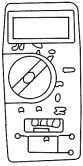
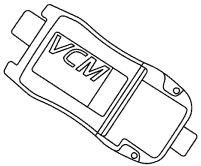
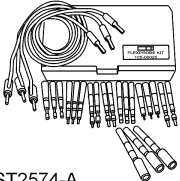


DIAGNOSIS AND TESTING

Reversing Lamps

Special Tool(s)

 ST1137-A	73III Automotive Meter 105-R0057 or equivalent
 ST2834-A	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool
 ST2574-A	Flex Probe Kit 105-R025C or equivalent

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect the following for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> • Reversing lamp switch • Digital transmission range (TR) sensor 	<ul style="list-style-type: none"> • Bussed electrical center (BEC) fuse 62 (20A) • Circuitry • Bulbs • Smart junction box (SJB)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

NOTE: Make sure the headlamp switch is in the OFF position.

NOTE: Make sure the multifunction switch is in the LOW BEAM position.

4. **NOTE:** Make sure to use the latest scan tool software release.

If the cause is not visually evident, connect the scan tool to the data link connector (DLC).

5. **NOTE:** The vehicle communication module (VCM) LED prove-out confirms power and ground from the DLC are provided to the VCM.

If the scan tool does not communicate with the VCM:

- Check the VCM connection to the vehicle.
- Check the scan tool connection to the VCM.
- Refer to Section 418-00, No Power To The Scan Tool, to diagnose no communication with the scan tool.

6. If the scan tool does not communicate with the vehicle:
 - Verify the ignition key is in the ON position.
 - Verify the scan tool operation with a known good vehicle.
 - Refer to Section 418-00 to diagnose no response from the powertrain control module (PCM).
7. Carry out the network test:
 - If the scan tool responds with no communication for one or more modules, refer to Section 418-00.
 - If the network test passes, retrieve and record the continuous memory DTCs.
8. Clear the continuous DTCs and carry out the self-test diagnostics for the SJB.
9. If the DTCs retrieved are related to the concern, go to the Smart Junction Box (SJB) Diagnostic Trouble Code (DTC) Index. For all other DTCs, refer to Section 419-10.
10. If no DTCs related to the concern are retrieved, GO to [Symptom Chart](#).

DIAGNOSIS AND TESTING (Continued)**Smart Junction Box (SJB) Diagnostic Trouble Code (DTC) Index**

DTC	Description	Action
B1342	ECU is Faulted	REPAIR all other DTCs first. CLEAR the DTCs. RETRIEVE the DTCs. If DTC B1342 is retrieved again, INSTALL a new SJB. REFER to Section 419-10. TEST the system for normal operation.
B2525	Left Rear Backup Lamp Circuit Failure	If the reversing lamp is inoperative, GO to Pinpoint Test T . If the reversing lamp is always on, GO to Pinpoint Test U .
B2532	Right Rear Backup Lamp Circuit Short to Battery	If the reversing lamp is inoperative, GO to Pinpoint Test T . If the reversing lamp is always on, GO to Pinpoint Test U .
All other DTCs	—	REFER to Section 419-10.

Symptom Chart**Symptom Chart**

Condition	Possible Sources	Action
<ul style="list-style-type: none"> No communication with the smart junction box (SJB) 	<ul style="list-style-type: none"> Circuitry SJB 	<ul style="list-style-type: none"> REFER to Section 418-00.
<ul style="list-style-type: none"> The reversing lamps are inoperative 	<ul style="list-style-type: none"> Fuse Circuitry Reversing lamp switch Bussed electrical center (BEC) SJB Powertrain control module (PCM) 	<ul style="list-style-type: none"> GO to Pinpoint Test S.
<ul style="list-style-type: none"> An individual reversing lamp is inoperative 	<ul style="list-style-type: none"> Circuitry SJB 	<ul style="list-style-type: none"> GO to Pinpoint Test T.
<ul style="list-style-type: none"> The reversing lamps are on continuously 	<ul style="list-style-type: none"> Circuitry Reversing lamp switch SJB PCM 	<ul style="list-style-type: none"> GO to Pinpoint Test U.

Pinpoint Tests**Pinpoint Test S: The Reversing Lamps Are Inoperative**

[Refer to Wiring Diagrams Cell 93, Reversing Lamps for schematic and connector information.](#)

Normal Operation — Manual Transmission

The powertrain control module (PCM) sends a voltage reference signal to the reversing lamp switch through circuit 1789 (VT/WH). When the transmission is placed in REVERSE (R), the reversing lamp switch closes and routes the signal back to the PCM through circuit 359 (GY/RD). The PCM then sends a signal to the smart junction box (SJB), via the instrument cluster, over the communication network. The SJB then provides voltage to the reversing lamps. The SJB is provided voltage from the bussed electrical center (BEC) through circuit 1679 (WH/YE) to power the reversing lamps.

DIAGNOSIS AND TESTING (Continued)**Normal Operation — Automatic Transmission**

When the PCM detects the transmission is in REVERSE (R), a signal is sent to the SJB over the communication network. The SJB then provides voltage to the reversing lamps. The SJB is provided voltage from the BEC through circuit 1679 (WH/YE) to power the reversing lamps.

The PCM sets DTCs if any faults with the digital transmission range (TR) sensor inputs are detected.

Possible Causes

- Fuse
- Circuit 359 (GY/RD) open
- Circuit 1679 (WH/YE) open
- Circuit 1789 (VT/WH) open
- Reversing lamp switch
- BEC
- SJB
- PCM

PINPOINT TEST S: THE REVERSING LAMPS ARE INOPERATIVE

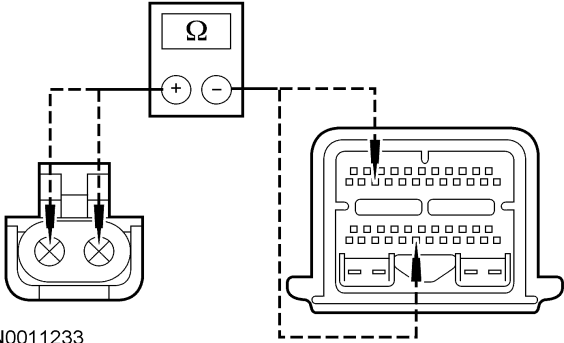
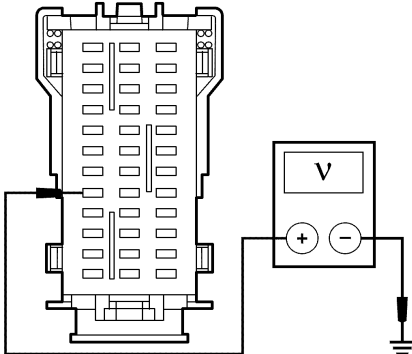
 **CAUTION:** Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

Test Step		Result / Action to Take
S1	CHECK THE REVERSING LAMP SWITCH INPUT	Yes GO to S4 . No For a manual transmission, GO to S2 . For an automatic transmission, REFER to Section 307-01 to continue diagnosis of the digital transmission range (TR) sensor DTCs.
	<ul style="list-style-type: none"> • Enter the following diagnostic mode on the scan tool: PCM Transmission Status PID. • Monitor the PCM transmission status PID while placing the transmission in REVERSE (R). • Does the PID indicate the transmission is in REVERSE (R)? 	
S2	CHECK THE REVERSING LAMP SWITCH	Yes INSTALL a new reversing lamp switch. REFER to Reversing Lamp Switch in this section. TEST the system for normal operation. No REMOVE the jumper wire. GO to S3 .
	<ul style="list-style-type: none"> • Key in OFF position. • Disconnect: Reversing Lamp Switch C169. • Connect a fused (5A) jumper wire between the reversing lamp switch C169-A, circuit 1789 (VT/WH), harness side and the reversing lamp switch C169-B, circuit 359 (GY/RD), harness side. <div data-bbox="402 1270 667 1541" data-label="Diagram"> </div> <p>N0011231</p> <ul style="list-style-type: none"> • Key in ON position. • Do the reversing lamps illuminate? 	
S3	CHECK CIRCUITS 1789 (VT/WH) AND 359 (GY/RD) FOR AN OPEN	
	<ul style="list-style-type: none"> • Key in OFF position. • Disconnect: PCM C175t. 	

(Continued)

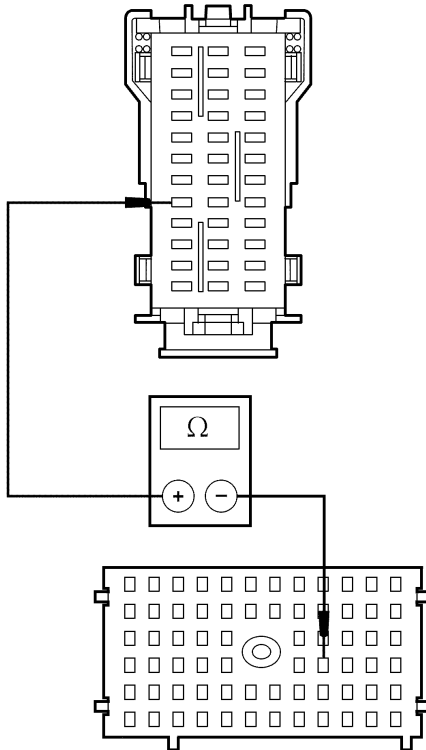
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST S: THE REVERSING LAMPS ARE INOPERATIVE (Continued)

	Test Step	Result / Action to Take
S3	CHECK CIRCUITS 1789 (VT/WH) AND 359 (GY/RD) FOR AN OPEN (Continued)	
	<ul style="list-style-type: none"> Measure the resistance between the reversing lamp switch C169-A, circuit 1789 (VT/WH), harness side and the PCM C175t-21, circuit 1789 (VT/WH), harness side; and between the reversing lamp switch C169-B, circuit 359 (GY/RD), harness side and the PCM C175t-41, circuit 359 (GY/RD), harness side.  <p>N0011233</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes GO to S7.</p> <p>No REPAIR the circuit in question. TEST the system for normal operation.</p>
S4	CHECK CIRCUIT 1679 (WH/YE) FOR VOLTAGE	
	<ul style="list-style-type: none"> Key in OFF position. Disconnect: SJB C2280h. Measure the voltage between the SJB C2280h-29, circuit 1679 (WH/YE), harness side and ground.  <p>N0046932</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? 	<p>Yes GO to S6.</p> <p>No VERIFY the BEC fuse 62 (20A) is OK. If OK, GO to S5.</p>
S5	CHECK CIRCUIT 1679 (WH/YE) FOR AN OPEN	
	<ul style="list-style-type: none"> Key in OFF position. Disconnect: BEC C1035a. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)**PINPOINT TEST S: THE REVERSING LAMPS ARE INOPERATIVE (Continued)**

Test Step		Result / Action to Take
S5	CHECK CIRCUIT 1679 (WH/YE) FOR AN OPEN (Continued) <ul style="list-style-type: none"> Measure the resistance between the SJB C2280h-29, circuit 1679 (WH/YE), harness side and the BEC C1035a-D9, circuit 1679 (WH/YE), harness side.  <p>N0046933</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes INSTALL a new BEC. TEST the system for normal operation.</p> <p>No REPAIR the circuit. TEST the system for normal operation.</p>
S6	CHECK FOR CORRECT SJB OPERATION <ul style="list-style-type: none"> Key in OFF position. Disconnect all the SJB connectors. Check for: <ul style="list-style-type: none"> — corrosion — damaged pins — pushed-out pins Connect all the SJB connectors and make sure they seat correctly. Operate the system and verify the concern is still present. Is the concern still present? 	<p>Yes INSTALL a new SJB. REFER to Section 419-10. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>
S7	CHECK FOR CORRECT PCM OPERATION <ul style="list-style-type: none"> Disconnect all the PCM connectors. Check for: <ul style="list-style-type: none"> — corrosion — damaged pins — pushed-out pins Connect all the PCM connectors and make sure they seat correctly. Operate the system and verify the concern is still present. Is the concern still present? 	<p>Yes INSTALL a new PCM. REFER to Section 303-14. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>

Pinpoint Test T: An Individual Reversing Lamp Is Inoperative

Refer to Wiring Diagrams Cell 93, Reversing Lamps for schematic and connector information.

DIAGNOSIS AND TESTING (Continued)

Normal Operation

When the transmission is placed in REVERSE (R), the powertrain control module (PCM) sends a signal to the smart junction box (SJB) over the communication network. The SJB then provides voltage through circuits 1362 (DG/OG) and 1367 (WH/YE) to the LH and RH reversing lamps, respectively. Ground for the lamps is provided through circuit 1205 (BK).

DTC B2525 — sets when the SJB detects an open or short to ground on the LH reversing lamp voltage supply circuit.

DTC B2532 — sets when the SJB detects an open or short to ground on the RH reversing lamp voltage supply circuit.

Possible Causes

- Circuit 1205 (BK) open
- Circuit 1362 (DG/OG) open or short to ground
- Circuit 1367 (WH/YE) open or short to ground
- SJB

PINPOINT TEST T: AN INDIVIDUAL REVERSING LAMP IS INOPERATIVE

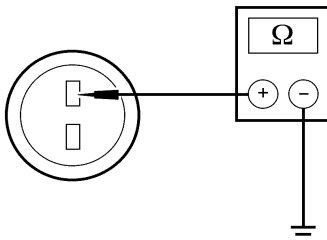
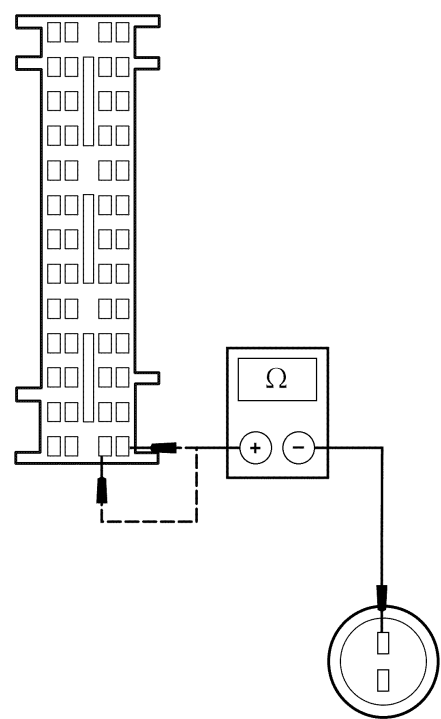
 **CAUTION:** Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

Test Step		Result / Action to Take
T1	CHECK CIRCUIT 1205 (BK) FOR AN OPEN <ul style="list-style-type: none">• Key in OFF position.• Disconnect: Inoperative Reversing Lamp.• Measure the resistance between the LH reversing lamp C451-1, circuit 1205 (BK), harness side and ground; or between the RH reversing lamp C461-1, circuit 1205 (BK), harness side and ground. <div data-bbox="381 1077 708 1318"></div> <p>N0011227</p> <ul style="list-style-type: none">• Is the resistance less than 5 ohms?	<p>Yes GO to T2.</p> <p>No REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.</p>
T2	CHECK CIRCUIT 1362 (DG/OG) OR CIRCUIT 1367 (WH/YE) FOR A SHORT TO GROUND <ul style="list-style-type: none">• Disconnect: SJB C2280d.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST T: AN INDIVIDUAL REVERSING LAMP IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
T2	CHECK CIRCUIT 1362 (DG/OG) OR CIRCUIT 1367 (WH/YE) FOR A SHORT TO GROUND (Continued)	
<div><ul style="list-style-type: none">Measure the resistance between the LH reversing lamp C451-2, circuit 1362 (DG/OG), harness side and ground; or between the RH reversing lamp C461-2, circuit 1367 (WH/YE), harness side and ground.</div> <div></div> <div>N0011229</div> <div><ul style="list-style-type: none">Is the resistance greater than 10,000 ohms?</div>		<div>Yes GO to T3.</div> <div>No REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.</div>
T3	CHECK CIRCUIT 1362 (DG/OG) OR CIRCUIT 1367 (WH/YE) FOR AN OPEN	
<div><ul style="list-style-type: none">Measure the resistance between the LH reversing lamp C451-2, circuit 1362 (DG/OG), harness side and the SJB C2280d-26, circuit 1362 (DG/OG), harness side; or between the RH reversing lamp C461-2, circuit 1367 (WH/YE), harness side and the SJB C2280d-13, circuit 1367 (WH/YE), harness side.</div> <div></div> <div>N0046934</div> <div><ul style="list-style-type: none">Is the resistance less than 5 ohms?</div>		<div>Yes GO to T4.</div> <div>No REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.</div>

(Continued)

DIAGNOSIS AND TESTING (Continued)**PINPOINT TEST T: AN INDIVIDUAL REVERSING LAMP IS INOPERATIVE (Continued)**

Test Step		Result / Action to Take
T4	CHECK FOR CORRECT SJB OPERATION	Yes INSTALL a new SJB. REFER to Section 419-10. TEST the system for normal operation. No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.
	<ul style="list-style-type: none"> • Disconnect all the SJB connectors. • Check for: <ul style="list-style-type: none"> — corrosion — damaged pins — pushed-out pins • Connect all the SJB connectors and make sure they seat correctly. • Operate the system and verify the concern is still present. • Is the concern still present? 	

Pinpoint Test U: The Reversing Lamps Are On Continuously

Refer to Wiring Diagrams Cell 93, Reversing Lamps for schematic and connector information.

Normal Operation — Manual Transmission

The powertrain control module (PCM) sends a voltage reference signal to the reversing lamp switch through circuit 1789 (VT/WH). When the transmission is placed in REVERSE (R), the reversing lamp switch closes and routes the signal back to the PCM through circuit 359 (GY/RD). The PCM then sends a signal to the smart junction box (SJB) over the communication network. The SJB then provides voltage through circuits 1362 (DG/OG) and 1367 (WH/YE) to the LH and RH reversing lamps, respectively. The PCM sets DTCs if any faults with the digital transmission range (TR) sensor inputs are detected.

Normal Operation — Automatic Transmission

When the PCM detects the transmission is in REVERSE (R), a signal is sent to the SJB over the communication network. The SJB then provides voltage through circuits 1362 (DG/OG) and 1367 (WH/YE) to the LH and RH reversing lamps, respectively. The PCM sets DTCs if any faults with the digital transmission range (TR) sensor inputs are detected. The SJB sets DTCs if a fault is detected on the reversing lamp output circuits.

DTC B2525 — sets when the SJB detects a short to voltage on the LH reversing lamp voltage supply circuit.

DTC B2532 — sets when the SJB detects a short to voltage on the RH reversing lamp voltage supply circuit.

Possible Causes

- Circuit 1362 (DG/OG) short to voltage
- Circuit 1367 (WH/YE) short to voltage
- Circuit 1789 (VT/WH) short to ground
- Reversing lamp switch
- SJB
- PCM

PINPOINT TEST U: THE REVERSING LAMPS ARE ON CONTINUOUSLY

 **CAUTION:** Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

Test Step		Result / Action to Take
U1	USE THE RECORDED DTCs FROM THE SJB SELF-TEST	Yes GO to U2 . No GO to U3 .
	<ul style="list-style-type: none"> • Key in OFF position. • Using the recorded results from the SJB self-test: • Was DTC B2525 or B2532 present? 	

(Continued)

DIAGNOSIS AND TESTING (Continued)**PINPOINT TEST U: THE REVERSING LAMPS ARE ON CONTINUOUSLY (Continued)**

Test Step		Result / Action to Take
U2	CHECK CIRCUITS 1362 (DG/OG) AND 1367 (WH/YE) FOR A SHORT TO VOLTAGE	
	<ul style="list-style-type: none"> Disconnect: SJB C2280d. Key in ON position. Does either reversing lamp continue to illuminate? 	<p>Yes REPAIR circuit 1362 (DG/OG) (LH reversing lamp) or circuit 1367 (WH/YE) (RH reversing lamp) as necessary. CLEAR the DTCs. REPEAT the self-test.</p> <p>No GO to U6.</p>
U3	CHECK THE PCM	
	<ul style="list-style-type: none"> Disconnect: PCM C175t. Key in ON position. Do the reversing lamps continue to illuminate? 	<p>Yes GO to U6.</p> <p>No If equipped with a manual transmission, GO to U4. If equipped with an automatic transmission, REFER to Section 307-01 to continue diagnosis of the digital transmission range (TR) sensor DTCs.</p>
U4	CHECK THE REVERSING LAMP SWITCH	
	<ul style="list-style-type: none"> Key in OFF position. Connect: PCM C175t. Disconnect: Reversing Lamp Switch C169. Key in ON position. Do the reversing lamps continue to illuminate? 	<p>Yes GO to U5.</p> <p>No INSTALL a new reversing lamp switch. REFER to Reversing Lamp Switch in this section. TEST the system for normal operation.</p>
U5	CHECK CIRCUIT 1789 (VT/WH) FOR A SHORT TO GROUND	
	<ul style="list-style-type: none"> Key in OFF position. Disconnect: PCM C175t. Measure the resistance between the reversing lamp switch C169-A, circuit 1789 (VT/WH), harness side and ground. <div data-bbox="384 1192 711 1495" data-label="Diagram"> <p>The diagram illustrates the testing procedure for circuit 1789. It shows a reversing lamp switch with two terminals. One terminal is connected to a multimeter probe, and the other terminal is connected to a ground symbol. The multimeter is labeled with a resistance symbol (Ω) and has '+' and '-' terminals.</p> </div> <p>N0011234</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? 	<p>Yes GO to U7.</p> <p>No REPAIR the circuit. TEST the system for normal operation.</p>
U6	CHECK FOR CORRECT SJB OPERATION	
	<ul style="list-style-type: none"> Key in OFF position. Disconnect all the SJB connectors. Check for: <ul style="list-style-type: none"> corrosion damaged pins pushed-out pins Connect all the SJB connectors and make sure they seat correctly. Operate the system and verify the concern is still present. Is the concern still present? 	<p>Yes INSTALL a new SJB. REFER to Section 419-10. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.</p>
U7	CHECK FOR CORRECT PCM OPERATION	
	<ul style="list-style-type: none"> Key in OFF position. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)**PINPOINT TEST U: THE REVERSING LAMPS ARE ON CONTINUOUSLY (Continued)**

Test Step		Result / Action to Take
U7	CHECK FOR CORRECT PCM OPERATION (Continued)	
<ul style="list-style-type: none">• Disconnect all the PCM connectors.• Check for:<ul style="list-style-type: none">— corrosion— damaged pins— pushed-out pins• Connect all the PCM connectors and make sure they seat correctly.• Operate the system and verify the concern is still present.• Is the concern still present?		<p>Yes INSTALL a new PCM. REFER to Section 303-14. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>

Yes

INSTALL a new PCM. REFER to Section 303-14. TEST the system for normal operation.

No

The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.