# **Turn Signal and Hazard Lamps**

#### Special Tool(s)

0 a g 0 a g	73III Automotive Meter 105-R0057 or equivalent
ST2634-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

#### **Principles of Operation**

NOTE: The Smart Junction Box (SJB) is also known as the Generic Electronic Module (GEM).

The <u>SJB</u> monitors the multifunction switch position by sending voltage reference signals to the multifunction switch. When the multifunction switch is in the LH or RH TURN position, the input signal is routed to an internal ground within the <u>SJB</u>. When the hazard flasher lamp switch is pressed, the input signal is routed to ground.

NOTE: The hazard switch is a momentary contact switch.

When the <u>SJB</u> receives a request for a turn signal or the hazard lamps, the <u>SJB</u> supplies on/off voltage to the appropriate turn lamps.

The rear stoplamps are combined with the turn lamps. The turn and hazard lamp functions override the rear stoplamp function.

The timed on/off cycle is determined by the <u>SJB</u> and is set to flash approximately 80 times per minute if both the front and rear turn lamps operate correctly. If an individual turn signal lamp is inoperative, the <u>SJB</u> flashes the remaining turn lamp approximately 160 times per minute.

#### **Inspection and Verification**

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

#### **Visual Inspection Chart**

Mechanical	Electrical
<ul><li>Multifunction switch</li><li>Hazard flasher lamp switch</li></ul>	<ul> <li>Wiring, terminals or connectors</li> <li>Bulb(s)</li> <li>Smart Junction Box (SJB)</li> </ul>

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 <u>DLC</u> are provided to the <u>VCM</u>.

If the scan tool does not communicate with the <u>VCM</u>:

- Check the <u>VCM</u> connection to the vehicle.
- Check the scan tool connection to the <u>VCM</u>.
- Refer to Section 418-00, No Power To The Scan Tool, to diagnose no power to 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 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 <u>Diagnostic Trouble Code (DTC) Chart</u> in this section. For all other DTCs, refer to the Diagnostic Trouble Code (DTC) Chart in <u>Section 419-10</u>.
- 10. If no DTCs related to the concern are retrieved, GO to Symptom Chart.

#### **Symptom Chart**

#### Symptom Chart

Condition	Possible Sources	Action
<ul> <li>The turn signal lamps are inoperative</li> </ul>	<ul> <li>Wiring, terminals or connectors</li> <li>Multifunction switch</li> <li>Smart Junction Box (SJB)</li> </ul>	<ul> <li><u>GO to Pinpoint</u> <u>Test J</u>.</li> </ul>
<ul> <li>The turn signal lamps are always on</li> </ul>	<ul> <li>Wiring, terminals or connectors</li> <li>Multifunction switch</li> <li><u>SJB</u></li> </ul>	<ul> <li><u>GO to Pinpoint</u> <u>Test K</u>.</li> </ul>
One turn signal lamp is	<ul> <li>Wiring, terminals or</li> </ul>	<u>GO to Pinpoint</u>

inoperative/always on	connectors <ul> <li>Bulb holder</li> <li>Bussed Electrical Center (BEC)</li> <li><u>SJB</u></li> </ul>	<u>Test L</u> .
<ul> <li>The hazard lamps are inoperative/always on</li> </ul>	<ul> <li>Wiring, terminals or connectors</li> <li>Hazard flasher lamp switch</li> <li><u>SJB</u></li> </ul>	• <u>GO to Pinpoint</u> <u>Test M</u> .

# **Pinpoint Tests**

## Pinpoint Test J: The Turn Signal Lamps Are Inoperative

Refer to Wiring Diagrams Cell <u>90</u>, Turn Signal/Stop/Hazard Lamps for schematic and connector information.

## **Normal Operation**

The Smart Junction Box (SJB) sends a voltage reference signal to the multifunction switch through circuit 1393 (LB/RD) (LH turn signal) and circuit 1392 (LG/OG) (RH turn signal). When the multifunction switch is placed in the LH or RH TURN position, the signal is routed through circuit 1396 (VT/WH) to an internal ground within the <u>SJB</u>.

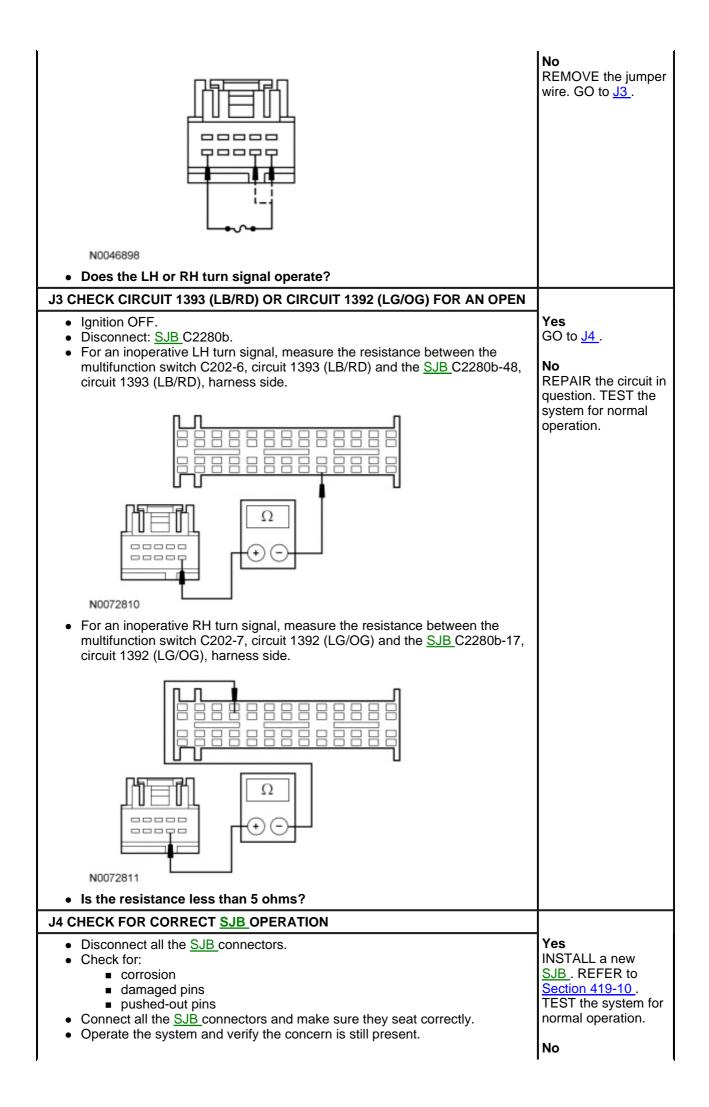
# This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Multifunction switch
- <u>SJB</u>

# PINPOINT TEST J: THE TURN SIGNAL LAMPS ARE INOPERATIVE

# *NOTICE:* 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
J1 CHECK THE HIGH BEAM OPERATION	
<ul> <li>Ignition OFF.</li> <li>Place the headlamp switch in the HEADLAMPS ON position.</li> <li>Place the multifunction switch in the HIGH BEAM position.</li> <li>Do the high beams operate correctly?</li> </ul>	Yes GO to <u>J2</u> . No REFER to <u>Headlamps</u> in this section.
J2 CHECK THE MULTIFUNCTION SWITCH	
<ul> <li>Place the headlamp switch in the OFF position.</li> <li>Disconnect: Multifunction Switch C202.</li> <li>Ignition ON.</li> <li>Connect a fused jumper wire between the multifunction switch C202-6 (LH turn signal), circuit 1393 (LB/RD) and the multifunction switch C202-10, circuit 1396 (VT/WH), harness side; or between the multifunction switch C202-7 (RH turn signal), circuit 1392 (LG/OG) and the multifunction switch C202-10, circuit 1396 (VT/WH), harness side.</li> </ul>	Yes REMOVE the jumper wire. INSTALL a new multifunction switch. REFER to <u>Section</u> <u>211-05</u> . TEST the system for normal operation.



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#### Pinpoint Test K: The Turn Signal Lamps Are Always On

Refer to Wiring Diagrams Cell <u>90</u>, Turn Signal/Stop/Hazard Lamps for schematic and connector information.

#### **Normal Operation**

The Smart Junction Box (SJB) sends a voltage reference signal to the multifunction switch through circuit 1393 (LB/RD) (LH turn signal) and circuit 1392 (LG/OG) (RH turn signal). When the multifunction switch is placed in the LH or RH TURN position, the signal is routed through circuit 1396 (VT/WH) to an internal ground within the <u>SJB</u>.

- DTC B2281 (Right Turn Switch Short to Ground) an on-demand DTC that sets when the <u>SJB</u> detects a short to ground from the RH turn signal input circuit.
- DTC B2282 (Left Turn Switch Short to Ground) an on-demand DTC that sets when the <u>SJB</u> detects a short to ground from the LH turn signal input circuit.

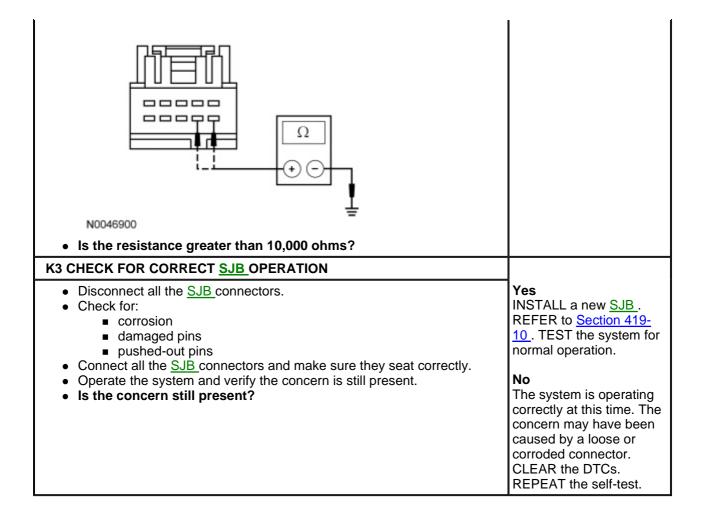
#### This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Multifunction switch
- <u>SJB</u>

#### PINPOINT TEST K: THE TURN SIGNAL LAMPS ARE ALWAYS ON

# *NOTICE:* 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
K1 CHECK THE MULTIFUNCTION SWITCH	
<ul> <li>Ignition OFF.</li> <li>Disconnect: Multifunction Switch C202.</li> <li>Ignition ON.</li> </ul>	<b>Yes</b> GO to <u>K2</u> .
• Do the turn signal lamps continue to flash on and off?	<b>No</b> INSTALL a new multifunction switch. REFER to <u>Section 211-</u> <u>05</u> . CLEAR the DTCs. REPEAT the self-test.
K2 CHECK CIRCUIT 1393 (LB/RD) OR CIRCUIT 1392 (LG/OG) FOR A SHORT TO GROUND	
<ul> <li>Ignition OFF.</li> <li>Disconnect: <u>SJB</u>C2280b.</li> <li>Measure the resistance between the multifunction switch C202-6 (LH turn signal), circuit 1393 (LB/RD), harness side and ground; and between the multifunction switch C202-7 (RH turn signal), circuit 1392 (LG/OG), harness side and ground.</li> </ul>	Yes GO to <u>K3</u> . No REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self- test.



# Pinpoint Test L: One Turn Signal Lamp Is Inoperative/Always On

Refer to Wiring Diagrams Cell 90, Turn Signal/Stop/Hazard Lamps for schematic and connector information.

#### **Normal Operation**

When the Smart Junction Box (SJB) detects a request for the LH or RH turn signal, the <u>SJB</u> provides voltage, through the Bussed Electrical Center (BEC), to the front turn lamps through circuit 1342 (GY/BK) (LH front turn lamp) or circuit 1341 (DB/OG) (RH front turn lamp). The turn lamps are grounded through circuit 1205 (BK) through the <u>BEC</u>.

The rear lamps are combination stop/turn lamps. The function of the rear turn lamps uses the stoplamp circuitry.

DTC Description	Fault Trigger Conditions
<ul> <li>B1499 — Lamp Turn Signal Left Circuit Failure</li> </ul>	A continuous and on-demand DTC that sets when the <u>SJB</u> detects an open or short to voltage from the LH front turn signal voltage supply circuit.
<ul> <li>B1502 — Lamp Turn Signal Left Circuit Short to Ground</li> </ul>	A continuous and on-demand DTC that sets when the <u>SJB</u> detects a short to ground from the LH front turn signal voltage supply circuit.
<ul> <li>B1503 — Lamp Turn Signal Right Circuit Failure</li> </ul>	A continuous and on-demand DTC that sets when the <u>SJB</u> detects an open or short to voltage from the RH front turn signal voltage supply circuit.
<ul> <li>B1506 — Lamp Turn Signal Right Circuit Short to Ground</li> </ul>	A continuous and on-demand DTC that sets when the <u>SJB</u> detects a short to ground from the RH front turn signal voltage supply circuit.

This pinpoint test is intended to diagnose the following:

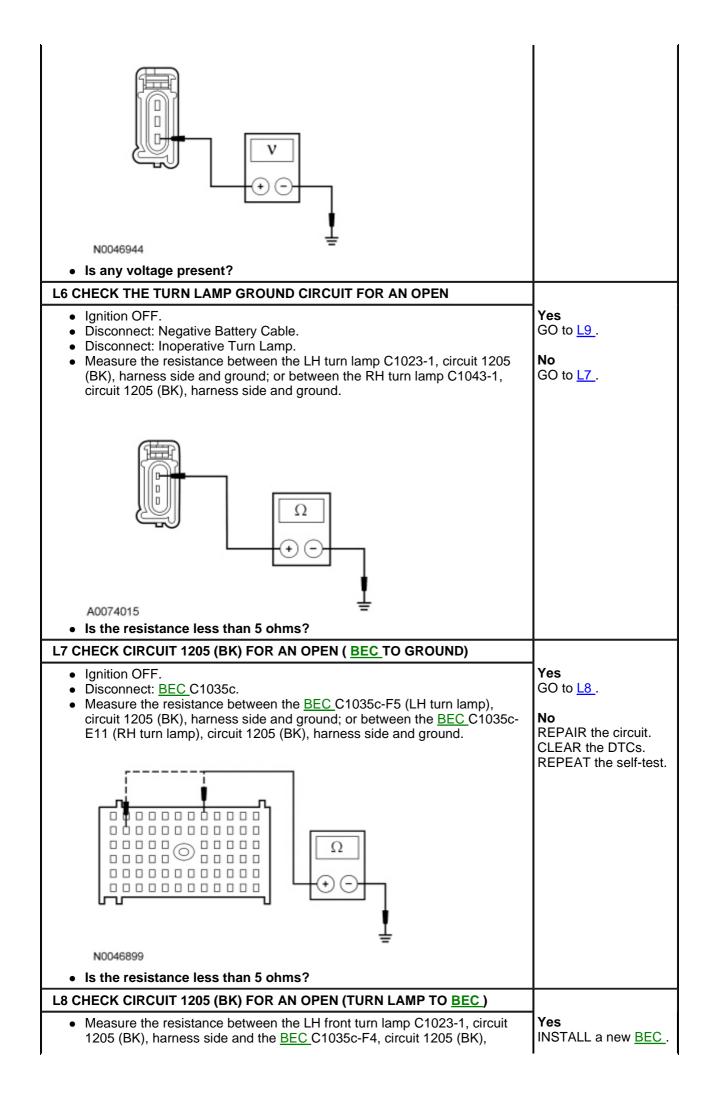
- Wiring, terminals or connectors
- Bulb holder
- <u>BEC</u>
- <u>SJB</u>

#### PINPOINT TEST L: ONE TURN SIGNAL LAMP IS INOPERATIVE/ALWAYS ON

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

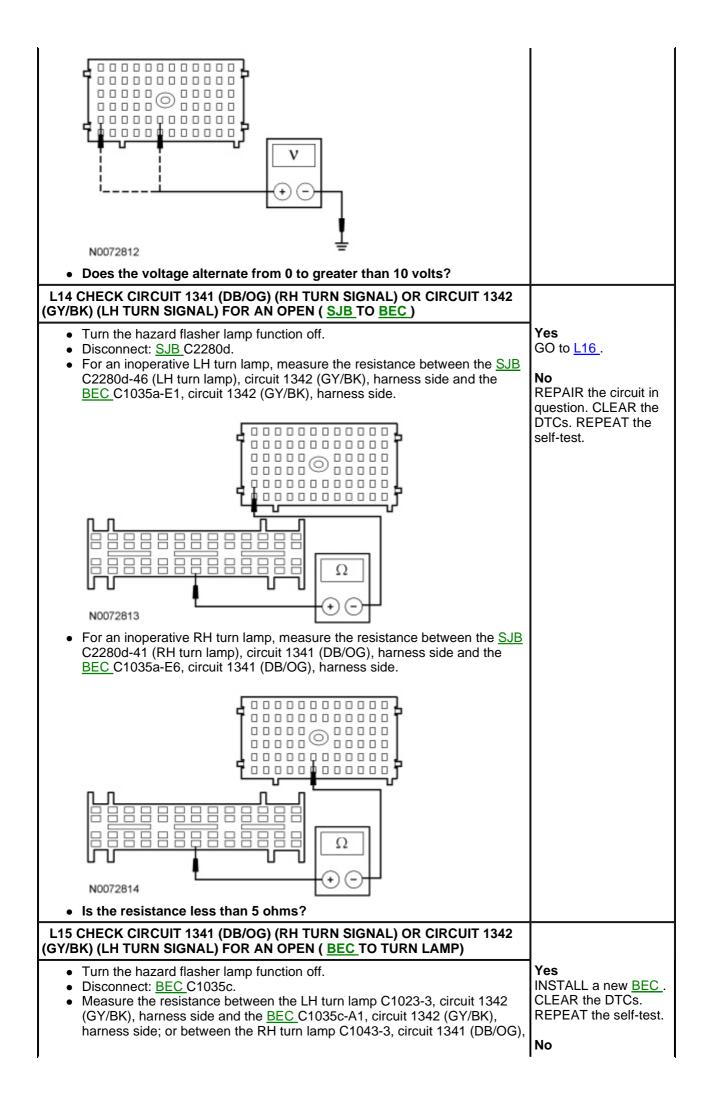
**NOTE:** Failure to disconnect the battery when instructed will result in false resistance readings. Refer to <u>Section</u> <u>414-01</u>.

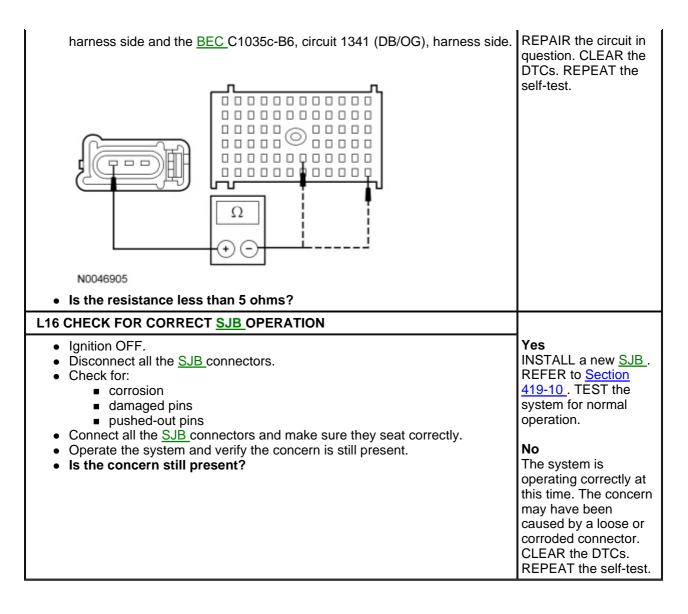
Test Step	Result / Action to Take
L1 CHECK THE STOPLAMPS	
<ul> <li>Ignition ON.</li> <li>Apply and release the brake pedal, while observing the stoplamps.</li> <li>Do the stoplamps operate correctly?</li> </ul>	Yes GO to <u>L2</u> . <b>No</b> REFER to <u>Stoplamps</u> in this section.
L2 DETERMINE IF A TURN SIGNAL LAMP IS ALWAYS ON	
<ul> <li>NOTE: Make sure the multifunction switch is in the NEUTRAL position.</li> <li>Observe the front turn lamps.</li> <li>Is either turn lamp illuminated?</li> </ul>	<b>Yes</b> GO to <u>L3</u> . <b>No</b> GO to <u>L6</u> .
L3 CHECK THE TURN LAMP VOLTAGE SUPPLY CIRCUIT FOR A SHORT TO VOLTAGE	
<ul> <li>Ignition OFF.</li> <li>Disconnect: <u>SJB</u> 2280d.</li> <li>Ignition ON.</li> <li>Does either turn lamp continue to illuminate?</li> </ul>	<b>Yes</b> GO to <u>L4</u> . <b>No</b> GO to <u>L16</u> .
L4 CHECK CIRCUIT 1341 (DB/OG) (RH TURN SIGNAL) OR CIRCUIT 1342 (GY/BK) (LH TURN SIGNAL) FOR A SHORT TO VOLTAGE ( <u>SJB</u> TO <u>BEC</u> )	
<ul> <li>Ignition OFF.</li> <li>Disconnect: <u>BEC</u>C1035a.</li> <li>Ignition ON.</li> <li>Does either turn lamp continue to illuminate?</li> </ul>	Yes GO to <u>L5</u> . No REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.
L5 CHECK CIRCUIT 1341 (DB/OG) (RH TURN SIGNAL) OR CIRCUIT 1342 (GY/BK) (LH TURN SIGNAL) FOR A SHORT TO VOLTAGE ( <u>BEC</u> TO TURN LAMP)	
<ul> <li>Ignition OFF.</li> <li>Disconnect: <u>BEC</u> C1035c.</li> <li>Disconnect: Always On Lamp.</li> <li>Ignition ON.</li> <li>Measure the voltage between the LH front turn lamp C1023-3, circuit 1342 (GY/BK), harness side and ground; or between the RH front turn lamp C1043-3, circuit 1341 (DB/OG), harness side and ground.</li> </ul>	Yes REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test. No INSTALL a new <u>BEC</u> . CLEAR the DTCs. REPEAT the self-test.



harness side; or between the RH front turn lamp C1043-1, circuit 1205 (BK), harness side and the <u>BEC C1035c-F11, circuit 1205</u> (BK), harness side.	CLEAR the DTCs. REPEAT the self-test.
<ul> <li>Is the resistance less than 5 ohms?</li> </ul>	<b>No</b> REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
L9 CHECK FOR VOLTAGE TO THE INOPERATIVE TURN LAMP	<u> </u>
<ul> <li>Connect: Negative Battery Cable.</li> <li>Turn the hazard flasher lamp function on.</li> <li>Measure the voltage between the LH front turn lamp C1023-3, circuit 1342 (GY/BK), harness side and ground; or between the RH front turn lamp C1043-3, circuit 1341 (DB/OG), harness side and ground.</li> </ul>	Yes INSTALL a new bulb holder. CLEAR the DTCs. REPEAT the self-test.
	<b>No</b> GO to <u>L10</u> .
N0066286 • Does the voltage alternate between 0 and greater than 10 volts?	
L10 CHECK THE TURN LAMP VOLTAGE SUPPLY CIRCUIT FOR A SHORT TO GROUND	
<ul> <li>Turn the hazard flasher lamp function off.</li> <li>Disconnect: <u>SJB</u> C2280d.</li> <li>Measure the resistance between the LH turn lamp C1023-3, circuit 1342 (GY/BK), harness side and ground; or between the RH turn lamp C1043-3, circuit 1341 (DB/OG), harness side and ground.</li> </ul>	<b>Yes</b> GO to <u>L13</u> . <b>No</b> GO to <u>L11</u> .
N0046902	

Is the resistance greater than 10,000 ohms?	l
L11 CHECK CIRCUIT 1341 (DB/OG) (RH TURN SIGNAL) OR CIRCUIT 1342 (GY/BK) (LH TURN SIGNAL) FOR A SHORT TO GROUND ( <u>SJB</u> TO <u>BEC</u> )	
<ul> <li>Disconnect: <u>BEC</u> C1035a.</li> <li>Measure the resistance between the LH turn lamp C1023-3, circuit 1342 (GY/BK), harness side and ground; or between the RH turn lamp C1043-3, circuit 1341 (DB/OG), harness side and ground.</li> </ul>	Yes REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.
	<b>No</b> GO to <u>L12</u> .
N0046902	
<ul> <li>Is the resistance greater than 10,000 ohms?</li> <li>L12 CHECK CIRCUIT 1341 (DB/OG) (RH TURN SIGNAL) OR CIRCUIT 1342</li> </ul>	
(GY/BK) (LH TURN SIGNAL) FOR A SHORT TO GROUND ( <u>BEC</u> TO TURN LAMP)	
<ul> <li>Disconnect: <u>BEC</u>C1035c.</li> <li>Measure the resistance between the LH turn lamp C1023-3, circuit 1342 (GY/BK), harness side and ground; or between the RH turn lamp C1043-3, circuit 1341 (DB/OG), harness side and ground.</li> </ul>	Yes INSTALL a new <u>BEC</u> . CLEAR the DTCs. REPEAT the self-test.
	No REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.
N0046902	
Is the resistance greater than 10,000 ohms?	
<ul> <li>L13 CHECK FOR VOLTAGE TO THE <u>BEC</u></li> <li>Connect: <u>SJB</u>C2280d.</li> <li>Disconnect: <u>BEC</u>C1035a.</li> </ul>	Yes GO to <u>L15</u> .
<ul> <li>Turn the hazard flasher lamp function on.</li> <li>Measure the voltage between the <u>BEC</u> C1035a-E1 (LH turn lamp), circuit 1342 (GY/BK), harness side and ground; or between the <u>BEC</u> C1035a-E6 (RH turn lamp), circuit 1341 (DB/OG), harness side and ground.</li> </ul>	<b>No</b> GO to <u>L14</u> .
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#### Pinpoint Test M: The Hazard Lamps Are Inoperative/Always On

Refer to Wiring Diagrams Cell 90, Turn Signal/Stop/Hazard Lamps for schematic and connector information.

#### **Normal Operation**

The Smart Junction Box (SJB) sends a voltage reference signal to the hazard flasher lamp switch through circuit 1689 (RD/WH). When the hazard flasher lamp switch is pressed, the signal is routed to ground through circuit 1205 (BK).

• DTC B2071 (Hazard Switch Signal Short to Ground) — an on-demand DTC that sets when the <u>SJB</u> detects a short to ground from the hazard flasher lamp switch input circuit.

#### This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Hazard flasher lamp switch
- <u>SJB</u>

#### PINPOINT TEST M: THE HAZARD LAMPS ARE INOPERATIVE/ALWAYS ON

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

**NOTE:** Failure to disconnect the battery when instructed will result in false resistance readings. Refer to <u>Section</u> 414-01.

Test Step	Result / Action to Take
M1 USE THE RECORDED DTCs FROM THE <u>SJB</u> SELF-TEST	
<ul> <li>Ignition OFF.</li> <li>Retrieve the recorded results from the <u>SJB</u> self-test.</li> <li>Was DTC B2071 present?</li> </ul>	Yes GO to <u>M2</u> . No
	GO to <u>M4</u> .
M2 CHECK THE HAZARD FLASHER LAMP SWITCH (DTC B2071)	
<ul> <li>Disconnect: Hazard Flasher Lamp Switch C2039.</li> <li>Ignition ON.</li> <li>Enter the following diagnostic mode on the scan tool: <u>SJB</u>Self-Test.</li> <li>Repeat the <u>SJB</u>on-demand self-test.</li> <li>Is DTC B2071 present?</li> </ul>	Yes GO to <u>M3</u> . No INSTALL a new hazard flasher lamp switch. REFER to <u>Hazard Flasher Lamp</u> <u>Switch</u> in this section. TEST the system for normal operation.
M3 CHECK CIRCUIT 1689 (RD/WH) FOR SHORT TO GROUND	
<ul> <li>Ignition OFF.</li> <li>Disconnect: <u>SJB</u>C2280b.</li> <li>Measure the resistance between the hazard flasher lamp switch C2039-5, circuit 1689 (RD/WH), harness side and ground.</li> </ul>	Yes GO to <u>M7</u> . No REPAIR the circuit. CLEAR the DTCs. REPEAT the self- test.
N0010906	
Is the resistance greater than 10,000 ohms?	ļ
<ul> <li>M4 CHECK CIRCUIT 1205 (BK) FOR AN OPEN</li> <li>Disconnect: Negative Battery Cable.</li> <li>Disconnect: Hazard Flasher Lamp Switch C2039.</li> <li>Measure the resistance between the hazard flasher lamp switch C2039-1, circuit 1205 (BK), harness side and ground.</li> </ul>	Yes GO to <u>M5</u> . <b>No</b> REPAIR the circuit. TEST the system for normal
	operation.
N0038814	

Is the resistance less than 5 ohms?	
M5 CHECK CIRCUIT 1689 (RD/WH) FOR AN OPEN	
<ul> <li>Disconnect: <u>SJB</u>C2280b.</li> <li>Measure the resistance between the <u>SJB</u>C2280b-24, circuit 1689 (RD/WH), harness side and the hazard flasher lamp switch C2039-5, circuit 1689 (RD/WH), harness side.</li> </ul>	Yes GO to <u>M6</u> . No REPAIR the circuit. TEST
	the system for normal operation.
<ul><li>Is the resistance less than 5 ohms?</li></ul>	
M6 CHECK THE HAZARD FLASHER LAMP SWITCH	4,
<ul> <li>Connect: Hazard Flasher Lamp Switch C2039.</li> <li>While pressing and releasing the hazard flasher lamp switch, measure the resistance between the <u>SJB</u>C2280b-24, circuit 1689 (RD/WH), harness side and ground.</li> </ul>	Yes GO to <u>M7</u> . No INSTALL a new hazard
	flasher lamp switch. REFE to <u>Hazard Flasher Lamp</u> <u>Switch</u> in this section. TES the system for normal operation.
N0046907	
<ul> <li>Is the resistance less than 5 ohms with the hazard flasher lamp switch pressed and greater than 10,000 ohms with the hazard flasher lamp switch released?</li> </ul>	
M7 CHECK FOR CORRECT SJB OPERATION	]
<ul> <li>Disconnect all the <u>SJB</u> connectors.</li> <li>Check for: <ul> <li>corrosion</li> <li>damaged pins</li> <li>pushed-out pins</li> </ul> </li> </ul>	Yes INSTALL a new <u>SJB</u> . REFER to <u>Section 419-10</u> TEST the system for norm operation.
<ul> <li>Connect all the <u>SJB</u> connectors and make sure they seat correctly.</li> <li>Operate the system and verify the concern is still present.</li> <li>Is the concern still present?</li> </ul>	No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEA the DTCs. REPEAT the se test.