-6/10

### 5 Ground Circuit Check

Ignition OFF.

Disconnect engine control unit (ECU) connector (X72). See Load Center Harness (W3) Component Location. (Group 9015-10.)

Check for ground at the following pins on ECU connector (X72):

- L2—circuit G11 BLK
- L3—circuit G11 BLK
- M2—circuit G11 BLK

Is ground present at all pins?

**YES:** Go to CAN Circuit Check.

**NO:** Circuit G11 BLK is open. Repair circuit or replace harness. See Load Center Harness (W3) Wiring Diagram. (Group 9015-10.)

AA95137,00019EF -19-24SEP18-7/10

Continued on next page

**002141.09 — CAN Communication Lost for SSM**

*CAN communication error; the flex load controller (FLC) has lost communication with the sealed switch module (SSM).*

AA95137,00019F6 -19-24SEP18-1/10

**CAN Communication Lost For SSM Diagnostic Procedure****Alarm Level:**

No Warning Lamp

AA95137,00019F6 -19-24SEP18-2/10

**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.](#)

AA95137,00019F6 -19-24SEP18-3/10

**2 Component Check**

Perform sealed switch module (SSM) test by accessing the DIAGNOSTICS / SWITCH MODULE submenu on the advanced display unit (ADU). [See Display Unit—Main Menu—Diagnostics—Switch Module.](#) (Operators Manual.)

Does SSM test good?

**YES:** [Go to Program Flex Load Controller.](#)

**NO:** [Go to Fuse Check.](#)

AA95137,00019F6 -19-24SEP18-4/10

**3 Fuse Check**

Ignition OFF.

Remove fuse (F2). [See Fuse and Relay Specifications.](#) (Group 9015-10.)

Check fuse (F2) for continuity.

Is continuity indicated?

**YES:** [Go to Voltage Check.](#)

**NO:** Replace fuse (F2).

AA95137,00019F6 -19-24SEP18-5/10

**4 Voltage Check**

Ignition OFF.

Disconnect sealed switch module (SSM) connector (X53). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Ignition ON, engine OFF.

Check circuit P02 RED for voltage between pin 1 on SSM connector (X53) and machine ground.

Is voltage present?

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

**NO:** Circuit P02 RED is open. Repair circuit or replace harness. [See Load Center Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

Continued on next page

AA95137,00019F6 -19-24SEP18-6/10

## Flex Load Controller (FLC) Diagnostic Trouble Codes

### 5 Harness Check

Turn battery disconnect OFF.

Disconnect left front work light (E20) and right front work light (E21). [See Cab Roof Harness \(W19\) Component Location](#). (Group 9015-10.)

Disconnect flex load controller (FLC) connectors (X40, X41, and X42). [See Load Center Harness \(W3\) Component Location](#). (Group 9015-10.)

Check for continuity between pin H4 (circuit L02 BRN) on FLC connector (X42) and all other pins on connectors (X40, X41, and X42).

Is continuity indicated?

**YES:** Circuit L02 BRN is short to circuit with continuity indicated. Repair circuit or replace harness. [See Load Center Harness \(W3\) Wiring Diagram](#), and [see Cab Roof Harness \(W19\) Wiring Diagram](#). (Group 9015-10.)

**NO:** [Go to Program Controller](#).

AA95137,00019FC -19-24SEP18-7/8

### 6 Program Controller

Program flex load controller (FLC).

Check for active FLC codes.

Is code 002356.05 present?

**YES:** Replace controller. [See Flex Load Controller \(FLC\) Remove and Install](#). (Group 9015-20.)

**NO:** Checks complete.

AA95137,00019FC -19-24SEP18-8/8

## 002356.06 — Front Work Lights High Current

*Front work light circuit is short to ground.*

AA95137,00019FD -19-09JUL08-1/7

### Front Work Lights High Current Diagnostic Procedure

**Alarm Level:**

No Warning Lamp

AA95137,00019FD -19-09JUL08-2/7

### 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

AA95137,00019FD -19-09JUL08-3/7

## Flex Load Controller (FLC) Diagnostic Trouble Codes

### 2 Component Check

Ignition OFF.

Disconnect turn switch (S25) connector. [See Front Console Harness \(W4\) Component Location](#). (Group 9015-10.)

Put turn switch (S25) into RIGHT turn position.

Check for continuity between pins D and F on turn switch (S25).

Is continuity indicated?

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

**NO:** Turn switch (S25) malfunction. Replace switch.

AA95137,0001A05 -19-09JUL08-4/7

### 3 Short Circuit Check

Ignition OFF.

Disconnect turn switch (S25) connector. [See Front Console Harness \(W4\) Component Location](#). (Group 9015-10.)

Check circuit L10 BRN for ground at pin D on turn switch (S25) connector.

Is ground present?

**YES:** Circuit L10 BRN is short to ground. Repair circuit or replace harness. [See Load Center Harness \(W3\) Wiring Diagram](#), and [see Front Console Harness \(W4\) Wiring Diagram](#). (Group 9015-10.)

**NO:** [Go to Harness Check](#).

AA95137,0001A05 -19-09JUL08-5/7

### 4 Harness Check

Turn battery disconnect OFF.

Disconnect turn switch (S25) connector. [See Front Console Harness \(W4\) Component Location](#). (Group 9015-10.)

Disconnect flex load controller (FLC) connectors (X40, X41, and X42). [See Load Center Harness \(W3\) Component Location](#). (Group 9015-10.)

Check for continuity between pin H1 (circuit L10 BRN) on FLC connector (X41) and all other pins on connectors (X40, X41, and X42).

Is continuity indicated?

**YES:** Circuit L10 BRN is short to circuit with continuity indicated. Repair circuit or replace harness. [See Load Center Harness \(W3\) Wiring Diagram](#), and [see Front Console Harness \(W4\) Wiring Diagram](#). (Group 9015-10.)

**NO:** [Go to Program Controller](#).

AA95137,0001A05 -19-09JUL08-6/7

### 5 Program Controller

Program flex load controller (FLC).

Check for active FLC codes.

Is code 002369.04 present?

**YES:** Replace controller. [See Flex Load Controller \(FLC\) Remove and Install](#). (Group 9015-20.)

**NO:** Checks complete.

AA95137,0001A05 -19-09JUL08-7/7

## Flex Load Controller (FLC) Diagnostic Trouble Codes

### 5 Program Controller

Program flex load controller (FLC).

Check for active FLC codes.

Is code 002680.05 present?

**YES:** Replace controller.  
[See Flex Load Controller \(FLC\) Remove and Install.](#)  
(Group 9015-20.)

**NO:** Checks complete.

AA95137,0001A0C -19-09JUL08-7/7

## 002697.02 — Timeout JSC Message

*Invalid update rate on controller area network (CAN) message from joystick steering controller (JSC).*

AA95137,0001AF8 -19-24JUL08-1/7

## Timeout JSC Message Diagnostic Procedure

AA95137,0001AF8 -19-24JUL08-2/7

### 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.](#)

AA95137,0001AF8 -19-24JUL08-3/7

### 2 Voltage Check

Ignition OFF.

Disconnect joystick steering controller (JSC) connector (X60).

Ignition ON, engine OFF.

Check circuit P29 RED for voltage at pin 2 on JSC connector (X60).

Is system voltage (approximately 24 volts) present?

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

**NO:** Circuit P29 RED is open. Repair circuit or replace harness.

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

AA95137,0001AF8 -19-24JUL08-4/7

### 3 Ground Circuit Check

Ignition OFF.

Disconnect joystick steering controller (JSC) connector (X60).

Check circuit G01 BLK for ground at pin 1 on JSC connector (X60).

Is ground present?

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

**NO:** Circuit G01 BLK is open. Repair circuit or replace harness.

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

AA95137,0001AF8 -19-24JUL08-5/7

Continued on next page

## Flex Load Controller (FLC) Diagnostic Trouble Codes

### 2 Voltage Check

Ignition OFF.

Disconnect service brake pressure sensor (B27). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Ignition ON, engine OFF.

Check circuit P69 RED for voltage between pin A on service brake pressure sensor (B27) connector and machine ground.

Is voltage less than 4 volts?

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

**NO:** [Go to Program Controller.](#)

AA95137,0001A14 -19-24SEP18-4/7

### 3 Open Circuit Check

Ignition OFF.

Disconnect service brake pressure sensor (B27). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Disconnect flex load controller (FLC) connector (X41) and connector (X42). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit P69 RED for continuity between pin A on service brake pressure sensor (B27) connector and pin F3 on FLC connector (X42).

Check circuit R69 BLK for continuity between pin C on service brake pressure sensor (B27) connector and pin M3 on FLC connector (X41).

Is continuity indicated in both circuits?

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

**NO:** Repair circuit(s) without continuity indicated or replace harness. [See Load Center Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

AA95137,0001A14 -19-24SEP18-5/7

### 4 Short Circuit Check

Ignition OFF.

Disconnect service brake pressure sensor (B27) and flex load controller (FLC) connector (X42). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit P69 RED for ground at pin A on service brake pressure sensor (B27) connector.

Is ground present?

**YES:** Circuit P69 RED is short to ground. Repair circuit or replace harness. [See Load Center Harness \(W3\) Wiring Diagram.](#) (Group 9015-10.)

**NO:** [Go to Program Controller.](#)

AA95137,0001A14 -19-24SEP18-6/7

### 5 Program Controller

Program flex load controller (FLC).

Check for active FLC codes.

Is code 003510.04 present?

**YES:** Replace controller. [See Flex Load Controller \(FLC\) Remove and Install.](#) (Group 9015-20.)

**NO:** Checks complete.

AA95137,0001A14 -19-24SEP18-7/7

## Flex Load Controller (FLC) Diagnostic Trouble Codes

### 3 Short Circuit Check

Ignition OFF.

Disconnect rear wiper motor (M5) 4-pin connector. [See Cab Roof Harness \(W19\) Component Location.](#) (Group 9015-10.)

Disconnect flex load controller (FLC) connector (X42). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit A11 ORG for ground at pin A on rear wiper motor (M5) 4-pin connector.

Is ground present?

**YES:** Circuit A11 ORG is short to ground. Repair circuit or replace harness. [See Load Center Harness \(W3\) Wiring Diagram,](#) and [see Cab Roof Harness \(W19\) Wiring Diagram.](#) (Group 9015-10.)

**NO:** [Go to Harness Check.](#)

AA95137,0001A1E -19-09JUL08-5/7

### 4 Harness Check

Turn battery disconnect OFF.

Disconnect rear wiper motor (M5) connectors. [See Cab Roof Harness \(W19\) Component Location.](#) (Group 9015-10.)

Disconnect flex load controller (FLC) connectors (X40, X41, and X42). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check for continuity between pin C1 (circuit A11 ORG) on FLC connector (X42) and all other pins on connectors (X40, X41, and X42).

Is continuity indicated?

**YES:** Circuit A11 ORG is short to circuit with continuity indicated. Repair circuit or replace harness. [See Load Center Harness \(W3\) Wiring Diagram](#) and [see Cab Roof Harness \(W19\) Wiring Diagram.](#) (Group 9015-10.)

**NO:** [Go to Program Controller.](#)

AA95137,0001A1E -19-09JUL08-6/7

### 5 Program Controller

Program flex load controller (FLC).

Check for active FLC codes.

Is code 522432.06 present?

**YES:** Replace controller. [See Flex Load Controller \(FLC\) Remove and Install.](#) (Group 9015-20.)

**NO:** Checks complete.

AA95137,0001A1E -19-09JUL08-7/7

## 522433.05 — Rear Wiper Low Speed Open or Short

*Rear wiper low speed circuit is open or short to power.*

AA95137,0001A1F -19-24SEP18-1/8

### Rear Wiper Low Speed Open or Short Diagnostic Procedure

**Alarm Level:**

No Warning Lamp

Continued on next page

AA95137,0001A1F -19-24SEP18-2/8

## Flex Load Controller (FLC) Diagnostic Trouble Codes

### 5 Harness Check

Turn battery disconnect OFF.

Disconnect analog return to dig (RTD) position sensor (B37). [See Loader Frame Harness \(W2\) Component Location](#). (Group 9015-10.)

Disconnect flex load controller (FLC) connectors (X40, X41, and X42). [See Load Center Harness \(W3\) Component Location](#). (Group 9015-10.)

Check for continuity between pin A3 (circuit H05 GRN) on FLC connector (X42) and all other pins on FLC connectors (X40, X41, and X42).

Is continuity indicated with any pin?

**YES:** Circuit H05 GRN is short to circuit with continuity indicated. Repair circuit or replace harness.

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

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

**NO:** [Go to Program Controller](#).

AA95137,0001A26 -19-09JUL08-7/8

### 6 Program Controller

Program flex load controller (FLC).

Check for active codes.

Is FLC code 522436.04 present?

**YES:** Replace controller. [See Flex Load Controller \(FLC\) Remove and Install](#). (Group 9015-10.)

**NO:** Checks complete.

AA95137,0001A26 -19-09JUL08-8/8

## 522437.04 — Return-to-Dig Switch Short to Ground

*Return-to-dig proximity switch is short to ground.*

AA95137,0001A27 -19-09JUL08-1/6

### Return-to-Dig Switch Short to Ground Diagnostic Procedure

**Alarm Level:**

No Warning Lamp

AA95137,0001A27 -19-09JUL08-2/6

### 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

AA95137,0001A27 -19-09JUL08-3/6

## Flex Load Controller (FLC) Diagnostic Trouble Codes

### 4 Harness Check

Turn battery disconnect OFF.

Disconnect head end boom cylinder pressure sensor. [See Loader Frame Harness \(W2\) Component Location](#). (Group 9015-10.)

Disconnect flex load controller (FLC) connectors (X40, X41, and X42). [See Load Center Harness \(W3\) Component Location](#). (Group 9015-10.)

Check for continuity between pin D1 (circuit N87 YEL) on FLC connector (X40) and all other pins on FLC connectors (X40, X41, and X42).

Is continuity indicated to any pin?

**YES:** Circuit N87 YEL is short to circuit with continuity indicated. Repair circuit or replace harness.

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

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

**NO:** Replace head end boom cylinder pressure sensor.

ML82895,0000825 -19-15FEB16-6/7

### 5 Program Controller

Program flex load controller (FLC).

Check for active codes.

Is FLC code 522544.04 present?

**YES:** Replace FLC. [See Flex Load Controller \(FLC\) Remove and Install](#). (Group 9015-20.)

**NO:** Checks complete.

ML82895,0000825 -19-15FEB16-7/7

## 522796.05 — Rear Washer Pump Open or Short

*Rear washer pump circuit is open or short to power.*

AA95137,0001A2F -19-24SEP18-1/8

### Rear Washer Pump Open or Short Diagnostic Procedure

**Alarm Level:**

No Warning Lamp

AA95137,0001A2F -19-24SEP18-2/8

### 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

AA95137,0001A2F -19-24SEP18-3/8

## Flex Load Controller (FLC) Diagnostic Trouble Codes

### 2 Voltage Check

Ignition OFF.

Disconnect FLC connector (X41). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit P21 RED for voltage at pins L1 and M1 on FLC connector (X41).

Is system voltage (approximately 24 volts) present?

**YES:** [Go to Program Controller.](#)

**NO:** [Go to Fuse Check.](#)

AA95137,0001A36 -19-09JUL08-4/8

### 3 Fuse Check

Ignition OFF.

Remove fuse (F21). [See Fuse and Relay Specifications.](#) (Group 9015-10.)

Check fuse (F21) for continuity.

Is continuity indicated?

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

**NO:** Fuse (F21) is blown.  
Replace fuse.

AA95137,0001A36 -19-09JUL08-5/8

### 4 Open Circuit Check

Ignition OFF.

Disconnect flex load controller (FLC) connector (X41) and vehicle electrical center (VEC) connector (X10) [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit P21 RED for continuity between pins L1 and M1 on FLC connector (X41) and pin H on VEC connector (X10).

Is continuity indicated?

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

**NO:** Circuit P21 RED is open. Repair circuit or replace harness.

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

AA95137,0001A36 -19-09JUL08-6/8

### 5 Short Circuit Check

Ignition OFF.

Remove fuse (F21). [See Fuse and Relay Specifications.](#) (Group 9015-10.)

Disconnect flex load controller (FLC) connector (X41). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit P21 RED for ground at pins L1 and M1 on FLC connector (X41).

Is ground present?

**YES:** Circuit P21 RED is short to ground. Repair circuit or replace harness.

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

**NO:** [Go to Program Controller.](#)

Continued on next page

AA95137,0001A36 -19-09JUL08-7/8

## Flex Load Controller (FLC) Diagnostic Trouble Codes

|                              |                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                               |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>4 Short Circuit Check</b> | Ignition OFF.<br><br>Disconnect joystick steering valve (JSV) connector (X61). <u>See Load Center Harness (W3) Component Location.</u> (Group 9015-10.)<br>Ignition ON, engine OFF.<br>Check for voltage at pin 3 (wire P66 RED). <u>See Load Center Harness (W3) Wiring Diagram.</u> (Group 9015-10.)<br>Is voltage present?                                  | <b>YES:</b> Go to next step in this check.<br><b>NO:</b> Repair or replace harness.                                                           |
|                              | Ignition OFF.<br><br>Disconnect joystick steering valve (JSV) connector (X61). <u>See Load Center Harness (W3) Component Location.</u> (Group 9015-10.)<br>Check for continuity between pin 3 (wire P66 RED) and all other pins on (JSV) connector (X61). <u>See Load Center Harness (W3) Wiring Diagram.</u> (Group 9015-10.)<br><br>Is continuity indicated? | <b>YES:</b> Short circuit on wire where continuity is indicated. Repair or replace harness.<br><b>NO:</b> Program flex load controller (FLC). |

AA95137,0001A3E -19-24SEP18-6/6

### 523795.06 — JSV Power High Current

*Joystick steering valve (JSV) power supply circuit is short to ground.*

AA95137,0001A3F -19-09JUL08-1/7

### JSV Power High Current Diagnostic Procedure

AA95137,0001A3F -19-09JUL08-2/7

|                             |                                                           |                                                                                                                                                             |
|-----------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1 Intermittent Check</b> | Does DTC periodically “go away”?                          | <b>YES:</b> DTC is intermittent. <u>See Intermittent Diagnostic Trouble Code (DTC) Diagnostics.</u> (Group 9015-20.)<br><b>NO:</b> <u>Go to Code Check.</u> |
| <b>2 Code Check</b>         | Check for active codes.<br><br>Are any JSV codes present? | <b>YES:</b> Correct problem causing JSV codes.<br><br><b>NO:</b> <u>Go to Short Circuit Check.</u>                                                          |

Continued on next page

AA95137,0001A3F -19-09JUL08-4/7

## Add Bucket Switch Short to Ground Diagnostic Procedure

AA95137,0001A48 -19-24SEP18-2/7

**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.](#)

AA95137,0001A48 -19-24SEP18-3/7

**2 Component Check**

Ignition ON, engine OFF.

Check operation of counter switch (S18) by accessing the DIAGNOSTICS / COUNTER SWITCH submenu on the advanced display unit (ADU). [See Display Unit—Main Menu—Diagnostics—Cab Switches.](#) (Operators Manual.)

Push "add bucket button" on the counter switch (S18). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Does a red dot appear over the "add bucket button" on the ADU?

**YES:** [Go to Program Controller.](#)

**NO:** [Go to Short Circuit Check.](#)

AA95137,0001A48 -19-24SEP18-4/7

**3 Short Circuit Check**

Ignition OFF.

Disconnect counter switch (S18). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check circuit A85 ORG for ground at pin 3 on remote counter switch connector.

Is ground present?

**YES:** circuit A87 ORG is short to ground. Repair circuit or replace harness.

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

**NO:** [Go to Harness Check.](#)

AA95137,0001A48 -19-24SEP18-5/7

**4 Harness Check**

Turn battery disconnect OFF.

Disconnect flex load controller (FLC) connectors (X41, X42, and X43) and remote counter switch (S18). [See Load Center Harness \(W3\) Component Location.](#) (Group 9015-10.)

Check for continuity between pin K2 (circuit A85 ORG) on connector (X41) and all other pins on FLC connectors (X41, X42, and X43).

Is continuity indicated between pin K2 and any pins?

**YES:** Circuit A85 ORG is short to circuit with continuity indicated. Repair circuit or replace harness.

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

**NO:** [Go to Program Controller.](#)

Continued on next page

AA95137,0001A48 -19-24SEP18-6/7

## Sealed Switch Module (SSM) Diagnostic Trouble Codes

|                                       |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                   |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1 Intermittent Check</b>           | Does DTC periodically “go away”?                                                                                                                                                                                                                                                                                                   | <b>YES:</b> DTC is intermittent. <u>See Intermittent Diagnostic Trouble Code (DTC) Diagnostics.</u> (Group 9015-20.)<br><b>NO:</b> <u>Go to Reset Controller.</u> |
| AA95137,0001A57 -19-24SEP18-3/9       |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                   |
| <b>2 Reset Controller</b>             | <p><i>NOTE: The sealed switch module (SSM) will not store diagnostic trouble codes; when ignition is cycled, the SSM will reset and all codes will be lost.</i></p> <p>Document all diagnostic codes.<br/>Ignition OFF.<br/>Wait 20 seconds.<br/>Ignition ON, engine OFF.</p> <p>Is SSM code 520752.09 present?</p>                | <b>YES:</b> <u>Go to CAN Circuit Check.</u><br><b>NO:</b> Checks complete.                                                                                        |
| AA95137,0001A57 -19-24SEP18-4/9       |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                   |
| <b>3 CAN Circuit Check</b>            | <p><u>Perform CAN Circuit Test.</u> (Group 9015-20.)</p> <p>Does CAN circuit test good?</p>                                                                                                                                                                                                                                        | <b>YES:</b> <u>Go to Controller Sensors Check.</u><br><b>NO:</b> Repair CAN circuit.                                                                              |
| AA95137,0001A57 -19-24SEP18-5/9       |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                   |
| <b>4 Controller Sensors Check</b>     | <p>Ignition ON, engine OFF.</p> <p>View flex load controller (FLC) monitored sensors by accessing the DIAGNOSTICS / HYDRAULIC SENSORS submenu on the advanced display unit (ADU). <u>See Display Unit—Main Menu—Diagnostics—Hydraulic Sensors.</u> (Operators Manual.)</p> <p>Does the monitor show a reading for all sensors?</p> | <b>YES:</b> <u>Go to Component Check.</u><br><b>NO:</b> <u>Go to Program Flex Load Controller.</u>                                                                |
| AA95137,0001A57 -19-24SEP18-6/9       |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                   |
| <b>5 Component Check</b>              | <p>Perform SSM test to verify keypad is malfunctioning. <u>See Display Unit—Main Menu—Diagnostics—Switch Module.</u> (Operator's Manual.)</p> <p>Does SSM test good?</p>                                                                                                                                                           | <b>YES:</b> <u>Go to Program Sealed Switch Module.</u><br><b>NO:</b> Replace SSM. <u>See Sealed Switch Module (SSM) Remove and Install.</u> (Group 9015-20.)      |
| AA95137,0001A57 -19-24SEP18-7/9       |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                   |
| <b>6 Program Flex Load Controller</b> | <p>Program flex load controller (FLC).</p> <p>Check for active codes.</p> <p>Is SSM code 520752.09 present?</p>                                                                                                                                                                                                                    | <b>YES:</b> Replace FLC. <u>See Flex Load Controller (FLC) Remove and Install.</u> (Group 9015-20.)<br><b>NO:</b> Checks complete.                                |
| Continued on next page                |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                   |
| AA95137,0001A57 -19-24SEP18-8/9       |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                   |

## Sealed Switch Module (SSM) Diagnostic Trouble Codes

### 7 Program Sealed Switch Module

Program sealed switch module (SSM).

Check for active codes.

Is SSM code 523336.09 present?

**YES:** Replace controller.  
See Sealed Switch Module (SSM) Remove and Install. (Group 9015-20.)

**NO:** Checks complete.

AA95137,0001A60 -19-24SEP18-9/9

## 523338.04 — Rear Washer Keypad Stuck

*Rear washer keypad on the sealed switch module (SSM) is stuck.*

AA95137,0001A61 -19-24SEP18-1/7

### Rear Washer Keypad Stuck Diagnostic Procedure

**Alarm Level:**

No Warning Lamp

AA95137,0001A61 -19-24SEP18-2/7

### 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 Reset Controller.

AA95137,0001A61 -19-24SEP18-3/7

### 2 Reset Controller

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

Document all diagnostic codes.

Ignition OFF.

Wait 20 seconds.

Ignition ON, engine OFF.

Is SSM code 523338.04 present?

**YES:** Go to Component Check.

**NO:** Checks complete.

AA95137,0001A61 -19-24SEP18-4/7

### 3 Component Check

Perform sealed switch module (SSM) test to verify keypad is malfunctioning. See Display Unit—Main Menu—Diagnostics—Switch Module. (Operator's Manual.)

Does SSM test good?

**YES:** Go to Program Controller.

**NO:** Go to CAN Circuit Check.

AA95137,0001A61 -19-24SEP18-5/7

### 4 CAN Circuit Check

Perform CAN Circuit Test. (Group 9015-20.)

Does CAN circuit test good?

**YES:** Go to Program Controller.

**NO:** Repair CAN circuit.

Continued on next page

AA95137,0001A61 -19-24SEP18-6/7

## Sealed Switch Module (SSM) Diagnostic Trouble Codes

### 5 Program Controller

Program sealed switch module (SSM).

Check for active codes.

Is SSM code 523852.04 present?

**YES:** Replace controller.

**NO:** Checks complete.

AA95137,0001A6A -19-23JUL08-7/7

## 523852.09 — Lost Spin Control LED Message

*Spin control LED signal missing from flex load controller (FLC).*

AA95137,0001A6B -19-24SEP18-1/9

### Lost Spin Control LED Message Diagnostic Procedure

**Alarm Level:**

No Warning Lamp

AA95137,0001A6B -19-24SEP18-2/9

### 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 Reset Controller.

AA95137,0001A6B -19-24SEP18-3/9

### 2 Reset Controller

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

Document all diagnostic codes.

Ignition OFF.

Wait 20 seconds.

Ignition ON, engine OFF.

Is SSM code 523852.09 present?

**YES:** Go to CAN Circuit Check.

**NO:** Checks complete.

AA95137,0001A6B -19-24SEP18-4/9

### 3 CAN Circuit Check

Perform CAN Circuit Test. (Group 9015-20.)

Does CAN circuit test good?

**YES:** Go to Controller Sensors Check.

**NO:** Repair CAN circuit.

AA95137,0001A6B -19-24SEP18-5/9

### 4 Controller Sensors Check

Ignition ON, engine OFF.

View flex load controller (FLC) monitored sensors by accessing the DIAGNOSTICS / HYDRAULIC SENSORS submenu on the advanced display unit (ADU). See Display Unit—Main Menu—Diagnostics—Hydraulic Sensors. (Operators Manual.)

Does the monitor show a reading for all sensors?

**YES:** Go to Component Check.

**NO:** Go to Program Flex Load Controller.

Continued on next page

AA95137,0001A6B -19-24SEP18-6/9

## Sealed Switch Module (SSM) Diagnostic Trouble Codes

### 2 Reset Controller

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

Document all diagnostic codes.

Ignition OFF.

Wait 20 seconds.

Ignition ON, engine OFF.

Is SSM code 523858.04 present?

**YES:** [Go to Component Check.](#)

**NO:** Checks complete.

AA95137,0001A74 -19-24SEP18-4/7

### 3 Component Check

Perform sealed switch module (SSM) test to verify keypad is malfunctioning. See [Display Unit—Main Menu—Diagnostics—Switch Module](#). (Operator's Manual.)

Does SSM test good?

**YES:** [Go to Program Controller.](#)

**NO:** [Go to CAN Circuit Check.](#)

AA95137,0001A74 -19-24SEP18-5/7

### 4 CAN Circuit Check

Perform [CAN Circuit Test](#). (Group 9015-20.)

Does CAN circuit test good?

**YES:** [Go to Program Controller.](#)

**NO:** Repair CAN circuit.

AA95137,0001A74 -19-24SEP18-6/7

### 5 Program Controller

Program sealed switch module (SSM).

Check for active codes.

Is SSM code 523858.04 present?

**YES:** Replace controller.

**NO:** Checks complete.

AA95137,0001A74 -19-24SEP18-7/7

## 523858.09 — Lost Ride Control LED Message

*Ride control LED signal missing from flex load controller (FLC).*

AA95137,0001A75 -19-24SEP18-1/9

### Lost Ride Control LED Message Diagnostic Procedure

**Alarm Level:**

No Warning Lamp

AA95137,0001A75 -19-24SEP18-2/9

### 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 Reset Controller](#)

Continued on next page

AA95137,0001A75 -19-24SEP18-3/9

## Sealed Switch Module (SSM) Diagnostic Trouble Codes

### 7 Program Sealed Switch Module

Program sealed switch module (SSM).

Check for active codes.

Is SSM code 523863.09 present?

**YES:** Replace controller.  
See Sealed Switch Module (SSM) Remove and Install. (Group 9015-20.)

**NO:** Checks complete.

AA95137,0001A7D -19-24SEP18-9/9

## 523864.04 — Hazards Keypad Stuck

*Hazards keypad on the sealed switch module (SSM) is stuck.*

AA95137,0001A7E -19-24SEP18-1/7

### Hazards Keypad Stuck Diagnostic Procedure

**Alarm Level:**

No Warning Lamp

AA95137,0001A7E -19-24SEP18-2/7

### 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 Reset Controller

AA95137,0001A7E -19-24SEP18-3/7

### 2 Reset Controller

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

Document all diagnostic codes.

Ignition OFF.

Wait 20 seconds.

Ignition ON, engine OFF.

Is SSM code 523864.04 present?

**YES:** Go to Component Check.

**NO:** Checks complete.

AA95137,0001A7E -19-24SEP18-4/7

### 3 Component Check

Perform sealed switch module (SSM) test to verify keypad is malfunctioning. See Display Unit—Main Menu—Diagnostics—Switch Module. (Operator's Manual.)

Does SSM test good?

**YES:** Go to Program Controller.

**NO:** Go to CAN Circuit Check.

AA95137,0001A7E -19-24SEP18-5/7

### 4 CAN Circuit Check

Perform CAN Circuit Test. (Group 9015-20.)

Does CAN circuit test good?

**YES:** Go to Program Controller.

**NO:** Repair CAN circuit.

AA95137,0001A7E -19-24SEP18-6/7

Continued on next page

## Advanced Display Unit (ADU) Diagnostic Trouble Codes

### 4 Battery Check

Ignition OFF.

Check battery voltage.

Is voltage approximately 24 volts?

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

**NO:** Clean and tighten battery terminals. See [Check Battery Electrolyte Level and Terminals](#). (Operator's Manual.)

Charge batteries. See [Using Battery Charger](#). (Operator's Manual.)

AA95137,0001A87 -19-24SEP18-6/9

### 5 Open Circuit Check

Ignition OFF.

Disconnect ADU connector (X48) and vehicle electrical center (VEC) connector (X13). See [Load Center Harness \(W3\) Component Location](#). (Group 9015-10.)

Check circuit P13 RED for continuity between pin H on ADU connector (X48) and pin F on VEC connector (X13).

Is continuity indicated?

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

**NO:** Circuit P13 RED is open. Repair circuit or replace harness.

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

AA95137,0001A87 -19-24SEP18-7/9

### 6 Short Circuit Check

Ignition OFF.

Disconnect ADU connector (X48). See [Load Center Harness \(W3\) Component Location](#). (Group 9015-10.)

Check circuit P13 RED for ground at pin H on ADU connector (X48).

Is ground present?

**YES:** Circuit P13 RED is short to ground. Repair circuit or replace harness.

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

**NO:** Go to [Program Controller](#).

AA95137,0001A87 -19-24SEP18-8/9

### 7 Program Controller

Program advanced display unit (ADU).

Check for active ADU codes.

Is code 000158.04 present?

**YES:** Replace controller. See [Advanced Display Unit \(ADU\) Remove and Install](#). (Group 9015-20.)

**NO:** Checks complete.

AA95137,0001A87 -19-24SEP18-9/9

## Advanced Display Unit (ADU) Diagnostic Trouble Codes

### 3 Program Controller

Program advanced display unit (ADU).

Check for active ADU codes.

Is code 523774.04 present?

**YES:** Replace controller.  
See Advanced Display Unit (ADU) Remove and Install.  
(Group 9015-20.)

**NO:** Checks complete.

AA95137,0001A96 -19-24SEP18-5/5

## 524076.10 — Information Button Stuck

*Information button has been active for 10 minutes.*

AA95137,0001A97 -19-24SEP18-1/6

### Information Button Stuck Diagnostic Procedure

#### Alarm Level:

No Warning Lamp

AA95137,0001A97 -19-24SEP18-2/6

### 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 Button Check.

AA95137,0001A97 -19-24SEP18-3/6

### 2 Button Check

Ignition ON, engine OFF.

Push information button on advanced display unit (ADU).

Check for active ADU codes.

Is code 524076.10 present?

**YES:** Go to Ignition On/Off Check.

**NO:** Checks complete.

AA95137,0001A97 -19-24SEP18-4/6

### 3 Ignition On/Off Check

Ignition ON, engine OFF.

Ignition OFF.

Check for active ADU codes.

Is code 524076.10 present?

**YES:** Go to Program Controller.

**NO:** Checks complete.

Continued on next page

AA95137,0001A97 -19-24SEP18-5/6

## Tire Pressure Monitoring (TPM) System Diagnostic Trouble Codes

|                                 |                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>3 ADU Alarm Setup</b>        | <p>Check second level alarm low pressure setting. <a href="#">See TPM—Alarm Setup</a>. (Group 9015-20.)</p> <p>Is the low pressure percentage setting set too low?</p>                          | <p><b>YES:</b> Adjust low pressure percentage setting using ADU. <a href="#">See TPM—Alarm Setup</a>. (Group 9015-20.)</p> <p><b>NO:</b> Inspect and fix low tire pressure tire. <a href="#">See Inspect Tires and Check Pressure</a>. (Operator's Manual.)</p> <p style="text-align: right;">AS79221,00000A4 -19-15FEB16-5/8</p>                                           |
| <b>4 Move to Another Tire</b>   | <p>Check tire information using JDG10928 tool of the remaining tires to verify a low pressure reading.</p> <p>Do any of the tires have low pressure?</p>                                        | <p><b>YES:</b> Fix low tire pressure. <a href="#">See Inspect Tires and Check Pressure</a>. (Operator's Manual.)</p> <p>Relearn sensor position. <a href="#">See TPM—Programming Sensors with SmartWave® Advanced Maintenance Tool</a></p> <p><b>NO:</b> Go to Reprogram Sensors.</p> <p style="text-align: right;">AS79221,00000A4 -19-15FEB16-6/8</p>                     |
| <b>5 Reprogram Sensors</b>      | <p>Reprogram all sensors. <a href="#">See TPM—Programming Sensors with SmartWave® Advanced Maintenance Tool</a>. (Group 9015-20.)</p> <p>Do all tire sensors program?</p>                       | <p><b>YES:</b> Go to Clear Codes and Retest.</p> <p><b>NO:</b> Replace the malfunctioning sensor and program new sensor. <a href="#">See TPM—Tire Pressure Sensor Remove and Install</a>, and <a href="#">See TPM—Programming Sensors with SmartWave® Advanced Maintenance Tool</a>. (Group 9015-20.)</p> <p style="text-align: right;">AS79221,00000A4 -19-15FEB16-7/8</p> |
| <b>6 Clear Codes and Retest</b> | <p>Clear codes. <a href="#">See Advanced Display Unit (ADU)—Clear Codes</a>. (Group 9015-16.)</p> <p>Operate machine for 5 minutes and check codes.</p> <p>Is code 000242.16 still present?</p> | <p><b>YES:</b> Replace the malfunctioning sensor and program new sensor. <a href="#">See TPM—Tire Pressure Sensor Remove and Install</a>, and <a href="#">See TPM—Programming Sensors with SmartWave® Advanced Maintenance Tool</a>. (Group 9015-20.)</p> <p><b>NO:</b> Check complete.</p> <p style="text-align: right;">AS79221,00000A4 -19-15FEB16-8/8</p>               |

Operational Checkout

Use this procedure to make a quick check of machine operation by doing a walk-around inspection and performing specific checks from the operator seat.

Complete visual checks (oil levels, oil condition, external leaks, loose hardware, linkage, wiring, etc.) before performing checkout.

Most checks will require machine systems to be at normal operating temperatures and a level area with adequate space to operate machine. Some checks may require varied surfaces.

No special tools are necessary to perform the checkout.

If no problem is found, go to next check. If a problem is indicated, an additional check or repair procedure will be suggested.

CS33148,0002AF1 -19-23JUN16-1/45

Diagnostic Trouble Code Check

CS33148,0002AF1 -19-23JUN16-2/45

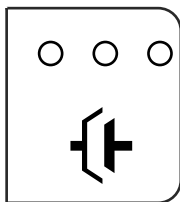
|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                  |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Display and Clear Trouble Codes | <p><b>Always check for diagnostic trouble codes and correct them before performing the operational checkout.</b></p> <p>Check for active and stored diagnostic trouble codes (DTCs).</p> <p>Diagnostic trouble codes can be displayed by using one of the following methods.</p> <ul style="list-style-type: none"><li>• Advanced Display Unit (ADU)<ul style="list-style-type: none"><li>- To access DTCs using the ADU, <a href="#">see Display Unit—Main Menu—Codes</a>. (Operator's Manual.)</li></ul></li><li>• Service ADVISOR™ Diagnostic Application<ul style="list-style-type: none"><li>- To access DTCs using Service ADVISOR™ diagnostic application, <a href="#">see Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application</a>. (Group 9015-20.)</li></ul></li></ul> <p><i>LOOK: Are diagnostic trouble codes present?</i></p> | <p><b>YES:</b> Correct all diagnostic trouble codes before proceeding.</p> <p><b>NO:</b> Continue with operational checkout.</p> |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|

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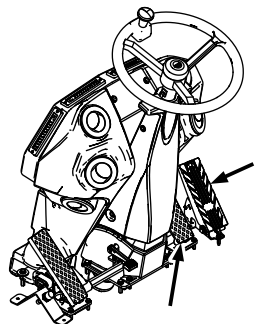
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CS33148,0002AF1 -19-23JUN16-3/45

# Torque Converter and Engine Power Check



T194311 —UN—11SEP03



TX1045806 —UN—17JUL08

**CAUTION:** Prevent possible injury from machine movement. Perform this check in an open area away from other people and machinery.

**Wear seat belt while operating machine.**

Fasten seat belt.

Release park brake.

Disable clutch cut-off by pushing clutch cut-off switch on sealed switch module (SSM) until all LEDs are off.

Using the advanced display unit (ADU), Set the fan speed to 100%. To set fan speed, see [Advanced Display Unit \(ADU\)—Fan Speed](#). (Group 9015-16.)

Apply service brakes so machine does not move.

Shift transmission to 3rd forward.

Push accelerator pedal until it contacts stop bolt. Record engine speed that appears in display window.

**LOOK:** Is torque converter stall speed within following range?

- No. 1 fuel: 2100—2200 rpm
- No. 2 fuel: 2145—2210 rpm

Put transmission in neutral and run for 15 seconds to cool oil.

**YES:** Check complete.

**NO:** If stall speed is outside range, problem may be engine power, torque converter, or hydraulic system.

To test engine power, see [Measure Intake Manifold Pressure \(Turbocharger Boost for Tier 3/Stage IIIA Engines\)](#). (CTM104.)

To test torque converter, see [Torque Converter Stall Speed Test](#). (Group 9020-25.)

To test hydraulic system, see [Load Sense Relief Valve Pressure Test and Adjustment](#). (Group 9025-25.)

Continued on next page

CS33148,0002AF1 -19-23JUN16-21/45

## Reversing Fan Check (If Equipped)



T194319 —UN—11SEP03

Push the reversing fan switch to enable manual mode. (LED on.)

**NOTE:** Reversing fan function cannot be operated twice within one minute. Wait one minute before attempting to reverse fan direction again.

**LISTEN/LOOK:** Does fan reverse direction and operate at full speed for 15 seconds?

Fan will change directions and operate at normal speed.

**YES:** Check complete.

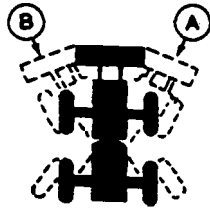
**NO:** Verify that function is enabled in the ADU Machine Configuration menu. [See Advanced Display Unit \(ADU\)—Enable Options.](#) (Group 9015-16.)

**NO:** Check reversing fan circuit and proportional fan circuit. [See Flex Load Controller \(FLC\) Circuit Theory of Operation.](#) (Group 9015-15.)

IF OK: Check fan hydraulic circuit. [See Hydraulic Fan Will Not Reverse Direction—If Equipped.](#) (Group 9025-15.)

CS33148,0002AF1 -19-23JUN16-38/45

## Orbital Steering Check



T6471AQ —UN—19OCT88

Transmission in neutral.

Run engine at slow idle.

Remove foot from brake pedal.

Release park brake.

Turn orbital steering wheel right until machine frames contact right articulation stops (position A).

Turn orbital steering wheel left until machine frames contact left articulation stops (position B).

**LOOK:** Does machine steer smoothly in both directions?

**FEEL:** Is excessive effort required to turn steering wheel?

**LOOK:** Do the frames stop moving when the steering wheel is stopped?

**NOTE:** It is normal for machine frames to drift away from frame stops when steering wheel is released.

**YES:** Check complete.

**NO:** [See Load Sense Relief Valve Pressure Test and Adjustment.](#) (Group 9025-25.)

Continued on next page

CS33148,0002AF1 -19-23JUN16-39/45

## Diagnostic Information

### 4 Engine Control Unit Payload Check

Check for latest payload programmed in the ECU. [See Downloading Payload File For Service ADVISOR](#). (CTM502.)

Is the latest payload programmed in the ECU?

**YES:** [See E2 - Engine Misfires/Runs Irregularly Diagnostic Procedure](#). (CTM502.)

**NO:** Download latest payload and reprogram ECU. [See Reprogramming Engine Control Unit \(ECU\) With Service ADVISOR](#). (CTM502.)

PM10405,0000384 -19-27APR09-6/6

## Engine Does Not Develop Full Power

PM10405,0000385 -19-27APR09-1/7

### Engine Does Not Develop Full Power Diagnostic Procedure

PM10405,0000385 -19-27APR09-2/7

### 1 Diagnostic Trouble Code Check

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

Are DTCs present?

**YES:** Correct malfunction causing DTC.

**NO:** [Go to Fuel Supply Check](#).

PM10405,0000385 -19-27APR09-3/7

### 2 Fuel Supply Check

Check fuel level and quality. [See Testing Diesel Fuel](#). (Operator's Manual.)

Is fuel at correct level and quality?

**YES:** [Go to Exhaust Restriction Check](#).

**NO:** Fill tank with clean fuel.

PM10405,0000385 -19-27APR09-4/7

### 3 Exhaust Restriction Check

Check exhaust system for restriction.

Is exhaust restricted?

**YES:** Remove restriction from exhaust. [See Engine Intake and Exhaust System Component Location](#). (Group 9010-15.)

**NO:** [Go to Fuel Filter Check](#).

PM10405,0000385 -19-27APR09-5/7

### 4 Fuel Filter Check

Check filter restriction indicator. [See Display Unit Functions](#). (Operator's Manual.)

Is filter restriction indicator on or flickering?

**YES:** [See Drain Water From Auxiliary Water Separator Fuel Filter—If Equipped and see Replace Final Fuel Filter](#). (Operator's Manual.)

**NO:** [Go to Engine Control Unit Payload Check](#).

Continued on next page

PM10405,0000385 -19-27APR09-6/7

1—Final Fuel Filter  
2—Mechanical Fuel Transfer Pump  
3—Prefilter  
4—In-Line Fuel Filter  
5—Fuel Return-to-Tank

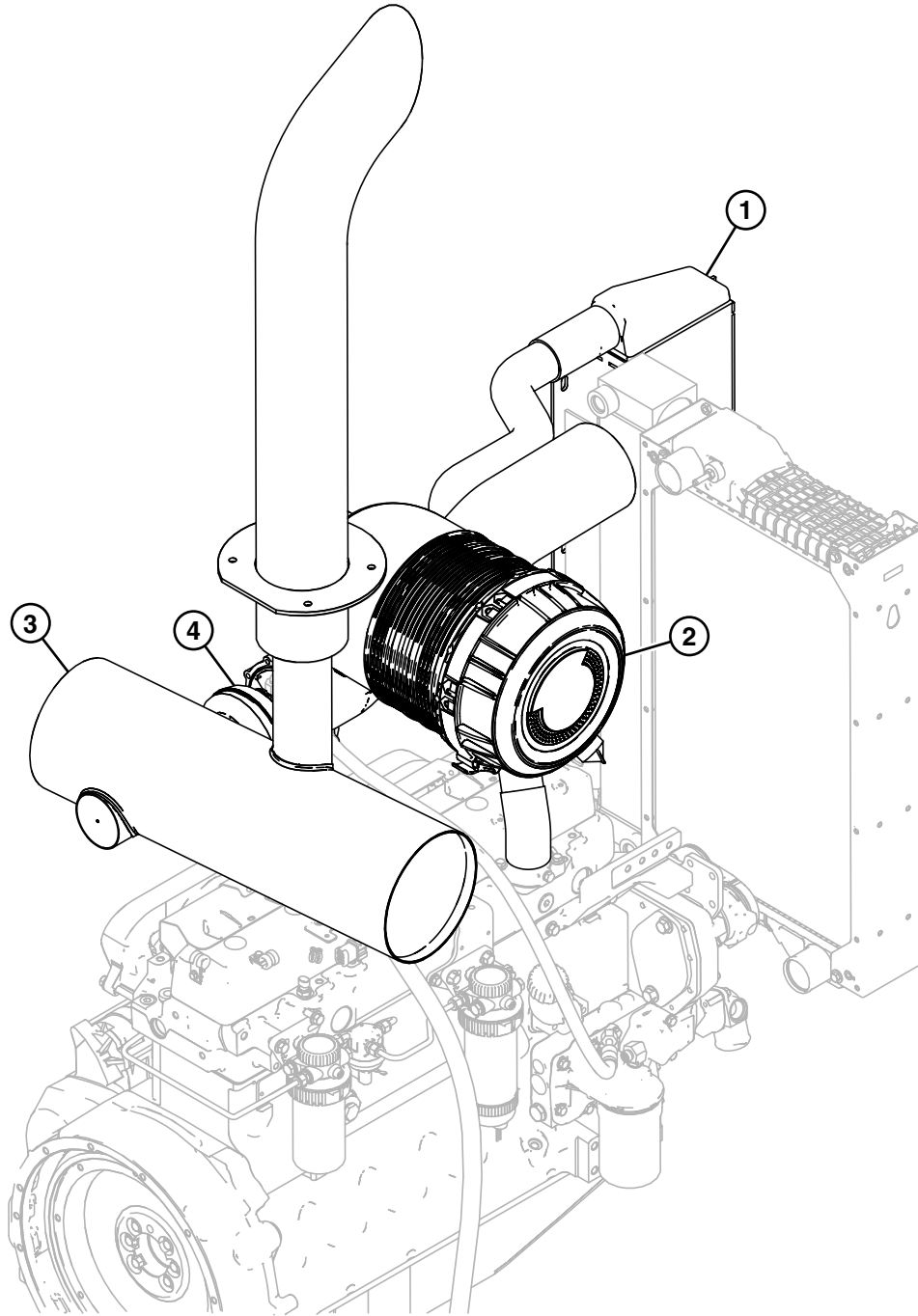
6—Fuel Tank  
7—Fuel Tank Breather  
8—High Pressure Fuel Pump  
9—High Pressure Common Rail Delivery Line (6 used)

10—Fuel Injector (6 used)  
11—Fuel Pressure Limiter  
12—High Pressure Common Rail (HPCR)  
13—Pump Control Valve (PCV) Solenoid

14—High Pressure Fuel Pump Delivery Line (2 used)  
15—Fuel Temp Sensor  
16—Fuel Inlet

WS68074,0001BA8 -19-25JUN08-2/2

## Engine Intake and Exhaust Component Location



TX1040033

Engine Intake and Exhaust Component Location

1—Charge Air Cooler

2—Air Filter Housing

3—Muffler

4—Turbocharger

Continued on next page

TW73308,0000228 -19-22MAY09-1/2

TX1040033 —UN—09APR08

|                                                                         | Page       |
|-------------------------------------------------------------------------|------------|
| TPM—Activating Tire Pressure Monitoring System.....                     | 9015-20-52 |
| TPM—Programming Sensors with SmartWave® Advanced Maintenance Tool ..... | 9015-20-52 |
| TPM—Programming Using Sensor Identification Numbers.....                | 9015-20-54 |
| TPM—Cold Inflation Pressure Setup .....                                 | 9015-20-54 |
| TPM—Alarm Setup.....                                                    | 9015-20-55 |
| TPM—Delete Sensors.....                                                 | 9015-20-55 |
| TPM—SmartWave® Advanced Maintenance Tool Diagnostics .....              | 9015-20-56 |
| TPM—Tire Pressure Sensor Remove and Install.....                        | 9015-20-56 |

|                                                                                    |                                                                                |                                                                    |                                                                                                            |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| F01— JDLink™ Battery Power 10-Amp Fuse                                             | F15— Spare Ignition Power 5-Amp Fuse                                           | F31— JDLink™ Ignition Power 5-Amp Fuse                             | F51— JDLink™ Run Signal 5-Amp Fuse                                                                         |
| F02— Sealed Switch Module (SSM) Battery Power 5-Amp Fuse                           | F16— Spare Ignition Power 15-Amp Fuse                                          | F32— Radar Object Detection (ROD) and Backup Alarm 5-Amp Fuse      | F52— Camera 5-Amp Fuse                                                                                     |
| F03— Engine Control Unit (ECU) Battery Power 20-Amp Fuse                           | F17— Diesel Fired Coolant Heater Power Battery Power 15-Amp Fuse (if equipped) | F33— Advanced Display Unit (ADU) Battery Power 5-Amp Fuse          | F53— Alternator Excitation 5-Amp Fuse                                                                      |
| F04— 24V/12V Converter, Rear Camera, and Radio Battery Power 15-Amp Fuse           | F18— Transmission Control Unit (TCU) Battery Power 5-Amp Fuse                  | F34— Spare Ignition Power 10-Amp Fuse                              | F55— Front and Rear Wiper Motor 5-Amp Fuse                                                                 |
| F05— Blower Motors 25-Amp Fuse                                                     | F20— Engine Compartment Light Battery Power 5-Amp Fuse (not used)              | F38— Fuel Pump, Air Filter Restriction, Ignition Power 15-Amp Fuse | F56— Tire Pressure Monitoring (TPM) System Ignition Power 5-Amp Fuse—If Equipped (marked as TPM Ign Power) |
| F08— Air Seat Adjust and Heat 20-Amp Fuse                                          | F21— Flex Load Center (FLC) Battery Power 10-Amp Fuse                          | F40— Transmission Output Speed Sensor 5-Amp Fuse                   | V2— Start Aid Solenoid 3-Amp Diode                                                                         |
| F09— 24V/12V Converter and Radio Ignition Power 10-Amp Fuse                        | F23— Diff Lock, Steering Pressure, Park Brake Switch 5-Amp Fuse                | F41— Ground Speed Radar and Advanced Payload Scale 10-Amp Fuse     | V3— Ignition Relay 3-Amp Diode                                                                             |
| F10— Engine Control Unit (ECU) Ignition Power 5-Amp Fuse                           | F28— Transmission Control Unit (TCU) Ignition Power 5-Amp Fuse                 | F46— 12-Volt Power Connector 10-Amp Fuse                           | V4— Start Relay 3-Amp Diode                                                                                |
| F11— RTD, Quick Shift Switches 10-Amp Fuse                                         | F29— Joystick Steering Ignition Power 5-Amp Fuse—If Equipped                   | F49— Service ADVISOR™ and Dome Light Battery Power 5-Amp Fuse      | V5— Spare 3-Amp Diode (marked as Alternator Excitation)                                                    |
| F13— ADU, Monitor Alarm, Turn Signal, and Counter Switch Ignition Power 5-Amp Fuse |                                                                                |                                                                    | V7— Reverse Polarity Protection 3-Amp Diode                                                                |

NOTE: The following items are located outside of the VEC:

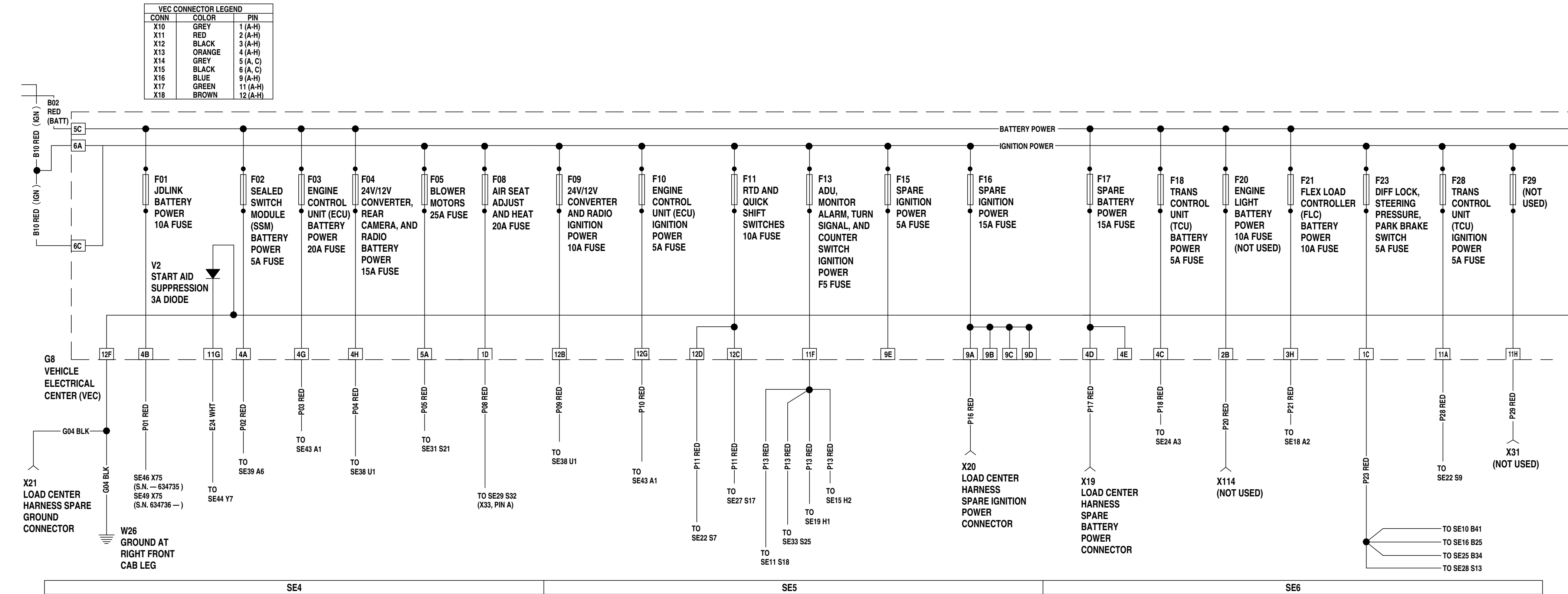
- Start relay (K3) is located in the right rear corner of the cab. See Load Center Harness (W3) Component Location. (Group 9015-10.)
- Ignition relay (K4) is located in the right rear corner of the cab. See Load Center Harness (W3) Component Location. (Group 9015-10.)
- Starter coil suppression 5-amp diode (V1) is located in the engine compartment near the

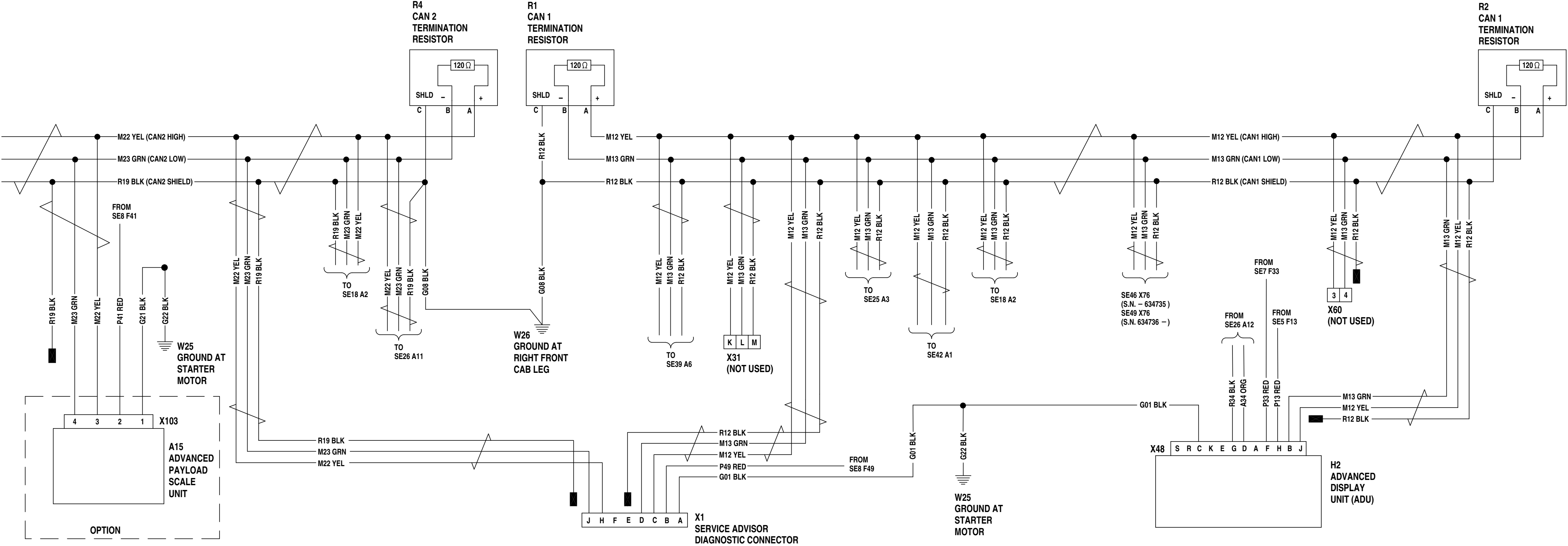
starter motor. See Load Center Harness (W3) Component Location. (Group 9015-10.)

- A/C compressor clutch 1-amp diode (V11) is located in the engine compartment near the A/C compressor. See Engine Harness (W6) Component Location. (Group 9015-10.)

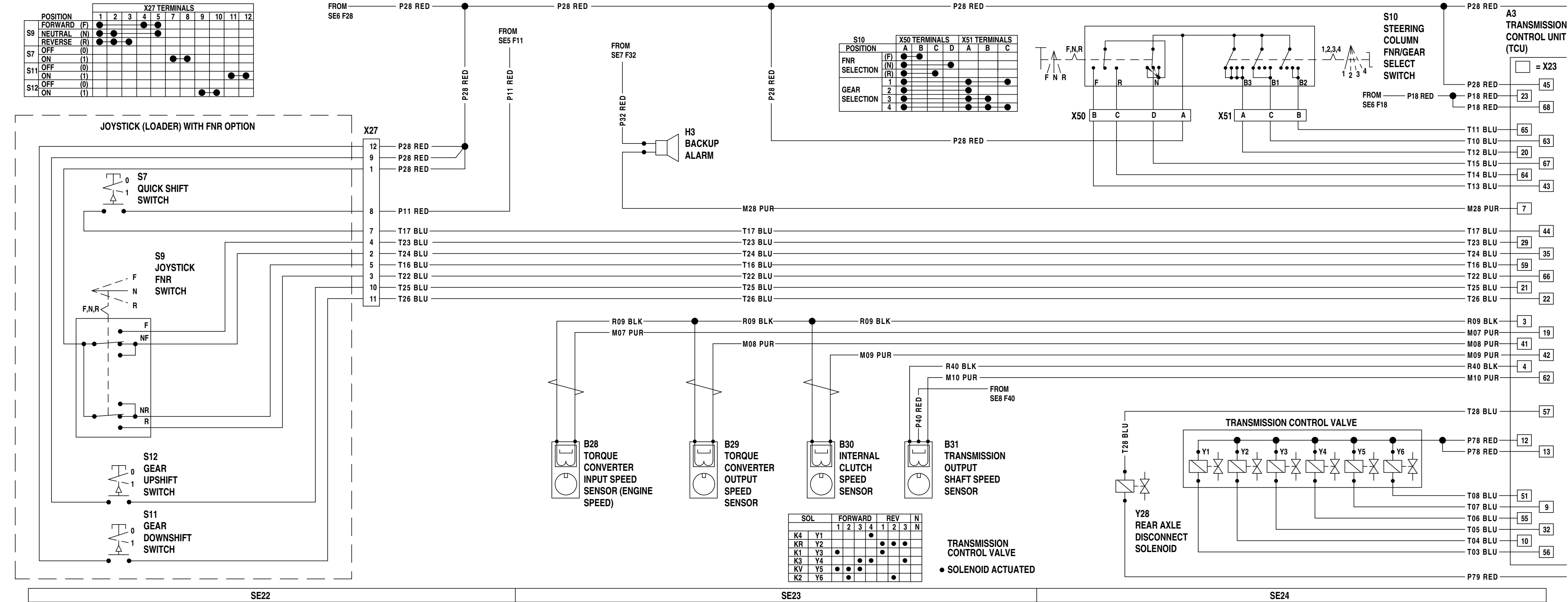
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AA95137,000179D -19-09JUN10-3/2





TX1084509 —UN—07DEC10



TX1084509

524K SYSTEM FUNCTIONAL SCHEMATIC (8 OF 17)

System Functional Schematic (SE22—SE24)

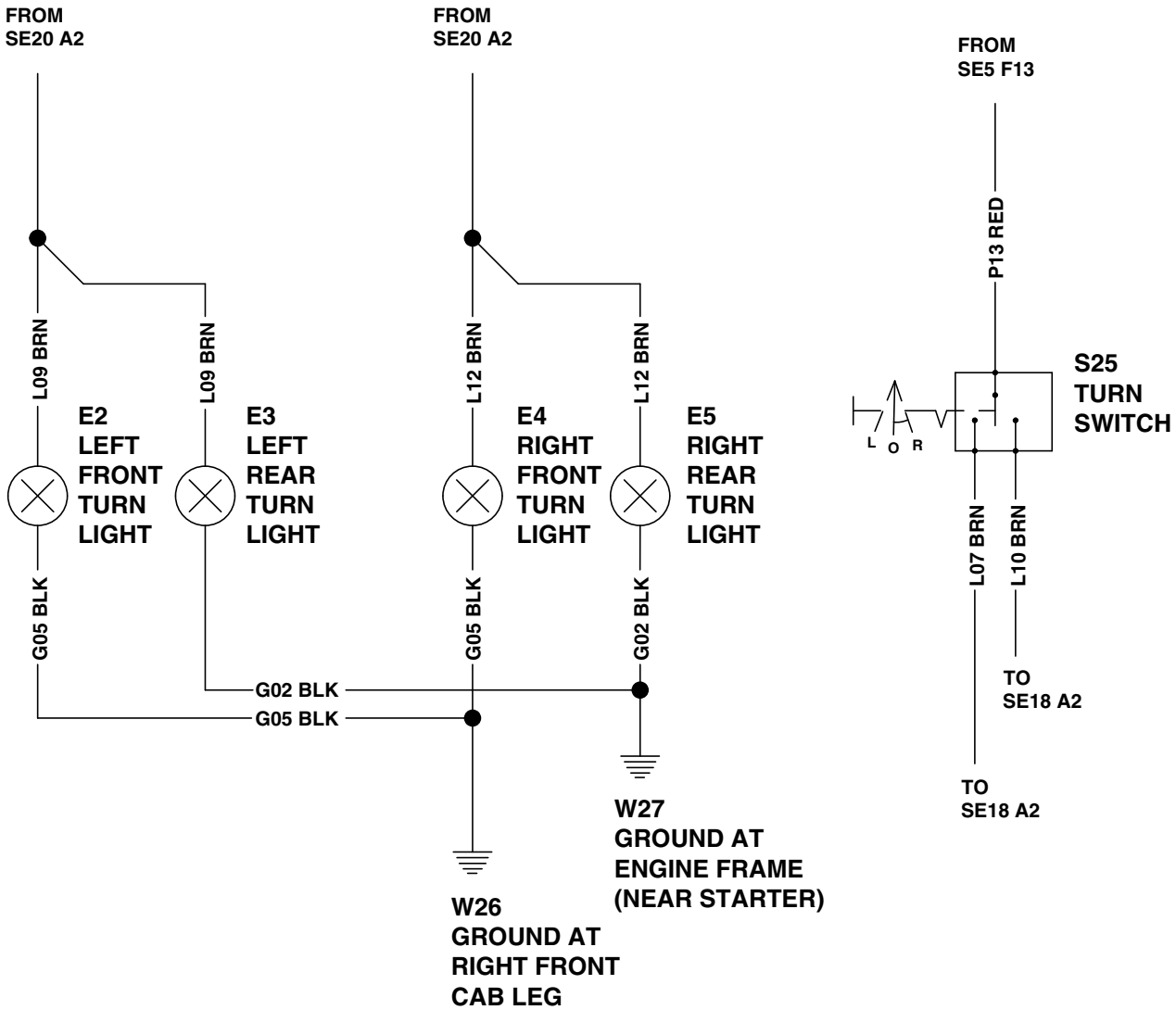
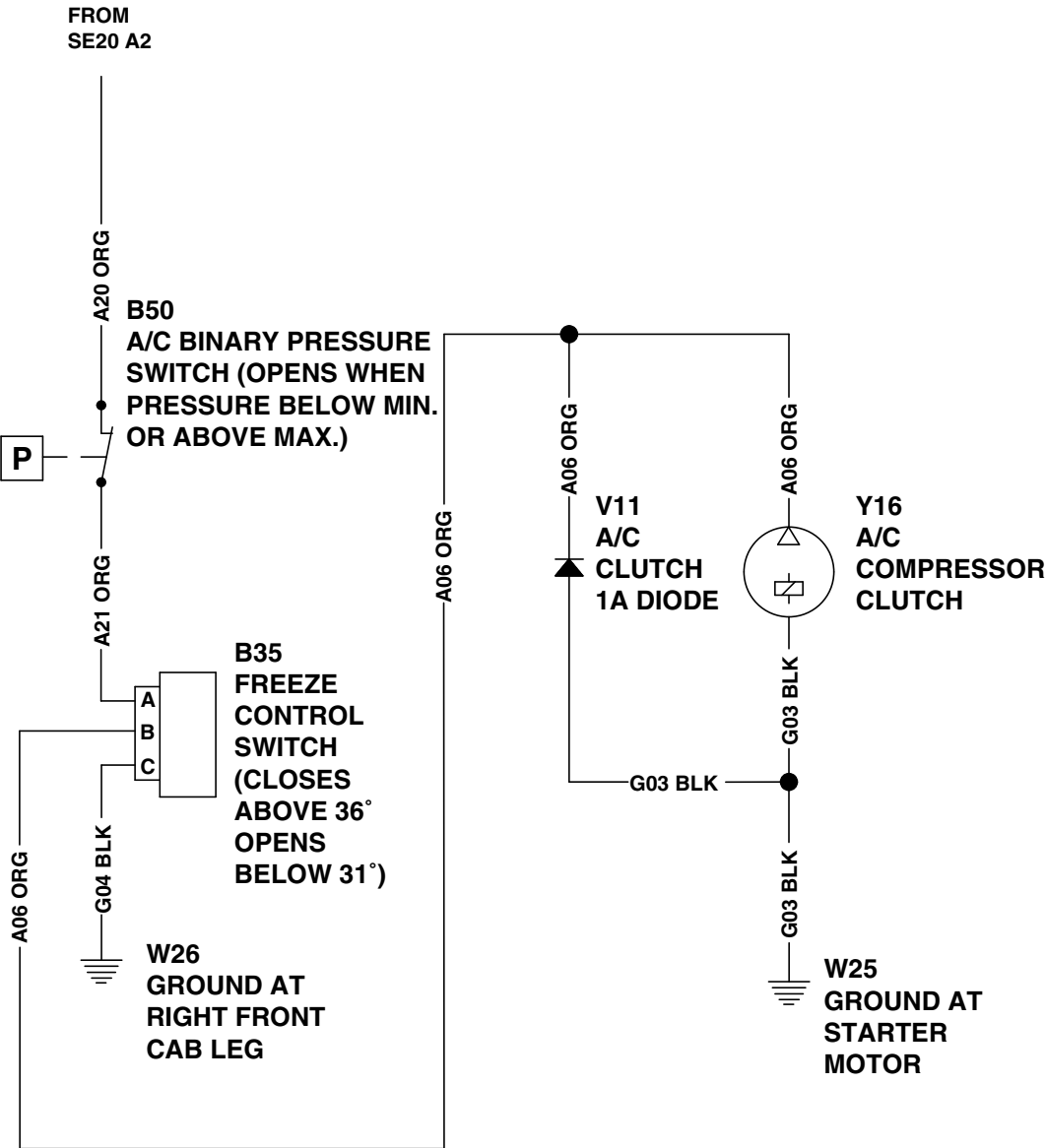
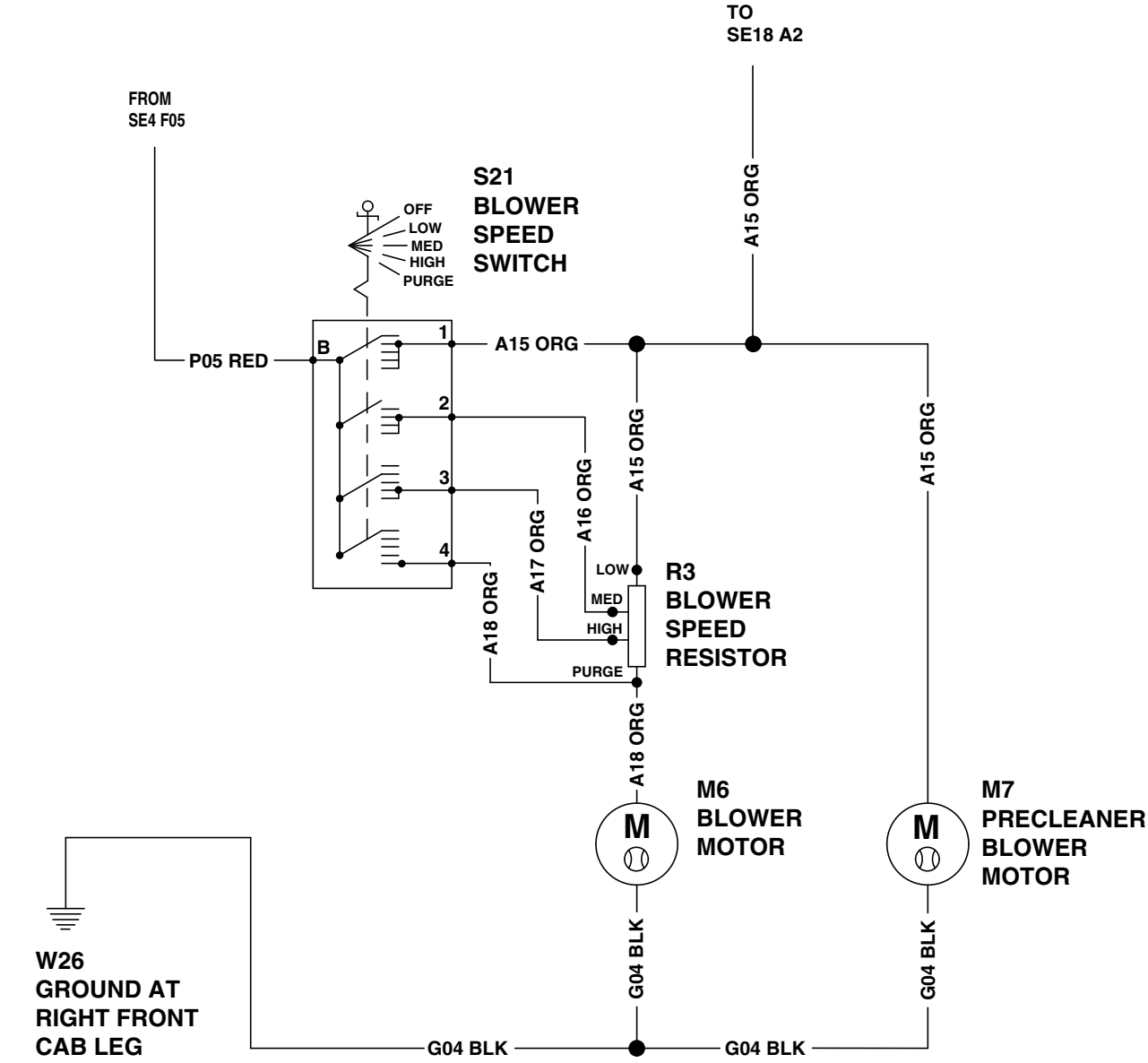
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AD32822,0000150 -19-01MAR18-16/31

TX1138899 —UN—26JUN13

S21  
BLOWER SPEED SWITCH

| POSITION | B | 1 | 2 | 3 | 4 |
|----------|---|---|---|---|---|
| OFF      | ● |   |   |   |   |
| LOW      | ● | ● |   |   |   |
| MED      | ● | ● | ● |   |   |
| HIGH     | ● | ● | ● | ● |   |
| PURGE    | ● | ● | ● | ● | ● |



NOTE: A/C ON/OFF  
SWITCH IN SSM  
(SE39 A6)

NOTE: HAZARDS SWITCH  
IN SSM (SE39 A6)

TX1138899

Continued on next page

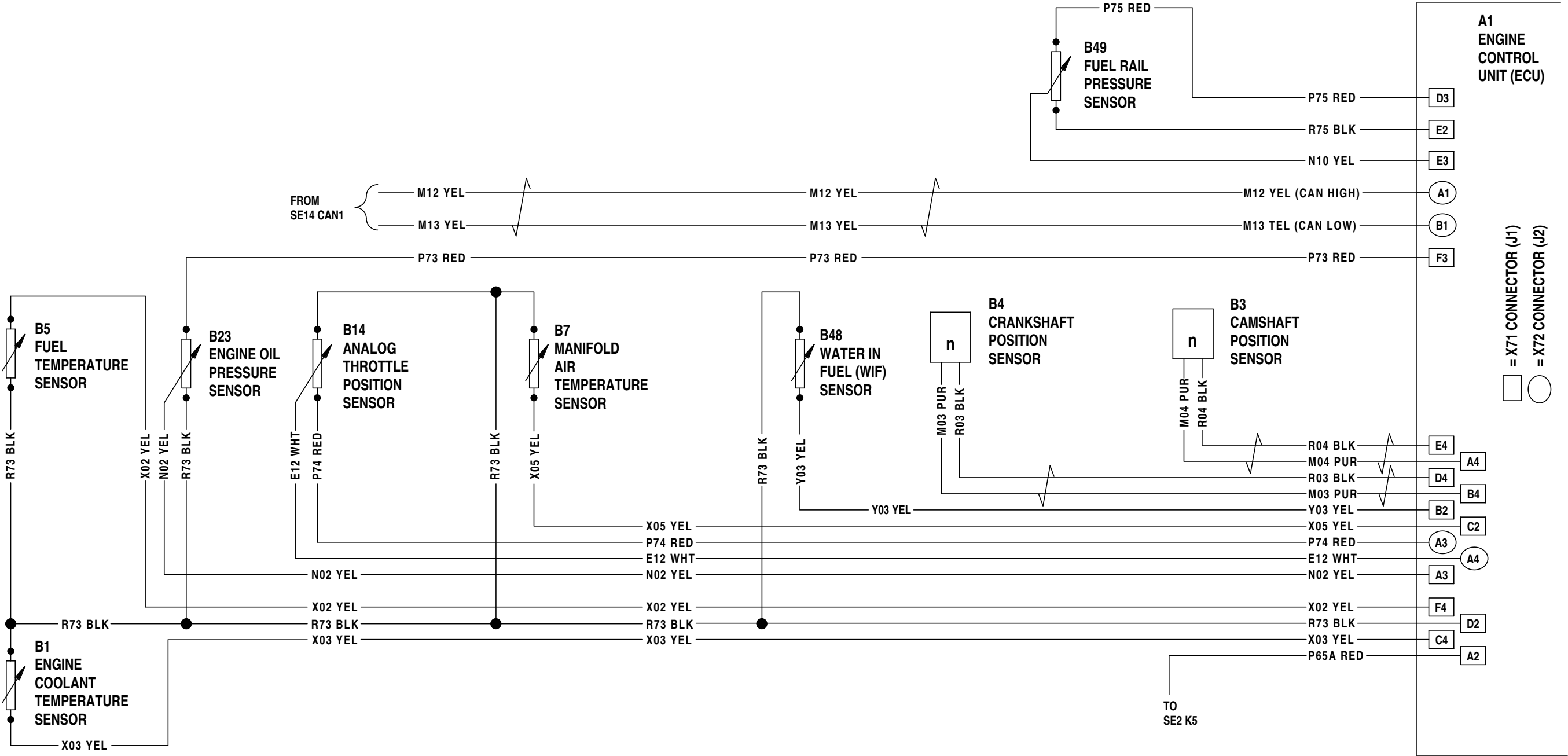
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- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: [www.heydownloads.com](http://www.heydownloads.com) by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL



SE40

SE41

SE42

TX1084501

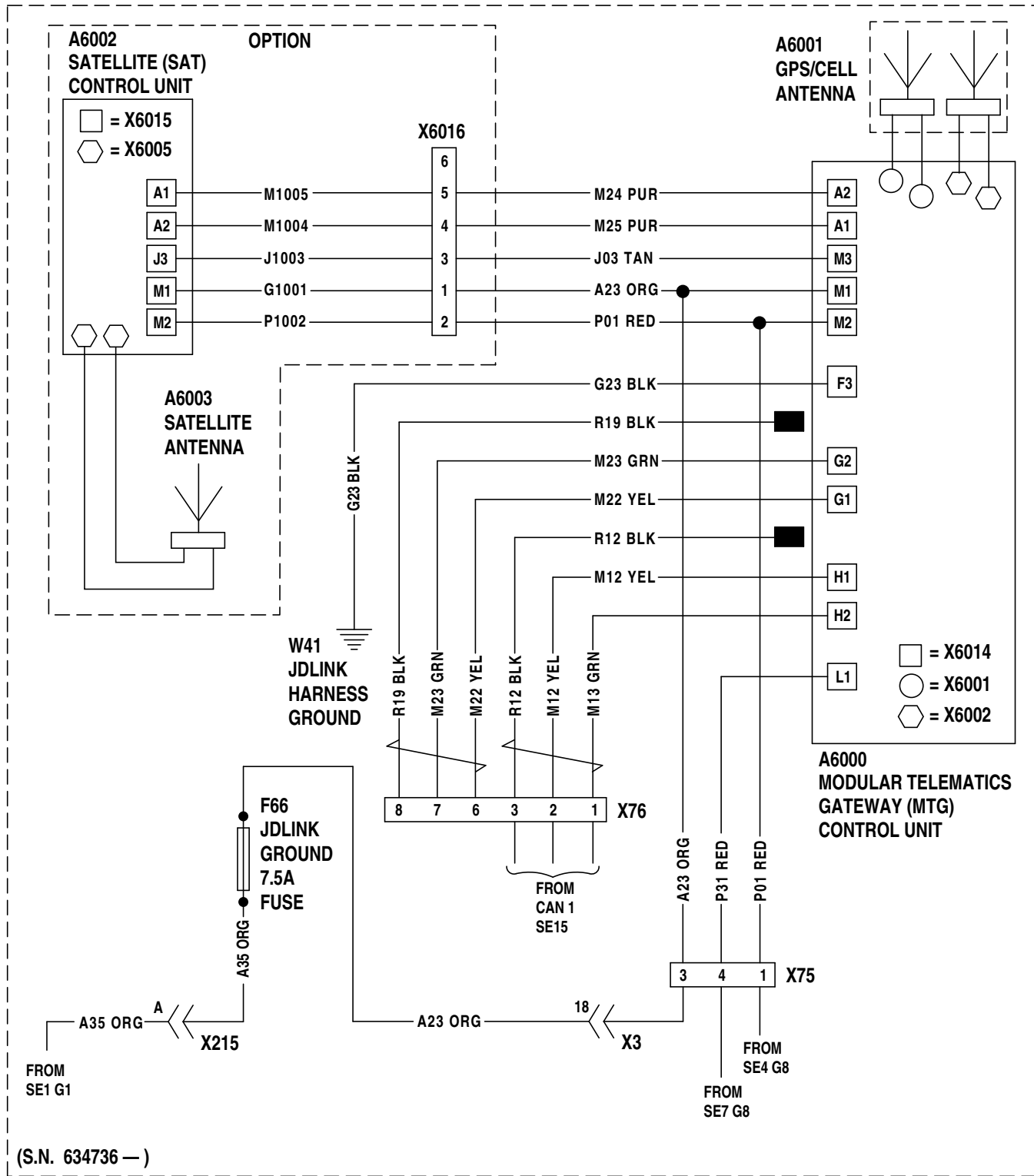
524K SYSTEM FUNCTIONAL SCHEMATIC (14 OF 17)

System Functional Schematic (SE40—SE42)

Continued on next page

AD32822,0000150 -19-01MAR18-28/31

**JDLink™ System Functional Schematic—If Equipped (S.N 634736— )**



(S.N. 634736 — )

TX1084643

SE49  
524K SYSTEM FUNCTIONAL SCHEMATIC (17 OF 17)

JDLink™ System Functional Schematic (SE49)

OUO1065,0001C59 -19-12NOV13-2/2

Load Center Harness (W3) Wiring Diagram

TX1042433 —UN—10JUL08

| END #1 | NUMBER | COLOR | END #2 |
|--------|--------|-------|--------|
| X541   | A01    | ORG   | X40    |
| X541   | A01A   | ORG   | X31    |
| X30    | A01B   | ORG   | X541   |
| X40    | A03    | ORG   | X67    |
| X3     | A04    | ORG   | X43    |
| X3     | A05    | ORG   | X43    |
| X4     | A06    | ORG   | X9     |
| M3     | A07    | ORG   | X43    |
| M3     | A08    | ORG   | X43    |
| M3     | A09    | ORG   | X41    |
| X6     | A11    | ORG   | X43    |
| X6     | A12    | ORG   | X43    |
| X6     | A13    | ORG   | X41    |
| S21    | A15    | ORG   | X578   |
| X578   | A15A   | ORG   | X9     |
| X40    | A15B   | ORG   | X578   |
| M7     | A15C   | ORG   | X578   |
| S21    | A16    | ORG   | X9     |
| S21    | A17    | ORG   | X9     |
| S21    | A18    | ORG   | X8     |
| X7     | A20    | ORG   | X41    |
| X75    | A23    | ORG   | X86    |
| X47    | A24    | ORG   | X88    |
| X5     | A31    | ORG   | X43    |
| X17    | A32    | ORG   | X77    |
| X101   | A33    | ORG   | X11    |
| H2     | A34    | ORG   | X101   |
| X105   | A85    | ORG   | X41    |
| X105   | A86    | ORG   | X43    |
| X105   | A87    | ORG   | X101   |
| M1     | B02    | RED   | X555   |
| X555   | B02A   | RED   | K4     |
| X555   | B02B   | RED   | K3     |
| X555   | B02C   | RED   | X14    |
| X53    | B03    | RED   | X12    |
| X18    | B04    | RED   | K4     |
| X11    | B04A   | RED   | K4     |
| X3     | B05    | RED   | X43    |
| X584   | B10    | RED   | K4     |
| X15    | B10A   | RED   | X584   |
| X15    | B10B   | RED   | X584   |
| M1     | E01    | WHT   | K3     |
| M1     | E01A   | WHT   | V1     |
| V1     | E01B   | WHT   | X72    |
| X72    | E02    | WHT   | X516   |
| X516   | E02A   | WHT   | K3     |
| X516   | E02B   | WHT   | X18    |
| X71    | E05    | WHT   | X4     |
| X71    | E06    | GRY   | X4     |
| X71    | E07    | GRN   | X4     |
| X71    | E08    | VLТ   | X4     |
| X71    | E09    | YEL   | X4     |

| END #1 | NUMBER | COLOR | END #2 |
|--------|--------|-------|--------|
| X71    | E10    | BLU   | X4     |
| B14    | E12    | WHT   | X72    |
| X592   | E13    | WHT   | X71    |
| X71    | E15    | RED   | X4     |
| X72    | E24    | WHT   | X4     |
| X23    | G01    | BLK   | X503   |
| X23    | G01A   | BLK   | X503   |
| H2     | G01B   | BLK   | X503   |
| X53    | G01C   | BLK   | X525   |
| X27    | G01D   | BLK   | X525   |
| X1     | G01E   | BLK   | X525   |
| X503   | G01F   | BLK   | X558   |
| X31    | G01H   | BLK   | X525   |
| X2     | G01J   | BLK   | X503   |
| X525   | G01K   | BLK   | X41    |
| X525   | G01L   | BLK   | X41    |
| X525   | G01M   | BLK   | X60    |
| X503   | G01N   | BLK   | X525   |
| A4     | G04    | BLK   | X532   |
| A4     | G04A   | BLK   | X532   |
| A4     | G04B   | BLK   | X532   |
| X33    | G04C   | BLK   | X532   |
| X576   | G04D   | BLK   | V1     |
| X5     | G04E   | BLK   | X576   |
| X5     | G04F   | BLK   | X576   |
| X8     | G04G   | BLK   | X577   |
| X7     | G04H   | BLK   | X577   |
| X21    | G04J   | BLK   | X577   |
| X577   | G04L   | BLK   | K3     |
| X577   | G04M   | BLK   | K4     |
| X18    | G04N   | BLK   | X576   |
| X576   | G04R   | BLK   | X26    |
| X577   | G04S   | BLK   | X26    |
| X577   | G04T   | BLK   | M7     |
| X576   | G04U   | BLK   | X35    |
| X532   | G04V   | BLK   | X576   |
| X47    | G04W   | BLK   | X532   |
| X88    | G04X   | BLK   | X532   |
| X6     | G04Y   | BLK   | X577   |
| X67    | G05    | BLK   | X26    |
| X67    | G05-A  | BLK   | X26    |
| X572   | G06    | BLK   | X94    |
| X95    | G06A   | BLK   | X572   |
| X572   | G06B   | BLK   | X5     |
| X572   | G06C   | BLK   | X77    |
| X572   | G06D   | BLK   | X35    |
| X572   | G06E   | BLK   | X101   |
| X30    | G08    | BLK   | X26    |
| M3     | G08A   | BLK   | X26    |
| X109   | G08B   | BLK   | X26    |
| X109   | G08C   | BLK   | X26    |
| X558   | G11    | BLK   | X556   |

| END #1 | NUMBER | COLOR | END #2 |
|--------|--------|-------|--------|
| X556   | G11A   | BLK   | X72    |
| X556   | G11B   | BLK   | X72    |
| X556   | G11C   | BLK   | X72    |
| X558   | G21    | BLK   | X557   |
| X557   | G21A   | BLK   | X104   |
| X557   | G21B   | BLK   | X567   |
| X557   | G21C   | BLK   | X86    |
| X103   | G21D   | BLK   | X557   |
| X567   | G21E   | BLK   | X101   |
| M1     | G22    | BLK   | X558   |
| X43    | H02    | GRN   | X67    |
| X40    | H04    | GRN   | X67    |
| X43    | H05    | GRN   | X67    |
| S4     | H08    | GRN   | X67    |
| S4     | H09    | GRN   | X67    |
| X31    | H10    | GRN   | X43    |
| X31    | H11    | GRN   | X40    |
| X31    | H12    | GRN   | X40    |
| X511   | H13    | GRN   | X43    |
| X3     | H13A   | GRN   | X511   |
| X4     | H13B   | GRN   | X511   |
| X43    | H15    | GRN   | X67    |
| X3     | H22    | GRN   | X41    |
| A4     | H23    | GRN   | X41    |
| X3     | H24    | GRN   | X43    |
| X3     | H26    | GRN   | X40    |
| X562   | H28    | GRN   | X67    |
| X40    | H28A   | GRN   | X562   |
| X43    | H28B   | GRN   | X562   |
| A4     | H33    | GRN   | X41    |
| A4     | H34    | GRN   | X41    |
| X3     | H35    | GRN   | X41    |
| X4     | J01    | TAN   | X11    |
| X75    | J02    | TAN   | X11    |
| X4     | J08    | TAN   | X10    |
| X43    | L02    | BRN   | X5     |
| X3     | L04    | BRN   | X40    |
| X3     | L06    | BRN   | X565   |
| X565   | L06A   | BRN   | X67    |
| X41    | L06B   | BRN   | X565   |
| X30    | L07    | BRN   | X41    |
| X3     | L09    | BRN   | X566   |
| X566   | L09A   | BRN   | X67    |
| X40    | L09B   | BRN   | X566   |
| X30    | L10    | BRN   | X41    |
| X3     | L12    | BRN   | X564   |
| X564   | L12A   | BRN   | X67    |
| X40    | L12B   | BRN   | X564   |
| X43    | L19    | BRN   | X67    |
| X53    | L20    | BRN   | X40    |
| X3     | L21    | BRN   | X43    |
| X5     | L22    | BRN   | X580   |

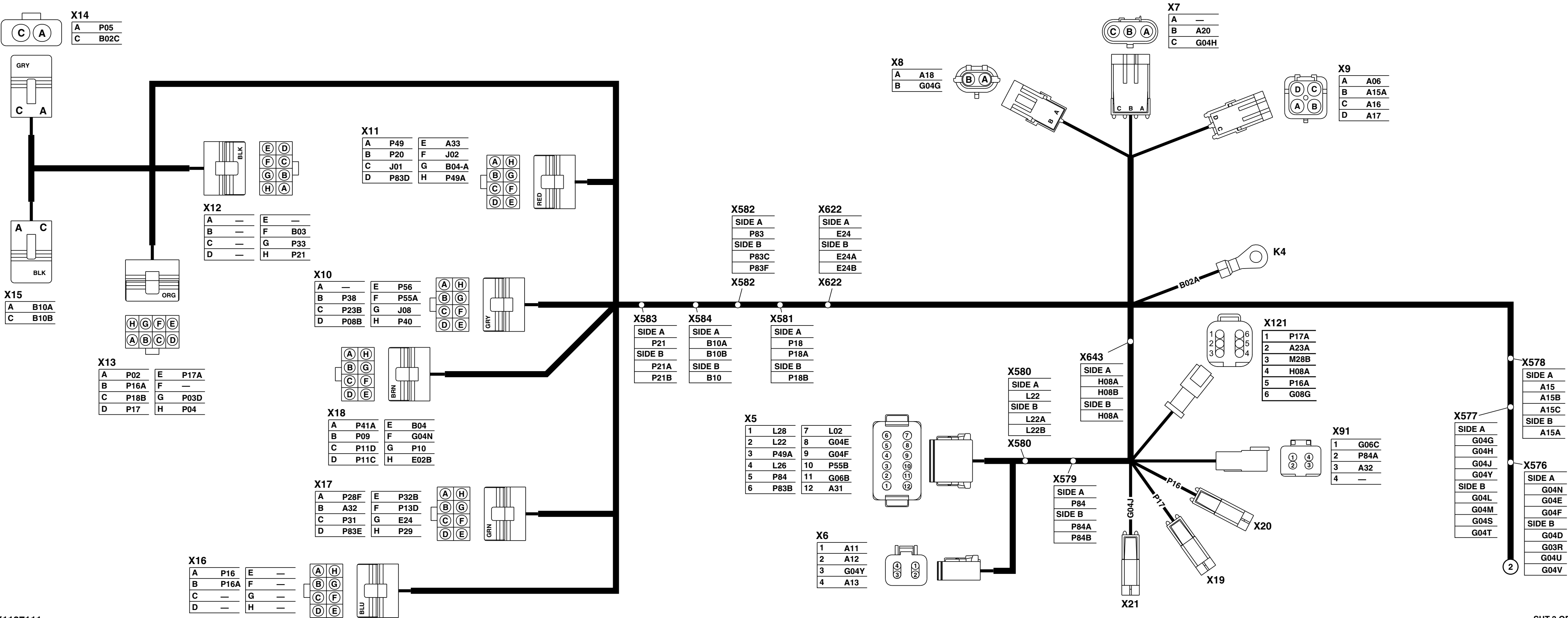
| END #1 | NUMBER | COLOR  | END #2 |
|--------|--------|--------|--------|
| X580   | L22A   | BRN    | X41    |
| X580   | L22B   | BRN    | X41    |
| X86    | L23    | BRN    | X41    |
| X41    | L24    | BRN    | X563   |
| X67    | L24A   | BRN    | X563   |
| X563   | L24B   | BRN    | X86    |
| X5     | L26    | BRN    | X43    |
| X5     | L28    | BRN    | X43    |
| X43    | L30    | BRN    | X86    |
| X73    | M02    | PUR    | X4     |
| X71    | M03    | PUR    | X4     |
| X71    | M04    | PUR    | X4     |
| X72    | M06    | PUR    | X4     |
| X23    | M07    | PUR    | X22    |
| X23    | M08    | PUR    | X22    |
| X23    | M09    | PUR    | X22    |
| X23    | M10    | PUR    | X22    |
| X53    | M12    | YEL    | X537   |
| H2     | M12A   | YEL    | X591   |
| R2     | M12B   | YEL    | X591   |
| R1     | M12C   | YEL    | X548   |
| X1     | M12D   | YEL    | X521   |
| X31    | M12E   | YEL    | X548   |
| X72    | M12F   | YEL    | X514   |
| X23    | M12G   | YEL    | X552   |
| X76    | M12H   | YEL    | X508   |
| X521   | M12J   | YEL    | X41    |
| X569   | M12K   | YEL    | X60    |
| X537   | M12L   | YEL    | X548   |
| X537   | M12M   | YEL    | X521   |
| X521   | M12N   | YEL    | X569   |
| X552   | M12P   | YEL    | X514   |
| X514   | M12Q   | YEL    | X508   |
| X508   | M12R   | YEL    | X569   |
| X591   | M12S   | YEL    | X552   |
| X53    | M13    | LT GRN | X535   |
| H2     | M13A   | LT GRN | X590   |
| R2     | M13B   | LT GRN | X590   |
| R1     | M13C   | LT GRN | X547   |
| X1     | M13D   | LT GRN | X520   |
| X31    | M13E   | LT GRN | X547   |
| X72    | M13F   | LT GRN | X513   |
| X23    | M13G   | LT GRN | X551   |
| X76    | M13H   | LT GRN | X509   |
| X520   | M13J   | LT GRN | X41    |
| X570   | M13K   | LT GRN | X60    |
| X535   | M13L   | LT GRN | X547   |
| X535   | M13M   | LT GRN | X520   |
| X520   | M13N   | LT GRN | X570   |
| X551   | M13P   | LT GRN | X513   |
| X513   | M13Q   | LT GRN | X509   |
| X509   | M13R   | LT GRN | X570   |

| END #1 | NUMBER | COLOR  | END #2 |
|--------|--------|--------|--------|
| X590   | M13S   | LT GRN | X551   |
| X71    | M18    | PUR    | X4     |
| X1     | M22    | YEL    | X573   |
| X103   | M22A   | YEL    | X524   |
| X104   | M22B   | YEL    | X504   |
| X41    | M22C   | YEL    | X500   |
| X500   | M22D   | YEL    | R4     |
| X504   | M22E   | YEL    | X86    |
| X573   | M22F   | YEL    | X500   |
| X524   | M22G   | YEL    | X504   |
| X573   | M22H   | YEL    | X524   |
| X1     | M23    | LT GRN | X574   |
| X103   | M23A   | LT GRN | X523   |
| X104   | M23B   | LT GRN | X505   |
| X41    | M23C   | LT GRN | X501   |
| X501   | M23D   | LT GRN | R4     |
| X505   | M23E   | LT GRN | X86    |
| X574   | M23F   | LT GRN | X501   |
| X523   | M23G   | LT GRN | X505   |
| X574   | M23H   | LT GRN | X523   |
| X23    | M28    | PUR    | X3     |
| X3     | N01    | YEL    | X41    |
| X71    | N02    | YEL    | X4     |
| X23    | N03    | YEL    | X22    |
| X3     | N04    | YEL    | X23    |
| X43    | N05    | YEL    | X3     |
| X40    | N06    | YEL    | B27    |
| X40    | N08    | YEL    | X86    |
| X71    | N10    | YEL    | X4     |
| X40    | N12    | YEL    | X87    |
| X41    | N14    | YEL    | X3     |
| X40    | N86    | YEL    | X67    |
| X40    | N87    | YEL    | X67    |
| X75    | P01    | RED    | X13    |
| X53    | P02    | RED    | X13    |
| X72    | P03    | RED    | X517   |
| X72    | P03A   | RED    | X517   |
| X72    | P03B   | RED    | X517   |
| X72    | P03C   | RED    | X517   |
| X517   | P03D   | RED    | X13    |
| X13    | P04    | RED    | X35    |
| S21    | P05    | RED    | X14    |
| X33    | P08    | RED    | X530   |
| X530   | P08A   | RED    | X88    |
| X530   | P08B   | RED    | X10    |
| X18    | P09    | RED    | X35    |
| X72    | P10    | RED    | X18    |
| A4     | P11    | RED    | X528   |
| X27    | P11A   | RED    | X528   |
| S4     | P11B   | RED    | X560   |
| X528   | P11C   | RED    | X18    |
| X560   | P11D   | RED    | X18    |

| END #1 | NUMBER | COLOR | END #2 |
|--------|--------|-------|--------|
| X560   | P11E   | RED   | X67    |
| H2     | P13    | RED   | X542   |
| X30    | P13A   | RED   | X542   |
| X542   | P13B   | RED   | X105   |
| X542   | P13C   | RED   | H1     |
| X542   | P13D   | RED   | X13    |
| X16    | P16    | RED   | X20    |
| X17    | P17    | RED   | X19    |
| X23    | P18    | RED   | X581   |
| X23    | P18A   | RED   | X581   |
| X581   | P18B   | RED   | X13    |
| X86    | P20    | RED   | X18    |
| X12    | P21    | RED   | X583   |
| X583   | P21A   | RED   | X41    |
| X583   | P21B   | RED   | X41    |
| X543   | P23    | RED   | X3     |
| S13    | P23A   | RED   | X543   |
| X543   | P23B   | RED   | X10    |
| X543   | P23C   | RED   | X67    |
| X526   | P28    | RED   | X23    |
| X27    | P28A   | RED   | X526   |
| X27    | P28B   | RED   | X526   |
| X27    | P28C   | RED   | X526   |
| X30    | P28D   | RED   | X526   |
| X526   | P28E   | RED   | X2     |
| X526   | P28F   | RED   | X17    |
| X31    | P29    | RED   | X17    |
| X75    | P31    | RED   | X17    |
| X3     | P32    | RED   | X507   |
| X507   | P32A   | RED   | X101   |
| X507   | P32B   | RED   | X17    |
| H2     | P33    | RED   | X12    |
| X10    | P38    | RED   | X4     |
| X22    | P40    | RED   | X10    |
| X103   | P41    | RED   | X561   |
| X18    | P41A   | RED   | X561   |
| X561   | P41B   | RED   | X86    |
| X1     | P49    | RED   | X11    |
| X5     | P49A   | RED   | X11    |
| M3     | P55    | RED   | X544   |
| X544   | P55A   | RED   | X10    |
| X544   | P55B   | RED   | X5     |
| X10    | P56    | RED   | X104   |
| X71    | P65-A  | RED   | X4     |
| X41    | P66    | RED   | X60    |
| X43    | P68    | RED   | X67    |
| X105   | P69    | RED   | X539   |
| X539   | P69A   | RED   | X43    |
| X539   | P69B   | RED   | X3     |
| X539   | P69C   | RED   | B27    |
| X539   | P69D   | RED   | X87    |
| X40    | P70    | RED   | X67    |

| END #1 | NUMBER | COLOR | END #2 |
|--------|--------|-------|--------|
| X71    | P71    | RED   | X4     |
| X71    | P72    | ORG   | X4     |
| X71    | P73    | RED   | X4     |
| B14    | P74    | RED   | X72    |
| X71    | P75    | RED   | X4     |
| B33    | P77    | RED   | X23    |
| X23    | P78    | RED   | X553   |
| X23    | P78A   | RED   | X553   |
| X553   | P78B   | RED   | X22    |
| X23    | P79    | RED   | X554   |
| X23    | P79A   | RED   | X554   |
| X554   | P79B   | RED   | X3     |
| X554   | P79C   | RED   | X22    |
| X94    | P83    | RED   | X545   |
| X582   | P83A   | RED   | X95    |
| X582   | P83B   | RED   | X5     |
| X545   | P83C   | RED   | X35    |
| X11    | P83D   | RED   | X582   |
| X17    | P83E   | RED   | X582   |
| X545   | P83F   | RED   | X582   |
| X5     | P84    | RED   | X579   |
| X579   | P84A   | RED   | X77    |
| X579   | P84B   | RED   | X35    |
| X71    | R03    | BLK   | X4     |
| X71    | R04    | BLK   | X4     |
| X23    | R06    | BLK   | X22    |
| X23    | R09    | BLK   | X549   |
| X22    | R09A   | BLK   | X549   |
| X22    | R09B   | BLK   | X549   |
| X22    | R09C   | BLK   | X549   |
| X53    | R12    | BLK   | X533   |
| H2     | R12A   | BLK   | X589   |
| R2     | R12B   | BLK   | X589   |
| R1     | R12C   | BLK   | X546   |
| X1     | R12D   | BLK   | X519   |
| X31    | R12E   | BLK   | X546   |
| X72    | R12F   | BLK   | X512   |
| X23    | R12G   | BLK   | X550   |
| X76    | R12H   | BLK   | X510   |
| X519   | R12J   | BLK   | X41    |
| X571   | R12K   | BLK   | X60    |
| X533   | R12L   | BLK   | X546   |
| X533   | R12M   | BLK   | X519   |
| X519   | R12N   | BLK   | X571   |
| X550   | R12P   | BLK   | X512   |
| X512   | R12Q   | BLK   | X510   |
| X510   | R12R   | BLK   | X571   |
| X589   | R12S   | BLK   | X550   |
| X510   | R12T   | BLK   | X109   |
| X71    | R14    | BLK   | X4     |
| X71    | R15    | BLK   | X4     |
| X71    | R18    | BLK   | X4     |

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| END #1 | NUMBER | COLOR | END #2 |
|--------|--------|-------|--------|
| X541   | A01    | ORG   | X40    |
| X541   | A01A   | ORG   | X31    |
| X30    | A01B   | ORG   | X541   |
| X40    | A03    | ORG   | X67    |
| X3     | A04    | ORG   | X43    |
| X3     | A05    | ORG   | X43    |
| X4     | A06    | ORG   | X9     |
| M3     | A07    | ORG   | X43    |
| M3     | A08    | ORG   | X43    |
| M3     | A09    | ORG   | X41    |
| X6     | A11    | ORG   | X43    |
| X6     | A12    | ORG   | X43    |
| X6     | A13    | ORG   | X41    |
| S21    | A15    | ORG   | X578   |
| X578   | A15A   | ORG   | X9     |
| X40    | A15B   | ORG   | X578   |
| M7     | A15C   | ORG   | X578   |
| S21    | A16    | ORG   | X9     |
| S21    | A17    | ORG   | X9     |
| S21    | A18    | ORG   | X8     |
| X7     | A20    | ORG   | X41    |
| X75    | A23    | ORG   | X641   |
| X641   | A23A   | ORG   | X121   |
| X641   | A23B   | ORG   | X86    |
| X47    | A24    | ORG   | X88    |
| X5     | A31    | ORG   | X43    |
| X17    | A32    | ORG   | X77    |
| X101   | A33    | ORG   | X11    |
| H2     | A34    | ORG   | X101   |
| X105   | A85    | ORG   | X41    |
| X105   | A86    | ORG   | X43    |
| X105   | A87    | ORG   | X101   |
| M1     | B02    | RED   | X555   |
| X555   | B02A   | RED   | K4     |
| X555   | B02B   | RED   | K3     |
| X555   | B02C   | RED   | X14    |
| X53    | B03    | RED   | X12    |
| X18    | B04    | RED   | K4     |
| X11    | B04A   | RED   | K4     |
| X3     | B05    | RED   | X43    |
| X584   | B10    | RED   | K4     |
| X15    | B10A   | RED   | X584   |
| X15    | B10B   | RED   | X584   |
| M1     | E01    | WHT   | K3     |
| M1     | E01A   | WHT   | V1     |
| V1     | E01B   | WHT   | X72    |
| X72    | E02    | WHT   | X516   |
| X516   | E02A   | WHT   | K3     |
| X516   | E02B   | WHT   | X18    |
| X71    | E05    | WHT   | X4     |
| X71    | E06    | GRY   | X4     |
| X71    | E07    | GRN   | X4     |

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| END #1 | NUMBER | COLOR | END #2 |
|--------|--------|-------|--------|
| X71    | E08    | VLT   | X4     |
| X71    | E09    | YEL   | X4     |
| X71    | E10    | BLU   | X4     |
| B14    | E12    | WHT   | X72    |
| X592   | E13    | WHT   | X71    |
| X71    | E15    | RED   | X4     |
| X72    | E24    | WHT   | X4     |
| X23    | G01    | BLK   | X503   |
| X23    | G01A   | BLK   | X503   |
| H2     | G01B   | BLK   | X503   |
| X53    | G01C   | BLK   | X525   |
| X27    | G01D   | BLK   | X525   |
| X1     | G01E   | BLK   | X525   |
| X503   | G01F   | BLK   | X558   |
| X31    | G01H   | BLK   | X525   |
| X2     | G01J   | BLK   | X503   |
| X525   | G01K   | BLK   | X41    |
| X525   | G01L   | BLK   | X41    |
| X525   | G01M   | BLK   | X60    |
| X503   | G01N   | BLK   | X525   |
| A4     | G04    | BLK   | X532   |
| A4     | G04A   | BLK   | X532   |
| A4     | G04B   | BLK   | X532   |
| X33    | G04C   | BLK   | X532   |
| X576   | G04D   | BLK   | V1     |
| X5     | G04E   | BLK   | X576   |
| X5     | G04F   | BLK   | X576   |
| X8     | G04G   | BLK   | X577   |
| X7     | G04H   | BLK   | X577   |
| X21    | G04J   | BLK   | X577   |
| X577   | G04L   | BLK   | K3     |
| X577   | G04M   | BLK   | K4     |
| X18    | G04N   | BLK   | X576   |
| X576   | G04R   | BLK   | X26    |
| X577   | G04S   | BLK   | X26    |
| X577   | G04T   | BLK   | M7     |
| X576   | G04U   | BLK   | X35    |
| X532   | G04V   | BLK   | X576   |
| X47    | G04W   | BLK   | X532   |
| X88    | G04X   | BLK   | X532   |
| X6     | G04Y   | BLK   | X577   |
| X67    | G05    | BLK   | X26    |
| X67    | G05-A  | BLK   | X26    |
| X572   | G06    | BLK   | X94    |
| X95    | G06A   | BLK   | X572   |
| X572   | G06B   | BLK   | X5     |
| X572   | G06C   | BLK   | X77    |
| X572   | G06D   | BLK   | X35    |
| X572   | G06E   | BLK   | X101   |
| X30    | G08    | BLK   | X642   |
| M3     | G08A   | BLK   | X642   |
| X109   | G08B   | BLK   | X642   |

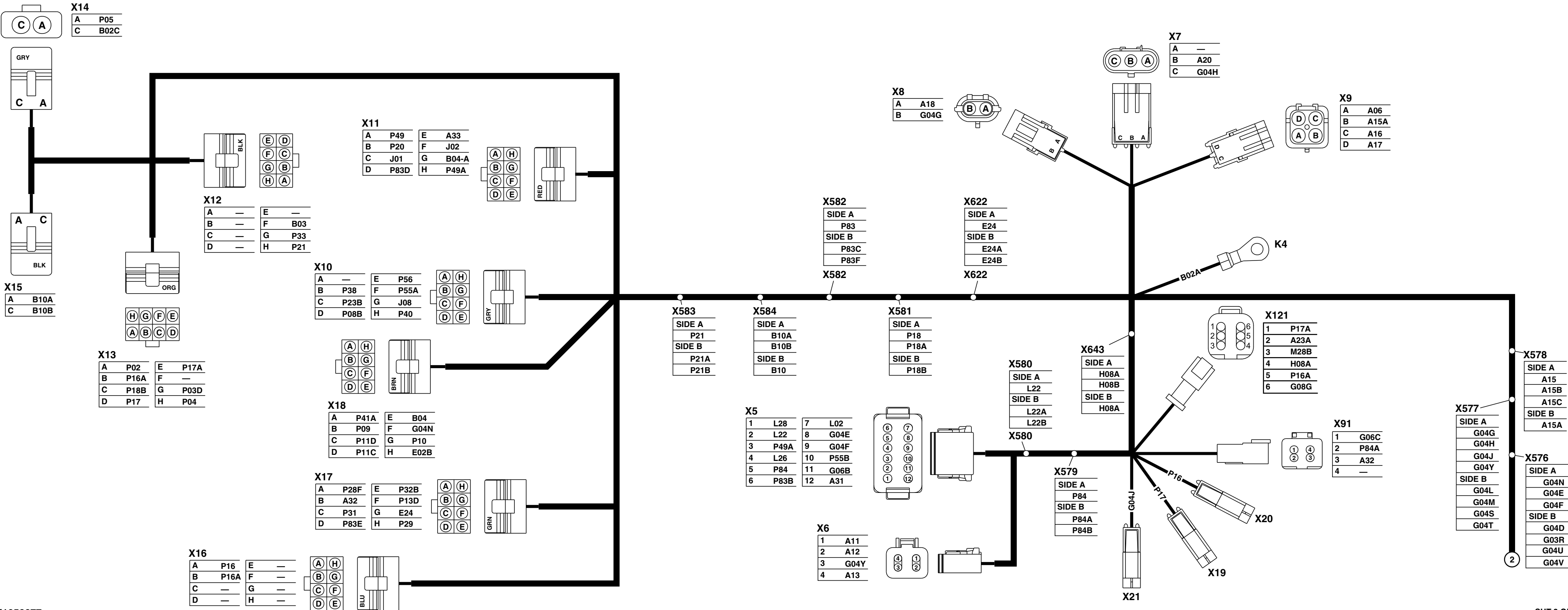
| END #1 | NUMBER | COLOR | END #2 |
|--------|--------|-------|--------|
| X109   | G08C   | BLK   | X642   |
| X642   | G08D   | BLK   | X214   |
| X642   | G08E   | BLK   | W26    |
| X642   | G08F   | BLK   | X116   |
| X642   | G08G   | BLK   | X121   |
| X558   | G11    | BLK   | X556   |
| X556   | G11A   | BLK   | X72    |
| X556   | G11B   | BLK   | X72    |
| X556   | G11C   | BLK   | X72    |
| X558   | G21    | BLK   | X557   |
| X557   | G21A   | BLK   | X104   |
| X557   | G21B   | BLK   | X567   |
| X557   | G21C   | BLK   | X86    |
| X103   | G21D   | BLK   | X557   |
| X567   | G21E   | BLK   | X101   |
| M1     | G22    | BLK   | X558   |
| X43    | H02    | GRN   | X67    |
| X40    | H04    | GRN   | X67    |
| X43    | H05    | GRN   | X67    |
| X643   | H08    | GRN   | X116   |
| X643   | H08A   | GRN   | X121   |
| X643   | H08B   | GRN   | X67    |
| S4     | H09    | GRN   | X67    |
| X31    | H10    | GRN   | X43    |
| X31    | H11    | GRN   | X40    |
| X31    | H12    | GRN   | X40    |
| X511   | H13    | GRN   | X43    |
| X3     | H13A   | GRN   | X511   |
| X4     | H13B   | GRN   | X511   |
| X43    | H15    | GRN   | X67    |
| X3     | H22    | GRN   | X41    |
| A4     | H23    | GRN   | X41    |
| X3     | H24    | GRN   | X43    |
| X3     | H26    | GRN   | X40    |
| X562   | H28    | GRN   | X67    |
| X40    | H28A   | GRN   | X562   |
| X43    | H28B   | GRN   | X562   |
| A4     | H33    | GRN   | X41    |
| A4     | H34    | GRN   | X41    |
| X3     | H35    | GRN   | X41    |
| X4     | J01    | TAN   | X11    |
| X75    | J02    | TAN   | X11    |
| X4     | J08    | TAN   | X10    |
| X43    | L02    | BRN   | X5     |
| X3     | L04    | BRN   | X40    |
| X3     | L06    | BRN   | X565   |
| X565   | L06A   | BRN   | X67    |
| X41    | L06B   | BRN   | X565   |
| X30    | L07    | BRN   | X41    |
| X3     | L09    | BRN   | X566   |
| X566   | L09A   | BRN   | X67    |
| X40    | L09B   | BRN   | X566   |

| END #1 | NUMBER | COLOR  | END #2 |
|--------|--------|--------|--------|
| X30    | L10    | BRN    | X41    |
| X3     | L12    | BRN    | X564   |
| X564   | L12A   | BRN    | X67    |
| X40    | L12B   | BRN    | X564   |
| X43    | L19    | BRN    | X67    |
| X53    | L20    | BRN    | X40    |
| X3     | L21    | BRN    | X43    |
| X5     | L22    | BRN    | X580   |
| X580   | L22A   | BRN    | X41    |
| X580   | L22B   | BRN    | X41    |
| X86    | L23    | BRN    | X41    |
| X41    | L24    | BRN    | X563   |
| X67    | L24A   | BRN    | X563   |
| X563   | L24B   | BRN    | X86    |
| X5     | L26    | BRN    | X43    |
| X5     | L28    | BRN    | X43    |
| X43    | L30    | BRN    | X86    |
| X73    | M02    | PUR    | X4     |
| X71    | M03    | PUR    | X4     |
| X71    | M04    | PUR    | X4     |
| X72    | M06    | PUR    | X4     |
| X23    | M07    | PUR    | X22    |
| X23    | M08    | PUR    | X22    |
| X23    | M09    | PUR    | X22    |
| X23    | M10    | PUR    | X22    |
| X53    | M12    | YEL    | X537   |
| H2     | M12A   | YEL    | X591   |
| R2     | M12B   | YEL    | X591   |
| R1     | M12C   | YEL    | X548   |
| X1     | M12D   | YEL    | X521   |
| X31    | M12E   | YEL    | X548   |
| X72    | M12F   | YEL    | X514   |
| X23    | M12G   | YEL    | X552   |
| X76    | M12H   | YEL    | X508   |
| X521   | M12J   | YEL    | X41    |
| X569   | M12K   | YEL    | X60    |
| X537   | M12L   | YEL    | X548   |
| X537   | M12M   | YEL    | X521   |
| X521   | M12N   | YEL    | X569   |
| X552   | M12P   | YEL    | X514   |
| X514   | M12Q   | YEL    | X508   |
| X508   | M12R   | YEL    | X569   |
| X591   | M12S   | YEL    | X552   |
| X53    | M13    | LT GRN | X535   |
| H2     | M13A   | LT GRN | X590   |
| R2     | M13B   | LT GRN | X590   |
| R1     | M13C   | LT GRN | X547   |
| X1     | M13D   | LT GRN | X520   |
| X31    | M13E   | LT GRN | X547   |
| X72    | M13F   | LT GRN | X513   |
| X23    | M13G   | LT GRN | X551   |
| X76    | M13H   | LT GRN | X509   |

| END #1 | NUMBER | COLOR  | END #2 |
|--------|--------|--------|--------|
| X520   | M13J   | LT GRN | X41    |
| X570   | M13K   | LT GRN | X60    |
| X535   | M13L   | LT GRN | X547   |
| X535   | M13M   | LT GRN | X520   |
| X520   | M13N   | LT GRN | X570   |
| X551   | M13P   | LT GRN | X513   |
| X513   | M13Q   | LT GRN | X509   |
| X509   | M13R   | LT GRN | X570   |
| X590   | M13S   | LT GRN | X551   |
| X71    | M18    | PUR    | X4     |
| X1     | M22    | YEL    | X573   |
| X103   | M22A   | YEL    | X524   |
| X104   | M22B   | YEL    | X504   |
| X41    | M22C   | YEL    | X500   |
| X500   | M22D   | YEL    | R4     |
| X504   | M22E   | YEL    | X86    |
| X573   | M22F   | YEL    | X500   |
| X524   | M22G   | YEL    | X504   |
| X573   | M22H   | YEL    | X524   |
| X1     | M23    | LT GRN | X574   |
| X103   | M23A   | LT GRN | X523   |
| X104   | M23B   | LT GRN | X505   |
| X41    | M23C   | LT GRN | X501   |
| X501   | M23D   | LT GRN | R4     |
| X505   | M23E   | LT GRN | X86    |
| X574   | M23F   | LT GRN | X501   |
| X523   | M23G   | LT GRN | X505   |
| X574   | M23H   | LT GRN | X523   |
| X23    | M28    | PUR    | X644   |
| X644   | M28A   | PUR    | X3     |
| X644   | M28B   | PUR    | X121   |
| X3     | N01    | YEL    | X41    |
| X71    | N02    | YEL    | X4     |
| X23    | N03    | YEL    | X22    |
| X3     | N04    | YEL    | X23    |
| X43    | N05    | YEL    | X3     |
| X40    | N06    | YEL    | B27    |
| X40    | N08    | YEL    | X86    |
| X71    | N10    | YEL    | X4     |
| X40    | N12    | YEL    | X87    |
| X41    | N14    | YEL    | X3     |
| X40    | N86    | YEL    | X67    |
| X40    | N87    | YEL    | X67    |
| X75    | P01    | RED    | X13    |
| X53    | P02    | RED    | X13    |
| X72    | P03    | RED    | X517   |
| X72    | P03A   | RED    | X517   |
| X72    | P03B   | RED    | X517   |
| X72    | P03C   | RED    | X517   |
| X517   | P03D   | RED    | X13    |
| X13    | P04    | RED    | X35    |
| S21    | P05    | RED    | X14    |

| END #1 | NUMBER | COLOR | END #2 |
|--------|--------|-------|--------|
| X33    | P08    | RED   | X530   |
| X530   | P08A   | RED   | X88    |
| X530   | P08B   | RED   | X10    |
| X18    | P09    | RED   | X35    |
| X72    | P10    | RED   | X18    |
| A4     | P11    | RED   | X528   |
| X27    | P11A   | RED   | X528   |
| S4     | P11B   | RED   | X560   |
| X528   | P11C   | RED   | X18    |
| X560   | P11D   | RED   | X18    |
| X560   | P11E   | RED   | X67    |
| H2     | P13    | RED   | X542   |
| X30    | P13A   | RED   | X542   |
| X542   | P13B   | RED   | X105   |
| X542   | P13C   | RED   | H1     |
| X542   | P13D   | RED   | X13    |
| X16    | P16    | RED   | X20    |
| X121   | P16A   | RED   | X16    |
| X17    | P17    | RED   | X19    |
| X121   | P17A   | RED   | X13    |
| X23    | P18    | RED   | X581   |
| X23    | P18A   | RED   | X581   |
| X581   | P18B   | RED   | X13    |
| X86    | P20    | RED   | X18    |
| X12    | P21    | RED   | X583   |
| X583   | P21A   | RED   | X41    |
| X583   | P21B   | RED   | X41    |
| X543   | P23    | RED   | X3     |
| S13    | P23A   | RED   | X543   |
| X543   | P23B   | RED   | X10    |
| X543   | P23C   | RED   | X67    |
| X526   | P28    | RED   | X23    |
| X27    | P28A   | RED   | X526   |
| X27    | P28B   | RED   | X526   |
| X27    | P28C   | RED   | X526   |
| X30    | P28D   | RED   | X526   |
| X526   | P28E   | RED   | X2     |
| X526   | P28F   | RED   | X17    |
| X31    | P29    | RED   | X17    |
| X75    | P31    | RED   | X17    |
| X3     | P32    | RED   | X507   |
| X507   | P32A   | RED   | X101   |
| X507   | P32B   | RED   | X17    |
| H2     | P33    | RED   | X12    |
| X10    | P38    | RED   | X4     |
| X22    | P40    | RED   | X10    |
| X103   | P41    | RED   | X561   |
| X18    | P41A   | RED   | X561   |
| X561   | P41B   | RED   | X86    |
| X1     | P49    | RED   | X11    |
| X5     | P49A   | RED   | X11    |
| M3     | P55    | RED   | X544   |

| END #1 | NUMBER | COLOR | END #2 |
|--------|--------|-------|--------|
| X544   | P55A   | RED   | X10    |
| X544   | P55B   | RED   | X5     |
| X10    | P56    | RED   | X104   |
| X71    | P65-A  | RED   | X4     |
| X41    | P66    | RED   | X60    |
| X43    | P68    | RED   | X67    |
| X105   | P69    | RED   | X539   |
| X539   | P69A   | RED   | X43    |
| X539   | P69B   | RED   | X3     |
| X539   | P69C   | RED   | B27    |
| X539   | P69D   | RED   | X87    |
| X40    | P70    | RED   | X67    |
| X71    | P71    | RED   | X4     |
| X71    | P72    | ORG   | X4     |
| X71    | P73    | RED   | X4     |
| B14    | P74    | RED   | X72    |
| X71    | P75    | RED   | X4     |
| B33    | P77    | RED   | X23    |
| X23    | P78    | RED   | X553   |
| X23    | P78A   | RED   | X553   |
| X553   | P78B   | RED   | X22    |
| X23    | P79    | RED   | X554   |
| X23    | P79A   | RED   | X554   |
| X554   | P79B   | RED   | X3     |
| X554   | P79C   | RED   | X22    |
| X94    | P83    | RED   | X545   |
| X582   | P83A   | RED   | X95    |
| X582   | P83B   | RED   | X5     |
| X545   | P83C   | RED   | X35    |
| X11    | P83D   | RED   | X582   |
| X17    | P83E   | RED   | X582   |
| X545   | P83F   | RED   | X582   |
| X5     | P84    | RED   | X579   |
| X579   | P84A   | RED   | X77    |
| X579   | P84B   | RED   | X35    |
| X71    | R03    | BLK   | X4     |
| X71    | R04    | BLK   | X4     |
| X23    | R06    | BLK   | X22    |
| X23    | R09    | BLK   | X549   |
| X22    | R09A   | BLK   | X549   |
| X22    | R09B   | BLK   | X549   |
| X22    | R09C   | BLK   | X549   |
| X53    | R12    | BLK   | X533   |
| H2     | R12A   | BLK   | X589   |
| R2     | R12B   | BLK   | X589   |
| R1     | R12C   | BLK   | X546   |
| X1     | R12D   | BLK   | X519   |
| X31    | R12E   | BLK   | X546   |
| X72    | R12F   | BLK   | X512   |
| X23    | R12G   | BLK   | X550   |
| X76    | R12H   | BLK   | X510   |
| X519   | R12J   | BLK   | X41    |





## System Diagrams

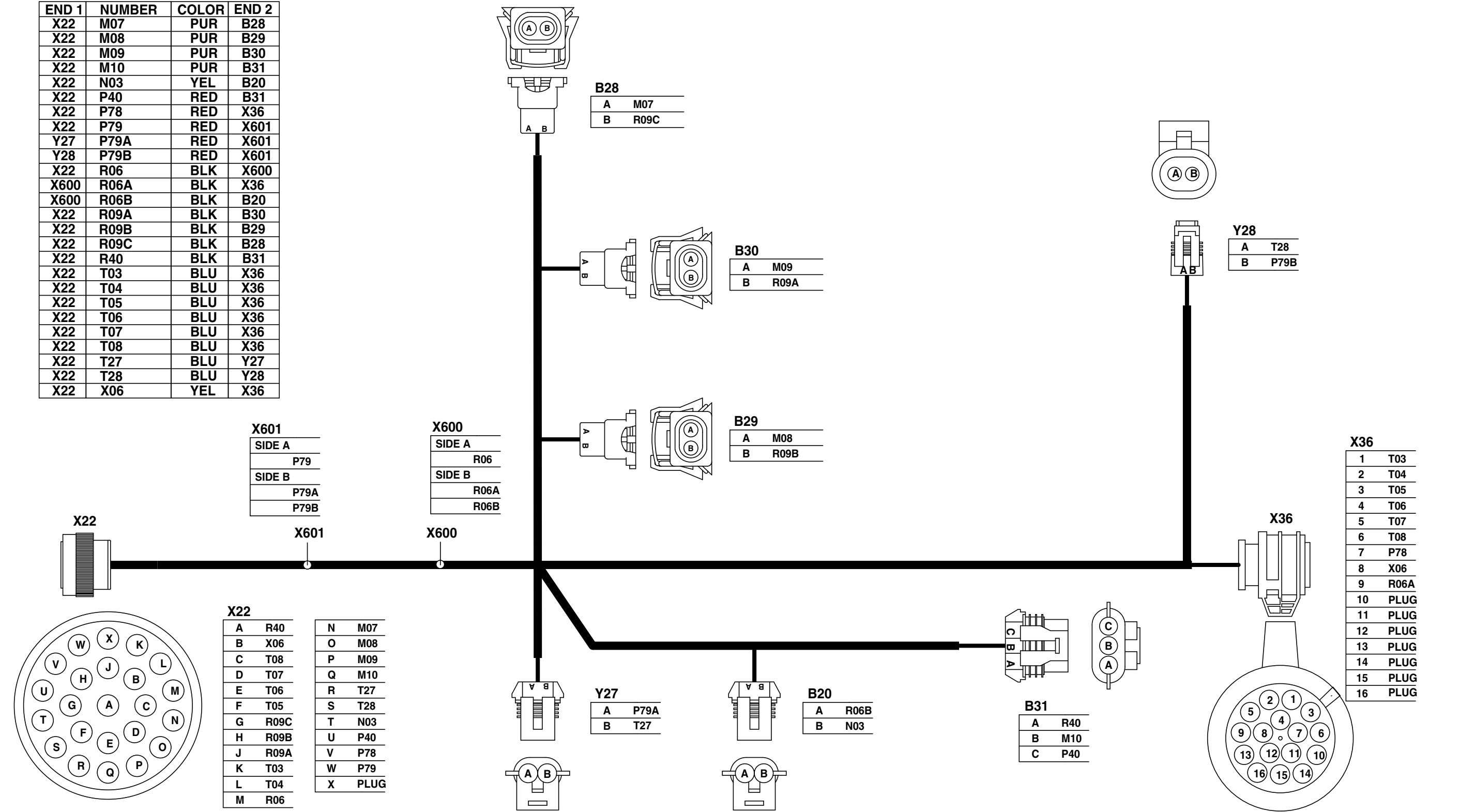
|                                                            |                                                                  |                                                           |                                     |
|------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------|
| B8—Hydraulic System Pressure Sensor                        | M2—Front Washer Pump                                             | X115— Engine Compartment Light 2-Pin Connector (not used) | Y13— Differential Lock Solenoid     |
| B15— Hydraulic Oil Temperature Sensor                      | M4—Rear Washer Pump                                              | X617— G02 BLK Splice                                      | Y14— Pilot Enable Solenoid          |
| B21— Hydraulic Oil Filter Restriction Switch               | X83— Power Limiting Solenoid 2-Pin Connector (not used)          | X618— L30 BRN Splice                                      | Y15— Boom Down Accumulator Solenoid |
| B34— Park Brake Pressure Switch (closes with low pressure) | X114— Engine Compartment Light Switch 2-Pin Connector (not used) | X619— H24 GRN Splice                                      | Y19— Park Brake Release Solenoid    |
|                                                            |                                                                  | Y7— Start Aid Solenoid (if equipped)                      |                                     |

AA95137,00013A6 -19-29JUL08-4/4

Transmission Harness (W10) Wiring Diagram

TX1123713 —UN—04OCT12

| END 1 | NUMBER | COLOR | END 2 |
|-------|--------|-------|-------|
| X22   | M07    | PUR   | B28   |
| X22   | M08    | PUR   | B29   |
| X22   | M09    | PUR   | B30   |
| X22   | M10    | PUR   | B31   |
| X22   | N03    | YEL   | B20   |
| X22   | P40    | RED   | B31   |
| X22   | P78    | RED   | X36   |
| X22   | P79    | RED   | X601  |
| Y27   | P79A   | RED   | X601  |
| Y28   | P79B   | RED   | X601  |
| X22   | R06    | BLK   | X600  |
| X600  | R06A   | BLK   | X36   |
| X600  | R06B   | BLK   | B20   |
| X22   | R09A   | BLK   | B30   |
| X22   | R09B   | BLK   | B29   |
| X22   | R09C   | BLK   | B28   |
| X22   | R40    | BLK   | B31   |
| X22   | T03    | BLU   | X36   |
| X22   | T04    | BLU   | X36   |
| X22   | T05    | BLU   | X36   |
| X22   | T06    | BLU   | X36   |
| X22   | T07    | BLU   | X36   |
| X22   | T08    | BLU   | X36   |
| X22   | T27    | BLU   | Y27   |
| X22   | T28    | BLU   | Y28   |
| X22   | X06    | YEL   | X36   |



TX1123713

Continued on next page

Transmission Harness (W10) Wiring Diagram

DF89619,00B5277 -19-15OCT12-1/2

Cab Roof Harness (W19) Wiring Diagram

XJ1177346 —UN—11NOV14

| END #1 | NUMBER | COLOR | END #2 |
|--------|--------|-------|--------|
| X6     | A11    | ORG   | M5     |
| X6     | A12    | ORG   | M5     |
| X6     | A13    | ORG   | M5     |
| X5     | A31    | ORG   | X621   |
| E14    | A31A   | ORG   | X621   |
| E13    | A31B   | ORG   | X621   |
| X5     | G04    | BLK   | X607   |
| X607   | G04A   | BLK   | E20    |
| X607   | G04B   | BLK   | E22    |
| X608   | G04C   | BLK   | E21    |
| X608   | G04D   | BLK   | E23    |
| X5     | G04E   | BLK   | X608   |
| X612   | G04G   | BLK   | E15    |
| X612   | G04H   | BLK   | M5     |
| X612   | G04J   | BLK   | S29    |
| X607   | G04K   | BLK   | E24    |
| X608   | G04L   | BLK   | E25    |
| X612   | G04M   | BLK   | S28    |
| X612   | G04N   | BLK   | X6     |
| X608   | G04P   | BLK   | E14    |
| X607   | G04R   | BLK   | E13    |
| X5     | G06    | BLK   | X34    |
| S28    | G07    | BLK   | S29    |
| X5     | L02    | BRN   | X611   |
| E20    | L02A   | BRN   | X611   |
| E21    | L02C   | BRN   | X611   |
| X5     | L22    | BRN   | E15    |
| X5     | L26    | BRN   | X610   |
| E23    | L26A   | BRN   | X610   |
| E22    | L26B   | BRN   | X610   |
| X5     | L28    | BRN   | X609   |
| X609   | L28A   | BRN   | X25    |
| X609   | L28B   | BRN   | X24    |
| X5     | P49    | RED   | E18    |
| X5     | P55    | RED   | M5     |
| X5     | P83    | RED   | X34    |
| X5     | P84    | RED   | X34    |

|    |      |
|----|------|
| X5 |      |
| 1  | L28  |
| 2  | L22  |
| 3  | P49  |
| 4  | L26  |
| 5  | P84  |
| 6  | P83  |
| 7  | L02  |
| 8  | G04  |
| 9  | G04E |
| 10 | P55  |
| 11 | G05  |
| 12 | A31  |

|    |      |
|----|------|
| X6 |      |
| 1  | A11  |
| 2  | A12  |
| 3  | G04N |
| 4  | A13  |

|     |      |
|-----|------|
| E24 |      |
| 1   | L28B |
| 2   | G04K |

|     |      |
|-----|------|
| E13 |      |
| 1   | A31B |
| 2   | G04R |

|     |      |
|-----|------|
| E20 |      |
| 1   | L02A |
| 2   | G04A |

|        |      |
|--------|------|
| X610   |      |
| SIDE A | L26  |
| SIDE B | L26A |
|        | L26B |

|        |      |
|--------|------|
| X611   |      |
| SIDE A | L02  |
| SIDE B | L02A |
|        | L02B |

|        |      |
|--------|------|
| X609   |      |
| SIDE A | L28  |
| SIDE B | L28A |
|        | L28B |

|     |      |
|-----|------|
| E25 |      |
| 1   | L28A |
| 2   | G04L |

|     |      |
|-----|------|
| E21 |      |
| 1   | L02C |
| 2   | G04C |

|        |      |
|--------|------|
| X607   |      |
| SIDE A | G04A |
|        | G04K |
|        | G04R |
| SIDE B | G04  |
|        | G04B |

|        |      |
|--------|------|
| X621   |      |
| SIDE A | A31B |
| SIDE B | A31  |
|        | A31A |

X621

|        |      |
|--------|------|
| X612   |      |
| SIDE A | G04J |
|        | G04M |
| SIDE B | G04G |
|        | G04H |
|        | G04N |

|     |      |
|-----|------|
| E23 |      |
| 1   | L26A |
| 2   | G04D |

|     |      |
|-----|------|
| E22 |      |
| 1   | L26B |
| 2   | G04B |

|     |      |
|-----|------|
| E15 |      |
| A   | G04G |
| B   | L22  |

|    |      |
|----|------|
| M5 |      |
| 1  | —    |
| 2  | G04H |
| 3  | A13  |
| 4  | A12  |
| 5  | A11  |
| 6  | P55  |

XJ1177346

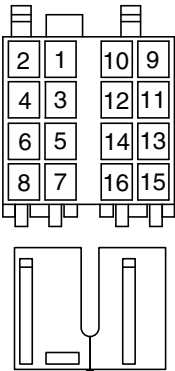
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Cab Roof Harness (W19) Wiring Diagram

BP63692,0000283 -19-11NOV14-1/2

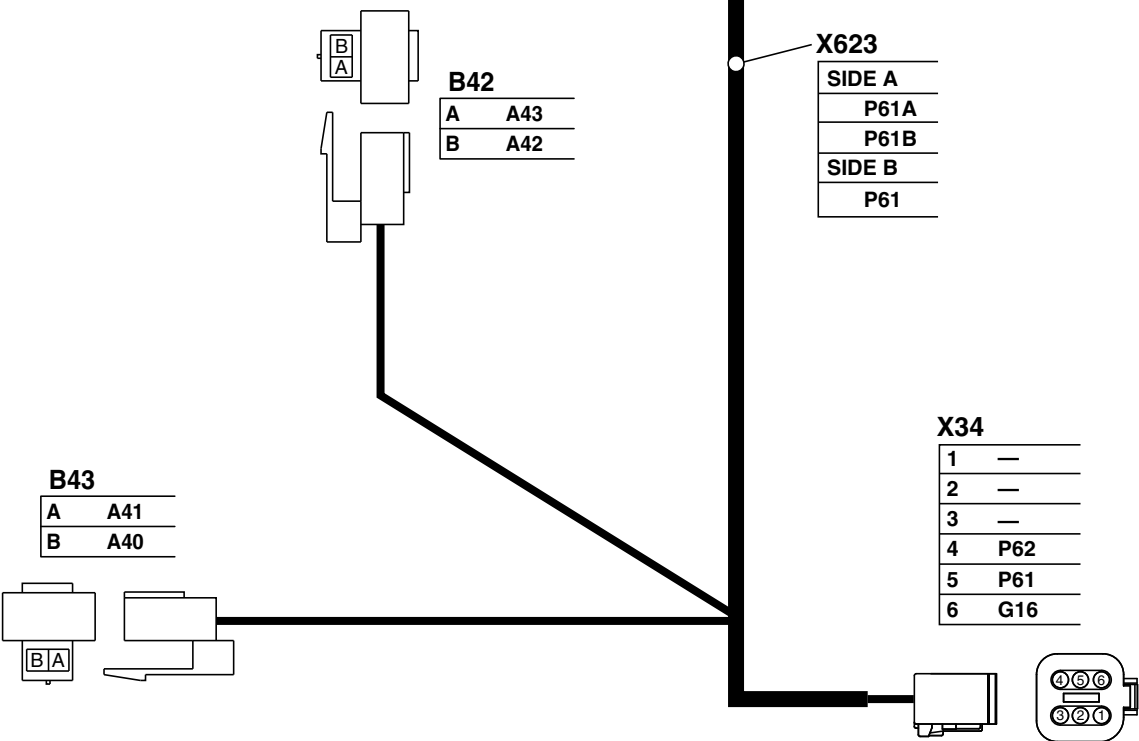
Radio Harness (W23) Wiring Diagram

| END #1 | NUMBER | COLOR | END #2 |
|--------|--------|-------|--------|
| A5     | A40    | ORG   | B43    |
| A5     | A41    | ORG   | B43    |
| A5     | A42    | ORG   | B42    |
| A5     | A43    | ORG   | B42    |
| A5     | G16    | BLK   | X34    |
| X34    | P61    | RED   | X623   |
| A5     | P61A   | RED   | X623   |
| A5     | P61B   | RED   | X623   |
| A5     | P62    | RED   | X34    |



| A5 |      |
|----|------|
| 1  | —    |
| 2  | —    |
| 3  | —    |
| 4  | P61A |
| 5  | —    |
| 6  | P61B |
| 7  | P62  |
| 8  | G16  |

|    |     |
|----|-----|
| 9  | —   |
| 10 | —   |
| 11 | A40 |
| 12 | A41 |
| 13 | A42 |
| 14 | A43 |
| 15 | —   |
| 16 | —   |



TX1043473

Radio Harness (W23) Wiring Diagram

A5—Radio  
B42— Left Speaker  
B43— Right Speaker

X34— Cab Roof Harness-to-  
Radio Harness 6-Pin  
Connector

X623— P61 RED Splice

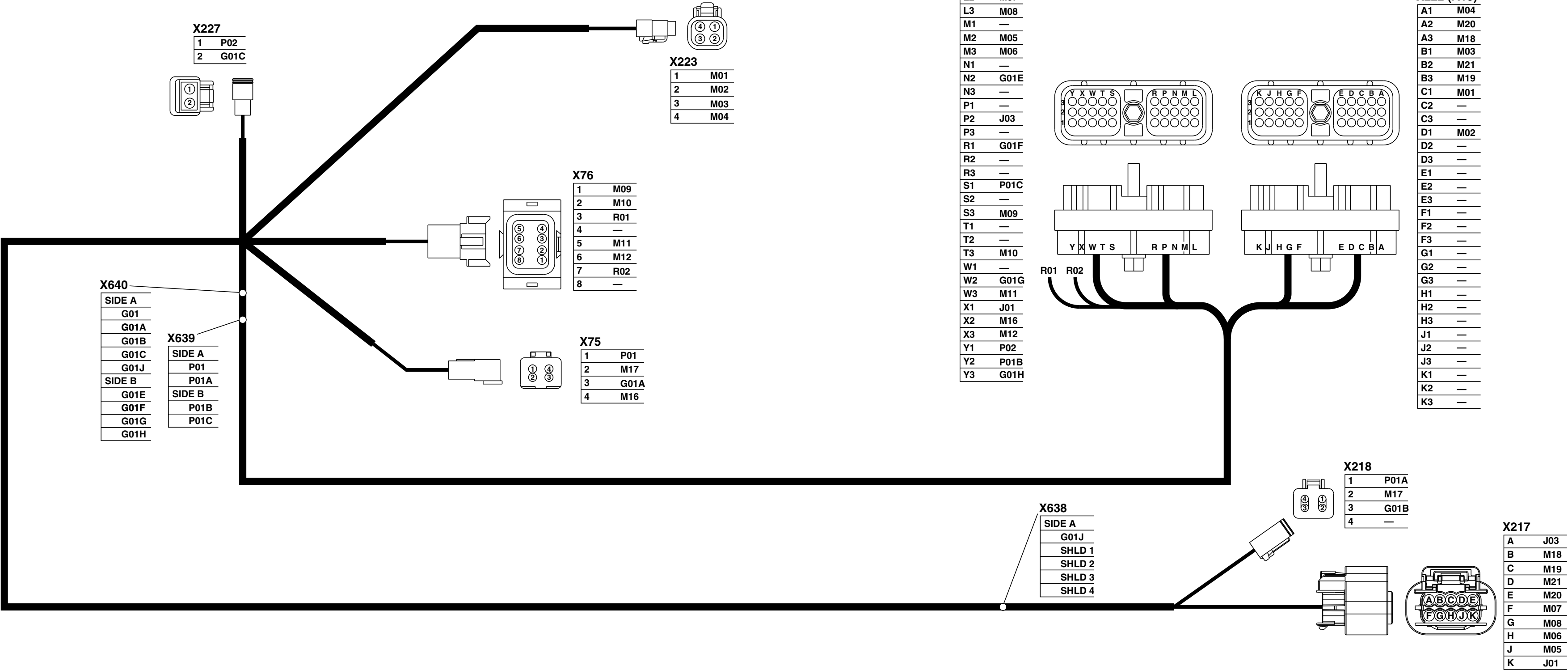
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TX1043473 —UN—03JAN12

Machine Information Gateway (MIG) Harness (W30) Wiring Diagram—If Equipped (S.N. —634735)

TX1041241 —UN—02JUL08

| END #1 | NUMBER | COLOR | END #2 |
|--------|--------|-------|--------|
| X640   | G01A   | BLK   | X75    |
| X640   | G01B   | BLK   | X218   |
| X640   | G01C   | BLK   | X227   |
| X221   | G01E   | BLK   | X640   |
| X221   | G01F   | BLK   | X640   |
| X221   | G01G   | BLK   | X640   |
| X221   | G01H   | BLK   | X640   |
| X640   | G01J   | BLK   | X638   |
| X221   | J01    | TAN   | X217   |
| X221   | J03    | TAN   | X217   |
| X222   | M01    | PUR   | X223   |
| X222   | M02    | PUR   | X223   |
| X222   | M03    | PUR   | X223   |
| X222   | M04    | PUR   | X223   |
| X221   | M05    | PUR   | X217   |
| X221   | M06    | PUR   | X217   |
| X221   | M07    | PUR   | X217   |
| X221   | M08    | PUR   | X217   |
| X221   | M09    | PUR   | X76    |
| X221   | M10    | PUR   | X76    |
| X221   | M11    | PUR   | X76    |
| X221   | M12    | PUR   | X76    |
| X221   | M16    | PUR   | X75    |
| X218   | M17    | PUR   | X75    |
| X222   | M18    | PUR   | X217   |
| X222   | M19    | PUR   | X217   |
| X222   | M20    | PUR   | X217   |
| X222   | M21    | PUR   | X217   |
| X639   | P01    | RED   | X75    |
| X639   | P01A   | RED   | X218   |
| X221   | P01B   | RED   | X639   |
| X221   | P01C   | RED   | X639   |
| X221   | P02    | RED   | X227   |
| X221   | R01    | RED   | X76    |
| X221   | R02    | RED   | X76    |
| X221   | SHLD 1 | BLK   | X638   |
| X221   | SHLD 2 | BLK   | X638   |
| X221   | SHLD 3 | BLK   | X638   |
| X221   | SHLD 4 | BLK   | X638   |



TX1041241

Continued on next page

Machine Information Gateway (MIG) Harness (W30) Wiring Diagram

OUO1065,0001C6F -19-13NOV13-4/5

|                                                           |                                                                           |                                                                 |                                                    |
|-----------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------|
| A1—Engine Control Unit (ECU)                              | H2—Advanced Display Unit (ADU)                                            | W25—Ground at Starter Motor                                     | X14— Vehicle Electrical Center 2-Pin GRY Connector |
| A2—Flex Load Controller (FLC)                             | K3—Start Relay                                                            | W26—Ground at Right Front Cab Leg                               | X15— Vehicle Electrical Center 2-Pin BLK Connector |
| A3—Transmission Control Unit (TCU)                        | K4—Ignition Relay                                                         | W27—Ground at Engine Frame (near starter)                       | X17— Vehicle Electrical Center 8-Pin GRN Connector |
| A6—Sealed Switch Module (SSM)                             | M1—Starter Motor                                                          | X3—Load Center Harness-to-Engine Frame Harness 31-Pin Connector | X18— Vehicle Electrical Center 8-Pin BRN Connector |
| B4—Crankshaft Position Sensor                             | S2—Battery Disconnect Switch                                              | X4—Load Center Harness-to-Engine Harness Connector              | X23— TCU Connector                                 |
| B5—Fuel Temperature Sensor                                | V1—Starter Coil Suppression 5-Amp Diode                                   | X10— Vehicle Electrical Center 8-Pin GRY Connector              | X48— Advanced Display Unit (ADU) 12-Pin Connector  |
| F02— Sealed Switch Module (SSM) Battery Power 5-Amp Fuse  | V2—Spare 3-Amp Diode (marked as Start Aid Solenoid Coil) (located on VEC) | X11— Vehicle Electrical Center 8-Pin RED Connector              | X68— 12-Volt Center Tap 1-Pin Connector            |
| F21— Flex Load Controller (FLC) Battery Power 10-Amp Fuse | V3—Ignition Relay 3-Amp Diode (located on VEC)                            | X12— Vehicle Electrical Center 8-Pin BLK Connector              | Y7—Start Aid Solenoid                              |
| F53— Alternator Excitation Ignition Power 5-Amp Fuse      | V4—Start Relay 3-Amp Diode (located on VEC)                               | X13— Vehicle Electrical Center 8-Pin ORG Connector              | Y8—High-Pressure Fuel Pump Solenoid                |
| G1—Batteries                                              | V5—Alternator Excitation 3-Amp Diode (located on VEC)                     |                                                                 |                                                    |
| G4—Alternator                                             | V7—Reverse Polarity Protection 3-Amp Diode (located on VEC)               |                                                                 |                                                    |
| G8—Vehicle Electrical Center (VEC)                        |                                                                           |                                                                 |                                                    |

Unswitched power is supplied to the following components:

- Starter Motor (M1)
- Alternator (G4)
- Start Relay (K3)
- Ignition Relay (K4)
- Sealed Switch Module (SSM) (A6) [from SSM Battery Power 5-Amp Fuse (F02)]
- Flex Load Controller (FLC) (A2) [from FLC Battery Power 10-Amp Fuse (F21)]

**Ignition ON**—When the ignition ON/engine START switch located on sealed switch module (SSM) (A6) is pushed once, current flows from terminal 3 of the SSM, through reverse polarity protection diode (V7), to the coil of ignition relay (K4), energizing the relay. With the ignition relay energized, current flows through the ignition relay to connector (X43) of flex load controller (FLC) (A2), powering up the FLC. For more information on the FLC, [see Flex Load Controller \(FLC\) Circuit Theory of Operation](#). (Group 9015-15.)

Power is also provided to engine control unit (ECU) (A1), transmission control unit (TCU) (A3), and advanced display unit (ADU) (H2). For power-up information of the ECU, TCU, and ADU, see the theory of operation of specific component:

- [Engine Control Unit \(ECU\) Circuit Theory of Operation](#). (Group 9015-15.)
- [Transmission Control Unit \(TCU\) Circuit Theory of Operation](#). (Group 9015-15.)
- [Advanced Display Unit \(ADU\) Circuit Theory of Operation](#). (Group 9015-15.)

When powered-up, the SSM sends a message across the controller area network (CAN) to the FLC that the ignition ON/engine START switch has been pushed. The FLC acknowledges by sending a message back to the SSM, causing the ignition power status LED to come on.

For more information concerning the CAN circuit, [see Controller Area Network \(CAN\) Theory of Operation](#). (Group 9015-15.)

**Anti-Theft Security System**—Upon ignition power-up, the FLC sends a request across the CAN data line to

the ECU to check the Lock/Unlock status of the ECU. If the ECU indicates that it is locked, then the FLC enables Security if not already enabled. A Security screen appears on the monitor requiring a valid PIN be entered before the engine can be started. For information on entering the PIN, [see Display Unit—Main Menu—Security](#). (Operator's Manual.)

The Security status (locked or unlocked) can be observed by accessing the DIAGNOSTICS / ENGINE SENSORS / PRESSURES/MISC submenu in the ADU menu structure. [See Display Unit—Main Menu—Diagnostics—Engine Sensors](#). (Operator's Manual.)

If a valid PIN is not entered within 5 minutes after ignition power-up, the FLC will turn off ignition power.

When the proper PIN is entered, the FLC sends an unlock request to the ECU. The ECU saves the unlocked state in nonvolatile memory, acknowledges the unlock request, and allows the engine to start (and run) until ignition power is turned off using the engine STOP/ignition OFF switch on the SSM.

When a PIN is required to start the engine and the delayed operator logout menu is not set to OFF, the engine can be restarted without reentering the PIN if the engine is started within 5 or 60 minutes (depending on setting) of stopping the engine.

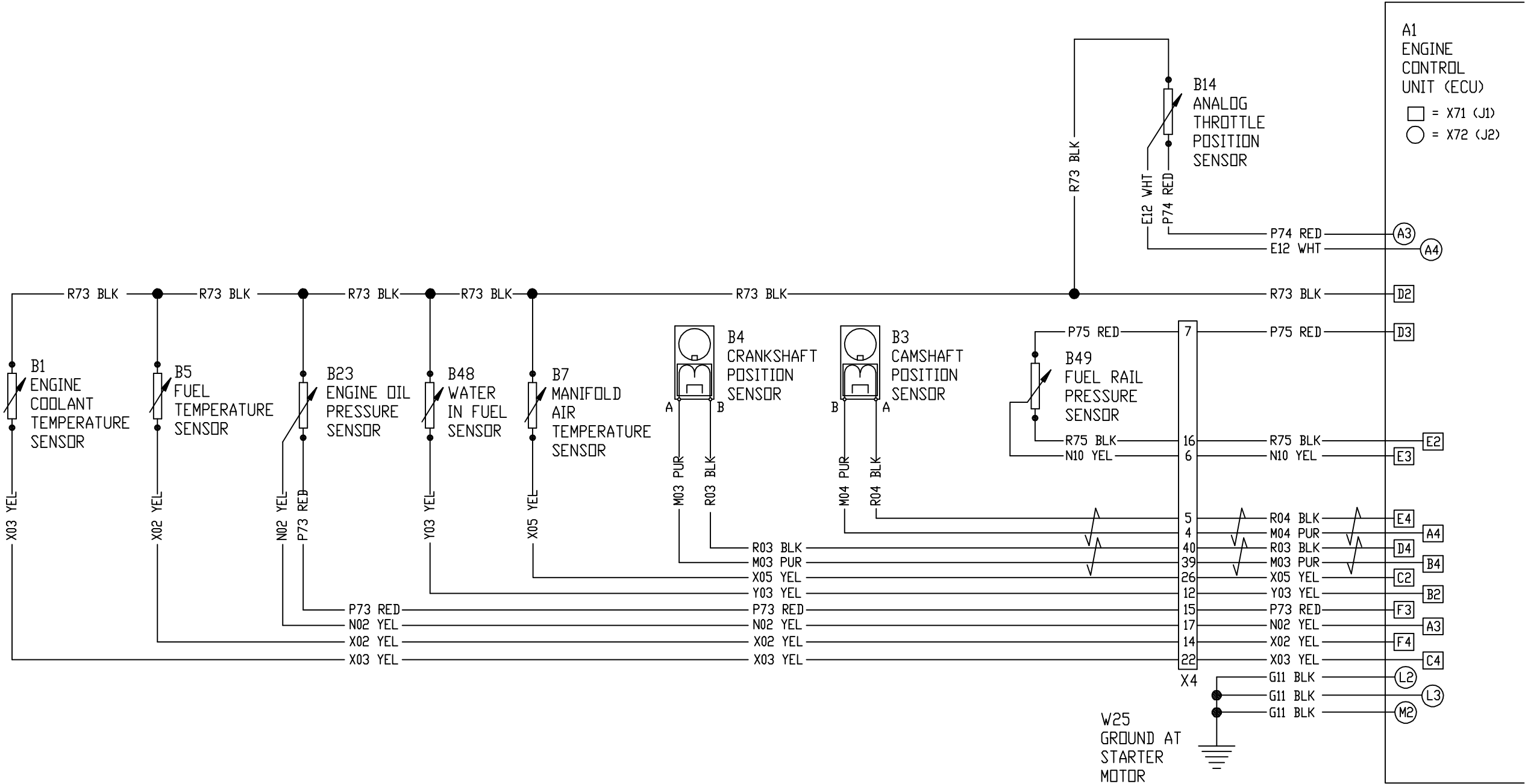
If OFF is selected in the delayed operator logout menu, the PIN needs to be entered at each startup. The delayed logout setting can be changed by accessing the SECURITY / DELAYED OPERATOR LOGOUT submenu in the ADU menu structure. [See Display Unit—Main Menu—Security—Delayed Operator Logout](#). (Operator's Manual.)

If ignition is powered up, but the engine is not started for 60 minutes after ignition ON, the FLC will turn off ignition power.

If the ECU indicates that it is unlocked and Security is not enabled, then pushing the ignition ON/engine START switch again starts the engine.

Continued on next page

OUO1010.0000ABF -19-27APR17-2/4



|                                                                         |                                                                  |                                                      |                                                                   |
|-------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------------|
| A2—Flex Load Controller (FLC)                                           | H2—Advanced Display Unit (ADU)                                   | X10— Vehicle Electrical Center 8-Pin GRY Connector   | X42— Flex Load Controller (FLC) Connector (J3) (BLU)              |
| A3—Transmission Control Unit (TCU)                                      | K4—Ignition Relay                                                | X11— Vehicle Electrical Center 8-Pin RED Connector   | X43— Flex Load Controller (FLC) Switch Power Connector (J4)       |
| A6—Sealed Switch Module (SSM)                                           | M1—Starter Motor                                                 | X12— Vehicle Electrical Center 8-Pin BLK Connector   | X48— Advanced Display Unit (ADU) 12-Pin Connector                 |
| B25— Steering System Pressure Switch (closes with high pressure)        | M8—Secondary Steering Pump Motor                                 | X13— Vehicle Electrical Center 8-Pin ORG Connector   | X68— 12-Volt Center Tap 1-Pin Connector                           |
| F02— Sealed Switch Module (SSM) Battery Power 5-Amp Fuse                | S2— Battery Disconnect Switch                                    | X14— Vehicle Electrical Center 2-Pin GRY Connector   | X86— Load Center Harness-to-Engine Frame Harness 12-Pin Connector |
| F21— Flex Load Controller (FLC) Battery Power 10-Amp Fuse               | V7— Reverse Polarity Protection 3-Amp Diode (located on VEC)     | X15— Vehicle Electrical Center 2-Pin BLK Connector   |                                                                   |
| F23— Differential Lock, Steering Pressure, Park Brake Switch 5-Amp Fuse | W25—Ground at Starter Motor                                      | X23— TCU Connector                                   |                                                                   |
| G1—Batteries                                                            | W26—Ground at Right Front Cab Leg                                | X40— Flex Load Controller (FLC) Connector (J1) (BRN) |                                                                   |
| G8—Vehicle Electrical Center (VEC)                                      | W27—Ground at Engine Frame (near starter)                        | X41— Flex Load Controller (FLC) Connector (J2) (BRN) |                                                                   |
|                                                                         | X3— Load Center Harness-to-Engine Frame Harness 31-Pin Connector |                                                      |                                                                   |
|                                                                         | X4— Load Center Harness-to-Engine Harness Connector              |                                                      |                                                                   |

**Flex Load Controller (FLC) (A2)**—The FLC controls and monitors the machine electrical systems and vehicle operations.

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

The FLC provides outputs that control various solenoids which, in turn, control and/or monitor many of the hydraulic functions on the machine.

The operator activates many of these functions using the sealed switch module (SSM) (A6). The SSM is a device that receives operator input through momentary switches. The SSM transmits the switch selection across the controller area network (CAN) to the FLC. The FLC uses the controller area network (CAN) to communicate with the other controllers. For more information on the CAN, see Controller Area Network (CAN) Theory of Operation. (Group 9015-15.)

The FLC interprets the CAN signals and determines if the input is valid or not. If the input is not valid for the machine options available or machine state, the input is ignored. If the input is valid, the appropriate function is activated. The SSM then receives confirmation that the function is activated and causes the appropriate LED on the switch button to come on to indicate that the function has been activated.

The status of the SSM switches can be read as a live value in the DIAGNOSTICS / SWITCH MODULE submenu of the ADU menu structure. See Display Unit—Main Menu—Diagnostics—Switch Module. (Operator's Manual.)

*NOTE: To check status of the SSM switches using the Diagnostics / Switch Module submenu, the engine must be off and ignition on.*

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

For more information on the SSM, see Switch Module Functions. (Operator's Manual.)

The FLC communicates much of the information to the advanced display unit (ADU) (H2), where the information is displayed. For more information on the ADU, see Advanced Display Unit (ADU) Circuit Theory of Operation. (Group 9015-15.)

The FLC also provides diagnostics in the form of diagnostic trouble codes for the systems it controls. For a list of flex load controller diagnostic trouble codes, see Flex Load Controller (FLC) Diagnostic Trouble Codes. (Group 9001-30.)

The FLC contains three types of digital on/off driver outputs that are controlled differently based upon the type of diagnostic trouble code (DTC) that occurs.

- 3-Amp (Dual Channel) Driver Output—Functions include: Horn, Detent Coils, Marker/Tail Lights, Turn Signals, All Solenoids (except proportional fan), Washer Pumps, Front/Rear Wiper High Speed, and Secondary Steering.
  - Open or Short—An open circuit or short to power condition is detected whenever the output is off. If the output is turned on, the software continues to drive the output so a technician can check voltage.
  - High Current—Detection of a high current condition occurs whenever the output is turned on and the driver detects an overload or over temperature condition. When the high current condition has been detected, the output turns off and only resets when the function or keyless switch is cycled.
 

**Exception:** The output for the turn signals resets every time the output is cycled and is not based upon the turn signal or hazard switch being cycled.

Continued on next page

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|                                               |                                                                  |                                                             |                                      |
|-----------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------|
| A2—Flex Load Controller (FLC)                 | G8—Vehicle Electrical Center (VEC)                               | X41— Flex Load Controller (FLC) Connector (J2) (BRN)        | Y15— Boom Down Accumulator Solenoid  |
| A4—Pilot Controller                           | S17— Return-to-Dig Switch (Z-Bar) (closed while sensing metal)   | X42— Flex Load Controller (FLC) Connector (J3) (BLU)        | Y20— Pin Disconnect Solenoid         |
| A6—Sealed Switch Module (SSM)                 | W26—Ground at Right Front Cab Leg                                | X43— Flex Load Controller (FLC) Switch Power Connector (J4) | Y40— RTC/Float Detent Coil           |
| B15— Hydraulic Oil Temperature Sensor         | W27—Ground at Engine Frame (near starter)                        | X67— Load Center Harness-to-Loader Frame Harness Connector  | Y41— Boom Height Kickout Detent Coil |
| B45— Analog BHKO/RTC Position Sensor          | X3— Load Center Harness-to-Engine Frame Harness 31-Pin Connector | Y14— Pilot Enable Solenoid                                  | Y42— Return-To-Dig Detent Coil       |
| B63— Rod-End Boom Cylinder Pressure Sensor    | X40— Flex Load Controller (FLC) Connector (J1) (BRN)             |                                                             |                                      |
| B64— Head-End Boom Cylinder Pressure Sensor   |                                                                  |                                                             |                                      |
| F11— RTD and Quick Shift Switches 10-Amp Fuse |                                                                  |                                                             |                                      |

**Pilot Enable/Boom Down**—When the ignition is ON and the engine is running, the hydraulic pilot controls can be enabled or disabled by pushing the pilot enable/boom down switch on the sealed switch module (SSM) (A6). When the pilot enable/boom down switch LED is on, the hydraulic pilot controls are enabled, allowing the hydraulic functions to be actuated.

When the hydraulic pilot controls are enabled, the FLC sends current out terminal A2 of FLC connector (X42) to pilot enable solenoid (Y14) and accumulator solenoid (Y15), energizing both solenoids.

Pushing the engine STOP/ignition OFF switch (on the SSM) to stop the engine also locks the hydraulic pilot control. When the engine is off, the boom down hydraulic function can be temporarily actuated to lower the boom. To do this, push the ignition ON/engine START switch (on the SSM) once to turn ignition ON, then push and hold the pilot enable/boom down switch while operating the pilot control lever (joystick). Holding the pilot enable/boom down switch energizes both the pilot enable solenoid and the accumulator solenoid, allowing oil pressure from the boom down accumulators to be used for pilot control. For hydraulic operation of pilot control, [see Pilot Pressure Reducing Valve Operation](#). (Group 9025-05.)

**Pilot Controller Detents**—The pilot controller (A4) controls the boom and bucket hydraulic functions. The pilot controller contains electromagnetic coils for the return-to-carry (Y40), boom height kickout (Y41), and return-to-dig (Y42) detents. The keyless ignition and pilot enable must be on (enabled) before any of the pilot controller detents become active.

**Return-to-Dig (RTD)**—This machine is equipped with Z-bar linkage. For Z-bar linkage machines, the return-to-dig function is enabled (left LED on) by pushing the return-to-dig enable switch on the sealed switch module (SSM) (A6). If no return-to-dig switch LEDs are on, the return-to-dig is disabled. The right LED is not used.

The return-to-dig switch (S17) is a metal sensing proximity switch mounted at the rod end of the bucket cylinder. When the return-to-dig function is enabled and the bucket is in the dump position, the return-to-dig switch senses a metal bar mounted to the Z-bar linkage. The metal bar, which is adjustable, causes the switch to close, allowing current from RTD and quick shift 10-amp fuse (F11) to flow to terminal C4 of FLC connector (X40).

When the FLC detects current at terminal C4 of FLC connector (X40), the FLC sends current out terminal D4 of FLC connector (X41) to the return-to-dig detent coil (Y42), energizing the coil.

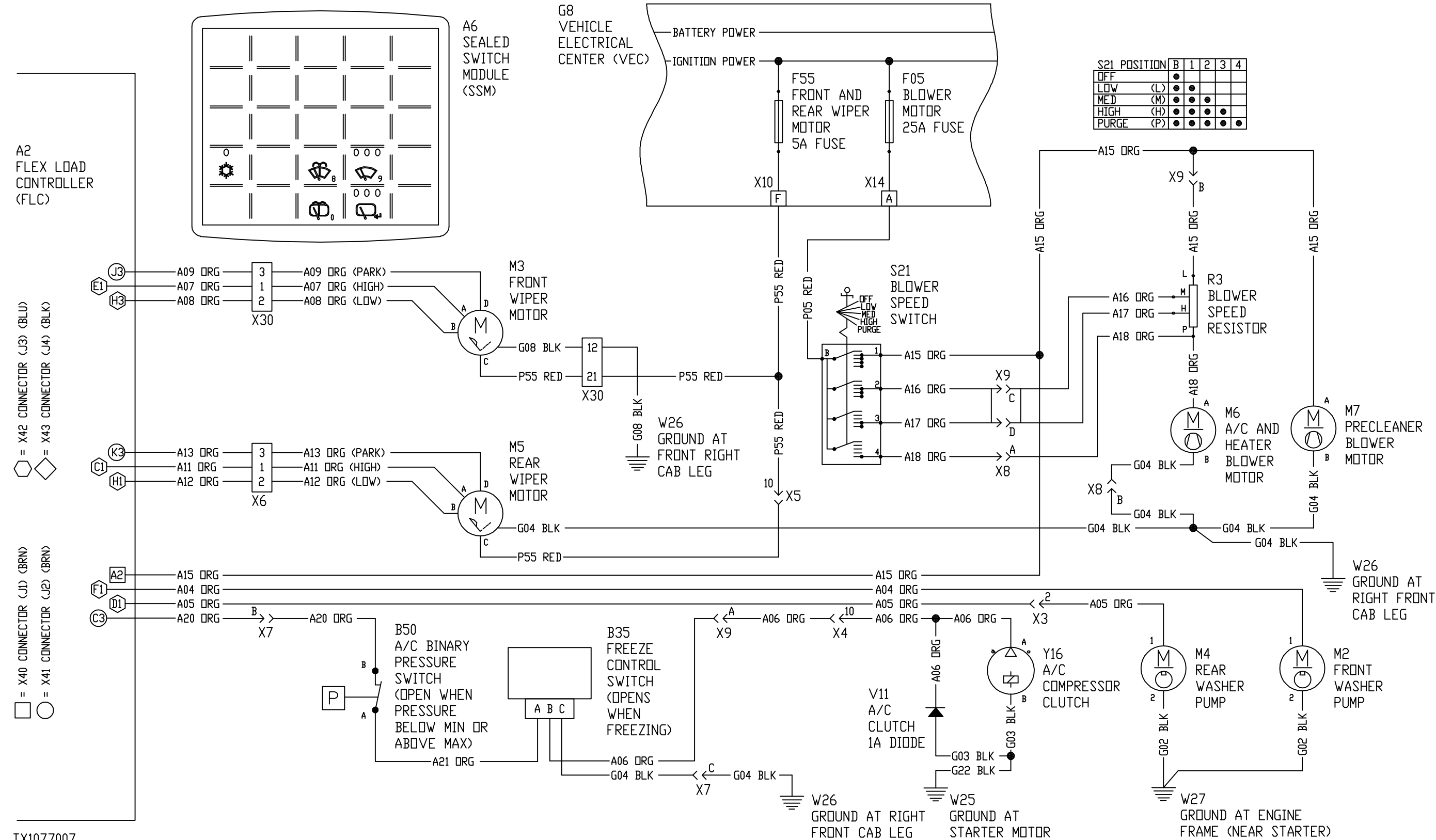
When the pilot control lever is moved fully to the bucket rollback position, the magnetic field created by the return-to-dig detent coil holds the pilot control lever at that position. As the bucket rolls back to the dig position, the detent coil holds the pilot control lever in the rollback position until the return-to-dig switch no longer senses the metal rod. The return-to-dig switch then opens, stopping current flow to terminal C4 of FLC connector (X40). When the FLC no longer detects current at terminal C4, the FLC stops current flow to the return-to-dig detent coil and, thus, allows the pilot control lever to return to neutral position.

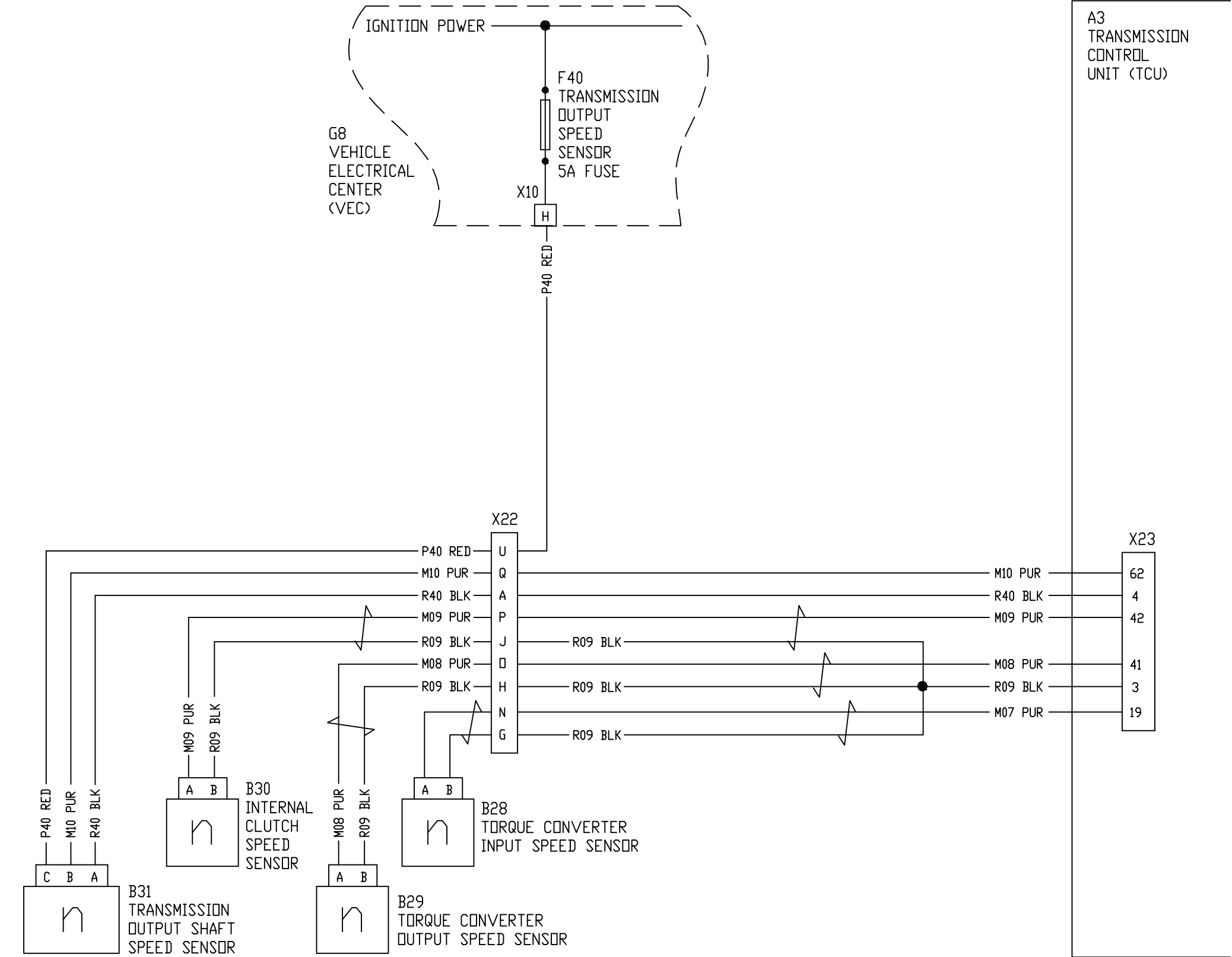
To set the return-to-dig position, [see Return-to-Dig Adjustment—Z-Bar Linkage](#). (Group 9015-20.)

**Boom Height Kickout (BHKO), Return-to-Carry (RTC), and Float**—The BHKO and RTC functions use BHKO/RTC sensor (B45) to detect the position of the boom.

The FLC supplies a 5-volt reference voltage to the BHKO/RTC sensor at terminal B1 of FLC connector (X40). The FLC provides a ground for the BHKO/RTC sensor at terminal E2 of FLC connector (X40).

The BHKO/RTC sensor then sends an analog signal representing boom position to terminal E1 of FLC connector (X40) and D3 of FLC connector (X42).





Continued on next page

Transmission Control Unit (TCU) Circuit Schematic (3 of 4)

OUO1010,0000AC9 -19-17JUN13-7/11

If the vehicle speed does decrease by 20 km/h (12.4 mph) within 6 seconds from when the park brake was first applied, the FLC sends DTC 524250.31 (Park Brake Possible Failure) message across the CAN data line to the ADU. The DTC causes a pop-up screen to appear on the ADU, indicating that the park brake needs inspection. The DTC also causes the STOP indicator and the pop-up screen to start flashing in unison. The audible alarm also activates.

The flashing pop-up screen continues until the park brake is released (OFF) as determined by the park brake pressure switch. When this occurs, the park brake light will function as normal except it will flash two times every 5 seconds, no matter if the park brake is ON or OFF.

Releasing the park brake does not deactivate the audible alarm, the flashing STOP indicator, or clear the DTC. The only way to reset the code, flashing icons, and audible alarm is to clear all DTC codes by accessing the ADU service mode menus. See Advanced Display Unit (ADU)—Clear Codes. (Group 9015-16.)

Turning the ignition OFF will not clear or reset the code or condition. The pop-up screen will appear at each power-up cycle until the DTC is cleared.

*NOTE: The park brake switch LED on the SSM will follow the park brake pressure switch status and is not affected by the inspect park brake function.*

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|                                                     |                                                                              |                                                           |                                                                  |
|-----------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------|
| A2—Flex Load Controller (FLC)                       | F41—Ground Speed Radar and Advanced Payload Scale Ignition Power 10-Amp Fuse | X10—Vehicle Electrical Center 8-Pin GRY Connector         | X48—Advanced Display Unit (ADU) 12-Pin Connector                 |
| A3—Transmission Control Unit (TCU)                  |                                                                              | X18—Vehicle Electrical Center 8-Pin BRN Connector         | X86—Load Center Harness-to-Engine Frame Harness 12-Pin Connector |
| A6—Sealed Switch Module (SSM)                       | G8—Vehicle Electrical Center (VEC)                                           | X22—Load Center Harness-to-Transmission Harness Connector | Y13—Differential Lock Solenoid                                   |
| A14—Ground Speed Radar (RDR) Unit                   | H2—Advanced Display Unit (ADU)                                               | X23—TCU Connector                                         |                                                                  |
| B31—Transmission Output Shaft Speed Sensor          | W25—Ground at Starter Motor                                                  | X41—Flex Load Controller (FLC) Connector (J2) (BRN)       |                                                                  |
| F40—Flex Load Controller (FLC) Connector (J1) (BRN) | W27—Ground at Engine Frame (near starter)                                    |                                                           |                                                                  |
|                                                     | X3—Load Center Harness-to-Engine Frame Harness 31-Pin Connector              |                                                           |                                                                  |

**NOTE:** The differential lock can always be engaged manually using the floor switch, regardless if the auto-differential lock is enabled or not.

For manual operation of the differential lock, see *Flex Load Controller (FLC) Circuit Theory of Operation*. (Group 9015-15.)

**NOTE:** For the auto-differential lock to function, the auto-differential lock system must be enabled by accessing the MACHINE CONFIGURATION / ENABLE OPTIONS menu in the ADU service mode menus. See *Advanced Display Unit (ADU)—Enable Options*. (Group 9015-16.)

**Auto-Differential Lock Operation**—Pushing the auto-differential lock switch on the sealed switch module (SSM) (A6) enables automatic differential lock mode. The SSM transmits the switch status across the CAN 1 data line to the flex load controller (FLC) (A2). When the FLC determines that the input is valid, the FLC transmits a message back to the SSM, causing the switch LED to come on.

When the automatic mode is enabled and the engine is running, the FLC transmits a message across the CAN 2 data line to the ground speed radar (RDR) unit (A14), causing the radar to transmit ultra high-frequency energy known as microwave energy toward the ground.

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

The ground speed radar unit measures the actual machine ground speed and direction, then transmits this information across the CAN 2 data line to the FLC. For more information on radar, see Radar Operation later in this story.

**NOTE:** If automatic mode is not enabled, the radar does not emit microwave energy.

When the auto-differential lock system is enabled and in automatic mode, the FLC automatically energizes

differential lock solenoid (Y13) when it determines wheel slip (less than 1/10 of a wheel turn) is present. The FLC does this by looking at the following:

- Calculated Vehicle Speed
- Selected Gear
- Machine Direction
- Actual Vehicle Ground Speed (from radar)

To determine the calculated vehicle speed, the FLC uses transmission output shaft speed information, final gear ratio, and tire size.

The transmission control unit (TCU) (A3) monitors the signal from transmission output shaft speed sensor (B31), then transmits this information across the CAN 1 data line to the FLC. For more information on the transmission output shaft speed sensor and the TCU, see *Transmission Control Unit (TCU) Circuit Theory of Operation*. (Group 9015-15.)

The differential lock will automatically engage when wheel slip is detected and ground speed is less than 12 km/h (7.5 mph) in forward or reverse direction.

The differential lock will automatically disengage when the following occurs:

- Ground speed increases by 2 km/h (1.2 mph).
- Transmission output shaft speed goes to zero.
- Machine changes travel direction.

Whenever the machine reaches a steady ground speed within 9—14 km/h (5.5—8.7 mph), an automatic calibration of the system is executed. The automatic calibration will compare the difference in values between the calculated machine speed and the radar ground speed and adjust accordingly. This calibration provides for compensation for the effects of tire wear, inflation pressure, and axle load.

Operating over a highly reflective surface, such as standing water, may cause signal dropout resulting in a false ground speed reading. If operating in such conditions and the differential lock applies when not intended, it is recommended to disable the auto-differential lock.

If the radar unit is not mounted correctly (e.g., loose mounting cap screws), excess vibration may result causing erratic operation that can adversely affect the radar unit's operation.

## Advanced Display Unit (ADU)—Service Mode

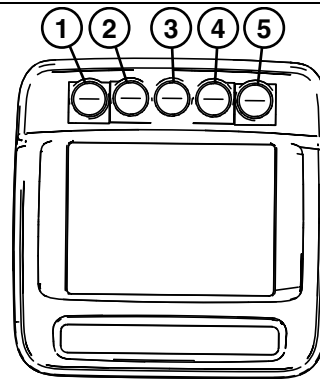
There are two versions of the ADU menu structure: Operator Mode and Service Mode.

Operator Mode is used to change user preferences, view operational settings, and view diagnostic trouble codes (DTCs). See Display Unit—Main Menu. (Operator's Manual.)

**NOTE:** *Service Mode can be accessed only from the Normal Display of the ADU. For Additional information on the Normal Display, see Display Unit—Normal Display. (Operator's Manual.)*

Service Mode provides additional items not available in Operator Mode. This feature allows a service technician to change operational settings and clear diagnostic trouble codes (DTCs). Service Mode provides the technician a means to monitor functions and settings for diagnostic and testing purposes. To enter Service Mode, enable ignition by pushing the ignition ON/engine START switch once. Push and hold the SELECT button (3) on the ADU for approximately 3 seconds until a pop-up display with SERVICE MODE ACTIVATED temporarily appears on the Main Menu.

**NOTE:** *When Service Mode is accessed, the Main Menu will stay in Service Mode, even if the ADU display is returned to the home screen. As long as the ignition is kept ON, the SELECT button needs to be pushed only once to re-enter Service Mode.*



Advanced Display Unit (ADU) Buttons

1— INFO Button  
2— BACK Button  
3— SELECT Button

4— DOWN Button  
5— UP Button

*Cycling the ignition to OFF, then back to ON, resets the ADU menu mode.*

Highlighting and navigating through a menu will provide corresponding information and/or a submenu.

- Push the SELECT (3) button to select the highlighted item.
- Push the BACK (2) button to go back one screen.
- Push the DOWN (4) button to scroll down the menu.
- Push the UP (5) button to scroll up the menu.

CS33148,0002ACF -19-09APR09-1/1

## Advanced Display Unit (ADU)—Clear Codes

This menu will clear all stored and active diagnostic trouble codes (DTCs).

The Clear Codes menu is a function of Service Mode. See Advanced Display Unit (ADU)—Service Mode. (Group 9015-16.)

### To clear DTCs:

1. Push and hold the SELECT button for approximately 3 seconds to access Service Mode.

2. From the Main Menu, push the DOWN button until CODES is highlighted, then push the SELECT button.
3. Push the DOWN button until CLEAR CODES is highlighted.
4. To clear codes and exit, push the SELECT button. To exit without clearing codes, push the BACK button.

CS33148,0002AD0 -19-06APR09-1/1

2. Remove connector cover from Service ADVISOR™ diagnostic 9-pin connector located at right console.
3. Connect diagnostic 9-pin connector cable (3) to diagnostic 9-pin connector (7).

#### 7—9-Pin Diagnostic Connector



TX1042042A —UN—12MAY08

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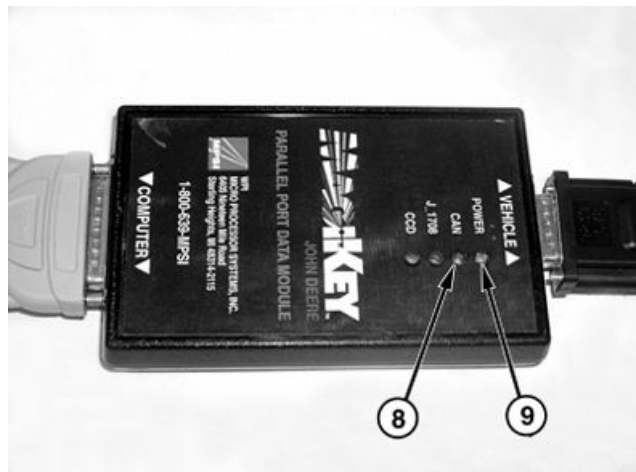
WS68074,0001A3F -19-31JUL08-2/3

4. Turn ignition ON. Power LED (9) must come on.
5. The CAN connection LED (8) will come on when computer connects to the CAN. The CAN connection LED may flicker—this is normal. When the CAN connection LED is on, the CAN is active and data is being transmitted.
6. If computer cannot connect to the CAN and the CAN connection LED does not come on, check all cable connections to the machine and computer. Make sure the ignition is ON and the power LED is on.

8—CAN Connection LED (red) 9—Power LED (green)



TX1011711A —UN—30AUG06



TX1011713A —UN—30AUG06

WS68074,0001A3F -19-31JUL08-3/3

## References

### 7 CAN Lo Wire Circuit Check

Using a multimeter, measure continuity between pin D (CAN Lo) and pin A (ground) of Service ADVISOR™ connector (3).

Is continuity measured?

**YES:** A short-to-ground exists on the CAN Lo wire. Check CAN Lo voltage one controller at a time to locate the harness where the short is located. Repair or replace harness as necessary.

**NO:** An open circuit exists on the CAN Lo wire. Repair or replace harness as necessary.

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WS68074,0001A42 -19-14FEB17-9/10

### 8 Controller Check

Turn ignition OFF. Locate the suspected controller(s). Using the System Functional Schematic, Wiring Diagram and Component Location Master Legend, locate the CAN wires and disconnect the appropriate connector. Using a multimeter, measure resistance between the CAN Hi and CAN Lo wires.

Is resistance between 55 and 65 ohms?

**YES:** Go to next step in this check.

**NO:** An open or short circuit exists in one of the CAN wires. Work from the controller back to the main harness, checking the CAN Hi and Lo wires for an open or short circuit.

Turn ignition ON. Using the System Functional Schematic, Wiring Diagram and Component Location Master Legend, check for power and ground at suspect controller(s).

Is power and ground present?

**YES:** Replace faulty controller.

**NO:** An open or short circuit exists in the circuit with no power or ground. Work from the controller back to the main harness, checking the power and ground circuits for an open or short circuit. Repair or replace harness as necessary.

WS68074,0001A42 -19-14FEB17-10/10

## References

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                       |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>3 Trigger Point Check</b></p> | <p>Start engine.</p> <p>Lower boom fully.</p> <p>Raise boom fully while observing monitor screen.</p> <p><i>NOTE: A warm-up screen may appear when boom reaches trigger point.</i></p> <p><i>Does monitor screen change to weigh screen or warm-up screen when bottom of bucket rises above drive lights (trigger point)?</i></p>                                                                                                                                                                                                                                                                                                                                                             | <p><b>YES:</b> <u>Go to Lift Check.</u></p> <p><b>NO:</b> The EPS system may require re-calibration or in-depth diagnostics. Contact your local Loadrite representative.</p> <p style="text-align: right;">OUO1010,0000AC5 -19-15FEB16-5/10</p>       |
| <p><b>4 Lift Check</b></p>          | <p>With material in the bucket, raise and lower boom fully following the lifting instructions as described in Operator's Manual. <u>See Embedded Payload Scale.</u> (Operator's Manual.)</p> <p><i>NOTE: Repeat lift if any of the following errors occur:</i></p> <ul style="list-style-type: none"> <li>• Poor Quality Lift</li> <li>• Lift Speed Too High</li> <li>• Lift Speed Changed</li> <li>• Bouncing Load</li> </ul> <p><i>Does a weight value appear on weight screen?</i></p>                                                                                                                                                                                                     | <p><b>YES:</b> <u>Go to Zero Scale Check.</u></p> <p><b>NO:</b> The EPS system may require re-calibration or in-depth diagnostics. Contact your local Loadrite representative.</p> <p style="text-align: right;">OUO1010,0000AC5 -19-15FEB16-6/10</p> |
| <p><b>5 Zero Scale Check</b></p>    | <p>With boom below the trigger point, push and hold the ADD BUCKET button on counter switch for at least 1 second until the zero lift screen is displayed.</p> <p>Raise the empty bucket to zero the scale.</p> <p><i>Does 0 appear on the zero update screen?</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                        | <p><b>YES:</b> <u>Go to Weight Check.</u></p> <p><b>NO:</b> Repeat zero scale check. If the scale does not zero, contact your Loadrite representative.</p> <p style="text-align: right;">OUO1010,0000AC5 -19-15FEB16-7/10</p>                         |
| <p><b>6 Weight Check</b></p>        | <p>Remove any material build-up from bucket and boom.</p> <p>Zero the scale. <u>See Zero Scale Check.</u></p> <p>Put a known weight of at least [454 kg (1000 lb)] into bucket.</p> <p>Raise and lower boom fully through at least three "good lift" cycles while observing weight reading. To obtain a "good lift", make sure to follow the proper lifting instructions. <u>See Embedded Payload Scale.</u> (Operator's Manual.)</p> <p><i>NOTE: If prompted by a warm-up screen, three warm-up lift cycles will be required before the three test lift cycles can be performed.</i></p> <p><i>Is the weight reading on the monitor screen within 1% of actual weight in the bucket?</i></p> | <p><b>YES:</b> Go to Counter Switch Check.</p> <p><b>NO:</b> <u>Go to Hydraulic System Check.</u></p> <p style="text-align: right;">OUO1010,0000AC5 -19-15FEB16-8/10</p>                                                                              |

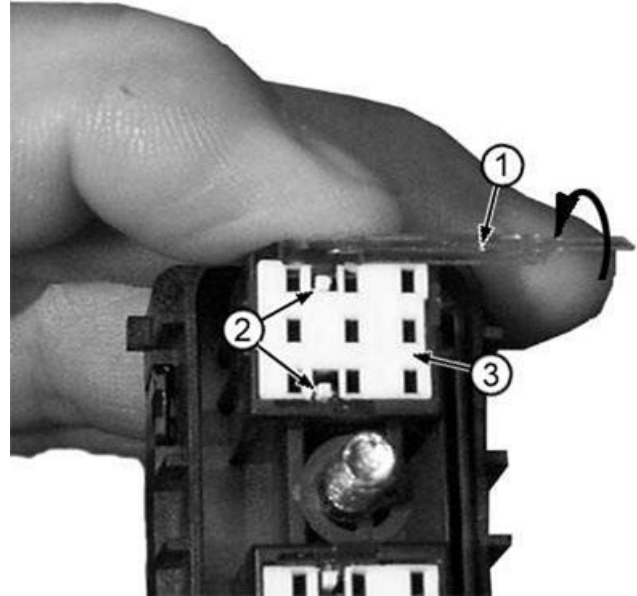
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## Replace CINCH™ Connectors

1. Remove extraction tool (1) from the loading side of connector.
2. Insert blade of extraction tool into locking tabs (2) of secondary lock (3). Rotate tool away from the CINCH™ connector to pry one side of the secondary lock out of the locked position. Repeat this step for the other locking tab.

**NOTE:** After unlocking one side of the secondary lock, a screwdriver or similar device may be used to hold it in the unlocked position while unlocking the second locking tab.

- 1— Extraction Tool                      3— Secondary Lock  
2— Secondary Lock Locking  
  Tabs



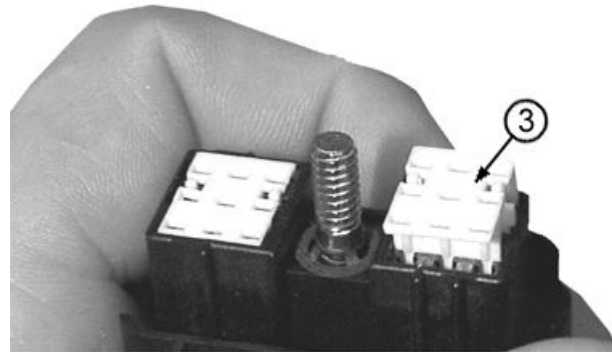
T132105B—UN—29JUN00

CINCH is a trademark of the Cinch Co.

CS33148,0002A8E -19-08JUL08-1/3

3. Remove secondary lock (3).

- 3— Secondary Lock



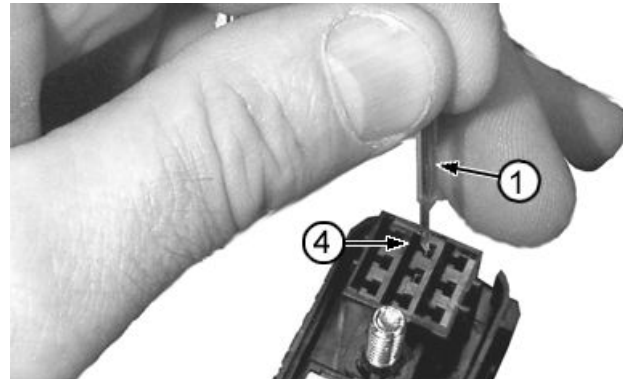
Remove Secondary Lock

T132301B—UN—29JUN00

CS33148,0002A8E -19-08JUL08-2/3

4. Insert pointed side of extraction tool (1) into the contact cavity (4) so that the flat side of tool faces secondary lock cavity (4). This will release the primary contact locking tab.
5. Pull wire out of the connector.
6. Replace terminals as necessary. See Install CINCH™ Contact. (Group 1600.)
7. Insert contact and wire into connector until it clicks.
8. Install secondary lock.

- 1— Extraction Tool                      4— Cavity



T132107B—UN—29JUN00

CS33148,0002A8E -19-08JUL08-3/3

## TPM—Alarm Setup

The tire pressure monitoring (TPM) system program must be activated in the advanced display unit (ADU) (H2). See TPM—Activating Tire Pressure Monitoring System. (Group 9015-20.)

Temperature and pressure alarm must be setup and turned on for the TMP system to alert the operator of a problem with the system.

1. To activate tire pressure monitoring (TPM) system the advanced display unit (ADU) (H2) must be in SERVICE MODE. See Advanced Display Unit (ADU)—Service Mode. (Group 9015-16.)
2. With the ADU in SERVICE MODE, press the menu button to scroll to the MAIN MENU screen.
3. Scroll to MACHINE CONFIGURATION and press select.
4. From MACHINE CONFIGURATION, scroll to TIRE PRESSURE MONITOR menu and press select.
5. From TIRE PRESSURE MONITOR, scroll to ALARM SETUP and press select.
6. From ALARM SETUP, scroll to one of the options and press select:
  - **TEMPERATURE ALARM**—Pressing select toggles temperature alarm between ON and OFF.

*NOTE: This is a temperature value entered by the operator, when temperature is above that value an alarm sounds.*

- **TEMPERATURE VALUE**—Enter the temperature alarm threshold then press select.
- **LEVEL 1 PRESS ALARM**—Pressing select toggles pressure alarm between ON and OFF.

*NOTE: This setup sounds the alarm when tire pressure is above or below the cold inflation pressure (CIP) recommended by the tire manufacturer by the percentage enter on this screen. See TPM—Cold Inflation Pressure Setup. (Group 9015-20.)*

- **LEVEL 1 PRESS VALUE**—Enter level 1 pressure value in percentage of full using the UP to increase or DOWN to decrease buttons, then press select.

*NOTE: This setup sounds the alarm when tire pressure is **critically** below the cold inflation pressure (CIP) recommended by the tire manufacturer by the percentage entered on this screen. See TPM—Cold Inflation Pressure Setup. (Group 9015-20.)*

- **LEVEL 2 PRESS VALUE**—Enter level 2 pressure value in percentage of full using the UP to increase or DOWN to decrease buttons, then press select.

AS79221.00000AD -19-11APR14-1/1

## TPM—Delete Sensors

The tire pressure monitoring (TPM) system program must be activated in the advanced display unit (ADU) (H2). See TPM—Activating Tire Pressure Monitoring System. (Group 9015-20.)

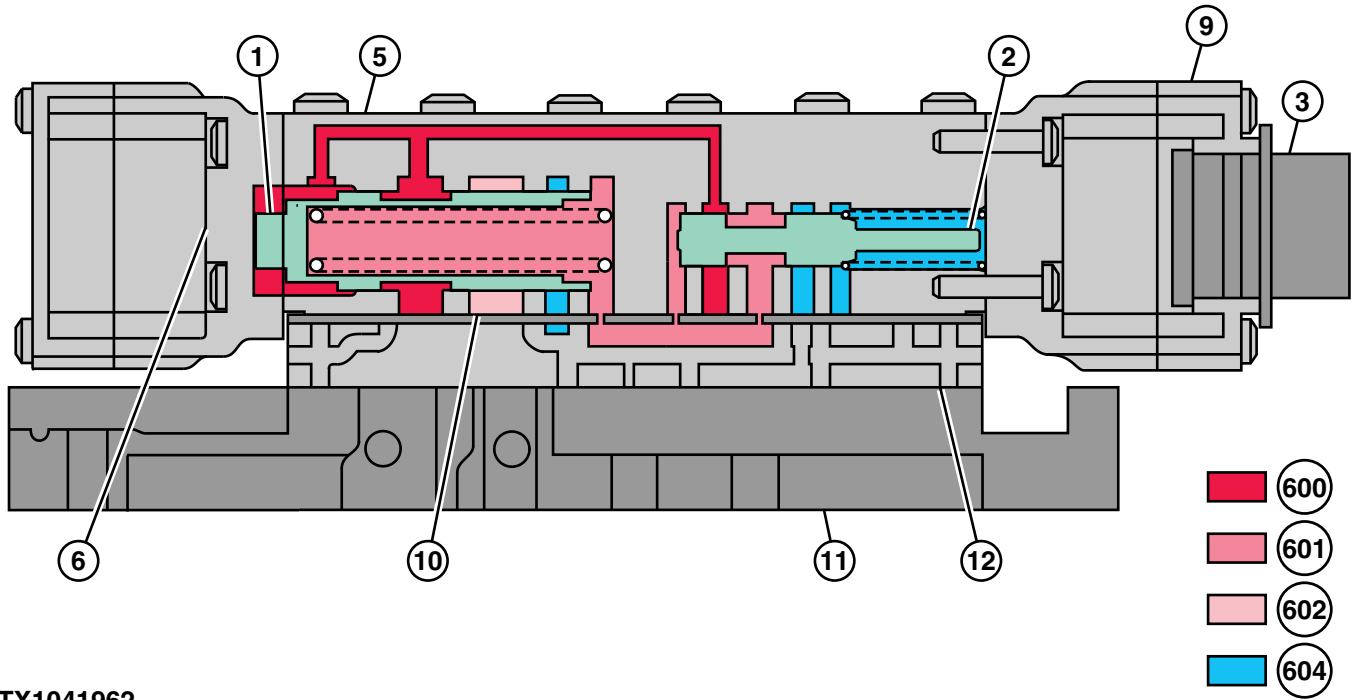
Use this function to clear one or all sensors out of the TMP system.

1. To activate tire pressure monitoring (TPM) system the advanced display unit (ADU) (H2) must be in SERVICE MODE. See Advanced Display Unit (ADU)—Service Mode. (Group 9015-16.)
2. With the ADU in SERVICE MODE, press the menu button to scroll to the MAIN MENU screen.

3. Scroll to MACHINE CONFIGURATION and press select.
4. From MACHINE CONFIGURATION, scroll to TIRE PRESSURE MONITOR menu and press select.
5. From TIRE PRESSURE MONITOR, scroll to DELETE SENSORS and press select.
6. From DELETE SENSORS, scroll to one of the options and press select:

- **DELETE ONE SENSOR**—scroll to the tire to be deleted and press select.
- **DELETE ALL SENSORS**—press select again to delete all sensors.

AS79221.00000AE -19-11APR14-1/1



TX1041962 —UN—09MAY08

# TX1041962

## Transmission Pressure Regulating Circuit

1— Pressure Regulating Valve  
2— Pressure Reducing Valve  
3— Connector

5— Valve Body  
6— Housing  
9— Cover  
10— Intermediate Plate  
11— Plate

12— Channel Plate  
600— Main Pressure Oil  
604— Return Oil  
601— Modulated Pressure Oil

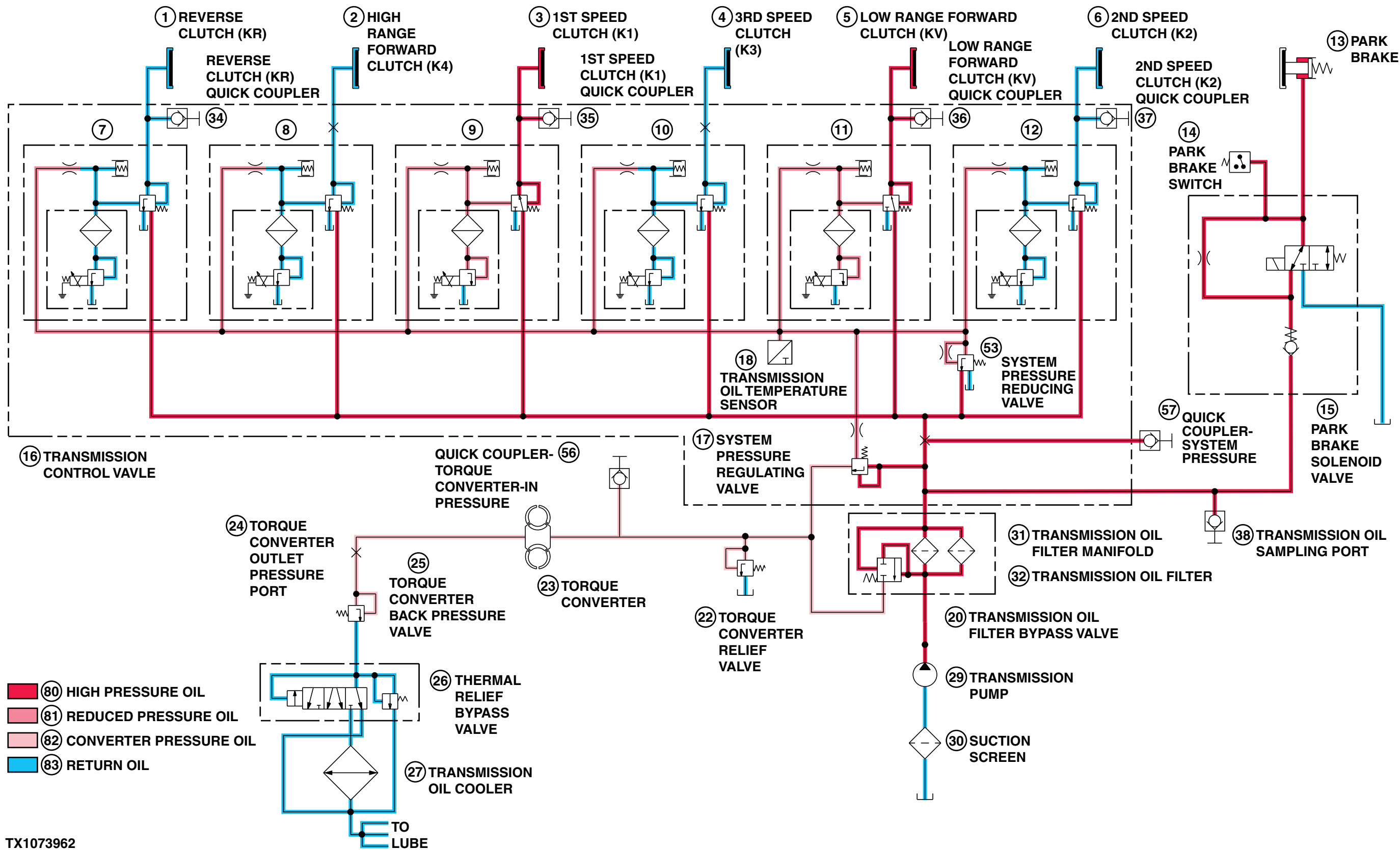
602— Reduced Pressure Oil

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TW73308,00000DB -19-05AUG08-2/3

Transmission System Schematic—First Forward

TX1073962 —UN—26MAR10



## Diagnostic Information

|                                                    |                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                 |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>11 Transmission Pump Flow Check</b>             | <p>Check transmission pump flow. <a href="#">Perform Transmission Pump Flow Test</a>. (Group 9020-25.)</p> <p>Is transmission pump flow within specification?</p>                                                                                                                         | <p><b>YES:</b> <a href="#">Go to Pressure Regulating Valve Check</a>.</p> <p><b>NO:</b> Repair or replace transmission pump, suction screen or suction tube. <a href="#">See Transmission Pump Remove and Install</a>. (Group 0360.)</p>                        |
| TW73308,000015A -19-14AUG08-13/21                  |                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                 |
| <b>12 Pressure Regulating Valve Check</b>          | <p>Check pressure regulating valve. <a href="#">Perform Transmission System Pressure Test</a>. (Group 9020-25.)</p> <p>Is transmission system pressure within specification?</p>                                                                                                          | <p><b>YES:</b> <a href="#">Go to Transmission Clutch Pressure Check</a>.</p> <p><b>NO:</b> Repair or replace transmission regulating valve. <a href="#">See Transmission Hydraulic Control Valve Disassemble and Assemble</a>. (Group 0360.)</p>                |
| TW73308,000015A -19-14AUG08-14/21                  |                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                 |
| <b>13 Transmission Clutch Pressure Check</b>       | <p>Check transmission clutch pressure. <a href="#">Perform Transmission Clutch Pressure Test</a>. (Group 9020-25.)</p> <p>Is transmission clutch pressure to specification?</p>                                                                                                           | <p><b>YES:</b> Checks complete.</p> <p><b>NO:</b> <a href="#">Go to Clutch Pack Check</a>.</p>                                                                                                                                                                  |
| TW73308,000015A -19-14AUG08-15/21                  |                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                 |
| <b>14 Clutch Pack Check</b>                        | <p>Check clutch pack leakage. <a href="#">Perform Transmission Element Leakage Test</a>. (Group 9020-25.)</p> <p>Is leakage within specification?</p>                                                                                                                                     | <p><b>YES:</b> <a href="#">Go to Engine-to-Transmission Drive Shaft Check</a>.</p> <p><b>NO:</b> Repair or replace clutch pack. <a href="#">See Clutch Pack KV and KR Disassemble</a> and <a href="#">see Clutch Pack KV and KR Assemble</a>. (Group 0350.)</p> |
| TW73308,000015A -19-14AUG08-16/21                  |                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                 |
| <b>15 Engine-to-Transmission Drive Shaft Check</b> | <p>Start engine.</p> <p>Shift transmission to neutral.</p> <p>Check torque converter output speed on the advanced display unit (ADU). <a href="#">See Display Unit—Main Menu—Diagnostics—Transmission Sensors</a>. (Operator's Manual.)</p> <p>Is torque converter output speed zero?</p> | <p><b>YES:</b> Repair engine-to-transmission drive shaft. <a href="#">See Universal Joint and Drive Shaft Remove and Install</a>. (Group 0225.)</p> <p><b>NO:</b> <a href="#">Go to Torque Converter Check</a>.</p>                                             |
| Continued on next page                             |                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                 |
| TW73308,000015A -19-14AUG08-17/21                  |                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                 |

## Diagnostic Information

### 4 Transmission Oil Cooler Check

Check oil cooler for debris and bent fins.

Are oil cooler fins clean and straight?

**YES:** [Go to Transmission Oil Cooler Thermal Bypass Valve Condition Check.](#)

**NO:** Clean and straighten oil cooler fins.

TW73308,0000186 -19-07SEP08-6/12

### 5 Transmission Oil Cooler Thermal Bypass Valve Condition Check

Check transmission oil cooler thermal bypass valve. [See Power Train Component Location.](#) (Group 9020-15.)

Is transmission oil cooler thermal bypass valve damaged?

**YES:** Replace transmission oil cooler thermal bypass valve.

**NO:** [Go to Transmission Oil Cooler Thermal Bypass Valve Operation Check.](#)

TW73308,0000186 -19-07SEP08-7/12

### 6 Transmission Oil Cooler Thermal Bypass Valve Operation Check

Check transmission oil cooler thermal bypass valve. [Perform Transmission Oil Cooler Thermal Bypass Valve Temperature Test.](#) (Group 9020-25.)

Is transmission oil cooler thermal bypass valve working correctly?

**YES:** [Go to Oil Cooler Restriction Check.](#)

**NO:** Repair or replace transmission oil cooler thermal bypass valve.

TW73308,0000186 -19-07SEP08-8/12

### 7 Oil Cooler Restriction Check

Check oil cooler restriction. [Perform Transmission Oil Cooler Restriction Test.](#) (Group 9020-25.)

Is oil cooler within specification?

**YES:** [Go to Transmission System Pressure Check.](#)

**NO:** Repair or replace oil cooler.

TW73308,0000186 -19-07SEP08-9/12

### 8 Transmission System Pressure Check

Check transmission system pressure. [Perform Transmission System Pressure Test.](#) (Group 9020-25.)

Is system pressure to specification?

**YES:** [Go to Torque Converter-Out Pressure Check.](#)

**NO:** Repair or replace system pressure regulating valve. [See Transmission Hydraulic Control Valve Disassemble and Assemble.](#) (Group 0360.)

Continued on next page

TW73308,0000186 -19-07SEP08-10/12

## Differential Lock Slips and Chatters Diagnostic Procedure

TW73308,00001C3 -19-27JUL10-2/6

**1 Diagnostic Trouble Code Check**

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

- Monitor Menus: see Display Unit—Main Menu—Codes—Active Codes. (Operator's Manual.)
- Service ADVISOR™ Application: See Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application. (Group 9015-20.)

Are any diagnostic trouble codes (DTC) present?

**YES:** Repair malfunction causing codes.**NO:** Go to Axle Oil Check.

TW73308,00001C3 -19-27JUL10-3/6

**2 Axle Oil Check**Check axle oil. See Front and Rear Axle Oil Level. (Operator's Manual.)**IMPORTANT:** Perform this service at the first 250 hours of operation and at 2000 hour intervals thereafter.

Has axle oil been changed as recommended?

**YES:** Go to Differential Lock Leakage Check.**NO:** Change axle oil. See Drain and Refill Front and Rear Axle Oil. (Operator's Manual.)

TW73308,00001C3 -19-27JUL10-4/6

**3 Differential Lock Leakage Check**Check differential lock pressure. Perform Differential Lock Pressure Test. (Group 9020-25.)

Is pressure within specification?

**YES:** Go to Differential Lock Disks and Plates Check.**NO:** Repair or replace leaking differential lock seal. See Disassemble and Assemble Differential Assembly. (CTM140119.)

TW73308,00001C3 -19-27JUL10-5/6

**4 Differential Lock Disks and Plates Check**Check differential lock disks and plates. See Disassemble and Assemble Differential Assembly. (CTM140119.)

Are differential lock disks and plates worn or damaged?

**YES:** Repair differential lock as necessary.**NO:** Checks complete.

TW73308,00001C3 -19-27JUL10-6/6

## Differential Lock Will Not Disengage

TW73308,00001C6 -19-19AUG08-1/7

## Differential Lock Will Not Disengage Diagnostic Procedure

Continued on next page

TW73308,00001C6 -19-19AUG08-2/7

## Diagnostic Information

### 6 Differential Lock Leakage Check

Check differential lock pressure. [Perform Differential Lock Pressure Test](#). (Group 9020-25.)

Is pressure within specification?

**YES:** Checks complete.

**NO:** Repair or replace leaking differential lock seal. [See Disassemble and Assemble Differential Locking \(Dif-Lok\) Clutch](#). (CTM140119.)

TW73308,00001C9 -19-19AUG08-8/8

## Driveline Excessive Vibration or Noise

MH66O88,0000756 -19-01AUG08-1/11

## Driveline Excessive Vibration or Noise Diagnostic Procedure

MH66O88,0000756 -19-01AUG08-2/11

### 1 Wheel Check

Check cap screws fastening rim to axle flange.

Are cap screws loose?

**YES:** Tighten cap screws. [See Wheel Remove and Install](#). (Group 0110.)

**NO:** [Go to Driveline Lubrication Check](#).

MH66O88,0000756 -19-01AUG08-3/11

### 2 Driveline Lubrication Check

Check driveline lubrication.

Are all driveline components lubricated properly?

**YES:** [Go to Universal Joint Retaining Cap Screws Check](#).

**NO:** Lubricate components as necessary. [See Grease](#). (Operator's Manual.)

MH66O88,0000756 -19-01AUG08-4/11

### 3 Universal Joint Retaining Cap Screws Check

Check for loose or missing universal joint retaining cap screws. [See Universal Joint and Drive Shaft Remove and Install](#). (Group 0225.)

Are retaining cap screws loose or missing?

**YES:** Install new retaining cap screws as needed.

**NO:** [Go to Drive Shaft Yoke Alignment Check](#).

MH66O88,0000756 -19-01AUG08-5/11

### 4 Drive Shaft Yoke Alignment Check

Check drive shaft yokes for alignment. [See Universal Joint and Drive Shaft Remove and Install](#). (Group 0225.)

Are drive shaft yokes aligned?

**YES:** [Go to Drive Shaft Check](#).

**NO:** Align yokes and install drive shafts.

Continued on next page

MH66O88,0000756 -19-01AUG08-6/11

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

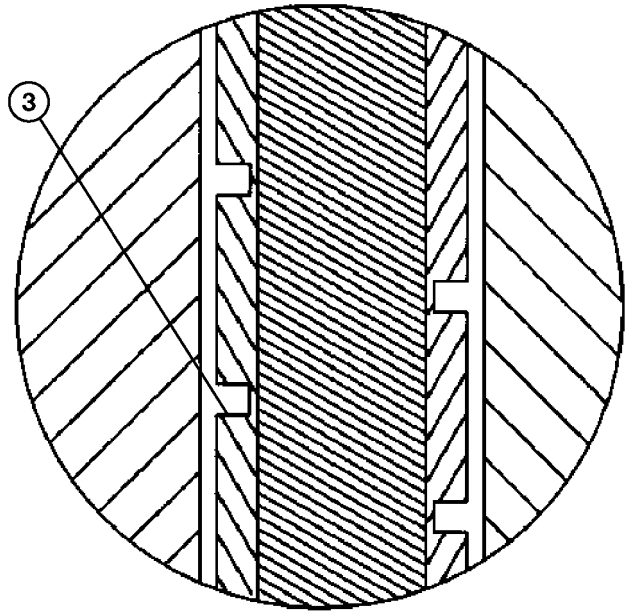
**Specification**

Oil Groove—Minimum—Depth..... 0.99 mm  
0.039 in.

New Brake Disk  
—Thickness..... 7.57 mm  
0.298 in.

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

**3— Oil Groove**



TX1014608 —UN—08NOV06

*TeamMate is a trademark of Deere & Company*

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



## Tests

- Incorrect torque converter or torque converter malfunction. Remove and replace torque converter. See Torque Converter and Housing Remove. (Group 0300.) and See Torque Converter and Housing Install. (Group 0300.)

10. After testing torque converter stall, restart engine. This sets proportional fan drive back to automatic mode.

AP88438,000061E -19-24AUG16-2/2

## Loader Hydraulic System Operation

*NOTE: For location of components, see Hydraulic System Component Location. (Group 9025-15.)*

*For system operation, see Hydraulic System Schematic. (Group 9025-15.)*

The major hydraulic functions are incorporated into one system, utilizing a single variable-displacement, axial-piston pump with load sense and pressure control. These components are linked together by a pressure compensating load sense system. Load sensing improves fuel economy and reduces heat buildup because horsepower is not wasted on excessive pump flow not being used.

The major components controlled are orbital steering, loader operations, and service brakes. Additional components operated by the same system, if equipped, are pin disconnect and ride control. Other hydraulic systems, if equipped, is an electric-drive motor-pump for secondary steering, hydraulic reversing fan for the hydraulic oil cooling circuit, and axle oil circulation and cooling. The hydraulic reversing fan and axle oil circulation utilizes fixed-displacement gear pumps mounted to the engine auxiliary drive.

The hydraulic system includes a closed-center loader control valve, single load sensing circuit providing flow priority to steering functions, loader function metering independent of work port load, and pressure diagnostic capabilities at the hydraulic pump manifold and main hydraulic pump control valve.

When the orbital steering valve is actuated, the orbital steering valve work port pressure is sent out as load sense to the loader control valve. Shuttle check valves in the loader control valve route loader function work port pressures with orbital steering load sense pressure. The load sense pressure is sent to the hydraulic pump manifold and matched with pilot pressure. The highest pressure is sent to the main hydraulic pump control valve as the hydraulic system load sense pressure. The main hydraulic pump responds by swashing, or de-swashing, to maintain a differential pressure above the hydraulic system load sense pressure.

Within the hydraulic pump manifold, the steering compensator valve is working to maintain a constant differential pressure between the orbital steering work port pressure and orbital steering inlet pressure. The main hydraulic pump control valve meters to a more open or closed position to maintain this differential pressure, which is set by the differential pressure spring force.

When the main hydraulic pump can no longer maintain the differential pressure, the steering compensator valve shifts to the fully open position to give hydraulic priority to the orbital steering valve.

Within the loader control valve, the determined orbital steering and loader function load sense pressure is sent to the spring side of the loader pressure compensators. When the main hydraulic pump can no longer maintain the desired hydraulic system differential pressure, the loader control valve pressure compensators begin to close off flow to the loader function work port. The loader control valve compensators and hydraulic pump manifold steering compensator valve work together to ensure that the steering system maintains hydraulic system flow priority.

When performing a combined loader function, the highest load sense pressure is sent to the spring side of the loader pressure compensators. This pressure is sent through the hydraulic pump manifold and to the main hydraulic pump control valve as the hydraulic system load sense pressure. Each loader control valve spool senses the same main hydraulic pump pressure. The amount of oil flow to each function is controlled by the metered spool position.

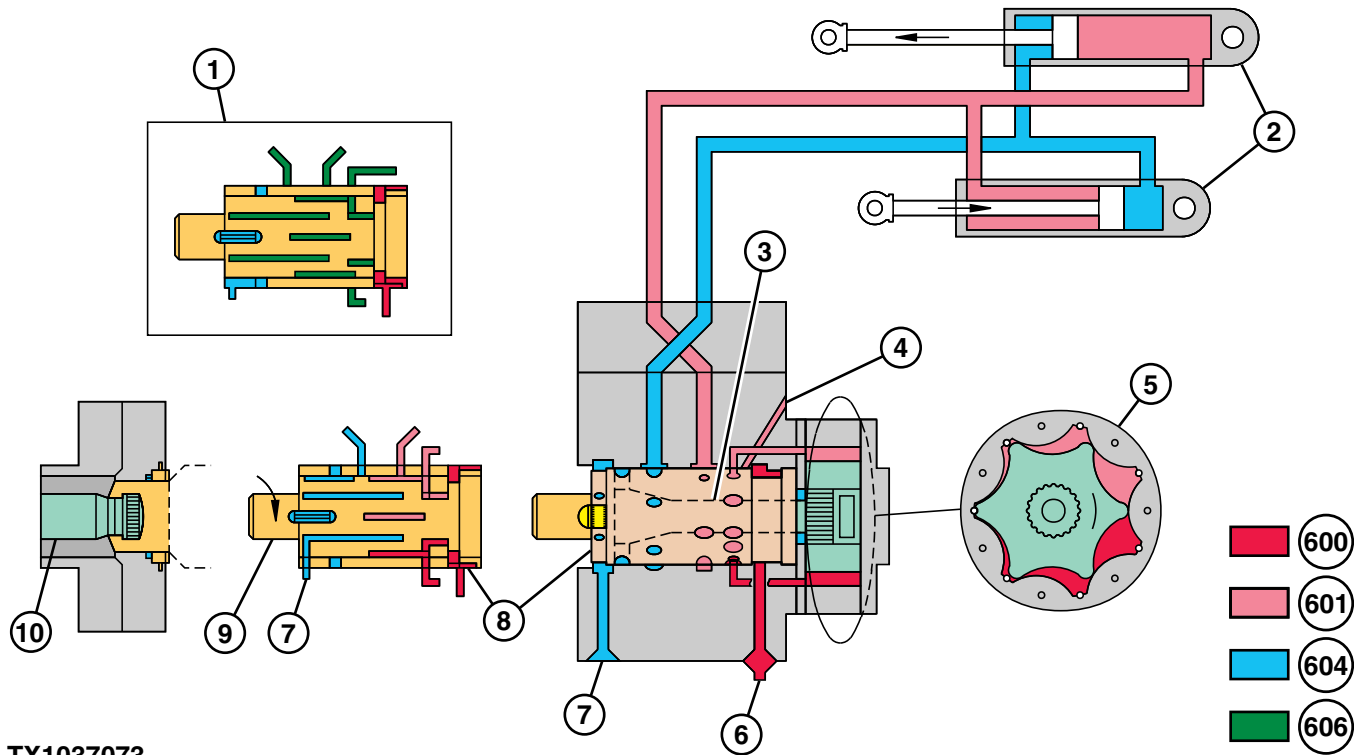
The spin control option uses hydraulic system pressure through the transducer which communicates with the flex load controller (FLC). This function derates the engine speed when wheel slip is noticed during heavy loader operation. The main hydraulic pump increases swash to meet the pressure demand when the engine rpm is lowered. For additional information on spin control see Flex Load Controller (FLC) Circuit Theory of Operation. (Group 9015-15.)

The return circuit for the main hydraulic system consists of a hydraulic return filter and hydraulic oil cooler and returns hydraulic oil to a non-pressurized hydraulic reservoir. The hydraulic return filter contains a multi-layer filter element within the filter housing and is located inside the hydraulic reservoir. The hydraulic return filter housing contains two bypass check valves. The filter bypass check valve allows oil to bypass the hydraulic return filter when the pressure differential across the filter exceeds the check valve spring setting. The hydraulic oil cooler bypass check valve allows oil to bypass the oil cooler when the cooler inlet pressure exceeds the check valve spring setting.

The return filter housing contains a temperature sensor and a delta pressure switch. An option is a reversing fan system to help clear the radiators of debris. The oil cooler is an oil-to-air heat exchanger.

SW03989,0000508 -19-29JUL08-1/1

## Orbital Steering Valve Operation



TX1037073

Orbital Steering Valve Operation

- 1— Neutral
- 2— Steering Cylinders
- 3— Anticavitation Valves
- 4— Load Sense Orifice

- 5— Gerotor
- 6— From Compensator Valve
- 7— Return
- 8— Sleeve
- 9— Spool

- 10— Orbital Steering Shaft
- 600— High-Pressure Oil
- 601— Medium-Pressure Oil

- 604— Return Oil
- 606— Trapped Oil

The orbital steering valve consists of a spool (9) inside a sleeve (8) within a housing. When the steering wheel is not moving, the orbital steering valve is in the neutral (1) position. In neutral, the spool and sleeve are aligned so that oil flow through the valve is blocked. The steering cylinders (2) are held stationary by trapped oil in the left and right work ports.

When the orbital steering valve is turned to the right, the spool rotates relative to the sleeve, and opens passages that allow system pressure oil to flow through the spool and sleeve assembly. Oil flows to the gerotor (5) causing the gerotor gear to rotate. Operating pressure oil flows from the gerotor back into the orbital steering valve, where it is directed out the work port to the respective ends of the steering cylinders.

A bypass orifice is machined into the spool and sleeve assembly. It is a variable orifice that introduces a small leak into the pressure side of the steering valve. Its purpose is to dampen the initial pressure surge when the orbital steering wheel is partially turned. When the steering wheel is fully turned, the leak is closed off.

Return oil flows back in through the work port through the spool and sleeve assembly to return to the hydraulic reservoir. The load sense orifice (4) is located between the sleeve and the gerotor. This orifice feeds the load-sensing circuit between the orbital steering valve and the steering compensator valve in the hydraulic pump manifold.

When the rotation of the steering wheel stops, the gerotor gear continues to move, turning the sleeve, until the sleeve stops the flow to the gerotor. At this point, the valve is back in the neutral position and will remain there until the steering wheel is moved again.

The orbital steering valve has a variable steering rate that is proportional to the speed at which the steering wheel is rotated. A variable orifice bypasses oil around the gerotor. Turning the steering wheel slowly takes more turns (variable orifice small), stop-to-stop, versus fewer turns (variable orifice large) when turning the steering wheel quickly.

Four anti-cavitation balls, not shown, are located inside the spool.

SW03989,0000149 -19-30APR08-1/1

TX1037073 —UN—27FEB08

- |                          |                        |                             |                        |
|--------------------------|------------------------|-----------------------------|------------------------|
| 1—Wobble Plate           | 7—Spool Assembly       | 13—Bucket Dump (B) Port     | 17—Return Oil (T) Port |
| 2—Push Rod               | 8—Work Port A          | 14—Boom Raise (C) Port      | 18—Vehicle Front       |
| 3—Pull Plate             | 9—Work Port C          | 15—Pressure Oil (P) Port    |                        |
| 4—Extra Centering Spring | 10—Plunger Assembly    | 16—Bucket Rollback (D) Port |                        |
| 5—Metering Spring        | 11—Spring Guide        |                             |                        |
| 6—Return Spring          | 12—Boom Lower (A) Port |                             |                        |

Single-lever pilot controllers move fore and aft, as well as side to side, and consist of four two-position, two-way, lever-operated valves.

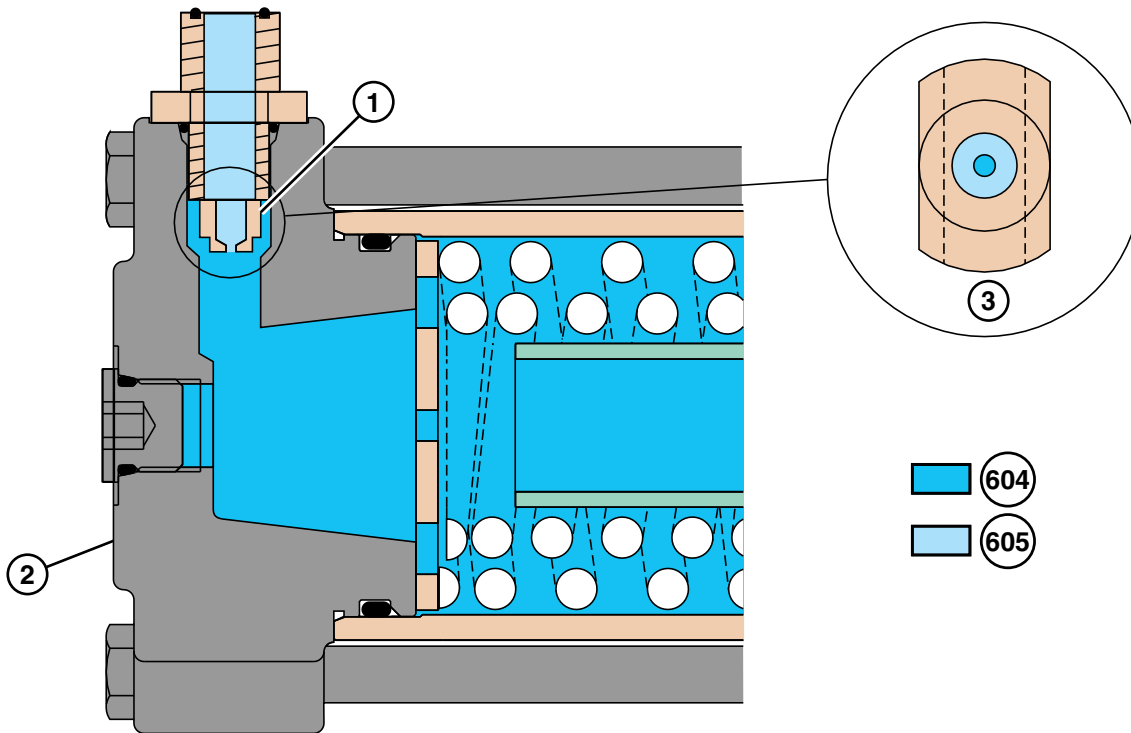
In neutral, the return spring (6) and extra centering spring (4) hold the spool assembly (7) closed, blocking flow from the pressure port (15) to the work ports and directing oil to return line. During operation, pilot pressure oil from the pilot pressure reducing valve enters the pilot controller housing at the pressure port. When the control lever is activated in either direction, the push rod (2) moves the

plunger assembly (10) down against the spring guide (11). The spring guide compresses both return spring (6) and metering spring (5), moving the spool assembly (7) down into the metering position, which allows the oil to flow out the work port. With the spool assembly moved to maximum travel, full pilot pressure is available to shift the control valve spool.

Bucket rollback, boom float, and raise functions all use an electromagnetic detent.

AS79221,000031F -19-16DEC10-2/2

## Control Valve Pilot Orifice Check Valve Operation



TX1037072

Pilot Orifice Check Valve for Control Valve Sections

- |                         |                 |                                |
|-------------------------|-----------------|--------------------------------|
| 1—Orifice Check Plate   | 3—Top View      | 605— Low-Pressure (return) Oil |
| 2—Control Valve End Cap | 604— Return Oil |                                |

Orifice check plate (1) is installed in the loader control valve end cap of bucket and auxiliary control valve sections. The orifice dampens the control valve spool movement to stop unwanted bucket or auxiliary function movement when the pilot control lever is centering itself.

It also stops unwanted correction in the other direction as the lever kicks out of bucket return-to-dig.

AS79221,0000320 -19-16DEC10-1/1

TX1037072 —UN—25FEB08

The load sense relief valve limits the maximum load sense oil pressure for the hydraulic system by reducing the pressure from high work port loads and steering loads. The reduced load sense is then sent to the hydraulic pump manifold where it determines hydraulic system load sense pressure. Load sense pressure change is sent to the main hydraulic pump control valve. The hydraulic pump manifold receives the combined, maximum steering and loader function load sense pressure from the load sense isolator (9) in the loader control valve. In the hydraulic pump manifold, a shuttle valve matches the loader control valve load sense signal with the pilot control pressure.

The highest pressure is then sent to the main hydraulic pump control valve as the hydraulic system load sense pressure. Therefore, the maximum hydraulic system pressure is set by the load sense relief valve adjustment.

The pressure regulating valve spool (10) ensures that a constant pressure to the loader control valve return circuit is maintained. If pressure in the return circuit is too high, the spool shifts against the spring to allow the return oil to flow to the hydraulic return passage. If the pressure is lower than the spring pressure, the spool shifts and allows output pressure from the main hydraulic pump (13) into the return circuit to raise the pressure.

SW03989,0000668 -19-01JUL08-2/2

1— Work Port  
2— Outlet  
3— Poppet Seat  
4— Poppet  
5— Return Passage  
6— Pilot Pin

7— Pilot Poppet  
8— Pilot Spring  
9— Poppet Spring  
10— Normal Operation  
11— Pilot Operation

12— Relief Operation  
13— Anticavitation Operation  
600— High-Pressure Oil  
601— Medium-Pressure Oil

602— Low-Pressure Oil  
604— Return Oil  
615— Cavitation

Both work ports of the loader control valve auxiliary section use a pilot-operated circuit relief with anticavitation valve.

During normal operation (10), the poppet (4) is positioned against the poppet seat (3) to seal the work port (1) oil from the outlet (2).

As the circuit pressure increases, pilot operation (11) will begin at a relief pressure setting. The pressure forces the pilot pin (6) to push the pilot poppet (7) off its seat. Grooves cut into the pilot pin bleed oil on the side of the pin, past the pilot poppet, to a return passage (5).

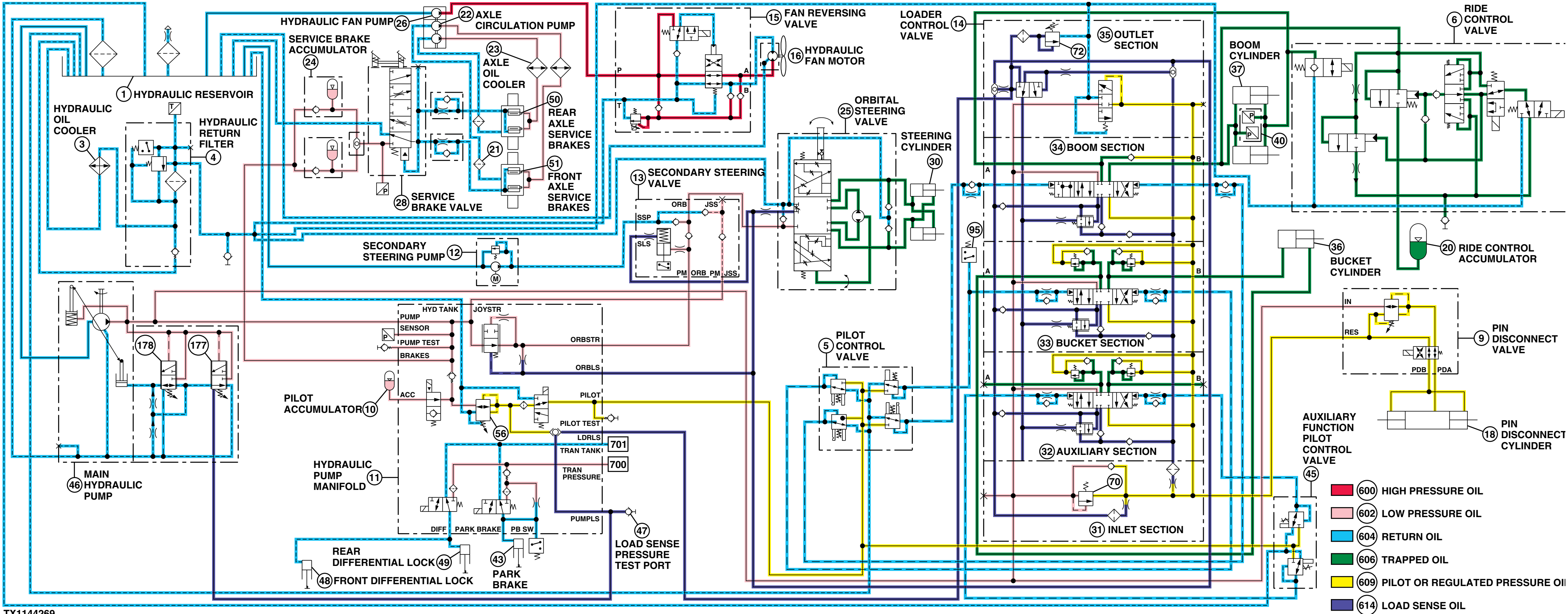
During relief operation (12), increased oil pressure causes the poppet (4) to overcome poppet spring (9) force. Relief

pressure oil will flow from the work port to outlet across the poppet.

If the work port pressure in the circuit drops below return pressure, the anticavitation operation (13) of the circuit relief with anticavitation valve occurs. If cavitation occurs, the oil pressure in the work port and in the spring area of the poppet (4) drops below return oil pressure. Return oil pressure works against the shoulder of the poppet to force it open against the spring, allowing regulated return oil to be drawn back into the work port.

SW03989,0000474 -19-01JUL08-4/4

TX1144269 —UN—23SEP13

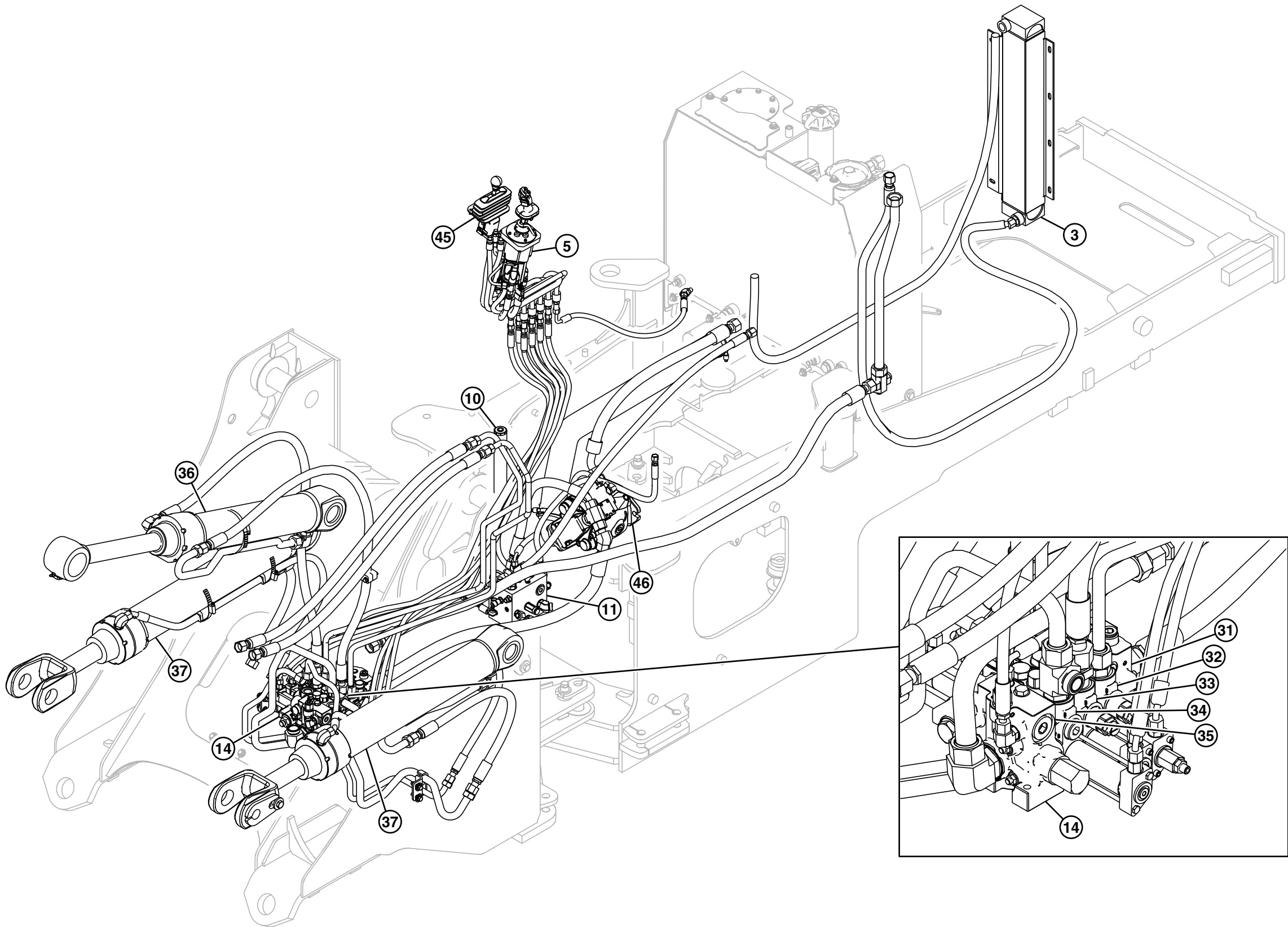


TX1144269

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Hydraulic System Schematic—Neutral (S.N. 642122— )

OOU01020,0001800 -19-23SEP13-3/4

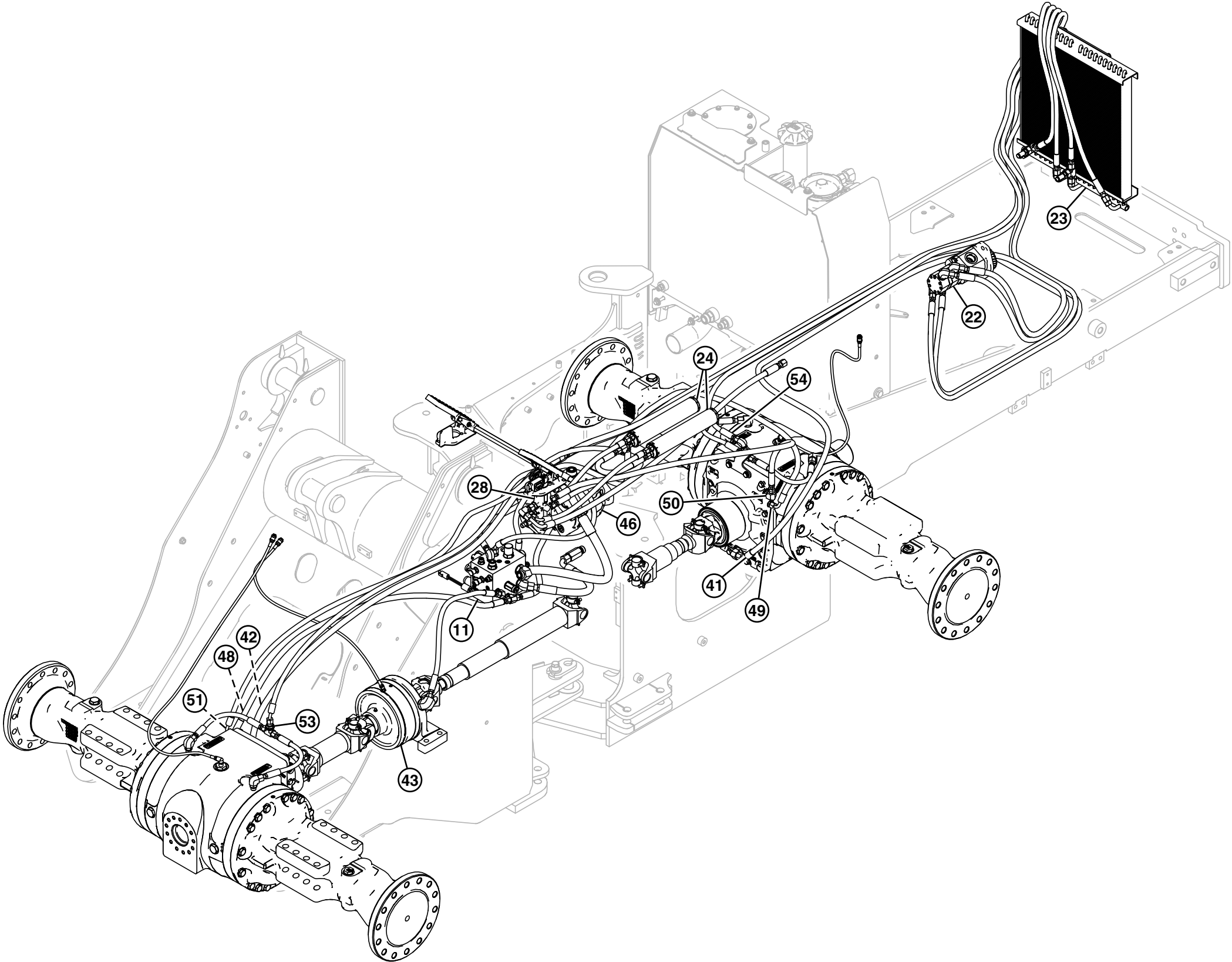


TX1101333

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Loader and Hydraulic Cooling Circuit Component Location (S.N. 642122— )

OUO1020,0001803 -19-15FEB12-5/14



TX1041004

Continued on next page

Service Brake, Park Brake, and Axle Cooling Circuit Component Location (S.N. —642121)

OUC1020,0001803 -19-15FEB12-11/14

## Diagnostic Information

|                                                                                                        |                                                                                                                                                                                      |                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1 Return-to-Carry Switch Check</b>                                                                  | Check position of return-to-carry switch.<br><br>Is switch in ON position?                                                                                                           | <b>YES:</b> Push switch to OFF position.<br><br><b>NO:</b> <u>Go to Pilot Control Pressure Check.</u><br><br>OUO1020,0001691 -19-02APR08-3/7                                                                                                 |
| <b>2 Pilot Control Pressure Check</b>                                                                  | Check pilot pressure reducing valve. <u>Perform Pilot Pressure Reducing Valve Pressure Test.</u> (Group 9025-25.)<br><br>Is pilot pressure reducing valve adjusted to specification? | <b>YES:</b> <u>Go to Pilot Controller Detent Check.</u><br><br><b>NO:</b> Adjust or replace pilot pressure reducing valve. <u>See Hydraulic Pump Manifold Disassemble and Assemble.</u> (Group 3160.)<br><br>OUO1020,0001691 -19-02APR08-4/7 |
| <b>3 Pilot Controller Detent Check</b>                                                                 | Check pilot controller. <u>See Flex Load Controller (FLC) Circuit Theory of Operation.</u> (Group 9015-15.)<br><br>Is flex load controller adjusted to specification?                | <b>YES:</b> <u>Go to Pilot Control Valve Check.</u><br><br><b>NO:</b> Repair or replace FLC.<br><br>OUO1020,0001691 -19-02APR08-5/7                                                                                                          |
| <b>4 Pilot Control Valve Check</b>                                                                     | Check pilot control valve. <u>Perform Pilot Control Valve Pressure Test.</u> (Group 9025-25.)<br><br>Is pilot control valve to specification?                                        | <b>YES:</b> <u>Go to Loader Control Valve Check.</u><br><br><b>NO:</b> Repair or replace pilot control valve.<br><br>OUO1020,0001691 -19-02APR08-6/7                                                                                         |
| <b>5 Loader Control Valve Check</b>                                                                    | Check loader control valve. <u>See Loader Control Valve Disassemble and Assemble.</u> (Group 3160.)<br><br>Is loader control valve worn or damaged?                                  | <b>YES:</b> Repair or replace loader control valve.<br><br><b>NO:</b> Checks complete.<br><br>OUO1020,0001691 -19-02APR08-7/7                                                                                                                |
| <b>One Hydraulic Function Not Working</b><br><br>DF89619,00B5270 -19-08OCT12-1/10                      |                                                                                                                                                                                      |                                                                                                                                                                                                                                              |
| <b>One Hydraulic Function Not Working Diagnostic Procedure</b><br><br>DF89619,00B5270 -19-08OCT12-2/10 |                                                                                                                                                                                      |                                                                                                                                                                                                                                              |
| <b>1 Hydraulic Line Check</b>                                                                          | Check hydraulic lines. <u>See Hydraulic System Component Location.</u> (Group 9025-15.)<br><br>Are any hydraulic lines blocked or damaged?                                           | <b>YES:</b> Repair or replace damaged lines.<br><br><b>NO:</b> Go to Pilot Control Lever Adjustment Check.<br><br>Continued on next page<br>DF89619,00B5270 -19-08OCT12-3/10                                                                 |

**1 Main Hydraulic Pump Pressure Cut-Off and Differential Pressure Check**

Check pressure cut-off and differential pressure. Perform Main Hydraulic Pump Control Valve Test and Adjustment. (Group 9025-25.)

Are main hydraulic pump pressure cut-off and differential pressures adjusted to specification?

**YES:** Go to Orbital Steering Valve Contamination Check.

**NO:** Adjust main hydraulic pump control valve pressures to specification.

OUO1020,00016A3 -19-01MAY08-3/4

**2 Orbital Steering Valve Contamination Check**

Check hydraulic oil filter for contamination. See Hydraulic Oil Filter Inspection Procedure. (Group 9025-25.)

Is hydraulic oil filter contaminated?

**YES:** Replace orbital steering valve and clean hydraulic reservoir. See Orbital Steering Valve Remove and Install (Group 0960.) and perform Hydraulic Oil Cleanup Procedure Using Portable Filter Caddy. (Group 3160.)

**NO:** Check complete.

OUO1020,00016A3 -19-01MAY08-4/4

**Secondary Steering Motor Will Not Operate—If Equipped**

SW03989,00004D8 -19-07APR08-1/4

**Secondary Steering Motor Will Not Operate Diagnostic Procedure**

SW03989,00004D8 -19-07APR08-2/4

**1 Electrical Check**

Check secondary steering circuit. See Flex Load Controller (FLC) Circuit Theory of Operation. (Group 9015-15.)

Is FLC circuit malfunctioning?

**YES:** Repair or replace FLC circuit components.

**NO:** Go to Secondary Steering Pump Check.

SW03989,00004D8 -19-07APR08-3/4

**2 Secondary Steering Pump Check**

Check secondary steering pump.

Does secondary steering pump spin freely?

**YES:** Check complete.

**NO:** Replace secondary steering pump.

SW03989,00004D8 -19-07APR08-4/4

**Secondary Steering Pump Runs But Will Not Steer Machine—If Equipped**

SW03989,00004D9 -19-22JUL08-1/3

**Secondary Steering Pump Runs But Will Not Steer Machine Diagnostic Procedure**

Continued on next page

SW03989,00004D9 -19-22JUL08-2/3

## Hydraulic Oil Sampling Procedure

For hydraulic oil sampling, [see Fluid Sampling Procedure](#).  
(Group 9010-25.)

RM58335,0000181 -19-15FEB16-1/1

## Hydraulic Oil Warmup Procedure

| SPECIFICATIONS            |                      |
|---------------------------|----------------------|
| Engine Speed              | Fast Idle            |
| Hydraulic Oil Temperature | 60—70°C<br>140—160°F |

| SERVICE EQUIPMENT AND TOOLS                            |
|--------------------------------------------------------|
| JT02156A Digital Pressure and Temperature Analyzer Kit |

The purpose of this procedure is to warm the hydraulic oil to a proper temperature for performing hydraulic tests and adjustments.

Service ADVISOR™ diagnostic application or advanced display unit (ADU) can be used to indicate hydraulic oil temperature.

Temperature sensor is located in hydraulic return filter on top of reservoir.

**IMPORTANT: Prevent machine damage caused by overheating. JT02156A Digital Pressure and Temperature Analyzer Kit must be used to monitor oil temperature if either diagnostic trouble code (DTC) 001638.00 or DTC 001638.04 is present.**

For more information on DTCs, [see 001638.00 — Hydraulic Oil High Temperature](#) and [see 001638.04 — Hydraulic Oil Temperature Sensor Short to Ground](#).  
(Group 9001-30.)

For installation information for JT02156A Digital Pressure and Temperature Analyzer Kit, [see JT02156A Digital Pressure and Temperature Analyzer Kit Installation](#).  
(Group 9025-25.)

*Service ADVISOR is a trademark of Deere & Company*

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

1. Park and prepare machine for service. [See Park And Prepare For Service Safely](#). (Group 9000-01.)
2. Display hydraulic oil temperature. [See Display Unit—Main Menu—Diagnostics—Hydraulic Sensors](#). (Operator's Manual.)
3. Operate engine at specification with pilot enable switch ON.

### Specification

Engine—Speed..... Fast Idle

**IMPORTANT: To avoid hydraulic system damage, do not hold hydraulic functions over relief for more than 30 second intervals.**

4. Hold bucket rollback function over relief, raise and lower boom.
5. Periodically cycle all hydraulic functions to distribute warm oil.
6. Warm hydraulic oil to specification.

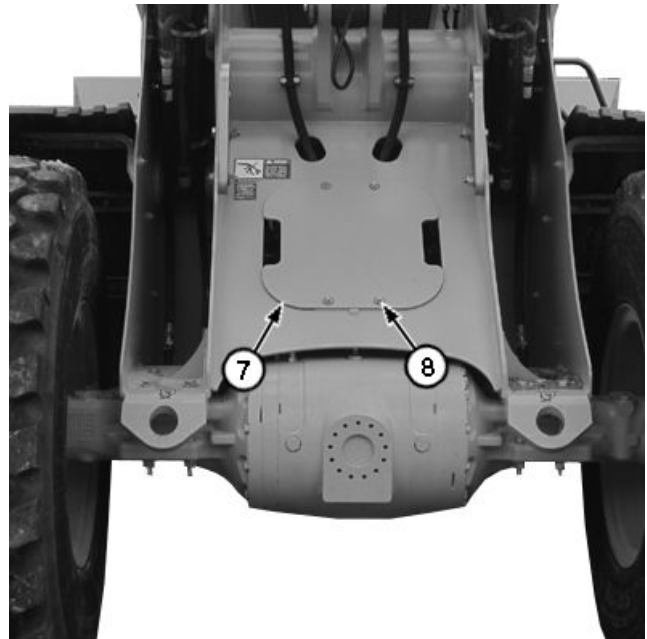
### Specification

Hydraulic  
Oil—Temperature.....60—70°C  
140—160°F

ML82895,000071F -19-07FEB13-1/1

5. Remove loader frame front cover to access loader control valve.

7— Loader Frame Front Cover    8— Cap Screw (4 used)



TX1101014A —UN—11NOV11

*Loader Frame Front Cover*

Continued on next page

TX04577,00000AE -19-14JAN16-2/4

6. Connect JT02162 35 000 kPa (350 bar) (5000 psi) Transducer and JT02158 Digital Pressure and Temperature Analyzer to hydraulic system pressure test port (1) of hydraulic pump manifold (2). See JT02156A Digital Pressure and Temperature Analyzer Kit Installation. (Group 9025-25.)

**IMPORTANT:** To avoid hydraulic system damage, do not hold hydraulic functions over pressure relief for more than 30-second intervals.

7. With engine at specification, hold bucket rollback function over pressure relief.

**Specification**

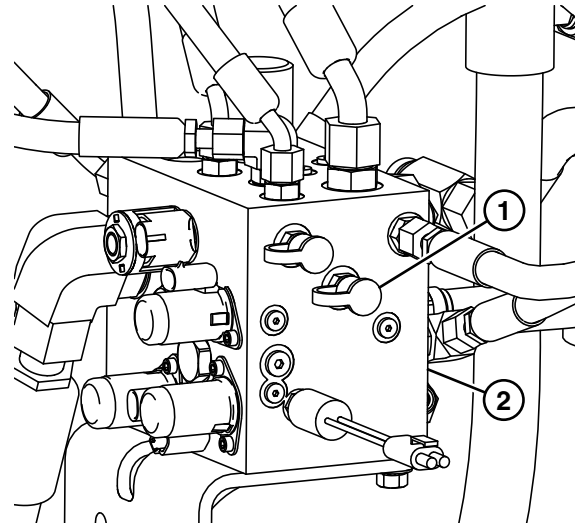
Engine—Speed.....Slow Idle

8. Record pressure reading.

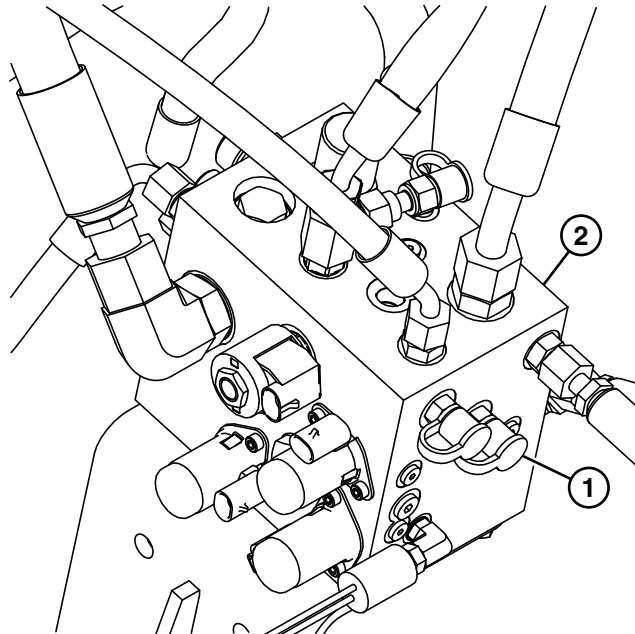
**NOTE:** Mark position of main hydraulic pump pressure cut-off spool adjusting screw for later reference.

9. Adjust main hydraulic pump control valve to specifications. See Main Hydraulic Pump Control Valve Test and Adjustment. (Group 9025-25.)

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



Hydraulic Pump Manifold (S.N. —642121)



Hydraulic Pump Manifold (S.N. 642122— )

TX1037869 —UN—03MAR08

TX1099452 —UN—13OCT11

Continued on next page

TX04577,00000AF -19-14JAN16-3/4

4. Disconnect outlet line (5) and install tee fitting with test port (4).
5. Connect JT02162 35 000 kPa (350 bar) (5000 psi) Transducer and JT02158 Digital Pressure and Temperature Analyzer to test port. See JT02156A Digital Pressure and Temperature Analyzer Kit Installation. (Group 9025-25.)
6. Remove vacuum or fill hydraulic reservoir. See Drain and Refill Capacities. (Operator's Manual.)
7. Perform Hydraulic Oil Warmup Procedure. (Group 9025-25.)

**Specification**

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

**NOTE:** Wire H13 GRN connects to solenoid coil (+) terminal (2).

8. Stop engine. Connect a remote start switch to solenoid battery terminal (1) and solenoid coil (+) terminal (2) on secondary steering motor solenoid.

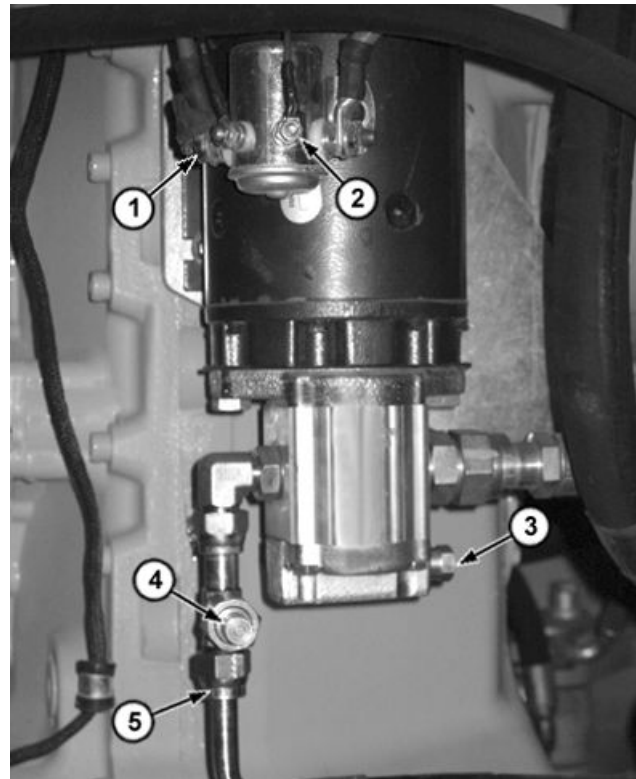
**IMPORTANT: DO NOT operate secondary steering pump and motor for more than 15 seconds with the steering in neutral or damage to the pump and motor can occur.**

9. Energize the solenoid for 15 seconds while watching digital pressure analyzer.
10. Record pressure reading and compare to specification.

**Specification**

|                      |                   |
|----------------------|-------------------|
| Secondary Steering   |                   |
| Pump Pressure Relief |                   |
| Valve—Pressure.....  | 10 342—10 690 kPa |
|                      | 103.4—106.9 bar   |
|                      | 1500—1550 psi     |

11. If pressure is not to specification, remove adjusting screw cover (3) and turn adjusting screw in to increase pressure or out to decrease pressure.
12. Replace adjusting screw cover.
13. Repeat test.



Secondary Steering Pump With Test Port

- |                             |                              |
|-----------------------------|------------------------------|
| 1—Solenoid Battery Terminal | 4—Tee Fitting With Test Port |
| 2—Solenoid Terminal (+)     | 5—Outlet Line                |
| 3—Adjusting Screw Cover     |                              |

14. If pressure cannot be adjusted to specification, replace secondary steering pump. See Secondary Steering Pump Remove and Install—If Equipped. (Group 0960.)
15. Apply vacuum or drain hydraulic reservoir. If draining hydraulic reservoir, see Drain and Refill Capacities. (Operator's Manual.)
16. Remove test equipment and connect line.
17. Remove vacuum or fill hydraulic reservoir. See Drain and Refill Capacities. (Operator's Manual.)
18. Remove frame articulation lock bar.

SW03989,0000663 -19-14JAN16-2/2

TX1044309A —UN—18JUN08

5. Disconnect hydraulic line to be tested at bulkhead.
6. Connect tee fitting to hydraulic line, then connect tee fitting to bulkhead.
7. Install JT02156A Digital Pressure and Temperature Analyzer kit and connect JT02162 Transducer to tee fitting. See JT02156A Digital Pressure and Temperature Analyzer Kit Installation. (Group 9025-25.)
8. Remove vacuum or fill hydraulic reservoir. See Drain and Refill Capacities. (Operator's Manual.)
9. **Neutral Position**—Run engine at specification and press pilot enable/boom down switch to enable pilot controls.

**Specification**

Engine—Speed ..... 875—925 rpm

10. With pilot control in neutral position, record pressure reading and compare to specification.

**Neutral Position—Specification**

Neutral Position—Pressure ..... 0 kPa  
 0 bar  
 0 psi

11. **Begin Metering Position**—Run engine at specification and press pilot enable/boom down switch to enable pilot controls.

**Specification**

Engine—Speed ..... 875—925 rpm

12. Slowly move auxiliary pilot control lever to actuate function until begin metering distance is met.

**Begin Metering—Specification**

Deflection at Top of Lever ..... 7.1—8.1 mm  
 Controller—Distance ..... 0.28—0.32 in

13. Record pressure reading and compare to specification.

**Begin Metering—Specification**

Control Lever Both ..... 620—760 kPa  
 Directions—Pressure ..... 6.2—7.6 bar  
 90—110 psi

14. **Feel Position**—Run engine at specification and press pilot enable/boom down switch to enable pilot controls.

**Specification**

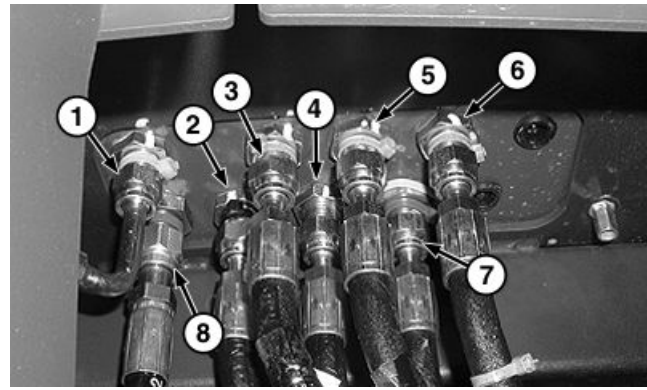
Engine—Speed ..... 875—925 rpm

*NOTE: The feel position is when the lever is moved enough to feel the detent ramp.*

15. Slowly move auxiliary pilot control lever to actuate function until feel position distance is met.

**Feel Position—Specification**

Deflection at Top of Lever ..... 45.2—47.7 mm  
 Controller—Distance ..... 1.78—1.88 in



Pilot Lines at Bulkhead

- |                                      |                          |
|--------------------------------------|--------------------------|
| 1—Return Line to Hydraulic Reservoir | 5—Boom Lower Pilot Line  |
| 2—Bucket Rollback Pilot Line         | 6—Work Port A Pilot Line |
| 3—Bucket Dump Pilot Line             | 7—Work Port B Pilot Line |
| 4—Boom Raise Pilot Line              | 8—Pilot Pressure Line    |

16. Record pressure reading and compare to specification.

**Feel Position—Specification**

Control Lever Both ..... 1958—2178 kPa  
 Directions—Pressure ..... 19.6—21.8 bar  
 284—316 psi

17. **Full Travel Position**—Run engine at specification and press pilot enable/boom down switch to enable pilot controls.

**Specification**

Engine—Speed ..... 875—925 rpm

18. Slowly move auxiliary pilot control lever to actuate function until full travel position distance is met.

**Full Travel Position—Specification**

Deflection at Top of Lever ..... 53.5—56.8 mm  
 Controller—Distance ..... 2.11—2.24 in

19. Record pressure reading and compare to specification.

**Full Travel Position—Specification**

Control Lever Both ..... 3964—4309 kPa  
 Directions—Pressure ..... 39.6—43.0 bar  
 575—625 psi

20. If a function pressure is not at specification:

- a. Disconnect function pilot line to control valve. Close openings using caps and plugs and repeat test.
- b. If pressure is now at specification, repair loader control valve components. See Loader Control Valve Disassemble and Assemble. (Group 3160.)
- c. If pilot pressure is not at specification and pilot pressure reducing valve pressure test had been performed, replace pilot control valve. See Pilot Control Valve Remove and Install. (Group 3160.)

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SW03989,000066D -19-21JAN16-3/4

TX1028435A—UN—28AUG07

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