Instrumentation, Message Center and Warning Chimes

Special Tool(s)

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

Principles of Operation

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

The Instrument Cluster (IC), message center and warning chimes utilize a microprocessor to control the gauge and indicator functions. Data is sent to the IC over the High Speed Controller Area Network (HS-CAN) bus lines and through hardwired circuitry from individual components. The IC uses each input to output an action to the gauges or indicators. The IC uses input messages from other modules to control the gauges, informational indicators, warning indicators, message center and warning chimes over the communication networks. If a required message is missing or invalid for less than 5 seconds, the gauge or indicator that requires the message remains at the last commanded state based upon the last known good message. For example, if the brake status message is missing for less than 5 seconds and the brake warning indicator was ON, the indicator remains in the ON state until the next good message is received. If the message remains missing or invalid for greater than 5 seconds, the IC sets a U-code DTC and the output becomes a default action for the indicator or gauge. Each indicator or gauge utilizes a different default strategy depending on the nature of the indication. Refer to the normal operation descriptions located before each individual pinpoint test for further description of the default action specific to each indicator or gauge. If the messaged input to the cluster returns at any time, the normal function of the gauge or indicator resumes.

NOTE: Whenever a network message is suspected as missing and confirmed by a missing message DTC (U-code), it is important to look for other symptoms that may also be present in the IC and throughout the vehicle. Once a DTC is set in the IC , it may be helpful to review the complete message list available in Section 418-00 to see what other modules also rely on the same message and run the self-test for those modules. If the message is missing from other modules, the same DTC may also be set in those modules. Confirmation of missing messages common to multiple modules may indicate that the originating module is the source of the concern or the communication network may be experiencing some problems.

It is very important to understand:

- where the input originates.
- all the information necessary in order for a feature to operate.
- which module(s) receive(s) the input or command message.

- does the module which received the input control the output of the feature, or does it output a message over the communication network to another module.
- which module controls the output of the feature.

Instrument Cluster (IC)

IC Gateway Function

The IC acts as a gateway module by receiving information in one format and transmitting it to other modules using another format. For example, the IC receives the vehicle speed data from the PCM over the HS-CAN , converts the data into a Medium Speed Controller Area Network (MS-CAN) message and sends (gateways) the message to other network modules such as the HVAC module, the Audio Control Module (ACM), and the SJB . This enables network communication between modules that do not communicate using the same network (HS-CAN or MS-CAN).

IC Configuration

The IC contains items that are configurable. All configurable items are configured at the end of the line production and only available for configuration using Programmable Module Installation (PMI) or As-Built data. Refer to Section 418-01 for PMI module configuration.

IC Prove-Out

The IC and other vehicle modules carry out a display prove-out to verify that all module controlled warning/indicator lamps and monitored systems are functioning correctly within the IC . When the ignition switch is cycled to the ON position with the engine off, the indicators illuminate to prove-out according the following table:

Indicator	Indicator Type	Prove-Out Duration
Air bag	Warning	6 seconds
ABS	Warning	3 seconds
Anti-theft indicator	Informational	3 seconds
Brake	Warning	3 seconds
Charge	Informational	Engine start up
Check fuel cap	Informational	3 seconds
Door ajar	Informational	No prove-out
Engine over-temperature	Warning	3 seconds
High beam	Informational	No prove-out
Low engine oil pressure	Warning	Engine startup
Low fuel	Informational	3 seconds
Malfunction Indicator Lamp (MIL)	Warning	Engine startup
Overdrive (O/D) off	Informational	No prove-out
RH/LH turn signals	Informational	No prove-out
Safety belt	Warning	65 seconds if the safety belt is unbuckled, turns off when the safety belt is buckled
Speed control	Informational	No prove-out
Tire Pressure Monitoring System (TPMS)	Warning	3 seconds

Traction control	Informational	3 seconds
Powertrain malfunction (wrench)	Informational	3 seconds

Information And Message Center

The message center is a vacuum fluorescent display, which is part of the IC . The message center electronic functions use both hardwired and controller area network (CAN) circuits to transmit and receive information.

Warning Chimes

Chime Characteristics

Each warning chime has unique characteristics that help to identify and differentiate each warning chime. The warning chimes use volume, chime frequency, length of time the chime sounds and the number of chime tones to identify which chime is sounding. The IC prioritizes the chimes according to a preset hierarchy programmed into the IC software. When more than one chime request is received by the IC , the most important chime sounds. If a lower priority chime is currently sounding, the higher priority request takes over and replaces the lower priority chime.

Safety Belt Warning Chime

The safety belt warning chime is activated when the ignition switch is in the RUN or START position and the Restraints Control Module (RCM) detects an unbuckled driver safety belt. The IC generates the chime for a duration of 6 seconds or until the safety belt is buckled.

Belt-Minder®

The Belt-Minder® feature supplements the current safety belt warning function. The Belt-Minder® feature is enabled after the current safety belt warning is complete. The Belt-Minder® reminds the driver that the driver or passenger safety belt is unbuckled by intermittently sounding a chime and illuminating the safety belt warning lamp in the IC once the vehicle speed has exceeded 5 km/h (3 mph). While activated, the Belt-Minder® alternates the chime and indicator from ON for 6 seconds, to OFF for 30 seconds.

NOTE: The Belt-Minder® is a configurable item. To configure without using a scan tool, refer to Belt-Minder® Deactivating/Activating in this section.

The Belt-Minder® reminder stops when:

- The driver or passenger safety belt is buckled.
- The ignition switch is turned to the OFF or ACC position.
- Five minutes have elapsed since Belt-Minder® has started.

Key-In-Ignition Warning Chime

When the key-in-ignition switch closes, it sends a voltage signal to the IC , which then sounds a warning chime, provided the ignition key is in the ignition lock cylinder, the ignition switch is in the OFF position, and the driver door is open. The IC sounds a steady tone, which continues until the key is removed, the ignition switch is rotated to the RUN position, or the driver door is closed.

Air Bag Warning Chime

The air bag warning chime warns the driver that a fault has occurred in the Supplemental Restraint System (SRS) and that the air bag warning indicator lamp is not working by sounding a chime when the ignition switch is in the RUN position for more than 20 seconds. When these conditions exist, the RCM removes the ground to the IC . The IC then activates the warning chime. The warning consists of 5 sets of 5 one-second tone bursts. Each set is separated by 5 seconds of silence. The warning is repeated every 30 minutes.

Door/Trunk Ajar Warning Chime

The door/trunk ajar warning chime warns that a door, or the trunk, is not fully closed. The chime sounds when any door or the trunk becomes ajar while the ignition switch is in the RUN position.

Headlamps On Warning Chime

The headlamps on warning chime is activated when the IC receives the parking lamps ON message from the SJB, the key is out of the ignition, and the driver door is ajar. The warning consists of repeated one-half second bursts and continues to sound until the exterior lamps are turned off, the driver door is closed, or 10 minutes have elapsed, at which time the battery saver turns the exterior lamps off.

Message Center Warning Chime

The message center warning chime accompanies any initial warning message display, as well as any repeated initial warning message. As the message center is an integral part of the IC, the interaction between the message center and the chime function is also integral to the IC.

The message center switch tone sounds when any switch on the message center is pressed. The message center switches are supplied with a voltage reference signal from the IC. When a switch is pressed, it routes the signal through a specific resistor in the switch assembly and then to ground.

Performance Shift Warning Chime

The performance shift warning chime provides an audible alert to inform the driver to shift the transmission gear. The chime is configured through the message center independently of the visual performance shift indicator. The chime feature on/off status and the desired rpm for the chime to sound are configurable items. The IC uses engine data rpm sent to the IC over the HS-CAN communication lines and compares the value against the customer preset engine rpm to determine when to sound the chime. When the actual engine rpm matches the preset engine rpm, the IC sounds the chime.

Inspection and Verification

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

Visual Inspection Chart

Mechanical	Electrical

• Accessory drive belt
• Brake fluid level
• Door/trunk ajar status
• Engine coolant level
• Engine oil level
• Fuel cap status
• Fuel level
• Fuel tank
• Tire pressure
	• Smart Junction Box (SJB) fuse(s):
	  ▪ 8 (10A)
	  ▪ 16 (5A)
	  ▪ 19 (5A)
	• Wiring, terminals or connectors
	• Message center switches
	• Key-in ignition warning switch (part of the ignition switch)
	• SJB
	• Instrument Cluster (IC)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. **NOTE:** Make sure to use the latest scan tool software release.

   If the cause is not visually evident, connect the scan tool to the Data Link Connector (DLC).
5. **NOTE:** The Vehicle Communication Module (VCM) LED prove-out confirms power and ground from the

DLC are provided to the VCM.

If the scan tool does not communicate with the VCM:
- Check the VCM connection to the vehicle.
- Check the scan tool connection to the VCM.
- Refer to Section 418-00, No Power To The Scan Tool, to diagnose no 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 IC, ABS module, PCM, SJB and Restraints Control Module (RCM).

9. If the DTCs retrieved are related to the concern, go to DTC Charts.

10. If no DTCs related to the concern are retrieved, GO to Symptom Chart - Instrument Cluster (IC), GO to Symptom Chart - Information And Message Center or GO to Symptom Chart - Warning Chimes.

DTC Charts

Instrument Cluster (IC) DTC Chart

DTC	Description	Action
B1202	Fuel Sender Circuit Open	GO to Pinpoint Test B.
B1204	Fuel Sender Circuit Short To Ground	GO to Pinpoint Test B.
B1205	EIC Switch-1 Assembly Circuit Failure	GO to Pinpoint Test AJ.
B1317	Battery Voltage High	GO to Pinpoint Test AO.
B1318	Battery Voltage Low	GO to Pinpoint Test AP.
B1342	ECU Is Faulted	INSTALL a new Instrument Cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
B1353	Ignition Key-In Circuit Open	GO to Pinpoint Test AL.
B1556	Ignition RUN/START Circuit Open	GO to Pinpoint Test A.
B1557	Ignition RUN/START Circuit Short to Battery	GO to Pinpoint Test AQ.
B2143	NVM Memory Failure	CLEAR the DTCs. REPEAT the self-test. If the DTC is still present, INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
B236A	Chime Output Open	CLEAR the DTCs. REPEAT the self-test. If the DTC is still present, INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
B2477	Module Configuration Failure	CONFIGURE the IC. REFER to Section 418-01. CLEAR the DTCs. REPEAT the self-test. If DTC B2477 returns, INSTALL a new IC. REFER to Instrument Cluster (IC) in this section.

B2627	Fuel Sender Circuit Open #2	GO to Pinpoint Test B .
B2628	Fuel Sender Circuit Short to Ground #2	GO to Pinpoint Test B .
B2879	Fuel Tank Jet Pump Fault	GO to Pinpoint Test B .
B2903	Chime Output Circuit Short To Battery	CLEAR the DTCs. REPEAT the self-test. If the DTC is still present, INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
B2940	Chime Output Circuit Short To Ground	CLEAR the DTCs. REPEAT the self-test. If the DTC is still present, INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
C1093	Traction Control Disable Switch Circuit Failure	REFER to Section 206-09 .
U0073	Control Module Communication Bus A Off	REFER to Section 418-00 .
U1900	CAN Communication Bus Fault - Receive Error	REFER to Section 418-00 .
U2023	Fault Received From External Node	DTC U2023 is set when a module receives invalid network data from another module with a faulted input. RETRIEVE and REPAIR all non-network DTCs in the other modules on the network. REFER to Section 419-10 for a list of all DTCs.
U2050	No Application Present	REPROGRAM the IC . If the DTC occurs after a software reprogram, REPROGRAM the IC again. If the DTC reappears after each attempt to reprogram, INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Smart Junction Box (SJB) DTC Chart

DTC	Description	Action
B1201	Fuel Sender Circuit Failure	GO to Pinpoint Test B .
B1202	Fuel Sender Circuit Open	GO to Pinpoint Test B .
B2479	Park Brake Switch Circuit Short to Ground	GO to Pinpoint Test M .
B2627	Fuel Sender Circuit Open #2	GO to Pinpoint Test B .
B2628	Fuel Sender Circuit Short to Ground #2	GO to Pinpoint Test B .
C1189	Brake Fluid Level Sensor Input Short Circuit to Ground	GO to Pinpoint Test M .
All other DTCs	—	REFER to the Diagnostic Trouble Code (DTC) Chart in Section 419-10 .

PCM DTC Chart

DTC	Description	Action
P0457	Evaporative Emission System Leak Detected (fuel cap loose/off)	GO to Pinpoint Test V .
P0460	Fuel Level Sensor A Circuit	REFER to the Powertrain Control/Emissions

		Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B .
P0461	Fuel Level Sensor A Circuit Range/Performance	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B .
P0462	Fuel Level Sensor A Circuit Low	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B .
P0463	Fuel Level Sensor A Circuit High	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B .
P2065	Fuel Level Sensor B Circuit	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B .
P2066	Fuel Level Sensor B Circuit Range/Performance	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B .
P2067	Fuel Level Sensor B Circuit Low	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B .
P2068	Fuel Level Sensor B Circuit High	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B .
All other DTCs	—	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.

Symptom Chart

Symptom Chart — Instrument Cluster (IC)

Condition	Possible Sources	Action
• No communication with the Instrument Cluster (IC)	• Fuse(s) • Wiring, terminals or connectors • IC	• REFER to Section 418-00 .
• No communication with the Smart Junction Box (SJB)	• Fuse(s) • Wiring, terminals or connectors • SJB	• REFER to Section 418-00 .
• The Instrument Cluster (IC) is inoperative	• Fuse(s) • Wiring, terminals or	• GO to Pinpoint Test

	connectors • IC	A .
• Incorrect fuel gauge indication	• Wiring, terminals or connectors • Fuel pump module • Fuel level sensor • Fuel level sender (float and card) • Fuel tank • SJB • IC	• GO to Pinpoint Test B .
• The boost gauge is inoperative (Shelby GT 500 only)	• PCM • IC	• GO to Pinpoint Test C .
• Incorrect temperature gauge indication	• PCM • IC	• GO to Pinpoint Test D .
• Incorrect voltage gauge indication	• Charging system concern • IC	• GO to Pinpoint Test E .
• The tachometer is inoperative	• PCM • IC	• GO to Pinpoint Test F .
• Incorrect oil pressure gauge indication	• Wiring, terminals or connectors • Engine oil pressure switch • SJB • IC	• GO to Pinpoint Test G .
• The speedometer/odometer is inoperative	• PCM • IC	• GO to Pinpoint Test H .
• Incorrect speedometer indication	• Tire size configuration • Axle ratio configuration • PCM concern • IC	• GO to Pinpoint Test I .
• The low oil pressure warning indicator is never/always on	• Wiring, terminals or connectors • Engine oil pressure switch • SJB • IC	• GO to Pinpoint Test J .
• The engine over-temperature warning indicator is never/always on	• PCM • IC	• GO to Pinpoint Test K .
• The brake warning indicator is never on	• Wiring, terminals or connectors • Parking brake switch • Brake fluid level switch • SJB • IC	• GO to Pinpoint Test L .
• The brake warning indicator is always on	• Wiring, terminals or connectors • Parking brake switch • Brake fluid level	• GO to Pinpoint Test M .

	switch • SJB • IC	
• The ABS warning indicator is never/always on	• ABS module • IC	• GO to Pinpoint Test N.
• The air bag warning indicator is never/always on	• Wiring, terminals or connectors • Restraints Control Module (RCM) • IC	• GO to Pinpoint Test O.
• The safety belt warning indicator is never/always on	• Wiring, terminals or connectors • RCM • IC	• GO to Pinpoint Test P.
• The door ajar warning indicator is never/always on	• SJB • IC	• GO to Pinpoint Test Q.
• The Malfunction Indicator Lamp (MIL) is never/always on	• PCM • IC	• GO to Pinpoint Test R.
• The powertrain malfunction (wrench) warning indicator is never/always on	• PCM • IC	• GO to Pinpoint Test S.
• The Overdrive (O/D) off indicator is never/always on	• PCM • IC	• GO to Pinpoint Test T.
• The charging system warning indicator is never/always on	• Charging system concern • PCM • IC	• GO to Pinpoint Test U.
• The check fuel cap indicator is never/always on	• PCM • IC	• GO to Pinpoint Test V.
• The high beam indicator is never/always on	• SJB • IC	• GO to Pinpoint Test W.
• The turn signal indicator is never/always on	• SJB • IC	• GO to Pinpoint Test X.
• The speed control indicator is never/always on	• PCM • IC	• GO to Pinpoint Test Y.
• The traction control indicator is never/always on	• ABS module • IC	• GO to Pinpoint Test Z.
• The Daytime Running Lamps (DRL) indicator is never/always on	• SJB • IC	• GO to Pinpoint Test AA.
• The low fuel warning indicator is never/always on	• IC	• GO to Pinpoint Test AB.
• The performance shift warning indicator is never/always on (Shelby GT 500 only)	• PCM • IC	• GO to Pinpoint Test AC.
• The shift indicator is never/always on (Shelby GT 500 only)	• PCM • IC	• GO to Pinpoint Test AD.

• The Tire Pressure Monitoring System (TPMS) warning indicator is never/always on	• TPMS concern • SJB • IC	• GO to Pinpoint Test AE .
• The anti-theft indicator is never/always on	• PCM • IC	• GO to Pinpoint Test AF .

Symptom Chart — Information And Message Center

Condition	Possible Sources	Action
• The message center is not operating correctly	• Message center switch concern • IC	• GO to Pinpoint Test AG .
• The message center display is blank	• IC	• PRESS the message center INFO button. If the message center display is still blank, INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
• The message center switch does not operate correctly	• Wiring, terminals or connectors • Message center switch • IC	• GO to Pinpoint Test AH .
• The CHECK TRAC CONTROL warning is inoperative	• IC	• CHECK the traction control system for correct operation. ▪ If the traction control system does not operate correctly, REFER to Section 206-09 . ▪ If the traction control system operates correctly, INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
• The TURN SIGNAL ON message is inoperative	• IC	• CHECK the turn signal indicators for correct operation. ▪ If the turn signal indicators do not operate correctly, GO to Pinpoint Test X . ▪ If the turn signal indicators operate correctly, INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
• The CHECK CHARGING SYSTEM message is inoperative	• IC	• CHECK the charging system warning indicator for correct operation. ▪ If the charging system warning indicator does not operate correctly, GO to Pinpoint Test U . ▪ If the charging system warning indicator operates correctly, INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

• The BRAKE SYSTEM FAILURE warning is inoperative	• IC	• CHECK the brake warning indicator for correct operation. ▪ If the brake warning indicator does not operate correctly, GO to Pinpoint Test L . ▪ If the brake warning indicator operates correctly, INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
• The LOW FUEL LEVEL message is inoperative	• IC	• CHECK the fuel gauge for correct operation. ▪ If the fuel gauge does not operate correctly, GO to Pinpoint Test B . ▪ If the fuel gauge operates correctly, INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
• The LOW OIL PRESSURE warning is inoperative	• IC	• CHECK the oil pressure gauge for correct operation. ▪ If the oil pressure gauge does not operate correctly, GO to Pinpoint Test G . ▪ If the oil pressure gauge operates correctly, INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
• The CHECK FUEL CAP message is inoperative/always on	• PCM • IC	• GO to Pinpoint Test AI .
• The DRIVER DOOR, PASSENGER DOOR, AND TRUNK AJAR warning is inoperative	• IC	• CHECK the interior lamps for correct operation. ▪ If the interior lamps do not operate correctly, REFER to Section 417-02 . ▪ If the interior lamps operate correctly, INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
• The PARK BRAKE ON message is inoperative	• IC	• CHECK the brake warning indicator for correct operation. ▪ If the brake warning indicator does not operate correctly, GO to Pinpoint Test L . ▪ If the brake warning indicator operates correctly, INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Symptom Chart — Warning Chimes

Condition	Possible Sources	Action
• All the chimes are inoperative	• IC	• INSTALL a new IC . REFER to Instrument Cluster (IC) in this

		section. TEST the system for normal operation.
• The key-in-ignition chime is inoperative	• Wiring, terminals or connectors • Key-in-ignition switch (part of the ignition switch) • IC	• GO to Pinpoint Test AJ .
• The headlamps on warning chime is inoperative	• SJB	• GO to Pinpoint Test AK .
• The chime sounds when the driver door is ajar (no key in the ignition and the headlamps are off)	• Wiring, terminals or connectors • Key-in-ignition switch (part of the ignition switch) • IC	• GO to Pinpoint Test AL .
• The performance shift warning chime does not operate correctly	• IC configuration • IC	• GO to Pinpoint Test AM .
• The safety belt warning chime is inoperative	• IC	• GO to Pinpoint Test AN .
• The Belt-Minder® feature does not operate correctly	• Belt-Minder® deactivated • IC	• GO to Pinpoint Test AN .
• The air bag warning chime does not operate correctly	• IC	• CHECK the operation of the safety belt and air bag warning indicators. ▪ If the safety belt and air bag warning indicators do not operate correctly, GO to Pinpoint Test P (safety belt warning indicator) or GO to Pinpoint Test O (air bag warning indicator). ▪ If the safety belt and air bag warning indicators operate correctly, INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
• The message center switch tone is inoperative	• IC	• CHECK the operation of the message center switch. ▪ If the message center switch does not operate correctly, GO to Pinpoint Test AH . ▪ If the message center switch operates correctly, INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Tests

Pinpoint Test A: The Instrument Cluster (IC) Is Inoperative

Refer to Wiring Diagrams Cell 60 , Instrument Cluster for schematic and connector information.

Normal Operation

With the ignition switch in the START or RUN position, the Instrument Cluster (IC) receives voltage from the Smart Junction Box (SJB) through circuits 489 (PK/BK) and 1266 (RD/YE). With the ignition switch in the OFF position, the IC receives its keep-alive memory voltage from the SJB through circuit 1001 (WH/YE). The IC is grounded through circuit 1205 (BK).

- DTC B1556 (Ignition RUN/START Circuit Open) — a continuous and on-demand DTC that sets in the IC if the IC receives a network message from the SJB indicating that the ignition switch is in the RUN or START position and there is no voltage on the IC run/start circuit 489 (PK/BK).

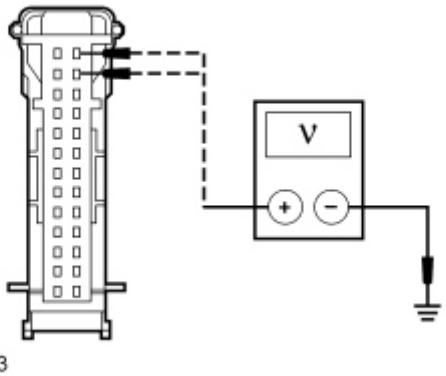
This pinpoint test is intended to diagnose the following:

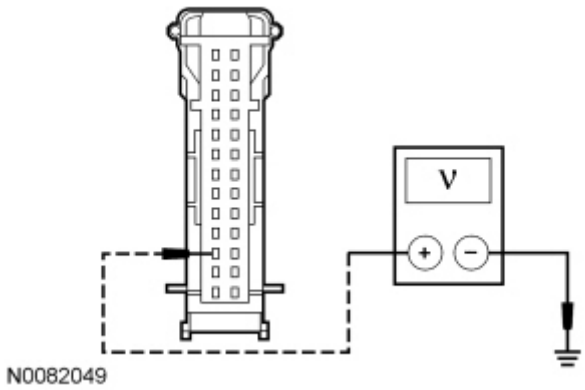
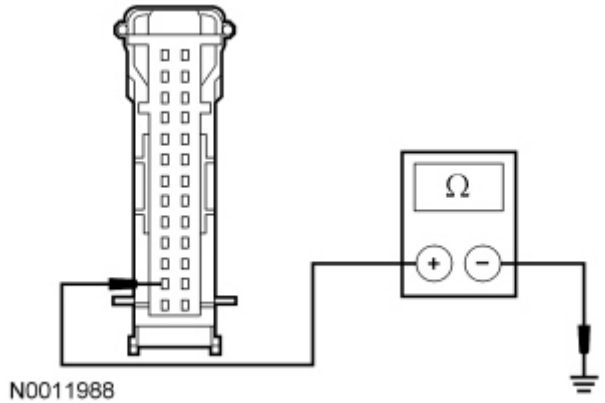
- Fuse(s)
- Wiring, terminals or connectors
- IC

PINPOINT TEST A: THE IC IS INOPERATIVE

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 Section 414-01 .

Test Step	Result / Action to Take
A1 CHECK THE IC VOLTAGE SUPPLY WITH KEY ON	
• Ignition OFF. • Disconnect: IC C220. • Ignition ON. • Measure the voltage between the IC , harness side and ground as follows: **Connector-Pin** / **Circuit** C220-25 / 1266 (RD/YE) C220-26 / 489 (PK/BK)  N0082083 • **Are the voltages greater than 10 volts?**	**Yes** GO to A2 . **No** VERIFY the SJB fuses 16 (5A) and 19 (5A) are OK. If OK, REPAIR the circuit in question. If not OK, REFER to the Wiring Diagrams Manual to identify the possible causes for the short circuit. CLEAR the DTCs. REPEAT the self-test.
A2 CHECK THE IC VOLTAGE SUPPLY WITH KEY OFF	

• Ignition OFF. • Measure the voltage between the IC C220-3, circuit 1001 (WH/YE), harness side and ground.  N0082049 • **Is the voltage greater than 10 volts?**	**Yes** GO to A3 . **No** VERIFY the SJB fuse 8 (10A) is OK. If OK, REPAIR the circuit in question. If not OK, REFER to the Wiring Diagrams Manual to identify the possible causes for the short circuit. CLEAR the DTCs. REPEAT the self-test.
A3 CHECK CIRCUIT 1205 (BK) FOR AN OPEN	
• Ignition OFF. • Disconnect: Negative Battery Cable. • Measure the resistance between the IC C220-2, circuit 1205 (BK) harness side and ground.  N0011988 • **Is the resistance less than 5 ohms?**	**Yes** GO to A4 . **No** REPAIR the circuit. TEST the system for normal operation.
A4 CHECK FOR CORRECT IC OPERATION	

• Disconnect the IC connector.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect the IC connector and make sure it seats correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

Pinpoint Test B: Incorrect Fuel Gauge Indication

Refer to Wiring Diagrams Cell 60 , Instrument Cluster for schematic and connector information.

Normal Operation

The fuel tank is a saddle tank design with variable resistance senders in each side of the tank. The fuel pump module (LH side) and the fuel level sensor (RH side) are driven by floats that provide resistances related to the fuel level on each side of the tank to the Smart Junction Box (SJB). The fuel pump module and the fuel level

sensor uses an approximate resistance range between 15 ohms ± 2 ohms at empty (E) and 160 ohms ± 4 ohms at full (F). The fuel pump module is hardwired to the SJB through the signal circuit 1356 (LG/VT) and the return circuit 1357 (LB/YE). The fuel level sensor is hardwired to the SJB through the signal circuit 29 (YE/WH) and the return circuit 1357 (LB/YE). The SJB monitors the resistance readings that are sent to the SJB from the fuel pump module and the fuel level sensor and sends the Instrument Cluster (IC) a message over the communication network to command the fuel gauge with a corresponding movement of the pointer. If the fuel level sensor is open, the fuel gauge defaults to the fuel pump module value only and the fuel gauge indicates E to 1/2 tank. If the fuel pump module is open, the fuel gauge defaults to the empty position.

The IC uses 4 different operating modes to calculate the fuel level:

- Key OFF fueling
- Anti-slosh (default mode)
- Key ON fueling
- Recovery

After a fuel fill up, the time for the fuel gauge to move from empty (E) to full (F) ranges from 2 seconds to 55 minutes depending on which operating mode the fuel gauge is in.

Key OFF Fueling Mode

The key OFF fueling mode (2 seconds to read empty [E] to full [F]) requires 3 conditions be met:

- The key must be in the OFF position throughout the entire refueling of the vehicle.
- At least 15% of the vehicle's fuel capacity must be added to the fuel tank.
- The IC must receive a valid key ON fuel sender reading within 1 second of the key being put into the RUN position. The key ON sample readings are considered valid if the fuel sender reading is between 15 ohms ± 2 ohms and 160 ohms ± 4 ohms.
- If these conditions are not met, the fuel gauge stays in the anti-slosh mode, which results in a slow to read full (F) event.

Anti-Slosh Mode

The default fuel gauge mode is called the anti-slosh mode. To prevent fuel gauge changes from fuel slosh (gauge instability due to changes in fuel sender readings caused by fuel moving around in the tank), the fuel gauge takes approximately 55 minutes to go from empty (E) to full (F).

Key ON Fueling Mode

The key ON fueling mode (approximately 90 seconds to read empty [E] to full [F]) requires 3 conditions be met:

- The transmission is in PARK (P) (automatic transmissions), or the parking brake applied (manual transmissions).
- The key is in the RUN position.
- At least 15% of the vehicle's fuel capacity must be added to the fuel tank.

In key ON fueling mode, a 30-second timer activates after the transmission is placed into the PARK (P) position or when the parking brake is applied. When the 30-second time has elapsed and at least 15% of the vehicle's fuel capacity has been added, the fuel gauge response time is 90 seconds to read from empty (E) to full (F). When the transmission is shifted out of PARK (P) or the parking brake is released, the fuel gauge strategy reverts to the anti-slosh mode. The key ON fueling mode prevents slow to read full events from happening if the customer refuels the vehicle with the key in the RUN position.

Recovery Mode

Recovery mode is incorporated into the IC strategy to recover from missing fuel level inputs during a refueling event. Missing fuel level inputs result from intermittent opens in the fuel sender or its circuits. Recovery mode (empty [E] to full [F] approximately 20 minutes) is initiated when the following 2 conditions are met:

- The IC is in the anti-slosh (default) mode.
- The actual fuel level in the tank is greater than what is being displayed by the fuel gauge.

IC DTCs

DTC Description	Fault Trigger Conditions
• B1202 — Fuel Sender Circuit Open (LH Side)	A continuous DTC set in the instrument cluster if the message from the SJB indicates an open or short to voltage on the input from circuits 1356 (LG/VT) or 1357 (LB/YE) for 33 seconds.
• B1204 — Fuel Sender Circuit Short To Ground (LH Side)	A continuous DTC set in the instrument cluster if the message from the SJB indicates a short to ground on the input from circuit 1356 (LG/VT) or if circuit 1356 (LG/VT) is shorted to circuit 1357 (LB/YE) for 33 seconds.
• B2627 — Fuel Sender Circuit Open #2 (RH Side)	A continuous DTC set in the instrument cluster if the message from the SJB indicates an open or short to voltage on the input from circuits 29 (YE/WH) or 1357 (LB/YE).
• B2628 — Fuel Sender Circuit Short To Ground #2 (RH Side)	A continuous DTC set in the instrument cluster if the message from the SJB indicates a short to ground on the input from circuit 29 (YE/WH) or if circuit 29 (YE/WH) is shorted to circuit 1357 (LB/YE).
NOTE: Normal operation of the fuel delivery system allows the fuel level sensor side of the fuel tank (the side opposite the fuel filler hose inlet) to have less fuel than the fuel pump module side of the tank (the side with the fuel filler hose inlet). B2879 — Fuel Tank Jet Pump Fault	A continuous DTC set in the instrument cluster if the fuel level message from the SJB indicates a large discrepancy in the amount of fuel between the fuel pump module and the fuel level sensor sides of the tank. The fuel level in the fuel level sensor side of the tank (the side opposite the fuel filler hose inlet) has significantly more fuel than the fuel pump module side of the tank (the side with the fuel filler hose inlet).

Smart Junction Box (SJB) DTCs

DTC Description	Fault Trigger Conditions
• B1201 — Fuel Sender Circuit Failure (LH Side)	Sets in the SJB on-demand if the SJB detects a short to ground on the input from circuit 1356 (LG/VT) or if circuit 1356 (LG/VT) is shorted to circuit 1357 (LB/YE).
• B1202 — Fuel Sender Circuit Open (LH Side)	Sets in the SJB on-demand if the SJB detects an open or short to voltage on the input from circuits 1356 (LG/VT) or 1357 (LB/YE).
• B2627 — Fuel Sender Circuit Open #2 (RH Side)	Sets in the SJB on-demand if the SJB detects an open or short to voltage on the input from circuits 29 (YE/WH) or 1357 (LB/YE).
• B2628 — Fuel Sender Circuit Short To Ground #2 (RH Side)	Sets in the SJB on-demand if the SJB detects a short to ground on the input from circuit 29 (YE/WH) or if circuit 29 (YE/WH) is shorted to circuit 1357 (LB/YE).

PCM DTCs

DTC Description	Fault Trigger Conditions
• P0460 — Fuel Level Sensor A Circuit (LH Side)	Sets when the PCM determines the value of the fuel pump module signal is stuck, that the fuel level input signal does not change or does not correspond with the calculated fuel usage.
• P0461 — Fuel Level Sensor A Circuit Range/Performance (LH Side)	Sets when the PCM determines the fuel pump module signal repeatedly moves in and out of range, exceeding the minimum or maximum allowable calibrated parameters for a specified fuel fill percentage in the fuel tank.
• P0462 — Fuel Level Sensor A Circuit Low (LH Side)	Sets in the PCM when the PCM detects a short to ground on the fuel pump module signal circuit based on the messaged input received from the instrument cluster.

• P0463 — Fuel Level Sensor A Circuit High (LH Side)	Sets in the PCM when the PCM detects an open or short to voltage on the fuel pump module signal circuit based on the messaged input received from the instrument cluster.
• P2065 — Fuel Level Sensor B Circuit (RH Side)	Sets when the PCM determines the value of the fuel level sensor input signal is stuck, that the fuel level input signal does not change or does not correspond with the calculated fuel usage.
• P2066 — Fuel Level Sensor B Circuit Range/Performance (RH Side)	Sets when the PCM determines the fuel level sensor input signal repeatedly moves in and out of range, exceeding the minimum or maximum allowable calibrated parameters for a specified fuel fill percentage in the fuel tank.
• P2067 — Fuel Level Sensor B Circuit Low (RH Side)	Sets in the PCM when the PCM detects a short to ground on the fuel level sensor signal circuit based on the messaged input received from the instrument cluster.
• P2068 — Fuel Level Sensor B Circuit High (RH Side)	Sets in the PCM when the PCM detects an open or a short to voltage on the fuel level sensor signal circuit based on the messaged input received from the instrument cluster.

This pinpoint test is intended to diagnose the following:

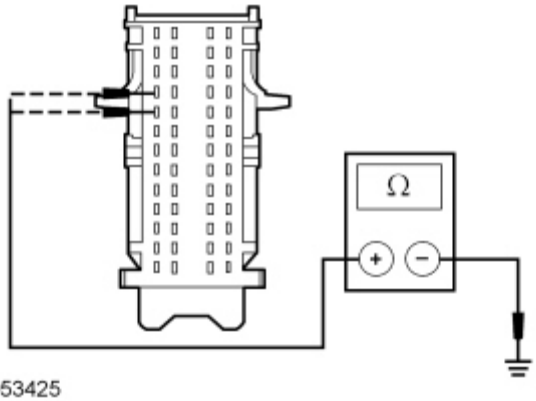
- Wiring, terminals or connectors
- Fuel pump module (LH side)
- Fuel level sensor (RH side)
- Fuel level sender (float and card)
- SJB
- Fuel tank
- IC

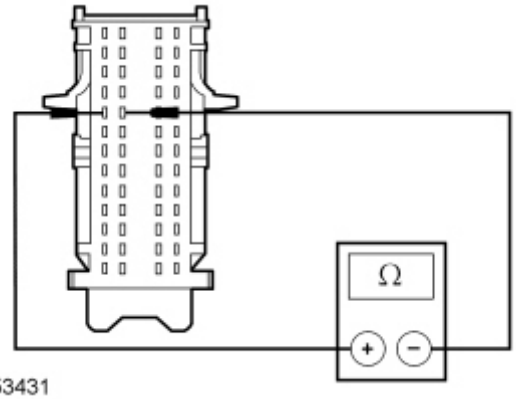
PINPOINT TEST B: INCORRECT FUEL GAUGE INDICATION

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

NOTE: Once the repairs are complete, clear the IC DTCs.

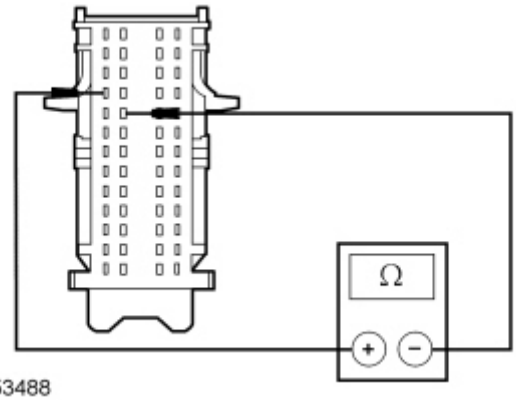
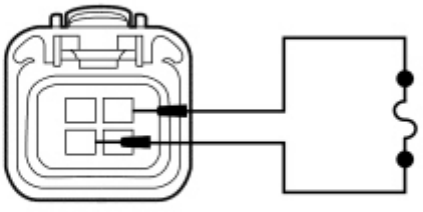
Test Step	Result / Action to Take
B1 CARRY OUT THE COMMUNICATION NETWORK TEST	**Yes** GO to B2. **No** REFER to Section 418-00.
• Ignition ON. • Enter the following diagnostic mode on the scan tool: Network Test. • Carry out the network test. • **Does the SJB pass the network test?**	
B2 CARRY OUT THE IC FUEL GAUGE ACTIVE COMMAND USING THE SCAN TOOL	**Yes** GO to B3. **No** GO to B23.
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC Active Command. • Select the IC fuel level control active command and scroll the fuel level at: 0%, 50%, and 100%. • **Does the fuel gauge needle start at empty (E), move to half at 50%, and full (F) at 100%?**	
B3 RETRIEVE THE RECORDED DTCs FROM THE CONTINUOUS MEMORY IC SELF-TEST	**Yes** For DTC B1204 or DTC B2628, GO to B4.
NOTE: The IC DTCs are all set in continuous memory only. For all diagnostics, use only the IC DTCs. • Check for recorded continuous memory IC DTCs from the self-test.	

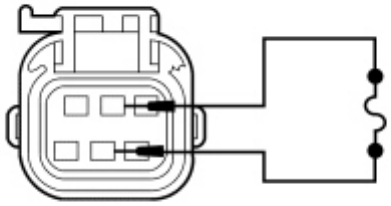
• **Are any IC DTCs recorded?**	For DTC B1202, GO to B8. For DTC B2627, GO to B13. For DTC B2879, GO to B18. **No** GO to B18.
B4 CHECK THE FUEL SENDER FOR A SHORT TO GROUND **NOTE:** The fuel pump module may also be called the fuel tank unit. **NOTE:** The fuel level sensor may also be called the fuel sender. • Disconnect: Fuel Pump Module C433 (4.0L and 4.6L) or C4331 (5.4L) (DTC B1204) (LH Side) or Fuel Sender C434 (DTC B2628) (RH Side). • Ignition ON. • Wait one minute. • Enter the following diagnostic mode on the scan tool: IC Self-Test. • **NOTE:** Make sure to use only the IC DTCs for this step. Once the repairs are complete, clear the IC DTCs. • **NOTE:** It is normal for DTC B1204 or B2628 to be present during this step and should be ignored. • Clear the IC DTCs. Repeat the IC self-test. • **Is DTC B1202 or B2627 retrieved?**	**Yes** To continue DTC B1204 diagnostics, GO to B21. To continue DTC B2628 diagnostics, INSTALL a new fuel level sensor. REFER to Section 310-01. CLEAR the DTCs. REPEAT the self-test. **No** GO to B5.
B5 CHECK CIRCUITS 29 (YE/WH) OR 1356 (LG/VT) FOR A SHORT TO GROUND • Ignition OFF. • Disconnect: SJB C2280c. • For DTC B2628, measure the resistance between the SJB C2280c-43, circuit 29 (YE/WH) (DTC B2628), harness side and ground  N0053425 • For DTC B1204, measure the resistance between the SJB C2280c-44, circuit 1356 (LG/VT) (DTC B1204), harness side and ground. • **Is the resistance greater than 10,000 ohms?**	**Yes** For DTC B1204, GO to B6. For DTC B2628, GO to B7. **No** REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.
B6 CHECK CIRCUITS 1356 (LG/VT) AND 1357 (LB/YE) FOR A SHORT TOGETHER • Measure the resistance between the SJB C2280c-31, circuit 1357 (LB/YE), harness side and the SJB C2280c-44, circuit 1356 (LG/VT), harness side.	**Yes** GO to B22. **No** REPAIR the circuits. CLEAR the DTCs. REPEAT the self-test.



N0053431

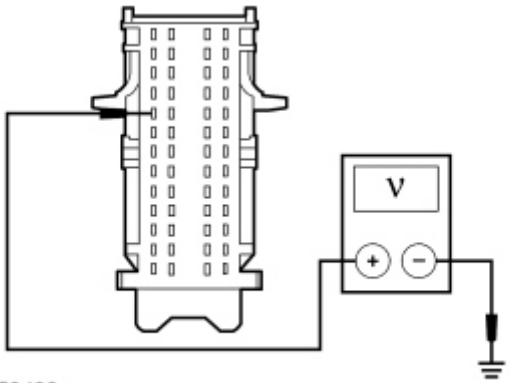
- **Is the resistance greater than 10,000 ohms?**

B7 CHECK CIRCUITS 29 (YE/WH) AND 1357 (LB/YE) FOR A SHORT TOGETHER	
• Measure the resistance between the SJB C2280c-43, circuit 29 (YE/WH), harness side and the SJB C2280c-31, circuit 1357 (LB/YE), harness side.  N0053488 • **Is the resistance greater than 10,000 ohms?**	**Yes** GO to B22 . **No** REPAIR the circuits. CLEAR the DTCs. REPEAT the self-test.
B8 CHECK THE FUEL PUMP MODULE FOR AN OPEN	
• Ignition OFF. • Disconnect: Fuel Pump Module C433 (4.0L and 4.6L) or C4331 (5.4L) (LH Side). • On 4.0L and 4.6L engines, connect a fused jumper wire between the fuel pump module C433-2, circuit 1357 (LB/YE), harness side and the fuel pump module C433-4, circuit 1356 (LG/VT), harness side.  N0082055 • On 5.4L engines, connect a fused jumper wire between the fuel pump module C4331-2, circuit 1357 (LB/YE), harness side and the fuel pump module C4331-5, circuit 1356 (LG/VT), harness side.	**Yes** REMOVE the jumper wire. GO to B21 . **No** LEAVE the jumper wire connected. GO to B9 .

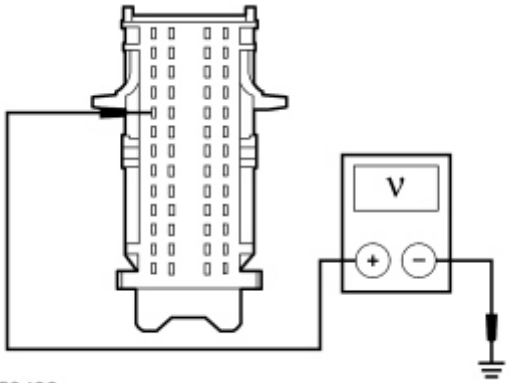


N0082050

- Ignition ON.
- Wait one minute.
- Enter the following diagnostic mode on the scan tool: IC Self-Test.
- **NOTE:** Make sure to use only the IC DTCs for this step. Once the repairs are complete, clear the IC DTCs.
- **NOTE:** It is normal for DTC B1202 to be present during this step and should be ignored.
- Clear the IC DTCs. Repeat the IC self-test.
- **Is DTC B1204 set?**

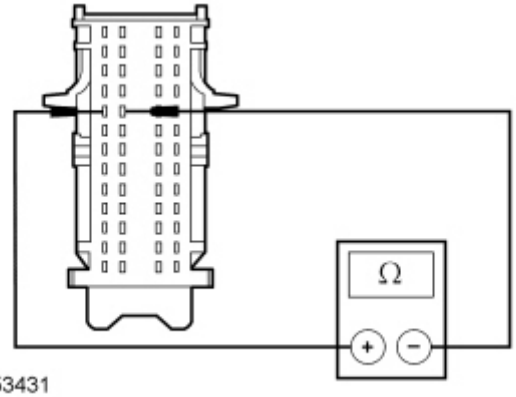
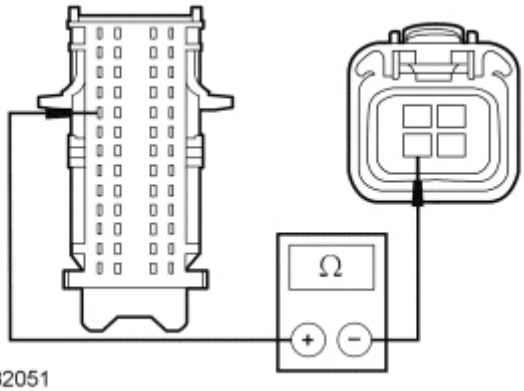
B9 CHECK THE FUEL PUMP MODULE CIRCUITRY FOR A SHORT TO VOLTAGE	
• Ignition OFF. • Disconnect: SJB C2280c. • Ignition ON. • Measure the voltage between the SJB C2280c-44, circuit 1356 (LG/VT), harness side and ground.  N0053428 • **Is any voltage present?**	**Yes** REMOVE the jumper wire. GO to B10 . **No** LEAVE the jumper wire connected. GO to B11 .

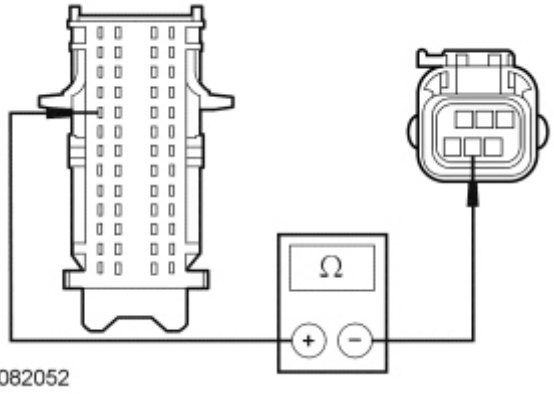
B10 CHECK CIRCUIT 1356 (LG/VT) FOR A SHORT TO VOLTAGE	
• Measure the voltage between the SJB C2280c-44, circuit 1356 (LG/VT), harness side and ground.	**Yes** REPAIR circuit 1356 (LG/VT) for a short to voltage. CLEAR the DTCs. REPEAT the self-test. **No** REPAIR circuit 1357 (LB/YE) for a short to voltage. CLEAR the DTCs. REPEAT the self-test.



N0053428

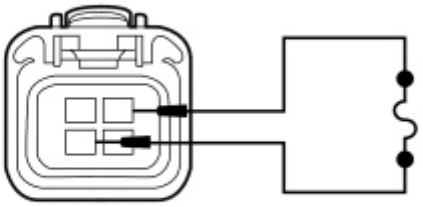
- **Is any voltage present?**

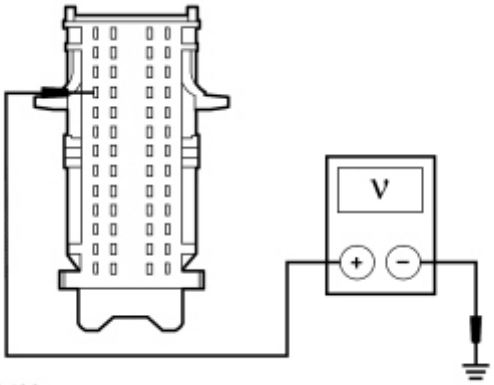
B11 CHECK THE FUEL PUMP MODULE CIRCUITRY FOR AN OPEN • Ignition OFF. • Measure the resistance between the SJB C2280c-31, circuit 1357 (LB/YE), harness side; and between the SJB C2280c-44, circuit 1356 (LG/VT), harness side.  N0053431 • **Is the resistance less than 5 ohms?**	**Yes** REMOVE the jumper wire. GO to B22 . **No** REMOVE the jumper wire. GO to B12 .
B12 CHECK CIRCUIT 1356 (LG/VT) FOR AN OPEN • On 4.0L and 4.6L engines, measure the resistance between the SJB C2280c-44, circuit 1356 (LG/WH), harness side and the fuel pump module C433-4, circuit 1356 (LG/WH), harness side.  N0082051 • On 5.4L engines, measure the resistance between the SJB C2280c-44, circuit 1356 (LG/WH), harness side and the fuel pump module C4331-5, circuit 1356 (LG/WH), harness side.	**Yes** REPAIR circuit 1357 (LB/YE) for an open. CLEAR the DTCs. REPEAT the self-test. **No** REPAIR circuit 1356 (LG/WH) for an open. CLEAR the DTCs. REPEAT the self-test.



N0082052

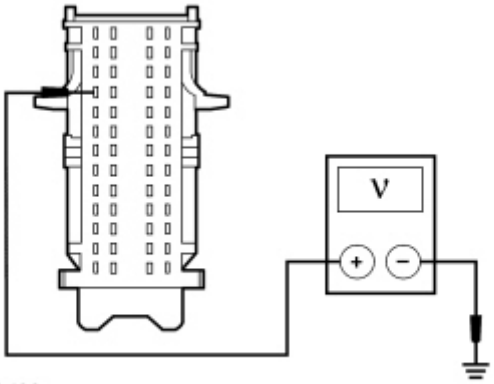
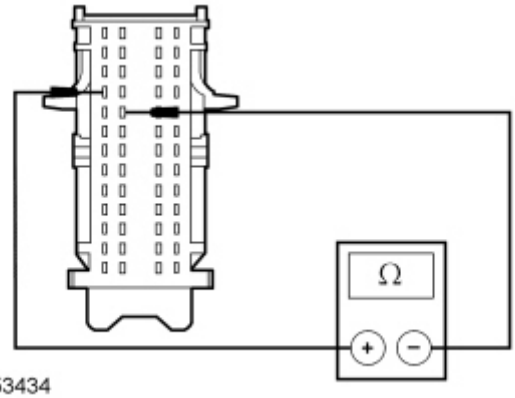
- **Is the resistance less than 5 ohms?**

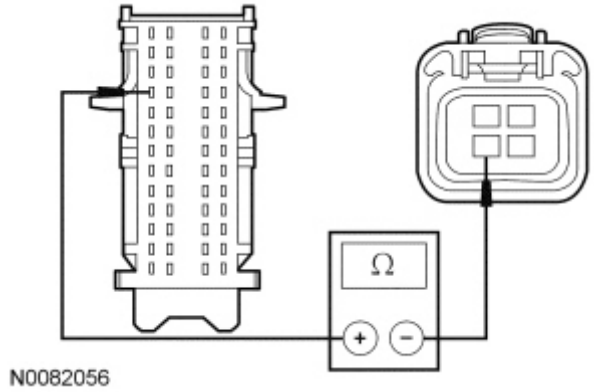
B13 CHECK THE FUEL LEVEL SENSOR FOR AN OPEN - Ignition OFF. - Disconnect: Fuel Level Sensor C434 (RH Side). - Connect a fused jumper wire between the fuel level sensor C434-4, circuit 29 (LB/YE), harness side and the fuel level sensor C434-2, circuit 1356 (LG/VT), harness side.  N0082055 - Ignition ON. - Wait one minute. - Enter the following diagnostic mode on the scan tool: IC Self-Test. - **NOTE:** Make sure to use only the IC DTCs for this step. Once the repairs are complete, clear the IC DTCs. - **NOTE:** It is normal for DTC B2627 to be present during this step and should be ignored. - Clear the IC DTCs. Repeat the IC self-test. - **Is DTC B2628 set?**	**Yes** INSTALL a new fuel level sensor. REFER to Section 310-01 . CLEAR the DTCs. REPEAT the self-test. **No** LEAVE the jumper wire connected. GO to B14 .
B14 CHECK CIRCUIT 29 (YE/WH) FOR A SHORT TO VOLTAGE - Ignition OFF. - Disconnect: SJB C2280c. - Ignition ON. - Measure the voltage between the SJB C2280c-43, circuit 29 (YE/WH), harness side and ground.	**Yes** REMOVE the jumper wire. GO to B15 . **No** LEAVE the jumper wire connected. GO to B16 .

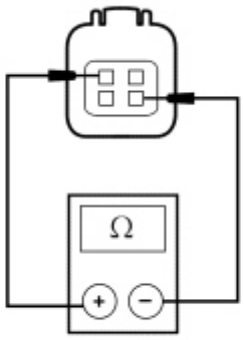


N0053433

- **Is any voltage present?**

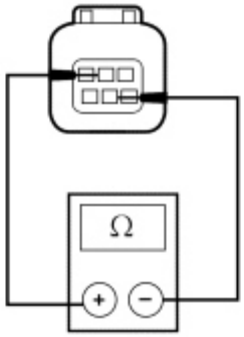
B15 CHECK CIRCUIT 29 (YE/WH) FOR A SHORT TO VOLTAGE WITH THE CIRCUIT ISOLATED	
• Measure the voltage between the SJB C2280c-43, circuit 29 (YE/WH), harness side and ground.  N0053433 • **Is any voltage present?**	**Yes** REPAIR circuit 29 (YE/WH) for a short to voltage. CLEAR the DTCs. REPEAT the self-test. **No** REPAIR circuit 1357 (LB/YE) for a short to voltage. CLEAR the DTCs. REPEAT the self-test.
B16 CHECK THE FUEL LEVEL SENSOR CIRCUITRY FOR AN OPEN	
• Ignition OFF. • Measure the resistance between the SJB C2280c-31, circuit 1357 (LB/YE), harness side; and between the SJB C2280c-43, circuit 29 (YE/WH), harness side.  N0053434 • **Is the resistance less than 5 ohms?**	**Yes** REMOVE the jumper wire. GO to B22 . **No** REMOVE the jumper wire. GO to B17 .
B17 CHECK CIRCUIT 29 (YE/WH) FOR AN OPEN	
• Measure the resistance between the SJB C2280c-43, circuit 29 (YE/WH), harness side and the fuel level sensor C434-4, circuit 29 (YE/WH), harness side.	**Yes** REPAIR circuit 1357 (LB/YE) for an open. CLEAR the DTCs. REPEAT the self-test.

 • **Is the resistance less than 5 ohms?**	**No** REPAIR circuit 29 (YE/WH) for an open. CLEAR the DTCs. REPEAT the self-test.
B18 INSPECT THE FUEL TANK	
• Check the fuel tank for any damage or deformation. • **Is the fuel tank OK?**	**Yes** GO to B19 . **No** VERIFY that the fuel pump module or fuel level sensor are not damaged. INSTALL a new fuel tank. REFER to Section 310-01 . CLEAR the DTCs. REPEAT the self-test.
B19 INSPECT THE FUEL PUMP MODULE, FUEL LEVEL SENSOR AND FUEL TRANSFER TUBES	
• Remove the fuel pump module and fuel level sensor. Refer to Section 310-01 . • Inspect the fuel transfer tube, connections, fuel pump module and fuel level sensor for any damage or deformation. • **Are the fuel transfer tube, connections, fuel pump module and the fuel level sensor OK?**	**Yes** GO to B20 . **No** REPAIR or INSTALL a new fuel tank (for fuel transfer tube concerns), fuel pump module or fuel level sensor as necessary. REFER to Section 310-01 . CLEAR the DTCs. REPEAT the self-test.
B20 CHECK THE FUEL PUMP MODULE AND FUEL LEVEL SENSOR RESISTANCE READINGS	
NOTE: The fuel pump module and fuel level sensor resistance varies from 15 ± 2 ohms when empty (E) to 160 ± 4 ohms when full (F). • On 4.0L and 4.6L engines, measure the resistance between the fuel pump module C433 pin 2, component side and the fuel pump module C433 pin 4, component side.	**Yes** INSTALL a new fuel tank. REFER to Section 310-01 . CLEAR the DTCs. REPEAT the self-test. **No** For the fuel pump module, GO to B21 . For the fuel level sensor, INSTALL a new fuel level sensor. REFER to Section 310-01 . CLEAR the DTCs. REPEAT the self-test.



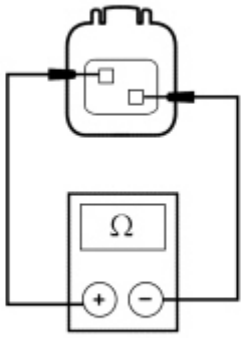
N0084251

- On 5.4L engines, measure the resistance between the fuel pump module C4331 pin 2, component side and the fuel pump module C4331 pin 5, component side.



N0084252

- For all engines, measure the resistance between the fuel level sensor C434 pin 4, component side and the fuel level sensor C434 pin 2, component side while slowly moving the float arm from the bottom to the top of travel.



N0084253

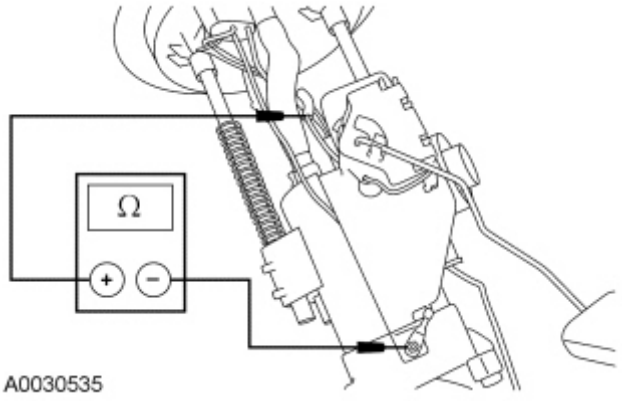
- **Does the resistance of both senders start at approximately 15 ohms with the float at the bottom of the travel and slowly increase to approximately 160 ohms with the float at the top of the travel?**

B21 CHECK THE FUEL LEVEL SENDER

- **NOTE:** The fuel level sender resistance will measure between 15 ohms ± 2 ohms at the lower stop position and 160 ohms ± 4 ohms at the upper stop position.
- Remove the fuel pump module. Refer to Section 310-01 .
- **NOTE:** Disconnect the fuel level sender input wire from the fuel level sender for this measurement.
- Measure the resistance between the fuel level sender input wire and the fuel level sender ground while slowly moving the float arm between the lower stop and the upper stop position.

Yes
INSTALL a new fuel pump module. REFER to Section 310-01 . TEST the system for normal operation.

No
INSTALL a new fuel level sender. REFER to Section

 • **Does the resistance slowly increase from approximately 15 ohms to 160 ohms?**	310-01 . TEST the system for normal operation.

B22 CHECK FOR CORRECT SJB OPERATION
• Disconnect all the SJB connectors.
• Check for:
  • corrosion
  • damaged pins
  • pushed-out pins
• Connect all the SJB connectors and make sure they seat correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new SJB .
	REFER to Section 419-10 .
	TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.
	CLEAR the DTCs. REPEAT the self-test.

B23 CHECK FOR CORRECT IC OPERATION
• Disconnect the IC connector.
• Check for:
  • corrosion
  • damaged pins
  • pushed-out pins
• Connect the IC connector and make sure it seats correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new IC .
	REFER to Instrument Cluster (IC) in this section.
	TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.
	CLEAR the DTCs. REPEAT the self-test.

Pinpoint Test C: The Boost Gauge Is Inoperative (Shelby GT 500 Only)

Normal Operation

The boost gauge measures the amount of engine boost provided by the supercharger in pounds per square inch (PSI). The Instrument Cluster (IC) receives the boost gauge data from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus lines. If the boost gauge status message is invalid or missing for more than 5 seconds, the boost gauge indication is zero. If the message is invalid or missing for less than 5 seconds, the boost gauge displays the last valid data received. The missing or invalid data may make the gauge appear sluggish or unresponsive to engine boost changes.

This pinpoint test is intended to diagnose the following:

- PCM
- IC

PINPOINT TEST C: THE BOOST GAUGE IS INOPERATIVE (SHELBY GT 500 ONLY)

Test Step	Result / Action to Take
C1 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND PCM SELF-TESTS	
• Check for recorded PCM DTCs from the continuous and on-demand self-tests. • **Are any DTCs retrieved?**	**Yes** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. **No** GO to C2 .
C2 CARRY OUT THE IC GAUGES ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select IC boost gauge (BOOST) active command the boost gauge on while monitoring the boost gauge. • **Does the boost gauge sweep correctly?**	**Yes** INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test D: Incorrect Temperature Gauge Indication

Normal Operation

The PCM receives the Engine Coolant Temperature (ECT) status through hardwired circuitry to the ECT sensor. The Instrument Cluster (IC) receives the ECT data from the PCM over the communication network. The IC monitors the ECT data received from the PCM and commands the ECT gauge pointer.

This pinpoint test is intended to diagnose the following:

- PCM
- IC

PINPOINT TEST D: INCORRECT TEMPERATURE GAUGE INDICATION

Test Step	Result / Action to Take
D1 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND PCM SELF-TESTS	
• Check for recorded PCM DTCs from the continuous and on-demand self-tests. • **Are any DTCs recorded?**	**Yes** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. **No** GO to D2 .
D2 CARRY OUT THE IC COOLANT TEMPERATURE GAUGE ACTIVE COMMAND USING THE SCAN TOOL	

• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC temperature gauge (ENGCOOLNT) active command on and off while monitoring the temperature gauge. • **Does the temperature gauge start at C (cold) when at 0%, and move to H (hot) at 100%?**	**Yes** INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test E: Incorrect Voltage Gauge Indication

Normal Operation

The voltage gauge displays the system battery voltage as measured at the Instrument Cluster (IC) RUN input circuit.

This pinpoint test is intended to diagnose the following:

- Charging system concern
- IC

PINPOINT TEST E: INCORRECT VOLTAGE GAUGE INDICATION

Test Step	Result / Action to Take
E1 CHECK THE CHARGING SYSTEM FOR CORRECT OPERATION	
• Check the charging system. Refer to Section 414-00 . • **Does the charging system operate correctly?**	**Yes** GO to E2 . **No** REPAIR the charging system. REFER to Section 414-00 .
E2 CARRY OUT THE IC VOLTMETER ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC voltmeter (VOLT_GAUGE) active command on and off while monitoring the voltmeter. • **Does the voltmeter start at L (low) when at 0%, and move to H (high) at 100%?**	**Yes** GO to Pinpoint Test A . **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test F: The Tachometer Is Inoperative

Normal Operation

The Instrument Cluster (IC) receives the tachometer data from the PCM over the communication network and commands the tachometer pointer between 0 and 7,000 rpm (4.0L and 5.4L engines), or between 0 and 8,000 rpm (4.6L engine) according to the data.

This pinpoint test is intended to diagnose the following:

- PCM
- IC

PINPOINT TEST F: THE TACHOMETER IS INOPERATIVE

Test Step	Result / Action to Take
F1 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND PCM SELF-TESTS	
• Check for recorded PCM DTCs from the continuous and on-demand self-tests. • **Are any DTCs recorded?**	**Yes** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. **No** GO to F2.
F2 CARRY OUT THE IC TACHOMETER ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC tachometer (TACH_IND) active command and scroll in increments of 10% while monitoring the tachometer. The tachometer should increase in increments of approximately 700 rpm (4.0L engine), or 800 rpm (4.6L engine) for each 10% change. • **Does the tachometer gauge increase within specifications?**	**Yes** INSTALL a new PCM. REFER to Section 303-14. TEST the system for normal operation. **No** INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test G: Incorrect Oil Pressure Gauge Indication

Refer to Wiring Diagrams Cell 60, Instrument Cluster for schematic and connector information.

Normal Operation

The Smart Junction Box (SJB) is hardwired to the engine oil pressure switch. The engine oil pressure switch unit consists of a diaphragm and contact points, which are normally open. When there is low (under 41 kPa [6 psi]) or no oil pressure, the engine oil pressure switch remains open, removing the ground to the SJB. When sufficient oil pressure exists, the engine oil pressure switch closes providing a ground signal to the SJB. The SJB monitors the oil pressure ground signal and sends a message to the Instrument Cluster (IC) to operate the oil pressure gauge according to the engine oil pressure.

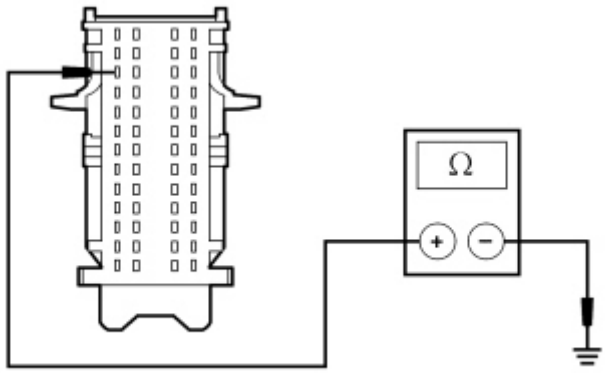
The engine oil pressure switch is hardwired to the SJB through circuit 208 (GY). When the oil pressure is within normal ranges, the engine oil pressure switch closes, grounding the signal to the SJB. The SJB then sends a message to the IC through the communication network to command the oil pressure gauge into the normal range. When engine oil pressure is low, the engine oil pressure switch opens, removing the ground to the SJB. The SJB sends a low oil pressure message to the IC through the communication network to command the oil pressure gauge to the low oil pressure range.

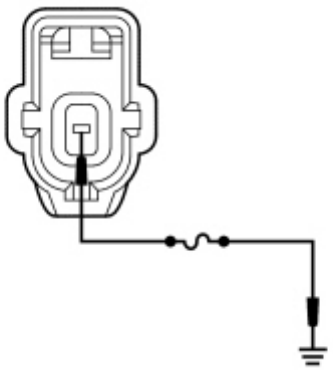
This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Engine oil pressure switch
- SJB
- IC

PINPOINT TEST G: INCORRECT OIL PRESSURE GAUGE INDICATION

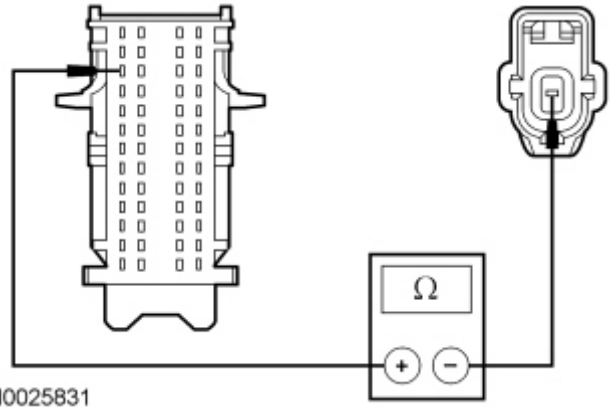
NOTICE: **Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.**

Test Step	Result / Action to Take
G1 CARRY OUT THE IC TACHOMETER ACTIVE COMMAND USING THE SCAN TOOL • Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC oil pressure gauge (OIL_POS) active command on and off while monitoring the oil pressure gauge. • **Does the oil pressure gauge start at the low range and increase to the normal range when commanded on?**	**Yes** If the oil pressure gauge always indicates normal, GO to G2. If the oil pressure gauge always indicates low, GO to G4. **No** INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
G2 CHECK THE ENGINE OIL PRESSURE SWITCH • Ignition OFF. • Disconnect: Engine Oil Pressure Switch C103. • Ignition ON. • With the engine oil pressure switch disconnected, monitor the oil pressure gauge. • **Does the oil pressure gauge indicate low?**	**Yes** INSTALL a new engine oil pressure switch. TEST the system for normal operation. **No** GO to G3.
G3 CHECK CIRCUIT 208 (GY) FOR A SHORT TO GROUND • Ignition OFF. • Disconnect: SJB C2280c. • Measure the resistance between the SJB C2280c-42, circuit 208 (GY), harness side and ground.  N0012025 • **Is the resistance greater than 10,000 ohms?**	**Yes** GO to G7. **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
G4 CHECK THE ENGINE OIL PRESSURE SWITCH • Ignition OFF. • Disconnect: Engine Oil Pressure Switch C103. • Connect a fused jumper wire between the engine oil pressure switch C103-1, circuit 208 (GY), harness side and ground.	**Yes** REMOVE the jumper wire. GO to G6. **No** REMOVE the jumper wire. GO to G5.



N0002760

- Ignition ON.
- **Does the oil pressure gauge indicate normal?**

G5 CHECK CIRCUIT 208 (GY) FOR AN OPEN	
• Ignition OFF. • Disconnect: SJB C2280c. • Measure the resistance between the SJB C2280c-42, circuit 208 (GY), harness side and the engine oil pressure switch C103-1, circuit 208 (GY), harness side.  N0025831 • **Is the resistance less than 5 ohms?**	**Yes** GO to G7 . **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
G6 CHECK THE OIL PRESSURE	
• Carry out the engine oil pressure test. Refer to Section 303-00 . • **Is the oil pressure within specification?**	**Yes** INSTALL a new engine oil pressure switch. TEST the system for normal operation. **No** REFER to Section 303-00 .
G7 CHECK FOR CORRECT SJB OPERATION	

• Disconnect all the SJB connectors.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect all the SJB connectors and make sure they seat correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new SJB .
	REFER to Section 419-10 .
	TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.

Pinpoint Test H: The Speedometer/Odometer Is Inoperative

Normal Operation

Vehicle speed information is sent to the Instrument Cluster (IC) by the PCM over the High Speed Controller Area Network (HS-CAN) communication bus. The PCM calculates vehicle speed from the transmission Output Shaft Speed (OSS) sensor input and from the tire size and axle ratio configuration in the Vehicle Identification (VID) block of the PCM. If the IC receives no vehicle speed signal after 1 second, the speedometer defaults to 0.

The IC receives an odometer message from the PCM and stores the mileage in memory. When the IC fails to receive the odometer message for more than 2 seconds, the odometer displays dashes.

This pinpoint test is intended to diagnose the following:

- PCM
- IC

PINPOINT TEST H: THE SPEEDOMETER/ODOMETER IS INOPERATIVE

Test Step	Result / Action to Take
H1 RETRIEVE THE RECORDED DTCs FROM THE PCM KOEO SELF-TEST	
• Check for recorded PCM DTCs from the Key ON Engine OFF (KOEO) self-test. • **Are any PCM DTCs recorded?**	**Yes** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. **No** GO to H2.
H2 RETRIEVE THE RECORDED IC DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND SELF-TESTS	
• Check the recorded IC DTCs from the continuous and on-demand self-test. • **Are any IC DTCs recorded?**	**Yes** REFER to Instrument Cluster (IC) Diagnostic Trouble Code (DTC) Index in this section. **No** For an inoperative speedometer, GO to H5. For an inoperative odometer, GO to H3.
H3 MONITOR THE MESSAGE CENTER CIRCUIT DISPLAYS	
• Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the all segments (SEGMENTS) active command and command the segments on while monitoring the message center display. • **Do the message center display segments illuminate correctly?**	**Yes** GO to H4. **No** GO to H7.
H4 CHECK FOR CORRUPTED NVM	
• Ignition ON. • Observe the message center display area. • **Does the odometer display ERROR?**	**Yes** GO to H7. **No** GO to H6.
H5 CARRY OUT THE IC SPEEDOMETER ACTIVE COMMAND USING THE SCAN TOOL	

• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC Active Command. • Select the IC speedometer active command. Command the speedometer and scroll in increments of 10% while monitoring the speedometer. The speedometer should increase in increments of approximately 19 km/h (12 mph) (4.0L engine), 23 km/h (14 mph) (4.6L engine) or 26 km/h (16 mph) (5.4L engine) for each 10% change. • **Does the speedometer begin at 0 and increase within specifications?**	**Yes** GO to H6 . **No** GO to H7 .
H6 CHECK FOR CORRECT PCM OPERATION	

• Disconnect all the PCM connectors.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect all the PCM connectors and make sure they seat correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

H7 CHECK FOR CORRECT IC OPERATION	

• Disconnect the IC connector.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect the IC connector and make sure it seats correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

Pinpoint Test I: Incorrect Speedometer Indication

Normal Operation

Vehicle speed information is sent to the Instrument Cluster (IC) by the PCM over the High Speed Controller Area Network (HS-CAN) communication bus. The PCM calculates vehicle speed from the transmission Output Shaft Speed (OSS) sensor input and from the tire size and axle ratio configuration in the Vehicle Identification (VID) block of the PCM. If the IC receives no vehicle speed signal after 1 second, the speedometer defaults to 0.

This pinpoint test is intended to diagnose the following:

- Tire size configuration
- Axle ratio configuration
- PCM concern
- IC

PINPOINT TEST I: INCORRECT SPEEDOMETER INDICATION

NOTE: It is important to confirm that the speedometer is inaccurate by either comparing vehicle speed against mile markers on highways (where available) or by comparison using a second vehicle before beginning diagnostics.

Test Step	Result / Action to Take

I1 CHECK THE TIRE SIZE CONFIGURATION	
• Enter the following diagnostic mode on the scan tool: Module Programming. • **NOTE:** The correct tire size can be found on the vehicle certification label on the LH B-pillar. Refer to Section 100-01 . • Select programmable parameters and verify that the vehicle has the correct tire size according to the certification label and the tire size is correctly configured in the PCM. • **Is the tire size correct and is the tire size parameter correctly configured?**	**Yes** GO to I2 . **No** CONFIGURE the tire size. TEST the system for normal operation.
I2 CHECK THE AXLE RATIO CONFIGURATION	
• Enter the following diagnostic mode on the scan tool: Module Programming. • Select programmable parameters and verify that the axle ratio is correctly configured in the PCM. • **Is the axle ratio parameter correctly configured?**	**Yes** GO to I3 . **No** CONFIGURE the axle ratio. TEST the system for normal operation.
I3 RETRIEVE THE RECORDED DTCs FROM THE PCM KOEO SELF-TEST	
• Check for recorded PCM DTCs from the Key ON Engine OFF (KOEO) self-test. • **Are any DTCs recorded?**	**Yes** DIAGNOSE all PCM DTCs first. REFER to Powertrain Control/Emissions Diagnosis (PC/ED) manual. **No** GO to I4 .
I4 RETRIEVE THE RECORDED DTCs FROM THE IC SELF-TEST	
• Check for recorded DTCs from the IC self-test. • **Are any DTCs recorded?**	**Yes** REFER to DTC Instrument Cluster (IC) Diagnostic Trouble Code (DTC) Index in this section. **No** GO to I5 .
I5 OBSERVE THE SPEEDOMETER OPERATION	
• Ignition ON. • Observe the speedometer while driving the vehicle at various speeds and stopping frequently. • **Does the speedometer begin at 0 km/h (0 mph), indicate the different vehicle speeds and fully return to the 0 km/h (0 mph) position when the vehicle is stopped?**	**Yes** GO to I6 . **No** GO to I8 .
I6 CARRY OUT THE IC SPEEDOMETER ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC speedometer (SPDOMETER) active command. Command the speedometer and scroll in increments of 10% while monitoring the speedometer. The speedometer should increase in increments of approximately 19 km/h (12 mph) (4.0L engine), 23 km/h (14 mph) (4.6L engine) or 26 km/h (16 mph) (5.4L engine) for each 10% change. • **Does the speedometer begin at 0 and increase within specifications?**	**Yes** GO to I7 . **No** GO to I8 .
I7 CHECK THE PCM VEHICLE SPEED SENSOR (VSS) PID	
• Enter the following diagnostic mode on the scan tool: PCM DataLogger.	**Yes** The speedometer is operating

• Select the PCM vehicle speed (VSS) PID and monitor the PID while driving the vehicle at 32 km/h (20 mph), 64 km/h (40 mph) and 97 km/h (60 mph). • **Does the speedometer indicate between 31-34 km/h (19-21 mph), 63-69 km/h (39-43 mph) and 93-103 km/h (58-64 mph) at the 3 PCM PID values?**	correctly at this time. **No** GO to I8 .
I8 CHECK FOR CORRECT IC OPERATION	

• Disconnect the IC connector.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect the IC connector and make sure it seats correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

Pinpoint Test J: The Low Oil Pressure Warning Indicator Is Never/Always On

Refer to Wiring Diagrams Cell 60 , Instrument Cluster for schematic and connector information.

Normal Operation

The Smart Junction Box (SJB) is hardwired to the engine oil pressure switch. The engine oil pressure switch unit consists of a diaphragm and contact points, which are normally open. When there is low (under 41 kPa [6 psi]) or no oil pressure, the engine oil pressure switch remains open, removing the ground to the SJB . When sufficient oil pressure exists, the engine oil pressure switch closes providing a ground signal to the SJB . The SJB monitors the oil pressure ground signal and sends a message to the Instrument Cluster (IC) to operate the oil pressure gauge according to the engine oil pressure.

The engine oil pressure switch is hardwired to the SJB through circuit 208 (GY). When the oil pressure is within normal ranges, the engine oil pressure switch closes, grounding the signal to the SJB . The SJB then sends a message to the IC through the communication network to command the low oil pressure warning indicator off. When engine oil pressure is low, the engine oil pressure switch opens, removing the ground to the SJB . The SJB sends a low oil pressure message to the IC through the communication network to command the low oil pressure warning indicator on.

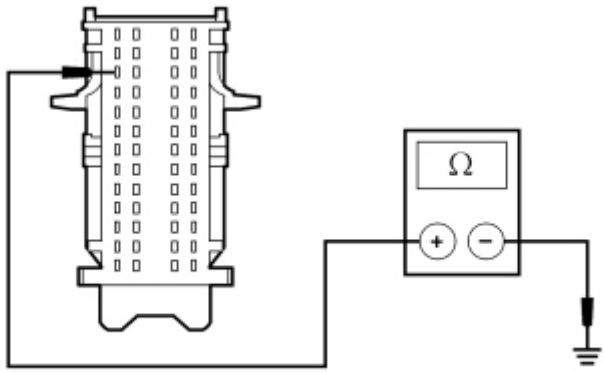
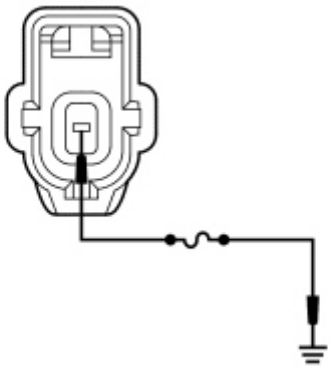
This pinpoint test is intended to diagnose the following:

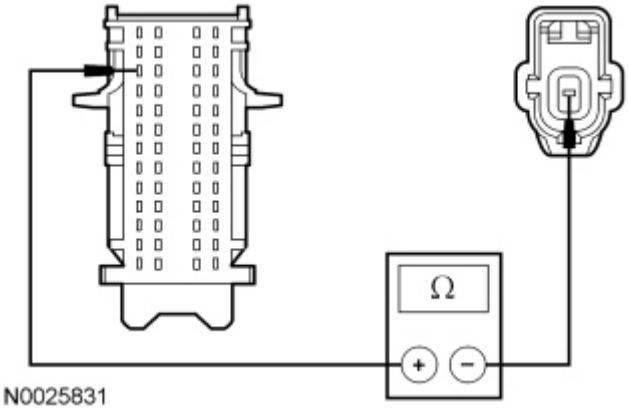
- Wiring, terminals or connectors
- Engine oil pressure switch
- SJB
- IC

PINPOINT TEST J: THE LOW OIL PRESSURE WARNING INDICATOR IS NEVER/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
J1 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC	**Yes** If the low oil pressure

DataLogger. • Select the IC all lamps (ALL_LAMP) active command on then off while monitoring the low oil pressure warning indicator. • **Does the low oil pressure warning indicator illuminate when commanded on, and turn off when commanded off?**	warning indicator is never on, GO to J2 . If the low oil pressure warning indicator is always on, GO to J4 . **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
J2 CHECK THE ENGINE OIL PRESSURE SWITCH • Ignition OFF. • Disconnect: Engine Oil Pressure Switch C103. • Ignition ON. • With the engine oil pressure switch disconnected, monitor the low oil pressure warning indicator. • **Is the low oil pressure warning indicator illuminated?**	**Yes** INSTALL a new engine oil pressure switch. TEST the system for normal operation. **No** GO to J3 .
J3 CHECK CIRCUIT 208 (GY) FOR A SHORT TO GROUND • Ignition OFF. • Disconnect: SJB C2280c. • Measure the resistance between the SJB C2280c-42, circuit 208 (GY), harness side and ground.  N0012025 • **Is the resistance greater than 10,000 ohms?**	**Yes** GO to J7 . **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
J4 CHECK THE ENGINE OIL PRESSURE SWITCH • Ignition OFF. • Disconnect: Engine Oil Pressure Switch C103. • Connect a fused jumper wire between the engine oil pressure switch C103-1, circuit 208 (GY), harness side and ground.  N0002760 • Ignition ON. • **Does the low oil pressure warning indicator illuminate?**	**Yes** REMOVE the jumper wire. GO to J6 . **No** REMOVE the jumper wire. GO to J5 .

J5 CHECK CIRCUIT 208 (GY) FOR AN OPEN	
• Ignition OFF. • Disconnect: SJB C2280c. • Measure the resistance between the SJB C2280c-42, circuit 208 (GY), harness side and the engine oil pressure switch C103-1, circuit 208 (GY), harness side.  N0025831 • **Is the resistance less than 5 ohms?**	**Yes** GO to J7. **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
J6 CHECK THE OIL PRESSURE	
• Carry out the engine oil pressure test. Refer to Section 303-00. • **Is the oil pressure within specification?**	**Yes** INSTALL a new engine oil pressure switch. TEST the system for normal operation. **No** REFER to Section 303-00.
J7 CHECK FOR CORRECT SJB OPERATION	

• Disconnect all the SJB connectors.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect all the SJB connectors and make sure they seat correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new SJB.
	REFER to Section 419-10.
	TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.

Pinpoint Test K: The Engine Over-Temperature Warning Indicator Is Never/Always On

Normal Operation

The engine over-temperature warning indicator informs the driver that the engine coolant is overheating due to loss of engine coolant fluid or other cause, and that the PCM is in failsafe cooling mode. There are 2 levels of failsafe cooling mode. The first mode is when the PCM provides engine operation but takes on the limp home strategy. The second mode is when the PCM determines that the engine is sufficiently over-temperature and is about to be shut down by the PCM. In both modes, the PCM provides the engine over-temperature information to the Instrument Cluster (IC) to illuminate the engine over-temperature warning indicator.

This pinpoint test is intended to diagnose the following:

- PCM
- IC

PINPOINT TEST K: THE ENGINE OVER-TEMPERATURE WARNING INDICATOR IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
K1 RETRIEVE THE RECORDED DTCs FROM THE CONTINUOUS AND ON-DEMAND PCM SELF-TESTS	
• Check for recorded PCM DTCs from the continuous and on-demand self-tests. • **Are any DTCs recorded?**	**Yes** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. **No** GO to K2.
K2 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC failsafe warning indicator (OVTEMP_LMP) active command on and off while monitoring the engine over-temperature warning indicator. • **Does the engine over-temperature warning indicator illuminate when commanded on, and turn off when commanded off?**	**Yes** GO to K3. **No** INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
K3 CHECK FOR CORRECT PCM OPERATION	

• Disconnect all the PCM connectors.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect all the PCM connectors and make sure they seat correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new PCM. REFER to Section 303-14. TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

Pinpoint Test L: The Brake Warning Indicator Is Never On

Refer to Wiring Diagrams Cell 60, Instrument Cluster for schematic and connector information.

Refer to Wiring Diagrams Cell 13, Power Distribution/SJB for schematic and connector information.

Normal Operation

The brake warning indicator alerts the driver if any of the following brake system conditions are present: the parking brake is set, the brake fluid level is low, the ABS module detects a base brake system failure, there is a loss of communication between the Instrument Cluster (IC) and the Smart Junction Box (SJB), or there is a loss of communication between the IC and the ABS module.

When the parking brake is applied, circuit 1309 (RD/YE) to the SJB is grounded by the parking brake switch through circuit 1205 (BK). The SJB receives the ground signal and sends the IC a message over the communication network to illuminate the brake warning indicator. When the brake fluid level is low, the brake fluid level switch closes, providing a signal to the SJB on circuit 547 (LG/YE) which is then routed back to the SJB on the signal return circuit 512 (TN/LG). When a base brake system concern is detected, the ABS module sends a signal to the IC over the communication network to illuminate the brake system warning indicator.

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors

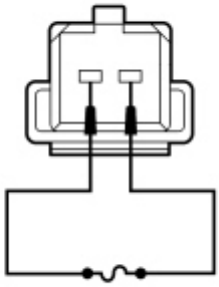
- Parking brake switch
- Brake fluid level switch
- SJB
- IC

PINPOINT TEST L: THE BRAKE WARNING INDICATOR IS NEVER ON

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

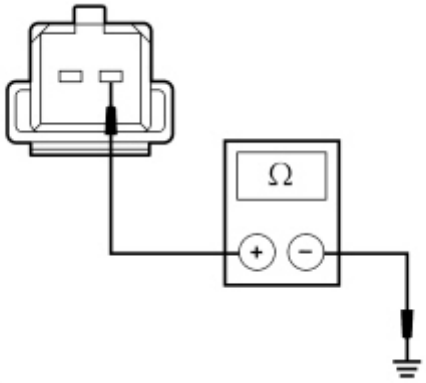
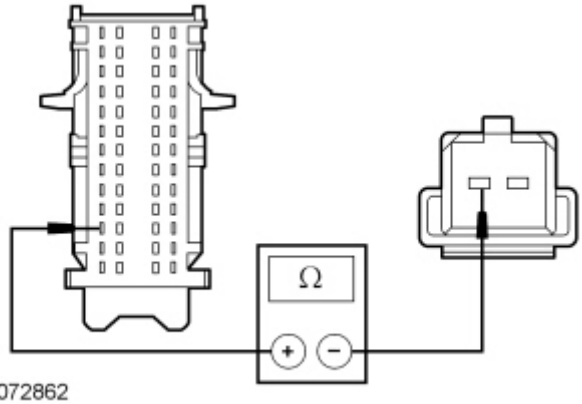
NOTE: Failure to disconnect the battery when instructed will result in false resistance readings. Refer to Section 414-01 .

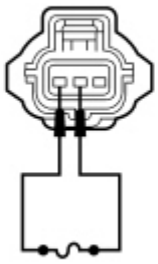
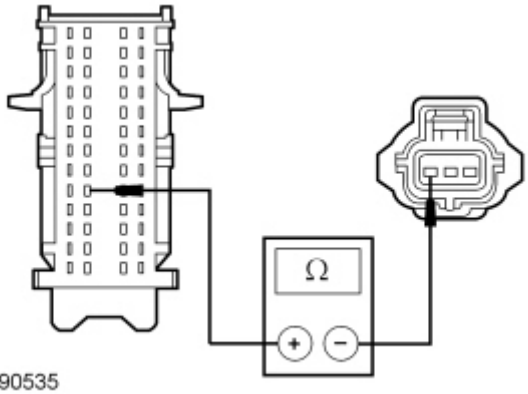
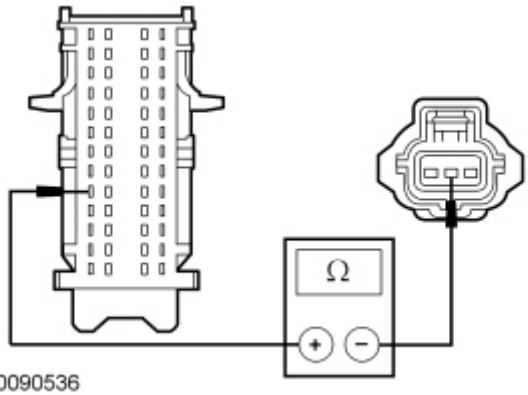
Test Step	Result / Action to Take
L1 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL • Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC brake warning indicator (BRK_LAMP) active command on while monitoring the brake warning indicator. • **Does the brake warning indicator illuminate?**	**Yes** GO to L2 . **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
L2 CHECK THE BRAKE WARNING INDICATOR WITH THE PARKING BRAKE APPLIED • Apply the parking brake while monitoring the brake warning indicator. • **Does the brake warning indicator illuminate?**	**Yes** GO to L7 . **No** GO to L3 .
L3 CHECK THE PARKING BRAKE SWITCH PID • Apply the parking brake. • Enter the following diagnostic mode on the scan tool: SJB DataLogger. • Monitor the SJB parking brake switch PID (PRK_BRK) while applying the parking brake. • **Does the PID agree with the parking brake position?**	**Yes** GO to L10 . **No** GO to L4 .
L4 CHECK THE PARKING BRAKE SWITCH • Ignition OFF. • Disconnect: Parking Brake Switch C306. • Connect a fused jumper wire between the parking brake switch C306-1, circuit 1309 (RD/YE), harness side and the parking brake switch C306-2, circuit 1205 (BK), harness side.	**Yes** REMOVE the jumper wire. INSTALL a new parking brake switch. TEST the system for normal operation. **No** REMOVE the jumper wire. GO to L5 .



N0002774

- Ignition ON.
- **Does the brake warning indicator illuminate?**

L5 CHECK CIRCUIT 1205 (BK) FOR AN OPEN • Ignition OFF. • Disconnect: Negative Battery Cable. • Measure the resistance between the parking brake switch C306-2, circuit 1205 (BK), harness side and ground.  N0009406 • **Is the resistance less than 5 ohms?**	**Yes** GO to L6 . **No** REPAIR the circuit. TEST the system for normal operation.
L6 CHECK CIRCUIT 1309 (RD/YE) FOR AN OPEN • Disconnect: SJB C2280c. • Measure the resistance between the SJB C2280c-50, circuit 1309 (RD/YE), harness side and the parking brake switch C306-1, circuit 1309 (RD/YE), harness side.  N0072862 • **Is the resistance less than 5 ohms?**	**Yes** GO to L10 . **No** REPAIR the circuit. TEST the system for normal operation.
L7 CHECK THE SJB OPERATION USING THE SCAN TOOL • Ignition OFF. • Disconnect: Brake Fluid Level Switch C124. • Connect a fused jumper wire between the brake fluid level switch C124-2, circuit 547 (LG/YE), harness side and the brake fluid level	**Yes** REMOVE the jumper wire. INSTALL a new brake fluid level switch. TEST the

switch C124-1, circuit 512 (TN/LG), harness side.  N0090534 • Ignition ON. • Enter the following diagnostic mode on the scan tool: SJB DataLogger. • Monitor the SJB brake fluid level PID (BRK_FLUID). • **Does the PID indicate low brake fluid level?**	system for normal operation. **No** REMOVE the jumper wire. GO to L8.
L8 CHECK CIRCUIT 512 (TN/LG) FOR AN OPEN • Ignition OFF. • Disconnect: SJB C2280c. • Measure the resistance between the SJB C2280c-35, circuit 512 (TN/LG), harness side and the brake fluid level switch C124-1, circuit 512 (TN/LG), harness side.  N0090535 • **Is the resistance less than 5 ohms?**	**Yes** GO to L9. **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
L9 CHECK CIRCUIT 547 (LG/YE) FOR AN OPEN • Measure the resistance between the SJB C2280c-48, circuit 547 (LG/YE), harness side and the brake fluid level switch C124-2, circuit 547 (LG/YE), harness side.  N0090536 • **Is the resistance less than 5 ohms?**	**Yes** GO to L10. **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

L10 CHECK FOR CORRECT SJB OPERATION	

• Disconnect all the SJB connectors.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect all the SJB connectors and make sure they seat correctly.
• Operate the system and verify that the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new SJB.
	REFER to Section 419-10.
	TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.
	CLEAR the DTCs. REPEAT the self-test.

Pinpoint Test M: The Brake Warning Indicator Is Always On

Refer to Wiring Diagrams Cell 60, Instrument Cluster for schematic and connector information.

Refer to Wiring Diagrams Cell 13, Power Distribution/SJB for schematic and connector information.

Normal Operation

The brake warning indicator alerts the driver if any of the following brake system conditions are present: the parking brake is set, the brake fluid level is low, the ABS module detects a base brake system failure, there is a loss of communication between the Instrument Cluster (IC) and the Smart Junction Box (SJB), or there is a loss of communication between the IC and the ABS module.

When the parking brake is applied, circuit 1309 (RD/YE) to the SJB is grounded by the parking brake switch through circuit 1205 (BK). The SJB receives the ground signal and sends the IC a message over the communication network to illuminate the brake warning indicator. When the brake fluid level is low, the brake fluid level switch closes, providing a signal to the SJB on circuit 547 (LG/YE) which is then routed back to the SJB on the signal return circuit 512 (TN/LG). When a base brake system concern is detected, the ABS module sends a signal to the IC over the communication network to illuminate the brake system warning indicator.

- DTC B2479 (Brake Park Switch Circuit Short to Ground) — sets on-demand if the SJB detects that the parking brake is applied during the self-test or if there is a short to ground on the parking brake input circuit 1309 (RD/YE).
- DTC C1189 (Brake Fluid Level Sensor Input Short Circuit to Ground) — sets on-demand and continuously if the SJB detects that the brake fluid is low or there is a short to ground on the brake fluid level input circuit 547 (LG/YE).

This pinpoint test is intended to diagnose the following:

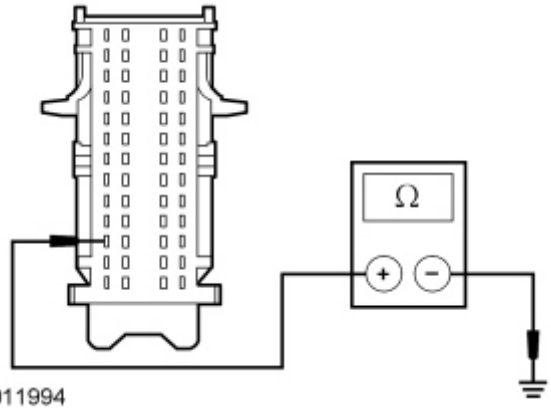
- Wiring, terminals or connectors
- Parking brake switch
- Brake fluid level switch
- SJB
- IC

PINPOINT TEST M: THE BRAKE WARNING INDICATOR IS ALWAYS ON

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

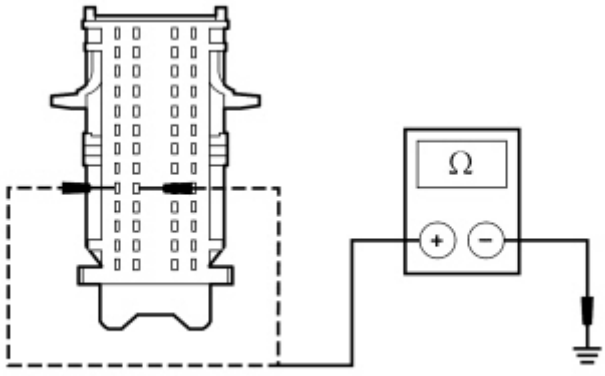
NOTE: Verify that the brake fluid level is full and the parking brake is fully released before proceeding with diagnostics.

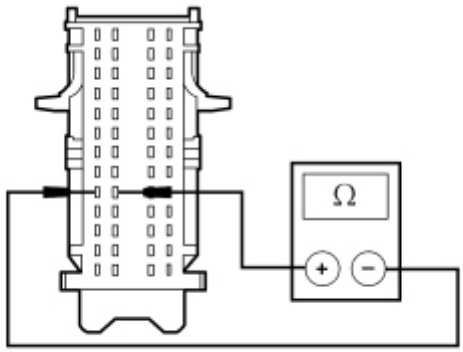
Test Step	Result / Action to Take
M1 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND SJB SELF-TESTS • Check for recorded SJB DTCs from the continuous and on-demand self-tests. • **Are any SJB DTCs recorded?**	**Yes** For DTC B2479, GO to M4. For DTC C1189, GO to M6. All other SJB DTCs, REFER to DTC Charts in this section. **No** GO to M2.
M2 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND ABS MODULE SELF-TESTS • Check for recorded ABS module DTCs from the continuous and on-demand self-tests. • **Are any ABS module DTCs recorded?**	**Yes** REFER to Section 206-09. **No** GO to M3.
M3 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL • Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC brake warning indicator (BRK_LAMP) active command on while monitoring the brake warning indicator. • **Does the brake warning indicator illuminate?**	**Yes** GO to M9. **No** INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
M4 CHECK THE PARKING BRAKE SWITCH • Ignition OFF. • Disconnect: Parking Brake Switch C306. • Ignition ON. • Observe the brake warning indicator. • **Does the brake warning indicator continue to illuminate?**	**Yes** GO to M5. **No** INSTALL a new parking brake switch. CLEAR the DTCs. REPEAT the self-test.
M5 CHECK CIRCUIT 1309 (RD/YE) FOR A SHORT TO GROUND • Ignition OFF. • Disconnect: SJB C2280c. • Measure the resistance between the SJB C2280c-50, circuit 1309 (RD/YE), harness side and ground.	**Yes** GO to M9. **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.



N0011994

- **Is the resistance greater than 10,000 ohms?**

M6 CHECK THE SJB OPERATION USING THE SCAN TOOL	
• Ignition OFF. • Disconnect: Brake Fluid Level Switch C124. • Ignition ON. • Enter the following diagnostic mode on the scan tool: SJB DataLogger. • Monitor the SJB brake fluid level (BRK_FLUID) PID. • **Does the PID indicate the brake fluid level is OK?**	**Yes** INSTALL a new brake fluid level switch. TEST the system for normal operation. **No** GO to M7.
M7 CHECK CIRCUITS 512 (TN/LG) AND 547 (LG/YE) FOR A SHORT TO GROUND	
• Ignition OFF. • Disconnect: SJB C2280c. • Measure the resistance between the SJB C2280c-35, circuit 512 (TN/LG), harness side and ground; and between the SJB C2280c-48, circuit 547 (LG/YE), harness side and ground.  N0012024 • **Are the resistances greater than 10,000 ohms?**	**Yes** GO to M8. **No** REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.
M8 CHECK CIRCUITS 512 (TN/LG) AND 547 (LG/YE) FOR A SHORT TOGETHER	
• Measure the resistance between the SJB C2280c-35, circuit 512 (TN/LG), harness side and the SJB C2280c-48, circuit 547 (LG/YE), harness side.	**Yes** GO to M9. **No** REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.

 N0072863 • **Is the resistance less than 5 ohms?**	
M9 CHECK FOR CORRECT SJB OPERATION	

• Disconnect all the SJB connectors.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect all the SJB connectors and make sure they seat correctly.
• Operate the system and verify that the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new SJB.
	REFER to Section 419-10.
	TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.

Pinpoint Test N: The ABS Warning Indicator Is Never/Always On

Normal Operation

The status of the ABS system is sent to the Instrument Cluster (IC) from the ABS module over the communication network. The IC monitors the ABS input and illuminates the ABS warning indicator when a concern is present.

This pinpoint test is intended to diagnose the following:

- ABS module
- IC

PINPOINT TEST N: THE ABS WARNING INDICATOR IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
N1 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND ABS MODULE SELF-TESTS	
• Check for recorded ABS module DTCs from the continuous and on-demand self-tests. • **Are any ABS module DTCs recorded?**	**Yes** REFER to Section 206-09. **No** GO to N2.
N2 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL	

• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC ABS warning indicator (ABS_LAMP) active command on and off while monitoring the ABS warning indicator. • **Does the ABS warning indicator illuminate when commanded on, and turn off when commanded off?**	**Yes** INSTALL a new ABS module. REFER to Section 206-09 . TEST the system for normal operation. **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test O: The Air Bag Warning Indicator Is Never/Always On

Refer to Wiring Diagrams Cell 60 , Instrument Cluster for schematic and connector information.

Normal Operation

The air bag warning indicator is used to provide a status of the Supplemental Restraint System (SRS). The Instrument Cluster (IC) receives a ground from the Restraints Control Module (RCM) through circuit 608 (BK/YE) to turn off the air bag warning indicator. If an air bag system concern is detected or a fault is detected in circuit 608 (BK/YE), a DTC is logged in the RCM and the RCM removes the ground to the IC to turn on the air bag warning indicator.

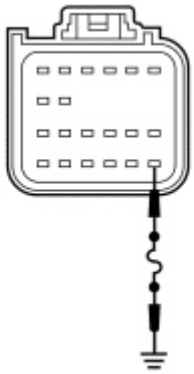
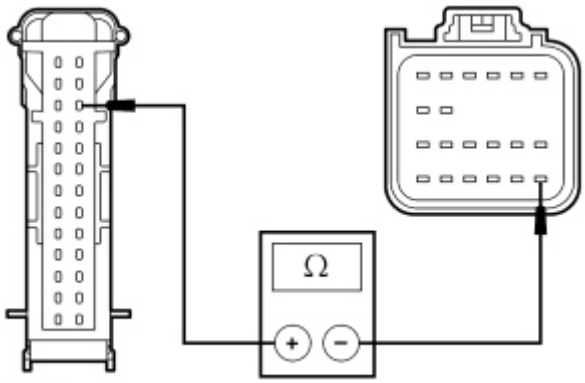
This pinpoint test is intended to diagnose the following:

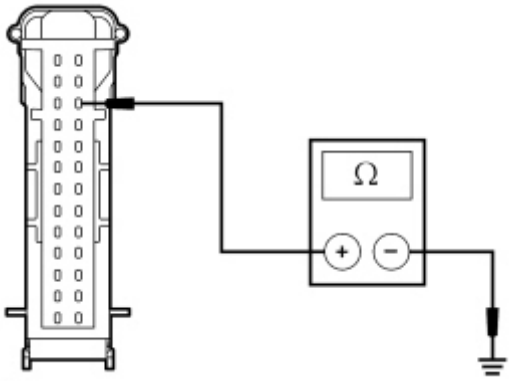
- Wiring, terminals or connectors
- RCM
- IC

PINPOINT TEST O: THE AIR BAG WARNING INDICATOR IS NEVER/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
O1 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND RCM SELF-TESTS	
• Check for recorded RCM DTCs from the continuous and on-demand self-tests. • **Are any RCM DTCs recorded?**	**Yes** REFER to Section 501-20B . **No** GO to O2 .
O2 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC all lamps (ALL_LAMP) active command on then off while monitoring the air bag warning indicator. • **Does the air bag warning indicator illuminate when commanded on, and turn off when commanded off?**	**Yes** If the air bag indicator is never on, GO to O5 . If the air bag indicator is always on, GO to O3 . **No** GO to O6 .
O3 CHECK THE RCM FOR CORRECT OPERATION	
• Deactivate the SRS . Refer to Section 501-20B . • Ignition OFF. • Disconnect: RCM C2041a. • Connect a fused jumper wire between the RCM C2041a-19, circuit	**Yes** REMOVE the jumper wire. GO to O7 .

608 (BK/YE), harness side and ground.  A0040663 • Ignition ON. • **Does the air bag indicator lamp illuminate after the IC proves out?**	**No** REMOVE the jumper wire. GO to O4.
O4 CHECK CIRCUIT 608 (BK/YE) FOR AN OPEN	
• Ignition OFF. • Disconnect: IC C220. • Measure the resistance between the IC C220-24, circuit 608 (BK/YE), harness side and the RCM C2041a-19, circuit 608 (BK/YE), harness side.  N0012027 • **Is the resistance less than 5 ohms?**	**Yes** GO to O8. **No** REPAIR the circuit. ACTIVATE the SRS. REFER to Section 501-20B. TEST the system for normal operation.
O5 ISOLATE THE RCM	
• Ignition OFF. • Deactivate the SRS. Refer to Section 501-20B. • Disconnect: RCM C2041a. • Observe the air bag warning indicator. • Ignition ON. • **Does the air bag warning indicator illuminate?**	**Yes** GO to O7. **No** GO to O6.
O6 CHECK CIRCUIT 608 (BK/YE) FOR A SHORT TO GROUND	
• Ignition OFF. • Disconnect: IC C220. • Measure the resistance between the IC C220-24, circuit 608 (BK/YE), harness side and ground.	**Yes** GO to O8. **No** REPAIR the circuit. ACTIVATE the SRS. REFER to Section 501-20B. TEST the system for normal operation.

 N0012028 • **Is the resistance greater than 10,000 ohms?**	

O7 CHECK FOR CORRECT RCM OPERATION
• Disconnect all the RCM connectors.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect all the RCM connectors and make sure they seat correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new RCM and ACTIVATE the SRS. REFER to Section 501-20B. TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ACTIVATE the SRS. REFER to Section 501-20B.

O8 CHECK FOR CORRECT IC OPERATION
• Disconnect the IC connector.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect the IC connector and make sure it seats correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. ACTIVATE the SRS. REFER to Section 501-20B. TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ACTIVATE the SRS. REFER to Section 501-20B.

Pinpoint Test P: The Safety Belt Warning Indicator Is Never/Always On

Refer to Wiring Diagrams Cell 60, Instrument Cluster for schematic and connector information.

Normal Operation

The safety belt warning indicator informs the driver that his/her safety belt and/or the front passengers safety belt is unbuckled. The first 65 seconds after the ignition switch transitions from OFF or ACC to RUN or START, the safety belt warning indicator and the associated chime are used as a reminder to the driver that the driver safety belt is not buckled. In this first 65 seconds the indicator illuminates when the driver safety belt is unbuckled and turns off whenever the safety belt is buckled. The indicator illuminates again if the safety belt is unbuckled after buckling and the 65 seconds has not yet expired. After the first 65 seconds, the Belt-Minder® activates to warn the driver that the driver or front passenger safety belt is not fastened.

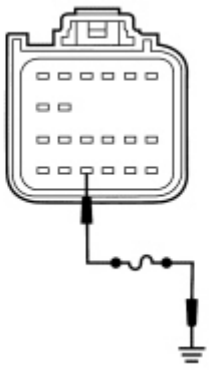
The safety belt switch is hardwired to the Restraints Control Module (RCM). The Instrument Cluster (IC) receives the safety belt switch status from the RCM through circuit 1083 (LB/PK). When the safety belt is unfastened, the RCM signals the IC to illuminate the safety belt warning indicator. A Belt-Minder® chime that is operating correctly indicates the RCM is monitoring and transmitting the correct operation of the safety belt status to the IC.

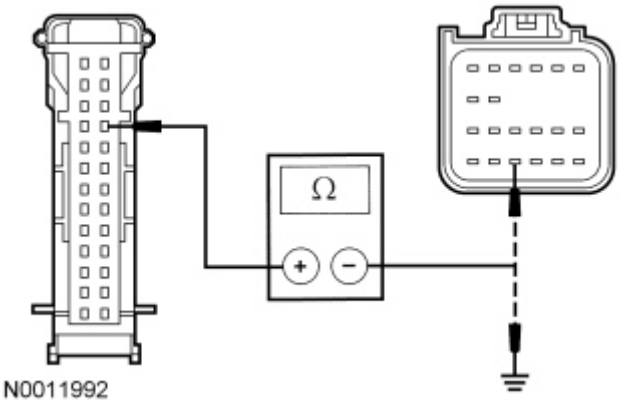
This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- RCM
- IC

PINPOINT TEST P: THE SAFETY BELT WARNING INDICATOR IS NEVER/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
P1 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND RCM SELF-TESTS	
• Check for recorded RCM DTCs from the continuous and on-demand self-tests. • **Are any DTCs retrieved?**	**Yes** REFER to Section 501-20B. **No** GO to P2.
P2 CHECK THE SAFETY BELT WARNING INDICATOR OPERATION	
• Deactivate the Supplemental Restraint System (SRS). Refer to Section 501-20B. • Ignition OFF. • Disconnect: RCM C2041a. • **NOTE:** If the fuse fails, repair circuit 1083 (LB/PK) for a short to ground. • Connect a fused jumper wire between the RCM C2041a-22, circuit 1083 (LB/PK), harness side and ground.  A0041080 • Observe the safety belt warning indicator with the jumper wire connected and disconnected. • Ignition ON. • **Does the safety belt warning indicator lamp illuminate with the jumper wire disconnected, and turn off when the jumper wire is connected?**	**Yes** REMOVE the jumper wire. GO to P4. **No** REMOVE the jumper wire. GO to P3.
P3 CHECK CIRCUIT 1083 (LB/PK) FOR AN OPEN OR A SHORT TO GROUND	
• Measure the resistance between the IC C220-23, circuit 1083 (LB/PK), harness side and the RCM C2041a-22, circuit 1083 (LB/PK), harness	**Yes** GO to P5.

side; and between the IC C220-23, circuit 1083 (LB/PK), harness side and ground.  N0011992 • **Is the resistance less than 5 ohms between the IC and the RCM, and greater than 10,000 ohms between the IC and ground?**	**No** REPAIR the circuit. ACTIVATE the SRS. REFER to Section 501-20B. TEST the system for normal operation.
P4 CHECK FOR CORRECT RCM OPERATION	

• Disconnect all the RCM connectors.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect all the RCM connectors and make sure they seat correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new RCM. REFER to Section 501-20B. ACTIVATE the SRS. REFER to Section 501-20B. TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ACTIVATE the SRS. REFER to Section 501-20B.

P5 CHECK FOR CORRECT IC OPERATION	

• Disconnect the IC connector.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect the IC connector and make sure it seats correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. ACTIVATE the SRS. REFER to Section 501-20B. TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ACTIVATE the SRS. REFER to Section 501-20B.

Pinpoint Test Q: The Door Ajar Warning Indicator Is Never/Always On

Normal Operation

The door ajar indicator informs the driver that one or more doors, or the decklid is open while the ignition switch

is in the RUN position. When a door or decklid is ajar, the Smart Junction Box (SJB) sends a message to the Instrument Cluster (IC) to illuminate the door ajar indicator.

This pinpoint test is intended to diagnose the following:

- SJB
- IC

PINPOINT TEST Q: THE DOOR AJAR WARNING INDICATOR IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
Q1 CHECK THE OPERATION OF THE INTERIOR LAMPS • Open and close each door and the decklid, and monitor the interior lamps. • **Do the interior lamps operate correctly?**	**Yes** GO to Q2. **No** REFER to Section 417-02.
Q2 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL • Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC door ajar warning indicator (DRAJLMP) active command on and off while monitoring the door ajar warning indicator. • **Does the door ajar warning indicator illuminate when commanded on, and turn off when commanded off?**	**Yes** INSTALL a new SJB. REFER to Section 419-10. TEST the system for normal operation. **No** INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test R: The Malfunction Indicator Lamp (MIL) Is Never/Always On

Normal Operation

The Malfunction Indicator Lamp (MIL) is controlled by the Instrument Cluster (IC) using data sent from the PCM over the communication network. When an emission system concern exists, the PCM sets a DTC and sends the IC a message to turn on the MIL.

This pinpoint test is intended to diagnose the following:

- PCM
- IC

PINPOINT TEST R: THE MIL IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
R1 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND PCM SELF-TESTS • Check for recorded PCM DTCs from the continuous and on-demand self-tests. • **Are any DTCs recorded?**	**Yes** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. **No**

	GO to R2 .
R2 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC all lamps (ALL_LAMP) active command on then off while monitoring the MIL indicator. • **Does the MIL indicator illuminate when commanded on, and turn off when commanded off?**	**Yes** INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test S: The Powertrain Malfunction (Wrench) Warning Indicator is Never/Always On

Normal Operation

The PCM monitors the Electronic Throttle Control (ETC) system and provides the Instrument Cluster (IC) with the ETC status over the communication network. When a system concern is detected, the PCM provides the IC with a signal commanding the IC to illuminate the powertrain malfunction (wrench) indicator or display a message if equipped with a message center.

This pinpoint test is intended to diagnose the following:

- PCM
- IC

PINPOINT TEST S: THE POWERTRAIN MALFUNCTION (WRENCH) WARNING INDICATOR IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
S1 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND PCM SELF-TESTS	
• Check for recorded PCM DTCs from the continuous and on-demand self-tests. • **Are any DTCs recorded?**	**Yes** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. **No** GO to S2 .
S2 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC powertrain malfunction (wrench) warning indicator (ETC_IND) active command on and off while monitoring the powertrain malfunction (wrench) warning indicator. • **Does the powertrain malfunction (wrench) warning indicator illuminate when commanded on, and turn off when commanded off?**	**Yes** INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test T: The Overdrive (O/D) Off Indicator Is Never/Always On

Normal Operation

The Overdrive (O/D) off function is controlled by the O/D off switch located on the shifter assembly. The Instrument Cluster (IC) receives the overdrive off message from the PCM through the communication network. When the transmission overdrive is selected off, the overdrive off switch provides a ground signal to the PCM. The PCM, upon receipt of the overdrive off ground signal, provides an overdrive off message to the IC and the IC illuminates the O/D off indicator.

This pinpoint test is intended to diagnose the following:

- PCM
- IC

PINPOINT TEST T: THE O/D OFF INDICATOR IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
T1 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND PCM SELF-TESTS	
• Check for recorded PCM DTCs from the continuous and on-demand self-tests. • **Are any PCM DTCs recorded?**	**Yes** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. **No** GO to T2.
T2 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC O/D OFF (OVERDRV) active command on and off while monitoring the O/D OFF indicator. • **Does the O/D /D OFF indicator illuminate when commanded on, and turn off when commanded off?**	**Yes** INSTALL a new PCM. REFER to Section 303-14. TEST the system for normal operation. **No** INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test U: The Charging System Warning Indicator Is Never/Always On

Normal Operation

The PCM constantly monitors the generator regulator output. When the PCM detects a continuous high or low output signal, or when the ignition switch is ON and the engine is OFF, the PCM sends a message over the communication network to the Instrument Cluster (IC) to illuminate the charging system warning indicator. When the ignition switch is in the ON position, with the engine running, and the PCM determines that the set point for the regulator has been met, the PCM sends a message to the IC to turn off the charging system warning indicator.

This pinpoint test is intended to diagnose the following:

- Charging system concern
- PCM
- IC

PINPOINT TEST U: THE CHARGING SYSTEM WARNING INDICATOR IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
U1 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC all lamps (ALL_LAMP) active command on while monitoring the charging system warning indicator. • **Is the charging system warning indicator illuminated?**	**Yes** GO to U2. **No** INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
U2 RETRIEVE THE RECORDED DTCs FROM THE PCM KOEO SELF-TEST	
• Check for recorded PCM DTCs from the Key ON Engine OFF (KOEO) self-test. • **Are any charging system DTCs recorded?**	**Yes** REFER to Section 414-00. **No** GO to U3.
U3 CHECK THE CHARGING SYSTEM OPERATION	
• Check the charging system operation. Refer to Section 414-00. • **Does the charging system operate correctly?**	**Yes** GO to U4. **No** REFER to Section 414-00.
U4 RETRIEVE THE RECORDED DTCs FROM THE IC SELF-TEST	
• Check for recorded IC DTCs from the self-test. • **Is DTC U0100 recorded?**	**Yes** GO to Pinpoint Test AN. **No** INSTALL a new PCM. REFER to Section 303-14. TEST the system for normal operation.

Pinpoint Test V: The Check Fuel Cap Indicator Is Never/Always On

Normal Operation

The PCM monitors the fuel tank evaporative emission system for significant leaks that occur following refueling of the vehicle. Once the PCM detects a fuel vapor leak, the PCM sends the Instrument Cluster (IC) a message over the communication network to turn on the check fuel cap indicator. DTC P0457 sets in the PCM following a successful cruise test, which is initiated when the vehicle is driven at a steady speed above 64 km/h (40 mph) for a duration of approximately 4-5 minutes. If the PCM is unable to successfully run the cruise test, the IC does not receive the check fuel cap message and the check fuel cap indicator remains off.

- DTC P0457 (Evaporative Emission System Leak Detected (fuel cap loose/off)) — sets in the PCM if a fuel tank pressure change greater than -23.7 kPa (-7 in-Hg) of vacuum within 30 seconds after refueling occurs, or there is an excessive purge (fuel vapor) flow of greater than 454g (1.0lb) per minute.

This pinpoint test is intended to diagnose the following:

- PCM
- IC

PINPOINT TEST V: THE CHECK FUEL CAP INDICATOR IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
V1 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC check fuel cap indicator (FUEL_CAP) active command. Command the check fuel cap indicator on and off. Observe the check fuel cap indicator. • **Does the check fuel cap indicator illuminate when commanded on, and turn off when commanded off?**	**Yes** GO to V2 . **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
V2 RETRIEVE THE RECORDED DTCs FROM BOTH CONTINUOUS AND ON-DEMAND PCM SELF-TESTS	
• Check for recorded PCM DTCs from the continuous and on-demand self-tests. • **Is DTC P0457 recorded?**	**Yes** If the check fuel cap indicator is illuminated, REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. If the check fuel cap indicator is not illuminated, INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. **No** If the check fuel cap indicator is always on, INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation. If the check fuel cap indicator is not illuminated, the system is operating normally at this time. If the fuel cap was left off and the check fuel cap warning indicator did not turn on, driving conditions may not have allowed for the PCM to run the cruise test and message the IC to turn on the check fuel cap warning indicator.

Pinpoint Test W: The High Beam Indicator Is Never/Always On

Normal Operation

When the high beams are turned on, the Smart Junction Box (SJB) sends a signal to the Instrument Cluster (IC) through the communication network to illuminate the high beam indicator.

This pinpoint test is intended to diagnose the following:

- SJB
- IC

PINPOINT TEST W: THE HIGH BEAM INDICATOR IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
W1 CHECK THE HIGH BEAM HEADLAMPS OPERATION	

• Ignition ON. • Place the headlamp switch in the HIGH BEAMS ON position. Observe the high beam headlamps. • **Do the high beam headlamps operate correctly?**	**Yes** GO to W2 . **No** REFER to Section 417-01 .
W2 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC high beam indicator (HIGH_BEAM) active command on and off while monitoring the high beam indicator. • **Does the high beam indicator illuminate when commanded on, and turn off when commanded off?**	**Yes** INSTALL a new SJB . REFER to Section 419-10 . TEST the system for normal operation. **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test X: The Turn Signal Indicator Is Never/Always On

Normal Operation

When the multifunction switch is in the left or the right turn position, a message is sent to the Instrument Cluster (IC) from the SJB over the communication network, and the left or the right turn signal indicator flashes on and off.

This pinpoint test is intended to diagnose the following:

- SJB
- IC

PINPOINT TEST X: THE TURN SIGNAL INDICATOR IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
X1 CHECK THE TURN SIGNAL LAMPS OPERATION	
• Ignition ON. • Operate the LH and RH turn signals. • **Do the turn signals operate correctly?**	**Yes** GO to X2 . **No** REFER to Section 417-01 .
X2 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC all warning lamps (ALL_LAMP) active command on and off while monitoring the LH and RH turn signal indicators. • **Do the LH and RH turn signal indicators illuminate when commanded on, and turn off when commanded off?**	**Yes** INSTALL a new SJB . REFER to Section 419-10 . TEST the system for normal operation. **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test Y: The Speed Control Indicator Is Never/Always On

Normal Operation

The Instrument Cluster (IC) receives the speed control data from the PCM through the communication network.

When the speed control is engaged, the PCM provides a signal to the IC to illuminate the speed control indicator.

This pinpoint test is intended to diagnose the following:

- PCM
- IC

PINPOINT TEST Y: THE SPEED CONTROL INDICATOR IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
Y1 CHECK THE SPEED CONTROL OPERATION	**Yes** GO to Y2. **No** REFER to Section 310-03.
• Test drive the vehicle and operate the speed control. • **Does the speed control operate correctly?**	
Y2 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL	**Yes** INSTALL a new PCM. REFER to Section 303-14. TEST the system for normal operation. **No** INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC speed control indicator (CRUISE) active command while monitoring the speed control indicator. • **Does the speed control indicator illuminate when commanded on, and turn off when commanded off?**	

Pinpoint Test Z: The Traction Control Indicator Is Never/Always On

Normal Operation

The traction control indicator informs the driver that a traction control event is taking place, by flashing the indicator. It is also used to indicate a traction control system concern by illuminating the indicator constantly (not flashing). The Instrument Cluster (IC) receives the traction control signal from the ABS module through the communication network. When a traction control event is taking place, the ABS module sends a message to the IC over the communication network to flash the traction control indicator. When a traction control system concern exists, the ABS module sends a message to the IC to turn on the traction control indicator.

This pinpoint test is intended to diagnose the following:

- ABS module
- IC

PINPOINT TEST Z: THE TRACTION CONTROL INDICATOR IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
Z1 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND ABS MODULE SELF-TESTS	**Yes** REFER to Section 206-09.
• Check for recorded ABS module DTCs from the continuous and on-demand self-tests.	

• **Are any DTCs recorded?**	**No** GO to Z2 .
Z2 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND IC SELF-TESTS	
• Check for recorded IC DTCs from the continuous and on-demand self-tests. • **Is DTC C1093 recorded?**	**Yes** REFER to Section 206-09 . **No** GO to Z3 .
Z3 CARRY OUT THE IC INDICATOR LAMP ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC traction control indicator (STAB_IND) active command on and off while monitoring the traction control indicator. • **Does the traction control indicator illuminate when commanded on, and turn off when commanded off?**	**Yes** INSTALL a new ABS module. REFER to Section 206-09 . TEST the system for normal operation. **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test AA: The Daytime Running Lamps (DRL) Indicator Is Never/Always On

Normal Operation

When the Daytime Running Lamps (DRL) is on, the Smart Junction Box (SJB) sends a message over the communication network to the Instrument Cluster (IC) to illuminate the DRL indicator.

This pinpoint test is intended to diagnose the following:

- SJB
- IC

PINPOINT TEST AA: THE DRL INDICATOR IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
AA1 CHECK THE DRL OPERATION	
• Check the operation of the DRL . • **Does the DRL operate correctly?**	**Yes** GO to AA2 . **No** REFER to Section 417-01 .
AA2 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC all warning lamps (ALL_LAMP) active command on and off while monitoring the DRL indicator. • **Does the DRL indicator illuminate when commanded on, and turn off when commanded off?**	**Yes** INSTALL a new SJB . REFER to Section 419-10 . TEST the system for normal operation. **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test AB: The Low Fuel Warning Indicator Is Never/Always On

Normal Operation

The low fuel indicator is on when the fuel level reaches a predetermined level of approximately 1/16 tank. The low fuel level warning indicator and the fuel gauge are controlled by the Instrument Cluster (IC) based upon the fuel level data provided by the Smart Junction Box (SJB). When the IC receives the data, the fuel gauge indicates low fuel and the IC illuminates the low fuel warning indicator.

This pinpoint test is intended to diagnose the following:

- IC

PINPOINT TEST AB: THE LOW FUEL WARNING INDICATOR IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
AB1 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC all lamps (ALL_LAMP) active command on then off while monitoring the low fuel warning indicator. • **Does the low fuel warning indicator illuminate when commanded on and turn off when commanded off?**	**Yes** GO to AB2. **No** INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
AB2 CHECK THE FUEL GAUGE FOR CORRECT OPERATION	
• Ignition ON. • Check the fuel gauge. • **Does the fuel gauge operate correctly?**	**Yes** INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation. **No** GO to Pinpoint Test B.

Pinpoint Test AC: The Performance Shift Warning Indicator Is Never/Always On (Shelby GT 500 Only)

Normal Operation

The performance shift warning indicator shares the SVT logo on the tachometer. The performance shift indicator is configurable on or off and uses engine rpm to determine when to illuminate. The SVT logo is normally backlit in red when the performance indicator is configured off. When the performance shift warning indicator is configured on, the SVT logo red backlighting is turned off. When a preset engine rpm is reached, the SVT logo illuminates orange to alert the driver of the selected shift point. The performance shift warning indicator can be configured on or off through the message center.

The performance shift indicator receives the engine rpm status from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus lines. When the engine rpm is equal to the preset (configured) shift rpm, the Instrument Cluster (IC) turns on the performance shift indicator.

This pinpoint test is intended to diagnose the following:

- PCM
- IC

PINPOINT TEST AC: THE PERFORMANCE SHIFT WARNING INDICATOR IS NEVER/ALWAYS ON (SHELBY GT 500 ONLY)

Test Step	Result / Action to Take
AC1 CHECK THE PERFORMANCE SHIFT CONFIGURATION	
• Verify that the performance shift indicator is configured on. Refer to Message Center Configuration or the Owner's Literature for additional information. • **Is the performance shift indicator configured on?**	**Yes** GO to AC2. **No** CONFIGURE the performance shift indicator on. REFER to Message Center Configuration or the Owner's Literature for additional information. TEST the system for normal operation.
AC2 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND PCM SELF-TESTS	
• Retrieve the recorded DTCs from the PCM continuous and on-demand self-tests. • **Are any DTCs retrieved?**	**Yes** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. **No** GO to AC3.
AC3 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC all lamps (ALL_LAMP) active command on then off while monitoring the performance shift indicator. • **Does the performance shift indicator turn on when commanded on and turn off when commanded off?**	**Yes** INSTALL a new PCM. REFER to Section 303-14. TEST the system for normal operation. **No** INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test AD: The Shift Indicator Is Never/Always On (Shelby GT 500 Only)

Normal Operation

The shift indicator is used to inform the driver of shift points that provide the highest fuel economy. The shift indicator is controlled by the Instrument Cluster (IC) based upon a shift message sent from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus lines.

This pinpoint test is intended to diagnose the following:

- PCM
- IC

PINPOINT TEST AD: THE SHIFT INDICATOR IS NEVER/ALWAYS ON (SHELBY GT 500 ONLY)

Test Step	Result / Action to Take
AD1 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND PCM SELF-TESTS	

• Retrieve the recorded DTCs from the PCM continuous and on-demand self-tests. • **Are any DTCs retrieved?**	**Yes** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. **No** GO to AD2 .
AD2 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC all lamps (ALL_LAMP) active command while monitoring the up shift indicator. • **Does the shift indicator turn on when commanded on and turn off when commanded off?**	**Yes** INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test AE: The Tire Pressure Monitoring System (TPMS) Warning Indicator Is Never/Always On

Normal Operation

The tire pressure warning indicator alerts the driver that one or more of the tires on the vehicle has low tire pressure or is flat. The Tire Pressure Monitoring System (TPMS) system consists of a tire pressure sensor and a transmitter located on each tire. The Instrument Cluster (IC) receives the TPMS status message(s) from the Smart Junction Box (SJB) over the Medium Speed Controller Area Network (MS-CAN) communication bus lines. If a low tire is detected by the TPMS , the SJB sends a message to the IC and the IC turns on the TPMS warning indicator. If there is a problem or fault detected in the TPMS , the SJB sends the appropriate message to the IC and the IC flashes the TPMS warning indicator. If the TPMS status message is invalid or missing for more than 5 seconds, the IC flashes the TPMS warning indicator for 75 seconds then turns the indicator on steady.

This pinpoint test is intended to diagnose the following:

- TPMS concern
- SJB
- IC

PINPOINT TEST AE: THE TPMS WARNING INDICATOR IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
AE1 CHECK THE TIRE PRESSURE	
• Verify that the tire pressure in all tires meets the recommended tire pressures on the vehicle certification label. Refer to Section 100-01 . • **Do all the tires meet the recommended tire pressures?**	**Yes** GO to AE2 . **No** CORRECT the tire pressures. TEST the system for normal operation.
AE2 RETRIEVE THE RECORDED DTCs FROM BOTH THE IC CONTINUOUS AND ON-DEMAND SELF-TESTS	
• Check for recorded IC DTCs from the continuous and on-demand self-tests. • **Is DTC B2477 recorded?**	**Yes** REFER to Section 418-01 to carry out the Programmable Module Installation (PMI) for the IC . **No** GO to AE3 .
AE3 RETRIEVE THE RECORDED DTCs FROM BOTH	

THE CONTINUOUS AND ON-DEMAND SJB SELF-TESTS	
• Check for recorded DTCs from the SJB continuous and on-demand self-tests. • **Are any SJB DTCs retrieved?**	**Yes** REFER to Section 419-10 . **No** GO to AE4 .
AE4 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC tire pressure warning indicator (TIRE_PRES) active command on then off again while monitoring the TPMS warning indicator. • **Does the TPMS warning indicator turn on when commanded on and turn off when commanded off?**	**Yes** INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test AF: The Anti-Theft Indicator Is Never/Always On

Normal Operation

The Instrument Cluster (IC) receives the anti-theft status from the PCM over the High Speed Controller Area Network (HS-CAN)communication bus lines. The anti-theft indicator proves out for 3 seconds when the ignition switch is turned to the RUN or the START position. If there is a Passive Anti-Theft System (PATS) concern, the indicator either flashes rapidly or glows steadily (for more than 3 seconds) when the ignition switch is turned to the RUN or START position. The PATS PATS also flashes the anti-theft indicator every 2 seconds at ignition OFF to act as a visual theft deterrent.

This pinpoint test is intended to diagnose the following:

- PCM
- IC

PINPOINT TEST AF: THE ANTI-THEFT INDICATOR IS NEVER/ALWAYS ON

Test Step	Result / Action to Take
AF1 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND PCM SELF-TESTS	
• Retrieve the recorded DTCs from the PCM continuous and on-demand self-tests. • **Are any DTCs retrieved?**	**Yes** If there are any PATS DTCs present, REFER to Section 419-01B . For all other PCM DTCs, REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. **No** GO to AF2 .
AF2 CARRY OUT THE IC INDICATOR LAMP CONTROL ACTIVE COMMAND	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC anti-theft indicator (THFTLMP) active command on then off again while	**Yes** INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. **No**

monitoring the anti-theft indicator. • **Does the anti-theft indicator turn on when commanded on and turn off when commanded off?**	INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test AG: The Message Center Is Not Operating Correctly

Normal Operation

The message center display is located below the speedometer in the Instrument Cluster (IC). The message center functionality is controlled through the message center switches, which are hardwired to the IC through circuits 1410 (TN/OG) and 1411 (GY/OG). The message center switches use a different resistance value for each switch, allowing the IC to determine which switch is pressed.

This pinpoint test is intended to diagnose the following:

- Message center switch concern
- IC

PINPOINT TEST AG: THE MESSAGE CENTER IS NOT OPERATING CORRECTLY

Test Step	Result / Action to Take
AG1 CHECK THE MESSAGE CENTER DISPLAY OPERATION USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC display segment (SEGMENTS 2) active command. Command the display segments on while observing the message center display. • **Does the message center display illuminate all segments?**	**Yes** The system is OK. If the SET, INFO or RESET buttons are inoperative, GO to Pinpoint Test AH . **No** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Test AH: The Message Center Switch Does Not Operate Correctly

Refer to Wiring Diagrams Cell 60 , Instrument Cluster for schematic and connector information.

Normal Operation

The message center switch assembly uses circuits 1410 (TN/OG) and 1411 (GY/OG) to communicate the requested switch function to the message center.

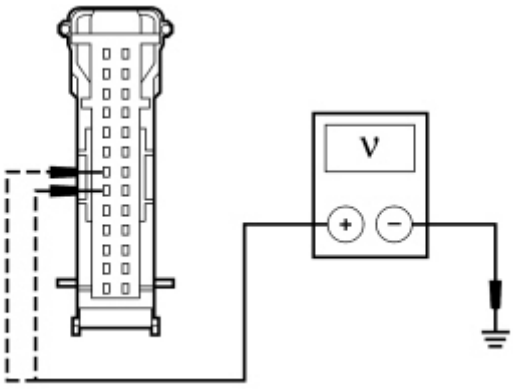
- DTC B1205 (EIC Switch-1 Assembly Circuit Failure) — an on-demand DTC that sets if the Instrument Cluster (IC) detects any of the message center buttons pressed during the self-test.

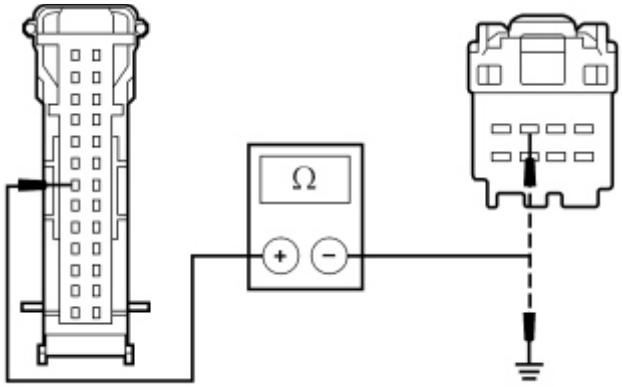
This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Message center switch
- IC

PINPOINT TEST AH: THE MESSAGE CENTER SWITCH DOES NOT OPERATE CORRECTLY

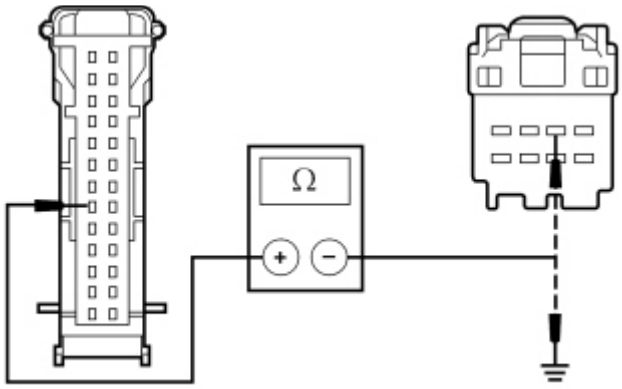
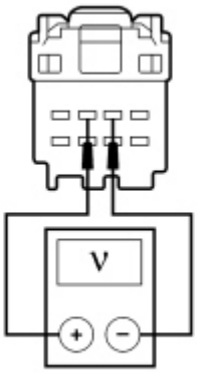
NOTICE: **Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.**

Test Step	Result / Action to Take
AH1 RETRIEVE THE RECORDED DTCs FROM BOTH THE CONTINUOUS AND ON-DEMAND IC SELF-TESTS	
• Check the recorded IC DTCs from the continuous and on-demand self-tests. • **Is DTC B1205 recorded?**	**Yes** INSTALL a new message center switch. REFER to Message Center Switch . TEST the system for normal operation. **No** GO to AH2 .
AH2 CHECK THE IC PID FOR THE MESSAGE CENTER SWITCH USING THE SCAN TOOL	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC DataLogger. • Select the IC message center INFO switch (INFOSW), SETUP switch (SETUPSW) and RESET switch (RES_SW) PIDs while pressing each message center switch (INFO, SETUP, and RESET). • **Does the PID agree with the switch position?**	**Yes** GO to AH7 . **No** GO to AH3 .
AH3 CHECK CIRCUITS 1410 (TN/OG) AND 1411 (GY/OG) FOR A SHORT TO VOLTAGE	
• Ignition OFF. • Disconnect: IC C220. • Disconnect: Message Center Switch C253. • Ignition ON. • Measure the voltage between the IC C220-7, circuit 1410 (TN/OG), harness side and ground; and between the IC C220-6, circuit 1411 (GY/OG), harness side and ground.  N0012667 • **Is any voltage present?**	**Yes** REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test. **No** GO to AH4 .
AH4 CHECK CIRCUIT 1410 (TN/OG) FOR AN OPEN AND SHORT TO GROUND	
• Ignition OFF. • Measure the resistance between the IC C220-7, circuit 1410 (TN/OG), harness side and the message center switch C253-3, circuit 1410 (TN/OG), harness side; and between the IC C220-7, circuit 1410 (TN/OG), harness side and ground.	**Yes** GO to AH5 . **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.



N0012061

- **Is the resistance less than 5 ohms between the IC and the message center switch, and greater than 10,000 ohms between the IC and ground?**

AH5 CHECK CIRCUIT 1411 (GY/OG) FOR AN OPEN AND SHORT TO GROUND	
• Measure the resistance between the IC C220-6, circuit 1411 (GY/OG), harness side and the message center switch C253-2, circuit 1411 (GY/OG), harness side; and between the IC C220-6, circuit 1411 (GY/OG), harness side and ground.  N0012062 • **Is the resistance less than 5 ohms between the IC and the message center switch, and greater than 10,000 ohms between the IC and ground?**	**Yes** GO to AH6 . **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
AH6 CHECK FOR VOLTAGE FROM THE IC	
• Connect: IC C220. • Ignition ON. • Measure the voltage between the message center switch C253-3, circuit 1410 (TN/OG), harness side and the message center switch C253-2, circuit 1411 (GY/OG), harness side.  N0064498 • **Is the voltage greater than 10 volts?**	**Yes** INSTALL a new message center switch. REFER to Message Center Switch in this section. TEST the system for normal operation. **No** GO to AH7 .
AH7 CHECK FOR CORRECT IC OPERATION	

• Disconnect the IC connector.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect the IC connector and make sure it seats correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.

Pinpoint Test AI: The CHECK FUEL CAP Message Is Inoperative/Always On

Normal Operation

The PCM monitors the fuel tank evaporative emission system for significant leaks that occur following refueling of the vehicle. Once the PCM detects a fuel vapor leak, the PCM sends the Instrument Cluster (IC) a message over the communication network to turn on the CHECK FUEL CAP message. DTC P0457 sets in the PCM following a successful cruise test, which is initiated when the vehicle is driven at a steady speed above 64 km/h (40 mph) for a duration of approximately 4-5 minutes. If the PCM is unable to successfully run the cruise test, the IC does not receive the check fuel cap message and the CHECK FUEL CAP message remains off.

- DTC P0457 (Evaporative Emission System Leak Detected (fuel cap loose/off)) — sets in the PCM if a fuel tank pressure change greater than -23.7 kPa (-7 in-Hg) of vacuum within 30 seconds after refueling occurs, or there is an excessive purge (fuel vapor) flow of greater than 454g (1.0lb) per minute.

This pinpoint test is intended to diagnose the following:

- PCM
- IC

PINPOINT TEST AI: THE CHECK FUEL CAP MESSAGE IS INOPERATIVE/ALWAYS ON

Test Step	Result / Action to Take
AI1 RETRIEVE THE RECORDED DTCs FROM BOTH CONTINUOUS AND ON-DEMAND PCM SELF-TESTS	
• Check for recorded PCM DTCs from the continuous and on-demand self-tests. • **Is DTC P0457 recorded?**	**Yes** If the CHECK FUEL CAP message is displayed, REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. If the CHECK FUEL CAP message is not displayed, INSTALL a new PCM. REFER to Section 303-14. TEST the system for normal operation. **No** If the CHECK FUEL CAP message is always displayed, INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation. If the CHECK FUEL CAP message is not displayed, the system is operating normally at this time. If the fuel cap was left off and the

	check fuel cap warning indicator did not turn on, driving conditions may not have allowed for the PCM to run the cruise test and message the IC to turn on the check fuel cap warning indicator.

Pinpoint Test AJ: The Key-In-Ignition Chime Is Inoperative

Refer to Wiring Diagrams Cell 60 , Instrument Cluster for schematic and connector information.

Normal Operation

When the key is inserted into the ignition lock cylinder, the key-in-ignition switch (part of the ignition switch) closes and routes a voltage signal to the Instrument Cluster (IC) through circuit 1414 (LG/VT). The voltage signal indicates to the IC the key is inserted into the ignition lock cylinder. If the IC detects that the ignition switch is in the OFF or ACC position with the key inserted in the ignition lock cylinder and the driver door is ajar, the key-in-ignition warning chime (located in the IC) sounds.

- DTC B1353 (Ignition Key-In Chime Circuit Open) — a continuous and on-demand DTC that sets in the IC if the IC detects a run/start input on circuit 489 (PK/BK) with no key-in-ignition input on circuit 1414 (LG/VT).

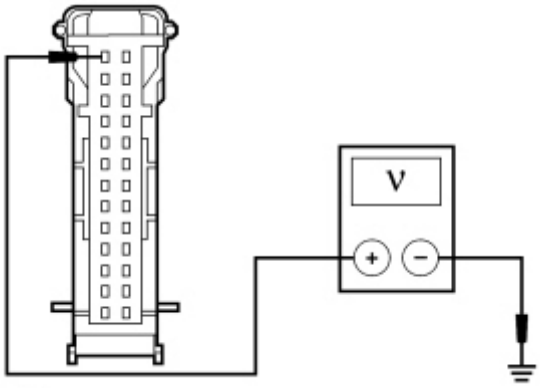
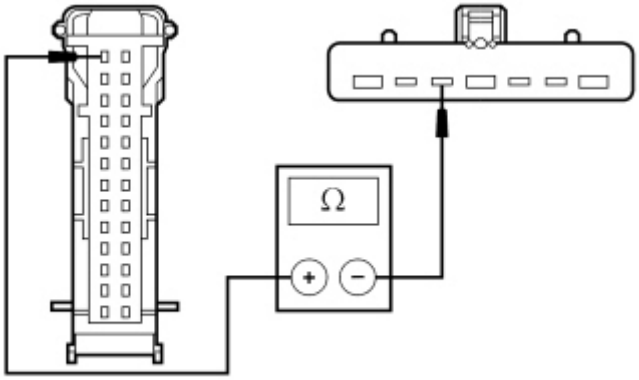
This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Key-in-ignition switch (part of the ignition switch)
- IC

PINPOINT TEST AJ: THE KEY-IN-IGNITION CHIME IS 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
AJ1 CHECK FOR DRIVER DOOR AJAR INPUT TO THE SJB	
• Check the operation of the interior lamps while opening and closing the driver door. • **Do the interior lamps operate correctly?**	**Yes** GO to AJ2 . **No** REFER to Section 417-02 .
AJ2 CHECK THE IC CHIME FUNCTION	
• Ignition OFF. • Turn the parking lamps on. • Open the driver door. • **Does the headlamps on warning chime sound?**	**Yes** GO to AJ3 . **No** GO to AJ5 .
AJ3 CHECK THE INPUT TO THE IC FOR DTC B1353	
• Disconnect: IC C220. • Insert the ignition key into the ignition lock cylinder. • Measure the voltage between the IC C220-13, circuit 1414 (LG/VT), harness side and ground.	**Yes** GO to AJ5 . **No** GO to AJ4 .

 N0012126 • **Is the voltage greater than 10 volts?**	
AJ4 CHECK CIRCUIT 1414 (LG/VT) FOR AN OPEN	
• Disconnect: Ignition Switch C250. • Measure the resistance between the IC C220-13, circuit 1414 (LG/VT), harness side and the ignition switch C250-5, circuit 1414 (LG/VT), harness side.  N0012127 • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new ignition switch. REFER to Section 211-05 . CLEAR the DTCs. REPEAT the self-test. **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
AJ5 CHECK FOR CORRECT IC OPERATION	

• Disconnect the IC connector.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect the IC connector and make sure it seats correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.

Pinpoint Test AK: The Headlamps On Warning Chime Is Inoperative

Normal Operation

When the key is inserted into the ignition lock cylinder, the key-in-ignition switch (part of the ignition switch) closes and routes a voltage signal to the Instrument Cluster (IC) through circuit 1414 (LG/VT). When the ignition key is not inserted into the ignition lock cylinder, the driver door is ajar and the headlamps are on, the Smart Junction Box (SJB) sends a message to the IC over the Medium Speed Controller Area Network (MS-CAN). The IC interprets this signal and sounds the headlamps on warning chime.

This pinpoint test is intended to diagnose the following:

- SJB

PINPOINT TEST AK: THE HEADLAMPS ON WARNING CHIME IS INOPERATIVE

Test Step	Result / Action to Take
AK1 CHECK THE EXTERIOR LIGHTING	
• Check the operation of the exterior lighting. • **Does the exterior lighting operate correctly?**	**Yes** GO to AK2. **No** REFER to Section 417-01.
AK2 CHECK THE IC CHIME FUNCTION	
• Ignition OFF. • Place the key in the ignition lock cylinder. • Open the driver door. • **Does the key-in-ignition warning chime sound?**	**Yes** INSTALL a new SJB. REFER to Section 419-10. TEST the system for normal operation. **No** GO to Pinpoint Test AJ.

Pinpoint Test AL: The Chime Sounds When The Driver Door Is Ajar (No Key In The Ignition And The Headlamps Are Off)

Refer to Wiring Diagrams Cell 60, Instrument Cluster for schematic and connector information.

Normal Operation

When the key is inserted into the ignition lock cylinder, the key-in-ignition switch (part of the ignition switch) closes and routes a voltage signal to the Instrument Cluster (IC) through circuit 1414 (LG/VT). The voltage signal indicates to the IC the key is inserted into the ignition lock cylinder. If the IC detects that the ignition switch is in the OFF or ACC position with the key inserted in the ignition lock cylinder and the driver door is ajar, the key-in-ignition warning chime (located in the IC) sounds.

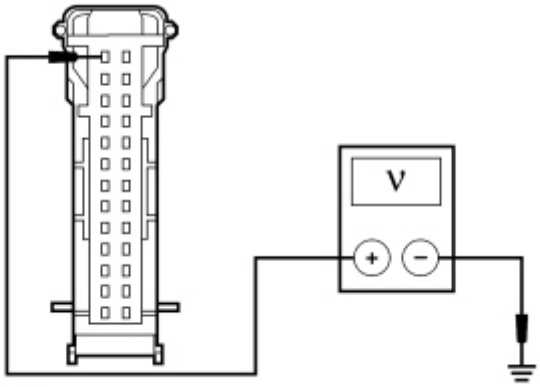
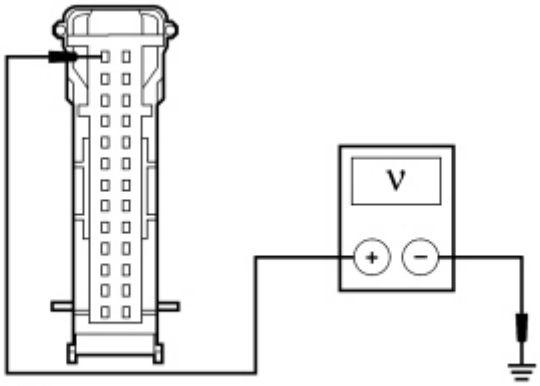
This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Key-in-ignition switch (part of the ignition switch)
- IC

PINPOINT TEST AL: THE CHIME SOUNDS WHEN THE DRIVER DOOR IS AJAR (NO KEY IN THE IGNITION AND THE HEADLAMPS ARE OFF)

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
AL1 CHECK THE IC ILLUMINATION	
• Check the operation of the IC illumination. • **Does the IC illumination operate correctly?**	**Yes** GO to AL2. **No** REFER to Section 413-00.
AL2 CHECK THE INPUT TO THE IC	
• Ignition OFF.	**Yes**

• Disconnect: IC C220. • Remove the ignition key from the ignition lock cylinder. • Measure the voltage between the IC C220-13, circuit 1414 (LG/VT), harness side and ground.  N0012126 • **Is any voltage present?**	GO to AL3 . **No** GO to AL4 .
AL3 CHECK CIRCUIT 1414 (LG/VT) FOR A SHORT TO VOLTAGE	
• Disconnect: Ignition Switch C250. • Measure the voltage between the IC C220-13, circuit 1414 (LG/VT), harness side and ground.  N0012126 • **Is any voltage present?**	**Yes** REPAIR the circuit. TEST the system for normal operation. **No** INSTALL a new ignition switch. REFER to Section 211-05 . TEST the system for normal operation.
AL4 CHECK FOR CORRECT IC OPERATION	

• Disconnect the IC connector.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect the IC connector and make sure it seats correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

Pinpoint Test AM: The Performance Shift Warning Chime Does Not Operate Correctly

Normal Operation

The performance shift warning chime feature on/off status and the desired rpm for the chime to sound are items that are configured through the message center. The Instrument Cluster (IC) uses actual engine rpm sent to the IC over the High Speed Controller Area Network (HS-CAN) communication bus and compares the value against the customer preset engine rpm to determine when to sound the chime. When actual engine rpm matches the preset engine rpm, the IC sounds the chime.

This pinpoint test is intended to diagnose the following:

- IC configuration
- IC

PINPOINT TEST AM: THE PERFORMANCE SHIFT WARNING CHIME DOES NOT OPERATE CORRECTLY

Test Step	Result / Action to Take
AM1 CHECK THE IC CONFIGURATION	
• Verify that the performance shift warning chime (tone) is configured on and that the desired rpm setting is configured. Refer to Message Center Configuration or the Owner's Literature for configuration of the performance shift warning chime. • **Is the performance shift chime (tone) configured on and the desired rpm selected?**	**Yes** INSTALL a new IC. REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation. **No** CONFIGURE the performance warning shift chime (tone) on and configure the desired rpm setting. REFER to Message Center Configuration in this section or the Owner's Literature for additional information. TEST the system for normal operation.

Pinpoint Test AN: The Safety Belt Warning Chime Does Not Operate Correctly/The Belt-Minder® Feature Does Not Operate Correctly

Normal Operation

The Instrument Cluster (IC) receives the safety belt and Belt-Minder® control from the Restraints Control Module (RCM) through circuit 1083 (LB/PK). The safety belt warning chime sounds for approximately 6 seconds when the driver safety belt is not fastened and the ignition lock cylinder is turned from the OFF/LOCK or ACC to the ON or START position.

The Belt-Minder® feature supplements the safety belt warning function and is enabled after the safety belt warning is complete. The Belt-Minder® simultaneously sounds the chime and illuminates the safety belt warning lamp in the IC once the vehicle speed has exceeded 5 km/h (3 mph).

NOTE: Make sure that the safety belt/Belt-Minder® chime operation is verified with the vehicle moving at least 5 km/h (3 mph).

This pinpoint test is intended to diagnose the following:

- Belt-Minder® deactivated
- Safety belt warning indication concern
- Speedometer concern
- IC

PINPOINT TEST AN: THE SAFETY BELT WARNING CHIME IS INOPERATIVE/THE BELT-MINDER® FEATURE DOES NOT OPERATE CORRECTLY

Test Step	Result / Action to Take
AN1 CHECK THE KEY-IN-IGNITION WARNING CHIME OPERATION	
• Ignition OFF. • With the ignition switch in the OFF position and	**Yes** GO to AN2.

the key in the ignition lock cylinder, open the LH front door and observe the key-in-ignition warning chime operation. • **Does the key-in-ignition warning chime operate correctly?**	**No** REFER to GO to Pinpoint Test AJ .
AN2 CHECK THE SAFETY BELT WARNING INDICATOR FOR CORRECT OPERATION	
• Buckle then unbuckle the LH front safety belt. • With the key in the ON position, verify the safety belt warning indicator illuminates with the safety belt unbuckled and turns off when buckled. • **Does the safety belt warning indicator operate correctly?**	**Yes** GO to AN3 . **No** REFER to GO to Pinpoint Test P .
AN3 CHECK THE SPEEDOMETER OPERATION	
• Drive the vehicle and verify that the speedometer is operating correctly. • **Does the speedometer operate correctly?**	**Yes** GO to AN4 . **No** REFER to GO to Pinpoint Test H .
AN4 CHECK THE BELT-MINDER® CONFIGURATION	
• Verify that the Belt-Minder® is activated or configured on for the seating position in question. Refer to Belt-Minder® Deactivating/Activating in this section to configure without a scan tool. • **Is the Belt-Minder® activated for the seating position in question?**	**Yes** INSTALL a new RCM . REFER to Section 501-20B . TEST the system for normal operation. **No** ACTIVATE the Belt-Minder® for the seating position in question. REFER to Belt-Minder® Deactivating/Activating in this section. TEST the system for normal operation.

Pinpoint Test AO: DTC B1317

Refer to Wiring Diagrams Cell 60 , Instrument Cluster for schematic and connector information.

Normal Operation

- DTC B1317 (Battery Voltage High) — a continuous and on-demand DTC that sets in the Instrument Cluster (IC) if the IC detects high battery voltage on the B+ keep-alive memory voltage input, circuit 1001 (WH/YE).

This pinpoint test is intended to diagnose the following:

- Charging system concern
- IC

PINPOINT TEST AO: DTC B1317

NOTE: DTC B1317 may be stored in the module memory due to past battery charging or vehicle jump starting events.

Test Step	Result / Action to Take
AO1 CHECK FOR DTC B1317 OR P0563 SET IN OTHER MODULE	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC Self-Test. • Retrieve the continuous memory DTCs	**Yes** REFER to Section 414-00 to diagnose an overcharging condition.

from all modules. • **Is DTC B1317, B1676 or P0563 (PCM) set in more than 1 module?**	**No** GO to AO2 .
AO2 CHECK THE BATTERY VOLTAGE	
• Turn off all interior/exterior lights and accessories. • Start and run the engine at approximately 2,000 rpm for 3 minutes while monitoring the battery voltage. • **Does the battery voltage rise to 15.5 volts or higher?**	**Yes** REFER to Section 414-00 to diagnose an overcharging condition. **No** GO to AO3 .
AO3 RECHECK FOR DTC B1317	
• Turn the engine off. • Ignition ON. • Enter the following diagnostic mode on the scan tool: Self-Test. • Clear out the IC self-test. • **Is DTC B1317 present?**	**Yes** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation. **No** The system is operating normally at this time. The DTC may have been set previously during battery charging or while jump starting the vehicle.

Pinpoint Test AP: DTC B1318

Refer to Wiring Diagrams Cell 60 , Instrument Cluster for schematic and connector information.

Normal Operation

- DTC B1318 (Battery Voltage Low) — a continuous and on-demand DTC that sets in the Instrument Cluster (IC) if the IC detects low battery voltage on the B+ keep-alive memory voltage input, circuit 1001 (WH/YE).

This pinpoint test is intended to diagnose the following:

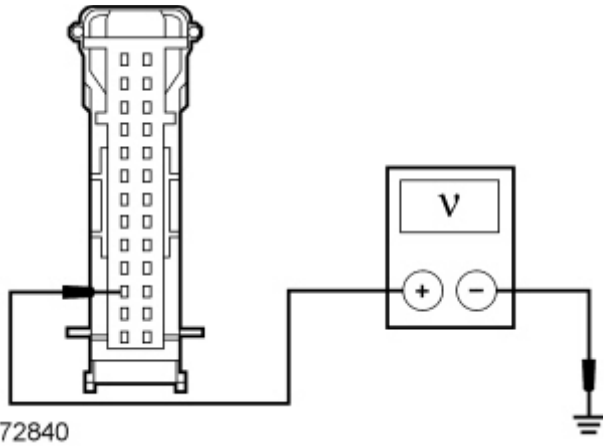
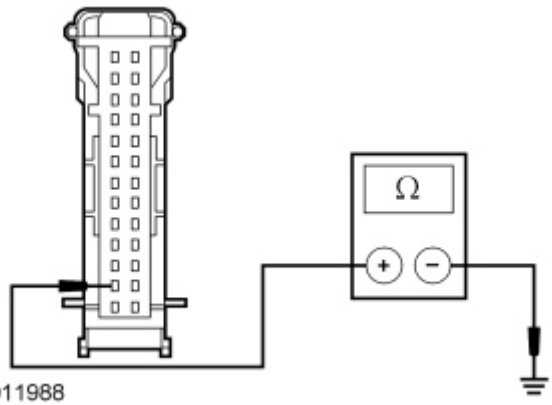
- Wiring, terminals or connectors
- High circuit resistance
- IC

PINPOINT TEST AP: DTC B1318

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 Section 414-01 .

Test Step	Result / Action to Take
AP1 RECHECK THE IC DTCs	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: IC Self-Test. • Clear the DTCs. Repeat the IC self-test. • **Is DTC B1318 still present?**	**Yes** GO to AP2 . **No** The system is operating correctly at this time. The DTC may have been set due to a previous low battery voltage condition.
AP2 CHECK FOR CHARGING SYSTEM DTCs IN THE PCM	
• Enter the following diagnostic mode on the scan tool: PCM	**Yes**

Self-Test. • Retrieve the continuous memory DTCs from all modules. • **Is DTC P0620, P0622, P0625, P0626 or P065B set in the PCM?**	REFER to Section 414-00 . **No** GO to AP3 .
AP3 CHECK THE BATTERY CONDITION AND STATE OF CHARGE	
• Check the battery condition and verify that the battery is fully charged. Refer to Section 414-01 . • **Is the battery OK and fully charged?**	**Yes** GO to AP4 . **No** REFER to Section 414-01 .
AP4 CHECK THE IC VOLTAGE SUPPLY	
• Ignition OFF. • Measure and record the voltage at the battery. • Disconnect: IC C220. • Ignition ON. • Measure the voltage between the IC C220-3, circuit 1001 (WH/YE), harness side and ground.  N0072840 • **Is the voltage within 0.2 volts of the recorded battery?**	**Yes** GO to AP5 . **No** REPAIR the circuit for high resistance. CLEAR the DTC. REPEAT the self-test.
AP5 CHECK THE IC GROUND CIRCUIT	
• Ignition OFF. • Disconnect: Negative Battery Cable. • Measure the resistance between the IC C220-2, circuit 1205 (BK), harness side and ground.  N0011988 • **Is the resistance less than 5 ohms?**	**Yes** GO to AP6 . **No** REPAIR the circuit for high resistance. TEST the system for normal operation.
AP6 CHECK FOR CORRECT IC OPERATION	
• Disconnect the IC connector. • Check for: ▪ corrosion ▪ damaged pins ▪ pushed-out pins • Connect the IC connector and make sure it seats correctly.	**Yes** INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

• Operate the system and verify the concern is still present. • **Is the concern still present?**	**No** The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

Pinpoint Test AQ: DTC B1557

Refer to Wiring Diagrams Cell 60 , Instrument Cluster for schematic and connector information.

Normal Operation

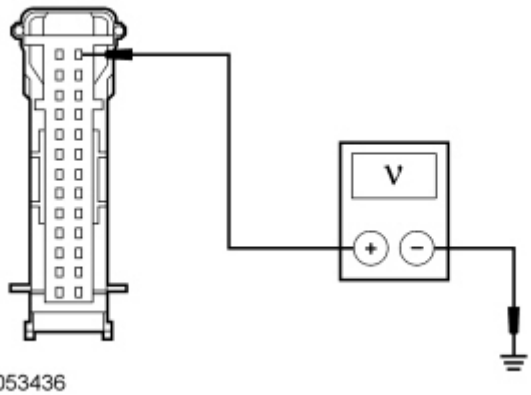
- DTC B1557 (Ignition RUN/START Circuit Short to Battery) — a continuous DTC that sets in the Instrument Cluster (IC) if the IC receives a voltage input on circuit 489 (PK/BK) and a message from the Smart Junction Box (SJB) indicating that the ignition switch has transitioned to the OFF or ACC position.

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- SJB
- IC

PINPOINT TEST AQ: DTC B1557

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
AQ1 CHECK THE IC VOLTAGE SUPPLY • Ignition OFF. • Disconnect: IC C220. • Measure the voltage between the IC C220-26, circuit 489 (PK/BK), harness side and ground.  N0053436 • **Is any voltage present?**	**Yes** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test. **No** GO to AQ2 .
AQ2 CHECK THE SJB IGNITION SWITCH PIDs • Ignition ON. • Enter the following diagnostic mode on the scan tool: SJB DataLogger. • Monitor the SJB ignition switch (IGN_SW) PID while moving the ignition switch from the RUN/START position to the OFF and ACC positions. • **Does the PID agree with the ignition switch position?**	**Yes** GO to AQ3 . **No** VERIFY that all SJB controlled systems function correctly. INSTALL a new SJB . REFER to Section 419-10 . TEST the system for normal operation.

AQ3 CHECK FOR CORRECT IC OPERATION	

• Disconnect the IC connector.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect the IC connector and make sure it seats correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new IC . REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.