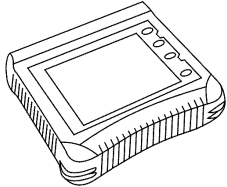
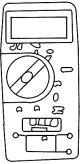
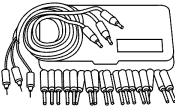


## DIAGNOSIS AND TESTING

### Anti-Lock Control

Refer to Wiring Diagrams Cell 42 for schematic and connector information.

#### Special Tool(s)

 <p>ST2332-A</p>	<p>Worldwide Diagnostic System (WDS), Vehicle Communication Module (VCM) with appropriate adapters, or equivalent diagnostic tool</p>
 <p>ST1137-A</p>	<p>73III Digital Multimeter 105-R0057 or equivalent</p>
 <p>ST1138-A</p>	<p>Flex Probe Kit 418-F090 (105-R025B) or equivalent</p>

#### Principles of Operation

The anti-lock brake system (ABS) module receives wheel speed readings from each wheel speed sensor and processes this information to determine if an ABS event is necessary. The wheel speed sensor electrically senses each tooth of the wheel speed sensor indicators as it passes through the wheel speed sensor's magnetic field.

The ABS module continuously monitors and compares the rotational speed of each wheel, and when it detects an impending wheel lock, modulates hydraulic brake pressure to the appropriate brake caliper. This is accomplished by the ABS module triggering the hydraulic control unit (HCU) to open and close the appropriate solenoid valves. Once the affected wheel returns to normal speed, the ABS module returns the solenoid valves to their normal position, and normal (base) braking resumes.

The ABS module is self-monitoring. When the ignition switch is turned to the RUN position, the ABS module does a preliminary electrical check, and at approximately 12 km/h (8 mph) the pump motor is turned on for approximately one half-second. Any malfunction of the ABS causes the ABS to shut off and the yellow ABS warning indicator to illuminate, however, normal power assisted braking remains.

The traction control system controls wheelspin by modulating engine torque and applying, then releasing the appropriate rear brake to restore traction when driving on slippery or loose surfaces.

The traction control system can be disabled by pressing the traction control switch and is indicated by an indicator lamp in the traction control switch. The traction control will reset and return to normal traction assist when the ignition switch is cycled or when the traction control switch is pressed and released a second time.

#### Inspection and Verification

1. Verify the customer concern.
2. Verify the stoplamps operate correctly by applying and releasing the brake pedal with the ignition switch in the OFF position. If the stoplamps do not operate correctly, refer to Section 417-01. If the stoplamps operate correctly, proceed to the next step.
3. Visually inspect for obvious signs of mechanical or electrical damage:

**DIAGNOSIS AND TESTING (Continued)****Visual Inspection Chart**

Mechanical	Electrical
<ul style="list-style-type: none"> <li>• Brake fluid level</li> <li>• Tire inflation</li> <li>• Wheel and tire sizes</li> <li>• Steering components and suspension components</li> <li>• Base brake system</li> <li>• Wheel speed sensor ring</li> <li>• HCU</li> </ul>	<ul style="list-style-type: none"> <li>• Bussed electrical center (BEC) fuse(s):               <ul style="list-style-type: none"> <li>— 7 (40A)</li> <li>— 65 (30A)</li> </ul> </li> <li>• Smart junction box (SJB) fuse 18 (10A)</li> <li>• Circuitry</li> <li>• Brake fluid level switch</li> <li>• Stoplamp switch</li> <li>• Wheel speed sensor</li> <li>• Anti-lock brake system (ABS) module</li> <li>• Traction control switch</li> </ul>

4. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step. If the cause is not visually evident, connect the diagnostic tool to the data link connector (DLC) and select the vehicle to be tested from the diagnostic tool menu. If the diagnostic tool does not communicate with the vehicle:
  - check that the program card is correctly installed.
  - check the connections to the vehicle.
5. If the diagnostic tool still does not communicate with the vehicle, refer to the diagnostic tool operating manual.
6. Carry out the diagnostic tool data link test. If the diagnostic tool responds with:
  - CAN or ISO circuit fault; all electronic control units no response/not equipped, refer to Section 418-00.
  - No response/not equipped for the ABS module, [GO to Pinpoint Test A.](#)
  - No response/not equipped for the SJB, Section 419-10.
  - System passed, retrieve and record the continuous diagnostic trouble codes (DTCs), erase the continuous DTCs and carry out self-test diagnostics for the ABS module.
7. If the DTCs retrieved are related to the concern, go to the Anti-Lock Brake System (ABS) Module Diagnostic Trouble Code (DTC) Index.
8. If no DTCs related to the concern are retrieved, [GO to Symptom Chart.](#)

**Anti-Lock Brake System (ABS) Module Diagnostic Trouble Code (DTC) Index**

DTC	Description	Source	Action
B1317	Battery Voltage High	ABS Module	<a href="#">GO to Pinpoint Test B.</a>
B1318	Battery Voltage Low	ABS Module	<a href="#">GO to Pinpoint Test B.</a>
B1342	ECU Is Defective	ABS Module	<b>NOTE:</b> If other DTCs are present, REPAIR them before installing a new module. CLEAR the DTCs. RETRIEVE the DTCs. If DTC B1342 is retrieved again, INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. REPEAT the self-test.
B2477	Module Configuration Failure	ABS Module	CONFIGURE the ABS module. REFER to Section 418-01. CLEAR the DTCs. REPEAT the self-test. If DTC B2477 is retrieved again, INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. REPEAT the self-test.
C1095	ABS Hydraulic Pump Motor Circuit Failure	ABS Module	<a href="#">GO to Pinpoint Test C.</a>
C1096	ABS Hydraulic Pump Motor Circuit Open	ABS Module	<a href="#">GO to Pinpoint Test C.</a>

**DIAGNOSIS AND TESTING (Continued)****Anti-Lock Brake System (ABS) Module Diagnostic Trouble Code (DTC) Index (Continued)**

<b>DTC</b>	<b>Description</b>	<b>Source</b>	<b>Action</b>
C1115	ABS Power Relay Output Short Circuit To Battery	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1115 is retrieved again, INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CARRY OUT the self-test with the brake pedal not applied.
C1145	Wheel Speed Sensor RF Input Circuit Failure	ABS Module	<a href="#">GO to Pinpoint Test D.</a>
C1155	Wheel Speed Sensor LF Input Circuit Failure	ABS Module	<a href="#">GO to Pinpoint Test D.</a>
C1165	Wheel Speed Sensor RR Input Circuit Failure	ABS Module	<a href="#">GO to Pinpoint Test D.</a>
C1175	Wheel Speed Sensor LR Input Circuit Failure	ABS Module	<a href="#">GO to Pinpoint Test D.</a>
C1185	ABS Power Relay Output Circuit Failure	ABS Module	CLEAR all DTCs. If DTC C1185 is retrieved again, INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CARRY OUT the self-test with the brake pedal not applied.
C1194	ABS Outlet Valve Coil LF Circuit Failure	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1194 is retrieved again, INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CARRY OUT the self-test with the brake pedal not applied.
C1198	ABS Inlet Valve Coil LF Circuit Failure	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1198 is retrieved again, INSTALL a new ABS module. INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CARRY OUT the self-test with the brake pedal not applied.
C1210	ABS Outlet Valve Coil RF Circuit Failure	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1210 is retrieved again, INSTALL a new ABS module. INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CARRY OUT the self-test with the brake pedal not applied.
C1214	ABS Inlet Valve Coil RF Circuit Failure	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1214 is retrieved again, INSTALL a new ABS module. INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CARRY OUT the self-test with the brake pedal not applied.
C1222	Wheel Speed Mismatch	ABS Module	<a href="#">GO to Pinpoint Test E.</a>
C1233	Wheel Speed LF Input Signal Missing	ABS Module	<a href="#">GO to Pinpoint Test E.</a>
C1234	Wheel Speed RF Input Signal Missing	ABS Module	<a href="#">GO to Pinpoint Test E.</a>

**DIAGNOSIS AND TESTING (Continued)****Anti-Lock Brake System (ABS) Module Diagnostic Trouble Code (DTC) Index (Continued)**

<b>DTC</b>	<b>Description</b>	<b>Source</b>	<b>Action</b>
C1235	Wheel Speed RR Input Signal Missing	ABS Module	GO to Pinpoint Test E.
C1236	Wheel Speed LR Input Signal Missing	ABS Module	GO to Pinpoint Test E.
C1242	ABS Outlet Valve Coil LR Circuit Failure	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1242 is retrieved again, INSTALL a new ABS module. INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CARRY OUT the self-test with the brake pedal not applied.
C1246	ABS Outlet Valve Coil RR Circuit Failure	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1246 is retrieved again, INSTALL a new ABS module. INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CARRY OUT the self-test with the brake pedal not applied.
C1250	ABS Inlet Valve Coil LR Circuit Failure	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1250 is retrieved again, INSTALL a new ABS module. INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CARRY OUT the self-test with the brake pedal not applied.
C1254	ABS Inlet Valve Coil RR Circuit Failure	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1254 is retrieved again, INSTALL a new ABS module. INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CARRY OUT the self-test with the brake pedal not applied.
C1329	ABS Valve Outlet Coil Over RF Temperature	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1329 is retrieved again, INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. CARRY OUT the self-test with the brake pedal not applied.
C1330	ABS Valve Outlet Coil Over LR Temperature	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1330 is retrieved again, INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. CARRY OUT the self-test with the brake pedal not applied.
C1331	ABS Valve Outlet Coil Over RR Temperature	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1331 is retrieved again, INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. CARRY OUT the self-test with the brake pedal not applied.

**DIAGNOSIS AND TESTING (Continued)****Anti-Lock Brake System (ABS) Module Diagnostic Trouble Code (DTC) Index (Continued)**

<b>DTC</b>	<b>Description</b>	<b>Source</b>	<b>Action</b>
C1332	ABS Valve Outlet Coil Over LF Temperature	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1332 is retrieved again, INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. CARRY OUT the self-test with the brake pedal not applied.
C1333	ABS Valve Inlet Coil Over RF Temperature	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1333 is retrieved again, INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. CARRY OUT the self-test with the brake pedal not applied.
C1334	ABS Valve Inlet Coil Over LR Temperature	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1334 is retrieved again, INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. CARRY OUT the self-test with the brake pedal not applied.
C1335	ABS Valve Inlet Coil Over RR Temperature	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1335 is retrieved again, INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. CARRY OUT the self-test with the brake pedal not applied.
C1336	ABS Valve Inlet Coil Over LF Temperature	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1336 is retrieved again, INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. CARRY OUT the self-test with the brake pedal not applied.
C1404	Traction Control Valve Rear Circuit Failure	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1404 is retrieved again, INSTALL a new ABS module. INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CARRY OUT the self-test with the brake pedal not applied.
C1446	Brake Switch Circuit Failure	ABS Module	<a href="#">GO to Pinpoint Test F.</a>
C1527	ABS TC Valve Inlet Coil Over Temperature	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1527 is retrieved again, INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. CARRY OUT the self-test with the brake pedal not applied.
C1531	ABS TC Valve Outlet Coil Over Temperature	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1531 is retrieved again, INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. CARRY OUT the self-test with the brake pedal not applied.

**DIAGNOSIS AND TESTING (Continued)****Anti-Lock Brake System (ABS) Module Diagnostic Trouble Code (DTC) Index (Continued)**

DTC	Description	Source	Action
C1730	Reference Voltage Out of Range (+5 V)	ABS Module	If any other DTC(s) are present, diagnose those DTC(s) first. CLEAR all DTCs. DRIVE the vehicle. If the DTC is still present, INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CARRY OUT the self-test with the brake pedal not applied.
C1958	ABS TC Valve Outlet Coil Failure	ABS Module	CLEAR all DTCs. DRIVE the vehicle. If DTC C1958 is retrieved again, INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. CARRY OUT the self-test with the brake pedal not applied.
U0073	CAN Bus off - Transmit Error	ABS Module	REFER to Section 418-00.
U1900	CAN Communication Bus Fault - Receive Error	ABS Module	REFER to Section 418-00.

**Symptom Chart****Symptom Chart**

Condition	Possible Sources	Action
<ul style="list-style-type: none"> <li>No communication with the anti-lock brake system (ABS) module</li> </ul>	<ul style="list-style-type: none"> <li>Circuitry</li> <li>ABS module</li> </ul>	<ul style="list-style-type: none"> <li>GO to Pinpoint Test A.</li> </ul>
<ul style="list-style-type: none"> <li>No communication with the instrument cluster</li> </ul>	<ul style="list-style-type: none"> <li>Circuitry</li> <li>Instrument cluster</li> </ul>	<ul style="list-style-type: none"> <li>REFER to Section 413-01 to continue diagnosis of the communication network.</li> </ul>
<ul style="list-style-type: none"> <li>The red brake warning indicator does not self-check</li> </ul>	<ul style="list-style-type: none"> <li>Circuitry</li> <li>Instrument cluster</li> </ul>	<ul style="list-style-type: none"> <li>REFER to Section 413-01 to continue diagnosis of the red brake warning indicator.</li> </ul>
<ul style="list-style-type: none"> <li>The red brake warning indicator stays on when the ignition is in RUN</li> </ul>	<ul style="list-style-type: none"> <li>Base brake system</li> <li>Circuitry</li> <li>Low brake fluid warning switch</li> <li>Parking brake switch</li> <li>Anti-lock brake system (ABS) module</li> <li>Instrument cluster</li> </ul>	<ul style="list-style-type: none"> <li>REFER to Section 413-01 to continue diagnosis of the red brake warning indicator.</li> </ul>
<ul style="list-style-type: none"> <li>The yellow anti-lock brake system (ABS) warning indicator does not self-check</li> </ul>	<ul style="list-style-type: none"> <li>Circuitry</li> <li>Instrument cluster</li> </ul>	<ul style="list-style-type: none"> <li>REFER to Section 413-01 to continue diagnosis of the yellow brake warning indicator.</li> </ul>
<ul style="list-style-type: none"> <li>Spongy/soft/low brake pedal with no warning indicator</li> </ul>	<ul style="list-style-type: none"> <li>Air in brake hydraulic system</li> <li>Base brake system</li> <li>Hydraulic control unit (HCU)</li> </ul>	<ul style="list-style-type: none"> <li>GO to Pinpoint Test G.</li> </ul>
<ul style="list-style-type: none"> <li>Poor vehicle tracking during anti-lock function</li> </ul>	<ul style="list-style-type: none"> <li>Tire pressure</li> <li>Air in the brake system</li> <li>Base brake system</li> <li>Hydraulic control unit (HCU).</li> </ul>	<ul style="list-style-type: none"> <li>REFER to Section 206-00 to continue diagnosis of the brake system.</li> <li>GO to Pinpoint Test H.</li> </ul>

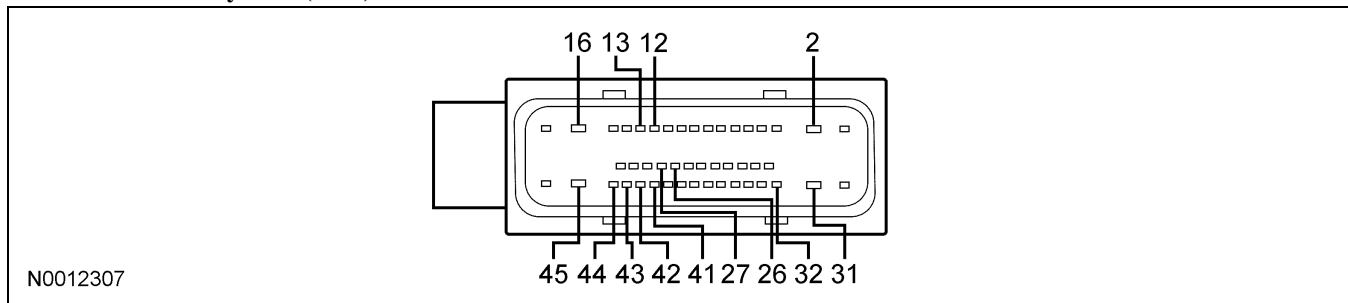
**DIAGNOSIS AND TESTING (Continued)**

**Symptom Chart (Continued)**

Condition	Possible Sources	Action
<ul style="list-style-type: none"> <li>The traction control is inoperative</li> </ul>	<ul style="list-style-type: none"> <li>Circuitry</li> <li>Traction control switch</li> <li>Anti-lock brake system (ABS) module</li> </ul>	<ul style="list-style-type: none"> <li>INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section.</li> </ul>
<ul style="list-style-type: none"> <li>The traction control system cannot be disabled</li> </ul>	<ul style="list-style-type: none"> <li>Circuitry</li> <li>Traction control switch</li> <li>Instrument cluster</li> <li>Anti-lock brake system (ABS) module</li> </ul>	<ul style="list-style-type: none"> <li>GO to Pinpoint Test I.</li> </ul>
<ul style="list-style-type: none"> <li>The traction control switch indicator is never/always on</li> </ul>	<ul style="list-style-type: none"> <li>Circuitry</li> <li>Traction control switch</li> <li>Anti-lock brake system (ABS) module</li> <li>Instrument cluster</li> </ul>	<ul style="list-style-type: none"> <li>GO to Pinpoint Test J.</li> </ul>

**Connector Circuit Reference**

**Anti-Lock Brake System (ABS) C135**

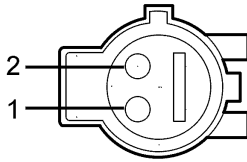


N0012307

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
2	601 (LB/PK) coil voltage	Voltage at all times. Less than 5 ohms between the ABS module and the bussed fused electrical center (BEC). Greater than 10,000 ohms between the ABS module and ground.
12	521 (TN/OG) LF wheel speed sensor voltage	0 volts, less than 5 ohms between the LF wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground.
13	522 (TN/BK) LF wheel speed sensor signal	0 volts, less than 5 ohms between the LF wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground.
16	1205 (BK) ground	0 volts, less than 5 ohms between the ABS module and ground. Greater than 10,000 ohms between the ABS module and ground.
26	514 (YE/RD) RF wheel speed sensor voltage	0 volts, less than 5 ohms between the RF wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground.

**DIAGNOSIS AND TESTING (Continued)**

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
27	516 (YE/BK) RF wheel speed sensor signal	0 volts, less than 5 ohms between the RF wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground.
31	534 (YE/LG) pump motor voltage	Hot at all times.
32	1844 (LG/RD) ABS module voltage	Hot in RUN/START.
41	519 (LG/BK) LR wheel speed sensor signal	0 volts, less than 5 ohms between the LR wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground.
42	518 (LG/RD) LR wheel speed sensor voltage	0 volts, less than 5 ohms between the LR wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground.
43	523 (RD/PK) RR wheel speed sensor voltage	0 volts, less than 5 ohms between the RR wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground.
44	524 (PK/BK) RR wheel speed sensor signal	0 volts, less than 5 ohms between the RR wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground.
45	1205 (BK) pump motor ground	0 volts, less than 5 ohms between the ABS module and ground. Greater than 10,000 ohms between the ABS module and ground.

**LH Front Wheel Speed Sensor C150, RH Front Wheel Speed Sensor C160, LH Rear Wheel Speed Sensor C3116, RH Rear Wheel Speed Sensor C3117**

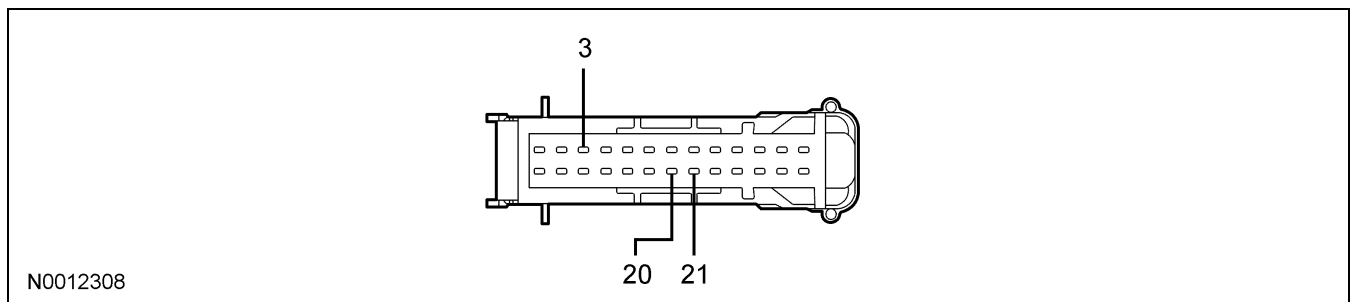
N0012463

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1 (C150)	521 (TN/OG) LH front wheel speed voltage	0 volts, less than 5 ohms between the wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground with the ABS module disconnected.
1 (C160)	514 (YE/RD) RH front wheel speed voltage	0 volts, less than 5 ohms between the wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground with the ABS module disconnected.



**DIAGNOSIS AND TESTING (Continued)**

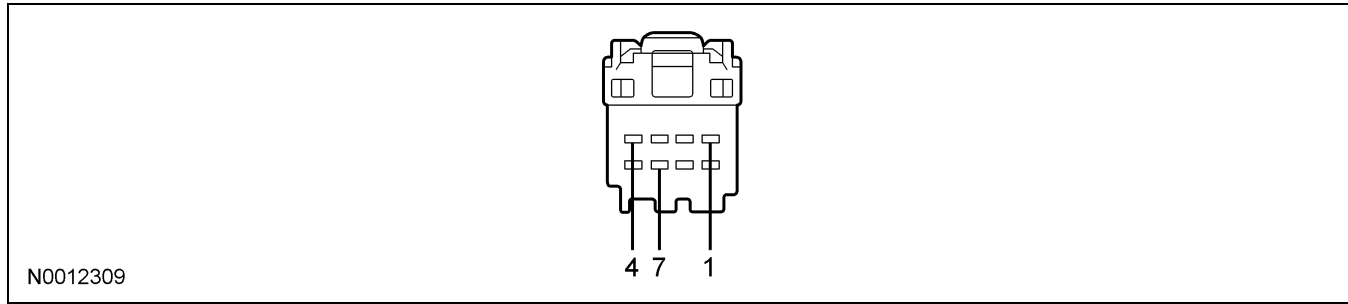
Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1 (C3116)	518 (LG/RD) LH rear wheel speed voltage	0 volts, less than 5 ohms between the wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground with the ABS module disconnected.
1 (C3117)	523 (RD/PK) RH rear wheel speed voltage	0 volts, less than 5 ohms between the wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground with the ABS module disconnected.
2 (C150)	522 (TN/BK) LH front wheel speed signal	0 volts, less than 5 ohms between the wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground with the ABS module disconnected.
2 (C160)	516 (YE/BK) RH front wheel speed signal	0 volts, less than 5 ohms between the wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground with the ABS module disconnected.
2 (C3116)	519 (LG/BK) LH rear wheel speed signal	0 volts, less than 5 ohms between the wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground with the ABS module disconnected.
2 (C3117)	524 (PK/BK) RH rear wheel speed signal	0 volts, less than 5 ohms between the wheel speed sensor and the ABS module. Greater than 10,000 ohms between the ABS module and ground with the ABS module disconnected.

**Instrument Cluster C220**

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
3	1001 (WH/YE) instrument cluster voltage	Voltage at all times. Less than 5 ohms between the instrument cluster and the smart junction box (SJB). Greater than 10,000 ohms between the ABS module and ground.
20	1412 (WH/PK) traction control override input	Less than 5 ohms between the instrument cluster and the traction control switch.
21	939 (VT) traction control switch indicator output	Less than 5 ohms between the instrument cluster and the traction control switch.

**DIAGNOSIS AND TESTING (Continued)**

**Traction Control Switch C2039**



Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1	1205 (BK) traction control switch ground	Less than 5 ohms between the traction control switch and ground.
4	939 (VT) traction control switch indicator input	Less than 5 ohms between the traction control switch and the instrument cluster.
7	1412 (WH/PK) traction control switch cancel	Less than 5 ohms between the traction control switch and the instrument cluster.

**Pinpoint Test A: No Communication With the Anti-lock Brake System (ABS) Module**

**Possible Causes**

**Normal Operation**

- circuit 601 (LB/PK) open
- circuit 1205 (BK) open
- circuit 1844 (LG/RD) open
- ABS module

The operating voltage required to supply the ABS module, hydraulic pump, and isolation valves is in a range between 10 and 16 volts.

Voltage is supplied by the smart junction box (SJB) through circuit 1844 (LG/RD) (ignition feed) and the bussed electrical center (BEC) through circuit 601 (LB/PK) (voltage at all times). Ground is provided through circuit 1205 (BK).

**PINPOINT TEST A: NO COMMUNICATION WITH THE ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**

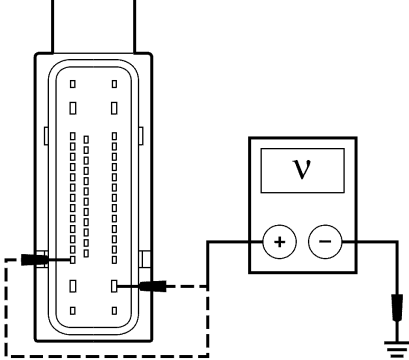
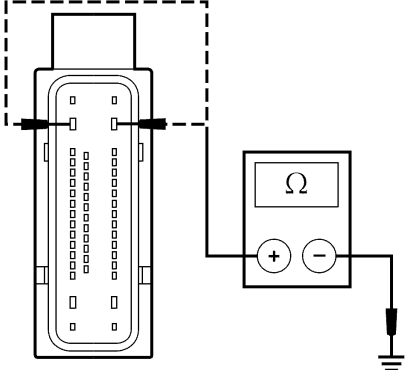
**⚠ CAUTION:** Use the flex probe kit for all test connections to prevent damage to the wiring terminals. Do not use standard multimeter probes.

Test Step		Result / Action to Take
A1	<b>CHECK CIRCUIT 601 (LB/PK) FOR AN OPEN</b>	
	<ul style="list-style-type: none"> <li>• Key in OFF position.</li> <li>• Disconnect: ABS Module C135.</li> <li>• Key in ON position.</li> </ul>	

(Continued)

**DIAGNOSIS AND TESTING (Continued)**

**PINPOINT TEST A: NO COMMUNICATION WITH THE ANTI-LOCK BRAKE SYSTEM (ABS) MODULE (Continued)**

Test Step		Result / Action to Take
<b>A1</b>	<p><b>CHECK CIRCUIT 601 (LB/PK) FOR AN OPEN (Continued)</b></p> <ul style="list-style-type: none"> <li>Measure the voltage between the ABS module C135-2, circuit 601 (LB/PK), harness side and ground; and between the ABS module C135-32, circuit 1844 (LG/RD), harness side and ground.</li> </ul>  <p>N0012329</p> <ul style="list-style-type: none"> <li><b>Are the voltages greater than 10 volts?</b></li> </ul>	<p><b>Yes</b> GO to <b>A2</b>.</p> <p><b>No</b> REPAIR the circuit in question. REPEAT the self-test.</p>
<b>A2</b>	<p><b>CHECK CIRCUIT 1205 (BK) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>Key in OFF position.</li> <li>Measure the resistance between the ABS module C135-16, circuit 1205 (BK), harness side and ground; and between the ABS module C135-45, circuit 1205 (BK), harness side and ground.</li> </ul>  <p>N0009314</p> <ul style="list-style-type: none"> <li><b>Are the resistances less than 5 ohms?</b></li> </ul>	<p><b>Yes</b> CHECK the module communications network. REFER to Section 418-00.</p> <p><b>No</b> REPAIR the circuit in question. REPEAT the self-test.</p>

**Pinpoint Test B: DTCs B1317 AND B1318 — Battery Voltage High/Low**

**Normal Operation**

The vehicle electrical system voltage supplied is within the range of 10-16 volts. Above or below that voltage range, the DTC B1317 (Battery Voltage High) or the DTC B1318 (Battery Voltage Low) will be set. The voltage is supplied by the bussed electrical center (BEC) through circuit 601 (LB/PK) (voltage at all times) and the smart junction box (SJB) through circuit 1844 (LG/RD) (ignition feed). Ground is provided through circuit 1205 (BK).

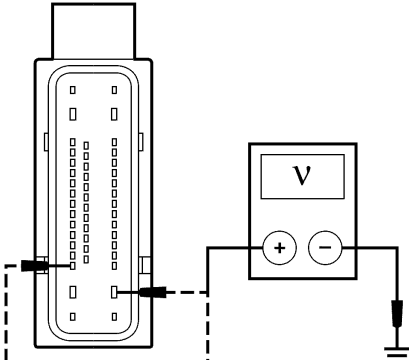
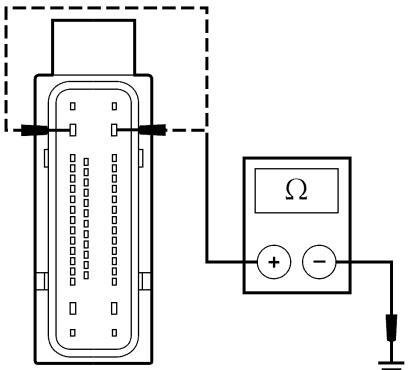
**Possible Causes**

- circuit 601 (LB/PK) open
- circuit 1205 (BK) open
- circuit 1844 (LG/RD) open
- charging system
- anti-lock brake system (ABS) module

**DIAGNOSIS AND TESTING (Continued)**

**PINPOINT TEST B: DTCs B1317 AND B1318 — BATTERY VOLTAGE HIGH/LOW**

**⚠ CAUTION:** Use the flex probe kit for all test connections to prevent damage to the wiring terminals. Do not use standard multimeter probes.

Test Step		Result / Action to Take
<b>B1</b>	<b>CHECK THE BATTERY VOLTAGE</b>	<p><b>Yes</b> GO to <b>B2</b>.</p> <p><b>No</b> REFER to Section 414-00 to continue diagnosis of the charging system.</p>
	<ul style="list-style-type: none"> <li>Measure the battery voltage between the positive and negative battery terminals with the key ON and the engine OFF (KOEO), and with the engine running.</li> <li><b>Is the battery voltage between 10 and 13 volts with KOEO, and between 13 and 17 volts with the engine running?</b></li> </ul>	
<b>B2</b>	<b>CHECK CIRCUIT 601 (LB/PK) AND CIRCUIT 1844 (LG/RD) FOR VOLTAGE</b>	<p><b>Yes</b> GO to <b>B3</b>.</p> <p><b>No</b> REPAIR the circuit in question. CLEAR the DTCs. CARRY OUT the self-test with the brake pedal not applied.</p>
	<ul style="list-style-type: none"> <li>Key in OFF position.</li> <li>Disconnect: Anti-Lock Brake Module C135.</li> <li>Key in ON position.</li> <li>Measure the voltage between the ABS module C135-2, circuit 601 (LB/PK), harness side and ground; and between the ABS module C135-32, circuit 1844 (LG/RD), harness side and ground.</li> </ul>  <p>N0012329</p> <ul style="list-style-type: none"> <li><b>Are the voltages greater than 10 volts?</b></li> </ul>	
<b>B3</b>	<b>CHECK CIRCUIT 1205 (BK) FOR AN OPEN</b>	<p><b>Yes</b> GO to <b>B4</b>.</p> <p><b>No</b> REPAIR the circuit in question. REPEAT the self-test.</p>
	<ul style="list-style-type: none"> <li>Key in OFF position.</li> <li>Measure the resistance between the ABS module C135-16, circuit 1205 (BK), harness side and ground; and between the ABS module C135-45, circuit 1205 (BK), harness side and ground.</li> </ul>  <p>N0009314</p> <ul style="list-style-type: none"> <li><b>Are the resistances less than 5 ohms?</b></li> </ul>	

(Continued)

**DIAGNOSIS AND TESTING (Continued)**

**PINPOINT TEST B: DTCs B1317 AND B1318 — BATTERY VOLTAGE HIGH/LOW (Continued)**

Test Step		Result / Action to Take
<b>B4</b>	<b>CHECK FOR CORRECT ABS MODULE OPERATION</b>	<p><b>Yes</b> INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CLEAR the DTCs. REPEAT the self-test.</p> <p><b>No</b> The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. CARRY OUT the self-test with the brake pedal not applied.</p>
	<ul style="list-style-type: none"> <li>• Disconnect the ABS connector.</li> <li>• Check for:                             <ul style="list-style-type: none"> <li>• corrosion</li> <li>• spread or bent pins</li> <li>• pushed-out pins</li> </ul> </li> <li>• Connect the ABS connector and make sure it seats correctly.</li> <li>• Operate the system and verify the concern is still present.</li> <li>• <b>Is the concern still present?</b></li> </ul>	

**Pinpoint Test C: DTCs C1095 and C1096 — ABS Hydraulic Pump Motor Circuit Failure/Open**

**Normal Operation**

Anti-lock brake system (ABS) diagnostic trouble code (DTC) C1095 sets only when the motor is initially commanded on for 100 ms (+/-6 ms), and the ABS hydraulic pump motor is then commanded off and the voltage back is read after 6 ms. If the voltage indicates the motor is spinning at less than 500 rpm there may be a locked motor. If this condition is detected 4 times then a locked motor DTC C1095 is set. The pump motor is checked for an open circuit 2 seconds after the most recent successful pump motor off command. If the pump motor feedback remains greater than 0.75 volt for more than 50 ms (+/-6 ms) after these conditions have been met, then DTC C1096 is set.

Voltage is supplied from the bussed electrical center (BEC) through circuit 534 (YE/LG) (voltage at all times). Ground is provided through circuit 1205 (BK).

**Possible Causes**

- circuit 534 (YE/LG) open
- circuit 1205 (BK) open
- hydraulic pump motor
- ABS module

**PINPOINT TEST C: DTCs C1095 AND C1096 — ABS HYDRAULIC PUMP MOTOR CIRCUIT FAILURE/OPEN**

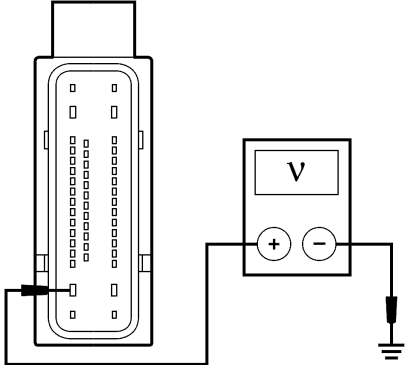
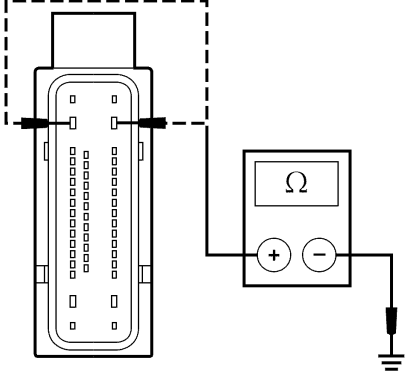
 **CAUTION:** Use the flex probe kit for all test connections to prevent damage to the wiring terminals. Do not use standard multimeter probes.

Test Step		Result / Action to Take
<b>C1</b>	<b>CHECK THE ANTI-LOCK BRAKE SYSTEM (ABS) PUMP MOTOR</b>	<p><b>Yes</b> INSTALL a new ABS module and hydraulic control unit (HCU) as necessary. REFER to Anti-Lock Brake System (ABS) Module and Hydraulic Control Unit (HCU) in this section. CLEAR the DTCs. REPEAT the ABS self-test.</p> <p><b>No</b> GO to <b>C2</b>.</p>
	<ul style="list-style-type: none"> <li>• Key in ON position.</li> <li>• <b>Is the ABS pump motor running all the time?</b></li> </ul>	

(Continued)

**DIAGNOSIS AND TESTING (Continued)**

**PINPOINT TEST C: DTCs C1095 AND C1096 — ABS HYDRAULIC PUMP MOTOR CIRCUIT FAILURE/OPEN (Continued)**

Test Step		Result / Action to Take
<b>C2</b>	<b>CHECK THE PUMP MOTOR OPERATION</b>	
	<ul style="list-style-type: none"> <li>Enter the following diagnostic mode on the diagnostic tool: ABS Module Active Command.</li> <li>Trigger the ABS module pump motor ON active command.</li> <li><b>Does the ABS pump motor run for approximately 2 seconds?</b></li> </ul>	<p><b>Yes</b> CLEAR the DTCs. CHECK the yellow ABS warning indicator while driving the vehicle (brakes must not be applied) above 32 km/h (20 mph). If the yellow ABS warning indicator illuminates, RETRIEVE the DTCs. If DTC C1096 is retrieved, GO to <b>C5</b>.</p> <p>If DTC C1095 is retrieved, INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. CLEAR the DTCs. REPEAT the self-test.</p> <p><b>No</b> TRIGGER the ABS module pump motor OFF active command. GO to <b>C3</b>.</p>
<b>C3</b>	<b>CHECK CIRCUIT 534 (YE/LG) FOR AN OPEN</b>	
	<ul style="list-style-type: none"> <li>Disconnect: ABS Module C135.</li> <li>Measure the voltage between the ABS module C135-31, circuit 534 (YE/LG), harness side and ground.</li> </ul>  <p>N0009315</p> <ul style="list-style-type: none"> <li><b>Is the voltage greater than 10 volts?</b></li> </ul>	<p><b>Yes</b> GO to <b>C4</b>.</p> <p><b>No</b> REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.</p>
<b>C4</b>	<b>CHECK CIRCUIT 1205 (BK) FOR AN OPEN</b>	
	<ul style="list-style-type: none"> <li>Key in OFF position.</li> <li>Measure the resistance between the ABS module C135-45, circuit 1205 (BK), harness side and ground; and between the ABS module C135-16, circuit 1205 (BK), harness side and ground.</li> </ul>  <p>N0009314</p> <ul style="list-style-type: none"> <li><b>Are the resistances less than 5 ohms?</b></li> </ul>	<p><b>Yes</b> INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. CLEAR the DTCs. REPEAT the self-test.</p> <p><b>No</b> REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.</p>

(Continued)

**DIAGNOSIS AND TESTING (Continued)**

**PINPOINT TEST C: DTCs C1095 AND C1096 — ABS HYDRAULIC PUMP MOTOR CIRCUIT FAILURE/OPEN (Continued)**

Test Step		Result / Action to Take
<b>C5</b>	<b>CHECK FOR CORRECT ABS MODULE OPERATION</b>	
	<ul style="list-style-type: none"> <li>• Disconnect the ABS connector.</li> <li>• Check for:                             <ul style="list-style-type: none"> <li>• corrosion</li> <li>• spread or bent pins</li> <li>• pushed-out pins</li> </ul> </li> <li>• Connect the ABS connector and make sure it seats correctly.</li> <li>• Operate the system and verify the concern is still present.</li> <li>• <b>Is the concern still present?</b></li> </ul>	<p><b>Yes</b> INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CLEAR the DTCs. REPEAT the self-test.</p> <p><b>No</b> 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>

**Pinpoint Test D: DTCs C1145, C1155, C1165, and C1175 — Wheel Speed Sensor Input Circuit Failure**

**Normal Operation**

The active wheel speed sensors generate a square wave signal that is sent to the anti-lock brake system (ABS) module. The wheel speed sensor circuitry connects to the ABS module through 2 wires and a connector at each wheel speed sensor. When the ignition is turned to the RUN position, the ABS module carries out a self-test by sending a reference voltage to all of the wheel speed sensors and their circuitry to determine if they are functional.

Voltage and ground signals are supplied to the wheel speed sensors from the ABS module.

**Possible Causes**

- circuit 514 (YE/RD) open, short to voltage, or short to ground

- circuit 516 (YE/BK) open, short to voltage, or short to ground
- circuit 518 (LG/RD) open, short to voltage, or short to ground
- circuit 519 (LG/BK) open, short to voltage, or short to ground
- circuit 521 (TN/OG) open, short to voltage, or short to ground
- circuit 522 (TN/BK) open, short to voltage, or short to ground
- circuit 523 (RD/PK) open, short to voltage, or short to ground
- circuit 524 (PK/BK) open, short to voltage, or short to ground
- wheel speed sensor
- ABS module

**PINPOINT TEST D: DTCs C1145, C1155, C1165, AND C1175 — WHEEL SPEED SENSOR INPUT CIRCUIT FAILURE**

 **CAUTION:** Use the flex probe kit for all test connections to prevent damage to the wiring terminals. Do not use standard multimeter probes.

Test Step		Result / Action to Take
<b>D1</b>	<b>CHECK THE WHEEL SPEED CIRCUITS FOR A SHORT TO VOLTAGE</b>	
	<p><b>NOTE:</b> Both circuits must be checked for each DTC.</p> <ul style="list-style-type: none"> <li>• Key in OFF position.</li> <li>• Disconnect: Anti-lock Brake System (ABS) Module C135.</li> <li>• Disconnect: Suspect Wheel Speed Sensor.</li> <li>• Key in ON position.</li> <li>• Measure the voltage between the ABS module C135, harness side and ground as follows:</li> </ul>	

(Continued)

**DIAGNOSIS AND TESTING (Continued)**

**PINPOINT TEST D: DTCs C1145, C1155, C1165, AND C1175 — WHEEL SPEED SENSOR INPUT CIRCUIT FAILURE (Continued)**

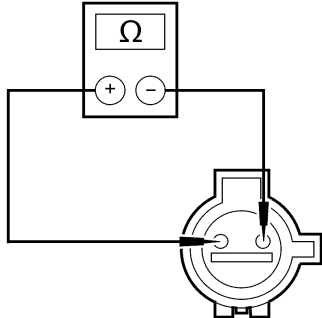
Test Step			Result / Action to Take	
<b>D1</b>	<b>CHECK THE WHEEL SPEED CIRCUITS FOR A SHORT TO VOLTAGE (Continued)</b>		<p><b>Yes</b> REPAIR the circuit(s) in question. CLEAR the DTC(s). REPEAT the self-test.</p> <p><b>No</b> GO to <b>D2</b>.</p>	
	<b>DTC</b>	<b>ABS Module Connector-Pin</b>		<b>Circuit</b>
	C1145	C135-26		514 (YE/RD)
	C1145	C135-27		516 (YE/BK)
	C1155	C135-13		522 (TN/BK)
	C1155	C135-12		521 (TN/OG)
	C1165	C135-44		524 (PK/BK)
	C1165	C135-43		523 (RD/PK)
	C1175	C135-42		518 (LG/RD)
	C1175	C135-41		519 (LG/BK)
<ul style="list-style-type: none"> <li>Is any voltage present?</li> </ul>				
<b>D2</b>	<b>CHECK THE WHEEL SPEED CIRCUITS FOR A SHORT TO GROUND</b>		<p><b>Yes</b> GO to <b>D3</b>.</p> <p><b>No</b> REPAIR the circuit(s) in question. CLEAR the DTCs. REPEAT the self-test.</p>	
	<p><b>NOTE:</b> Both circuits must be checked for each DTC.</p> <ul style="list-style-type: none"> <li>Key in OFF position.</li> <li>Measure the resistance between the ABS module C135, harness side and ground as follows:</li> </ul>			
	<b>DTC</b>	<b>ABS Module Connector-Pin</b>		<b>Circuit</b>
	C1145	C135-26		514 (YE/RD)
	C1145	C135-27		516 (YE/BK)
	C1155	C135-13		522 (TN/BK)
	C1155	C135-12		521 (TN/OG)
	C1165	C135-44		524 (PK/BK)
	C1165	C135-43		523 (RD/PK)
	C1175	C135-42		518 (LG/RD)
C1175	C135-41	519 (LG/BK)		
<ul style="list-style-type: none"> <li>Are the resistances greater than 10,000 ohms?</li> </ul>				
<b>D3</b>	<b>CHECK THE WHEEL SPEED CIRCUITS FOR AN OPEN</b>			
	<p><b>NOTE:</b> Both circuits must be checked for each DTC.</p> <ul style="list-style-type: none"> <li>Measure the resistance between the ABS module C135, harness side and the suspect wheel speed sensor connector, harness side as follows:</li> </ul>			

(Continued)



**DIAGNOSIS AND TESTING (Continued)**

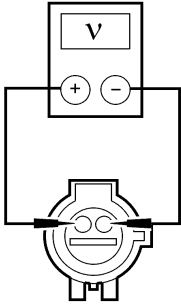
**PINPOINT TEST D: DTCs C1145, C1155, C1165, AND C1175 — WHEEL SPEED SENSOR INPUT CIRCUIT FAILURE (Continued)**

Test Step				Result / Action to Take
<b>D3</b>	<b>CHECK THE WHEEL SPEED CIRCUITS FOR AN OPEN (Continued)</b>			<p><b>Yes</b> GO to <b>D4</b>.</p> <p><b>No</b> REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.</p>
	<b>DTC</b>	<b>Circuit</b>	<b>ABS Module Connector-Pin</b> <b>Wheel Speed Sensor Connector-Pin</b>	
	C1145	514 (YE/RD)	C135-26 RH front wheel speed sensor C160-1	
	C1145	516 (YE/BK)	C135-27 RH front wheel speed sensor C160-2	
	C1155	521 (TN/OG)	C135-12 LH front wheel speed sensor C150-1	
	C1155	522 (TN/BK)	C135-13 LH front wheel speed sensor C150-2	
	C1165	523 (RD/PK)	C135-43 RH rear wheel speed sensor C3117-1	
	C1165	524 (PK/BK)	C135-44 RH rear wheel speed sensor C3117-2	
	C1175	519 (LG/BK)	C135-41 LH rear wheel speed sensor C3116-2	
	C1175	518 (LG/RD)	C135-42 LH rear wheel speed sensor C3116-1	
	<ul style="list-style-type: none"> <li>Are the resistances less than 5 ohms?</li> </ul>			
<b>D4</b>	<b>CHECK FOR SHORTED WHEEL SPEED SENSOR CIRCUITS</b>			<p><b>Yes</b> REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.</p> <p><b>No</b> GO to <b>D5</b>.</p>
	<ul style="list-style-type: none"> <li>Measure the resistance between the suspect wheel speed sensor pins, harness side with the meter in the 10 mega ohm range.</li> </ul> <div style="text-align: center;">  <p>A0057968</p> </div> <ul style="list-style-type: none"> <li>Is there any continuity?</li> </ul>			
<b>D5</b>	<b>CHECK THE ABS MODULE OUTPUT</b>			
	<ul style="list-style-type: none"> <li>Connect: ABS Module C135.</li> <li>Key in ON position.</li> </ul>			

(Continued)

**DIAGNOSIS AND TESTING (Continued)**

**PINPOINT TEST D: DTCs C1145, C1155, C1165, AND C1175 — WHEEL SPEED SENSOR INPUT CIRCUIT FAILURE (Continued)**

Test Step		Result / Action to Take
<b>D5</b>	<b>CHECK THE ABS MODULE OUTPUT (Continued)</b>	
	<ul style="list-style-type: none"> <li>Measure the voltage between the suspect wheel speed sensor pins, harness side.</li> </ul>  <p>A0057374</p> <ul style="list-style-type: none"> <li><b>Is the voltage greater than 10 volts?</b></li> </ul>	<p><b>Yes</b> INSTALL a new wheel speed sensor. REFER to Wheel Speed Sensor — Front or Wheel Speed Sensor — Rear in this section. CLEAR the DTCs. REPEAT the self-test.</p> <p><b>No</b> GO to <b>D6</b>.</p>
<b>D6</b>	<b>CHECK FOR CORRECT ABS MODULE OPERATION</b>	
	<ul style="list-style-type: none"> <li>Disconnect the ABS connector.</li> <li>Check for:                             <ul style="list-style-type: none"> <li>corrosion</li> <li>spread or bent pins</li> <li>pushed-out pins</li> </ul> </li> <li>Connect the ABS connector and make sure it seats correctly.</li> <li>Operate the system and verify the concern is still present.</li> <li><b>Is the concern still present?</b></li> </ul>	<p><b>Yes</b> INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CLEAR the DTCs. REPEAT the self-test.</p> <p><b>No</b> 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>

**Pinpoint Test E: DTCs C1222, C1233, C1234, C1235, and C1236 — Wheel Speed Sensor Input Signal Missing/Mismatch**

**Possible Causes**

- wheel speed sensor
- ABS module

**Normal Operation**

The wheel speed sensor and sensor ring generate a square wave signal to the anti-lock brake system (ABS) module that is proportional to wheel speed. The ABS module compares wheel speed inputs from all wheel speed sensors to determine an impending wheel lockup. Incorrect tire size can set these DTCs as well.

**PINPOINT TEST E: DTCs C1222, C1233, C1234, C1235, AND C1236 — WHEEL SPEED SENSOR INPUT SIGNAL MISSING/MISMATCH**

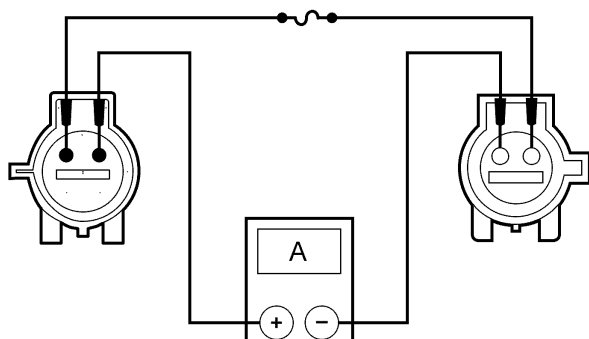
**⚠ CAUTION:** Use the flex probe kit for all test connections to prevent damage to the wiring terminals. Do not use standard multimeter probes.

Test Step		Result / Action to Take
<b>E1</b>	<b>CHECK THE DTCs FROM THE SELF-TEST</b>	
	<ul style="list-style-type: none"> <li>Retrieve the recorded results from the anti-lock brake system (ABS) module continuous and on-demand self-tests.</li> <li><b>Are DTCs C1145, C1155, C1165, or C1175 present?</b></li> </ul>	<p><b>Yes</b> GO to Pinpoint Test D.</p> <p><b>No</b> If DTC C1222 is present, GO to <b>E3</b>. All others, GO to <b>E2</b>.</p>

(Continued)

**DIAGNOSIS AND TESTING (Continued)**

**PINPOINT TEST E: DTCs C1222, C1233, C1234, C1235, AND C1236 — WHEEL SPEED SENSOR INPUT SIGNAL MISSING/MISMATCH (Continued)**

Test Step				Result / Action to Take
<b>E2</b>	<b>CHECK THE WHEEL SPEED SENSOR OUTPUT</b>			
<p><b>NOTE:</b> The ignition must be in the OFF position until the connections are made or a DTC sets and the ABS light illuminates, cutting voltage to the wheel speed sensors. If this happens, turn the key to the OFF position, and make sure that no jumper connections are shorted to ground or shorted together. Turn the key ON and wait for the ABS light to prove out.</p> <ul style="list-style-type: none"> <li>• Disconnect: Suspect Wheel Speed Sensor.</li> <li>• Connect a fused (5A) jumper wire between the wheel speed sensor, component side, and the wheel speed sensor, harness side as follows:</li> </ul>				
DTC	Suspect Wheel Speed Sensor (Component Side)	Suspect Wheel Speed Sensor Connector-Pin	Circuit	
C1233	LH front wheel speed sensor pin 1	C150-1	521 (TN/OG)	
C1234	RH front wheel speed sensor pin 1	C160-1	514 (YE/RD)	
C1235	RH rear wheel speed sensor pin 1	C3117-1	523 (RD/PK)	
C1236	LH rear wheel speed sensor pin 1	C3116-1	518 (LG/RD)	
 <p>A0080198</p> <ul style="list-style-type: none"> <li>• Connect the automotive meter between the wheel speed sensor, component side and the wheel speed sensor, harness side as follows:</li> </ul>				

(Continued)

**DIAGNOSIS AND TESTING (Continued)**

**PINPOINT TEST E: DTCs C1222, C1233, C1234, C1235, AND C1236 — WHEEL SPEED SENSOR INPUT SIGNAL MISSING/MISMATCH (Continued)**

Test Step				Result / Action to Take
<b>E2</b>	<b>CHECK THE WHEEL SPEED SENSOR OUTPUT (Continued)</b>			
	<b>Suspect Wheel Speed Sensor (Component Side)</b>	<b>Suspect Wheel Speed Sensor Connector-Pin</b>	<b>Circuit</b>	
C1233	LH front wheel speed sensor pin 2	C150-2	522 (TN/BK)	
C1234	RH front wheel speed sensor pin 2	C160-2	516 (YE/BK)	
C1235	RH rear wheel speed sensor pin 2	C3117-2	524 (PK/BK)	
C1236	LH rear wheel speed sensor pin 2	3116-2	519 (LG/BK)	
	<ul style="list-style-type: none"> <li>Key in ON position.</li> <li><b>NOTE:</b> The wheel must be moved very slowly to allow the meter to read the high and low current as the sensor passes the sensor tone ring openings. Measure the current while slowly moving the wheel.</li> <li><b>Does the automotive meter switch between 6.3 mA and 15.4 mA?</b></li> </ul>			<p><b>Yes</b> GO to <b>E4</b>.</p> <p><b>No</b> INSTALL a new wheel speed sensor. REFER to Wheel Speed Sensor — Front or Wheel Speed Sensor — Rear in this section. CLEAR the DTCs. REPEAT the self-test.</p>
<b>E3</b>	<b>CHECK FOR CORRECT ABS MODULE CONFIGURATION OPERATION</b>			
	<p><b>NOTE:</b> DTC C1222 indicates there is a problem with the configuration in the ABS module.</p> <ul style="list-style-type: none"> <li>Carry out the ABS module configuration. Verify the vehicle data matches the vehicle options. Refer to Section 418-01.</li> <li>Clear the DTCs and carry out the self-test.</li> <li><b>Is DTC C1222 still present?</b></li> </ul>			<p><b>Yes</b> GO to <b>E4</b>.</p> <p><b>No</b> The system is operating correctly at this time. CLEAR the DTCs. REPEAT the self-test.</p>
<b>E4</b>	<b>CHECK FOR CORRECT ABS MODULE OPERATION</b>			
	<ul style="list-style-type: none"> <li>Disconnect the ABS connector.</li> <li>Check for:                             <ul style="list-style-type: none"> <li>corrosion</li> <li>spread or bent pins</li> <li>pushed-out pins</li> </ul> </li> <li>Connect the ABS connector and make sure it seats correctly.</li> <li>Operate the system and verify the concern is still present.</li> <li><b>Is the concern still present?</b></li> </ul>			<p><b>Yes</b> INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CLEAR the DTCs. REPEAT the self-test.</p> <p><b>No</b> 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>

**Pinpoint Test F: DTC C1446 — Brake Switch Circuit Failure**

**Normal Operation**

The anti-lock brake system (ABS) module receives a voltage signal from the smart junction box (SJB) on circuit 535 (LB/RD) through the brake pedal switch. When the brake pedal is applied the voltage signal is no longer referenced by the ABS module.

**Possible Causes**

- brake pedal switch
- ABS module
- hydraulic control unit (HCU)

**DIAGNOSIS AND TESTING (Continued)**

**PINPOINT TEST F: DTC C1446 — BRAKE SWITCH CIRCUIT FAILURE**

Test Step		Result / Action to Take
<b>F1</b>	<b>MONITOR THE SMART JUNCTION BOX (SJB) PIDs</b>	<p><b>Yes</b> GO to <b>F2</b>.</p> <p><b>No</b> For further diagnosis of the stoplamps, REFER to Section 417-01.</p>
	<ul style="list-style-type: none"> <li>Connect the diagnostic tool.</li> <li>Key in ON position.</li> <li>Enter the following diagnostic mode on the diagnostic tool: SJB Stoplamp Switch PID.</li> <li>Press and release the brake pedal while monitoring the SJB stoplamp switch PID.</li> <li><b>Do the stoplamps illuminate and does the PID agree?</b></li> </ul>	
<b>F2</b>	<b>MONITOR THE ABS MODULE STOPLAMP SWITCH PID</b>	
	<ul style="list-style-type: none"> <li>Enter the following diagnostic mode on the diagnostic tool: ABS Module Stoplamp Switch PID.</li> <li>Press and release the brake pedal while monitoring the stoplamp switch PID and observing the stoplamps.</li> <li><b>Does the PID agree with the brake pedal position?</b></li> </ul>	<p><b>Yes</b> GO to <b>F3</b>.</p> <p><b>No</b> REPAIR circuit 535 (LB/RD).</p>
<b>F3</b>	<b>CHECK FOR CORRECT ABS MODULE OPERATION</b>	<p><b>Yes</b> INSTALL a new ABS module. REFER to Anti-Lock Brake System (ABS) Module in this section. CLEAR the DTCs. REPEAT the self-test.</p> <p><b>No</b> The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. CARRY OUT the self-test with the brake pedal not applied.</p>
	<ul style="list-style-type: none"> <li>Disconnect the ABS connector.</li> <li>Check for:                             <ul style="list-style-type: none"> <li>corrosion</li> <li>spread or bent pins</li> <li>pushed-out pins</li> </ul> </li> <li>Connect the ABS connector and make sure it seats correctly.</li> <li>Operate the system and verify the concern is still present.</li> <li><b>Is the concern still present?</b></li> </ul>	

**Pinpoint Test G: Spongy/Soft/Low Brake Pedal with No Warning Indicator**

**Possible Causes**

- base brake system
- hydraulic control unit (HCU)

**Normal Operation**

The brake pedal should be firm when applied.

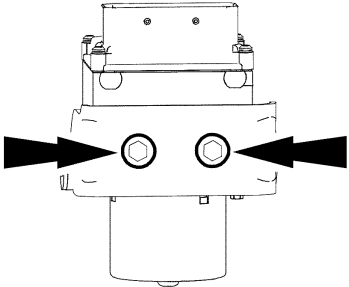
**PINPOINT TEST G: SPONGY/SOFT/LOW BRAKE PEDAL WITH NO WARNING INDICATOR**

Test Step		Result / Action to Take
<b>G1</b>	<b>CHECK THE BASE BRAKE COMPONENTS</b>	<p><b>Yes</b> REPAIR or INSTALL new components as necessary. TEST the system for normal operation.</p> <p><b>No</b> GO to <b>G2</b>.</p>
	<ul style="list-style-type: none"> <li>Visually inspect the brake lines from the hydraulic control unit (HCU) to the brake calipers.</li> <li>Visually inspect the calipers and brake components.</li> <li><b>Are any of these components damaged?</b></li> </ul>	
<b>G2</b>	<b>CHECK FOR A LEAKING DUMP VALVE</b>	
	<ul style="list-style-type: none"> <li>Key in OFF position.</li> </ul>	

(Continued)

**DIAGNOSIS AND TESTING (Continued)**

**PINPOINT TEST G: SPONGY/SOFT/LOW BRAKE PEDAL WITH NO WARNING INDICATOR (Continued)**

Test Step		Result / Action to Take
<b>G2</b>	<b>CHECK FOR A LEAKING DUMP VALVE (Continued)</b>	
<ul style="list-style-type: none"> <li>Remove the rubber boots from the 2 HCU low pressure accumulators (LPA) and insert a clean steel implement (e.g. paper clip or a small screwdriver) into each LPA.</li> </ul>  <p>N0012765</p> <ul style="list-style-type: none"> <li>Key in ON position.</li> <li><b>NOTE:</b> A leaking dump valve is similar to the master cylinder bypass condition. It is important that the pedal be quickly and forcefully applied to rule out master cylinder bypass as a condition. Have an assistant press hard on the brake pedal while observing the steel implements.</li> <li><b>Do either of the implements move out 6.35 mm (0.25 in) or more?</b></li> </ul>		<p><b>Yes</b> INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section.</p> <p><b>No</b> REMOVE the steel implements. INSTALL the rubber boots on each LPA. REFER to Section 206-00 to continue diagnosis of the base brake system.</p>

**Pinpoint Test H: Poor Vehicle Tracking During Anti-lock Function**

**Normal Operation**

The operating voltage required to supply the anti-lock brake system (ABS) module, hydraulic pump, and isolation valves is in a range between 10 and 16 volts.

Voltage is supplied by the smart junction box (SJB) through circuit 1844 (LG/RD) (ignition feed) and from the bussed electrical center (BEC) through circuit 534 (YE/LG), and circuit 601 (LB/PK) (voltage at all times). Ground is provided through circuit 1205 (BK).

**Possible Causes**

- base brake system
- hydraulic control unit (HCU)

**PINPOINT TEST H: POOR VEHICLE TRACKING DURING ANTI-LOCK FUNCTION**

Test Step		Result / Action to Take
<b>H1</b>	<b>BLEED THE BRAKE SYSTEM</b>	
<ul style="list-style-type: none"> <li>Bleed the brake system using the diagnostic tool. Refer to Section 206-00.</li> <li>Test drive the vehicle.</li> <li><b>Does the vehicle track correctly?</b></li> </ul>		<p><b>Yes</b> The brake system is operating correctly. The concern may have been caused by air in the hydraulic system or a sticky valve.</p> <p><b>No</b> GO to <b>H2</b>.</p>
<b>H2</b>	<b>CHECK THE ABS INLET VALVE (CLOSED POSITION)</b>	
<ul style="list-style-type: none"> <li>Key in ON position.</li> <li>Enter the following diagnostic mode on the diagnostic tool: ABS Module Active Command.</li> </ul>		

(Continued)

**DIAGNOSIS AND TESTING (Continued)**

**PINPOINT TEST H: POOR VEHICLE TRACKING DURING ANTI-LOCK FUNCTION (Continued)**

Test Step		Result / Action to Take
<b>H2</b>	<b>CHECK THE ABS INLET VALVE (CLOSED POSITION) (Continued)</b>	
	<ul style="list-style-type: none"> <li>With the vehicle in NEUTRAL, position it on a hoist. Refer to Section 100-02.</li> <li>Rotate all the wheels to make sure they rotate freely (the transmission must be in NEUTRAL).</li> <li>Trigger the ABS module LF INLET ON active command.</li> <li>Apply moderate brake pedal effort.</li> <li>Have an assistant attempt to rotate the LF wheel.</li> <li><b>Does the LF wheel rotate?</b></li> </ul>	<p><b>Yes</b> TRIGGER the LF INLET OFF active command. GO to <b>H3</b>.</p> <p><b>No</b> INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. TEST the system for normal operation.</p>
<b>H3</b>	<b>CHECK THE ABS INLET VALVE (OPEN POSITION)</b>	
	<ul style="list-style-type: none"> <li>Apply moderate brake pedal effort.</li> <li>Have an assistant attempt to rotate the LF wheel.</li> <li><b>Does the LF wheel rotate?</b></li> </ul>	<p><b>Yes</b> INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. TEST the system for normal operation.</p> <p><b>No</b> GO to <b>H4</b>.</p>
<b>H4</b>	<b>CHECK THE ABS OUTPUT VALVE (OPEN POSITION)</b>	
	<ul style="list-style-type: none"> <li>Apply moderate brake pedal effort.</li> <li>Trigger ABS module LF INLET ON active command.</li> <li>Trigger ABS module ABS POWER ON active command (turns on the pump motor) for 6 seconds. (The trigger must be pressed 3 times. Each press runs the pump for 2 seconds.)</li> <li>Trigger the ABS module LF OUTLET ON active command, then trigger the ABS module LF OUTLET OFF active command. Repeat 3 times.</li> <li>Have an assistant attempt to rotate the LF wheel.</li> <li><b>Does the LF wheel rotate?</b></li> </ul>	<p><b>Yes</b> TRIGGER all active commands OFF. GO to <b>H5</b>.</p> <p><b>No</b> INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. TEST the system for normal operation.</p>
<b>H5</b>	<b>CHECK THE ABS INLET AND OUTLET VALVES (CLOSED POSITION)</b>	
	<ul style="list-style-type: none"> <li>Apply moderate brake pedal effort.</li> <li>Have an assistant attempt to rotate the LF wheel.</li> <li><b>Does the LF wheel rotate?</b></li> </ul>	<p><b>Yes</b> INSTALL a new HCU. REFER to Hydraulic Control Unit (HCU) in this section. TEST the system for normal operation.</p> <p><b>No</b> REPEAT this procedure (beginning with Step H2) for the RF, LR and RR wheels using the appropriate active commands. If no failure occurs, the system is operating normally.</p>

**Pinpoint Test I: The Traction Control System Cannot Be Disabled**

**Normal Operation**

Engine torque modulation is achieved by regulating fuel and spark to the cylinders. The traction control system operates using the anti-lock brake system (ABS) module to interact with the powertrain control module (PCM) to reduce engine torque and apply the brakes if the wheels lose traction and begin to spin during acceleration.

The instrument cluster circuit 1412 (WH/PK) monitors for a ground (change of state). When the traction control switch is pressed momentary ground occurs through circuit 1205 (BK). The instrument cluster then sends a voltage to the traction control switch through circuit 939 (VT) illuminating the traction control switch and disabling the system.

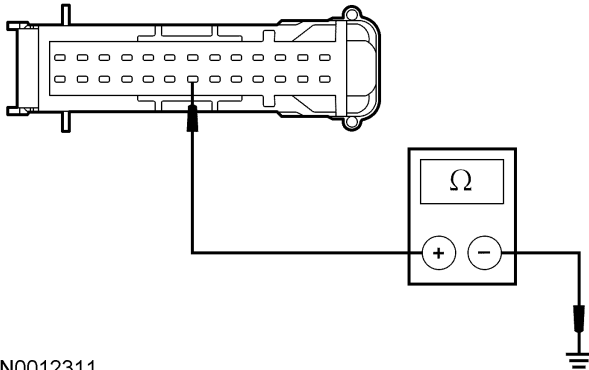
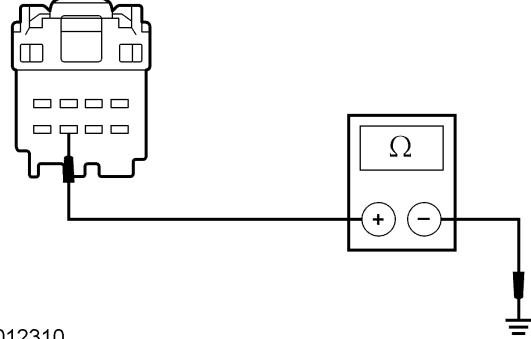
**Possible Causes**

- circuit 1205 (BK) open
- circuit 1412 (WH/PK) open or short to ground
- traction control switch
- ABS module
- instrument cluster

**DIAGNOSIS AND TESTING (Continued)**

**PINPOINT TEST I: THE TRACTION CONTROL SYSTEM CANNOT BE DISABLED**

**⚠ CAUTION:** Use the flex probe kit for all test connections to prevent damage to the wiring terminals. Do not use standard multimeter probes.

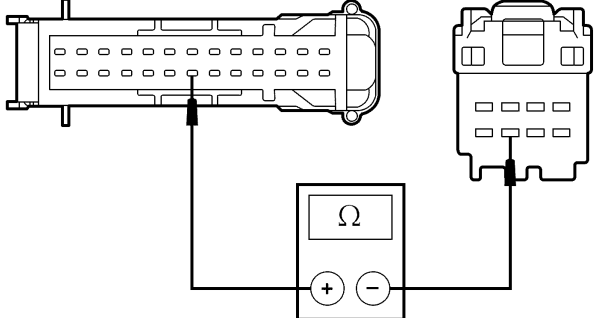
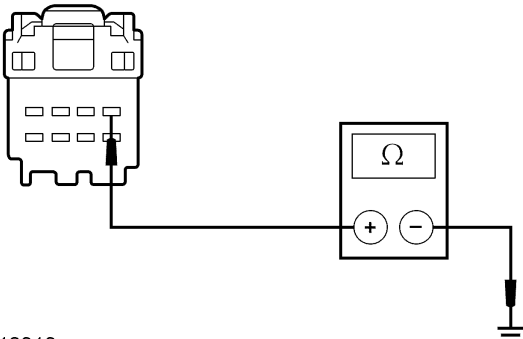
	Test Step	Result / Action to Take
11	<p><b>MONITOR THE INSTRUMENT CLUSTER PID</b></p> <ul style="list-style-type: none"> <li>• Key in ON position.</li> <li>• Enter the following diagnostic mode on the diagnostic tool: Instrument Cluster PID.</li> <li>• Monitor the instrument cluster traction control switch status PID while pressing the traction control disable switch repeatedly.</li> <li>• <b>Does the PID agree with the switch position?</b></li> </ul>	<p><b>Yes</b> GO to <b>I6</b>.</p> <p><b>No</b> GO to <b>I2</b>.</p>
12	<p><b>CHECK THE TRACTION CONTROL SWITCH INPUT</b></p> <ul style="list-style-type: none"> <li>• Key in OFF position.</li> <li>• Disconnect: Instrument Cluster C220.</li> <li>• Measure the resistance between the instrument cluster C220-20, circuit 1412 (WH/PK), harness side and ground while pressing and releasing the traction control switch.</li> </ul>  <p>N0012311</p> <ul style="list-style-type: none"> <li>• <b>Is the resistance less than 5 ohms with the switch pressed and greater than 10,000 ohms with the switch released?</b></li> </ul>	<p><b>Yes</b> GO to <b>I3</b>.</p> <p><b>No</b> INSTALL a new traction control switch. REFER to Traction Control Switch in this section. CLEAR the DTCs. REPEAT the self-test.</p>
13	<p><b>CHECK CIRCUIT 1412 (WH/PK) FOR A SHORT TO GROUND</b></p> <ul style="list-style-type: none"> <li>• Key in OFF position.</li> <li>• Disconnect: Traction Control Switch C2039.</li> <li>• Measure the resistance between the traction control switch C2039-7, circuit 1412 (WH/PK), harness side and ground.</li> </ul>  <p>N0012310</p> <ul style="list-style-type: none"> <li>• <b>Is the resistance greater than 10,000 ohms?</b></li> </ul>	<p><b>Yes</b> GO to <b>I4</b>.</p> <p><b>No</b> REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.</p>
14	<p><b>CHECK CIRCUIT 1412 (WH/PK) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>• Disconnect: Traction Control Switch C2039.</li> </ul>	

(Continued)



**DIAGNOSIS AND TESTING (Continued)**

**PINPOINT TEST I: THE TRACTION CONTROL SYSTEM CANNOT BE DISABLED (Continued)**

	Test Step	Result / Action to Take
<p><b>14</b></p>	<p><b>CHECK CIRCUIT 1412 (WH/PK) FOR AN OPEN (Continued)</b></p> <ul style="list-style-type: none"> <li>Measure the resistance between the instrument cluster C220-20, circuit 1412 (WH/PK), harness side and the traction control switch C2039-7, circuit 1412 (WH/PK), harness side.</li> </ul>  <p>N0012312</p> <ul style="list-style-type: none"> <li><b>Is the resistance less than 5 ohms?</b></li> </ul>	<p><b>Yes</b> GO to <b>I5</b>.</p> <p><b>No</b> REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.</p>
<p><b>15</b></p>	<p><b>CHECK CIRCUIT 1205 (BK) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>Measure the resistance between the traction control switch C2039-1, circuit 1205 (BK), harness side and ground.</li> </ul>  <p>N0012313</p> <ul style="list-style-type: none"> <li><b>Is the resistance less than 5 ohms?</b></li> </ul>	<p><b>Yes</b> INSTALL a new traction control switch. REFER to Traction Control Switch in this section. CLEAR the DTCs. REPEAT the self-test.</p> <p><b>No</b> REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.</p>
<p><b>16</b></p>	<p><b>CHECK FOR CORRECT INSTRUMENT CLUSTER OPERATION</b></p> <ul style="list-style-type: none"> <li>Disconnect the instrument cluster connector.</li> <li>Check for:             <ul style="list-style-type: none"> <li>corrosion</li> <li>spread or bent pins</li> <li>pushed-out pins</li> </ul> </li> <li>Connect the instrument cluster connector and make sure it seats correctly.</li> <li>Operate the system and verify the concern is still present.</li> <li><b>Is the concern still present?</b></li> </ul>	<p><b>Yes</b> INSTALL a new instrument cluster. REFER to Section 413-01. CLEAR the DTCs. REPEAT the self-test.</p> <p><b>No</b> 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>

**DIAGNOSIS AND TESTING (Continued)**

**Pinpoint Test J: The Traction Control Switch Indicator is Never/Always On**

**Normal Operation**

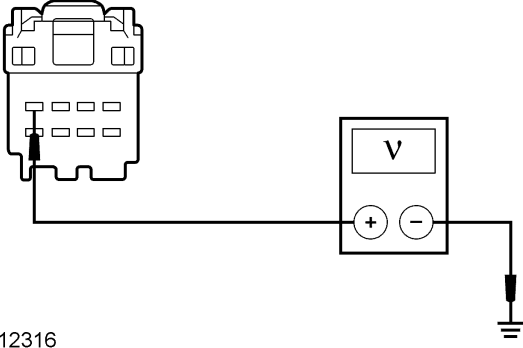
The instrument cluster circuit 1412 (WH/PK) monitors for a ground (change of state). When the traction control switch is pressed momentary ground occurs through circuit 1205 (BK). The instrument cluster then sends a voltage to the traction control switch through circuit 939 (VT) illuminating the traction control switch and disabling the system.

**Possible Causes**

- circuit 939 (VT) open or short to ground
- circuit 1412 (WH/PK) open or short to ground
- traction control switch
- instrument cluster

**PINPOINT TEST J: THE TRACTION CONTROL SWITCH INDICATOR IS NEVER/ALWAYS ON**

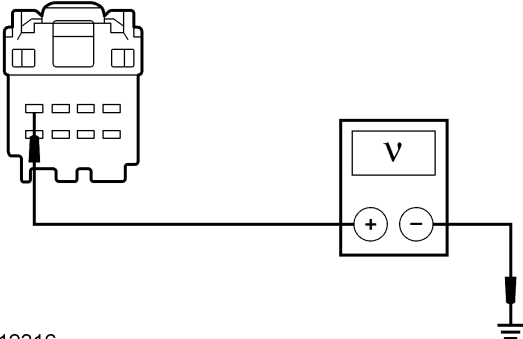
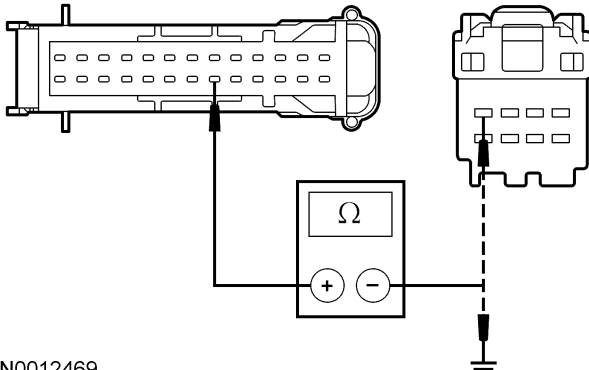
**⚠ CAUTION:** Use the flex probe kit for all test connections to prevent damage to the wiring terminals. Do not use standard multimeter probes.

Test Step		Result / Action to Take
<b>J1</b>	<b>VERIFY THE TRACTION CONTROL SYSTEM OPERATION</b>	<p><b>Yes</b> GO to <b>J2</b>.</p> <p><b>No</b> REFER to symptom chart to continue diagnosis.</p>
	<ul style="list-style-type: none"> <li>• Operate the system and verify the traction control system can be enabled and disabled.</li> <li>• <b>Does the traction control system operate correctly?</b></li> </ul>	
<b>J2</b>	<b>CHECK CIRCUIT 939 (VT) FOR VOLTAGE</b>	<p><b>Yes</b> GO to <b>J3</b>.</p> <p><b>No</b> GO to <b>J4</b>.</p>
	<ul style="list-style-type: none"> <li>• Key in OFF position.</li> <li>• Disconnect: Traction Control Switch C2039.</li> <li>• Key in ON position.</li> <li>• Measure the voltage between the traction control switch C2039-4, circuit 939 (VT), harness side and ground.</li> </ul> <div style="text-align: center;">  <p>N0012316</p> </div> <ul style="list-style-type: none"> <li>• <b>Is any voltage present?</b></li> </ul>	
<b>J3</b>	<b>CHECK CIRCUIT 939 (VT) FOR A SHORT TO VOLTAGE</b>	
	<ul style="list-style-type: none"> <li>• Key in OFF position.</li> <li>• Disconnect: Instrument Cluster C220.</li> <li>• Key in ON position.</li> </ul>	

(Continued)

**DIAGNOSIS AND TESTING (Continued)**

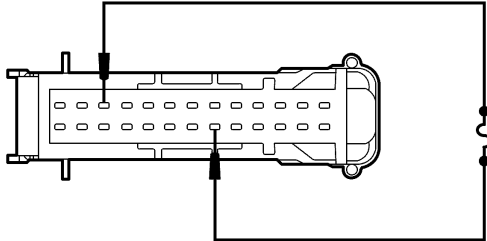
**PINPOINT TEST J: THE TRACTION CONTROL SWITCH INDICATOR IS NEVER/ALWAYS ON (Continued)**

Test Step		Result / Action to Take
<b>J3</b>	<b>CHECK CIRCUIT 939 (VT) FOR A SHORT TO VOLTAGE (Continued)</b>	
<ul style="list-style-type: none"> <li>Measure the voltage between the traction control switch C2039-4, circuit 939 (VT), harness side and ground.</li> </ul>  <p>N0012316</p> <ul style="list-style-type: none"> <li><b>Is any voltage present?</b></li> </ul>		<p><b>Yes</b> REPAIR the circuit. TEST the system for normal operation.</p> <p><b>No</b> GO to <b>J6</b>.</p>
<b>J4</b>	<b>CHECK CIRCUIT 939 (VT) FOR AN OPEN OR SHORT TO GROUND</b>	
<ul style="list-style-type: none"> <li>Key in OFF position.</li> <li>Measure the resistance between the instrument cluster C220-21, circuit 939 (VT), harness side and the traction control switch C2039-4, circuit 939 (VT), harness side; and between the instrument cluster C220-21, circuit 939 (VT), harness side and ground.</li> </ul>  <p>N0012469</p> <ul style="list-style-type: none"> <li><b>Is the resistance less than 5 ohms between the instrument cluster and the traction control switch, and greater than 10,000 ohms between the instrument cluster and ground?</b></li> </ul>		<p><b>Yes</b> GO to <b>J5</b>.</p> <p><b>No</b> REPAIR the circuit. TEST the system for normal operation.</p>
<b>J5</b>	<b>CHECK THE INSTRUMENT CLUSTER OPERATION</b>	
<ul style="list-style-type: none"> <li>Connect: Traction Control Switch C2039.</li> </ul>		

(Continued)

**DIAGNOSIS AND TESTING (Continued)**

**PINPOINT TEST J: THE TRACTION CONTROL SWITCH INDICATOR IS NEVER/ALWAYS ON (Continued)**

Test Step		Result / Action to Take
<b>J5</b>	<p><b>CHECK THE INSTRUMENT CLUSTER OPERATION (Continued)</b></p> <ul style="list-style-type: none"> <li>Connect a fused (10A) jumper wire between the instrument cluster C220-21, circuit 939 (VT), harness side and the instrument cluster C220-3, circuit 1001 (WH/YE), harness side.</li> </ul>  <p>N0012470</p> <ul style="list-style-type: none"> <li><b>Does the traction control switch indicator illuminate?</b></li> </ul>	<p><b>Yes</b> Remove the jumper wire. GO to <b>J6</b>.</p> <p><b>No</b> INSTALL a new traction control switch. REFER to Traction Control Switch in this section. CLEAR the DTCs. REPEAT the self-test.</p>
<b>J6</b>	<p><b>CHECK FOR CORRECT INSTRUMENT CLUSTER OPERATION</b></p> <ul style="list-style-type: none"> <li>Disconnect the instrument cluster connector.</li> <li>Check for:                             <ul style="list-style-type: none"> <li>corrosion</li> <li>spread or bent pins</li> <li>pushed-out pins</li> </ul> </li> <li>Connect the instrument cluster connector and make sure it seats correctly.</li> <li>Operate the system and verify the concern is still present.</li> <li><b>Is the concern still present?</b></li> </ul>	<p><b>Yes</b> INSTALL a new instrument cluster. REFER to Section 413-01. CLEAR the DTCs. REPEAT the self-test.</p> <p><b>No</b> 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>