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 receives information through hardwired circuitry and over the controller area network (CAN) to control the gauges, indicators, message center and warning chimes.

As a technician it is very important to understand:

- where the input (command) originates from.
- all the information (messages) 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 (message) control the output of the feature, or does it output a message over the communication network circuits to another module.
- which module controls the output of the feature.

Instrument Cluster (IC) Configuration

When installing a new instrument cluster (IC), it is necessary to upload the module configuration information to the scan tool. Following installation of the instrument cluster (IC), download the module configuration information from the scan tool into the new instrument cluster (IC). Refer to Section 418-01.

The following items are configurable:

- Speedometer calibration
- Brake system (base, anti-lock brake system (ABS), ABS/traction control [TC])
- Door ajar
- Shift indicator lamp
- Daytime running lamps (DRL)
- Door ajar warning chime
- Overspeed warning chime

- Back-up warning chime
- Key in warning chime
- Security system

Instrument Cluster (IC) Prove-Out

The instrument cluster (IC) carries out a display prove-out to verify that the warning/indicator lamps and monitored systems are operating correctly. When the ignition switch is turned to the ON position, the charging system warning indicator, the low oil pressure warning indicator, and the malfunction indicator lamp (MIL) illuminate until the engine is started and operating normally. The safety belt warning indicator proves out for 65 seconds or until the safety belt is fastened.

Each time the ignition switch is turned from the OFF to the ON positions, the following instrument cluster (IC) warning indicators prove out for 3 seconds:

- ABS warning indicator
- Air bag warning indicator (6 seconds)
- BRAKE warning indicator
- Fail safe cooling warning indicator
- Low fuel warning indicator
- Traction control indicator
- Anti-theft indicator
- Check fuel cap warning indicator
- Powertrain malfunction (wrench) warning indicator
- Tire pressure monitoring system (TPMS) warning indicator

Tachometer

The instrument cluster (IC) receives the tachometer data from the powertrain control module (PCM) over the communication network and commands the tachometer pointer between 0 and 7,000 rpm (4.0L engines), or between 0 and 8,000 rpm (4.6L engines) according to the data.

Speedometer

The instrument cluster (IC) receives the vehicle speed information from the PCM over the communication network and displays it on the speedometer gauge. If the instrument cluster (IC) receives no vehicle speed signal after 1 second, the speedometer defaults to 0.

Odometer

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

Fuel Gauge

The instrument cluster (IC) receives the fuel level signal from the fuel level sensor, part of the fuel pump module. The fuel level sensor measures variable resistance in the fuel tank depending on the current fuel level. When the fuel level is low, the resistance in the unit is low (15 ohms ± 2 ohms). When the fuel level is high, the resistance in the unit is high (160 ohms ± 4 ohms).

The instrument cluster (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.

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 instrument cluster (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.

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).

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 put into the PARK (P) position (automatic transmissions) or when the parking brake is applied (manual transmissions). 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 is incorporated into the instrument cluster (IC) strategy to recover from missing fuel level inputs during a refueling event. Missing fuel level input 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 instrument cluster (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.

Engine Coolant Temperature Gauge

The PCM receives the engine coolant temperature status through hardwired circuitry to the engine coolant temperature (ECT) sensor. The instrument cluster (IC) receives the engine coolant temperature data from the PCM over the communication network. The instrument cluster (IC) monitors the engine coolant temperature data received from the PCM and commands the engine coolant temperature gauge pointer.

Voltage Gauge

The voltage gauge displays the system battery voltage as measured at the instrument cluster (IC) run input circuit.

Oil Pressure Gauge

The smart junction box (SJB) is hardwired to the oil pressure switch. The 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 oil pressure switch remains open, removing the ground to the SJB. When sufficient oil pressure exists, the 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.

Boost Gauge (GT 500 Only)

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 powertrain control module (PCM) over the high speed controller area network (CAN) communication bus lines.

Indicators

Low Fuel Warning Indicator

The low fuel warning indicator is controlled by the instrument cluster (IC) and warns the driver when the fuel level is 1/16 of a tank or lower.

Check Fuel Cap Warning Indicator

The PCM monitors pressure in the fuel evaporative system and detects massive or critical losses of pressure. When a critical loss of pressure in the fuel evaporative system is detected, the PCM provides a message over the communication network and the instrument cluster (IC) illuminates the check fuel cap warning indicator.

BRAKE Warning Indicator

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 SJB, or there is a loss of communication between the instrument cluster (IC) and the ABS module.

Safety Belt Warning Indicator

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 front row safety belts are not buckled. In this first 65 seconds the indicator illuminates when the driver and/or front passenger safety belt is unbuckled (with a person in the seat) and turns off whenever the safety belt(s) in the occupied front row seat(s) is buckled. The indicator illuminates again if a safety belt is unbuckled after both are buckled and the 65 seconds has not yet expired. After 65 seconds, the indicator turns off regardless of the front row safety belts status.

Anti-Lock Brake System (ABS) Warning Indicator

The ABS warning indicator informs the driver of a malfunction in the ABS system. Inputs are provided by the ABS module over the communication network. For additional information, refer to Section 206-09.

Malfunction Indicator Lamp (MIL)

The MIL is illuminated when a DTC is detected by the PCM. The instrument cluster (IC) receives the MIL data from the PCM through the communication network.

Powertrain Malfunction (Wrench) Warning Indicator

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 instrument cluster (IC) with a signal commanding the instrument cluster (IC) to illuminate the powertrain malfunction (wrench) indicator or display a message if equipped with a message center.

High Beam Indicator

When the high beams are turned on, the SJB sends a signal to the instrument cluster (IC) through the communication network to illuminate the high beam indicator.

Turn Indicators

The SJB sends a message to the instrument cluster (IC) over the communication network when the multifunction switch is in the RH and LH turn signal position. When the multifunction switch is in the RH or LH turn signal position, the instrument cluster (IC) flashes the RH or LH turn indicators.

Air Bag Warning Indicator

The air bag warning indicator is used to provide a status of the supplemental restraint system. The instrument cluster (IC) receives a message from the restraint control module (RCM) over the hard wired circuits. If an air bag system concern is detected, a DTC is logged and the RCM sends a message to the instrument cluster (IC) to illuminate the air bag warning indicator.

Speed Control Indicator

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 instrument cluster (IC) to illuminate the speed control indicator.

Charging System Warning Indicator

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 instrument cluster (IC) to turn off the charging system warning indicator.

Failsafe Cooling Warning Indicator

The failsafe cooling warning indicator informs the driver the engine coolant is overheating due to loss of engine coolant fluid or other cause, and the PCM is taking on limp home strategy. The other purpose is to inform the driver the engine cannot be cooled enough with the limp home strategy and the engine is about to be shut down by the PCM. The failsafe cooling information is sent from the PCM to the instrument cluster (IC) to illuminate the failsafe cooling warning indicator.

Overdrive Off (O/D OFF) Indicator

The instrument cluster (IC) receives the overdrive off signal 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 signal to the instrument cluster (IC) and the instrument cluster (IC) illuminates the overdrive off indicator.

Daytime Running Lamp (DRL) Indicator

When the DRL is on, the SJB sends a message over the communication network, to the instrument cluster (IC), illuminating the DRL indicator.

Low Oil Pressure Warning Indicator

The SJB is hardwired to the oil pressure switch. The 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 oil pressure switch remains open, removing the ground to the SJB. When sufficient oil pressure exists, the 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 turn the indicator on or off according to the engine oil pressure.

Door/Trunk Ajar Warning Indicator

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 SJB sends a message to the instrument cluster (IC) to illuminate the door ajar indicator.

Traction Control Indicator

The traction control indicator flashes when the vehicle traction control is in active mode or is being controlled by the ABS module. The instrument cluster (IC) receives the traction control signal from the ABS module through the communication network. The instrument cluster (IC) monitors the traction control signal, and when the ABS module detects a traction control concern, the instrument cluster (IC) illuminates the traction control indicator.

Anti-Theft Indicator

The anti-theft indicator is used to deter potential thefts of the vehicle by providing a conspicuous indicator that flashes every 2 seconds with the ignition off when the passive anti-theft system (PATS) is armed. The instrument cluster (IC) receives the anti-theft status from the PCM over the high speed CAN communication bus lines.

Shift Indicator (GT 500 Only)

The shift indicator is used to inform the driver of shift points that provide the highest fuel economy. The PCM uses engine throttle position, engine load and engine rpm information to determine what the optimum shift point is to provide the greatest fuel economy.

Performance Shift Warning Indicator (GT 500 Only)

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.

Tire Pressure Monitoring System (TPMS) Warning Indicator

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 SJB receives the data from each tire and transmits the status over the medium speed CAN communication bus lines to the instrument cluster (IC) to indicate whether the low tire pressure warning indicator telltale should be illuminated, flashed, or turned off.

Information And Message Center

The message center provides the following features:

- Information displays
- Setup displays
- Warning messages
- System check messages

The message center information can be selected through a set of 3 buttons:

- SET
- INFO
- RESET

Information Mode

The information displays are non-timed modes. The selected mode remains on until the driver presses a message center button to change the mode or it is overridden by another mode. The information display modes are:

- Trip/total odometer
- Trip odometer
- Distance to empty
- Average fuel economy
- Fuel used
- Instantaneous fuel economy
- Trip elapsed drive time
- Average speed
- Blank display

Setup Mode

The setup mode provides a list of items that can be configured by the driver. The setup modes are:

- SYSTEM CHECK
- COLOR SELECTION
- UNITS (English/Metric)
- DISPLAY MODE (Single/Dual)
- LANGUAGES

Warnings Mode

A single chime sounds when a warning message is displayed. The warning messages display once whenever the ignition switch is turned to the ON position or a fault occurs in a system.

The warning messages are:

- DRIVER DOOR AJAR
- PASSENGER DOOR AJAR
- TRUNK AJAR
- CHECK CHARGING SYSTEM
- CHECK FUEL CAP
- CHECK TRAC CONTROL
- LOW BRAKE FLUID LEVEL
- BRAKE SYSTEM FAILURE
- PARK BRAKE ON
- LOW FUEL LEVEL
- LOW OIL PRESSURE
- TURN SIGNAL ON

System Check

Selecting this function from the SETUP menu causes the message center to cycle through each of the systems being monitored. For each of the monitored systems, the message center indicates either an OK message or a warning message for 2 to 4 seconds. The sequence of the system check report is as follows:

- OIL PRESSURE OK
- CHARGING SYSTEM OK
- DRIVERS DOOR CLOSED
- PASSENGER DOOR CLOSED
- TRUNK CLOSED
- BRAKE SYSTEM OK
- TRAC CONTROL OK
- FUEL CAP OK
- FUEL LEVEL OK
- XXX MILES TO EMPTY

Performance Mode Configuration (GT 500 Only)

The message center provides the ability to configure the performance shift warning indicator and the performance shift warning chime features independent of each other. The 2 configurable items for each feature are the feature on/off and the shift points (engine rpm). Refer to Message Center Configuration in this section for additional information on configuring these 2 items.

Warning Chimes

Key-In-Ignition Warning Chime

When the key-in-ignition switch closes, it sends a voltage signal to the instrument cluster (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 instrument cluster (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 the air bag warning indicator lamp is not working and a fault has occurred by sounding a chime when the ignition switch is in the RUN position for more than 20 seconds. When these conditions exist, the restraints control module (RCM) sends a chime request through the communication network to the instrument cluster (IC). The instrument cluster (IC) then activates the warning chime. The warning consists of 5 sets of five 1-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 instrument cluster (IC) receives the parking lamps ON signal from the smart junction box (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.

Safety Belt Warning Chime

The safety belt warning chime is activated when the ignition switch is in the RUN position and the RCM detects an unbuckled driver safety belt. The instrument cluster (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 his/her safety belt is unbuckled by intermittently sounding a chime and illuminating the safety belt warning lamp in the instrument cluster (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 using a scan tool, refer to Section 418-01. 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.

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 instrument cluster (IC), the interaction between the message center and the chime function is also integral to the instrument cluster (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 instrument cluster (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 vehicle. 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 instrument cluster (IC) uses engine data rpm sent to the instrument cluster (IC) over the high speed controller area network (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 instrument cluster (IC) sounds the chime.

Inspection and Verification

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

Visual Inspection Chart

Mechanical	Electrical

• Accessory drive belt
• Fuel tank
• Engine coolant level
• Engine oil level
• Brake fluid level
	• Smart junction box (SJB) fuse(s):
	  ▪ 8 (10A)
	  ▪ 16 (5A)
	  ▪ 19 (5A)
	• Circuitry
	• Message center switches
	• Key-in ignition warning switch (part of the ignition switch)
	• Smart junction box (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 communication with the scan tool.
6. If the scan tool does not communicate with the vehicle:
   - Verify the ignition key is in the ON position.
   - Verify the scan tool operation with a known good vehicle.
   - Refer to Section 418-00 to diagnose no response from the powertrain control module (PCM).
7. Carry out the network test:
   - If the scan tool responds with no communication for one or more modules, refer to Section 418-00.
   - If the network test passes, retrieve and record the continuous memory DTCs.
8. Clear the continuous DTCs and carry out the self-test diagnostics for the instrument cluster (IC), anti-lock brake system (ABS) module, powertrain control module (PCM), SJB and restraints control module (RCM).
9. If the DTCs retrieved are related to the concern, go to the Instrument Cluster (IC) Diagnostic Trouble Code (DTC) Index, the Smart Junction Box (SJB) Diagnostic Trouble Code (DTC) Index, or the Powertrain Control Module (PCM) Diagnostic Trouble Code (DTC) Index.

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.

Instrument Cluster (IC) Diagnostic Trouble Code (DTC) Index

DTC	Description	Action
B1202	Fuel Sender Circuit Open (fuel pump module sender)	GO to Pinpoint Test A.
B1204	Fuel Sender Circuit Short To Ground (fuel pump module sender)	GO to Pinpoint Test A.
B1205	EIC Switch-1 Assembly Circuit Failure	GO to Pinpoint Test AE.
B1317	Battery Voltage High	CLEAR the DTCs. REPEAT the self-test. If DTC B1317 is retrieved, REFER to Section 414-00 to diagnose the charging system for overcharging.
B1318	Battery Voltage Low	CLEAR the DTCs. REPEAT the self-test. If DTC B1318 is retrieved, REFER to Section 414-00 to diagnose the charging system for low voltage.
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 AG.
B1556	Ignition RUN/START Circuit Open	GO to Pinpoint Test AD.
B1557	Ignition RUN/START Circuit Short to Battery	GO to Pinpoint Test AK.
B2143	NVM Memory Failure	CLEAR the DTCs. REPEAT the self-test. If the DTC is still present, INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
B236A	Chime Output Circuit Open	INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
B2477	Module Configuration Error	RECONFIGURE the module. REFER to Section 418-01. CLEAR the DTCs. REPEAT the self-test. If DTC B2477 returns, INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section.
B2627	Fuel Sender Circuit Open #2 (remote fuel sender)	GO to Pinpoint Test A.
B2628	Fuel Sender Circuit Short to Ground #2 (remote fuel sender)	GO to Pinpoint Test A.
B2879	Fuel Tank Jet Pump Fault	GO to Pinpoint Test A.
B2903	Chime Output Circuit Short to Battery	INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
B2940	Chime Output Circuit Short to Ground	INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
U0073	Control Module Communication Off Bus	REFER to Section 418-00.

DTC	Description	Action
U2050	No Application Present	REFLASH the instrument cluster (IC). If the DTC occurs after a software reflash, REFLASH the instrument cluster (IC) again. If the DTC reappears after each attempt to reflash, INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
All other DTCs	—	REFER to Section 419-10.

Smart Junction Box (SJB) Diagnostic Trouble Code (DTC) Index

DTC	Description	Action
B1201	Fuel Sender Circuit Failure (fuel pump module sender)	GO to Pinpoint Test A.
B1202	Fuel Sender Circuit Open (fuel pump module sender)	GO to Pinpoint Test A.
B2479	Brake Park Switch Circuit Short to Ground	GO to Pinpoint Test K.
B2627	Fuel Sender Circuit Open #2 (remote fuel sender)	GO to Pinpoint Test A.
B2628	Fuel Sender Circuit Short to Ground #2 (remote fuel sender)	GO to Pinpoint Test A.
C1189	Brake Fluid Level Sensor Input Short Circuit to Ground	GO to Pinpoint Test K.
U1900	CAN Communication Bus Fault—Receive Error	REFER to Section 418-00.
All other DTCs	—	REFER to Section 419-10.

Powertrain Control Module (PCM) Diagnostic Trouble Code (DTC) Index

DTC	Description	Action
P0457	Evaporative Emission System Leak Detected (fuel cap loose/off)	GO to Pinpoint Test J.
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 A.
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 A.
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 A.
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 A.

DTC	Description	Action
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 A.
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 A.
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 A.
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 A.
All other DTCs	—	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.

Symptom Charts

Symptom Chart — Instrument Cluster (IC)

Condition	Possible Causes	Action
• No communication with the instrument cluster (IC)	• Fuse(s) • Circuitry • Instrument cluster (IC)	• REFER to Section 418-00.
• Incorrect fuel gauge indication	• Circuitry • Fuel tank • Fuel pump module • Fuel level sender (float and card) • Smart junction box (SJB) • Instrument cluster (IC)	• GO to Pinpoint Test A.
• The boost gauge is inoperative (GT 500 only)	• Powertrain control module (PCM) • Instrument cluster (IC)	• GO to Pinpoint Test B.
• Incorrect temperature gauge indication	• PCM • Instrument cluster (IC)	• GO to Pinpoint Test C.
• Incorrect voltage gauge indication	• PCM • Instrument cluster (IC)	• GO to Pinpoint Test D.
• The tachometer is inoperative	• PCM • Instrument cluster (IC)	• GO to Pinpoint Test E.
• Incorrect oil pressure gauge indication	• Circuitry • Engine oil pressure switch • SJB • Instrument cluster (IC)	• GO to Pinpoint Test F.
• The speedometer/odometer is inoperative	• PCM • Instrument cluster (IC)	• GO to Pinpoint Test G.

• Incorrect speedometer indication	• Tire size configuration • Axle ratio configuration • PCM concern • Instrument cluster (IC)	• GO to Pinpoint Test AL.
• The safety belt warning indicator is inoperative/does not operate correctly	• Circuitry • Restraint control module (RCM) • Instrument cluster (IC)	• GO to Pinpoint Test H.
• The O/D off indicator is never/always on	• PCM • Instrument cluster (IC)	• GO to Pinpoint Test I.
• The check fuel cap warning indicator is never/always on	• PCM • Instrument cluster (IC)	• GO to Pinpoint Test J.
• The brake warning indicator is never/always on	• Circuitry • Parking brake switch • Brake fluid level switch • Anti-lock brake system (ABS) module • SJB • Instrument cluster (IC)	• GO to Pinpoint Test K.
• The charging system warning indicator is never/always on	• Charging system • PCM • Instrument cluster (IC)	• GO to Pinpoint Test L.
• The high beam indicator is never/always on	• SJB • Instrument cluster (IC)	• GO to Pinpoint Test M.
• The turn signal indicator is never/always on	• SJB • Instrument cluster (IC)	• GO to Pinpoint Test N.
• The anti-lock brake system (ABS) warning indicator is never/always on	• ABS module • Instrument cluster (IC)	• GO to Pinpoint Test O.
• The low oil pressure warning indicator is never/always on	• Circuitry • Engine oil pressure switch • SJB • Instrument cluster (IC)	• GO to Pinpoint Test P.
• The malfunction indicator lamp (MIL) is never/always on	• PCM • Instrument cluster (IC)	• GO to Pinpoint Test Q.
• The air bag warning indicator is never/always on	• Circuitry • RCM • Instrument cluster (IC)	• GO to Pinpoint Test R.
• The speed control indicator is never/always on	• PCM • Instrument cluster (IC)	• GO to Pinpoint Test S.
• The powertrain malfunction (wrench) warning indicator is never/always on	• PCM • Instrument cluster (IC)	• GO to Pinpoint Test T.
• The failsafe cooling warning indicator is never/always on	• PCM • Instrument cluster (IC)	• GO to Pinpoint Test U.

• The door ajar warning indicator is inoperative/does not operate correctly	• SJB • Instrument cluster (IC)	• GO to Pinpoint Test V.
• The traction control indicator is never/always on	• ABS module • Instrument cluster (IC)	• GO to Pinpoint Test W.
• The daytime running lamps (DRL) indicator is never/always on	• SJB • Instrument cluster (IC)	• GO to Pinpoint Test X.
• The low fuel warning indicator is never/always on	• Instrument cluster (IC)	• GO to Pinpoint Test Y.
• The performance shift warning indicator is never/always on (GT 500 only)	• PCM • Instrument cluster (IC)	• GO to Pinpoint Test Z.
• The shift indicator is never/always on (GT 500 only)	• PCM • Instrument cluster (IC)	• GO to Pinpoint Test AA.
• The tire pressure monitoring system (TPMS) warning indicator is never/always on	• TPMS concern • SJB • Instrument cluster (IC)	• GO to Pinpoint Test AB.
• The anti-theft indicator is never/always on	• PCM • Instrument cluster (IC)	• GO to Pinpoint Test AC.
• The instrument cluster (IC) is inoperative	• Fuse(s) • Circuitry • Instrument cluster (IC)	• GO to Pinpoint Test AD.

Symptom Chart — Information And Message Center

Condition	Possible Causes	Action
• The message center is not operating correctly	• Message center switch • Instrument cluster (IC)	• GO to Pinpoint Test AE.
• The message center display is blank	• Instrument cluster (IC)	• PRESS the message center INFO button. If the message center display is still blank, INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.
• The message center switch does not operate correctly	• Circuitry • Message center switch • Instrument cluster (IC)	• GO to Pinpoint Test AF.

• The CHECK TRAC CONTROL warning is inoperative	• Instrument cluster (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 instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

• The TURN SIGNAL ON warning is inoperative	• Instrument cluster (IC)	• CHECK the turn signal indicators for correct operation.
		  • If the turn signal indicators do not operate correctly, GO to Pinpoint Test N.
		  • If the turn signal indicators operate correctly, INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

• The CHECK CHARGING SYSTEM warning is inoperative	• Instrument cluster (IC)	• CHECK the charging system warning indicator for correct operation.
		  • If the charging system warning indicator does not operate correctly, GO to Pinpoint Test L.
		  • If the charging system warning indicator operates correctly, INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

• The BRAKE SYSTEM FAILURE warning is inoperative	• Instrument cluster (IC)	• CHECK the brake warning indicator for correct operation.
		  • If the brake warning indicator does not operate correctly, REFER to GO to Pinpoint Test K.
		  • If the brake warning indicator operates correctly, INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

• The LOW FUEL LEVEL warning is inoperative	• Instrument cluster (IC)	• CHECK the fuel gauge for correct operation.
		  • If the fuel gauge does not operate correctly, GO to Pinpoint Test A.
		  • If the fuel gauge operates correctly, INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

• The LOW OIL PRESSURE warning is inoperative	• Instrument cluster (IC)	• CHECK the oil pressure gauge for correct operation.
		  • If the oil pressure gauge does not operate correctly, GO to Pinpoint Test F.
		  • If the oil pressure gauge operates correctly, INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

• The CHECK FUEL CAP warning is inoperative	• Instrument cluster (IC)	• CHECK for powertrain control module (PCM) DTCs.
		  • If PCM DTCs are present, REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.
		  • If no PCM DTCs are present, INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

• The DRIVER DOOR, PASSENGER DOOR, AND TRUNK AJAR warning is inoperative	• Instrument cluster (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 instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

• The PARK BRAKE ON warning is inoperative	• Instrument cluster (IC)	• CHECK the brake warning indicator for correct operation.
		  • If the brake warning indicator does not operate correctly, GO to Pinpoint Test K.
		  • If the brake warning indicator operates correctly, INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Symptom Chart — Warning Chimes

Condition	Possible Causes	Action
• All the chimes are inoperative	• Instrument cluster (IC)	• INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

• The safety belt warning chime is inoperative	• Instrument cluster (IC)	• CHECK the safety belt warning indicator operation.
		  • If the safety belt warning indicator does not operate correctly, GO to Pinpoint Test H.
		  • If the safety belt warning indicator operates correctly, INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section.

• The Belt-Minder® feature does not operate correctly	• Belt-Minder® deactivated	• ACTIVATE the Belt-Minder® feature. REFER to Belt-Minder® Deactivating/Activating in this section.

	• Instrument cluster (IC)	• CHECK the safety belt warning indicator operation.
		  • If the safety belt warning indicator does not operate correctly, GO to Pinpoint Test H.
		  • If the safety belt warning indicator operates correctly, INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section.

• The key-in-ignition chime is inoperative	• Circuitry • Key-in-ignition switch (part of the ignition switch) • Instrument cluster (IC)	• GO to Pinpoint Test AG.
• The headlamps on warning chime is inoperative	• Smart junction box (SJB)	• GO to Pinpoint Test AH.
• The chime sounds when the driver door is ajar (no key in the ignition and the headlamps are off)	• Circuitry • Key-in-ignition switch (part of the ignition switch) • Instrument cluster (IC)	• GO to Pinpoint Test AI.
• The performance shift warning chime does not operate correctly	• Instrument cluster (IC) configuration • Instrument cluster (IC)	• GO to Pinpoint Test AJ.

• The air bag warning chime does not operate correctly	• Restraints control module (RCM)
	• Instrument cluster (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, REFER to GO to Pinpoint Test H (safety belt warning indicator) or GO to Pinpoint Test R (air bag warning indicator).
		  • If the safety belt and air bag warning indicators operate correctly, INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

• The message center switch tone is inoperative	• Instrument cluster (IC)	• CHECK the operation of the message center switches.
		  • If the message center switches do not operate correctly, GO to Pinpoint Test AF.
		  • If the message center switches operate correctly, INSTALL a new instrument cluster (IC). REFER to Instrument Cluster (IC) in this section. TEST the system for normal operation.

Pinpoint Tests

Pinpoint Test A: Incorrect Fuel Gauge Indication

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

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.*

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.

Instrument Cluster 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).

DTC Description	Fault Trigger Conditions
• 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.

DTC Description	Fault Trigger Conditions
• 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.

Possible Causes

- Circuit 29 (YE/WH) short to circuit 1357 (LB/YE)
- Circuit 29 (YE/WH) open, short to ground or voltage
- Circuit 1356 (LG/VT) open, short to ground or voltage
- Circuit 1356 (LG/VT) short to circuit 1357 (LB/YE)
- Circuit 1357 (LB/YE) open or short to voltage
- Fuel pump module (LH side)
- Fuel level sensor (RH side)
- Fuel level sender (float and card)
- SJB
- Fuel tank
- Instrument cluster (IC)

PINPOINT TEST A : 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 instrument cluster (IC) DTCs.*

A1 CARRY OUT THE COMMUNICATION NETWORK TEST

- 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?

Yes	GO to A2.
No	REFER to Section 418-00.

A2 CARRY OUT THE INSTRUMENT CLUSTER (IC) FUEL GAUGE ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (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%?

Yes	GO to A3.
No	GO to A23.

A3 RETRIEVE THE RECORDED DTCS FROM THE CONTINUOUS MEMORY INSTRUMENT CLUSTER (IC) SELF-TEST

NOTE: *The instrument cluster (IC) DTCs are all set in continuous memory only. For all diagnostics, use only the instrument cluster (IC) DTCs.*

- Check for recorded continuous memory instrument cluster (IC) DTCs from the self-test.

Are any instrument cluster (IC) DTCs recorded?

Yes	For DTC B1204 or DTC B2628, GO to A4. For DTC B1202, GO to A8. For DTC B2627, GO to A13. For DTC B2879, GO to A18.
No	GO to A18.

A4 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: Instrument Cluster (IC) Self-Test.
- **NOTE:** *Make sure to use only the instrument cluster (IC) DTCs for this step. Once the repairs are complete, clear the instrument cluster (IC) DTCs.*

  NOTE: *It is normal for DTC B1204 or B2628 to be present during this step and should be ignored.*

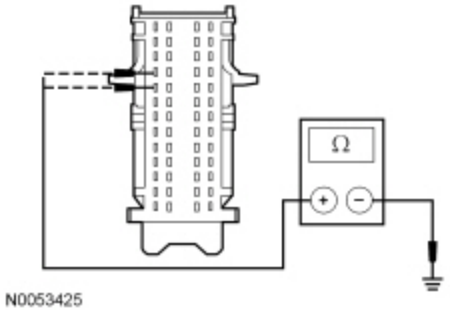
  Clear the instrument cluster (IC) DTCs. Repeat the instrument cluster (IC) self-test.

Is DTC B1202 or B2627 retrieved?

Yes	To continue DTC B1204 diagnostics, GO to A21. 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 A5.

A5 CHECK CIRCUIT 29 (YE/WH) OR CIRCUIT 1356 (LG/VT) FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect: SJB C2280C .
- For DTC B2628, measure the resistance between the SJB C2280C Pin 43, circuit 29 (YE/WH) (DTC B2628), harness side and ground



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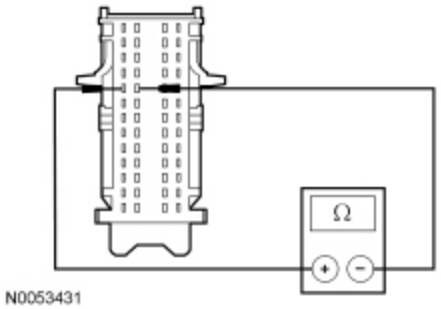
- For DTC B1204, measure the resistance between the SJB C2280C Pin 44, circuit 1356 (LG/VT) (DTC B1204), harness side and ground.

Is the resistance greater than 10,000 ohms?

Yes	For DTC B1204, GO to A6. For DTC B2628, GO to A7.
No	REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.

A6 CHECK CIRCUITS 1356 (LG/VT) AND 1357 (LB/YE) FOR A SHORT TOGETHER

- Measure the resistance between the SJB C2280C Pin 31, circuit 1357 (LB/YE), harness side and the SJB C2280C Pin 44, circuit 1356 (LG/VT), harness side.



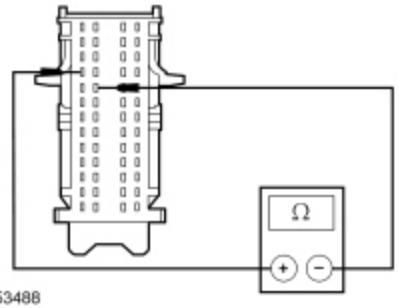
N0053431

Is the resistance greater than 10,000 ohms?

Yes	GO to A22.
No	REPAIR the circuits. CLEAR the DTCs. REPEAT the self-test.

A7 CHECK CIRCUITS 29 (YE/WH) AND 1357 (LB/YE) FOR A SHORT TOGETHER

- Measure the resistance between the SJB C2280C Pin 43, circuit 29 (YE/WH), harness side and the SJB C2280C Pin 31, circuit 1357 (LB/YE), harness side.



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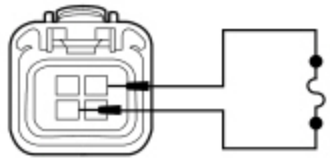
Is the resistance greater than 10,000 ohms?

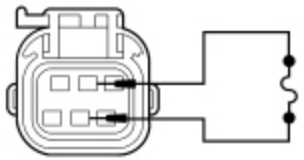
Yes	GO to A22.
No	REPAIR the circuits. CLEAR the DTCs. REPEAT the self-test.

A8 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 Pin 2, circuit 1357 (LB/YE), harness side and the fuel pump module C433 Pin 4, circuit 1356 (LG/VT), harness side.


N0082055

- On 5.4L engines, connect a fused jumper wire between the fuel pump module C4331 Pin 2, circuit 1357 (LB/YE), harness side and the fuel pump module C4331 Pin 5, circuit 1356 (LG/VT), harness side.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- Ignition ON.
- Wait one minute.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Self-Test.
- **NOTE:** *Make sure to use only the instrument cluster (IC) DTCs for this step. Once the repairs are complete, clear the instrument cluster (IC) DTCs.*

  NOTE: *It is normal for DTC B1202 to be present during this step and should be ignored.*

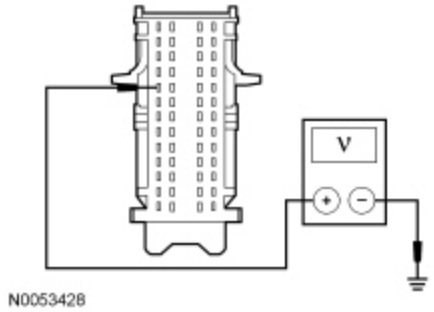
  Clear the instrument cluster (IC) DTCs. Repeat the instrument cluster (IC) self-test.

Is DTC B1204 set?

Yes	REMOVE the jumper wire. GO to A21.
No	LEAVE the jumper wire connected. GO to A9.

A9 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 Pin 44, circuit 1356 (LG/VT), harness side and ground.

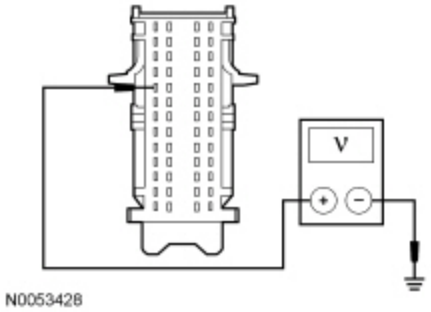


Is any voltage present?

Yes	REMOVE the jumper wire. GO to A10.
No	LEAVE the jumper wire connected. GO to A11.

A10 CHECK CIRCUIT 1356 (LG/VT) FOR A SHORT TO VOLTAGE

- Measure the voltage between the SJB C2280C Pin 44, circuit 1356 (LG/VT), harness side and ground.

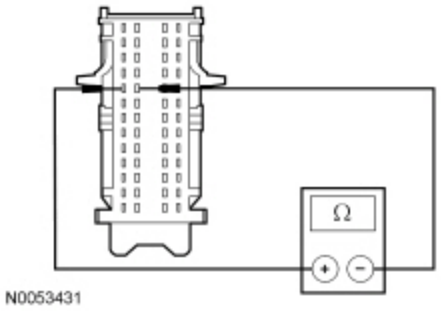


Is any voltage present?

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.

A11 CHECK THE FUEL PUMP MODULE CIRCUITRY FOR AN OPEN

- Ignition OFF.
- Measure the resistance between the SJB C2280C Pin 31, circuit 1357 (LB/YE), harness side; and between the SJB C2280C Pin 44, circuit 1356 (LG/VT), harness side.

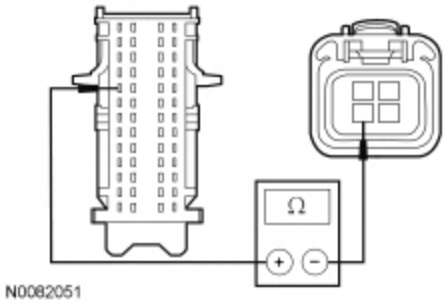


Is the resistance less than 5 ohms?

Yes	REMOVE the jumper wire. GO to A22.
No	REMOVE the jumper wire. GO to A12.

A12 CHECK CIRCUIT 1356 (LG/VT) FOR AN OPEN

- On 4.0L and 4.6L engines, measure the resistance between the SJB C2280C Pin 44, circuit 1356 (LG/VT), harness side and the fuel pump module C433 Pin 4, circuit 1356 (LG/VT), harness side.



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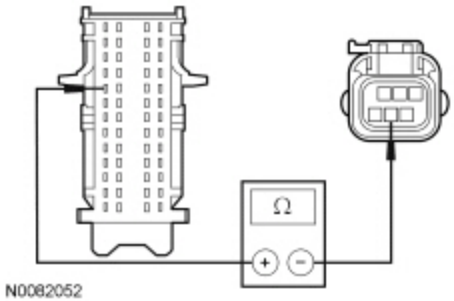
- On 5.4L engines, measure the resistance between the SJB C2280C Pin 44, circuit 1356 (LG/VT), harness side and the fuel pump module C4331 Pin 5, circuit 1356 (LG/VT), harness side.



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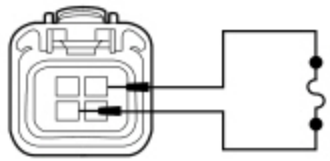
Is the resistance less than 5 ohms?

Yes	REPAIR circuit 1357 (LB/YE) for an open. CLEAR the DTCs. REPEAT the self-test.
No	REPAIR circuit 1356 (LG/VT) for an open. CLEAR the DTCs. REPEAT the self-test.

A13 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 Pin 4, circuit 29 (LB/YE), harness side and the fuel level sensor C434 Pin 2, circuit 1356 (LG/VT), harness side.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- Ignition ON.
- Wait one minute.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Self-Test.
- **NOTE:** *Make sure to use only the instrument cluster (IC) DTCs for this step. Once the repairs are complete, clear the SJB and instrument cluster (IC) DTCs.*

  NOTE: *It is normal for DTC B2627 to be present during this step and should be ignored.*

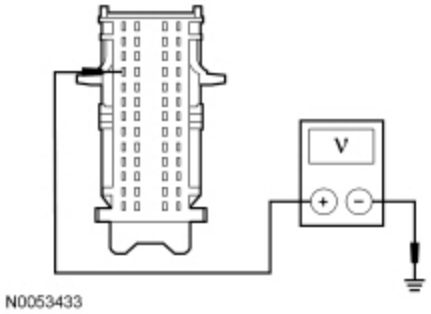
  Clear the instrument cluster (IC) DTCs. Repeat the instrument cluster (IC) self-test.

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 A14.

A14 CHECK CIRCUIT 29 (YE/WH) FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect: SJB C2280C .
- Ignition ON.
- Measure the voltage between the SJB C2280C Pin 43, circuit 29 (YE/WH), harness side and ground.

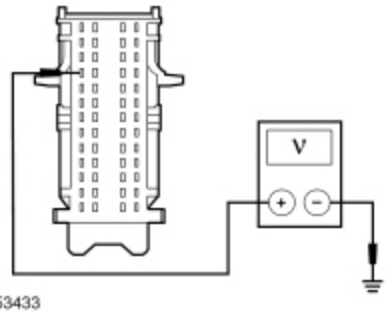


Is any voltage present?

Yes	REMOVE the jumper wire. GO to A15.
No	LEAVE the jumper wire connected. GO to A16.

A15 CHECK CIRCUIT 29 (YE/WH) FOR A SHORT TO VOLTAGE WITH THE CIRCUIT ISOLATED

- Measure the voltage between the SJB C2280C Pin 43, circuit 29 (YE/WH), harness side and ground.



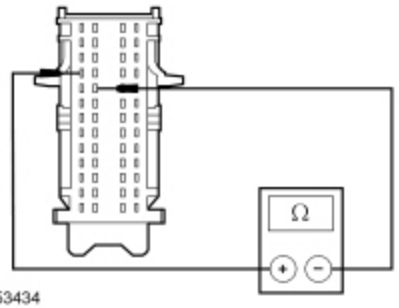
N0053433

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.

A16 CHECK THE FUEL LEVEL SENSOR CIRCUITRY FOR AN OPEN

- Ignition OFF.
- Measure the resistance between the SJB C2280C Pin 31, circuit 1357 (LB/YE), harness side; and between the SJB C2280C Pin 43, circuit 29 (YE/WH), harness side.



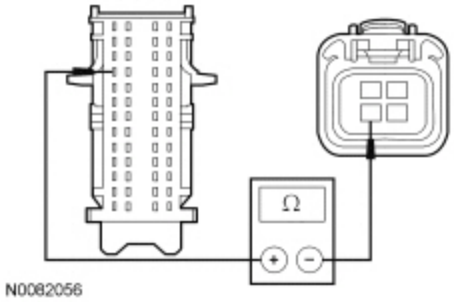
N0053434

Is the resistance less than 5 ohms?

Yes	REMOVE the jumper wire. GO to A22.
No	REMOVE the jumper wire. GO to A17.

A17 CHECK CIRCUIT 29 (YE/WH) FOR AN OPEN

- Measure the resistance between the SJB C2280C Pin 43, circuit 29 (YE/WH), harness side and the fuel level sensor C434 Pin 4, circuit 29 (YE/WH), harness side.



Is the resistance less than 5 ohms?

Yes	REPAIR circuit 1357 (LB/YE) for an open. CLEAR the DTCs. REPEAT the self-test.
No	REPAIR circuit 29 (YE/WH) for an open. CLEAR the DTCs. REPEAT the self-test.

A18 INSPECT THE FUEL TANK

- Check the fuel tank for any damage or deformation.

Is the fuel tank OK?

Yes	GO to A19.
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.

A19 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.

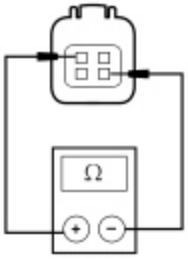
Are the fuel transfer tube, connections, fuel pump module and the fuel level sensor OK?

Yes	GO to A20.
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.

A20 CHECK THE FUEL PUMP MODULE AND FUEL LEVEL SENSOR RESISTANCE READINGS

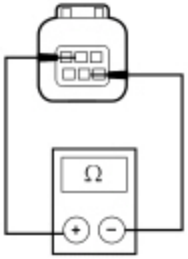
NOTE: *The fuel pump module and fuel level sensor resistance varies from 15 ± 2 ohms when empty (E) to 160 ± 4 ohms when full (F).*

- 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.



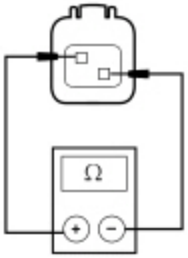
N0084251

- 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?

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 A21. For the fuel level sensor, INSTALL a new fuel level sensor. REFER to Section 310-01. CLEAR the DTCs. REPEAT the self-test.

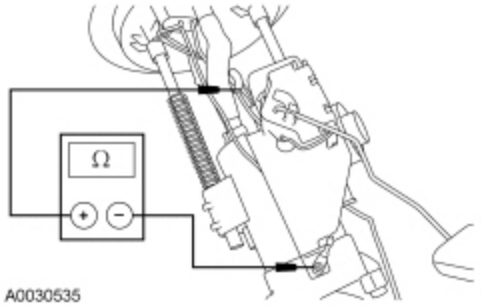
A21 CHECK THE FUEL LEVEL SENDER

- **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.



Does the resistance slowly increase from approximately 15 ohms to 160 ohms?

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 310-01. TEST the system for normal operation.

A22 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.

A23 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 B: The Boost Gauge Is Inoperative (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 powertrain control module (PCM) over the high speed controller area network (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.

Possible Causes

- PCM
- Instrument cluster (IC)

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

B1 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 there any DTCs retrieved?

Yes	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.
No	GO to B2.

B2 CARRY OUT THE INSTRUMENT CLUSTER (IC) GAUGES ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) boost gauge active command and monitor the gauge.

Does the boost gauge sweep correctly?

Yes	GO to B3.
No	GO to B4.

B3 CHECK FOR CORRECT PCM OPERATION

- Disconnect all PCM connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect all 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 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.

B4 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect all instrument cluster (IC) connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect all instrument cluster (IC) 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 instrument cluster (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 C: Incorrect Temperature Gauge Indication

Normal Operation

The engine coolant temperature (ECT) sensor unit monitors the coolant temperature and is hardwired directly to the powertrain control module (PCM). The status of the engine coolant temperature is sent from the PCM to the instrument cluster (IC) over the communication network.

Possible Causes

- PCM
- Instrument cluster (IC)

PINPOINT TEST C : INCORRECT TEMPERATURE GAUGE INDICATION

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 recorded?

Yes	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.
No	GO to C2.

C2 CARRY OUT THE INSTRUMENT CLUSTER (IC) COOLANT TEMPERATURE GAUGE ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) temperature gauge active command and scroll in 2 increments of 0%, and 100%.

Does the temperature gauge start at C (cold) when at 0%, and move to H (hot) at 100%?

Yes	GO to C4.
No	GO to C3.

C3 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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.

C4 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 D: Incorrect Voltage Gauge Indication

Normal Operation

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

Possible Causes

- PCM
- Instrument cluster (IC)

PINPOINT TEST D : INCORRECT VOLTAGE GAUGE INDICATION

D1 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 D2.
No	REPAIR the charging system. REFER to Section 414-00.

D2 CARRY OUT THE INSTRUMENT CLUSTER (IC) VOLTMETER ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) voltmeter active command and scroll the voltmeter in 2 increments 0%, and 100%.

Does the voltmeter start at L (low) when at 0%, and move to H (high) at 100%?

Yes	GO to Pinpoint Test AD.
No	GO to D3.

D3 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion

    - damaged pins
    - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 E: The Tachometer Is Inoperative

Normal Operation

Engine rpm data is provided to the instrument cluster (IC) by the powertrain control module (PCM) through the communication network.

Possible Causes

- PCM
- Instrument cluster (IC)

PINPOINT TEST E : THE TACHOMETER IS INOPERATIVE

E1 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 E2.

E2 CARRY OUT THE INSTRUMENT CLUSTER (IC) TACHOMETER ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) tachometer 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	GO to E3.
No	GO to E4.

E3 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.

E4 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 F: Incorrect Oil Pressure Gauge Indication

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

Normal Operation

The oil pressure switch is a normally open switch that is hardwired to the smart junction box (SJB) through circuit 208 (GY). When the oil pressure is within normal ranges, the oil pressure switch closes, grounding the signal to the SJB. The SJB then sends a command signal to the instrument cluster (IC) through the communication network, to turn off the oil pressure warning indicator. When engine oil pressure is low, the oil pressure switch opens, removing the ground to the SJB. The SJB sends a low oil pressure command to the instrument cluster (IC) through the communication network to illuminate the oil pressure warning indicator.

Possible Causes

- Circuit 208 (GY) open or short to ground
- Engine oil pressure switch
- SJB
- Instrument cluster (IC)

PINPOINT TEST F : 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.

F1 CARRY OUT THE INSTRUMENT CLUSTER (IC) TACHOMETER ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) oil pressure gauge active command on and off.

Does the oil pressure gauge start at the low range and increase to the normal range when selected on?

Yes	If the oil pressure gauge always indicates normal, GO to F2. If the oil pressure gauge always indicates low, GO to F4.
No	GO to F8.

F2 CHECK THE OIL PRESSURE SWITCH

- Ignition OFF.
- Disconnect: Engine Oil Pressure Switch C103 .
- Ignition ON.
- With the oil pressure switch disconnected, monitor the oil pressure gauge.

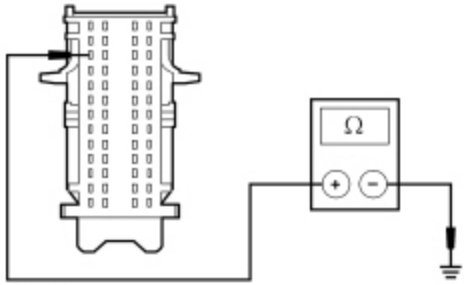
Does the oil pressure gauge indicate low?

Yes	INSTALL a new engine oil pressure switch. TEST the system for normal operation.
No	GO to F3.

F3 CHECK CIRCUIT 208 (GY) FOR A SHORT TO GROUND

- Ignition OFF.

- Disconnect: SJB C2280C .
- Disconnect: Engine Oil Pressure Switch C103 .
- Measure the resistance between the SJB C2280C Pin 42, circuit 208 (GY), harness side and ground.



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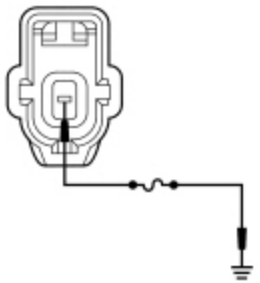
Is the resistance greater than 10,000 ohms?

Yes	GO to F7.
No	REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

F4 CHECK THE OIL PRESSURE SWITCH

- Ignition OFF.
- Disconnect: Oil Pressure Switch C103 .
- Connect a fused (5A) jumper wire between the oil pressure switch C103 Pin 1, circuit 208 (GY), harness side and ground.


N0002760

- Ignition ON.

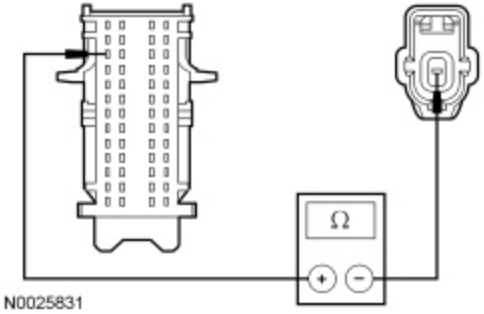
Does the oil pressure gauge indicate normal?

Yes	REMOVE the jumper wire. GO to F5.
No	REMOVE the jumper wire. GO to F6.

F5 CHECK CIRCUIT 208 (GY) FOR AN OPEN

- Ignition OFF.

- Disconnect: SJB C2280C .
- Measure the resistance between the SJB C2280C Pin 42, circuit 208 (GY), harness side and the engine oil pressure switch C103 Pin 1, circuit 208 (GY), harness side.



Is the resistance less than 5 ohms?

Yes	GO to F8.
No	REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

F6 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.

F7 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.

F8 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 G: The Speedometer/Odometer Is Inoperative

Normal Operation

Vehicle speed information is sent to the instrument cluster (IC) by the powertrain control module (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.

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

Possible Causes

- PCM
- Instrument cluster (IC)

PINPOINT TEST G : THE SPEEDOMETER/ODOMETER IS INOPERATIVE

G1 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 G2.

G2 RETRIEVE THE RECORDED INSTRUMENT CLUSTER (IC) DTCS FROM BOTH THE CONTINUOUS AND ON-DEMAND SELF-TESTS

- Check the recorded instrument cluster (IC) DTCs from the continuous and on-demand self-test.

Are any instrument cluster (IC) DTCs recorded?

Yes	REFER to Instrument Cluster (IC) Diagnostic Trouble Code (DTC) Index in this section.
No	For an inoperative speedometer, GO to G5. For an inoperative odometer, GO to G3.

G3 MONITOR THE MESSAGE CENTER CIRCUIT DISPLAYS

- Enter the following diagnostic mode on the scan tool: Instrument Cluster (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 G4.
No	GO to G7.

G4 CHECK FOR CORRUPTED NON-VOLATILE MEMORY (NVM)

- Ignition ON.
- Observe the message center display area.

Does the odometer display ERROR?

Yes	GO to G7.
No	GO to G6.

G5 CARRY OUT THE INSTRUMENT CLUSTER (IC) SPEEDOMETER ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (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 G6.
No	GO to G7.

G6 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.

G7 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 H: The Safety Belt Warning Indicator Is Inoperative/Does Not Operate Correctly

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

Normal Operation

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 instrument cluster (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 instrument cluster (IC).

Possible Causes

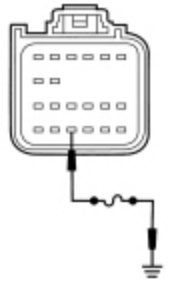
- Circuit 1083 (LB/PK) open, short to ground voltage
- RCM
- Instrument cluster (IC)

PINPOINT TEST H : THE SAFETY BELT WARNING INDICATOR IS INOPERATIVE/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.

H1 CHECK THE SAFETY BELT WARNING INDICATOR OPERATION

- Deactivate the supplemental restraint system (SRS). Refer to Section 501-20B.
- Ignition OFF.
- Disconnect: RCM C2041A .
- Connect a fused (10A) jumper wire between the RCM C2041A Pin 22, circuit 1083 (LB/PK), harness side and ground.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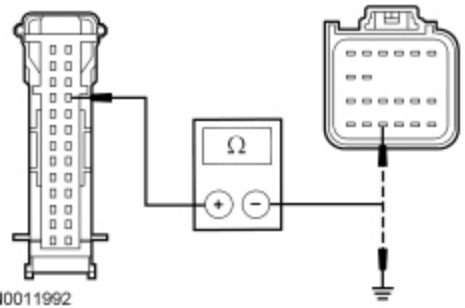
- Observe the safety belt warning indicator with the jumper wire connected and disconnected.
- Ignition ON.

Does the safety belt warning indicator lamp illuminate with the jumper wire disconnected, and turn off when the jumper wire is connected?

Yes	GO to H5.
No	GO to H2.

H2 CHECK CIRCUIT 1083 (LB/PK) FOR AN OPEN OR A SHORT TO GROUND

- Ignition OFF.
- Disconnect: Instrument Cluster (IC) C220 .
- Measure the resistance between the instrument cluster (IC) C220 Pin 23, circuit 1083 (LB/PK), harness side and the RCM C2041A Pin 22, circuit 1083 (LB/PK), harness side; and between the instrument cluster (IC) C220 Pin 23, circuit 1083 (LB/PK), harness side and ground.



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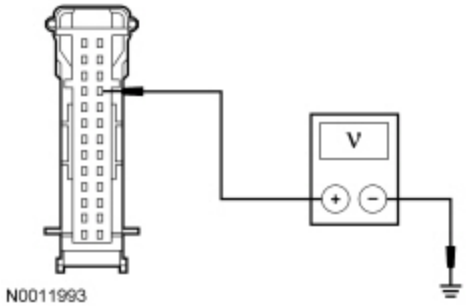
Is the resistance less than 5 ohms between the instrument cluster (IC) and the RCM, and greater than 10,000 ohms between the instrument cluster (IC) and ground?

Yes	GO to H3.
No	REPAIR the circuit. ACTIVATE the SRS. REFER to Section 501-20B. TEST the system for normal operation.

H3 CHECK CIRCUIT 1083 (LB/PK) FOR A SHORT TO VOLTAGE

- Ignition ON.
- Measure the voltage between the instrument cluster (IC) C220 Pin 23, circuit 1083 (LB/PK), harness side and ground.



Is any voltage present?

Yes	REPAIR the circuit. ACTIVATE the SRS. REFER to Section 501-20B. TEST the system for normal operation.
No	GO to H4.

H4 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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.

H5 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.

Pinpoint Test I: The 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 O/D off status is transmitted to the instrument cluster (IC) from the powertrain control module (PCM) over the communication network.

Possible Causes

- PCM
- Instrument cluster (IC)

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

I1 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 I2.

I2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) O/D OFF active command on and off. Observe the O/D OFF indicator.

Does the O/D OFF indicator illuminate when selected on, and turn off when selected off?

Yes	GO to I4.
No	GO to I3.

I3 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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.

I4 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 J: The Check Fuel Cap Warning Indicator Is Never/Always On

Normal Operation

The powertrain control module (PCM) monitors the fuel tank evaporative emission system for significant leaks that occur following refueling of the vehicle. If the PCM detects that the fuel cap has been left off following vehicle refueling, the PCM sends a message to the instrument cluster (IC) over the communication network to turn on the check fuel

cap warning indicator.

DTC P0457 — sets in the PCM if the PCM detects a fuel tank pressure change greater than -23.7 kPa (-7 in-Hg) of water within 30 seconds after refueling occurs, or if there is an excessive purge (fuel vapor) flow of greater than 0.45 gm/s (0.06 lb) per minute.

Possible Causes

- PCM
- Instrument cluster (IC)

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

J1 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 J2.

J2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICTOR LAMP ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) check fuel cap indicator on and off. Observe the check fuel cap indicator.

Does the check fuel cap indicator illuminate when selected on, and turn off when selected off?

Yes	GO to J4.
No	GO to J3.

J3 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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.

J4 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 K: The Brake Warning Indicator Is Never/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

When the parking brake is applied, circuit 1309 (RD/YE) to the smart junction box (SJB) is grounded by the parking brake switch through circuit 1205 (BK). The SJB receives the ground signal and sends the instrument cluster (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) is routed back to the SJB on the signal return circuit 512 (TN/LG). When a base brake system concern is detected, the anti-lock brake system (ABS) module sends a signal to the instrument cluster (IC) over the communication network to illuminate the brake system warning indicator.

DTC B2479 — sets on-demand if the SJB detects that the parking brake is applied during the on-demand self-test or if there is a short to ground on the parking brake input circuit 1309 (RD/YE).

DTC C1189 — sets on-demand or 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).

Possible Causes

- Circuit 512 (TN/LG) open or short to ground
- Circuit 547 (LG/YE) open or short to ground
- Circuit 1205 (BK) open
- Circuit 1309 (RD/YE) open or short to ground
- Parking brake switch
- Brake fluid level switch
- SJB

- Instrument cluster (IC)

PINPOINT TEST K : THE BRAKE 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.

K1 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 K4. For DTC C1189, GO to K9. All other SJB DTCs, REFER to the Smart Junction Box (SJB) Diagnostic Trouble Code (DTC) Index.
No	GO to K2.

K2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) brake warning indictor active command on and off. Observe the brake warning indicator.

Does the brake warning indicator illuminate when selected on, and turn off when selected off?

Yes	GO to K3.
No	GO to K13.

K3 CHECK THE PARKING BRAKE SWITCH PID

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: SJB Parking Brake Switch PID.
- Monitor the SJB parking brake switch PID while applying and releasing the parking brake.

Does the PID agree with the parking brake position?

Yes	GO to K9.
No	If the PID indicates that the parking brake is always applied, GO to K4. If the PID indicates that the parking brake is never applied, GO to K6.

K4 CHECK THE PARKING BRAKE SWITCH (INDICATOR ALWAYS ON)

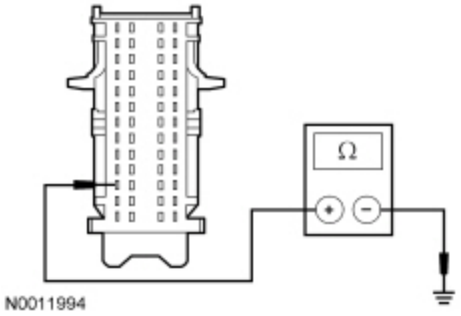
- Disconnect: Parking Brake Switch C306 .
- Observe the brake warning indicator.

Does the brake warning indicator continue to illuminate?

Yes	GO to K5.
No	INSTALL a new parking brake switch. CLEAR the DTCs. REPEAT the self-test.

K5 CHECK CIRCUIT 1309 (RD/YE) FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect: SJB C2280C .
- Measure the resistance between the SJB C2280C Pin 50, circuit 1309 (RD/YE), harness side and ground.

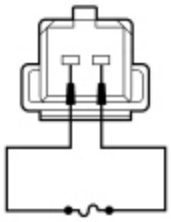


Is the resistance greater than 10,000 ohms?

Yes	GO to K14.
No	REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

K6 CHECK THE PARKING BRAKE SWITCH (INDICATOR INOPERATIVE)

- Disconnect: Parking Brake Switch C306 .
- Connect a fused (5A) jumper wire between the parking brake switch C306 Pin 1, circuit 1309 (RD/YE), harness side and the parking brake switch C306 Pin 2, circuit 1205 (BK), harness side.

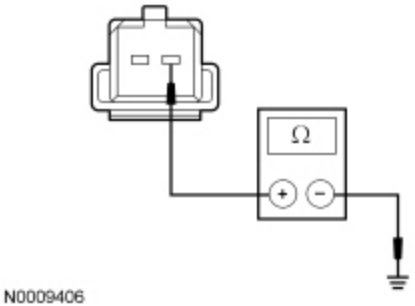


Does the brake warning indicator illuminate?

Yes	INSTALL a new parking brake switch. CLEAR the DTCs. REPEAT the self-test.
No	REMOVE the jumper wire. GO to K7.

K7 CHECK CIRCUIT 1205 (BK) FOR AN OPEN

- Ignition OFF.
- Measure the resistance between the parking brake switch C306 Pin 2, circuit 1205 (BK), harness side and ground.



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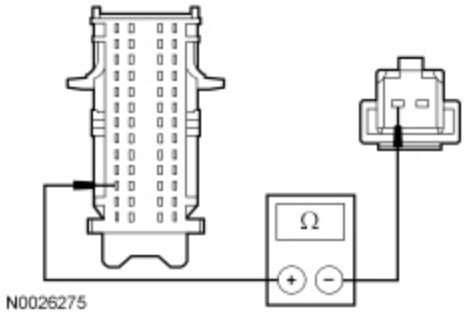
Is the resistance less than 5 ohms?

Yes	GO to K8.
No	REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

K8 CHECK CIRCUIT 1309 (RD/YE) FOR AN OPEN

- Disconnect: SJB C2280C .
- Measure the resistance between the SJB C2280C Pin 50, circuit 1309 (RD/YE), harness side and the parking brake switch C306 Pin 1, circuit 1309 (RD/YE), harness side.



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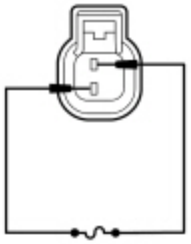
Is the resistance less than 5 ohms?

Yes	GO to K14.
No	REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

K9 CHECK THE SJB OPERATION USING THE SCAN TOOL

- Enter the following diagnostic mode on the scan tool: SJB Brake Fluid Level PID.
- Ignition OFF.
- Disconnect: Brake Fluid Level Switch C124 .
- Ignition ON.
- Monitor the brake fluid level PID.
- Connect a fused (10A) jumper wire between the brake fluid level switch C124 Pin 1, circuit 547 (LG/YE), harness side and the brake fluid level switch C124 Pin 2, circuit 512 (TN/LG), harness side.



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Does the PID indicate OK with the brake fluid level switch disconnected, and indicate low brake fluid level when the jumper wire is in place?

Yes	REMOVE the jumper wire. GO to K10.
No	REMOVE the jumper wire. GO to K11.

K10 CHECK THE BRAKE FLUID LEVEL SWITCH PID USING THE SCAN TOOL

- Enter the following diagnostic mode on the scan tool: SJB Brake Fluid Level PID.
- Connect: Brake Fluid Level Switch C124 .
- Ignition ON.
- **NOTICE: Do not spill brake fluid onto painted or plastic surfaces. If spilled, wipe up immediately before damage to the painted or plastic surface occurs.**

  Using a suitable tool, lightly push the brake fluid level float to the bottom of the reservoir. Monitor the SJB brake fluid PID.

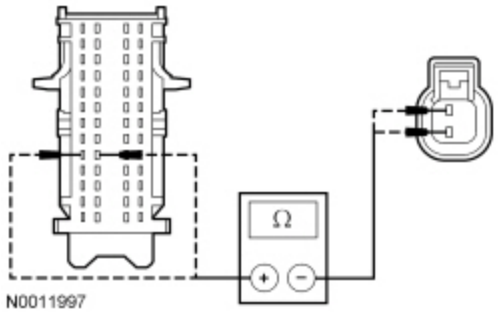
Does the PID indicate low fluid level with the brake fluid level float pushed down, and indicate normal with the brake fluid level float released?

Yes	GO to K14.
No	INSTALL a new brake fluid level switch. TEST the system for normal operation.

K11 CHECK CIRCUITS 512 (TN/LG) AND 547 (LG/YE) FOR AN OPEN

- Ignition OFF.
- Disconnect: SJB C2280C .

- Measure the resistance between the SJB C2280C Pin 35, circuit 512 (TN/LG), harness side and the brake fluid level switch C124 Pin 2, circuit 512 (TN/LG), harness side; and between the SJB C2280C Pin 48, circuit 547 (LG/YE), harness side and the brake fluid level switch C124 Pin 1, circuit 547 (LG/YE), harness side.

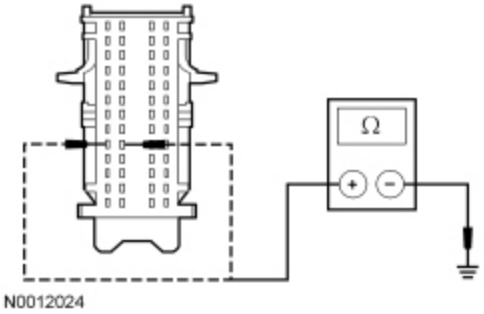


Are the resistances less than 5 ohms?

Yes	GO to K12.
No	REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.

K12 CHECK CIRCUITS 512 (TN/LG) AND 547 (LG/YE) FOR A SHORT TO GROUND

- Measure the resistance between the SJB C2280C Pin 35, circuit 512 (TN/LG), harness side and ground; and between the SJB C2280C Pin 48, circuit 547 (LG/YE), harness side and ground.



Are the resistances greater than 10,000 ohms?

Yes	GO to K14.
No	REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.

K13 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect all the instrument cluster (IC) connectors.
- Check for:
  - corrosion
  - damaged pins

- pushed-out pins
- Connect all the instrument cluster (IC) 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 instrument cluster (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.

K14 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 L: The Charging System Warning Indicator Is Never/Always On

Normal Operation

The charging system warning indicator is controlled by the instrument cluster (IC) based upon data received from the powertrain control module (PCM) over the communication network.

Possible Causes

- Charging system
- PCM
- Instrument cluster (IC)

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

L1 CHECK THE CHARGING SYSTEM FOR CORRECT OPERATION

- Check the charging system operation. Refer to Section 414-00.

Is the charging system operating correctly?

Yes	GO to L2.
No	REFER to Section 414-00.

L2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) charging system warning indicator active command on. Observe the charging system warning indicator.

Is the charging system warning indicator illuminated?

Yes	GO to L3.
No	GO to L4.

L3 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.

L4 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 M: 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.

Possible Causes

- SJB
- Instrument cluster (IC)

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

M1 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 M2.
No	REFER to Section 417-01.

M2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) high beam indicator active command on and off. Observe the high beam indicator.

Does the high beam indicator illuminate when selected on, and turn off when selected off?

Yes	GO to M4.
No	GO to M3.

M3 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins

- Connect the instrument cluster (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 instrument cluster (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.

M4 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.

Pinpoint Test N: 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 smart junction box (SJB) through the communication network, and the left or the right turn signal indicator flashes on and off.

Possible Causes

- SJB
- Instrument cluster (IC)

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

N1 CHECK THE TURN SIGNAL LAMPS OPERATION

- Ignition ON.
- Operate the LH and RH turn signals.

Do the turn signals operate correctly?

Yes	GO to N2.

No	REFER to Section 417-01.

N2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) all warning lamps active command on and off. Observe the LH and RH turn signal indicators.

Do the LH and RH turn signal indicators illuminate when selected on, and turn off when selected off?

Yes	GO to N4.
No	GO to N3.

N3 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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.

N4 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.

Pinpoint Test O: The Anti-Lock Brake System (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 instrument cluster (IC) monitors the ABS input and illuminates the ABS warning indicator when a concern is present.

Possible Causes

- ABS module
- Instrument cluster (IC)

PINPOINT TEST O : THE ANTI-LOCK BRAKE SYSTEM (ABS) WARNING INDICATOR IS NEVER/ALWAYS ON

O1 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 O2.

O2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) ABS warning indicator active command on and off. Observe the ABS warning indicator.

Does the ABS warning indicator illuminate when selected on, and turn off when selected off?

Yes	GO to O3.
No	GO to O4.

O3 CHECK FOR CORRECT ABS MODULE OPERATION

- Disconnect the ABS module connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the ABS module 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 ABS module. REFER to Section 206-09. 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.

O4 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 P: 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 oil pressure switch is a normally open switch that is hardwired to the smart junction box (SJB) through circuit 208 (GY). When the oil pressure is within normal ranges, the oil pressure switch closes, grounding the signal to the SJB. The SJB then sends a command signal to the instrument cluster (IC) through the communication network, to turn off the oil pressure warning indicator. When engine oil pressure is low, the oil pressure switch opens, removing the ground to the SJB. The SJB sends a low oil pressure command to the instrument cluster (IC) through the communication network to illuminate the oil pressure warning indicator.

Possible Causes

- Circuit 208 (GY) open or short to ground
- Engine oil pressure switch
- SJB
- Instrument cluster (IC)

PINPOINT TEST P : 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.

P1 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.

- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) low oil pressure warning indicator active command on and off. Observe the low oil pressure warning indicator.

Does the low oil pressure warning indicator illuminate when selected on, and turn off when selected off?

Yes	If the low oil pressure warning indicator is never on, GO to P2. If the low oil pressure warning indicator is always on, GO to P4.
No	GO to P8.

P2 CHECK THE OIL PRESSURE SWITCH

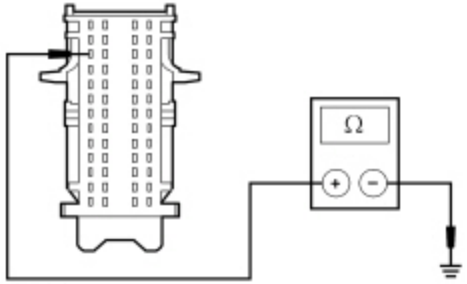
- Ignition OFF.
- Disconnect: Engine Oil Pressure Switch C103 .
- Ignition ON.
- With the oil pressure switch disconnected, monitor the low oil pressure warning indicator.

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 P3.

P3 CHECK CIRCUIT 208 (GY) FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect: SJB C2280C .
- Disconnect: Engine Oil Pressure Switch C103 .
- Measure the resistance between the SJB C2280C Pin 42, circuit 208 (GY), harness side and ground.



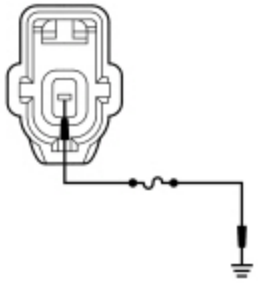
N0012025

Is the resistance greater than 10,000 ohms?

Yes	GO to P7.
No	REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

P4 CHECK THE OIL PRESSURE SWITCH

- Ignition OFF.
- Disconnect: Oil Pressure Switch C103 .
- Connect a fused (5A) jumper wire between the oil pressure switch C103 Pin 1, circuit 208 (GY), harness side and ground.


N0002760

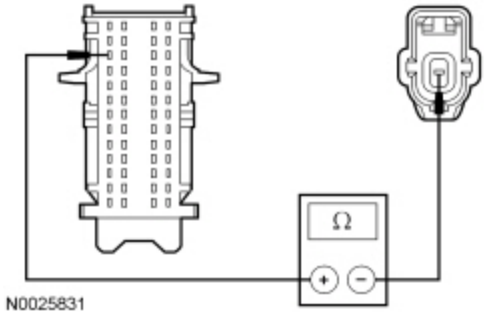
- Ignition ON.

Does the low oil pressure warning indicator illuminate?

Yes	REMOVE the jumper wire. GO to P5.
No	REMOVE the jumper wire. GO to P6.

P5 CHECK CIRCUIT 208 (GY) FOR AN OPEN

- Ignition OFF.
- Disconnect: SJB C2280C .
- Measure the resistance between the SJB C2280C Pin 42, circuit 208 (GY), harness side and the engine oil pressure switch C103 Pin 1, circuit 208 (GY), harness side.



Is the resistance less than 5 ohms?

Yes	GO to P8.
No	REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

P6 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.

P7 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.

P8 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 Q: The Malfunction Indicator Lamp (MIL) Is Never/Always On

Normal Operation

The MIL is controlled by the instrument cluster (IC) using data sent from the powertrain control module (PCM) over the communication network.

Possible Causes

- PCM
- Instrument cluster (IC)

PINPOINT TEST Q : THE MALFUNCTION INDICATOR LAMP (MIL) IS NEVER/ALWAYS ON

Q1 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 Q2.

Q2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICTOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.

- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) warning MIL indicator active command on and off. Observe the MIL indicator.

Does the MIL indicator illuminate when selected on, and turn off when selected off?

Yes	GO to Q4.
No	GO to Q3.

Q3 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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.

Q4 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 R: 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 provides an indication that there is a restraint system concern present and the air bag may be inoperative or have degraded performance. If the instrument cluster (IC) does not receive the air bag warning indicator command over circuit 608 (BK/YE), the instrument cluster (IC) illuminates the air bag warning indicator.

Possible Causes

- Circuit 608 (BK/YE) open or short to ground
- Restraints control module (RCM)
- Instrument cluster (IC)

PINPOINT TEST R : 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.

R1 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 R2.

R2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) air bag warning indicator active command on and off. Observe the air bag warning indicator.

Does the air bag warning indicator illuminate when selected on, and turn off when selected off?

Yes	If the air bag indicator is never on, GO to R5. If the air bag indicator is always on, GO to R3.
No	GO to R6.

R3 CHECK THE RCM FOR CORRECT OPERATION

- Deactivate the supplemental restraint system (SRS). Refer to Section 501-20B.
- Ignition OFF.
- Disconnect: RCM C2041A .
- Connect a fused (5A) jumper wire between the RCM C2041A Pin 19, circuit 608 (BK/YE), harness side and ground.

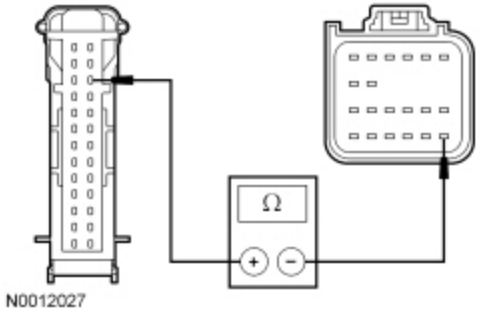
- Ignition ON.

Does the air bag indicator lamp illuminate after the instrument cluster (IC) proves out?

Yes	REMOVE the jumper wire. GO to R4.
No	REMOVE the jumper wire. GO to R8.

R4 CHECK CIRCUIT 608 (BK/YE) FOR AN OPEN

- Ignition OFF.
- Disconnect: Instrument Cluster (IC) C220 .
- Measure the resistance between the instrument cluster (IC) C220 Pin 24, circuit 608 (BK/YE), harness side and the RCM C2041A Pin 19, circuit 608 (BK/YE), harness side.



Is the resistance less than 5 ohms?

Yes	GO to R7.
No	REPAIR the circuit. REACTIVATE the SRS. REFER to Section 501-20B. TEST the system for normal operation.

R5 ISOLATE THE RCM

- Ignition OFF.
- Deactivate the SRS. Refer to Section 501-20B.
- Disconnect: RCM C2041A .

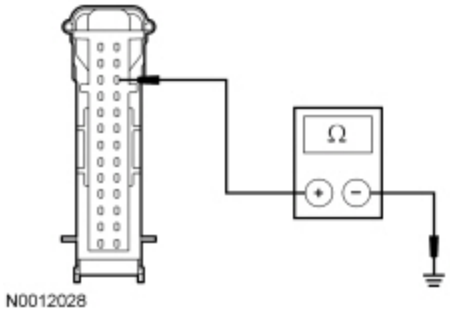
- Observe the air bag warning indicator.
- Ignition ON.

Does the air bag warning indicator illuminate?

Yes	GO to R8.
No	GO to R6.

R6 CHECK CIRCUIT 608 (BK/YE) FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect: Instrument Cluster (IC) C220 .
- Measure the resistance between the instrument cluster (IC) C220 Pin 24, circuit 608 (BK/YE), harness side and ground.



Is the resistance greater than 10,000 ohms?

Yes	GO to R7.
No	REPAIR the circuit. ACTIVATE the SRS. REFER to Section 501-20B. TEST the system for normal operation.

R7 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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.

R8 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.

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

Normal Operation

The speed control status information is sent to the instrument cluster (IC) from the powertrain control module (PCM) over the communication network.

Possible Causes

- PCM
- Instrument cluster (IC)

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

S1 CHECK THE SPEED CONTROL OPERATION

- Test drive the vehicle and operate the speed control.

Does the speed control operate correctly?

Yes	GO to S2.
No	REFER to Section 310-03.

S2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.

- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) speed control indicator active command on and off. Observe the speed control indicator.

Does the speed control indicator illuminate when selected on, and turn off when selected off?

Yes	GO to S3.
No	GO to S4.

S3 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.

S4 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 T: The Powertrain Malfunction (Wrench) Warning Indicator is Never/Always On

Normal Operation

The instrument cluster (IC) receives the electronic throttle control (ETC) status from the powertrain control module (PCM) over the communication network. When a system concern is detected, the PCM sends the instrument cluster (IC) a command signal to illuminate the powertrain malfunction (wrench) warning indicator.

Possible Causes

- PCM
- Instrument cluster (IC)

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

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 DTCs recorded?

Yes	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.
No	GO to T2.

T2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) wrench warning indicator active command on and off. Observe the powertrain malfunction (wrench) warning indicator.

Does the powertrain malfunction (wrench) warning indicator illuminate when selected on, and turn off when selected off?

Yes	GO to T4.
No	GO to T3.

T3 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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.

T4 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 U: The Failsafe Cooling Warning Indicator Is Never/Always On

Normal Operation

The failsafe cooling warning indicator informs the driver that the engine coolant is overheating due to loss of engine coolant fluid or other cause, and that the powertrain control module (PCM) is taking on limp home strategy. The other purpose is to inform the driver the engine cannot be cooled enough with the limp home strategy and the engine is about to be shut down by the PCM. The failsafe cooling information is sent from the PCM to the instrument cluster (IC) to illuminate the failsafe cooling warning indicator.

Possible Causes

- PCM
- Instrument cluster (IC)

PINPOINT TEST U : THE FAILSAFE COOLING WARNING INDICATOR IS NEVER/ALWAYS ON

U1 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 U2.

U2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) failsafe warning indicator active command on and off. Observe the failsafe cooling warning indicator.

Does the failsafe cooling warning indicator illuminate when selected on, and turn off when selected off?

Yes	GO to U3.
No	GO to U4.

U3 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.

U4 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 V: The Door Ajar Warning Indicator Is Inoperative/Does Not Operate Correctly

Normal Operation

The door ajar indicator informs the driver if any of the doors, or the decklid is not completely closed. The information is sent from the smart junction box (SJB) to the instrument cluster (IC) over the communication network.

Possible Causes

- SJB
- Instrument cluster (IC)

PINPOINT TEST V : THE DOOR AJAR WARNING INDICATOR IS INOPERATIVE/DOES NOT OPERATE CORRECTLY

V1 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 V2.
No	REFER to Section 417-02.

V2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument door ajar warning indicator active command on and off. Observe the door ajar warning indicator.

Does the door ajar warning indicator illuminate when selected on, and turn off when selected off?

Yes	GO to V3.
No	GO to V4.

V3 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.

V4 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion

- damaged pins
- pushed-out pins

- Connect the instrument cluster (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 instrument cluster (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 W: 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 malfunction in the traction control system by illuminating the indicator constantly (not flashing).

Possible Causes

- Anti-lock brake system (ABS) module
- Instrument cluster (IC)

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

W1 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) traction control indicator active command on and off. Observe the traction control indicator.

Does the traction control indicator illuminate when selected on, and turn off when selected off?

Yes	GO to W3.
No	GO to W2.

W2 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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.

W3 CHECK FOR CORRECT ABS MODULE OPERATION

- Disconnect the ABS module connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the ABS module 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 ABS module. REFER to Section 206-09. 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 X: The Daytime Running Lamps (DRL) Indicator Is Never/Always On

Normal Operation

When the 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.

Possible Causes

- SJB
- Instrument cluster (IC)

PINPOINT TEST X : THE DAYTIME RUNNING LAMPS (DRL) INDICATOR IS NEVER/ALWAYS ON

X1 CHECK THE DRL OPERATION

- Check the operation of the DRL.

Does the DRL operate correctly?

Yes	GO to X2.
No	REFER to Section 417-01.

X2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.

- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) all warning lamps active command on and off. Observe the DRL indicator.

Does the DRL indicator illuminate when selected on, and turn off when selected off?

Yes	GO to X4.
No	GO to X3.

X3 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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.

X4 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.

Pinpoint Test Y: 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 instrument cluster (IC) receives the data, the fuel gauge indicates low fuel and the instrument cluster (IC) illuminates the low fuel warning indicator.

Possible Causes

- Instrument cluster (IC)

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

Y1 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) low fuel warning indicator active command on and off. Observe the low fuel warning indicator.

Does the low fuel warning indicator illuminate when selected on and turn off when selected off?

Yes	GO to Y2.
No	GO to Y3.

Y2 CHECK THE FUEL GAUGE FOR CORRECT OPERATION

- Ignition ON.
- Check the fuel gauge.

Does the fuel gauge operate correctly?

Yes	GO to Y3.
No	GO to Pinpoint Test A.

Y3 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 Z: The Performance Shift Warning Indicator Is Never/Always On (GT 500 Only)

Normal Operation

The performance shift 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 performance shift indicator receives the engine rpm status from the powertrain control module (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.

Possible Causes

- PCM
- Instrument cluster (IC)

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

Z1 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 Z2.
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.

Z2 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 there any DTCs retrieved?

Yes	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.
No	GO to Z3.

Z3 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) indicator lamp control.
- Select the performance shift indicator active command on then off again while observing the performance shift indicator.

Does the performance shift indicator turn on when commanded on and turn off when commanded off?

Yes	GO to Z4.
No	GO to Z5.

Z4 CHECK FOR CORRECT PCM OPERATION

- Disconnect all PCM connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect all 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 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.

Z5 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect all instrument cluster (IC) connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect all instrument cluster (IC) 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 instrument cluster (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 AA: The Shift Indicator Is Never/Always On (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 powertrain control module (PCM) over the high speed controller area network (HS-CAN) communication bus lines.

Possible Causes

- PCM
- Instrument cluster (IC)

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

AA1 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 there any DTCs retrieved?

Yes	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.
No	GO to AA2.

AA2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) indicator lamp control.
- Select the gear shift up indicator active command on then off again while observing the shift indicator.

Does the shift indicator turn on when commanded on and turn off when commanded off?

Yes	GO to AA3.
No	GO to AA4.

AA3 CHECK FOR CORRECT PCM OPERATION

- Disconnect all PCM connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect all 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 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.

AA4 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect all instrument cluster (IC) connectors.
- Check for:

    - corrosion
    - damaged pins
    - pushed-out pins
- Connect all instrument cluster (IC) 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 instrument cluster (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 AB: The Tire Pressure Monitoring System (TPMS) Warning Indicator Is Never/Always On

Normal Operation

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 instrument cluster (IC) and the instrument cluster (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 instrument cluster (IC) and the instrument cluster (IC) flashes the TPMS warning indicator. If the TPMS status message is invalid or missing for more than 5 seconds, the instrument cluster (IC) flashes the TPMS warning indicator for 75 seconds then turns the indicator on steady.

Possible Causes

- TPMS concern
- SJB
- Instrument cluster (IC)

PINPOINT TEST AB : THE TIRE PRESSURE MONITORING SYSTEM (TPMS) WARNING INDICATOR IS NEVER/ALWAYS ON

AB1 CHECK THE INSTRUMENT CLUSTER (IC) CONFIGURATION

- Verify that the TPMS is configured on in the instrument cluster (IC) using as-built data. Refer to Section 418-01.

Is the TPMS configured on?

Yes	GO to AB2.
No	CONFIGURE the TPMS in the instrument cluster (IC). REFER to Section 418-01.

AB2 RETRIEVE THE RECORDED DTCS FROM BOTH THE CONTINUOUS AND ON-DEMAND SJB SELF-TESTS

- Retrieve the recorded DTCs from the SJB continuous and on-demand self-tests.

Are there any SJB DTCs retrieved?

Yes	REFER to Section 419-10.

No	GO to AB3.

AB3 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) indicator lamp control.
- Select the tire pressure indicator active command on then off again while observing the TPMS warning indicator.

Does the TPMS warning indicator turn on when commanded on and turn off when commanded off?

Yes	GO to AB4.
No	GO to AB5.

AB4 CHECK FOR CORRECT SJB OPERATION

- Disconnect all SJB connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect all 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 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.

AB5 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect all instrument cluster (IC) connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect all instrument cluster (IC) 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 instrument cluster (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 AC: 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. PATS also flashes the anti-theft indicator every 2 seconds at ignition OFF to act as a visual theft deterrent.

Possible Causes

- PCM
- Instrument cluster (IC)

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

AC1 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 there 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 AC2.

AC2 CARRY OUT THE INSTRUMENT CLUSTER (IC) INDICATOR LAMP CONTROL ACTIVE COMMAND

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) indicator lamp control.
- Select the anti-theft indicator active command on then off again while observing the shift indicator.

Does the anti-theft indicator turn on when commanded on and turn off when commanded off?

Yes	GO to AC3.
No	GO to AC4.

AC3 CHECK FOR CORRECT PCM OPERATION

- Disconnect all PCM connectors.
- Check for:
  - corrosion
  - damaged pins

- pushed-out pins
- Connect all 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 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.

AC4 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect all instrument cluster (IC) connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect all instrument cluster (IC) 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 instrument cluster (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 AD: 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 instrument cluster (IC) receives its keep-alive voltage from the SJB through circuit 1001 (WH/YE). The instrument cluster (IC) is grounded through circuit 1205 (BK).

DTC B1556 — is set continuous DTC and on-demand if the instrument cluster (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 instrument cluster (IC) run/start circuit 489 (PK/BK).

Possible Causes

- Fuse(s)
- Circuit 489 (PK/BK) open
- Circuit 1001 (WH/YE) open
- Circuit 1205 (BK) open
- Circuit 1266 (RD/YE) open

- Instrument cluster (IC)

PINPOINT TEST AD : THE INSTRUMENT CLUSTER (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.

AD1 CHECK THE INSTRUMENT CLUSTER (IC) VOLTAGE SUPPLY

- Ignition OFF.
- Disconnect: Instrument Cluster (IC) C220 .
- Ignition ON.
- Measure the voltage between the instrument cluster (IC), harness side and ground as follows:

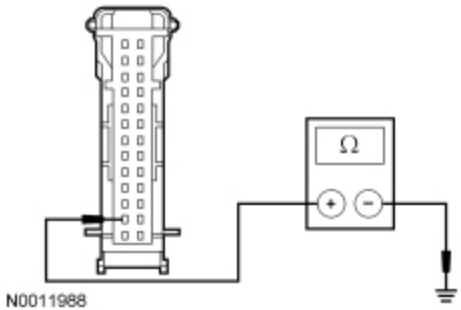
Instrument Cluster (IC) Connector-Pin	Circuit
C220 Pin 3	1001 (WH/YE)
C220 Pin 25	1266 (RD/YE)
C220 Pin 26	489 (PK/BK)

Are the voltages greater than 10 volts?

Yes	GO to AD2.
No	VERIFY the SJB fuses 8 (10A), 16 (5A), and 19 (5A) are OK. If OK, REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.

AD2 CHECK CIRCUIT 1205 (BK) FOR AN OPEN

- Ignition OFF.
- Measure the resistance between the instrument cluster (IC) C220 Pin 2, circuit 1205 (BK) harness side and ground.



Is the resistance less than 5 ohms?

Yes	GO to AD3.
No	REPAIR the circuit. TEST the system for normal operation.

AD3 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 AE: 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 instrument cluster (IC) through circuits 1410 (TN/OG) and 1411 (GY/OG). The message center switches use a different resistance value for each switch, allowing the instrument cluster (IC) to determine which switch is pressed.

Possible Causes

- Message center switch
- Instrument cluster (IC)

PINPOINT TEST AE : THE MESSAGE CENTER IS NOT OPERATING CORRECTLY

AE1 CHECK THE MESSAGE CENTER DISPLAY OPERATION USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) Active Command.
- Select the instrument cluster (IC) display segment control active command on. Observe 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 AF.
No	GO to AE2.

AE2 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.

- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 AF: 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 — is a continuous and on-demand DTC that sets if the instrument cluster (IC) detects any of the message center buttons pressed.

Possible Causes

- Circuit 1410 (TN/OG) open, short to ground or voltage
- Circuit 1411 (GY/OG) open, short to ground or voltage
- Message center switch
- Instrument cluster (IC)

PINPOINT TEST AF : 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.

AF1 RETRIEVE THE RECORDED DTCS FROM BOTH THE CONTINUOUS AND ON-DEMAND INSTRUMENT CLUSTER (IC) SELF-TESTS

- Check the recorded instrument cluster (IC) DTCs from the continuous and on-demand self-tests.

Are any instrument cluster (IC) DTCs recorded?

Yes	For DTC B1205, GO to AF3. For all other instrument cluster (IC) DTCs, REFER to Section 419-10.
No	GO to AF2.

AF2 CHECK THE INSTRUMENT CLUSTER (IC) PID FOR THE MESSAGE CENTER SWITCH USING THE SCAN TOOL

- Ignition ON.

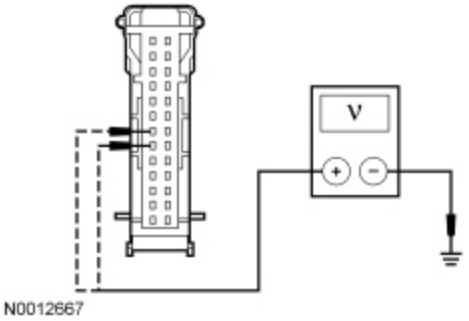
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) PIDs.
- Select and monitor the instrument cluster (IC) message center switch PIDs, INFOSW, SETUPSW and RES_SW while pressing each message center switch (INFO, SETUP, and RESET).

Does the PID agree with the switch position?

Yes	GO to AF6.
No	GO to AF3.

AF3 CHECK CIRCUITS 1410 (TN/OG) AND 1411 (GY/OG) FOR A SHORT TO VOLTAGE

- Ignition ON.
- Measure the voltage between the instrument cluster (IC) C220 Pin 7, circuit 1410 (TN/OG), harness side and ground; and between the instrument cluster (IC) C220 Pin 6, circuit 1411 (GY/OG), harness side and ground.

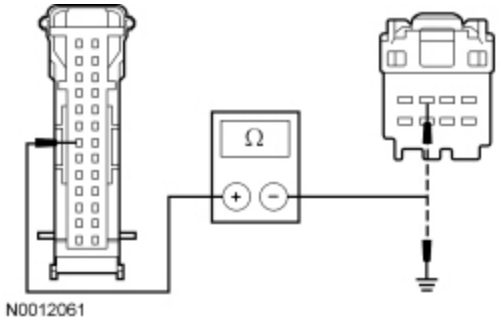


Is any voltage present?

Yes	REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.
No	GO to AF4.

AF4 CHECK CIRCUIT 1410 (TN/OG) FOR AN OPEN AND SHORT TO GROUND

- Ignition OFF.
- Disconnect: Instrument Cluster (IC) C220 .
- Disconnect: Message Center Switch C253 .
- Measure the resistance between the instrument cluster (IC) C220 Pin 7, circuit 1410 (TN/OG), harness side and the message center switch C253 Pin 3, circuit 1410 (TN/OG), harness side; and between the instrument cluster (IC) C220 Pin 7, circuit 1410 (TN/OG), harness side and ground.



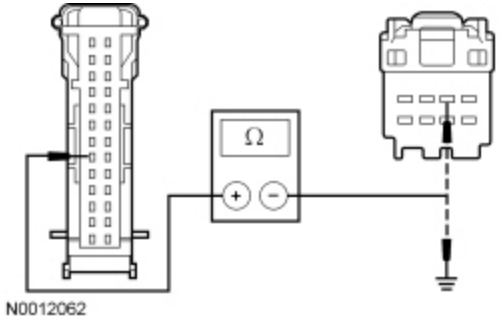
N0012061

Is the resistance less than 5 ohms between the instrument cluster (IC) and the message center switch, and greater than 10,000 ohms between the instrument cluster (IC) and ground?

Yes	GO to AF5.
No	REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

AF5 CHECK CIRCUIT 1411 (GY/OG) FOR AN OPEN AND SHORT TO GROUND

- Measure the resistance between the instrument cluster (IC) C220 Pin 6, circuit 1411 (GY/OG), harness side and the message center switch C253 Pin 2, circuit 1411 (GY/OG), harness side; and between the instrument cluster (IC) C220 Pin 6, circuit 1411 (GY/OG), harness side and ground.



N0012062

Is the resistance less than 5 ohms between the instrument cluster (IC) and the message center switch, and greater than 10,000 ohms between the instrument cluster (IC) and ground?

Yes	INSTALL a new message center switch. REFER to Message Center Switch in this section. CLEAR the DTCs. REPEAT the self-test.
No	REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

AF6 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins

    - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 AG: 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 instrument cluster (IC) the key is inserted into the ignition lock cylinder. If the instrument cluster (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 instrument cluster [IC]) sounds.

DTC B1353 — is a continuous and on-demand DTC that sets if the instrument cluster (IC) detects a run/start input on circuit 489 (PK/BK) with no key-in-ignition input on circuit 1414 (LG/VT).

Possible Causes

- Circuit 1414 (LG/VT) open
- Key-in-ignition switch (part of the ignition switch)
- Instrument cluster (IC)

PINPOINT TEST AG : 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.

AG1 CHECK FOR DRIVER DOOR AJAR INPUT TO THE SMART JUNCTION BOX (SJB)

- Check the operation of the interior lamps while opening and closing the driver door.

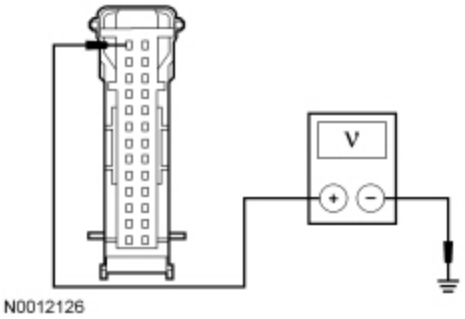
Do the interior lamps operate correctly?

Yes	GO to AG2.
No	REFER to Section 417-02 to continue diagnosis of the interior lamps.

AG2 CHECK THE INPUT TO THE INSTRUMENT CLUSTER (IC) FOR DTC B1353

- Ignition OFF.

- Disconnect: Instrument Cluster (IC) C220 .
- Insert the ignition key into the ignition lock cylinder.
- Measure the voltage between the instrument cluster (IC) C220 Pin 13, circuit 1414 (LG/VT), harness side and ground.

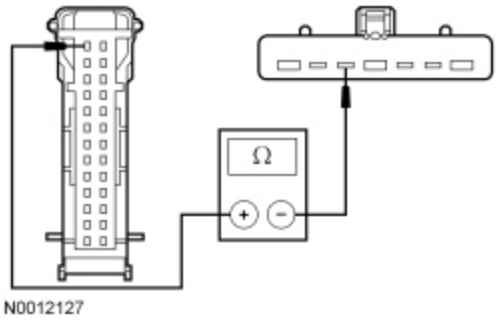


Is the voltage greater than 10 volts?

Yes	GO to AG4.
No	GO to AG3.

AG3 CHECK CIRCUIT 1414 (LG/VT) FOR AN OPEN

- Disconnect: Ignition Switch C250 .
- Measure the resistance between the instrument cluster (IC) C220 Pin 13, circuit 1414 (LG/VT), harness side and the ignition switch C250 Pin 5, circuit 1414 (LG/VT), harness side.



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.

AG4 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:

    - corrosion
    - damaged pins
    - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 AH: 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 instrument cluster (IC) over the medium speed controller area network (MS-CAN). The instrument cluster (IC) interprets this signal and sounds the headlamps on warning chime.

Possible Causes

- SJB

PINPOINT TEST AH : THE HEADLAMPS ON WARNING CHIME IS INOPERATIVE

AH1 CHECK THE EXTERIOR LIGHTING

- Check the operation of the exterior lighting.

Does the exterior lighting operate correctly?

Yes	GO to AH2.
No	REFER to Section 417-01 to continue diagnosis of the exterior lighting.

AH2 CHECK THE OPERATION OF THE KEY-IN IGNITION WARNING CHIME

- Verify the key-in-ignition warning chime operates correctly.

Does the key-in-ignition warning chime operate correctly?

Yes	GO to AH3.
No	GO to Pinpoint Test AG.

AH3 CHECK FOR CORRECT SJB OPERATION

- Disconnect all of the SJB connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect all of 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.

Pinpoint Test AI: 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 instrument cluster (IC) the key is inserted into the ignition lock cylinder. If the instrument cluster (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 instrument cluster [IC]) sounds.

Possible Causes

- Circuit 1414 (LG/VT) short to voltage
- Key-in-ignition switch (part of the ignition switch)
- Instrument cluster (IC)

PINPOINT TEST AI : 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.

AI1 CHECK THE INSTRUMENT CLUSTER (IC) ILLUMINATION

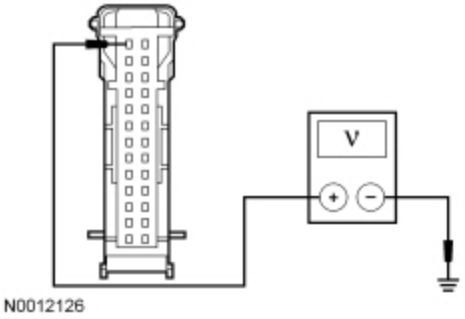
- Check the operation of the instrument cluster (IC) illumination.

Does the instrument cluster (IC) illumination operate correctly?

Yes	GO to AI2.
No	REFER to Section 413-00 to continue diagnosis of the instrument cluster (IC) illumination.

AI2 CHECK THE INPUT TO THE INSTRUMENT CLUSTER (IC)

- Ignition OFF.
- Disconnect: Instrument Cluster (IC) C220 .
- Remove the ignition key from the ignition lock cylinder.
- Measure the voltage between the instrument cluster (IC) C220 Pin 13, circuit 1414 (LG/VT), harness side and ground.

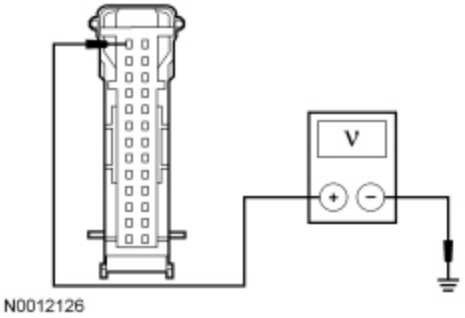


Is any voltage present?

Yes	GO to AI3.
No	GO to AI4.

AI3 CHECK CIRCUIT 1414 (LG/VT) FOR A SHORT TO VOLTAGE

- Disconnect: Ignition Switch C250 .
- Measure the voltage between the instrument cluster (IC) C220 Pin 13, circuit 1414 (LG/VT), harness side and ground.



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.

AI4 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 AJ: The Performance Shift Warning Chime Does Not Operate Correctly

Normal Operation

The chime feature on/off status and the desired rpm for the chime to sound are configurable items that are configured through the message center. The instrument cluster (IC) uses actual engine rpm sent to the instrument cluster (IC) over the high speed controller area network (HS-CAN) communication lines 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 instrument cluster (IC) sounds the chime

Possible Causes

- Instrument cluster (IC) configuration
- Instrument cluster (IC)

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

AJ1 CHECK THE INSTRUMENT CLUSTER (IC) CONFIGURATION

- Verify that the performance warning shift chime (tone) is configured on and that the desired rpm setting is configured. Refer to the Owner's Literature for additional information.

Is the performance shift chime (tone) configured on and the desired rpm selected?

Yes	GO to AJ2.
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.

AJ2 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion

    - damaged pins
    - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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 AK: DTC B1557 — Ignition RUN/START Circuit Short To Battery

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 instrument cluster (IC) receives its keep-alive voltage from the SJB through circuit 1001 (WH/YE). The instrument cluster (IC) is grounded through circuit 1205 (BK).

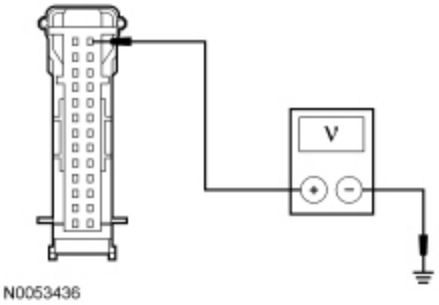
DTC B1557 — is a continuous DTC that sets if the instrument cluster (IC) receives a voltage input on circuit 489 (PK/BK) and a message from the SJB indicating that the ignition switch has transitioned to the OFF or ACC position.

Possible Causes

- Circuit 489 (PK/BK) short to voltage
- SJB
- Instrument cluster (IC)

PINPOINT TEST AK : DTC B1557 — IGNITION RUN/START CIRCUIT SHORT TO BATTERY

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.
AK1 CHECK THE INSTRUMENT CLUSTER (IC) VOLTAGE SUPPLY
• Ignition OFF. • Disconnect: Instrument Cluster (IC) C220 . • Measure the voltage between the instrument cluster (IC) C220 Pin 26, circuit 489 (PK/BK), harness side and ground.



Is voltage present?

Yes	REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
No	GO to AK2.

AK2 CHECK THE SJB IGNITION SWITCH PIDS

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: SJB Ignition Switch PIDs.
- Monitor the SJB ignition switch PIDs while moving the ignition switch from the RUN/START position to the OFF and ACC positions.

Do the PIDs agree with the ignition switch position?

Yes	GO to AK3.
No	VERIFY that all SJB controlled systems function correctly. GO to AK4.

AK3 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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.

AK4 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 AL: Incorrect Speedometer Indication

Normal Operation

Vehicle speed information is sent to the instrument cluster (IC) by the powertrain control module (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. Factors that could potentially affect the accuracy of the speedometer are configurable items such as tire size and axle ratio configuration.

Possible Causes

- Tire size configuration
- Axle ratio configuration
- PCM concern
- Instrument cluster (IC)

PINPOINT TEST AL : 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.*

AL1 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 AL2.
No	CONFIGURE the tire size. TEST the system for normal operation.

AL2 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 AL3.
No	CONFIGURE the axle ratio. TEST the system for normal operation.

AL3 RETRIEVE THE RECORDED DTCS FROM THE PCM KEY ON ENGINE OFF (KOEO) SELF-TEST

- Check for recorded PCM DTCs from the 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 AL4.

AL4 RETRIEVE THE RECORDED DTCS FROM THE INSTRUMENT CLUSTER (IC) SELF-TEST

- Check for recorded DTCs from the instrument cluster (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 AL5.

AL5 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 AL6.
No	GO to AL8.

AL6 CARRY OUT THE INSTRUMENT CLUSTER (IC) SPEEDOMETER ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Instrument Cluster (IC) DataLogger.
- Select the instrument cluster (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 AL7.
No	GO to AL8.

AL7 CHECK THE PCM VEHICLE SPEED SENSOR (VSS) PID

- Enter the following diagnostic mode on the scan tool: PCM DataLogger.
- 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?

Yes	The speedometer is operating correctly at this time.
No	GO to AL8.

AL8 CHECK FOR CORRECT INSTRUMENT CLUSTER (IC) OPERATION

- Disconnect the instrument cluster (IC) connector.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect the instrument cluster (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 instrument cluster (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.