





Instrumentation, Message Center and Warning Chimes

Special Tool(s)

| | |
|---|---|
|  | Fluke 77-1V Digital Multimeter FLU77-4 or equivalent |
|  | Instrument Gauge System Tester 014-R1063 or equivalent |
|  | Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool |
|  | Flex Probe Kit NUD105-R025D or equivalent |

Principles of Operation

NOTE: When installing a new Instrument Panel Cluster (IPC) , it is necessary to upload the module configuration to the scan tool. Following installation of the IPC , download the module configuration from the scan tool into the new IPC . Refer to [Section 418-01](#) to carry out Programmable Module Installation (PMI) . It is also necessary to carry out a parameter reset procedure whenever a new IPC or PCM is installed. Refer to [Section 419-01B](#).

The IPC , message center and warning chimes utilize a microprocessor to control the gauge and indicator functions. Data is sent to the IPC over the Medium Speed Controller Area Network (MS-CAN) and the High Speed Controller Area Network (HS-CAN) bus lines and through hardwired circuitry from individual components. The IPC uses each input to output an action to the gauges or indicators.

It is very important to understand:

- where the input originates.
- all the information necessary in order for a feature to operate.
- which module(s) receive(s) the input or command message.
- does the module which received the input control the output of the feature, or does it output a message over the communication network to another module.
- which module controls the output of the feature.

Instrument Panel Cluster (IPC)

IPC Gateway Function

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

IPC Network Messages

The IPC uses input messages from other modules to control the gauges, informational indicators and warning indicators over the communication networks. If a required message is missing or invalid for less than 5 seconds, the gauge or indicator that requires the message remains at the last commanded state based upon the last known good message. For example, if the brake status message is missing for less than 5 seconds and the brake warning indicator was on, the indicator remains in the on state until the next good message is received. If the message remains missing or invalid for more than 5 seconds, the IPC sets a U-code DTC and the output becomes a default action for the indicator or gauge. Each indicator or gauge utilizes a different default strategy depending on the nature of the indication. Refer to the normal operation descriptions located before each individual pinpoint test for further description of the default action specific to each indicator or gauge. If the messaged input to the cluster returns at any time, the normal function of the gauge or indicator resumes.

NOTE: Whenever a network message is suspected as missing and confirmed by a missing message DTC (U-code), it is important to look for other symptoms that may also be present in the IPC and throughout the vehicle. Once a DTC is set in the IPC , it may be helpful to review the complete message list available in [Section 418-00](#) to see what other modules also rely on the same message and run the self-test for those modules. If the message is missing from other modules, the same DTC may also be set in those modules.

Confirmation of missing messages common to multiple modules may indicate that the originating module is the source of the concern or the communication network may be experiencing some problems.

IPC Configuration

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

| Customer Preference | As-Built Parameter | State Description |
|---------------------|---|---|
| — | ABS | <ul style="list-style-type: none"> • Enabled |
| — | Ambient Color | <ul style="list-style-type: none"> • Enabled • Enabled |
| — | Auto Lamp | <ul style="list-style-type: none"> • Enabled • Disabled |
| — | Auto Lock | <ul style="list-style-type: none"> • Enabled |
| — | Auto High Beams | <ul style="list-style-type: none"> • No auto high beams |
| — | Auto Unlock | <ul style="list-style-type: none"> • Enabled |
| — | Belt-Minder® | <ul style="list-style-type: none"> • Enabled |
| — | Compass | <ul style="list-style-type: none"> • Compass • No compass |
| Default Language | — | <ul style="list-style-type: none"> • English |
| — | Engine Type | <ul style="list-style-type: none"> • Gas |
| — | Electronic Stability Control (ESC) | <ul style="list-style-type: none"> • Enabled |
| — | Electronic Power Assist Steering (EPAS) | <ul style="list-style-type: none"> • Enabled |
| — | Electronic Power Assist Steering (EPAS) Selectable Effort | <ul style="list-style-type: none"> • Enabled |
| — | Gauge Color | <ul style="list-style-type: none"> • Enabled • Disabled |
| — | Gear Select | <ul style="list-style-type: none"> • Automatic transmission • Manual transmission |

| Customer Preference | As-Built Parameter | State Description |
|---------------------|--|--|
| — | Gulf Coast Country Destination | <ul style="list-style-type: none"> • Gulf coast country • Non-gulf coast country |
| — | Halo Color | <ul style="list-style-type: none"> • Enabled • Disabled |
| — | Integrated Keyhead Transmitter (IKT) Programming | <ul style="list-style-type: none"> • Enabled |
| — | Japan Destination | <ul style="list-style-type: none"> • Japan • Non-Japan |
| — | Key_In_Ignition Chime | <ul style="list-style-type: none"> • Enabled |
| — | MyKey® | <ul style="list-style-type: none"> • Enabled |
| — | Navigation | <ul style="list-style-type: none"> • Enabled • Disabled |
| — | Oil Life | <ul style="list-style-type: none"> • Enabled |
| — | Oil Minder | <ul style="list-style-type: none"> • Enabled |
| — | Passive Entry Passive Start (<u>IA</u>) | <ul style="list-style-type: none"> • Enabled |
| — | PDS Available | <ul style="list-style-type: none"> • Enabled |
| — | Reverse Park Aid | <ul style="list-style-type: none"> • Enabled • Disabled |
| — | RSC_ESC Chime Warning | <ul style="list-style-type: none"> • Enabled |
| — | Speedometer Bias | <ul style="list-style-type: none"> • Enabled • Disabled |
| — | Splash screen | <ul style="list-style-type: none"> • No splash screen (base <u>IPC</u>) • Optional <u>IPC</u> splash screen • GT500 <u>IPC</u> splash screen |
| — | Tank Configuration | <ul style="list-style-type: none"> • Saddle tank |
| — | Tank Selection | <ul style="list-style-type: none"> • Base • Shelby |

| Customer Preference | As-Built Parameter | State Description |
|---------------------|--|--|
| — | Tire Pressure Monitoring System (TPMS) | <ul style="list-style-type: none"> • Enabled |
| — | Track Applications | <ul style="list-style-type: none"> • Enabled • Disabled |
| Track Key | — | <ul style="list-style-type: none"> • Enabled |
| — | <u>TCM</u> | <ul style="list-style-type: none"> • Enabled (automatic transmission) • Disabled (manual transmission) |
| — | Transmission Type | <ul style="list-style-type: none"> • Automatic transmission • Manual transmission |
| — | Virtual Gauges | <ul style="list-style-type: none"> • Enabled • Disabled |
| — | Welcome Strategy | <ul style="list-style-type: none"> • Enabled |

IPC Software Flashing

The IPC is capable of receiving updated software after the end of line production. This updating is called software flashing and is only carried out when a TSB provides the direction to do so. Follow all instructions in the TSB when flashing the IPC when carrying out the flashing procedure.

IPC Prove-Out

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

| Indicator | Indicator Type | Prove-Out Duration |
|----------------------------------|----------------|--------------------|
| ABS | Warning | 3 seconds |
| Air bag | Warning | 6 seconds |
| Brake | Warning | 3 seconds |
| Charging system | Informational | Engine start up |
| Cruise control | Informational | No prove-out |
| Door ajar | Informational | No prove-out |
| Engine over-temperature | Warning | 3 seconds |
| Grade assist | Informational | No prove-out |
| High beam | Informational | No prove-out |
| Low engine oil pressure | Warning | Engine startup |
| Low fuel | Informational | 3 seconds |
| Malfunction Indicator Lamp (MIL) | Warning | Engine startup |

| Indicator | Indicator Type | Prove-Out Duration |
|--|----------------|---|
| Powertrain malfunction (wrench) (base <u>IPC</u> only) | Informational | 3 seconds |
| RH/LH turn signal | Informational | No prove-out |
| Safety belt | Warning | 65 seconds if the safety belt is unbuckled, turns off when the safety belt is buckled |
| Stability/traction control (sliding car icon) | Informational | 3 seconds |
| Stability/traction control disabled (sliding car OFF icon) | Informational | 3 seconds |
| Tire Pressure Monitoring System (TPMS) | Warning | 3 seconds |
| Upshift indicator (GT500) | Informational | Engine startup |
| SVT performance shift indicator (GT500) | Informational | No prove-out |

Information And Message Center

The message center is an integral part of the IPC that receives and acts upon much of the same information that is input and used to operate the IPC gauges, informational. indicators, warning indicators and warning chimes. The message center is a 2-line display located in the center (optional or GT500 IPC) or the right side (base IPC) of the IPC . All message center functions are controlled by a 3-button or 5-way message center switch, which is hardwired to the IPC . The message center switch consists of 3 buttons and a resistor ladder with a different resistor associated with each switch button. The IPC sends out a reference voltage to the message center switch and monitors the voltage drop that results from the voltage flowing through the resistor when a message center button is pressed. The voltage drop varies depending upon the resistance of each button, providing a specific indication to the IPC which switch is pressed.

Electronic Compass (Without Navigation)

The compass display (located in the Front Display Interface Module (FDIM)) receives battery voltage from the SJB . The compass module (integral to the auto-dimming interior mirror) provides hardwired vehicle directional inputs to the IPC , which sends the compass information to the FDIM over the Medium Speed Controller Area Network (MS-CAN) . The compass is capable of self-calibrating. This decreases the need to manually set the compass. If the compass is displaying a heading (and not displaying the C or CAL indicator), the compass is in auto-calibration mode. In this mode, the compass automatically calibrates for changes in vehicle magnetics over the life of the vehicle. This auto-calibration mode makes sure the compass heading is always accurate. If the compass displays the C or CAL indicator for an extended period of time (longer than 5 seconds), this indicates the compass has been placed in the manual calibration mode and therefore, requires manual calibration.

Warning Chimes

The IPC uses inputs that are hardwired to individual components and messages that are sent from the other modules over the HS-CAN or MS-CAN to control the warning chime functions.

Warning Chime Characteristics

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

There are 3 different chimes as listed below:

- Repetitive
- Single tone
- Tick-tock

The following table provides a summary of the chime characteristics:

IPC Chime Characteristics

| Chime Name | Chime Type | Condition/Description |
|---------------------------------|------------|---|
| Air bag warning chime | Repetitive | Consists of 5 sets of chime sequences that make up a chime cycle. Each chime sequence consists of 5 one-second chime tones followed by a 5-second delay. |
| Belt-Minder® A/B | Repetitive | The chime sounds 6 one-second chime tones/safety belt warning indicator flash sequences for as long as the <u>IPC</u> receives the Belt-Minder® chime request. |
| Door/trunk ajar warning chime | Single | 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 | Repetitive | The headlamps on warning chime is activated when the <u>IPC</u> receives the parking lamps ON message from the <u>SJB</u> , 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. |
| Key-in-ignition | Repetitive | When the key-in-ignition switch closes, it sends a voltage signal to the <u>IPC</u> , 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 <u>IPC</u> 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. |
| Message center | Single | The message center warning chime accompanies any initial warning message display, as well as any repeated initial warning message. 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 <u>IPC</u> . When a switch is pressed, it routes the signal through a specific resistor in the switch assembly and then to ground. |
| Parking brake on | Repetitive | The chime sounds repetitive tones for as long as the parking brake is applied and the <u>IPC</u> receives the chime on command. |
| Performance shift warning chime | Single | The performance shift warning chime provides an audible alert to inform the driver to shift the transmission gear. |
| Perimeter alarm | Repetitive | The chime sounds 3 sequences of chime tones. The first sequence sounds 12 tones when the driver door is opened using a key and the alarm is armed. The second sequence sounds 9 chime tones followed by the third sequence of 12 tones. |
| Safety belt | Repetitive | The chime sounds 6 times or as long as the safety belt is unbuckled and the <u>IPC</u> receives the chime on command. |
| Turn signal left on | Repetitive | Repetitive chime tone for as long as the RH or LH turn signal is on, the vehicle has travelled 3.2 km (2.0 miles) and the <u>IPC</u> receives the chime on command. |
| Turn signal | Tick-tock | Repetitive tick-tock tone for as long as the RH or LH turn signal command is received by the <u>IPC</u> . |

Air Bag Secondary Warning Chime

The air bag secondary warning chime warns that the air bag warning indicator light does not work correctly. The IPC monitors the air bag warning indicator status internally. When a fault is present in the air bag warning indicator and the IPC receives an air bag warning indicator on request from the Restraints Control Module (RCM) , the air bag secondary warning chime sounds.

The air bag secondary warning chime inputs are:

- Ignition state.
- Air bag warning indicator chime request communicated by the RCM to the IPC .

Belt-Minder®

The Belt-Minder® is configurable. To configure without using a scan tool, refer to [Belt-Minder® Deactivating/Activating](#) in this section.

The Belt-Minder® feature supplements the current safety belt warning function and is enabled after the current safety belt warning is complete. The Belt-Minder® reminds the driver that the driver or passenger safety belt is unbuckled by intermittently and simultaneously sounding a chime and illuminating the safety belt warning indicator in the IPC once the vehicle speed has exceeded 9.7 km/h (6 mph). The Belt-Minder® remains active for 5 minutes from the time it is started.

While activated, the Belt-Minder® chime provides a series of 6 chime/safety belt warning indicator flash sequences that when combined make up a chime cycle. Each chime/safety belt warning indicator sequence consists of a one-second chime tone and safety belt warning indicator on/off state. The Belt-Minder® chime and the safety belt warning indicator sound and flash for 6 seconds, then the chime stops and the safety belt warning indicator remains on for 30 seconds. The IPC repeats the chime cycle for 5 minutes.

If the vehicle speed drops below 5 km/h (3 mph) once the Belt-Minder® chime has activated, the chime turns off and the safety belt warning indicator remains on. When the vehicle speed exceeds 9.7 km/h (6 mph) again, the Belt-Minder® chime resumes.

The IPC also provides a toll booth feature which allows the driver or passenger to unbuckle their safety belt after the safety belts were initially buckled, providing 1 minute without warnings after the vehicle exceeds 9.7 km/h (6 mph) again with a safety belt unbuckled.

When a MyKey® programmed key is in use, the driver cannot configure the Belt-Minder® off. Once the Belt-Minder® is activated, the Belt-Minder® continues to chime periodically (does not time out after 5 minutes) and the audio system is muted until the driver and passenger safety belts are fastened. Refer to [Section 419-01B](#) for more information on the MyKey® feature.

The Belt-Minder® warning chime inputs are the:

- Ignition state
- Driver or passenger safety belt warning chime request communicated by the RCM to the IPC through the HS-CAN .

Headlamps On Warning Chime

The headlamps on warning chime warns that the headlamps are on when the driver door is ajar and the key is removed from the ignition lock cylinder. The headlamps on warning chime sounds if the driver door is ajar and the headlamp switch is in the PARK or HEADLAMP position when the ignition is OFF with the key out.

The headlamps on warning chime stops sounding when any one of the above conditions are removed.

The headlamps on warning chime inputs are:

- Ignition state.
- Key-in-ignition status to the SJB .
- Door ajar input from the driver door ajar switch to the SJB .
- Headlamp switch input to the SJB .
- Headlamps on chime request communicated by the SJB to the IPC through the MS-CAN .

Key-In-Ignition Warning Chime

The key-in-ignition warning chime warns that the key is still in the ignition lock cylinder when the driver door is ajar. The key-in-ignition warning chime sounds when the driver door is ajar, the key is in the ignition lock cylinder and in the OFF or ACC position.

The key-in-ignition warning chime stops sounding when the driver door is closed, the key is removed from the ignition lock cylinder, or if the ignition switch is turned to the ON position.

The key-in-ignition warning chime inputs are:

- Ignition state.
- Key-in-ignition switch position to the SJB .
- Door ajar input from the driver door ajar switch to the SJB .
- Key-in-ignition chime request communicated by the SJB to the IPC through the MS-CAN .

Message Center Warning Chime

The message center warning chime feature draws the driver's attention to the message center display to view a new warning message or message center warning indicator displayed. The IPC provides a single one-second tone whenever a new warning message is displayed in the message center. If multiple warning messages are present, the IPC sounds a chime for each of the warning messages that are present.

Parking Brake Warning Chime

The parking brake warning chime warns that the parking brake is engaged when the vehicle is in motion. The parking brake warning chime sounds if the ignition is in RUN mode, the parking brake is engaged, and the vehicle speed is more than 5 km/h (3 mph).

The parking brake warning chime stops sounding if the parking brake is released, the ignition is not in the RUN mode, if the vehicle speed is less than 5 km/h (3 mph), or after 90 seconds from the time the chime is activated.

The parking brake warning chime inputs are:

- Ignition state.
- Parking brake switch status communicated by the SJB to the IPC through the MS-CAN .
- Vehicle speed data communicated by the PCM to the SJB through the MS-CAN .
- Parking brake warning chime request communicated by the SJB to the IPC .

Performance Shift Warning Chime

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

Perimeter Alarm Chime

The perimeter alarm chime warning alerts the driver that the perimeter alarm is armed when the driver door is unlocked with a key. The perimeter alarm warning chime is only functional when a key is used to unlock the driver door. If the Integrated Keyhead Transmitter (IKT) key is used to unlock the door, the perimeter alarm is disarmed and the perimeter alarm warning chime does not sound. The perimeter alarm warning chime sounds for 12 seconds when the driver door is opened and turns off when the perimeter alarm is disarmed (either by using the IKT key or turning the key to the ON position). After the 12-second chime duration, the chime stops sounding and the perimeter alarm activates, sounding the horn and flashing the turn signal lights.

The perimeter alarm chime inputs are:

- Ignition state.
- Passive Anti-Theft System (PATS) armed/disarmed status.
- Driver door ajar input to the SJB .
- Perimeter alarm chime request from the SJB to the IPC through the MS-CAN .

Safety Belt Warning Chime

The safety belt warning chime warns that the safety belt is not fastened. The safety belt warning chime sounds for 6 seconds when the driver's safety belt is not fastened and the ignition switch is transitioned from the OFF or ACC position to the ON or START position.

The safety belt warning chime stops sounding when the safety belt is fastened, when the ignition is switched from the ON or START position to the OFF or ACC position, or when the chime has sounded for approximately 6 seconds.

The safety belt warning chime inputs are:

- Ignition state.
- Driver's safety belt warning chime request communicated by the RCM to the IPC through the HS-CAN .

Turn Signal Left On Warning Chime

The turn signal left on warning chime warns that the turn signal has not been cancelled. The turn signal left on warning chime sounds if the left or right turn signal is on and the vehicle has traveled more than 3.2 km (2.0 miles).

The turn signal left on warning chime stops sounding if the turn signal is turned off, or if the ignition is switched to the OFF or ACC position.

The turn signal left on warning chime inputs are:

- Ignition state.
- Turn signal on data communicated by the SJB to the IPC through the MS-CAN .
- Odometer rolling count data communicated by the PCM to the IPC through the HS-CAN .

Turn/Hazard On Tone

Since the turn/hazard flasher is an electronic function of the SJB , the on/off sound that used to be present with standard bi-metal flashers is no longer present. To provide an audible sound and indicate that the RH/LH turn or hazard indicators are on, the IPC provides a tick-tock tone along with the visual turn signal indicators.

The turn/hazard on tone inputs are:

- Left turn indicator signal from the SJB to the IPC through the MS-CAN .
- Right turn indicator signal from the SJB to the IPC through the MS-CAN .
-

Inspection and Verification

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

Visual Inspection Chart

| Mechanical | Electrical |
|---|--|
| <ul style="list-style-type: none"> • Accessory drive belt • Brake fluid level • Compass module (integral to the auto-dimming interior mirror) • Door/trunk ajar status • Engine coolant level • Engine oil level • Front Display Interface Module (FDIM) • Fuel evaporative system • Fuel tank • Tire pressure • Tire size | <ul style="list-style-type: none"> • Smart Junction Box (SJB) fuse(s): <ul style="list-style-type: none"> ▪ 14 (10A) (FDIM) ▪ 26 (10A) (Instrument Panel Cluster (IPC)) ▪ 36 (5A) (IPC) ▪ 41 (15A) (compass module) • Wiring, terminals or connectors • Message center switch • Key-in ignition warning switch (part of the ignition switch) • SJB • IPC |

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

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

If the cause is not visually evident, connect the scan tool to the Data Link Connector (DLC) .

5. **NOTE:** *The Vehicle Communication Module (VCM) LED prove-out confirms power and ground from the [DLC](#) are provided to the [VCM](#) .*

If the scan tool does not communicate with the [VCM](#) :

- Check the [VCM](#) connection to the vehicle.
- Check the scan tool connection to the [VCM](#) .
- Refer to [Section 418-00](#), No Power To The Scan Tool, to diagnose no power to the scan tool.

6. If the scan tool does not communicate with the vehicle:

- Verify the ignition key is in the ON position.
- Verify the scan tool operation with a known good vehicle.
- Refer to [Section 418-00](#) to diagnose no response from the PCM.

7. Carry out the network test.

- If the scan tool responds with no communication for one or more modules, refer to [Section 418-00](#).
- If the network test passes, retrieve and record the continuous memory DTCs.

8. Clear the continuous DTCs and carry out the self-test diagnostics for the [IPC](#) , ABS module, PCM, [SJB](#) and Restraints Control Module (RCM) .

9. If the DTCs retrieved are related to the concern, go to DTC Charts. For all other DTCs, refer to the DTC Chart in [Section 419-10](#).

10. If no DTCs related to the concern are retrieved, GO to [Symptom Chart — Instrument Panel Cluster \(IPC\)](#), GO to [Symptom Chart — Information And Message Center](#) or GO to [Symptom Chart — Warning Chimes](#).

Instrument Panel Cluster (IPC) Dealer Test Mode

To enter the [IPC](#) self-diagnostic mode, begin with the ignition key in the OFF position. Press and hold the message center RESET button. Turn the key to the RUN position and hold the RESET button until the display indicates ENGINEERING TEST MODE, usually within 3 to 5 seconds. Press the RESET button once to advance through each stage of the self-test. To exit the [IPC](#) dealer test mode, turn the ignition to the OFF position.

NOTE: *If the message center detects a non-resettable fault condition that it is reporting out on such as door ajar, the dealer test mode session cannot be entered until the fault condition has been corrected and the message removed. If the dealer test mode session is interrupted by the fault condition display (such as door ajar), the session can be resumed by pressing the RESET button.*

NOTE: *Some of the displays listed in the table below use xxx's to represent a numeric or alpha-numeric value. The value may display the same amount of characters represented by the xxx's or there may be more/less depending on the type of display. For example: VEHICLE SPEED xxxx.x MPH may display VEHICLE SPEED 25 MPH. Note that there were 4 x's in the display description but only 2 digits in the actual display.*

Dealer Test Mode Data — Base IPC

| First Line Display | Second Line Display | Description |
|----------------------|---------------------|--|
| ENGINEERING | TEST MODE | Initial entry display into the self-test mode. |
| GAUGE | TEST | Carries out the gauge sweep of all gauges, then displays the present gauge values. Also carries out the checksum test on Read-Only Memory (ROM) . |
| All segments | — | Carries out the prove-out of all dot matrix pixels in all characters. |
| TELLTALE | TEST | Illuminates all the microprocessor-controlled lamps and LEDs. |
| PART NUMBER | XXXX-XX | Return to normal operation of all microprocessor-controlled lamps/LEDs and displays the alpha-numeric prefix and suffix of the <u>IPC</u> part number. |
| <u>ROM</u> LEVEL | \$XXXX | Displays the hexadecimal Read-Only Memory (ROM) level and type. |
| <u>NVM</u> ROM LEVEL | \$XXXX | Displays the software release date in mm/dd/yy format stored in Non-Volatile Memory (NVM) . |
| EEPROM LEVEL | \$XX | Displays the hexadecimal EE level. If an <u>NVM</u> checksum fault exists, the second line displays \$xxx FAIL. |
| MANUFACTURE | DATE XX/XX/XX | Displays hexadecimal coding of the final manufacturing test date. |
| B&A CONFIG | BYTE 1-6 \$XX | Displays hexadecimal coding of vehicle options <u>NVM</u> for lines 1 through 4 of As-Built data. |
| MANUF CONFIG | BYTE 1 \$XX | Displays hexadecimal coding of vehicle options <u>NVM</u> for line 1 of As-Built data for ABS/traction control/interactive vehicle dynamics, oil life threshold, Tire Pressure Monitoring System (TPMS) and Belt-Minder®. |
| CONTINUOUS | DTC \$XXXXXX | Displays DTCs in 16-bit hexadecimal format. DTCs displayed are those detected in continuous operation not during self-test. If no DTCs are present, the DTC: None is displayed. |
| VEHICLE SPEED | XXX.X MPH | Displays the English speed value being inputs in tenths of mph to the Instrument Panel Cluster (IPC) , the speedometer indicates the present filtered speed. If the High Speed Controller Area Network (HS-CAN) message is missing, the second line displays ---.- MPH. If the <u>HS-CAN</u> message is invalid, the second line displays INV MPH. If the vehicle speed input is an unknown value, UNKNOWN MPH is displayed. |
| VEHICLE SPEED | XXX.X km/h | Displays the metric speed value being inputs in tenths of km/h to the <u>IPC</u> , the speedometer indicates the present filtered speed. If the <u>HS-CAN</u> message is missing, the second line displays --.- km/h. If the <u>HS-CAN</u> message is invalid, the second line displays INVALID km/h. If the vehicle speed input is an unknown value, UNKNOWN km/h is displayed. |
| SPEEDOMETER | DC XXXX | Displays corresponding gauge driver counts output for present rpm value (0-4095). |
| TACHOMETER | XXXX RPM | Displays the tachometer value being input in rpm to the <u>IPC</u> . The tachometer indicates the present filtered rpm. If the <u>HS-CAN</u> message is missing, the second line displays ---.- RPM. If the <u>HS-CAN</u> message is invalid, the second line displays INV RPM. If the engine speed input is an unknown value, UNKNOWN RPM is displayed. |
| TACHOMETER | DC XXXX | Displays corresponding gauge driver counts output for present rpm value (0-4095). |
| FUEL 1 LEVEL | XXX INSTANT | Displays the present primary (fuel pump module) unfiltered fuel level. 000-009 = short circuit. 010-254 = normal range. 255 = open. INV = invalid input. |
| FUEL 2 LEVEL | XXX INSTANT | Displays the present secondary (fuel level sender) unfiltered fuel level. 000-009 = short circuit. 010-254 = normal range. 255 = open. INV = invalid input. |
| FUEL 1 LEVEL % | STATUS XXX | Displays present filtered primary (fuel pump module) input for fuel level percent status. 000-254 = normal range. 0255= open or short circuit detected. INV = invalid input. |
| FUEL 2 LEVEL % | STATUS XXX | Displays present filtered secondary (fuel level sender) input for fuel level percent status. 000-254 = normal range. 0255= open or short circuit detected. INV = invalid input. |
| FUELCMB LEVEL % | STATUS XXX | Displays the present combined fuel level percent status in decimal (used by the gauge). |
| FUEL GAUGE | DC \$XX | Displays the present combined fuel level percent status in decimal (used by the gauge). |

| First Line Display | Second Line Display | Description |
|--------------------|---------------------|---|
| INSTANT DTE | XXX MILES | NOTE: This display may differ from the <u>DTE</u> displayed in the <u>INFO</u> menu of the message center due to the use of the unfiltered <u>DTE</u> calculation. --- = invalid input. Displays the calculated (unfiltered) Distance To Empty (DTE) in miles. |
| FUEL 1 ON/OFF/SZ | XXX XXX XXX | Displays the key on, key off, and zero speed samples for the fuel pump module. If the input is invalid, the message center displays --- --- ---. |
| FUEL 2 ON/OFF/SZ | XXX XXX XXX | Displays the key on, key off, and zero speed samples for the secondary fuel level input (fuel level sender). If the input is invalid, the message center displays --- --- ---. |
| F1 #S ON/OFF/SZ | XXX XXX XXX | Displays the number of valid samples used for key on, key off, and zero speed samples for the primary fuel level input (fuel pump module). |
| F2 #S ON/OFF/SZ | XXX XXX XXX | Displays the number of valid samples used for key on, key off, and zero speed samples for the secondary fuel level input (fuel level sender). |
| FUEL LEVEL | INIT REF \$XXXX | Displays the corresponding fuel gauge driver counts output for the filtered fuel level percent status value (0-4095). |
| COOLANT TEMP | XX C | Displays the last engine temperature input value from the PCM over the <u>HS-CAN</u> in degrees C. The engine temperature gauge indicates the present filtered temperature. If the temperature message is missing, the second line displays --- C. If the temperature message is invalid, the second line displays INV C. |
| COOLANT TEMP | DC \$XX | Displays the corresponding gauge driver counts output for the filtered temperature value (0-4095). |
| FAILSAFE | COOL MODE XX | Displays the last engine temperature input value from the PCM over the <u>HS-CAN</u> in degrees C. The engine temperature gauge indicates the present filtered temperature. If the temperature message is missing, the second line displays --- C. If the temperature message is invalid, the second line displays INV C. |
| ODOMETER | XXX COUNTS | Displays the unfiltered odometer rolling count input received over the <u>HS-CAN</u> from the PCM, in decimal. If the odometer rolling count data is missing, the second line displays --- COUNTS. If the odometer rolling count data is invalid, the second line displays INV counts. |
| TRIP ODOMETER | A XXXX.X mi | Displays the trip odometer A value stored in <u>RAM</u> in miles. If the trip A odometer rolling count data is missing or invalid for 5 seconds, the second line displays A ---.-. |
| TRIP ODOMETER | B XXXX.X mi | Displays the trip odometer B value stored in <u>RAM</u> in miles. If the trip B odometer rolling count data is missing or invalid for 5 seconds, the second line displays B ---.-. |
| BATTERY | XX.X VOLTS | Displays the present battery reading in volts at the <u>IPC</u> input pin. |
| BATTERY A/D | COUNTS XXX | Battery analog/digital counts. Displays present battery 10 bit analog/digital counts in decimal. |
| RUN/START | SENSE X | RUN/START sense circuit check. B = voltage detected (circuit is high). O = no voltage detected (circuit is open). |
| DIMMING LITVAL | XXX | Displays the lighting command message in percentage from the <u>SJB</u> over the <u>MS-CAN</u> . If the lighting command message is missing, the second line displays ---. If the lighting command message is invalid, the second line displays INV. |
| DIMMING DIMVAL | XXX | Displays the dimming command message in percentage from the <u>SJB</u> over the <u>MS-CAN</u> . If the dimming command message is missing, the second line displays ---. If the dimming command message is invalid, the second line displays INV. |
| DIMMING STEP | XXX | Displays the actual dimming output in steps from 0-21 (0 indicates dimming off) to the <u>IPC</u> backlighting. |
| DOOR AJAR | STATUS xx | Displays the door ajar status in hexadecimal code received from the <u>SJB</u> over the <u>MS-CAN</u> . If the door ajar status is missing, the message center displays --. |
| GEM INFO | STATUS XX | Displays the <u>MS-CAN</u> <u>SJB</u> information in hexadecimal. If the <u>SJB</u> message is missing, the second line displays STATUS --. |
| ABS INFO | STATUS XX | Displays the <u>HS-CAN</u> ABS module information in hexadecimal. If the ABS message is missing, the second line displays STATUS --. |
| PCM INFO | STATUS XX | Displays the <u>HS-CAN</u> PCM information in hexadecimal. If the PCM message is missing, the second line displays STATUS ----. |

| First Line Display | Second Line Display | Description |
|--------------------|---------------------|---|
| MC SWITCH | XXX RA/D CNTS | Displays current message center switch input analog/digital counts in decimal. 0-48 = short to ground. 49-228 = INFO button pressed. 229-465 = RESET. 466-724 = SETUP button pressed. 725-932 = no button pressed. 933-1023 = open circuit. |
| OPS | RA/D XX | Displays the hardwired engine oil pressure status in decimal received from the engine oil pressure switch. 0-615 = oil pressure switch open (low oil pressure). 820-1023 = oil pressure switch closed (normal oil pressure). |
| LAST CHIME | SOUNDED XXXX | Displays the last chime that sounded. |
| A/D PORT 2-9 | XXX | Displays the 16 bit hexadecimal value of the port analog/digital reading. |
| DIGITAL INPUTS | PORT A, B, C XX | Displays 8 bit hexadecimal value of the digital port readings. |
| DIGITAL INPUTS | HET1 XXXX | Displays the 8 bit hexadecimal value of the port reading. |
| GAUGE | TEST GAUGE | Repeats the test display cycle. |

Dealer Test Mode Data — Optional IPC

| First Line Display | Second Line Display | Description |
|----------------------|---------------------|---|
| ENGINEERING | TEST MODE | Initial entry display into the self-test mode. |
| GAUGE | TEST | Carries out the gauge sweep of all gauges, then displays the present gauge values. Also carries out the checksum test on Read-Only Memory (ROM) . |
| All segments | — | Carries out the prove-out of all dot matrix pixels in all characters. |
| ALL MICRO CONT | BULBS ON | Illuminates all the microprocessor-controlled lamps and LEDs. |
| PART NUMBER | XXXX-XX | Returns to normal operation of all microprocessor-controlled lamps/LEDs and displays the alphanumeric prefix and suffix of the <u>IPC</u> part number. |
| ROM LEVEL | \$XXXX | Displays the hexadecimal Read-Only Memory (ROM) level and type. |
| <u>NVM ROM</u> LEVEL | \$XXXX | Displays the software release date in mm/dd/yy format stored in Non-Volatile Memory (NVM) . |
| EEPROM LEVEL | \$XX | Displays the hexadecimal EE level. If an <u>NVM</u> checksum fault exists, the second line displays \$xxx FAIL. |
| MANUFACTURE | DATE XX/XX/XX | Displays hexadecimal coding of the final manufacturing test date. |
| VOPS CONFIG | BYTE 1-5 \$XX | Displays hexadecimal coding of vehicle options <u>NVM</u> for lines 1 through 4 of As-Built data. |
| MANUF CONFIG | BYTE 1 \$XX | Displays hexadecimal coding of vehicle options <u>NVM</u> for line 1 of As-Built data for ABS/traction control/interactive vehicle dynamics, oil life threshold, Tire Pressure Monitoring System (TPMS) and Belt-Minder®. |
| CONTINUOUS | DTC \$XXXXXX | Displays DTCs in 16-bit hexadecimal format. DTCs displayed are those detected in continuous operation not during self-test. If no DTCs are present, the DTC: None is displayed. |
| VEHICLE SPEED | XXX.X MPH | Displays the English speed value being inputs in tenths of mph to the Instrument Panel Cluster (IPC) , the speedometer indicates the present filtered speed. If the High Speed Controller Area Network (HS-CAN) message is missing, the second line displays ---. MPH. If the <u>HS-CAN</u> message is invalid, the second line displays INV MPH. If the vehicle speed input is an unknown value, UNKNOWN MPH is displayed. |
| VEHICLE SPEED | XXX.X km/h | Displays the metric speed value being inputs in tenths of km/h to the <u>IPC</u> , the speedometer indicates the present filtered speed. If the <u>HS-CAN</u> message is missing, the second line displays --.- km/h. If the <u>HS-CAN</u> message is invalid, the second line displays INVALID km/h. If the vehicle speed input is an unknown value, UNKNOWN km/h is displayed. |

| First Line Display | Second Line Display | Description |
|--------------------|---------------------|---|
| SPEEDOMETER | DC XXXX | Displays corresponding gauge driver counts output for present rpm value (0-4095). |
| TACHOMETER | XXXX RPM | Displays the tachometer value being input in rpm to the <u>IPC</u> . The tachometer indicates the present filtered rpm. If the <u>HS-CAN</u> message is missing, the second line displays ---. RPM. If the <u>HS-CAN</u> message is invalid, the second line displays INV RPM. If the engine speed input is an unknown value, UNKNOWN RPM is displayed. |
| TACHOMETER | DC XXXX | Displays corresponding gauge driver counts output for present rpm value (0-4095). |
| FUEL 1 LEVEL | FLPS IN XXXX | Displays present filtered primary (fuel pump module) input for fuel level percent status. 000-254 = normal range. 0255= open or short circuit detected. INV = invalid input. |
| FUEL 2 LEVEL | FLPS IN XXXX | Displays present filtered secondary (fuel level sender) input for fuel level percent status. 000-254 = normal range. 0255= open or short circuit detected. INV = invalid input. |
| FUELCMB FILT | % STATUS XXXX | Displays the present combined fuel level percent status in decimal (used by the gauge). |
| FUEL GAUGE | DC \$XX | Displays the present combined fuel level percent status in decimal (used by the gauge). |
| INSTANT DTE | XXX MILES | NOTE: This display may differ from the <u>DTE</u> displayed in the <u>INFO</u> menu of the message center due to the use of the unfiltered <u>DTE</u> calculation. --- = invalid input. Displays the calculated (unfiltered) Distance To Empty (DTE) in miles. |
| FUEL1ON/OFF/SZ | XXX XXX XXX | Displays the number of valid samples used for key on, key off, and zero speed samples for the primary fuel level input (fuel pump module). |
| FUEL2ON/OFF/SZ | XXX XXX XXX | Displays the number of valid samples used for key on, key off, and zero speed samples for the secondary fuel level input (fuel level sender). |
| F1#S ON/OFF/SZ | XXX XXX XXX | Displays the number of valid samples used for key on, key off, and zero speed samples for the secondary fuel level input (fuel level sender). |
| F2# ON/OFF/SZ | XXX XXX XXX | Displays the number of valid samples used for key on, key off, and zero speed samples for the secondary fuel level input (fuel level sender). |
| FUEL LEVEL | INIT REF \$XXXX | Displays the corresponding fuel gauge driver counts output for the filtered fuel level percent status value (0-4095). |
| COOLANT TEMP | XX C | Displays the last engine temperature input value from the PCM over the <u>HS-CAN</u> in degrees C. The engine temperature gauge indicates the present filtered temperature. If the temperature message is missing, the second line displays --- C. If the temperature message is invalid, the second line displays INV C. |
| COOLANT TEMP | DC \$XX | Displays the corresponding gauge driver counts output for the filtered temperature value (0-4095). |
| FAIL SAFE | COOL MODE XX | Displays the last engine temperature input value from the PCM over the <u>HS-CAN</u> in degrees C. The engine temperature gauge indicates the present filtered temperature. If the temperature message is missing, the second line displays --- C. If the temperature message is invalid, the second line displays INV C. |
| ODOMETER | XXX COUNTS | Displays the unfiltered odometer rolling count input received over the <u>HS-CAN</u> from the PCM, in decimal. If the odometer rolling count data is missing, the second line displays --- COUNTS. If the odometer rolling count data is invalid, the second line displays INV counts. |
| TRIP ODOMETER | A XXXX.X mi | Displays the trip odometer A value stored in <u>RAM</u> in miles. If the trip A odometer rolling count data is missing or invalid for 5 seconds, the second line displays A ---.. |
| TRIP ODOMETER | B XXXX.X mi | Displays the trip odometer B value stored in <u>RAM</u> in miles. If the trip B odometer rolling count data is missing or invalid for 5 seconds, the second line displays B ---.. |
| BATTERY | XX.X VOLTS | Displays the present battery reading in volts at the <u>IPC</u> input pin. |
| BATTERY A/D | COUNTS XXX | Battery analog/digital counts. Displays present battery 10 bit analog/digital counts in decimal. |
| MCSW IN | XXX A/D CNTS | Displays current message center switch input analog/digital counts in decimal. 0-48 = short to ground. 49-228 = INFO button pressed. 229-465 = RESET. 466-724 = SETUP button pressed. 725-932 = no button pressed. 933-1023 = open circuit. |
| LAST CHIME | SOUNDED XXXX | Displays the last chime that sounded. |

| First Line Display | Second Line Display | Description |
|--------------------|---------------------|---|
| A/D PORT 2-9 | XXX | Displays the 16 bit hexadecimal value of the port analog/digital reading. |
| DIGITAL INPUTS | PORT A, B, C XX | Displays 8 bit hexadecimal value of the digital port readings. |
| DIGITAL INPUTS | HET1 XXXX | Displays the 8 bit hexadecimal value of the port reading. |
| GAUGE | TEST MODE | Repeats the test display cycle. |

DTC Charts

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Instrument Panel Cluster (IPC) DTC Chart

| DTC | Description | Action |
|----------|---|--|
| B10D5:13 | <u>PATS</u> Antenna: Circuit Open | REFER to Section 419-01B . |
| B10D7:05 | <u>PATS</u> Key: System Programming Failure | REFER to Section 419-01B . |
| B10D7:51 | <u>PATS</u> Key: Not Programmed | REFER to Section 419-01B . |
| B10D7:87 | <u>PATS</u> Key: Missing Message | REFER to Section 419-01B . |
| B10D7:8F | <u>PATS</u> Key: Erratic | REFER to Section 419-01B . |
| B10D8:00 | <u>PATS</u> Key Less Than Minimum Programmed: No Sub-Type Information | REFER to Section 419-01B . |
| B10D9:87 | <u>PATS</u> Transponder: Missing Message | REFER to Section 419-01B . |
| B10DA:51 | <u>PATS</u> PCM Identifier: Not Programmed | REFER to Section 419-01B . |
| B10DA:61 | <u>PATS</u> PCM Identifier: Signal Calculation Failure | REFER to Section 419-01B . |
| B10DA:86 | <u>PATS</u> PCM Identifier: Signal Invalid | REFER to Section 419-01B . |
| B1218:44 | Transmitter Identification Code: Data Memory Failure | REFER to Section 501-14 . |
| B1218:51 | Transmitter Identification Code: Not Programmed | REFER to Section 501-14 . |
| B1218:81 | Transmitter Identification Code: Invalid Serial Data Received | REFER to Section 501-14 . |
| B1A75:11 | Fuel Sender No. 1: Circuit Short To Ground | GO to Pinpoint Test B . |
| B1A75:15 | Fuel Sender No. 1: Circuit Short to Battery or Open | GO to Pinpoint Test B . |
| B1A76:11 | Fuel Sender No. 2 : Circuit Short to Ground | GO to Pinpoint Test B . |
| B1A76:15 | Fuel Sender No. 2: Circuit Short to Battery or Open | GO to Pinpoint Test B . |
| B1A82:11 | External Trip Switch: Circuit Short to Ground | GO to Pinpoint Test A1 . |
| B1A82:13 | External Trip Switch: Circuit Open | GO to Pinpoint Test A1 . |

| DTC | Description | Action |
|----------|---|---|
| B1A82:23 | External Trip Switch: Signal Stuck Low | GO to Pinpoint Test AI. |
| P062F:44 | Internal Control Module EEPROM Error: Data Memory Failure | CLEAR the DTCs. REPEAT the self-test. If the DTC is still present, INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| P1243:06 | Second Fuel Pump Fault or Ground Fault: Algorithm Based Failure | GO to Pinpoint Test B. |
| P1534:14 | Restraint Deployment Indicator Circuit: Open or Short to Ground | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. |
| U0100:00 | Lost Communication with <u>ECM</u> /PCM "A": No Sub Type Information | REFER to Section 419-01B. |
| U0100:87 | Lost Communication with <u>ECM</u> /PCM "A": Missing Message | GO to Pinpoint Test AS. |
| U0121:00 | Lost Communication With the Anti-Lock Brake System (ABS) control module: No Sub Type Information | GO to Pinpoint Test AT. |
| U0121:87 | Lost Communication With the Anti-Lock Brake System (ABS) control module: Missing Message | GO to Pinpoint Test AT. |
| U0122:87 | Lost Communication With Vehicle Dynamics Control Module: Missing Message | GO to Pinpoint Test BE |
| U0131:87 | Lost Communication With the Power Steering Control Module: Missing Message | GO to Pinpoint Test AU. |
| U0140:87 | Lost Communication With the Body Control Module: Missing Message | GO to Pinpoint Test AV. |
| U0142:87 | Lost Communication With the Body Control Module B (BCM-B) : Missing Message | GO to Pinpoint Test AW. |
| U0151:87 | Lost Communication With the Restraints Control Module (RCM) : Missing Message | GO to Pinpoint Test AX. |
| U0159:00 | Lost Communication With the Parking Assist Control Module "A": No Sub Type Information | GO to Pinpoint Test AY. |
| U0161:87 | Lost Communication With the Compass Module: Missing Message | GO to Pinpoint Test AJ. |
| U0161:92 | Lost Communication With the Compass Module: Performance or Incorrect Operation | GO to Pinpoint Test AJ. |
| U0164:87 | Lost Communication With the Heating Ventilation Air Conditioning (HVAC) Control Module: Missing Message | GO to Pinpoint Test AZ. |
| U0184:87 | Lost Communication With the Radio: Missing Message | GO to Pinpoint Test BA. |
| U0401:00 | Invalid Data Received from the <u>ECM</u> /PCM A: No Sub Type Information | This DTC is set when the IPC receives invalid network data for 5 seconds or more from the PCM for the turbo boost, transmission fluid temperature, engine oil temperature the inlet air temperature data. RETRIEVE and REPAIR all non-network DTCs in the PCM and other modules on the network. REFER to Powertrain |

| DTC | Description | Action |
|----------|--|--|
| | | Control/Emissions Diagnosis (PC/ED) manual. If no DTCs are present in the PCM, DIAGNOSE the observable symptom. |
| U0401:68 | Invalid Data Received from the ECM /PCM A: Event Information | This DTC is set when the <u>IPC</u> receives invalid network data from the PCM. RETRIEVE and REPAIR all non-network DTCs in the PCM and other modules on the network. REFER to Powertrain Control/Emissions Diagnosis (PC/ED) manual. If no DTCs are present in the PCM, DIAGNOSE the observable symptom. |
| U0401:81 | Invalid Data Received from the ECM /PCM A: Invalid Serial Data Received | This DTC is set when the <u>IPC</u> receives invalid network data for 5 seconds or more from the PCM for the engine oil temperature and the inlet air temperature data. RETRIEVE and REPAIR all non-network DTCs in the PCM and other modules on the network. REFER to Section 419-10 . If no DTCs are present in the PCM, DIAGNOSE the observable symptom. |
| U0415:00 | Invalid Data Received From Anti-Lock Brake System (ABS) Control Module: No Sub Type Information | NOTE: <i>When this DTC sets, the accelerometer marker (or red dot) is blank.</i> This DTC is set when the <u>IPC</u> receives invalid network data for 5 seconds or more from the ABS module for the accelerometer data. RETRIEVE and REPAIR all non-network DTCs in the ABS module and other modules on the network. REFER to Section 206-09 for a list of DTCs. If no DTCs are present in the ABS module, DIAGNOSE the observable symptom. |
| U0415:81 | Invalid Data Received From Anti-Lock Brake System (ABS) Control Module: Invalid Serial Data Received | NOTE: <i>When this DTC sets, the accelerometer marker (or red dot) is blank.</i> This DTC is set when the <u>IPC</u> receives invalid network data for 5 seconds or more from the ABS module for the accelerometer data. RETRIEVE and REPAIR all non-network DTCs in the ABS module and other modules on the network. REFER to Section 206-09 for a list of DTCs. If no DTCs are present in the ABS module, DIAGNOSE the observable symptom. |
| U0422:86 | Invalid Data Received from the Body Control Module: Signal Invalid | This DTC is set when the <u>IPC</u> receives invalid network data from the <u>PAM</u> . The <u>IPC</u> receives parking aid data when the <u>IPC</u> is not configured for parking aid. If either an <u>IPC</u> or <u>PAM</u> was installed, CARRY OUT the <u>PMI</u> for the suspect module. REFER to Section 418-01 . CLEAR the DTCs. REPEAT the self-test. |
| U045A:55 | Invalid Data Received From Parking Assist Control Module "A": Not Configured | The <u>IPC</u> and <u>SJB</u> configuration do not match. If either an <u>IPC</u> or <u>SJB</u> was installed, CARRY OUT the <u>PMI</u> for the suspect module. REFER to Section 418-01 . CLEAR the DTCs. REPEAT the self-test. |
| U045A:68 | Invalid Data Received From Parking Assist Control Module "A": Event Information | This DTC is set when the <u>IPC</u> receives invalid network data from the <u>PAM</u> . RETRIEVE and REPAIR all non-network DTCs in the <u>PAM</u> and other modules on the network. REFER to Section 419-10 . If no DTCs are present in the <u>PAM</u> , DIAGNOSE the observable symptom. |
| U2100:55 | Initial Configuration Not Complete: Not Configured | CARRY OUT the Programmable Module Installation (PMI) procedure for the <u>IPC</u> . REFER to Section 418-01 . |
| U2101:56 | Control Module Configuration Incompatible: Invalid/Incompatible Configuration | The <u>IPC</u> and <u>SJB</u> configuration do not match. If either an <u>IPC</u> or <u>SJB</u> was installed, CARRY OUT the <u>PMI</u> for the suspect module. REFER to Section 418-01 . CLEAR the DTCs. REPEAT the self-test. |
| U3000:45 | Control Module: Program Memory Failure | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| U3003:16 | Battery Voltage: Circuit Voltage Below Threshold | GO to Pinpoint Test BB. |
| U3003:17 | Battery Voltage: Circuit Voltage Above Threshold | GO to Pinpoint Test BC. |
| U300A:94 | Ignition Switch: Unexpected Operation | GO to Pinpoint Test BD. |

Body Control Module (BCM) DTC Chart

| DTC | Description | Action |
|----------------|--|--|
| B1352 | Ignition Key-In Circuit Failure | If the key-in-ignition chime is inoperative, GO to Pinpoint Test AM . If the key-in-ignition chime is always on, GO to Pinpoint Test AO . |
| B2479 | Park Brake Switch Circuit Short to Ground | GO to Pinpoint Test P . |
| C1125 | Brake Fluid Level Sensor Input Circuit Failure | GO to Pinpoint Test P . |
| All other DTCs | — | REFER to the DTC Chart in Section 419-10 . |

PCM DTC Chart

| DTC | Description | Action |
|----------------|--|--|
| P0457 | Evaporative Emission System Leak Detected (fuel cap loose/off) | GO to Pinpoint Test AL . |
| P0460 | Fuel Level Sensor A Circuit | REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B . |
| P0461 | Fuel Level Sensor A Circuit Range/Performance | REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B . |
| P0462 | Fuel Level Sensor A Circuit Low | REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B . |
| P0463 | Fuel Level Sensor A Circuit High | REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B . |
| P2065 | Fuel Level Sensor B Circuit | REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B . |
| P2066 | Fuel Level Sensor B Circuit Range/Performance | REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B . |
| P2067 | Fuel Level Sensor B Circuit Low | REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B . |
| P2068 | Fuel Level Sensor B Circuit High | REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first. If sent here from the PC/ED manual, GO to Pinpoint Test B . |
| All other DTCs | — | REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. |

Symptom Chart

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Symptom Chart — Instrument Panel Cluster (IPC)

| Condition | Possible Sources | Action |
|--|--|--|
| <ul style="list-style-type: none"> No communication with the Instrument Panel Cluster (IPC) | <ul style="list-style-type: none"> Fuse(s) Wiring, terminals or connectors | <ul style="list-style-type: none"> REFER to Section 418-00. |

| | | |
|---|--|--|
| | <ul style="list-style-type: none"> • <u>IPC</u> | |
| <ul style="list-style-type: none"> • The Instrument Panel Cluster (IPC) is inoperative | <ul style="list-style-type: none"> • Fuse • Wiring, terminals or connectors • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test A. |
| <ul style="list-style-type: none"> • Incorrect fuel gauge indication | <ul style="list-style-type: none"> • Wiring, terminals or connectors • Fuel pump module (LH side) • Fuel level sensor (RH side) • Fuel level sender (float and card) • Fuel tank transfer tube • Fuel tank • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test B. |
| <ul style="list-style-type: none"> • The engine temperature gauge is inoperative | <ul style="list-style-type: none"> • PCM • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test C. |
| <ul style="list-style-type: none"> • Incorrect engine temperature gauge indication | <ul style="list-style-type: none"> • PCM concern • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test D. |
| <ul style="list-style-type: none"> • The tachometer is inoperative | <ul style="list-style-type: none"> • PCM • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test E. |
| <ul style="list-style-type: none"> • Incorrect tachometer indication | <ul style="list-style-type: none"> • PCM concern • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test F. |
| <ul style="list-style-type: none"> • The speedometer is inoperative | <ul style="list-style-type: none"> • PCM • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test G. |
| <ul style="list-style-type: none"> • Incorrect speedometer indication | <ul style="list-style-type: none"> • Tire size configuration • Axle ratio configuration • PCM concern • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test H. |
| <ul style="list-style-type: none"> • The virtual accelerometer/track applications functions are inoperative (if equipped) | <ul style="list-style-type: none"> • Stability-traction control concern • ABS concern • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test I. |
| <ul style="list-style-type: none"> • The virtual air/fuel ratio gauge is inoperative (except accelerometer and voltage gauges) (if equipped) | <ul style="list-style-type: none"> • PCM input concern • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test J. |
| <ul style="list-style-type: none"> • The virtual boost/vacuum gauge is inoperative (if equipped) | <ul style="list-style-type: none"> • PCM input concern • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test J. |
| <ul style="list-style-type: none"> • The virtual inlet air temperature gauge is inoperative (if equipped) | <ul style="list-style-type: none"> • PCM input concern • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test J. |
| <ul style="list-style-type: none"> • The virtual oil temperature gauge is inoperative (if equipped) | <ul style="list-style-type: none"> • PCM input concern • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test J. |
| <ul style="list-style-type: none"> • The virtual transmission oil temperature gauge is inoperative (if equipped) | <ul style="list-style-type: none"> • PCM input concern • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test J. |
| <ul style="list-style-type: none"> • The virtual voltage gauge is inoperative (if equipped) | <ul style="list-style-type: none"> • Wiring, terminals or connectors • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test K. |
| <ul style="list-style-type: none"> • The odometer is inoperative | <ul style="list-style-type: none"> • PCM • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test L. |
| <ul style="list-style-type: none"> • The low oil pressure warning indicator is never/always on | <ul style="list-style-type: none"> • Wiring, terminals or connectors • Engine oil pressure switch • Base engine concern • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test M. |
| <ul style="list-style-type: none"> • The engine over-temperature warning indicator is never/always on (base <u>IPC</u>) | <ul style="list-style-type: none"> • PCM • <u>IPC</u> | <ul style="list-style-type: none"> • GO to Pinpoint Test N. |

| | | |
|---|--|---|
| <ul style="list-style-type: none"> The brake warning indicator is never on | <ul style="list-style-type: none"> Wiring, terminals or connectors Parking brake warning indicator switch Brake fluid level switch Smart Junction Box (SJB) <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test Q. |
| <ul style="list-style-type: none"> The brake warning indicator is always on | <ul style="list-style-type: none"> Wiring, terminals or connectors Parking brake warning indicator switch Brake fluid level switch ABS concern <u>SJB</u> <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test P. |
| <ul style="list-style-type: none"> The ABS warning indicator is never/always on | <ul style="list-style-type: none"> ABS module <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test Q. |
| <ul style="list-style-type: none"> The air bag warning indicator is never/always on | <ul style="list-style-type: none"> Restraints Control Module (RCM) <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test R. |
| <ul style="list-style-type: none"> The safety belt warning indicator is never/always on | <ul style="list-style-type: none"> <u>RCM</u> <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test S. |
| <ul style="list-style-type: none"> The door ajar warning indicator is never/always on | <ul style="list-style-type: none"> Interior lighting concern <u>SJB</u> <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test T. |
| <ul style="list-style-type: none"> The Malfunction Indicator Lamp (MIL) is never/always on | <ul style="list-style-type: none"> PCM <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test U. |
| <ul style="list-style-type: none"> The powertrain malfunction (wrench) warning indicator is never/always on (base <u>IPC</u>) | <ul style="list-style-type: none"> Electronic Throttle Control (ETC) concern Transmission concern PCM <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test V. |
| <ul style="list-style-type: none"> The grade assist indicator is never/always on | <ul style="list-style-type: none"> Transmission concern PCM <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test W. |
| <ul style="list-style-type: none"> The charging system warning indicator is never/always on | <ul style="list-style-type: none"> Charging system concern PCM <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test X. |
| <ul style="list-style-type: none"> The high beam indicator is never/always on | <ul style="list-style-type: none"> High beam concern <u>SJB</u> <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test Y. |
| <ul style="list-style-type: none"> The LH/RH turn indicator is never/always on | <ul style="list-style-type: none"> Turn signal concern <u>SJB</u> <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test Z. |
| <ul style="list-style-type: none"> The cruise control indicator is never/always on | <ul style="list-style-type: none"> PCM <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test AA. |
| <ul style="list-style-type: none"> The stability/traction control indicator (sliding car icon) is never/always on | <ul style="list-style-type: none"> Stability/traction control concern ABS module <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test AB. |
| <ul style="list-style-type: none"> The stability/traction control disabled indicator (sliding car OFF icon) is never/always on | <ul style="list-style-type: none"> Stability/traction control concern A MyKey® programmed key is in use ABS module <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test AC. |

| | | |
|---|---|---|
| • The low fuel warning indicator is never/always on | • IPC | • GO to Pinpoint Test AD. |
| • The performance shift indicator is never/always on (GT500) | • PCM • IPC | • GO to Pinpoint Test AE. |
| • The shift indicator is never/always on (GT500) | • PCM • IPC | • GO to Pinpoint Test AF. |
| • The Tire Pressure Monitoring System (TPMS) warning indicator is never/always on | • Tire pressure • TPMS concern • SJB • IPC | • GO to Pinpoint Test AG. |
| • The anti-theft indicator is never/always on | • Passive Anti-Theft System (PATS) • IPC | • GO to Pinpoint Test AH. |

Symptom Chart — Information And Message Center

| Condition | Possible Sources | Action |
|--|--|---|
| • The message center is not operating correctly | • Wiring, terminals or connectors • Message center switch • IPC | • GO to Pinpoint Test AI. |
| • The message center display is blank | • IPC | • PRESS the message center INFO button. If the message center display is still blank, INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| • The compass is inoperative | • Fuse(s) • Wiring, terminals or connectors • Compass module (integral to the auto-dimming interior mirror) • Front Display Interface Module (FDIM) • Instrument Panel Cluster (IPC) | • GO to Pinpoint Test AJ. |
| • The compass is inaccurate | • Compass zone setting • Compass calibration • Compass module (integral to the auto-dimming interior mirror) • The auto-dimming interior mirror is upside down | • GO to Pinpoint Test AK. |
| • The SERVICE ADVANCETRAC warning is inoperative/always on | • Stability/traction control concern | • GO to Pinpoint Test AB to diagnose the stability-traction control indicator (sliding car icon). |
| • The CHECK CHARGING SYSTEM message is inoperative/always on | • Charging system concern | • GO to Pinpoint Test X to diagnose the charging system warning indicator. |
| • The CHECK BRAKE SYSTEM warning is inoperative/always on. | • Brake system concern | • If the brake warning indicator is never on, GO to Pinpoint Test O. • If the brake warning indicator is always on, GO to Pinpoint Test P. |
| • The LOW FUEL LEVEL message is inoperative | • IPC | • VERIFY that the odometer and fuel gauge are operating correctly and the Distance To Empty (DTE) display is 120 km (75 miles) (with a MyKey® programmed key) or 80 |

| | | |
|---|---|--|
| | | <p>km (50 miles) (with an administrator key) to empty or less.</p> <ul style="list-style-type: none"> If the odometer or fuel gauge do not operate correctly, GO to Pinpoint Test B (fuel gauge) or GO to Pinpoint Test L (odometer). If the <u>DTE</u> display is above 120 km (75 miles) (with a MyKey® programmed key) or 80 km (50 miles) (with an administrator key) to empty, the system is operating correctly. The low fuel warning is turned on when the <u>DTE</u> display is 120 km (75 miles) (with a MyKey® programmed key) or 80 km (50 miles) (with an administrator key) to empty or less. |
| <ul style="list-style-type: none"> The Distance To Empty (DTE) /average fuel economy display is inoperative | <ul style="list-style-type: none"> IPC | <ul style="list-style-type: none"> CHECK the operation of the speedometer, the fuel gauge or the odometer. <ul style="list-style-type: none"> If the speedometer, the fuel gauge or the odometer do not operate correctly, GO to Pinpoint Test B (fuel gauge), GO to Pinpoint Test G (speedometer) or GO to Pinpoint Test L (odometer). If the speedometer, the fuel gauge and the odometer operate correctly, INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| <ul style="list-style-type: none"> The DRIVER DOOR or PASSENGER DOOR warning is inoperative/always on | <ul style="list-style-type: none"> IPC | <ul style="list-style-type: none"> GO to Pinpoint Test T to diagnose the door ajar warning indicator. |
| <ul style="list-style-type: none"> The PARK BRAKE ON message is inoperative/always on | <ul style="list-style-type: none"> IPC | <ul style="list-style-type: none"> If the brake warning indicator is never on, GO to Pinpoint Test O. If the brake warning indicator is always on, GO to Pinpoint Test P. |
| <ul style="list-style-type: none"> The CHECK FUEL FILL INLET message is inoperative/always on | <ul style="list-style-type: none"> Evaporative fuel system concern PCM IPC | <ul style="list-style-type: none"> GO to Pinpoint Test AL. |
| <ul style="list-style-type: none"> A MyKey® message is inoperative/always on | <ul style="list-style-type: none"> Message center concern MyKey® system concern | <ul style="list-style-type: none"> OPEN then CLOSE the driver door and VERIFY that the DRIVER DOOR AJAR message center warning functions correctly. <ul style="list-style-type: none"> If the DRIVER DOOR AJAR message center warning does not function correctly, GO to Pinpoint Test T. If the DRIVER DOOR AJAR message center warning functions correctly, REFER to Section 419-01B to diagnose the MyKey® system. |
| <ul style="list-style-type: none"> The TIRE PRESSURE SENSOR FAULT, LOW TIRE PRESSURE or TIRE PRESSURE MONITOR FAULT warning is inoperative/always on | <ul style="list-style-type: none"> Tire Pressure Monitoring System (TPMS) warning indication concern TPMS concern | <ul style="list-style-type: none"> VERIFY that the <u>TPMS</u> warning indicator operates. <ul style="list-style-type: none"> If the <u>TPMS</u> warning indicator does not operate, GO to Pinpoint Test AG. If the <u>TPMS</u> warning indicator operates, REFER to Section 204-04. |
| <ul style="list-style-type: none"> The LOW OIL LEVEL warning message is always on (the oil level OK [5.0L only]) | <ul style="list-style-type: none"> Wiring, terminals or connectors Oil level switch PCM | <ul style="list-style-type: none"> GO to Pinpoint Test BF. |
| <ul style="list-style-type: none"> The XXX% OIL LIFE OIL LIFE OK, OIL LIFE XXX% HOLD RESET = NEW or OIL LIFE SET TO XXX% message is inoperative | <ul style="list-style-type: none"> IPC | <ul style="list-style-type: none"> NOTE: <i>If the oil life is not displayed in the SETUP menu, carry out the Programmable Module Installation (PMI) when the original module is not available. Refer to Section 418-01.</i> INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

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| <ul style="list-style-type: none"> The ENGINE OIL CHANGE SOON or OIL CHANGE REQUIRED message is inoperative | <ul style="list-style-type: none"> IPC | <ul style="list-style-type: none"> NOTE: <i>If the oil life is not displayed in the SETUP menu, carry out the PMI when the original module is not available. Refer to Section 418-01.</i> Using the system check in the message center, VERIFY that the oil life is between 0% and 5% for the ENGINE OIL CHANGE SOON message or at 0% for the OIL CHANGE REQUIRED message. <ul style="list-style-type: none"> If the oil life is between 0% and 5% and the ENGINE OIL CHANGE SOON message is inoperative, INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. If the oil life is at 0% and the OIL CHANGE REQUIRED message is inoperative, INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. If the oil life is not at the specified value, the message center is operating correctly. INFORM the customer how the message center functions and how the oil life messages are set. |
| <ul style="list-style-type: none"> The TRAIN RIGHT FRONT, LEFT FRONT, RIGHT REAR, or LEFT REAR message is inoperative/always on | <ul style="list-style-type: none"> TPMS warning indication concern TPMS sensor training | <ul style="list-style-type: none"> NOTE: <i>These messages only appear during the TPMS sensor training procedure. Refer to Section 204-04.</i> VERIFY that the TPMS warning indicator functions. <ul style="list-style-type: none"> If the TPMS warning indicator does not operate, GO to Pinpoint Test AG. If the TPMS warning indicator operates, CARRY OUT the TPMS sensor training. REFER to Section 204-04. |
| <ul style="list-style-type: none"> The TIRES NOT TRAINED - REPEAT message is always on | <ul style="list-style-type: none"> TPMS sensor training | <ul style="list-style-type: none"> CARRY OUT the TPMS sensor training. REFER to Section 204-04. |
| <ul style="list-style-type: none"> The TRAINING COMPLETE message is inoperative | <ul style="list-style-type: none"> TPMS sensor training incomplete | <ul style="list-style-type: none"> CARRY OUT the TPMS sensor training. REFER to Section 204-04. |

Symptom Chart — Warning Chimes

| Condition | Possible Sources | Action |
|--|--|---|
| <ul style="list-style-type: none"> All the chimes are inoperative | <ul style="list-style-type: none"> IPC | <ul style="list-style-type: none"> INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| <ul style="list-style-type: none"> The key-in-ignition chime is inoperative | <ul style="list-style-type: none"> Key-in-ignition switch (part of the ignition switch) SJB IPC | <ul style="list-style-type: none"> GO to Pinpoint Test AM. |
| <ul style="list-style-type: none"> The headlamps on warning chime is inoperative | <ul style="list-style-type: none"> Door ajar indication SJB IPC | <ul style="list-style-type: none"> GO to Pinpoint Test AN. |
| <ul style="list-style-type: none"> The chime sounds when the driver door is ajar (no key in the ignition and the headlamps are off) | <ul style="list-style-type: none"> Wiring, terminals or connectors Key-in-ignition switch (part of the ignition switch) SJB | <ul style="list-style-type: none"> GO to Pinpoint Test AQ. |
| <ul style="list-style-type: none"> The performance shift warning chime does not operate correctly | <ul style="list-style-type: none"> IPC configuration IPC | <ul style="list-style-type: none"> GO to Pinpoint Test AP. |
| <ul style="list-style-type: none"> The safety belt warning chime is inoperative | <ul style="list-style-type: none"> Safety belt warning indication concern RCM IPC | <ul style="list-style-type: none"> GO to Pinpoint Test AQ. |

| | | |
|--|---|---|
| <ul style="list-style-type: none"> The Belt-Minder® feature does not operate correctly | <ul style="list-style-type: none"> Belt-Minder® deactivated Speedometer concern <u>RCM</u> <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test AQ. |
| <ul style="list-style-type: none"> The turn signal on warning chime is inoperative | <ul style="list-style-type: none"> Odometer operation <u>IPC</u> | <ul style="list-style-type: none"> GO to Pinpoint Test AR. |
| <ul style="list-style-type: none"> The air bag secondary warning chime is inoperative/has activated | <ul style="list-style-type: none"> <u>IPC</u> | <ul style="list-style-type: none"> RETRIEVE the recorded DTCs from the <u>IPC</u> self-test. <ul style="list-style-type: none"> If <u>IPC</u> DTC P1534:14 is not present, the system is operating correctly. The air bag secondary warning chime sounds only when a fault in the air bag warning indicator is present and DTC P1534:14 is recorded. If <u>IPC</u> DTC P1534:14 is present, INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| <ul style="list-style-type: none"> The message center warning chime is inoperative | <ul style="list-style-type: none"> <u>IPC</u> | <ul style="list-style-type: none"> VERIFY that there are warning messages displayed and confirm, as new warning messages appear, that the warning chime sounds. <ul style="list-style-type: none"> If messages do not exist, the system is operating correctly at this time. The message center warning chime only sounds when the message center detects new warning messages. If warning messages exist and the chime does not sound, INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| <ul style="list-style-type: none"> The service AdvanceTrac® warning chime is inoperative | <ul style="list-style-type: none"> Stability/traction control indication <u>IPC</u> | <ul style="list-style-type: none"> VERIFY that the SERVICE ADVANCETRAC message is displayed in the message center and the stability/traction control indicator (sliding car icon) operates correctly. <ul style="list-style-type: none"> If the SERVICE ADVANCETRAC message is not displayed in the message center and the stability/traction control indicator (sliding car icon) is not illuminated, the system is operating correctly. If the SERVICE ADVANCETRAC message is displayed and the stability/traction control indicator (sliding car icon) is illuminated, INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. |

Pinpoint Tests

Pinpoint Test A: The Instrument Panel Cluster (IPC) Is Inoperative

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

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 Panel Cluster (IPC) receives voltage from the Smart Junction Box (SJB) . With the ignition switch in the OFF position, the IPC receives its keep-alive memory voltage from the SJB .

The IPC sets DTC U300A:94 in continuous memory and on-demand if the RUN/START input, circuit CBP36 (BU/BN) is open or if the SJB fuse 36 (5A) has failed.

This pinpoint test is intended to diagnose the following:

- Fuse
- Wiring, terminals or connectors
- IPC

PINPOINT TEST A : THE IPC IS INOPERATIVE

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

NOTE: Failure to disconnect the battery when instructed results in false resistance readings. Refer to [Section 414-01](#).

A1 RETRIEVE THE DTCS FROM THE IPC SELF-TEST

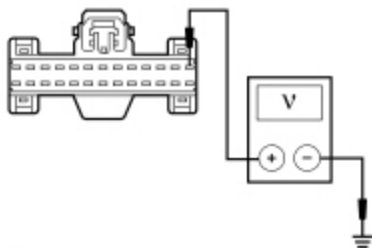
- Check for recorded DTCs from the IPC self-test.

Is DTC U300A:94 present?

| | |
|------------|--|
| Yes | GO to Pinpoint Test BD . |
| No | GO to A2 . |

A2 CHECK THE IPC VOLTAGE SUPPLY WITH KEY OFF

- Ignition OFF.
- Disconnect: IPC C220 .
- Measure the voltage between the IPC C220 Pin 1, circuit SBP26 (YE/RD), harness side and ground.



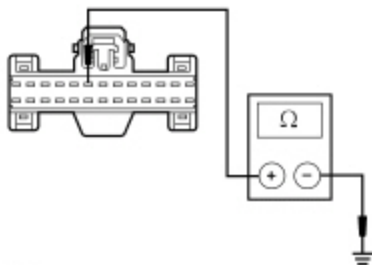
N0099725

Is the voltage greater than 10 volts?

| | |
|------------|--|
| Yes | GO to A3 . |
| No | VERIFY the <u>SJB</u> fuse 26 (10A) is OK. If OK, REPAIR the circuit in question. If not OK, REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short. TEST the system for normal operation. |

A3 CHECK THE GROUND CIRCUIT FOR AN OPEN

- Disconnect: Negative Battery Cable .
- Measure the resistance between the IPC C220 Pin 8, circuit GD116 (BK/VT), harness side and ground.



N0099726

Is the resistance less than 5 ohms?

| | |
|------------|---|
| Yes | GO to A4 . |
| No | REPAIR the circuit. TEST the system for normal operation. |

A4 CHECK FOR CORRECT IPC OPERATION

- Disconnect the IPC connector.
- Check for:
 - corrosion
 - damaged pins
 - pushed-out pins
- Connect the IPC 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 IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| No | The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. |

Pinpoint Test B: Incorrect Fuel Gauge Indication

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Refer to Wiring Diagrams Cell [60](#), Instrument Cluster for schematic and connector information.

The fuel tank is a saddle tank design with 2 variable resistance senders, driven by floats, that provide resistances related to fuel level in each side of the fuel tank to the Instrument Panel Cluster (IPC). The fuel level is determined using variable resistance fuel sender units, with an approximate resistance range between 180 ohms \pm 4 ohms at empty (E) and 10 ohms \pm 2 ohms at full (F). The IPC provides a reference voltage to the fuel level sender (part of the fuel pump module [LH side]) and the fuel level sensor (RH side) through individual signal circuits and receives a return through the signal return circuits from both the fuel level sender (part of the fuel pump module [LH side]) and fuel level sensor. As the fuel level changes, a float actuates a variable resistor on the fuel pump module and the fuel level sensor, raising or lowering the fuel level signal voltage depending on the resistance of the fuel level sender (float and card) or fuel level sensor. The IPC monitors the changes in voltage from both senders and commands the fuel gauge with a corresponding movement of the pointer. If the IPC detects the fuel level sensor circuitry is open, the fuel gauge defaults to the fuel level sender (part of the fuel pump module [LH side]) value only and the fuel gauge displays between 1/2 and empty (E) indicating the fuel level in the LH side of the fuel tank. If the IPC detects the fuel pump module circuitry is open, the fuel gauge defaults to the empty (E) position.

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

- Anti-slosh (default mode)
- Ignition OFF fueling
- Ignition 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 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 sensor 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 ignition OFF fueling mode (2 seconds to read empty [E] to full [F]) requires 3 conditions be met:

- The ignition must be in the OFF mode when refueling the vehicle.
- At least 15% of the vehicle's fuel capacity must be added to the fuel tank.
- The IPC must receive a valid ignition ON fuel sensor reading within one second of the ignition being put into the RUN mode. The key ON sample readings are considered valid if the fuel sensor reading is between 10 ohms \pm 2 ohms and 180 ohms \pm 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 ignition ON fueling mode (approximately 90 seconds to read empty [E] to full [F]) requires the following conditions be met:

- Engine speed is greater than 0 rpm.
- The transmission is in PARK (P).

- The ignition is in the RUN mode.
- At least 15% of the vehicle's fuel capacity must be added to the fuel tank.

In ignition ON fueling mode, a 30-second timer activates after the transmission is put into the PARK (P) position. 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 60 seconds to read from empty (E) to full (F). When the transmission is shifted out of PARK (P), the fuel gauge strategy reverts to the anti-slosh mode. The ignition ON fueling mode prevents slow to read full events from happening if the customer refuels the vehicle with the ignition in the RUN mode.

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

- The IPC 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.

Instrument Panel Cluster (IPC) DTCs

| DTC Description | Fault Trigger Conditions |
|--|---|
| <ul style="list-style-type: none"> • B1A75:11 — Fuel Sender No. 1: Circuit Short to Ground | A continuous and on-demand DTC that sets in the <u>IPC</u> if the <u>IPC</u> detects that the fuel level sender (part of the fuel pump module [LH side]) is out of range on the input circuit with a short to ground for 33 seconds. The <u>IPC</u> defaults the fuel gauge to empty (E) once the <u>IPC</u> detects a fault and sets DTC B1A75:11. |
| <ul style="list-style-type: none"> • B1A75:15 — Fuel Sender No. 1: Circuit Short to Battery or Open | A continuous and on-demand DTC that sets in the <u>IPC</u> if the <u>IPC</u> detects that the fuel level sender (part of the fuel pump module [LH side]) is out of range on the input circuit with an open or short to voltage on circuit VMC11 (YE/VT) or circuit RMC32 (GN/BU) for 33 seconds. The <u>IPC</u> defaults the fuel gauge to empty (E) once the <u>IPC</u> detects a fault and sets DTC B1A75:15. |
| <ul style="list-style-type: none"> • B1A76:11 — Fuel Sender No. 2: Circuit Short to Ground | A continuous and on-demand DTC that sets in the <u>IPC</u> if the <u>IPC</u> detects that the fuel level sensor (RH side) is out of range on the input circuit with a short to ground for 33 seconds. Once the <u>IPC</u> detects a fault, the <u>IPC</u> sets DTC B1A76:11 and the gauge displays between 1/2 and empty (E), indicating the fuel level in the LH side of the tank. |
| <ul style="list-style-type: none"> • B1A76:15 — Fuel Sender No. 2: Circuit Short to Battery or Open | A continuous and on-demand DTC that sets in the <u>IPC</u> if the <u>IPC</u> detects that the fuel level sensor (RH side) is out of range on the input circuit with an open or short to voltage on circuit RMC33 (WH/VT) for 33 seconds. Once the <u>IPC</u> detects a fault, the <u>IPC</u> sets DTC B1A76:15 and the gauge displays between 1/2 and empty (E), indicating the fuel level in the LH side of the tank. |
| <ul style="list-style-type: none"> • P1243:06 — Second Fuel Pump Fault or Ground Fault: Algorithm Based Failure | <p>NOTE: Normal operation of the fuel delivery system uses fuel from the fuel level sensor side of the fuel tank (RH side) prior to using fuel from the fuel level sender side of the fuel tank (LH side).</p> <p>Once the <u>IPC</u> detects a large discrepancy in the amount of fuel (based on input from both fuel sensors) between both sides of the fuel tank, with the fuel level sensor side (RH) having more fuel than the fuel level sender side (RH), the <u>IPC</u> sets DTC P1243:06.</p> |

PCM DTCs

| DTC Description | Fault Trigger Conditions |
|---|--|
| <ul style="list-style-type: none"> • P0460 — Fuel Level Sensor A Circuit | Sets when the PCM determines the value of the fuel level input signal is stuck, that the fuel level input signal does not change or does not correspond with the calculated fuel usage. |
| <ul style="list-style-type: none"> • P0461 — Fuel Level Sensor A Circuit Range/Performance | Sets when the PCM determines the fuel level 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. |

| DTC Description | Fault Trigger Conditions |
|---|---|
| <ul style="list-style-type: none"> P0462 — Fuel Level Sensor A Circuit Low | 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 <u>IPC</u> . |
| <ul style="list-style-type: none"> P0463 — Fuel Level Sensor A Circuit High | Sets in the PCM when the PCM detects an open or a short to voltage on the fuel pump module signal circuit based on the messaged input received from the <u>IPC</u> . |
| <ul style="list-style-type: none"> P2065 — Fuel Level Sensor B Circuit | 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. |
| <ul style="list-style-type: none"> P2066 — Fuel Level Sensor B Circuit Range/Performance | 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. |
| <ul style="list-style-type: none"> P2067 — Fuel Level Sensor B Circuit Low | 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 <u>IPC</u> . |
| <ul style="list-style-type: none"> P2068 — Fuel Level Sensor B Circuit High | Sets in the PCM when the PCM detects an open or short to voltage on the fuel level sensor signal circuit on the messaged input received from the <u>IPC</u> . |

This pinpoint test is intended to diagnose the following:

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

PINPOINT TEST B : INCORRECT FUEL GAUGE INDICATION

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

B1 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Ignition OFF.
- Check for recorded DTCs from the IPC self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | For DTC B1A75:11 or DTC B1A76:11, GO to B3 . For DTC B1A75:15, GO to B7 . For DTC B1A76:15, GO to B12 . For DTC P1243:06, GO to B16 . |
| No | GO to B2 . |

B2 CARRY OUT THE IPC FUEL GAUGE ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC fuel gauge (FuelLevel) active command. Command the fuel gauge from 0% to 25%, 50%, 75% and 100% while observing the fuel gauge.

Does the fuel gauge begin at (E) empty, move to approximately 1/4, 1/2, 3/4 and F (full)?

| | |
|------------|---|
| Yes | GO to B16 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

B3 CHECK THE FUEL SENDER FOR A SHORT TO GROUND

- Disconnect: Fuel Pump Module [C433](#) (3.7L or 5.0L) or [C4331](#) (5.8L) (DTC B1A75:11) .
- Disconnect: Fuel Level Sensor [C4374](#) (DTC B1A76:11) .
- Ignition ON.
- Wait one minute.
- Enter the following diagnostic mode on the scan tool: [IPC](#) Self-Test .
- **NOTE:** *DTC B1A75:11 or DTC B1A76:11 may also be present.*

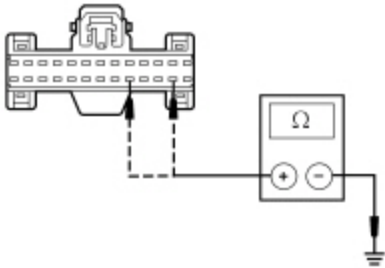
Repeat the [IPC](#) on-demand self-test.

Is DTC B1A75:15 or DTC B1A76:15 retrieved?

| | |
|------------|--|
| Yes | INSTALL a new fuel pump module (DTC B1A75:11) or fuel level sensor (DTC B1A76:11). REFER to Section 310-01 . CLEAR the DTCs. REPEAT the self-test. |
| No | GO to B4 . |

B4 CHECK THE FUEL LEVEL SIGNAL CIRCUITS FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect: [IPC C220](#) .
- Measure the resistance between the [IPC C220](#) Pin 15 (DTC B1A75:11), circuit VMC11 (YE/VT), harness side and ground; or between the [IPC C220](#) Pin 18 (DTC B1A76:11), circuit VMC23 (GN/OG), harness side and ground.

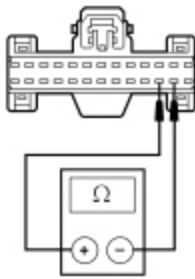


Is the resistance greater than 10,000 ohms?

| | |
|------------|--|
| Yes | For DTC B1A75:11, GO to B5 . For DTC B1A76:11, GO to B6 . |
| No | REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test. |

B5 CHECK THE FUEL PUMP MODULE SIGNAL AND RETURN CIRCUITS FOR A SHORT TOGETHER

- Measure the resistance between the [IPC C220](#) Pin 16, circuit RMC32 (GN/BU), harness side and between the [IPC C220](#) Pin 15, circuit VMC11 (YE/VT), harness side.



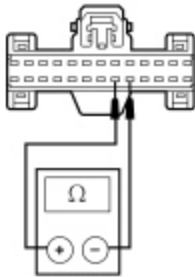
N0099734

Is the resistance greater than 10,000 ohms?

| | |
|------------|---|
| Yes | GO to B20 . |
| No | REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test. |

B6 CHECK THE FUEL LEVEL SENSOR SIGNAL AND RETURN CIRCUITS FOR A SHORT TOGETHER

- Measure the resistance between the [IPC C220](#) Pin 18, circuit VMC23 (GN/OG), harness side and the [IPC C220](#) Pin 19, circuit RMC33 (WH/VT), harness side.



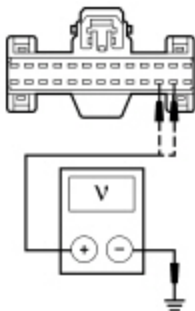
N0099737

Is the resistance greater than 10,000 ohms?

| | |
|------------|---|
| Yes | GO to B20 . |
| No | REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test. |

B7 CHECK THE FUEL PUMP MODULE CIRCUITRY FOR A SHORT TO VOLTAGE

- Disconnect: [IPC C220](#) .
- Ignition ON.
- Measure the voltage between the [IPC C220](#) Pin 15, circuit VMC11 (YE/VT), harness side and ground; and between the [IPC C220](#) Pin 16, circuit RMC23 (GN/BU), harness side and ground.



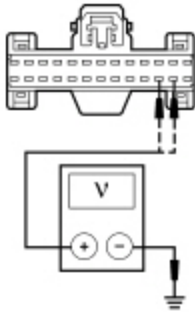
N0099736

Is any voltage present?

| | |
|------------|----------------------------|
| Yes | GO to B8 . |
| No | GO to B9 . |

B8 CHECK THE FUEL PUMP MODULE FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect: Fuel Pump Module [C433](#) (3.7L and 5.0L) or [C4331](#) (5.8L) .
- Ignition ON.
- Measure the voltage between the IPC [C220](#) Pin 15, circuit VMC11 (YE/VT), harness side and ground; and between the IPC [C220](#) Pin 16, circuit RMC32 (GN/BU), harness side and ground.

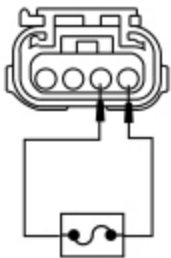


Is any voltage present?

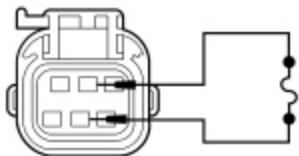
| | |
|------------|---|
| Yes | REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test. |
| No | INSTALL a new fuel pump module. REFER to Section 310-01 . CLEAR the DTCs. REPEAT the self-test. |

B9 CHECK THE FUEL PUMP MODULE CIRCUITRY FOR AN OPEN

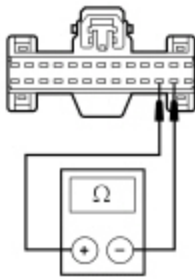
- Ignition OFF.
- Disconnect: Fuel Pump Module [C433](#) (3.7L and 5.0L) or [C4331](#) (5.8L) .
- For 3.7L and 5.0L engines, connect a fused jumper wire between the fuel pump module [C433](#) Pin 1, circuit RMC32 (GN/BU), harness side and the fuel pump module [C433](#) Pin 2, circuit VMC11 (YE/VT), harness side.



- For 5.8L engine, connect a fused jumper wire between the fuel pump module [C4331](#) Pin 5, circuit VMC11 (YE/VT), harness side and the fuel pump module [C4331](#) Pin 2, circuit RMC32 (GN/BU), harness side.



- Measure the resistance between the IPC [C220](#) Pin 16, circuit RMC32 (GN/BU), harness side and the IPC [C220](#) Pin 15, circuit VMC11 (YE/VT), harness side.



N0099734

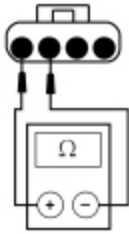
Is the resistance less than 5 ohms?

| | |
|------------|---|
| Yes | REMOVE the jumper wire. GO to B10 . |
| No | REMOVE the jumper wire. GO to B11 . |

B10 CHECK THE FUEL PUMP MODULE FOR AN OPEN

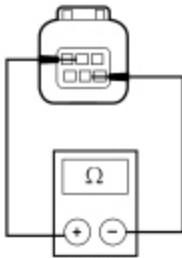
NOTE: The fuel level sensor resistance varies from 180 ± 4 ohms when empty (E) to 10 ± 2 ohms when full (F).

- For 3.7L and 5.0L engines, measure the resistance between the fuel pump module [C433](#) Pin 1, component side and the fuel pump module [C433](#) Pin 2, component side.



N0125075

- For 5.8L engine, measure the resistance between the fuel pump module [C4331](#) Pin 2, component side and the fuel pump module [C4331](#) Pin 5, component side.



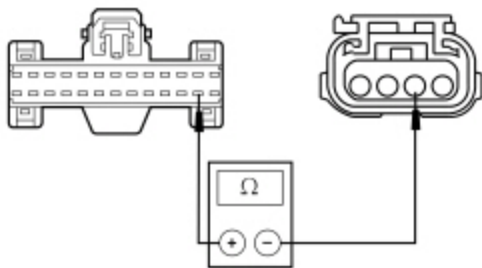
N0084252

Is the resistance between 10 and 180 ohms?

| | |
|------------|-----------------------------|
| Yes | GO to B20 . |
| No | GO to B19 . |

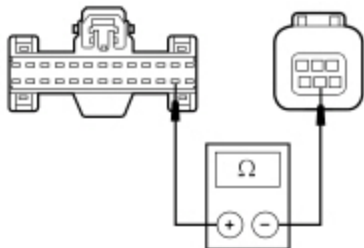
B11 CHECK THE FUEL LEVEL SIGNAL CIRCUIT FOR AN OPEN

- For 3.7L and 5.0L engines, measure the resistance between the IPC [C220](#) Pin 15, circuit VMC11 (YE/VT), harness side and the fuel pump module [C433](#) Pin 2, circuit VMC11 (YE/VT), harness side.



N0125072

- For 5.8L engine, measure the resistance between the [IPC C220](#) Pin 15, circuit VMC11 (YE/VT), harness side and the fuel pump module [C4331](#) Pin 5, circuit VMC11 (YE/VT), harness side.



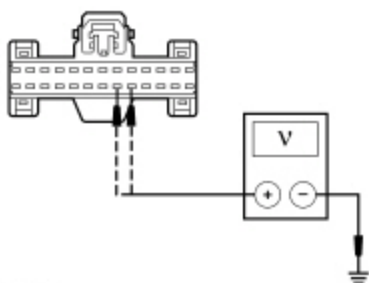
N0099738

Is the resistance less than 5 ohms?

| | |
|------------|---|
| Yes | REPAIR circuit RMC32 (GN/BU) for an open. CLEAR the DTCs. REPEAT the self-test. |
| No | REPAIR circuit VMC11 (YE/VT). CLEAR the DTCs. REPEAT the self-test. |

B12 CHECK THE FUEL LEVEL SENSOR CIRCUITRY FOR A SHORT TO VOLTAGE

- Disconnect: [IPC C220](#) .
- Disconnect: Fuel Level Sensor [C434](#) .
- Ignition ON.
- Measure the voltage between the [IPC C220](#) Pin 18, circuit VMC23 (GN/OG), harness side and ground; and between the [IPC C220](#) Pin 19, circuit RMC33 (WH/VT), harness side and ground.



N0099739

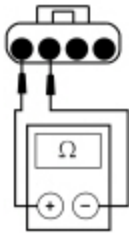
Is any voltage present?

| | |
|------------|---|
| Yes | REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test. |
| No | GO to B13 . |

B13 CHECK THE FUEL LEVEL SENSOR FOR AN OPEN

NOTE: The fuel level sensor resistance varies from 180 ± 4 ohms when empty (E) to 10 ± 2 ohms when full (F).

- Ignition OFF.
- Measure the resistance between the fuel level sensor [C4374](#) Pin 1, component side and the fuel level sensor [C4374](#) Pin 2, component side.



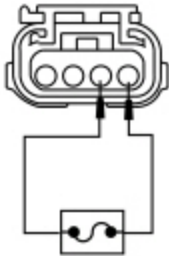
N0125075

Is the resistance between 10 and 180 ohms?

| | |
|------------|--|
| Yes | GO to B14 . |
| No | INSTALL a new fuel level sensor. REFER to Section 310-01 . CLEAR the DTCs. REPEAT the self-test. |

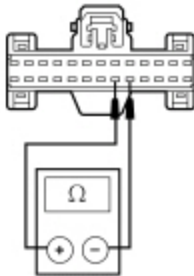
B14 CHECK THE FUEL LEVEL SENSOR CIRCUITRY FOR AN OPEN

- Connect a fused jumper wire between the fuel level sensor [C4374](#) Pin 2, circuit VMC23 (GN/OG), harness side and the fuel level sensor [C4374](#) Pin 1, circuit RMC33 (WH/VT), harness side.



N0125074

- Measure the resistance between the [IPC C220](#) Pin 18, circuit VMC23 (GN/OG), harness side and the [IPC C220](#) Pin 19, circuit RMC33 (WH/VT), harness side.



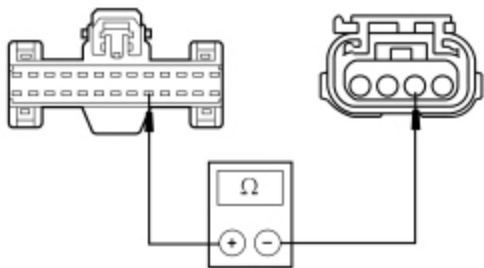
N0099737

Is the resistance less than 5 ohms?

| | |
|------------|---|
| Yes | REMOVE the jumper wire. GO to B20 . |
| No | REMOVE the jumper wire. GO to B15 . |

B15 CHECK THE FUEL LEVEL SENSOR SIGNAL FOR AN OPEN

- Measure the resistance between the [IPC C220](#) Pin 18, circuit VMC23 (GN/OG), harness side and the fuel level sensor [C4374](#) Pin 2, circuit VMC23 (GN/OG), harness side.



N0125204

Is the resistance less than 5 ohms?

| | |
|------------|---|
| Yes | REPAIR circuit RMC33 (WH/VT) for an open. CLEAR the DTCs. REPEAT the self-test. |
| No | REPAIR circuit VMC23 (GN/OG). CLEAR the DTCs. REPEAT the self-test. |

B16 INSPECT THE FUEL TANK

- Visually inspect the fuel tank for any damage or deformation.

Is the fuel tank OK?

| | |
|------------|--|
| Yes | GO to B17 . |
| No | INSTALL a new fuel tank. REFER to Section 310-01 . CLEAR the DTCs. REPEAT the self test. |

B17 INSPECT THE FUEL TANK TRANSFER TUBE CONNECTIONS

- Remove the fuel pump module and the fuel level sensor. Refer to [Section 310-01](#).
- Inspect the fuel tank transfer tube, connections, the fuel pump module and the fuel level sensor for any damage or deformation.

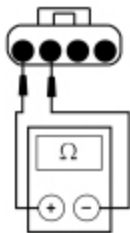
Are the fuel tank transfer tube, connections, the fuel pump module and the fuel level sensor OK?

| | |
|------------|--|
| Yes | GO to B18 . |
| No | INSTALL a new fuel tank transfer tube, fuel pump module or fuel level sensor as necessary. REFER to Section 310-01 . CLEAR the DTCs. REPEAT the self test. |

B18 CHECK THE FUEL PUMP MODULE AND FUEL LEVEL SENSOR RESISTANCE READINGS

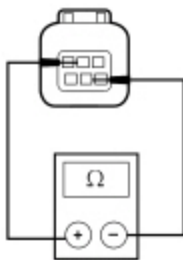
NOTE: The fuel pump module and fuel level sensor resistance varies from 180 ± 4 ohms when empty (E) to 10 ± 2 ohms when full (F).

- For 3.7L and 5.0L engines, measure the resistance between the fuel pump module [C433](#) Pin 1, component side and the fuel pump module [C433](#) Pin 2, component side while slowly moving the float from the bottom of the travel to the top.



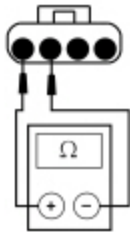
N0125075

- For 5.8L engine, measure the resistance between the fuel pump module [C4331](#) Pin 2, component side and the fuel pump module [C4331](#) Pin 5, component side while slowly moving the float from the bottom of the travel to the top.



N0084252

- For all engines, measure the resistance between the fuel level sensor [C4374](#) Pin 2, component side and the fuel level sensor [C4374](#) Pin 1, component side, while slowly moving the float from the bottom of the travel to the top.



N0125075

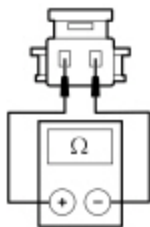
Does the resistance of both senders start at approximately 180 ohms with the float at the bottom of the travel and slowly decrease to approximately 10 ohms with the float at the top of the travel?

| | |
|------------|--|
| 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 B19 . For the fuel level sensor, INSTALL a new fuel level sensor. REFER to Section 310-01 . CLEAR the DTCs. REPEAT the self-test. |

B19 CHECK THE FUEL LEVEL SENDER (FLOAT AND CARD)

NOTE: The fuel level sender (float and card) resistance measures between 180 ± 4 ohms at the lower stop position and 10 ± 2 ohms at the upper stop position.

- Remove the fuel pump module. Refer to [Section 310-01](#).
- Disconnect the fuel level sender input wire from the fuel pump module.
- Measure the resistance between the fuel level sender connector pin 1, harness side and the fuel level sender connector pin 2, harness side while slowly moving the float arm between the lower and upper stop position.



N0112563

Does the resistance slowly decrease from approximately 180 ohms at the lower stop to 10 ohms at the upper stop?

| | |
|------------|---|
| Yes | INSTALL a new fuel pump module. REFER to Section 310-01 . CLEAR the DTCs. REPEAT the self-test. |
| No | INSTALL a new fuel level sender (float and card). REFER to Section 310-01 . CLEAR the DTCs. REPEAT the self-test. |

B20 CHECK FOR CORRECT IPC OPERATION

- Disconnect the IPC connector.
- Check for:
 - corrosion
 - damaged pins
 - pushed-out pins
- Connect the IPC 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 IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| No | The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test. |

Pinpoint Test C: The Engine Temperature Gauge Is Inoperative

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The PCM uses the Cylinder Head Temperature (CHT) sensor to measure the engine temperature. The Instrument Panel Cluster (IPC) receives the engine temperature data from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus. The IPC monitors the engine temperature data received from the PCM and commands the engine temperature gauge indication with a corresponding movement of the pointer.

If the engine temperature data is missing for 5 seconds or less or if the IPC receives invalid engine temperature data for 5 seconds or less, the IPC defaults the engine temperature gauge to the last setting, based upon the last known good temperature status message. If the IPC does not receive the engine temperature status message from the PCM for more than 5 seconds, the IPC sets DTC U0100:87 in continuous memory and defaults the temperature gauge to cold (C). If the engine temperature data is deemed invalid by the IPC for 5 seconds or more, the IPC sets DTC U0401:68 and defaults the engine temperature gauge to cold (C).

NOTE: If DTC U0100:87 is set in the IPC, other observable symptoms can be an inoperative tachometer, speedometer or odometer.

This pinpoint test is intended to diagnose the following:

- PCM
- IPC

PINPOINT TEST C : THE ENGING TEMPERATURE GAUGE IS INOPERATIVE

C1 RETRIEVE THE RECORDED PCM DTCs FROM THE KOEO SELF-TEST

- Check for recorded PCM DTCs from the Key ON Engine OFF (KOEO) self-test.

Are any DTCs recorded?

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

C2 RETRIEVE THE RECORDED DTCs FROM THE IPC SELF-TEST

- Check for recorded DTCs from the IPC self-test.

Are any DTCs retrieved?

| | |
|------------|--|
| Yes | For DTC U0100:87, GO to Pinpoint Test AS . For all other DTCs, REFER to DTC Charts in this section. |
|------------|--|

| | |
|----|----------------------------|
| No | GO to C3 . |
|----|----------------------------|

C3 CARRY OUT THE IPC ENGINE TEMPERATURE GAUGE ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: [IPC](#) DataLogger .
- Select the [IPC](#) temperature gauge (ENGCOOLNT) active command on and off while monitoring the engine temperature gauge.

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

| | |
|-----|---|
| Yes | INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

Pinpoint Test D: Incorrect Engine Temperature Gauge Indication

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The PCM uses the Cylinder Head Temperature (CHT) sensor to measure the engine temperature. The Instrument Panel Cluster (IPC) receives the engine temperature data from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus. The [IPC](#) monitors the engine temperature data received from the PCM and commands the engine temperature gauge indication with a corresponding movement of the pointer.

Fail-Safe Cooling

The PCM provides 2 modes or levels of fail-safe cooling for gasoline engines, which provides a visual indication to the driver that the engine is overheating while reducing the engine power to lower the engine temperature. When the PCM sends the [IPC](#) a fail-safe mode 1 or 2 command, the [IPC](#) drives the temperature gauge to the full hot (H) position.

If the engine temperature data is missing for 5 seconds or less or if the [IPC](#) receives invalid engine temperature data for 5 seconds or less, the [IPC](#) defaults the engine temperature gauge to the last setting, based upon the last known good temperature status message. If the [IPC](#) does not receive the engine temperature status message from the PCM for more than 5 seconds, the [IPC](#) sets DTC U0100:87 in continuous memory and defaults the engine temperature gauge to cold (C). If the engine temperature data is deemed invalid by the [IPC](#) for 5 seconds or more, the [IPC](#) sets DTC U0401:68 and defaults the engine temperature gauge to cold (C).

NOTE: If DTC U0100:87 is set in the [IPC](#) , other observable symptoms can be an inoperative tachometer, speedometer or odometer.

This pinpoint test is intended to diagnose the following:

- PCM concern
- [IPC](#)

PINPOINT TEST D : INCORRECT ENGINE TEMPERATURE GAUGE INDICATION

D1 CHECK FOR CORRECT OPERATION OF THE COOLING SYSTEM

- Verify that the engine cooling system and thermostat are functioning correctly.

Does the engine cooling system and thermostat operate correctly?

| | |
|-----|--|
| Yes | GO to D2 . |
| No | REFER to Section 303-03A . |

D2 RETRIEVE THE RECORDED PCM DTCS FROM THE KOEO SELF-TEST

- Check for recorded PCM DTCS from the Key ON Engine OFF (KOEO) self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | DIAGNOSE all PCM DTCs first. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. |
| No | GO to D3 . |

D3 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCs from the [IPC](#) self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | For DTC U0100:87, GO to Pinpoint Test AS . For DTC U0401:68, RETRIEVE and REPAIR all non-network DTCs in the PCM and other modules on the network. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual and REFER to Section 419-10 . For all other DTCs, REFER to DTC Charts in this section. |
| No | GO to D4 . |

D4 CARRY OUT THE ENGINE TEMPERATURE GAUGE ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
 - Enter the following diagnostic mode on the scan tool: [IPC](#) DataLogger .
 - **NOTE:** *The coolant temperature should range between 0-59°C (32-138°F) with the gauge in the cold (C) range, between 60-120°C (140-248°F) with the gauge in the normal or mid-range and above 123°C (253°F) with the gauge in the hot (H) range.*
- Select the instrument engine temperature gauge (ENGCOOLNT) active command. Command the temperature gauge according to the following table:

| Temperature Command | Gauge Position |
|----------------------------|---------------------------------|
| Below 50°C (122°F) | Cold (C) |
| Approximately 87°C (189°F) | Center of the gauge (mid-range) |
| Above 121°C (250°F) | Hot (H) |

Does the engine temperature gauge operate according to the above specifications?

| | |
|------------|---|
| Yes | GO to D5 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

D5 CHECK THE ENGINE TEMPERATURE INPUT USING THE DEALER TEST MODE

- Ignition ON.
 - Enter the [IPC](#) dealer test mode. Refer to [IPC](#) Dealer Test Mode in Inspection and Verification in this section.
 - **NOTE:** *The display below uses xxx's to represent a numeric or alpha-numeric value. The value may display the same amount of characters represented by the xxx's or there may be more/less depending on the type of display and that the minus symbol in parenthesis only appears if the temperature is below 0°C. For example: COOLANT TEMP xxx C may display COOLANT TEMP 20 C. Note that there were 3 x's in the display description but only 2 digits in the actual display.*
- Scroll through the displays to COOLANT TEMP xxx C.
- Start the engine and run the engine through a variety of engine temperatures.
 - **NOTE:** *The coolant temperature should range between 0-59°C (32-138°F) with the gauge in the cold (C) range, between 60-120°C (140-248°F) with the gauge in the normal or mid-range and above 123°C (253°F) with the gauge in the hot (H) range.*
- Monitor the engine temperature input to the [IPC](#) and the engine temperature gauge indication.

Does the engine temperature input agree with the position of the engine temperature gauge indication?

| | |
|------------|---|
| Yes | The engine temperature gauge is operating correctly at this time. |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

Pinpoint Test E: The Tachometer Is Inoperative

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The PCM uses the Crankshaft Position (CKP) sensor to measure the engine rpm. The PCM sends the Instrument Panel Cluster (IPC) data over the High Speed Controller Area Network (HS-CAN) communication bus to command the tachometer gauge according to the data.

If the engine rpm data is invalid for 5 seconds or less or if the IPC does not receive the engine rpm data for 5 seconds or less, the IPC defaults the tachometer to the last setting, based upon the last known good rpm message. If the IPC does not receive the engine rpm data from the PCM for more than 5 seconds, the IPC sets DTC U0100:87 in continuous memory and defaults the tachometer to 0 rpm. If the engine rpm data is deemed invalid by the IPC for 5 seconds or longer, the IPC sets DTC U0401:68 and defaults the tachometer to 0 rpm.

NOTE: If DTC U0100:87 is set in the IPC, other observable symptoms can be an inoperative speedometer, temperature gauge or odometer.

This pinpoint test is intended to diagnose the following:

- PCM
- IPC

PINPOINT TEST E : THE TACHOMETER IS INOPERATIVE

E1 RETRIEVE THE RECORDED PCM DTCs FROM THE KOEO SELF-TEST

- Check for recorded PCM DTCs from the Key ON Engine OFF (KOEO) self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | DIAGNOSE all PCM DTCs first. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. |
| No | GO to E2 . |

E2 CARRY OUT THE TACHOMETER ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC tachometer (TACH_IND) active command. Command the tachometer in 10% increments while monitoring the tachometer.

Does the tachometer indication increase within specifications?

| | |
|------------|---|
| Yes | GO to E3 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

E3 RETRIEVE THE RECORDED DTCs FROM THE IPC SELF-TEST

- Check for recorded DTCs from the IPC self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | For DTC U0100:87, GO to Pinpoint Test AS . For DTC U0401:68, RETRIEVE and REPAIR all non-network DTCs in the PCM and other modules on the network. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual and REFER to Section 419-10 . For all other DTCs, REFER to DTC Charts in this section. |
| No | INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. |

Pinpoint Test F: Incorrect Tachometer Indication

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The PCM uses the Crankshaft Position (CKP) sensor to measure the engine rpm. The PCM sends the Instrument Panel Cluster (IPC) data over the High Speed Controller Area Network (HS-CAN) communication bus to command the tachometer according to the data.

If the engine rpm data is invalid for 5 seconds or less or if the IPC does not receive the engine rpm data for 5 seconds or less, the IPC defaults the tachometer to the last setting, based upon the last known good rpm message. If the IPC does not receive the engine rpm data from the PCM for more than 5 seconds, the IPC sets DTC U0100:87 in continuous memory and defaults the tachometer to 0 rpm. If the engine rpm data is deemed invalid by the IPC for 5 seconds or longer, the IPC sets DTC U0401:68 and defaults the tachometer to 0 rpm.

NOTE: If DTC U0100:87 is set in the IPC, other observable symptoms can be an inoperative speedometer, temperature gauge or odometer.

This pinpoint test is intended to diagnose the following:

- PCM concern
- IPC

PINPOINT TEST F : INCORRECT TACHOMETER INDICATION

F1 RETRIEVE THE RECORDED PCM DTCs FROM THE KOEO SELF-TEST

- Check for recorded PCM DTCs from the Key ON Engine OFF (KOEO) self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | DIAGNOSE all PCM DTCs first. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. |
| No | GO to F2 . |

F2 RETRIEVE THE RECORDED DTCs FROM THE IPC SELF-TEST

- Check for recorded DTCs from the IPC self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | For DTC U0100:87, GO to Pinpoint Test AS . For DTC U0401:68, RETRIEVE and REPAIR all non-network DTCs in the PCM and other modules on the network. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual and REFER to Section 419-10 . For all other DTCs, REFER to DTC Charts in this section. |
| No | GO to F3 . |

F3 CARRY OUT THE TACHOMETER ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC tachometer (TACH_IND) active command. Command the tachometer in increments of 10% while monitoring the tachometer.

Does the tachometer indication increase within specifications?

| | |
|------------|---|
| Yes | GO to F4 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

F4 CHECK THE ENGINE RPM INPUT USING THE IPC DEALER TEST MODE

- Ignition ON.
 - Enter the IPC dealer test mode. Refer to IPC Dealer Test Mode in Inspection and Verification in this section.
 - **NOTE:** *The display below uses xxx's to represent a numeric or alpha-numeric value. The value may display the same amount of characters represented by the xxx's or there may be more/less depending on the type of display. For example: TACH VALUE xxx RPM may display TACH VALUE 650 RPM.*
- Scroll through the displays to TACH VALUE xxx RPM.
- Start the engine and operate the engine at 1,000, 1,500 and 2,000 rpm while monitoring both the tachometer and the engine rpm input in the dealer test mode.

Does the engine rpm input agree approximately with the position of the tachometer indication?

| | |
|------------|---|
| Yes | The tachometer is operating correctly at this time. |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

Pinpoint Test G: The Speedometer Is Inoperative

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) receives the vehicle speed signal from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus. The PCM receives vehicle speed from the Output Shaft Speed (OSS) sensor and uses axle ratio and tire Vehicle Identification (VID) block to generate the vehicle speed data sent to the IPC . The IPC monitors the vehicle speed input from the PCM and commands the speedometer with a corresponding movement of the pointer.

If the vehicle speed data is missing for 5 seconds or less or if the IPC receives invalid vehicle speed data for 5 seconds or less, the IPC defaults the speedometer to the last setting, based upon the last known good vehicle speed message. If the IPC does not receive the vehicle speed data from the PCM for more than 5 seconds, the IPC sets DTC U0100:87 in continuous memory and defaults the speedometer to 0 km/h (0 mph). If the vehicle speed data received is deemed invalid by the IPC for 5 seconds or longer, the IPC sets DTC U0401:68 and defaults the speedometer to 0 km/h (0 mph).

NOTE: *If DTC U0100:87 is set in the IPC , other observable symptoms can be an inoperative tachometer, temperature gauge or odometer.*

This pinpoint test is intended to diagnose the following:

- PCM
- IPC

PINPOINT TEST G : THE SPEEDOMETER IS INOPERATIVE

G1 CARRY OUT THE IPC SPEEDOMETER ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .

- Select the IPC speedometer (SPDOMETER) active command. Command the speedometer on and off while monitoring the speedometer.

Does the speed begin at 0 km/h (0 mph) move to 257 km/h (160 mph) and return to 0 km/h (0 mph)?

| | |
|------------|---|
| Yes | GO to G2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

G2 RETRIEVE THE RECORDED PCM DTCS FROM THE KOEO SELF-TEST

- Check for recorded PCM DTCS from the Key ON Engine OFF (KOEO) self-test.

Are any PCM DTCS recorded?

| | |
|------------|--|
| Yes | DIAGNOSE all PCM DTCS first. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. |
| No | GO to G3 . |

G3 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCS from the IPC self-test.

Are any DTCS recorded?

| | |
|------------|--|
| Yes | For DTC U0100:87, GO to Pinpoint Test AS . For DTC U0401:68, RETRIEVE and REPAIR all non-network DTCS in the PCM and other modules on the network. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual and REFER to Section 419-10 . For all other DTCS, REFER to DTC Charts in this section. |
| No | INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. |

Pinpoint Test H: Incorrect Speedometer Indication

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) receives the vehicle speed signal from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus. The PCM receives vehicle speed from the Output Shaft Speed (OSS) sensor and uses axle ratio and tire Vehicle Identification (VID) block to generate the vehicle speed data sent to the IPC. The IPC monitors the vehicle speed input from the PCM and commands the speedometer with a corresponding movement of the pointer.

A configurable item such as tire size could affect the accuracy of the speedometer.

If the vehicle speed data is missing for 5 seconds or less or if the IPC receives invalid vehicle speed data for 5 seconds or less, the IPC defaults the speedometer to the last setting, based upon the last known good vehicle speed message. If the IPC does not receive the vehicle speed data from the PCM for more than 5 seconds, the IPC sets DTC U0100:87 in continuous memory and defaults the speedometer to 0 km/h (0 mph). If the vehicle speed data received is deemed invalid by the IPC for 5 seconds or longer, the IPC sets DTC U0401:68 and defaults the speedometer to 0 km/h (0 mph).

NOTE: If DTC U0100:87 is set in the IPC, other observable symptoms can be an inoperative tachometer, temperature gauge or odometer.

This pinpoint test is intended to diagnose the following:

- Tire size configuration
- Axle ratio configuration
- PCM concern

- IPC

PINPOINT TEST H : INCORRECT SPEEDOMETER INDICATION

H1 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) and fully return to the 0 km/h (0 mph) position when the vehicle is stopped?

| | |
|------------|---|
| Yes | GO to H2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

H2 CHECK THE TIRE SIZE CONFIGURATION

- Enter the following diagnostic mode on the scan tool: PCM 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](#).*

Verify the vehicle has the correct tire size according to the vehicle 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 H3 . |
| No | CONFIGURE the PCM for the correct tire size. TEST the system for normal operation. |

H3 RETRIEVE THE RECORDED PCM DTCs FROM THE KOEO SELF-TEST

- Check for recorded PCM DTCs from the Key ON Engine OFF (KOEO) self-test.

Are any PCM DTCs recorded?

| | |
|------------|--|
| Yes | DIAGNOSE all PCM DTCs first. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. |
| No | GO to H4 . |

H4 RETRIEVE THE RECORDED DTCs FROM THE IPC SELF-TEST

- Check for recorded DTCs from the [IPC](#) self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | For DTC U0100:87, GO to Pinpoint Test AS . For DTC U0401:68, RETRIEVE and REPAIR all non-network DTCs in the PCM and other modules on the network. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual and REFER to Section 419-10 . For all other DTCs, REFER to DTC Charts in this section. |
| No | GO to H5 . |

H5 CARRY OUT THE IPC SPEEDOMETER ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: [IPC](#) DataLogger .
- Select the [IPC](#) speedometer (SPDOMETER) active command and command the speedometer in increments of approximately 10%. Observe the speedometer. The speedometer starts at 0 km/h (0 mph) and moves approximately 26 km/h (16 mph) for each 10% increment.

Does the speedometer begin at 0 km/h (0 mph) and move by approximately 26 km/h (16 mph) for each 10% increment?

| | |
|------------|---|
| Yes | GO to H6 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

H6 CHECK THE PCM VSS PIDS

- 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 | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

Pinpoint Test I: The Virtual Accelerometer/Track Applications Functions Are Inoperative (If Equipped)

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) receives the accelerometer data from the ABS module and the brake pedal applied status from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus.

If the accelerometer data is invalid or unknown for more than 5 seconds, the IPC sets DTC U0415:00 (invalid) or U0415:81 (unknown) in continuous memory and defaults the marker (red dot) in the accelerometer display off. If the accelerometer data is missing for more than 5 seconds, the IPC sets DTC U0121:00 in continuous memory and defaults the marker (red dot) in the accelerometer display off.

This pinpoint test is intended to diagnose the following:

- Stability/traction control concern
- ABS concern
- IPC

PINPOINT TEST I : THE VIRTUAL ACCELEROMETER/TRACK APPLICATIONS FUNCTIONS ARE INOPERATIVE (IF EQUIPPED)

I1 CHECK THE SPEEDOMETER OPERATION

- Verify that the speedometer operates.

Does the speedometer operate?

| | |
|------------|---|
| Yes | GO to I2 . |
| No | GO to Pinpoint Test G . |

I2 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Carry out the IPC self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | For DTC U0121:00, GO to Pinpoint Test AT . For all other DTCs, REFER to DTC Charts in this section. |
| No | GO to I3 . |

I3 RETRIEVE THE RECORDED DTCS FROM THE ABS MODULE SELF-TEST

- Carry out the ABS module self-test.

Are any DTCs recorded?

| | |
|------------|---|
| Yes | REFER to Section 206-09 . |
| No | GO to I4 . |

I4 VERIFY THE VEHICLE IS CONFIGURED FOR TRACK APPLICATIONS

- Using the message center button, scroll to the left until the main menu is displayed.
- Check whether the Trac Apps or the Mustang Apps menu is displayed in the main menu just below the fuel economy selection.

Does the main menu display the Track Apps or menu?

| | |
|------------|--|
| Yes | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| No | CARRY OUT the PMI using As-Built data for the IPC . TEST the system for normal operation. If the concern is still present, the vehicle was not equipped with track applications. |

Pinpoint Test J: A Virtual Gauge Is Inoperative (Except Accelerometer And Voltage Gauges) (If Equipped)

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) receives data from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus to control the air/fuel ratio, boost/vacuum (GT500), inlet air temperature, oil temperature and transmission oil temperature virtual gauges. The [IPC](#) monitors the data received from the PCM and commands the appropriate gauge indication.

If a virtual gauge data is missing for less than 5 seconds, the [IPC](#) defaults the gauge to the last setting, based upon the last known good message received. If the [IPC](#) does not receive the virtual gauge data from the PCM for 5 seconds or more, the [IPC](#) sets DTC U0100:87 in continuous memory and defaults the menu display to dashes (-----) and the gauge to the lowest setting.

This pinpoint test is intended to diagnose the following:

- PCM input
- [IPC](#)

PINPOINT TEST J : A VIRTUAL GAUGE IS INOPERATIVE (EXCEPT ACCELEROMETER AND VOLTAGE GAUGES) (IF EQUIPPED)

J1 RETRIEVE THE RECORDED PCM DTCS FROM THE KOEO SELF-TEST

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: PCM Self-Test .
- Carry out the PCM Key ON Engine OFF (KOEO) self-test.

Are any DTCs recorded?

| | |
|------------|---|
| Yes | REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. |
| No | GO to J2 . |

J2 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Enter the following diagnostic mode on the scan tool: [IPC](#) Self-Test .
- Carry out the [IPC](#) self-test.

Are any DTCs retrieved?

| | |
|------------|--|
| Yes | For DTC U0100:87, GO to Pinpoint Test AS . For all other DTCs, REFER to DTC Charts in this section. |
| No | GO to J3 . |

J3 VERIFY THE VEHICLE IS CONFIGURED FOR VIRTUAL GAUGES

- Using the message center button, scroll to the left until the main menu is displayed.
- From the main menu, select the gauge mode and scroll to right.

Does the gauge detail screen display To View in the lower RH side of the display?

| | |
|------------|--|
| Yes | GO to J4 . |
| No | CARRY OUT the PMI using As-Built data for the IPC . TEST the system for normal operation. If the concern is still present, the vehicle was not equipped with track applications. |

J4 VERIFY GAUGE MODE IS SELECTED

- From the gauge mode, scroll down to the gauge in question.

Does the gauge in question display?

| | |
|------------|--|
| Yes | The virtual gauge is functioning correctly at this time. The gauge in question may not have been selected from the menu. |
| No | INSTALL a new IPC . Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

Pinpoint Test K: The Virtual Voltage Gauge Is Inoperative (If Equipped)

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) uses the B+ hot at all times voltage from the Smart Junction Box (SJB) to measure and display the current operating voltage.

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- [IPC](#)

PINPOINT TEST K : THE VIRTUAL VOLTAGE GAUGE IS INOPERATIVE (IF EQUIPPED)

K1 VERIFY THE VEHICLE IS CONFIGURED FOR VIRTUAL GAUGES

- Using the message center button, scroll to the left until the main menu is displayed.
- From the main menu, select the gauge mode and scroll to right.

Does the gauge detail screen display To View in the lower RH side of the display?

| | |
|------------|--|
| Yes | GO to K2 . |
| No | CARRY OUT the PMI using As-Built data for the IPC . TEST the system for normal operation. If the concern is still present, the vehicle was not equipped with track applications. |

K2 VERIFY GAUGE MODE IS SELECTED

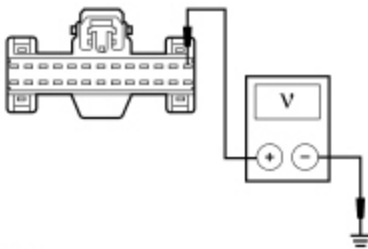
- From the main menu, select the gauge mode.
- Scroll to the right then down to select the voltage gauge then scroll to the right.

Does the voltage gauge display?

| | |
|------------|---|
| Yes | GO to K3 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

K3 CHECK THE IPC VOLTAGE SUPPLY WITH KEY OFF

- Ignition OFF.
- Disconnect: [IPC C220](#) .
- Measure the voltage between the [IPC C220](#) Pin 1, circuit SBP26 (YE/RD), harness side and ground.



N0099725

Is the voltage greater than 10 volts?

| | |
|------------|---|
| Yes | GO to K4 . |
| No | VERIFY the SJB fuse 26 (10A) is OK. If OK, REPAIR the circuit in question. If not OK, REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short. TEST the system for normal operation. |

K4 CHECK FOR CORRECT IPC OPERATION

- Disconnect the [IPC](#) connector.
- Check for:
 - corrosion
 - damaged pins
 - pushed-out pins
- Connect the [IPC](#) 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 IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| No | The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. |

Pinpoint Test L: The Odometer Is Inoperative

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) receives the odometer rolling count data from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus. The IPC monitors the odometer rolling count input from the PCM and commands the odometer with a display in the message center display area.

If the IPC does not receive the odometer rolling count data or if the rolling count data is deemed invalid from the PCM for less than 5 seconds, the IPC displays the mileage based upon the last good known input.

If the IPC does not receive the odometer rolling count data or if the rolling count data is deemed invalid from the PCM for 5 seconds or longer, the IPC sets DTC U0100:87 in continuous memory and defaults the odometer display to all dashes (-----).

If the Non-Volatile Memory (NVM) is corrupted, the message center displays ERROR.

NOTE: If DTC U0100:87 is set in the IPC, other observable symptoms can be an inoperative speedometer, tachometer or temperature gauge.

This pinpoint test is intended to diagnose the following:

- PCM
- IPC

PINPOINT TEST L : THE ODOMETER IS INOPERATIVE

| | | | | | |
|---|--|------------|--|-----------|---|
| L1 CHECK FOR CORRUPTED NVM | | | | | |
| <ul style="list-style-type: none"> • Ignition ON. • Observe the message center display area. <p>Does the odometer display in the message center display ERROR?</p> <table border="1"> <tr> <td>Yes</td> <td>INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation.</td> </tr> <tr> <td>No</td> <td>GO to L2.</td> </tr> </table> | | Yes | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. | No | GO to L2 . |
| Yes | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. | | | | |
| No | GO to L2 . | | | | |
| L2 RETRIEVE THE RECORDED PCM DTCS FROM THE KOEO SELF-TEST | | | | | |
| <ul style="list-style-type: none"> • Check for recorded PCM DTCS from the Key ON Engine OFF (KOEO) self-test. <p>Are any DTCS recorded?</p> <table border="1"> <tr> <td>Yes</td> <td>DIAGNOSE all PCM DTCS first. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.</td> </tr> <tr> <td>No</td> <td>GO to L3.</td> </tr> </table> | | Yes | DIAGNOSE all PCM DTCS first. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. | No | GO to L3 . |
| Yes | DIAGNOSE all PCM DTCS first. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. | | | | |
| No | GO to L3 . | | | | |
| L3 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST | | | | | |
| <ul style="list-style-type: none"> • Check for recorded DTCS from the <u>IPC</u> self-test. <p>Are any DTCS recorded?</p> <table border="1"> <tr> <td>Yes</td> <td>For DTC U0100:87, GO to Pinpoint Test AS. For DTC U0401:68, RETRIEVE and REPAIR all non-network DTCS in the PCM and other modules on the network. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual and REFER to Section 419-10. For all other DTCS, REFER to DTC Charts in this section.</td> </tr> <tr> <td>No</td> <td>INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation.</td> </tr> </table> | | Yes | For DTC U0100:87, GO to Pinpoint Test AS . For DTC U0401:68, RETRIEVE and REPAIR all non-network DTCS in the PCM and other modules on the network. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual and REFER to Section 419-10 . For all other DTCS, REFER to DTC Charts in this section. | No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| Yes | For DTC U0100:87, GO to Pinpoint Test AS . For DTC U0401:68, RETRIEVE and REPAIR all non-network DTCS in the PCM and other modules on the network. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual and REFER to Section 419-10 . For all other DTCS, REFER to DTC Charts in this section. | | | | |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. | | | | |

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

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Refer to Wiring Diagrams Cell [60](#), Instrument Cluster for schematic and connector information.

Normal Operation

The Instrument Panel Cluster (IPC) provides a reference voltage to the engine oil pressure switch. When the oil pressure is within normal ranges, the engine oil pressure switch closes to ground, pulling the reference voltage low in the [IPC](#) . The [IPC](#) senses the low reference voltage and turns off the low oil pressure warning indicator. When the engine oil pressure is low, the engine oil pressure switch opens, sending the reference voltage high in the [IPC](#) . The [IPC](#) senses the high voltage and turns the low oil pressure warning indicator on.

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Engine oil pressure switch
- Base engine oil pressure concern
- [IPC](#)

PINPOINT TEST M : 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.

NOTE: Failure to disconnect the battery when instructed results in false resistance readings. Refer to [Section 414-01](#).

M1 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: [IPC](#) DataLogger .
- Select the [IPC](#) low oil pressure warning indicator (OIL_P_LOW) active command. Command the low oil pressure warning indicator on and off while observing the low oil pressure warning indicator.

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

| | |
|------------|---|
| Yes | If the low oil pressure warning indicator is always on, GO to M4 . If the low oil pressure warning indicator is never on, GO to M2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

M2 CHECK FOR A STUCK CLOSED ENGINE OIL PRESSURE SWITCH

- Ignition OFF.
- Disconnect: Engine Oil Pressure Switch [C103](#) (3.7L and 5.8L) .
- Disconnect: Engine Oil Pressure Switch [C1642](#) (5.0L) .
- Ignition ON.
- Observe the low oil pressure warning indicator.

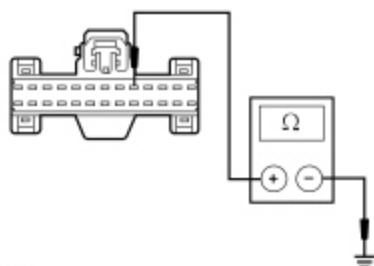
Does the low oil pressure warning indicator turn on?

| | |
|------------|--|
| Yes | INSTALL a new engine oil pressure switch. Refer to the appropriate section in Group 303 for the procedure. TEST the system for normal operation. |
| No | GO to M3 . |

M3 CHECK THE OIL PRESSURE INPUT CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.

- Disconnect: [IPC C220](#) .
- Measure the resistance between the [IPC C220](#) Pin 5, circuit CMC24 (GY), harness side and ground.



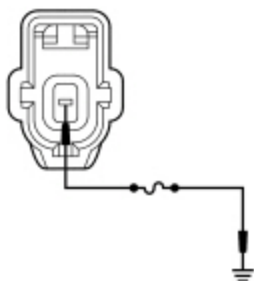
N0099727

Is the resistance greater than 10,000 ohms?

| | |
|------------|---|
| Yes | GO to M7 . |
| No | REPAIR the circuit. TEST the system for normal operation. |

M4 CHECK FOR A STUCK OPEN ENGINE OIL PRESSURE SWITCH

- Ignition OFF.
- Disconnect: Engine Oil Pressure Switch [C103](#) (3.7L and 5.8L) .
- Disconnect: Engine Oil Pressure Switch [C1642](#) (5.0L) .
- Connect a fused jumper wire between the engine oil pressure switch, [C103](#) Pin 1 (3.7L and 5.8L) or [C1642](#) (5.0L), circuit CMC24 (GY), harness side and ground.



N0002760

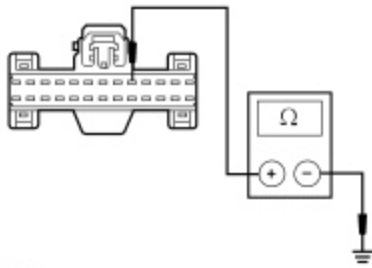
- Ignition ON.
- Observe the low oil pressure warning indicator.

Does the low oil pressure warning indicator turn off?

| | |
|------------|---|
| Yes | REMOVE the jumper wire. GO to M6 . |
| No | LEAVE the jumper wire connected. GO to M5 . |

M5 CHECK THE OIL PRESSURE INPUT CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect: [IPC C220](#) .
- With the jumper wire in place, measure the resistance between the [IPC C220](#) Pin 5, circuit CMC24 (GY), harness side and ground.



N0099727

Is the resistance less than 5 ohms?

| | |
|------------|---|
| Yes | REMOVE the jumper wire. GO to M7 . |
| No | REMOVE the jumper wire. REPAIR the circuit. TEST the system for normal operation. |

M6 CHECK THE OIL PRESSURE

- Carry out the oil pressure test. Refer to [Section 303-00](#).

Is the oil pressure within specification?

| | |
|------------|--|
| Yes | INSTALL a new engine oil pressure switch. Refer to the appropriate section in Group 303 for the procedure. TEST the system for normal operation. |
| No | REFER to Section 303-00 to continue diagnosis of the low engine oil pressure concern. |

M7 CHECK FOR CORRECT IPC OPERATION

- Disconnect the [IPC](#) connector.
- Check for:
 - corrosion
 - damaged pins
 - pushed-out pins
- Connect the [IPC](#) 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 IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. 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 Engine Over-Temperature Warning Indicator Is Never/Always On (Base [IPC](#))

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) receives the engine over-temperature command from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus. If the PCM detects an engine over-temperature condition or has entered into the fail-safe cooling mode, the PCM sends a command to the [IPC](#) to turn the engine over-temperature warning indicator on. The PCM incorporates 2 strategies for fail-safe cooling in the event that the engine has reached an over-temperature condition. The first strategy is when the PCM provides engine operation but takes on the limp home strategy. The second strategy is when the PCM determines that the engine is sufficiently over-temperature and is about to be shut down by the PCM.

If the engine over-temperature status message is missing or invalid for less than 5 seconds, the engine over-temperature warning indicator remains in the last on/off state, based upon the last known good engine over-temperature status message received. If the engine over-temperature message is invalid for more than 5 seconds, the IPC sets DTC U0401:68 in continuous memory and defaults the engine message center indicator on.

If the engine over-temperature status message is missing for more than 5 seconds, the IPC sets DTC U0100:87 in continuous memory and defaults the engine over-temperature warning indicator on.

NOTE: If DTC U0100:87 is set in the IPC, other observable symptoms can be an inoperative speedometer, tachometer or odometer.

This pinpoint test is intended to diagnose the following:

- PCM
- IPC

PINPOINT TEST N : THE ENGINE OVER-TEMPERATURE WARNING INDICATOR IS NEVER/ALWAYS ON (BASE IPC)

N1 CARRY OUT THE IPC WARNING LAMPS AND CHIME ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the engine over-temperature warning indicator (COOLANT_LMP) active command. Command the engine over-temperature warning indicator on and off while observing the engine over-temperature warning indicator.

Does the over-temperature warning indicator illuminate when commanded on, and turn off when commanded off?

| | |
|------------|---|
| Yes | GO to N2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

N2 RETRIEVE THE RECORDED DTCS FROM THE PCM KOEO SELF-TEST

- Check for recorded PCM DTCs from the Key ON Engine OFF (KOEO) self-test.

Are any PCM DTCs recorded?

| | |
|------------|---|
| Yes | REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. |
| No | GO to N3 . |

N3 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCs from the IPC self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | For DTC U0100:87, GO to Pinpoint Test AS . For DTC U0401:68, RETRIEVE and REPAIR all non-network DTCs in the PCM and other modules on the network. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual and REFER to Section 419-10 . For all other DTCs, REFER to DTC Charts in this section. |
| No | INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. |

Pinpoint Test O: The Brake Warning Indicator is Never On

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Refer to Wiring Diagrams Cell [60](#), Instrument Cluster for schematic and connector information.

Normal Operation

The Instrument Panel Cluster (IPC) uses 3 basic messaged inputs to control the brake warning indicator. The first 2 are the parking brake warning indicator switch and brake fluid level switch. The third is for the Electronic Brake Distribution (EBD) , controlled by the ABS module. The parking brake warning indicator switch and the brake fluid level switch status are sent from the Smart Junction Box (SJB) over the Medium Speed Controller Area Network (MS-CAN) communication bus. The EBD message is sent from the ABS module over the High Speed Controller Area Network (HS-CAN) communication bus lines. The parking brake warning indicator switch and brake fluid level switch are both hardwired to the SJB . The parking brake warning indicator switch and the brake fluid level use an external ground circuit.

The SJB provides a reference voltage to both the parking brake warning indicator switch and the brake fluid level switch. When the parking brake is applied, the parking brake warning indicator switch closes to ground, pulling the parking brake input circuit low. When a low brake fluid level condition exists, the low brake fluid level switch closes to ground, pulling the brake fluid level input circuit low. The SJB monitors the parking brake and the brake fluid level inputs sending the SJB a message to turn the brake warning indicator on or when the parking brake is applied. When the ABS module detects a base brake system concern or other ABS-related concerns that affect the EBD function, the ABS module sends a message to the IPC to illuminate both the ABS warning indicator and the brake warning indicator.

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Parking brake warning indicator switch
- Brake fluid level switch
- SJB
- IPC

PINPOINT TEST O : THE BRAKE WARNING INDICATOR IS NEVER ON

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

NOTE: Failure to disconnect the battery when instructed results in false resistance readings. Refer to [Section 414-01](#).

O1 DETERMINE IF THE BRAKE WARNING INDICATOR OPERATES WITH THE PARKING BRAKE

- Ignition ON.
- Apply the parking brake while monitoring the brake warning indicator.

Does the brake warning indicator illuminate with the parking brake applied?

| | |
|------------|----------------------------|
| Yes | GO to O7 . |
| No | GO to O2 . |

O2 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC all warning lamps (ALL_LAMP) active command. Command all the warning indicators on while observing the brake warning indicator.

Does the brake warning indicator illuminate when commanded on?

| | |
|------------|---|
| Yes | GO to O3 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

O3 CHECK THE PARKING BRAKE WARNING INDICATOR SWITCH PID

- Enter the following diagnostic mode on the scan tool: SJB DataLogger .
- Select the SJB parking brake PID (PRK_BRAKE). Monitor the parking brake PID while applying the parking brake.

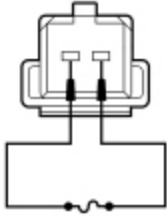
Does the PID agree with the parking brake position?

| | |
|------------|-----------------------------|
| Yes | GO to O11 . |
|------------|-----------------------------|

No GO to [O4](#).

O4 CHECK THE PARKING BRAKE WARNING INDICATOR SWITCH

- Disconnect: Parking Brake Warning Indicator Switch [C306](#) .
- Connect a fused jumper wire between the parking brake warning indicator switch [C306](#) Pin 2, circuit GD139 (BK-YE), harness side and the parking brake warning indicator switch [C306](#) Pin 1, circuit CMC25 (WH/VT), harness side.



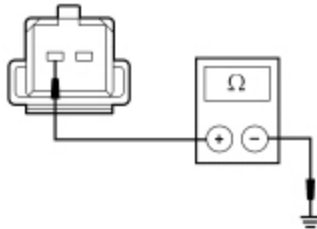
N0002774

Does the brake warning indicator illuminate?

| | |
|------------|---|
| Yes | REMOVE the jumper wire. INSTALL a new parking brake warning indicator switch. TEST the system for normal operation. |
| No | REMOVE the jumper wire. GO to O5 . |

O5 CHECK THE PARKING BRAKE GROUND CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect: Negative Battery Cable .
- Measure the resistance between the parking brake warning indicator switch [C306](#) Pin 2, circuit GD139 (BK-YE), harness side and ground.



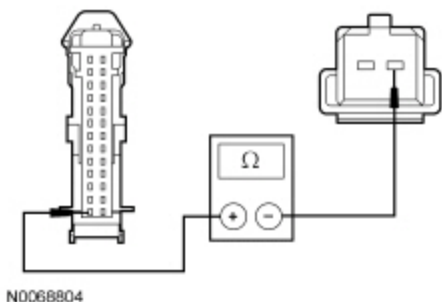
N0057133

Is the resistance less than 5 ohms?

| | |
|------------|---|
| Yes | GO to O6 . |
| No | REPAIR the circuit. TEST the system for normal operation. |

O6 CHECK THE PARKING BRAKE SIGNAL CIRCUIT FOR AN OPEN

- Disconnect: [SJB C2280C](#) .
- Measure the resistance between the [SJB C2280C](#) Pin 1, circuit CMC25 (WH/VT), harness side and the parking brake warning indicator switch [C306](#) Pin 1, circuit CMC25 (WH/VT), harness side and ground.



Is the resistance less than 5 ohms?

| | |
|------------|---|
| Yes | GO to Q11 . |
| No | REPAIR the circuit. TEST the system for normal operation. |

O7 CHECK THE BRAKE FLUID LEVEL SWITCH OPERATION

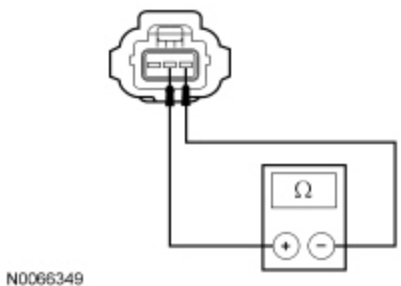
- Ignition OFF.
- Disconnect: Brake Fluid Level Switch [C124](#) .
- Ignition ON.

Does the brake warning indicator illuminate?

| | |
|------------|----------------------------|
| Yes | GO to Q9 . |
| No | GO to Q8 . |

O8 CHECK THE BRAKE FLUID LEVEL INPUT CIRCUIT FOR A SHORT TOGETHER

- Ignition OFF.
- Disconnect: [SJB C2280F](#) .
- Measure the resistance between the brake fluid level switch [C124](#) Pin 2, circuit CMC19 (GY/VT), harness side and the brake fluid level switch [C124](#) Pin 3, circuit RMC19 (YE/GY), harness side.

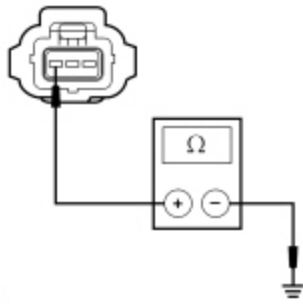


Is the resistance greater than 10,000 ohms?

| | |
|------------|--|
| Yes | GO to Q11 . |
| No | REPAIR the circuits. TEST the system for normal operation. |

O9 CHECK THE BRAKE FLUID LEVEL GROUND CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect: Negative Battery Cable .
- Measure the resistance between the brake fluid level switch [C124](#) Pin 1, circuit GD129 (BK/YE), harness side and ground.



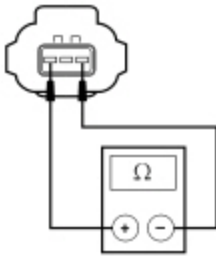
N0027596

Is the resistance less than 5 ohms?

| | |
|------------|---|
| Yes | GO to O10 . |
| No | REPAIR the circuit. TEST the system for normal operation. |

O10 CHECK THE BRAKE FLUID LEVEL SWITCH

- 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.**
- Remove the brake fluid from the reservoir to allow the brake fluid level switch to fall to the bottom of the reservoir.
- Measure the resistance between the brake fluid level switch C124 pin 3, component side and the brake fluid level switch C124 pin 1, component side.



N0057135

Is the resistance less than 5 ohms?

| | |
|------------|---|
| Yes | GO to O11 . |
| No | INSTALL a new brake fluid level switch. TEST the system for normal operation. |

O11 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 <u>SJB</u> . 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 P: The Brake Warning Indicator is Always On

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Refer to Wiring Diagrams Cell [60](#), Instrument Cluster for schematic and connector information.

Normal Operation

The Instrument Panel Cluster (IPC) uses 3 basic messaged inputs to control the brake warning indicator. The first 2 are the parking brake warning indicator switch and brake fluid level switch. The third is for the Electronic Brake Distribution (EBD) , controlled by the ABS. The parking brake warning indicator switch and the brake fluid level switch status are sent from the Smart Junction Box (SJB) over the Medium Speed Controller Area Network (MS-CAN) communication bus. The [EBD](#) message is sent from the ABS module over the High Speed Controller Area Network (HS-CAN) communication bus lines. The parking brake warning indicator switch and brake fluid level switch are both hardwired to the [SJB](#) . The parking brake warning indicator switch and the brake fluid level use an external ground circuit.

The [SJB](#) provides a reference voltage to both the parking brake warning indicator switch and the brake fluid level switch. When the parking brake is applied, the parking brake warning indicator switch closes to ground, pulling the brake fluid level input circuit low. When a low brake fluid level condition exists, the low brake fluid level switch closes to ground pulling the brake fluid level input circuit low. The [SJB](#) monitors the parking brake and the brake fluid level inputs, sending the [IPC](#) a message to turn the brake warning indicator on when the parking brake is applied, when the brake fluid level is low, or if the [SJB](#) detects an open in the brake fluid level signal or return circuits. When the ABS module detects a base brake system concern or other ABS-related concerns that affect the [EBD](#) function, the ABS module sends a message to the [IPC](#) to illuminate both the ABS warning indicator and the brake warning indicator.

If the brake fluid level or parking brake status messages are missing for more than 5 seconds, the [IPC](#) sets DTC U0140:87 and defaults the brake warning indicator on. If the [IPC](#) does not receive the ABS status message or the [EBD](#) message from the [ABS](#) module for more than 5 seconds, the [IPC](#) sets DTC U0121:87 and defaults the ABS warning indicator on.

- DTC B2479 (Park Brake Switch Circuit Short to Ground) — an on-demand DTC that sets when the [SJB](#) detects a short to ground on the parking brake warning indicator switch input circuit.
- DTC C1125 (Brake Fluid Level Sensor Input Circuit Failure) — a continuous and on-demand DTC that sets in the [SJB](#) if the [SJB](#) detects an open or a short to ground on the brake fluid level input circuit.

NOTE: If DTC U0140:87 is set in the [IPC](#) , other symptoms can also be present such as Tire Pressure Monitoring System (TPMS) , instrument panel backlighting, and door ajar indication.

NOTE: Whenever the [IPC](#) receives an [EBD](#) message from the ABS module, the [IPC](#) illuminates both the brake warning indicator and the ABS warning indicator simultaneously.

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Parking brake warning indicator switch
- Brake fluid level switch
- ABS concern
- [SJB](#)
- [IPC](#)

PINPOINT TEST P : THE BRAKE WARNING INDICATOR IS ALWAYS ON

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

P1 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: [IPC](#) DataLogger .
- Select the [IPC](#) all warning lamps (ALL_LAMP) active command. Command all the warning indicators on and off while observing the brake warning indicator.

Does the brake warning indicator turn off when commanded off?

| | |
|------------|---|
| Yes | GO to P2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

P2 RETRIEVE THE RECORDED DTCs FROM THE IPC SELF-TEST

- Check for recorded DTCs from the IPC self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | For DTC U0140:87, GO to Pinpoint Test AV . For DTC U0121:87, GO to Pinpoint Test AT . For all other DTCs, REFER to DTC Charts in this section. |
| No | GO to P3 . |

P3 RETRIEVE THE RECORDED DTCs FROM THE ABS MODULE SELF-TEST

- Check for recorded DTCs from the ABS module self-test.

Are any DTCs recorded?

| | |
|------------|---|
| Yes | REFER to Section 206-09 . |
| No | GO to P4 . |

P4 RETRIEVE THE RECORDED DTCs FROM THE SJB SELF-TEST

- Check for recorded DTCs from the SJB self-test.

Is DTC B2479 recorded?

| | |
|------------|----------------------------|
| Yes | GO to P5 . |
| No | GO to P8 . |

P5 CHECK THE PARKING BRAKE WARNING INDICATOR SWITCH PID

- Enter the following diagnostic mode on the scan tool: SJB DataLogger .
- Select the SJB parking brake PID (PRK_BRAKE). Monitor the parking brake PID while applying and releasing the parking brake.

Does the PID agree with the parking brake position?

| | |
|------------|-----------------------------|
| Yes | GO to P12 . |
| No | GO to P6 . |

P6 CHECK THE PARKING BRAKE WARNING INDICATOR SWITCH

- Disconnect: Parking Brake Warning Indicator Switch [C306](#) .
- Enter the following diagnostic mode on the scan tool: SJB DataLogger .
- Select the SJB parking brake PID (PRK_BRAKE). Monitor the parking brake PID.

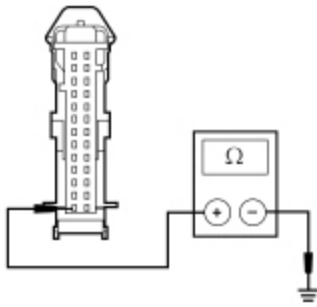
Does the PID indicate the parking brake is released or off?

| | |
|------------|---|
| Yes | INSTALL a new parking brake warning indicator switch. CLEAR the DTCs. REPEAT the self-test. |
| No | GO to P7 . |

P7 CHECK THE PARKING BRAKE INPUT CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect: SJB [C2280C](#) .

- Measure the resistance between the [SJB C2280C](#) Pin 1, circuit CMC25 (WH/VT), harness side and ground.

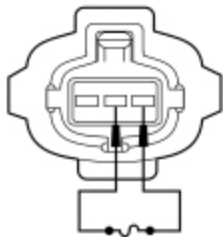


Is the resistance greater than 10,000 ohms?

| | |
|------------|---|
| Yes | GO to P12 . |
| No | REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test. |

P8 CHECK THE BRAKE WARNING INDICATOR USING THE FLUID LEVEL SWITCH

- Ignition OFF.
- Disconnect: Brake Fluid Level Switch [C124](#) .
- Connect a fused jumper wire between the brake fluid level switch [C124](#) Pin 2, circuit CMC19 (GY/VT), harness side and the brake fluid level switch [C124](#) Pin 3, circuit RMC19 (YE/GY), harness side.



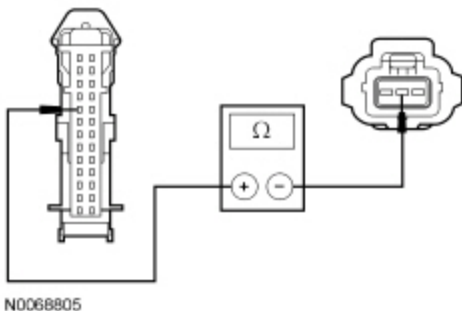
- Ignition ON.

Does the brake warning indicator turn off?

| | |
|------------|---|
| Yes | REMOVE the jumper wire. INSTALL a new brake fluid level switch. REPEAT the self-test. CLEAR the DTCs. |
| No | REMOVE the jumper wire. GO to P9 . |

P9 CHECK BRAKE FLUID LEVEL INPUT CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect: [SJB C2280F](#) .
- Measure the resistance between the [SJB C2280F](#) Pin 9, circuit CMC19 (GY/VT), harness side and the brake fluid level switch [C124](#) Pin 2, circuit CMC19 (GY/VT), harness side.

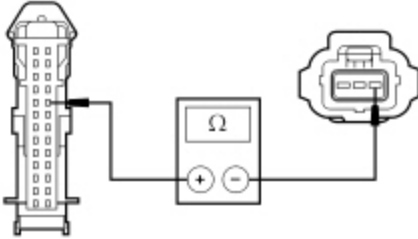


Is the resistance less than 5 ohms?

| | |
|------------|---|
| Yes | GO to P10 . |
| No | REPAIR the circuit. TEST the system for normal operation. |

P10 CHECK BRAKE FLUID LEVEL SIGNAL RETURN CIRCUIT OR AN OPEN

- Measure the resistance between the [SJB C2280F](#) Pin 22, circuit RMC19 (YE/GY), harness side and the brake fluid level switch [C124](#) Pin 3, circuit RMC19 (YE/GY), harness side.



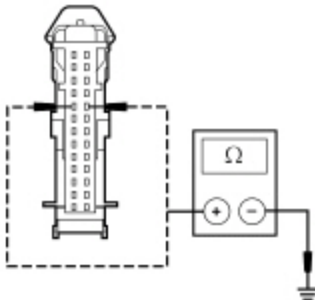
N0068806

Is the resistance less than 5 ohms?

| | |
|------------|---|
| Yes | GO to P11 . |
| No | REPAIR the circuit. TEST the system for normal operation. |

P11 CHECK BRAKE FLUID LEVEL INPUT AND SIGNAL RETURN CIRCUITS FOR A SHORT TO GROUND

- Measure the resistance between the [SJB C2280F](#) Pin 9, circuit CMC19 (GY/VT), harness side and ground; and between the [SJB C2280F](#) Pin 22, circuit RMC19 (YE/GY), harness side and ground.



N0060122

Are the resistances greater than 10,000 ohms?

| | |
|------------|---|
| Yes | GO to P12 . |
| No | REPAIR the circuit in question. TEST the system for normal operation. |

P12 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 <u>SJB</u> . 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 Q: The ABS Warning Indicator Is Never/Always On

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The ABS module provides ABS status to the Instrument Panel Cluster (IPC) over the High Speed Controller Area Network (HS-CAN) communication bus. If a fault condition exists in the ABS, the ABS module sends the IPC a command to either flash the ABS warning indicator or to turn it on. If the ABS status message is missing for less than 5 seconds, the IPC defaults the ABS warning indicator to the last on/off state, based upon the last known good ABS status message received. If the ABS status message is missing for more than 5 seconds, the IPC sets DTC U0121:87 and defaults the ABS warning indicator on.

This pinpoint test is intended to diagnose the following:

- ABS module
- IPC

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

Q1 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC ABS warning indicator (ABS_LAMP) active command on then off. Observe the ABS warning indicator.

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

| | |
|------------|---|
| Yes | GO to Q2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

Q2 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCS from the IPC self-test.

Are any ABS module DTCS recorded?

| | |
|------------|--|
| Yes | For DTC U0121:87, GO to Pinpoint Test AT . For all other DTCS, REFER to DTC Charts in this section. |
| No | GO to Q3 . |

Q3 RETRIEVE THE RECORDED DTCS FROM THE ABS MODULE SELF-TEST

- Check for recorded DTCS from the ABS module self-test.

Are any DTCS recorded?

| | |
|------------|---|
| Yes | REFER to Section 206-09 . |
| No | INSTALL a new ABS module. REFER to Section 206-09 . TEST the system for normal operation. |

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

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) receives the Supplemental Restraint System (SRS) status from the Restraints Control Module (RCM) over the High Speed Controller Area Network (HS-CAN) communication bus. If a SRS concern is detected, the RCM sets a DTC and sends a message to the IPC to turn on the air bag warning indicator.

If the SRS status message is missing for less than 5 seconds, the IPC defaults the air bag warning indicator to the last on/off state, based upon the last known good SRS status message received.

If the SRS status message is missing for more than 5 seconds, the IPC sets DTC U0151:87 and defaults the air bag warning indicator on.

This pinpoint test is intended to diagnose the following:

- RCM
- IPC

PINPOINT TEST R : THE AIR BAG WARNING INDICATOR IS NEVER/ALWAYS ON

R1 CARRY OUT THE IPC AIR BAG WARNING INDICATOR ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC all warning lamps (ALL_LAMP) active command. Command all the warning indicators on and off while observing the air bag warning indicator.

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

| | |
|------------|---|
| Yes | GO to R2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

R2 RETRIEVE THE RECORDED DTCs FROM THE RCM SELF-TEST

- Check for recorded DTCs from the RCM self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | REFER to Section 501-20B . |
| No | GO to R3 . |

R3 RETRIEVE THE RECORDED DTCs FROM THE IPC SELF-TEST

- Check for recorded DTCs from the IPC self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | For DTC U0151:87, GO to Pinpoint Test AX . For all other DTCs, REFER to DTC Charts in this section. |
| No | INSTALL a new <u>RCM</u> . REFER to Section 501-20B . TEST the system for normal operation. |

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

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Restraints Control Module (RCM) monitors the safety belt position through the safety belt buckle switch. The RCM provides the safety belt buckle status to the Instrument Panel Cluster (IPC) over the High Speed Controller Area Network (HS-CAN) communication bus.

If the IPC does not receive the safety belt buckle switch status from the RCM for less than 5 seconds, the IPC defaults the safety belt warning indicator to the last on/off state, based upon the last known good safety belt status message received.

If the IPC does not receive the safety belt buckle switch status from the RCM for more than 5 seconds, the IPC sets DTC U0151:87 and defaults the safety belt warning indicator off.

This pinpoint test is intended to diagnose the following:

- RCM
- IPC

PINPOINT TEST S : THE SAFETY BELT WARNING INDICATOR IS NEVER/ALWAYS ON

S1 RETRIEVE THE RECORDED DTCS FROM THE RCM SELF-TEST

- Check for recorded DTCS from the RCM self-tests.

Are any DTCS recorded?

| | |
|------------|--|
| Yes | REFER to Section 501-20B . |
| No | GO to S2 . |

S2 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCS from the IPC self-test.

Is DTC U0151:87 recorded?

| | |
|------------|--|
| Yes | GO to Pinpoint Test AX . |
| No | GO to S3 . |

S3 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC safety belt warning indicator (SBLT_LAMP) active command. Command the safety belt warning indicator on and off while observing the safety belt warning indicator.

Does the safety belt warning indicator illuminate when commanded on, and turn off when commanded off?

| | |
|------------|---|
| Yes | INSTALL a new <u>RCM</u> . REFER to Section 501-20B . TEST the system for normal operation. |
| No | INSTALL a new <u>IPC</u> . Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

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

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) receives the door ajar status for the LH and RH front door from the Smart Junction Box (SJB) over the Medium Speed Controller Area Network (MS-CAN) communication bus. When the IPC receives a message from the SJB that one or more doors are open or ajar, the IPC turns on the door ajar warning indicator.

If the door ajar status message is missing for less than 5 seconds, the door ajar warning indicator remains in the last indication mode (on or off) based upon the last known good message received.

If the door ajar status message is missing for more than 5 seconds, the IPC sets DTC U0140:87 and defaults the door ajar warning indicator on.

NOTE: If DTC U0140:87 is set in the SJB, other symptoms can also be present in the IPC such as high beam indicator, RH/LH turn indicators, instrument panel backlighting and Tire Pressure Monitoring System (TPMS).

This pinpoint test is intended to diagnose the following:

- Interior lighting concern
- SJB
- IPC

PINPOINT TEST T : THE DOOR AJAR 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.

T1 CHECK THE INTERIOR LIGHTING OPERATION

- Open and close each door while monitoring the courtesy lamps.

Do the courtesy lamps operate correctly with each door?

| | |
|------------|---|
| Yes | GO to T2 . |
| No | REFER to Section 417-02 . |

T2 RETRIEVE THE RECORDED DTCS FROM THE CONTINUOUS IPC SELF-TEST

- Check for recorded IPC DTCs from the continuous self-test.

Is DTC U0140:87 recorded?

| | |
|------------|--|
| Yes | GO to Pinpoint Test AV . |
| No | GO to T3 . |

T3 RETRIEVE THE RECORDED DTCS FROM THE SJB SELF-TEST

- Check for recorded DTCs from the SJB self-test.

Are any SJB DTCs recorded?

| | |
|------------|---|
| Yes | REFER to Section 419-10 . |
| No | GO to T4 . |

T4 CARRY OUT THE IPC DOOR AJAR WARNING INDICATOR ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC door ajar warning indicator (DOOR_AJAR) active command. Command the door ajar warning indicator on and off while observing the door ajar warning indicator.

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

| | |
|------------|---|
| Yes | INSTALL a new <u>SJB</u> . REFER to Section 419-10 . TEST the system for normal operation. |
| No | INSTALL a new <u>IPC</u> . Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

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

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Malfunction Indicator Lamp (MIL) is controlled by the Instrument Panel Cluster (IPC) using data sent from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus. If the MIL status message is missing for less than 5 seconds, the MIL remains in the last on or off state based upon the last known good charging system status message received. If the MIL status message is missing for more than 5 seconds, the IPC sets DTC U0100:87 in continuous memory and defaults the MIL on. If the MIL message is deemed invalid for longer than 5 seconds, the IPC defaults the MIL on.

NOTE: If DTC U0100:87 is set in the IPC, other observable symptoms can be an inoperative speedometer, tachometer or odometer.

This pinpoint test is intended to diagnose the following:

- PCM
- IPC

PINPOINT TEST U : THE MIL IS NEVER/ALWAYS ON

U1 CARRY OUT THE IPC WARNING LAMPS AND CHIME ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC MIL (MIL) active command. Command the MIL on and off while observing the MIL .

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

| | |
|------------|---|
| Yes | GO to U2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

U2 RETRIEVE THE RECORDED PCM DTCS FROM THE KOEO SELF-TEST

- Check for recorded PCM DTCS from the Key ON Engine OFF (KOEO) self-test.

Are any DTCS recorded?

| | |
|------------|--|
| Yes | DIAGNOSE all PCM DTCS first. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. |
| No | GO to U3 . |

U3 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCS from the IPC self-test.

Are any DTCS recorded?

| | |
|------------|--|
| Yes | For DTC U0100:87, GO to Pinpoint Test AS . For all other DTCS, REFER to DTC Charts in this section. |
| No | INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. |

Pinpoint Test V: The Powertrain Malfunction (Wrench) Warning Indicator Is Never/Always On (Base IPC)

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) receives the powertrain malfunction data from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus. The PCM monitors the Electronic Throttle Control (ETC) system status and transmission status. When a fault condition exists in the ETC system or in the transmission, the PCM provides the IPC with a message to turn the powertrain malfunction (wrench) indicator on.

If the ETC or transmission message is missing for less than 5 seconds, the IPC defaults the powertrain malfunction (wrench) indicator to the last on/off state, based upon the last known good ETC or transmission message received.

If the ETC or transmission message is missing for 5 seconds or longer, the IPC sets DTC U0100:87 and defaults the powertrain malfunction (wrench) warning indicator on.

NOTE: If U0100:87 is set in the IPC , other symptoms can also be present such as an inoperative speedometer, tachometer or temperature gauge.

This pinpoint test is intended to diagnose the following:

- ETC concern
- Transmission concern
- PCM
- IPC

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

V1 CHECK THE POWERTRAIN MALFUNCTION (WRENCH) OFF INDICATOR USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC powertrain malfunction (wrench) indicator (TRANSA_LMP) active command.
- Command the powertrain malfunction (wrench) indicator on and off while observing the powertrain malfunction (wrench) indicator.

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

| | |
|------------|---|
| Yes | GO to V2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

V2 RETRIEVE THE RECORDED PCM DTCS FROM THE KOEO SELF-TEST

- Check for recorded PCM DTCs from the Key ON Engine OFF (KOEO) self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | DIAGNOSE all PCM DTCs first. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. |
| No | GO to V3 . |

V3 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCs from the IPC self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | For DTC U0100:87, GO to Pinpoint Test AS . For all other DTCs, REFER to DTC Charts in this section. |
| No | INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. |

Pinpoint Test W: The Grade Assist Indicator is Never/Always On

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) receives the grade assist status from the Transmission Control Module (TCM) (part of the PCM) over the High Speed Controller Area Network (HS-CAN) communication bus. When the grade assist function is selected on, the TCM sends a message to the IPC to illuminate the grade assist indicator.

If the grade assist message is missing for less than 5 seconds, the grade assist indicator remains in the last on/off state, based upon the last known good grade assist message received.

If the grade assist off message is missing for more than 5 seconds, DTC U0100:87 sets in continuous memory and defaults the grade assist indicator off.

This pinpoint test is intended to diagnose the following:

- Transmission concern
- PCM
- IPC

PINPOINT TEST W : THE GRADE ASSIST INDICATOR IS NEVER/ALWAYS ON

W1 CHECK THE OPERATION OF THE GRADE ASSIST FUNCTION

- Verify that the grade assist function operates correctly.

Does the grade assist function correctly?

| | |
|------------|---|
| Yes | GO to W2 . |
| No | REFER to Section 307-01 . |

W2 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC grade assist (OVERDRV) active command on and off while monitoring the grade assist indicator.
- Monitor the grade assist indicator.

Does the grade assist indicator illuminate when commanded on, and turn off when commanded off?

| | |
|------------|---|
| Yes | GO to W3 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

W3 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCS from the IPC self-test.

Is DTC U0100:87 recorded?

| | |
|------------|----------------------------|
| Yes | GO to Pinpoint Test AS. |
| No | GO to W4 . |

W4 RETRIEVE THE RECORDED TCM DTCS FROM THE SELF-TEST

- Check for recorded TCM DTCS from the self-test.

Are any DTCS recorded?

| | |
|------------|--|
| Yes | REFER to the DTC Chart in Section 307-01 . |
|------------|--|

| | |
|-----------|--|
| No | INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. |
|-----------|--|

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

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The charging system indicator is controlled by the Instrument Panel Cluster (IPC) based upon data received from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus.

If the charging system message is missing for less than 5 seconds, the charging system indicator remains in the last indication mode (on or off). If the charging system message is missing for more than 5 seconds, the IPC sets DTC U0100:87 in continuous memory and defaults the charging system warning indicator on.

NOTE: If DTC U0100:87 is set in the IPC, other observable symptoms can be an inoperative speedometer, tachometer or odometer.

This pinpoint test is intended to diagnose the following:

- Charging system concern
- PCM
- IPC

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

X1 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC charging system warning indicator (CHARGE_LMP) active command. Command the charging system warning indicator on and off while observing the charging system warning indicator.

Does the charging system warning indicator illuminate when commanded on, and turn off when commanded off?

| | |
|------------|---|
| Yes | GO to X2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

X2 RETRIEVE THE RECORDED PCM DTCS FROM THE KOEO SELF-TEST

- Check for recorded PCM DTCS from the Key ON Engine OFF (KOEO) self-test.

Are any charging system DTCS recorded?

| | |
|------------|---|
| Yes | REFER to Section 414-00 . |
| No | GO to X3 . |

X3 CHECK THE CHARGING SYSTEM OPERATION

- Check the charging system operation. Refer to [Section 414-00](#).

Does the charging system operate correctly?

| | |
|------------|---|
| Yes | GO to X4 . |
| No | REFER to Section 414-00 . |

X4 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCs from the IPC self-test.

Is DTC U0100:87 recorded?

| | |
|------------|--|
| Yes | GO to Pinpoint Test AS . |
| No | INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. |

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

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

When the multifunction switch is in the high beam position, a message is sent to the Instrument Panel Cluster (IPC) from the Smart Junction Box (SJB) over the Medium Speed Controller Area Network (MS-CAN) communication bus. Upon receipt of the high beam on message, the IPC illuminates the high beam indicator.

If the high beam status message is missing from the SJB for less than 5 seconds, the IPC defaults the high beam indicator to the last on/off state, based upon the last known good high beam status message received.

If the high beam status message is missing for more than 5 seconds, the IPC sets DTC U0140:87 and defaults the high beam indicator off.

This pinpoint test is intended to diagnose the following:

- High beam concern
- SJB
- IPC

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

Y1 DETERMINE THE FAULT CONDITION

- Place the headlamps in the HIGH BEAM position.
- Ignition ON.
- Observe the high beam indicator.

Does the high beam indicator illuminate?

| | |
|------------|---|
| Yes | GO to Y4 . |
| No | LEAVE the headlamps in the HIGH BEAM position. GO to Y2 . |

Y2 CHECK THE HIGH BEAM HEADLAMPS OPERATION

- Observe the high beam headlamps.

Do the high beam headlamps operate correctly?

| | |
|------------|---|
| Yes | GO to Y3 . |
| No | REFER to Section 417-01 . |

Y3 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Turn off the headlamps.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC high beam indicator (HIGH_BEAM). Command the high beam indicator on and off while observing the high beam indicator.

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

| | |
|------------|---|
| Yes | GO to Y4 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

Y4 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCS from the [IPC](#) self-test.

Are any DTCS recorded?

| | |
|------------|--|
| Yes | For DTC U0140:87, GO to Pinpoint Test AV . For all other DTCS, REFER to DTC Charts in this section. |
| No | INSTALL a new SJB . REFER to Section 419-10 . TEST the system for normal operation. |

Pinpoint Test Z: The LH/RH Turn Indicator Is Never/Always On

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

When the multifunction switch is in the LH or RH TURN position a message is sent to the Instrument Panel Cluster (IPC) from the Smart Junction Box (SJB) over the Medium Speed Controller Area Network (MS-CAN) communication bus. Upon receipt of the LH/RH turn message, the [IPC](#) flashes the LH or RH turn signal indicator on and off.

This pinpoint test is intended to diagnose the following:

- Turn signal concern
- [SJB](#)
- [IPC](#)

PINPOINT TEST Z : THE LH/RH TURN INDICATOR IS NEVER/ALWAYS ON

Z1 CHECK THE LH OR RH TURN SIGNAL LAMPS OPERATION

- Ignition ON.
- Operate the LH or RH turn signal. Observe the exterior LH or RH turn lamps.

Do the turn signal lamps operate correctly?

| | |
|------------|---|
| Yes | GO to Z2 . |
| No | REFER to Section 417-01 . |

Z2 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Enter the following diagnostic mode on the scan tool: [IPC](#) DataLogger .
- Select the [IPC](#) RH or LH turn signal indicator (RH_TURN_L) or (LH_TURN_L) active command. Command the RH or LH turn signal indicator on and off while observing the LH or RH turn signal indicator.

Does the LH or RH turn signal indicator illuminate when commanded on, and turn off when commanded off?

| | |
|------------|---|
| Yes | GO to Z3 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

Z3 RETRIEVE THE RECORDED DTCs FROM THE IPC SELF-TEST

- Check for recorded DTCs from the IPC self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | For DTC U0140:87, GO to Pinpoint Test AV . For all other DTCs, REFER to DTC Charts in this section. |
| No | INSTALL a new <u>SJB</u> . REFER to Section 419-10 . TEST the system for normal operation. |

Pinpoint Test AA: The Cruise Control Indicator Is Never/Always On

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) receives the cruise control signal from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus. When the cruise control is engaged, the PCM sends a message to the IPC to illuminate the cruise control indicator. If the cruise control message is missing for less than 5 seconds, the IPC defaults the cruise control indicator to the last on/off state, based upon the last known good cruise control message received.

If the cruise control message is missing for more than 5 seconds, the IPC sets DTC U0100:87 in continuous memory and defaults the cruise control indicator off.

NOTE: If DTC U0100:87 is set in the IPC , other observable symptoms can be an inoperative speedometer, tachometer or odometer.

This pinpoint test is intended to diagnose the following:

- PCM
- IPC

PINPOINT TEST AA : THE CRUISE CONTROL INDICATOR IS NEVER/ALWAYS ON

AA1 CHECK THE CRUISE CONTROL OPERATION

- Check the cruise control system for correct operation.

Does the cruise control operate correctly?

| | |
|------------|---|
| Yes | GO to AA2 . |
| No | REFER to Section 419-03 . |

AA2 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC cruise control indicator (CRUISE) active command. Command the cruise control indicator on and off while observing the cruise control indicator.

Does the cruise control indicator illuminate when commanded on, and turn off when commanded off?

| | |
|------------|---|
| Yes | GO to AA3 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

AA3 RETRIEVE THE RECORDED DTCs FROM THE IPC SELF-TEST

- Check for recorded DTCs from the [IPC](#) self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | For DTC U0100:87, GO to Pinpoint Test AS . For all other DTCs, REFER to DTC Charts in this section. |
| No | INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. |

Pinpoint Test AB: The Stability/Traction Control Indicator (Sliding Car Icon) Is Never/Always On

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) receives the stability/traction control data from the ABS module over the High Speed Controller Area Network (HS-CAN) communication bus. The stability/traction control indicator (sliding car icon) flashes when the vehicle stability/traction control is in active mode or is being controlled by the ABS module. The stability/traction control indicator (sliding car icon) turns on steady if a fault condition exists in the system. The [IPC](#) monitors the stability/traction control message from the ABS module and either flashes the stability/traction control indicator (sliding car icon) or turns it on steady depending on the condition. If the stability/traction control message is missing for more than 5 seconds, the [IPC](#) sets DTC U0121:87 in continuous memory and defaults the stability/traction control indicator (sliding car icon) on.

This pinpoint test is intended to diagnose the following:

- Stability/traction control concern
- ABS module
- [IPC](#)

PINPOINT TEST AB : THE STABILITY/TRACTION CONTROL INDICATOR(SLIDING CAR ICON) IS NEVER/ALWAYS ON

AB1 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCs from the [IPC](#) self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | For DTC U0121:87, GO to Pinpoint Test AT . For all other DTCs, REFER to DTC Charts in this section. |
| No | GO to AB2 . |

AB2 RETRIEVE THE RECORDED DTCS FROM THE ABS MODULE SELF-TEST

- Check for recorded DTCs from the ABS module self-test.

Are any DTCs recorded?

| | |
|------------|---|
| Yes | REFER to Section 206-09 . |
| No | GO to AB3 . |

AB3 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: [IPC](#) DataLogger .
- Enter the [IPC](#) active command mode and select the stability/traction control indicator (sliding car icon) (TC/IVD/RSC_LMP) active command. Command the stability/traction control indicator (sliding car icon) on and off while observing the stability/traction control indicator (sliding car icon).

Does the stability/traction control indicator (sliding car icon) illuminate when commanded on, and turn off when

commanded off?

| | |
|------------|---|
| Yes | INSTALL a new ABS module. REFER to Section 206-09 . TEST the system for normal operation. |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

Pinpoint Test AC: The Stability/Traction Control Disabled Indicator (Sliding Car OFF Icon) Is Never/Always On

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The traction control switch is hardwired to the Instrument Panel Cluster (IPC) . When the traction control switch is pressed, the IPC sends a message to the ABS module over the High Speed Controller Area Network (HS-CAN) communication bus. The ABS module either disables or enables the stability/traction control and sends a message back to the IPC to turn on or off the stability/traction control disabled indicator (sliding car OFF icon) based upon the system state. If the traction control switch state message is missing for less than 5 seconds, the stability/traction control off indicator remains in the last indication mode (on or off) based upon the last known good message received. If the traction control switch state message is missing for more than 5 seconds, the IPC sets DTC U0121:87 in continuous memory and defaults the stability/traction control disabled indicator (sliding car OFF icon) off.

NOTE: When a MyKey® programmed key is in use and the AdvanceTrac® on feature is configured always on, the stability/traction control system cannot be disabled and the stability/traction control indicator does not turn on when the traction control disable button is pressed. The stability/traction control indicator still functions normally to indicate a stability/traction control system fault and a stability/traction control active event.

This pinpoint test is intended to diagnose the following:

- Stability/traction control concern
- A MyKey® programmed key is in use
- ABS module
- IPC

PINPOINT TEST AC : THE STABILITY/TRACTION CONTROL DISABLED INDICATOR IS NEVER/ALWAYS ON

AC1 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Enter the IPC active command mode and select the stability/traction control off indicator (sliding car OFF icon) (STAB_TC_LMP) active command. Command the stability/traction control off indicator (sliding car OFF icon) on and off while observing the stability/traction control off indicator (sliding car OFF icon).

Does the stability/traction control off indicator (sliding car OFF icon) illuminate when commanded on, and turn off when commanded off?

| | |
|------------|---|
| Yes | GO to AC2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

AC2 CHECK FOR THE KEY TYPE

- Check if the key is a MyKey® programmed key or administrator key. Refer to [Section 419-01B](#).

Is the key an administrator key?

| | |
|------------|---|
| Yes | GO to AC3 . |
| No | If the MyKey® AdvanceTrac® on feature is configured always on, the system is normal. The stability/traction control system cannot be disabled when the AdvanceTrac® on feature is configured always on. If the MyKey® AdvanceTrac® on feature is not configured always on, GO to AC3 . |

AC3 CHECK THE TRACTION CONTROL INPUT TO THE IPC

- Enter the following diagnostic mode on the scan tool: [IPC](#) DataLogger .
- Select the [IPC](#) traction control indicator PID (STAB_CTRL_SW).
- Monitor the traction control PID while pressing and releasing the traction control disable switch.

Does the traction control PID read **RELEASED** when the button is released and **DEPRESSED** when the button is pressed?

| | |
|------------|---|
| Yes | GO to AC4 . |
| No | REFER to Section 206-09 to diagnose the stability/traction control system cannot be disabled. |

AC4 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCS from the [IPC](#) self-test.

Are any DTCS recorded?

| | |
|------------|--|
| Yes | For DTC U0121:87, GO to Pinpoint Test AT . For all other DTCS, REFER to DTC Charts in this section. |
| No | GO to AC5 . |

AC5 RETRIEVE THE RECORDED DTCS FROM THE ABS MODULE SELF-TEST

- Check for recorded DTCS from the ABS self-test.

Are any DTCS recorded?

| | |
|------------|---|
| Yes | REFER to Section 206-09 . |
| No | INSTALL a new ABS module. REFER to Section 206-09 . TEST the system for normal operation. |

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

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The low fuel indicator turns on when the fuel level reaches a predetermined level, approximately 120 km (75 miles) (with a MyKey® programmed key) or 80 km (50 miles) (with an administrator key). The low fuel level warning indicator and fuel gauge are controlled by the Instrument Panel Cluster (IPC) based on the fuel level data provided by the fuel pump module.

This pinpoint test is intended to diagnose the following:

- [IPC](#)

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

AD1 CHECK THE FUEL GAUGE FOR CORRECT OPERATION

- Ignition ON.
- Observe the fuel gauge operation.

Does the fuel gauge operate correctly?

| | |
|------------|-----------------------------|
| Yes | GO to AD2 . |
|------------|-----------------------------|

| | |
|----|--|
| No | GO to Pinpoint Test B. |
|----|--|

AD2 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: [IPC](#) DataLogger .
- Select the [IPC](#) low fuel indicator (LOFUPELL) active command. Command the low fuel indicator on and off. Observe the low fuel indicator.

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

| | |
|-----|---|
| Yes | GO to AD3 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

AD3 CHECK THE DTE REMAINING MILEAGE DISPLAYED

- Ignition ON.
- Scroll through the information displays in the message center to the [DTE](#) display.

Does the [DTE](#) display indicate 120 km (75 miles) (with a MyKey® programmed key) or 80 km (50 miles) (with an administrator key) or less?

| | |
|-----|---|
| Yes | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| No | The system is operating normally at this time. The fuel level must be below one-eighth tank before the low fuel indicator is turned on. |

Pinpoint Test AE: The Performance Shift Indicator Is Never/Always On (GT500)

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

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 SVT logo is normally backlit in red when the performance indicator is configured off. When the performance shift 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 indicator can be configured on or off through the message center.

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

This pinpoint test is intended to diagnose the following:

- PCM
- [IPC](#)

PINPOINT TEST AE : THE PERFORMANCE SHIFT INDICATOR IS NEVER/ALWAYS ON (GT500)

AE1 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 AE2 . |
|-----|-----------------------------|

| | |
|-----------|---|
| 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. |
|-----------|---|

AE2 RETRIEVE THE RECORDED DTCS FROM BOTH THE CONTINUOUS AND ON-DEMAND PCM SELF-TESTS

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

Are any DTCs retrieved?

| | |
|------------|---|
| Yes | REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. |
| No | GO to AE3 . |

AE3 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: [IPC](#) DataLogger .
- Select the [IPC](#) all lamps (ALL_LAMP) active command on then off while monitoring the performance shift indicator.

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

| | |
|------------|---|
| Yes | INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

Pinpoint Test AF: The Shift Indicator Is Never/Always On (GT500)

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

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 Panel Cluster (IPC) based upon a shift message sent from the PCM over the High Speed Controller Area Network (HS-CAN) communication bus lines.

NOTE: If DTC U0100:87 is set in the [IPC](#), other observable symptoms can be an inoperative speedometer, tachometer or odometer.

This pinpoint test is intended to diagnose the following:

- PCM
- [IPC](#)

PINPOINT TEST AF : THE SHIFT INDICATOR IS NEVER/ALWAYS ON (GT500)

AF1 RETRIEVE THE RECORDED DTCS FROM BOTH THE CONTINUOUS AND ON-DEMAND PCM SELF-TESTS

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

Are any DTCs retrieved?

| | |
|------------|---|
| Yes | REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. |
| No | GO to AF2 . |

AF2 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCs from the [IPC](#) self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | For DTC U0100:87, GO to Pinpoint Test AS . For all other DTCs, REFER to DTC Charts in this section. |
| No | GO to AF3 . |

AF3 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: [IPC](#) DataLogger .
- Select the [IPC](#) all lamps (ALL_LAMP) active command while monitoring the up shift indicator.

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

| | |
|------------|---|
| Yes | INSTALL a new PCM. REFER to Section 303-14 . TEST the system for normal operation. |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

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

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) receives the Tire Pressure Monitoring System (TPMS) messages from the Smart Junction Box (SJB) over the Medium Speed Controller Area Network (MS-CAN) communication bus. If the [SJB](#) determines that the tire pressure has exceeded the low tire pressure limits, a message is sent to the [IPC](#) to turn the [TPMS](#) warning indicator on. If a [TPMS](#) fault condition exists, the [SJB](#) sends a message to the [IPC](#) to flash the [TPMS](#) warning indicator for 75 seconds then the [IPC](#) turns the indicator on steady. If the [TPMS](#) is in the [TPMS](#) sensor training mode, the [SJB](#) sends a command to the [IPC](#) to flash the [TPMS](#) warning indicator throughout the procedure. If the [TPMS](#) status message is missing or deemed invalid for less than 5 seconds, the [IPC](#) defaults the [TPMS](#) warning indicator to the last setting (on or off), based upon the last known good message received. If the [TPMS](#) status message is missing for more than 5 seconds, the [TPMS](#) warning indicator flashes for approximately 75 seconds then turns the indicator on steady. If the message is invalid for more than 5 seconds, the [IPC](#) sets DTC U0422:86 and flashes the [TPMS](#) warning indicator for approximately 75 seconds then turns the indicator on steady.

This pinpoint test is intended to diagnose the following:

- Tire pressure
- [TPMS](#) concern
- [SJB](#)
- [IPC](#)

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

AG1 CHECK THE TIRE PRESSURE

- Verify that the tire pressure in all tires meets the recommended tire pressures on the vehicle certification label. Refer to [Section 100-01](#).

Do all the tires meet the recommended tire pressures?

| | |
|------------|---|
| Yes | GO to AG2 . |
| No | CORRECT the tire pressures. TEST the system for normal operation. |

AG2 CARRY OUT THE IPC INDICATOR LAMP CONTROL ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: [IPC](#) DataLogger .
- Select the [TPMS](#) warning indicator (TPMWARN_LMP) active command. Command the [TPMS](#) warning indicator on and off while observing the [TPMS](#) warning indicator.

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

| | |
|------------|---|
| Yes | GO to AG3 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

AG3 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded IPC DTCs from the continuous self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | For DTC U0422:86, RETRIEVE and REPAIR all non-network DTCs in the other modules on the network. REFER to Section 419-10 . TEST the system for normal operation. For all other DTCs, REFER to DTC Charts in this section. |
| No | GO to AG4 . |

AG4 RETRIEVE THE RECORDED DTCS FROM THE SJB SELF-TEST

- Check for recorded DTCs from the SJB self-test.

Are any DTCs recorded?

| | |
|------------|--|
| Yes | REFER to Section 419-10 . |
| No | INSTALL a new <u>SJB</u> . REFER to Section 419-10 . TEST the system for normal operation. |

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

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) interacts with the PCM and controls the Passive Anti-Theft System (PATS) function. The IPC controls the anti-theft indicator based upon the status of the PATS .

The anti-theft indicator proves out for 3 seconds when the key is turned to the ON or START position. If there is a PATS concern, the anti-theft indicator either flashes rapidly or glows steadily (for more than 3 seconds) when the ignition is switched to the ON or the START mode. The PATS also flashes the anti-theft indicator every 2 seconds at ignition off to act as a visual theft deterrent for all vehicles.

This pinpoint test is intended to diagnose the following:

- PATS
- IPC

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

AH1 CARRY OUT THE IPC ANTI-THEFT INDICATOR ACTIVE COMMAND USING THE SCAN TOOL

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC anti-theft indicator (THEFT_LMP) active command. Command the anti-theft indicator on and off while observing the anti-theft indicator.

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

| | |
|------------|-----------------------------|
| Yes | GO to AH2 . |
|------------|-----------------------------|

| | |
|-----------|---|
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
|-----------|---|

AH2 RETRIEVE THE RECORDED DTCS FROM THE CONTINUOUS IPC SELF-TEST

- Check for recorded IPC DTCs from the continuous self-test.

Are any PATS -related DTCs recorded?

| | |
|------------|---|
| Yes | REFER to Section 419-01B . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

Pinpoint Test AI: The Message Center Is Not Operating Correctly

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Refer to Wiring Diagrams Cell [60](#), Instrument Cluster for schematic and connector information.

Normal Operation

The message center functionality is controlled through the message center switch (part of the LH steering wheel switch), which is hardwired to the Instrument Panel Cluster (IPC) through input and return circuits. There are 3 message center switch buttons (base IPC) or 5 message center switch buttons (optional and GT500 IPC). Each button operates a unique switch within the message center switch portion of the LH steering wheel switch assembly using a different resistance value associated with each specific button. The IPC sends out a reference voltage to the LH steering wheel switch on the input circuit and monitors the voltage drop when a message center switch button is pressed. The voltage drop varies depending upon the resistance of the specific button pressed, providing indication to the IPC , which switch is pressed.

| DTC Description | Fault Trigger Conditions |
|--|--|
| <ul style="list-style-type: none"> • B1A82:11 — External Trip Switch: Circuit Short To Ground | <p>NOTE: <i>This DTC only sets when equipped with the 3-button base message center <u>IPC</u> and does not apply to the 5-button optional message center <u>IPC</u> .</i></p> <p>A continuous and on-demand DTC that sets in the <u>IPC</u> when the <u>IPC</u> detects a short to ground on the message center switch input circuit.</p> |
| <ul style="list-style-type: none"> • B1A82:13 — External Trip Switch: Circuit Open | <p>A continuous and on-demand DTC that sets in the <u>IPC</u> when the <u>IPC</u> detects an open on the message center switch input circuit.</p> |
| <ul style="list-style-type: none"> • B1A82:23 — External Trip Switch: Signal Stuck Low | <p>A continuous DTC that sets in the <u>IPC</u> if the <u>IPC</u> senses any message center button as pressed for greater than 120 seconds.</p> |

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Message center switch (part of the LH steering wheel switch)
- Steering wheel harness (part of the steering wheel)
- Clockspring
- IPC

PINPOINT TEST AI : THE MESSAGE CENTER IS NOT OPERATING CORRECTLY

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

AI1 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC Self-Test .
- Carry out the IPC self-test.

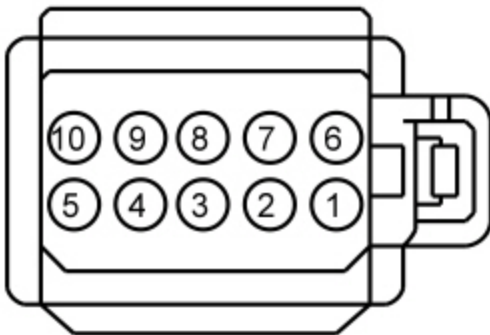
Are any DTCs recorded?

| | |
|------------|---|
| Yes | For DTC B1A82:11 or DTC B1A82:13, GO to A12 . For DTC B1A82:23, INSTALL a new LH steering wheel switch. REFER to Section 211-05 . CLEAR the DTC. REPEAT the self-test. For all other DTCs, REFER to DTC Charts in this section. |
| No | GO to A19 . |

AI2 CHECK THE IPC OUTPUT AT THE LH STEERING WHEEL SWITCH

- Ignition OFF.
- Disconnect: LH Steering Wheel Switch .
- Ignition ON.
- Measure the **voltage** between:

| Positive Lead | | Negative Lead | |
|-----------------------------|---------|-----------------------------|---------|
| Pin | Circuit | Pin | Circuit |
| C2998 Pin 2 | — | C2998 Pin 3 | — |



Is the voltage approximately 5 volts?

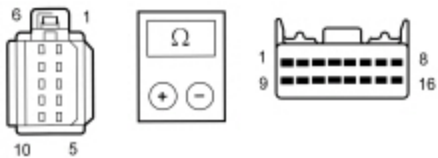
| | |
|------------|---|
| Yes | INSTALL a new LH steering wheel switch. REFER to Section 211-05 . CLEAR the DTCs. REPEAT the self-test. |
| No | GO to A13 . |

AI3 CHECK THE MESSAGE CENTER SWITCH SIGNAL AND RETURN CIRCUITS BETWEEN THE LH STEERING WHEEL SWITCH AND THE LOWER CLOCKSPrING FOR AN OPEN

- Ignition OFF.
- Disconnect: Lower Clockspring [C2274A](#) .

- Measure the **resistance** between:

| Positive Lead | | Negative Lead | |
|-----------------------------|---------|--------------------------------|---------|
| Pin | Circuit | Pin | Circuit |
| C2998 Pin 2 | — | C2274A, pin 3 (component side) | — |
| C2998 Pin 3 | — | C2274A, pin 4 (component side) | — |



N0136594

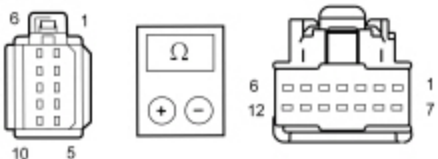
Are the resistances less than 5 ohms?

| | |
|------------|-----------------------------|
| Yes | GO to AI5 . |
| No | GO to AI4 . |

AI4 CHECK THE MESSAGE CENTER SWITCH SIGNAL AND RETURN CIRCUITS BETWEEN THE LH STEERING WHEEL SWITCH AND THE UPPER CLOCKSPRING FOR AN OPEN

- Remove the driver air bag. Refer to [Section 501-20B](#).
- Disconnect: Upper Clockspring [C2274B](#) .
- Measure the **resistance** between:

| Positive Lead | | Negative Lead | |
|-----------------------------|---------|-------------------------------|---------|
| Pin | Circuit | Pin | Circuit |
| C2998 Pin 2 | — | C2274B Pin 6 | — |
| C2998 Pin 3 | — | C2274B Pin 12 | — |



N0136595

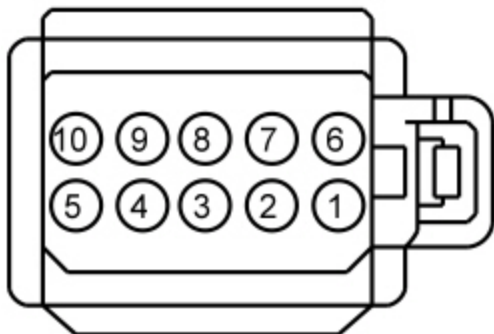
Is the resistance less than 5 ohms?

| | |
|------------|--|
| Yes | INSTALL a new clockspring. REFER to Section 501-20B . CLEAR the DTC. REPEAT the self-test. |
| No | INSTALL a new steering wheel. REFER to Section 211-04 . CLEAR the DTC. REPEAT the self-test. |

AI5 CHECK THE MESSAGE CENTER SWITCH SIGNAL CIRCUIT BETWEEN THE LH STEERING WHEEL SWITCH AND THE LOWER CLOCKSPRING FOR A SHORT TO GROUND

- Measure the **resistance** between:

| Positive Lead | | Negative Lead | |
|-----------------------------|---------|---------------|---------|
| Pin | Circuit | Pin | Circuit |
| C2998 Pin 2 | — | — | Ground |



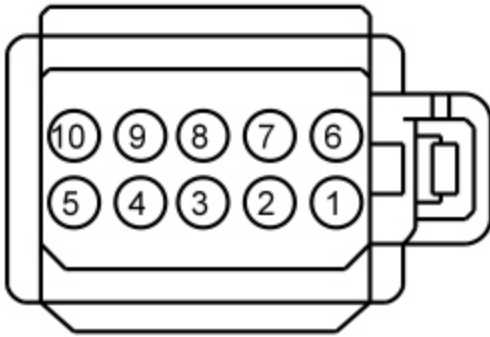
Is the resistance greater than 10,000 ohms?

| | |
|------------|-----------------------------|
| Yes | GO to AI7 . |
| No | GO to AI6 . |

AI6 CHECK THE MESSAGE CENTER SWITCH SIGNAL CIRCUIT BETWEEN THE LH STEERING WHEEL SWITCH AND THE UPPER CLOCKSPRING FOR A SHORT TO GROUND

- Disconnect: Upper Clockspring [C2274B](#) .
- Measure the **resistance** between:

| Positive Lead | | Negative Lead | |
|-----------------------------|---------|---------------|---------|
| Pin | Circuit | Pin | Circuit |
| C2998 Pin 2 | — | — | Ground |



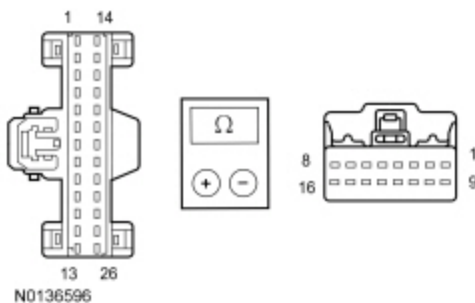
Is the resistance greater than 10,000 ohms?

| | |
|------------|--|
| Yes | INSTALL a new clockspring. REFER to Section 501-20B . CLEAR the DTC. REPEAT the self-test. |
| No | INSTALL a new steering wheel. REFER to Section 211-04 . CLEAR the DTC. REPEAT the self-test. |

A17 CHECK THE MESSAGE CENTER SWITCH SIGNAL AND RETURN CIRCUITS BETWEEN THE IPC AND THE LOWER CLOCKSPRING FOR AN OPEN

- Disconnect: [IPC](#) .
- Measure the **resistance** between:

| Positive Lead | | Negative Lead | |
|----------------------------|---------|-------------------------------|---------|
| Pin | Circuit | Pin | Circuit |
| C220 Pin 6 | — | C2274A Pin 3 | — |
| C220 Pin 4 | — | C2274A Pin 11 | — |



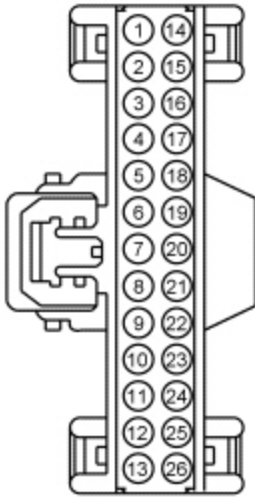
Is the resistance less than 5 ohms?

| | |
|------------|-----------------------------|
| Yes | GO to A18 . |
| No | REPAIR the circuit. |

A18 CHECK THE MESSAGE CENTER SWITCH SIGNAL CIRCUIT BETWEEN THE IPC AND THE LOWER CLOCKSPRING FOR A SHORT TO GROUND

- Disconnect: [IPC](#) .
- Measure the **resistance** between:

| Positive Lead | | Negative Lead | |
|----------------------------|---------|---------------|---------|
| Pin | Circuit | Pin | Circuit |
| C220 Pin 6 | — | — | Ground |
| C220 Pin 4 | — | — | Ground |



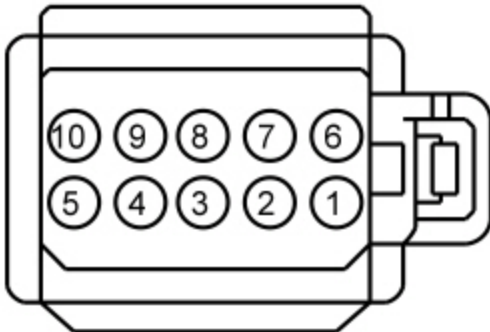
Is the resistance greater than 10,000 ohms?

| | |
|------------|-----------------------------|
| Yes | GO to A10 . |
| No | REPAIR the circuit. |

A19 CHECK FOR VOLTAGE FROM THE IPC

- Disconnect: LH Steering Wheel Switch .
- Ignition ON.
- Measure the **voltage** between:

| Positive Lead | | Negative Lead | |
|-----------------------------|---------|-----------------------------|---------|
| Pin | Circuit | Pin | Circuit |
| C2998 Pin 2 | — | C2998 Pin 3 | — |



Is the voltage approximately 5 volts?

| | |
|------------|---|
| Yes | INSTALL a new LH steering wheel switch. REFER to Section 211-05 . TEST the system for normal operation. |
| No | GO to AI10 . |

AI10 CHECK FOR CORRECT IPC OPERATION

- Disconnect the IPC) connector.
- Check for:
 - corrosion
 - damaged pins
 - pushed-out pins
- Connect the IPC 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 IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. 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 Compass Is Inoperative

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Refer to Wiring Diagrams Cell [124](#), Power Mirrors for schematic and connector information.

Normal Operation

The compass module (integral to the auto-dimming interior mirror) provides vehicle directional inputs to the Instrument Panel Cluster (IPC) , which sends the compass information to the Front Display Interface Module (FDIM) over the Medium Speed Controller Area Network (MS-CAN) . The FDIM displays the compass direction according to the information that has been provided by the compass module to the IPC .

- DTC U0161:87 (Lost Communication With Compass Module: Missing Message) — sets when the IPC does not receive any communications from the compass module.
- DTC U0161:92 (Lost Communication With Compass Module: Performance or Incorrect Operation) — sets when the IPC attempts a self-test of the compass module and its associated circuits and a failure results.

This pinpoint test is intended to diagnose the following:

- Fuse(s)
- Wiring, terminals or connectors
- Compass module (integral to the auto-dimming interior mirror)
- FDIM
- IPC

PINPOINT TEST AJ : THE COMPASS IS INOPERATIVE

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

AJ1 CHECK THE COMPASS DISPLAY

- Ignition ON.
- Check the compass display in the lower LH corner of the FDIM .

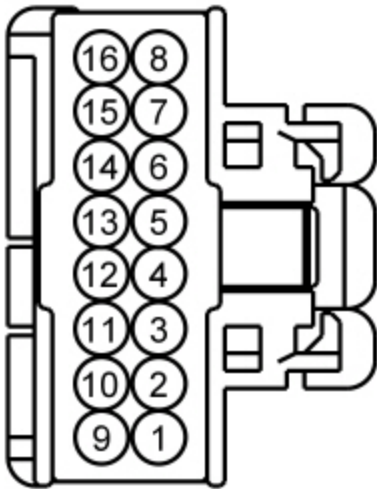
Does the compass display illuminate?

| | |
|------------|---|
| Yes | If the compass display illuminates with only 2 bars, GO to AJ2 . If the compass display turns on, but it does not display all directions, or indicates CAL, GO to Pinpoint Test AK . |
| No | REFER to Section 415-00 . |

AJ2 CHECK THE COMPASS MODULE VOLTAGE SUPPLY AT THE INTERIOR AUTO-DIMMING MIRROR

- Ignition OFF.
- Disconnect: Auto-Dimming Interior Mirror [C9039](#) .
- Ignition ON.
- Measure the **voltage** between:

| Positive Lead | | Negative Lead | |
|-----------------------------|------------|---------------|---------|
| Pin | Circuit | Pin | Circuit |
| C9039 Pin 1 | CBP41 (BU) | — | Ground |



Is the voltage greater than 10 volts?

| | |
|------------|--|
| Yes | GO to AJ3 . |
| No | VERIFY the Smart Junction Box (SJB) fuse 41 (15A) is OK. If OK, REPAIR the circuit. TEST the system for normal operation. If not OK, REFER to the Wiring Diagrams Manual to identify the possible causes of the circuit short. |

AJ3 CHECK THE INTERIOR AUTO-DIMMING MIRROR GROUND FOR CONTINUITY AT THE MIRROR

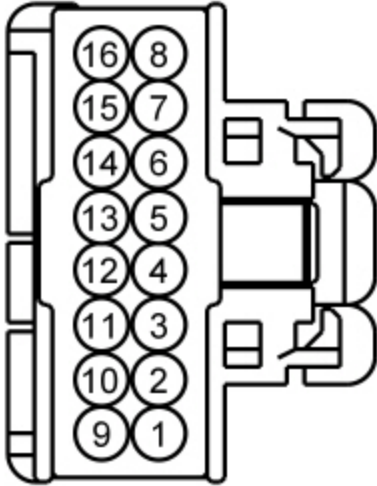
- Ignition OFF.
- Disconnect: Negative Battery Cable .
- Measure the **voltage** between:

With Video Display

| Positive Lead | | Negative Lead | |
|-----------------------------|------------|-----------------------------|---------------|
| Pin | Circuit | Pin | Circuit |
| C9039 Pin 1 | CBP41 (BU) | C9039 Pin 3 | GD139 (BK/YE) |

Without Video Display

| Positive Lead | | Negative Lead | |
|-----------------------------|------------|-----------------------------|---------------|
| Pin | Circuit | Pin | Circuit |
| C9039 Pin 1 | CBP41 (BU) | C9039 Pin 4 | GD139 (BK/YE) |



Is the voltage greater than 10 volts?

| | |
|------------|---|
| Yes | GO to AJ4 . |
| No | REPAIR the circuit. TEST the system for normal operation. |

AJ4 CHECK THE DTCS IN THE FDIM

- Connect: Auto-Dimming Interior Mirror [C9039](#) .
- Ignition ON.
- Clear the FDIM DTCs.
- Ignition OFF.
- Ignition ON.
- Wait 10 seconds.
- Retrieve the FDIM DTCs.

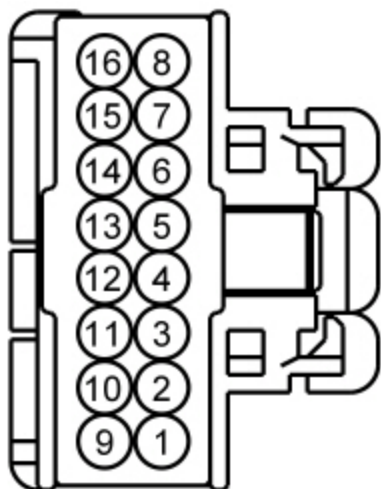
Is DTC U0155:00 present?

| | |
|------------|---|
| Yes | REFER to Section 415-00 . |
| No | GO to AJ5 . |

AJ5 CHECK THE COMPASS DATA + AND DATA - CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect: Auto-Dimming Interior Mirror [C9039](#) .
- Disconnect: IPC [C220](#) .
- Measure the **voltage** between:

| Positive Lead | | Negative Lead | |
|------------------------------|---------------|---------------|---------|
| Pin | Circuit | Pin | Circuit |
| C9039 Pin 10 | VMC30 (BU/GY) | — | Ground |



Is any voltage present?

Yes REPAIR the circuit in question. TEST the system for normal operation.

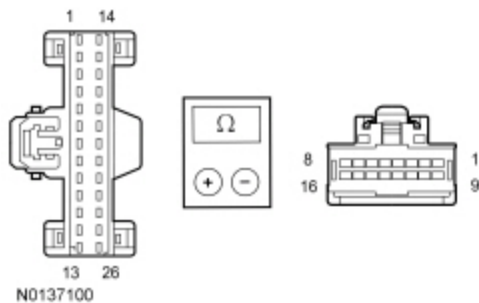
No GO to [AJ6](#).

AJ6 CHECK THE COMPASS DATA PLUS (+) CIRCUIT FOR AN OPEN

- Ignition OFF.
- Measure the **resistance** between:

With Camera Mirror

| Positive Lead | | Negative Lead | |
|-----------------------------|---------------|-----------------------------|---------------|
| Pin | Circuit | Pin | Circuit |
| C220 Pin 10 | VMC31 (GY/BY) | C9039 Pin 9 | VMC31 (GY/BY) |



Is the resistance less than 5 ohms?

Yes GO to [AJ7](#).

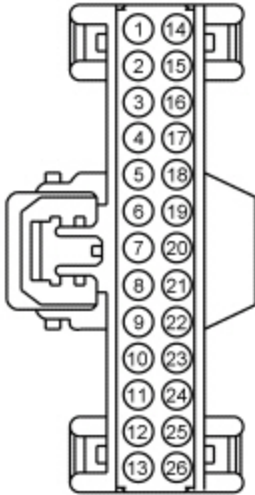
No REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

AJ7 CHECK THE COMPASS DATA PLUS (+) CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.

- Measure the **resistance** between:

| Positive Lead | | Negative Lead | |
|-----------------------------|---------------|---------------|---------|
| Pin | Circuit | Pin | Circuit |
| C220 Pin 10 | VMC31 (GY/BY) | — | Ground |



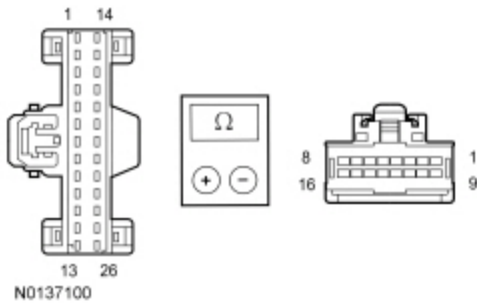
Is the resistance greater than 10,000 ohms?

| | |
|------------|---|
| Yes | GO to AJ8 . |
| No | REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test. |

AJ8 CHECK THE COMPASS DATA MINUS (-) CIRCUIT FOR AN OPEN

- Measure the **resistance** between:

| Positive Lead | | Negative Lead | |
|----------------------------|---------------|------------------------------|---------------|
| Pin | Circuit | Pin | Circuit |
| C220 Pin 9 | VMC30 (BU/GY) | C9039 Pin 10 | VMC30 (BU/GY) |



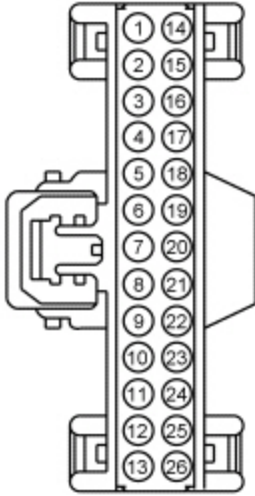
Is the resistance less than 5 ohms?

| | |
|------------|---|
| Yes | GO to AJ9 . |
| No | REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test. |

AJ9 CHECK THE COMPASS DATA MINUS (-) CIRCUIT FOR A SHORT TO GROUND

- Measure the **resistance** between:

| Positive Lead | | Negative Lead | |
|----------------------------|---------------|---------------|---------|
| Pin | Circuit | Pin | Circuit |
| C220 Pin 9 | VMC30 (BU/GY) | — | Ground |



Is the resistance greater than 10,000 ohms?

| | |
|------------|---|
| Yes | GO to AJ10 . |
| No | REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test. |

AJ10 CHECK FOR DTC U0161:87 OR DTC U0161:92

- Connect: [IPC C220](#) .
- Connect: Auto-Dimming Interior Mirror [C9039](#) .
- Ignition ON.
- Clear the [IPC](#) DTCs.
- Ignition OFF.
- Ignition ON.
- Wait 10 seconds.
- Retrieve the [IPC](#) DTCs.

Is DTC U0161:87 or DTC U0161:92 present?

| | |
|------------|---|
| Yes | INSTALL a new auto-dimming interior mirror. REFER to Section 501-09 . ADJUST the zone setting. REFER to Compass Zone Adjustment in this section. CALIBRATE the compass. REFER to Compass Calibration in this section. TEST the system for normal operation. |
| No | GO to AJ11 . |

AJ11 CHECK FOR CORRECT IPC OPERATION

- Disconnect the [IPC](#) connector.
- Check for:
 - corrosion
 - damaged pins
 - pushed-out pins
- Connect the [IPC](#) 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 IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation. |
| No | The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test. |

Pinpoint Test AK: The Compass Is Inaccurate

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

NOTE: This procedure is only applicable to vehicles without navigation. If the compass display is inaccurate on a vehicle with navigation, install a new Front Display Interface Module (FDIM) . Refer to [Section 415-00](#).

Normal Operation

When calibrated correctly, the compass module (integral to the auto-dimming interior mirror) provides vehicle directional inputs to the Instrument Panel Cluster (IPC) which sends the compass information to the **FDIM** over the Medium Speed Controller Area Network (MS-CAN) . The **FDIM** displays the vehicle heading based on the selected zone setting.

This pinpoint test is intended to diagnose the following:

- Compass zone setting
- Compass calibration
- Compass module (integral to the auto-dimming interior mirror)

PINPOINT TEST AK : THE COMPASS IS INACCURATE

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 AUTO-DIMMING INTERIOR MIRROR POSITION

- Verify the auto-dimming interior mirror is installed correctly with the compass connector on the bottom of the mirror.

Is the auto-dimming interior mirror installed correctly?

| | |
|------------|--|
| Yes | GO to AK2 . |
| No | REPOSITION the auto-dimming interior mirror so the compass connector is located on the bottom of the mirror. REFER to Section 501-09 . TEST the system for normal operation. |

AK2 CHECK THE COMPASS ACCURACY

- Set the zone. Refer to [Compass Zone Adjustment](#) in this section.
- Calibrate the compass. Refer to [Compass Calibration](#) in this section.
- Observe the compass display with the vehicle pointing in several different directions, as follows:

| Direction | Compass Display |
|-----------|-----------------|
| North | N |
| Northeast | NE |
| East | E |
| Southeast | SE |
| South | S |
| Southwest | SW |
| West | W |

| Direction | Compass Display |
|-----------|-----------------|
| Northwest | NW |

Does the compass display correctly for each direction?

| | |
|------------|--|
| Yes | The compass is OK. The concern may have been caused by an incorrect zone setting, or the compass was out of calibration. |
| No | INSTALL a new compass module. REFER to Auto-Dimming Interior Mirror in Section 501-09 . SET the zone. REFER to Compass Zone Adjustment in this section. CALIBRATE the compass. REFER to Compass Calibration in this section. TEST the system for normal operation. |

Pinpoint Test AL: The CHECK FUEL FILL INLET Message Is Inoperative/Always On

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

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

If the IPC does not receive the fuel cap off data from the PCM for 5 seconds or less, the IPC defaults the CHECK FUEL FILL INLET message to the last setting, based upon the last known good data message. If the IPC does not receive the fuel cap off data from the PCM for more than 5 seconds or if the data received is deemed invalid, the IPC sets DTC U0100:87 in continuous memory and defaults the CHECK FUEL FILL INLET message off.

NOTE: If DTC U0100:87 is set in the IPC, other observable symptoms can be an inoperative speedometer or odometer.

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

This pinpoint test is intended to diagnose the following:

- Evaporative emissions concern
- PCM
- IPC

PINPOINT TEST AL : THE CHECK FUEL FILL INLET MESSAGE IS INOPERATIVE/ALWAYS ON

AL1 CHECK THE MESSAGE CENTER DISPLAY OPERATION

- Close all doors and the luggage compartment lid.
- Ignition ON.
- Open the driver door and observe the message center.

Does the message center display DRIVER DOOR AJAR?

| | |
|------------|---|
| Yes | GO to AL2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

AL2 RETRIEVE THE RECORDED PCM DTCs FROM THE KOEO SELF-TEST

- Check for recorded PCM DTCs from the Key ON Engine OFF (KOEO) self-test.

Is DTC P0457 recorded?

| | |
|------------|---|
| Yes | If the CHECK FUEL FILL INLET message is displayed, REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. If the CHECK FUEL FILL INLET message is not displayed, GO to AL3 . |
| No | If the CHECK FUEL FILL INLET message is always displayed, INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. If the CHECK FUEL FILL INLET message is not displayed, the system is operating normally at this time. If the fuel cap was left off and the CHECK FUEL FILL INLET message did not turn on, driving conditions may not have allowed for the PCM to run the cruise test and message the IPC to turn on the check fuel cap warning indicator. |

AL3 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded [IPC](#) DTCs from the self-test.

Is DTC U0100:87 recorded?

| | |
|------------|--|
| Yes | GO to Pinpoint Test AS. |
| No | INSTALL a new PCM. REFER to Section 303-14 . |

Pinpoint Test AM: The Key-In-Ignition Warning Chime Is Inoperative

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) receives the key-in-ignition warning status from the Smart Junction Box (SJB) over the Medium Speed Controller Area Network (MS-CAN) communication bus.

The [SJB](#) monitors the door ajar input from the LH front door and the key-in-ignition switch status. When the [SJB](#) detects a key-in-ignition voltage and the LH front door is open or ajar, the [SJB](#) sends the [IPC](#) a chime request message to sound the key-in-ignition warning chime.

- DTC B1352 (Ignition Key-In Circuit Failure) — an on-demand DTC that sets in the [SJB](#) if the [SJB](#) detects an open on the key-in-ignition switch input circuit or if the [SJB](#) detects ignition START, RUN/START or RUN/ACC inputs without the key-in-ignition input.

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Key-in-ignition switch (part of the ignition switch)
- [SJB](#)
- [IPC](#)

PINPOINT TEST AM : THE KEY-IN-IGNITION WARNING CHIME IS INOPERATIVE

AM1 CHECK THE SAFETY BELT WARNING CHIME OPERATION

- Ignition OFF.
- Ignition ON.
- Monitor the safety belt warning chime when the ignition is transitioned from OFF to RUN for 6 seconds.

Does the safety belt warning chime operate for approximately 6 seconds?

| | |
|------------|---|
| Yes | GO to AM2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

AM2 CHECK THE DOOR AJAR WARNING INDICATOR OPERATION

- Ignition ON.
- Open then close the LH front door while observing the door ajar warning indicator in the [IPC](#) message center or the integrated display.

Does the door ajar warning indicator operate correctly?

| | |
|-----|-----------------------------|
| Yes | GO to AM3 . |
| No | GO to Pinpoint Test T. |

AM3 RETRIEVE THE RECORDED DTCS FROM THE SJB SELF-TEST

- Check for recorded DTCs from the [SJB](#) self-test.

Is DTC B1352 present?

| | |
|-----|---|
| Yes | GO to AM4 . |
| No | INSTALL a new SJB . REFER to Section 419-10 . TEST the system for normal operation. |

AM4 CHECK THE IGNITION SWITCH

- Ignition OFF.
- Disconnect: Ignition Switch [C250](#) .
- Carry out the ignition switch component test.
Refer to Wiring Diagrams Cell [149](#) for component testing.

Is the ignition switch OK?

| | |
|-----|--|
| Yes | REPAIR circuit CDC30 (BU/GY) for an open. CLEAR the DTCs. REPEAT the self-test. |
| No | INSTALL a new ignition switch. REFER to Section 211-05 . CLEAR the DTCs. REPEAT the self-test. |

Pinpoint Test AN: The Headlamps On Warning Chime Is Inoperative

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Smart Junction Box (SJB) receives the headlamp switch status from the headlamp switch. The [SJB](#) receives the LH front door ajar status from the LH front door ajar switch through hardwired circuitry.

The headlamps on warning chime sounds when the LH front door is opened with the ignition switch in the OFF position, no key-in-ignition input, and the headlamp switch is in the PARK or HEADLAMP ON position (or if a fault exists in the headlamp switch inputs). The [SJB](#) communicates the headlamp on chime request to the Instrument Panel Cluster (IPC) over the Medium Speed Controller Area Network (MS-CAN) communication bus. The autolamps feature must not be selected for the headlamps on warning chime to operate.

This pinpoint test is intended to diagnose the following:

- Door ajar indication
- [SJB](#)
- [IPC](#)

PINPOINT TEST AN : THE HEADLAMPS ON WARNING CHIME IS INOPERATIVE

AN1 CHECK THE SAFETY BELT WARNING CHIME OPERATION

- Ignition OFF.
- Ignition ON.
- Monitor the safety belt warning chime when the ignition is transitioned from OFF to RUN for 6 seconds.

Does the safety belt warning chime operate for approximately 6 seconds?

| | |
|------------|---|
| Yes | GO to AN2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

AN2 CHECK THE SAFETY BELT WARNING CHIME OPERATION

- Ignition OFF.
- Ignition ON.
- Monitor the safety belt warning chime when the ignition switch is transitioned from OFF to RUN for 6 seconds.

Does the safety belt warning chime operate for approximately 6 seconds?

| | |
|------------|---|
| Yes | GO to AN3 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

AN3 CHECK THE EXTERIOR LAMPS OPERATION

- Ignition OFF.
- Place the headlamp switch in the PARK position.

Do the parking lamps operate?

| | |
|------------|---|
| Yes | GO to AN4 . |
| No | REFER to Section 417-01 . |

AN4 CHECK THE DOOR AJAR WARNING INDICATOR OPERATION

- Ignition ON.
- Open then close the LH front door while observing the door ajar warning indicator in the IPC message center.

Does the door ajar warning indicator operate correctly?

| | |
|------------|--|
| Yes | INSTALL a new <u>SJB</u> . REFER to Section 419-10 . TEST the system for normal operation. |
| No | GO to Pinpoint Test T . |

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

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Refer to Wiring Diagrams Cell [60](#), Instrument Cluster for schematic and connector information.

Normal Operation

The Instrument Panel Cluster (IPC) receives the key-in-ignition warning status from the Smart Junction Box (SJB) over the Medium Speed Controller Area Network (MS-CAN) communication bus.

The key-in-ignition warning switch (part of the ignition switch) is hardwired to the SJB . When the key is inserted into the ignition lock cylinder, the key-in-ignition switch closes and supplies voltage to the SJB .

The SJB monitors the door ajar input from the LH front door and the key-in-ignition switch status. When the SJB detects a key-in-ignition voltage and the LH front door is open or ajar, the SJB sends the IPC a chime request message to sound the key-in-ignition warning chime.

- DTC B1352 (Ignition Key-In Circuit Failure) — an on-demand DTC that sets in the SJB if the SJB detects a short to voltage on the key-in-ignition switch input, circuit CDC30 (BU/GY) or if the SJB detects ignition START, RUN/START or RUN/ACC inputs without the key-in-ignition input.

This pinpoint test is intended to diagnose the following:

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

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

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

AO1 CHECK THE IPC ILLUMINATION

- **NOTE:** Be sure to allow 30 seconds for the illuminated entry/exit to time out. After 30 seconds, the IPC illumination should turn off.

Verify the IPC is not illuminated with the headlamp switch off.

Does the IPC illumination operate correctly?

| | |
|------------|---|
| Yes | GO to AO2 . |
| No | REFER to Section 413-00 . |

AO2 RETRIEVE THE RECORDED DTCS FROM THE SJB SELF-TEST

- Check for recorded DTCs from the SJB self-test.

Is DTC B1352 present?

| | |
|------------|-----------------------------|
| Yes | GO to AO3 . |
| No | GO to AO4 . |

AO3 CHECK THE SJB IGNITION INPUT PIDS

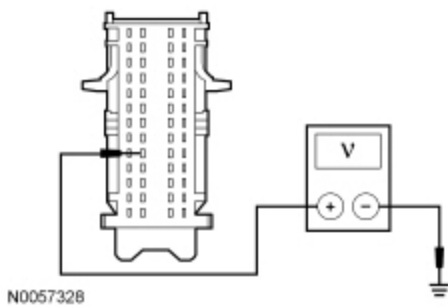
- Ignition ON.
- Enter the following diagnostic mode on the scan tool: SJB DataLogger .
- Select and monitor the SJB PIDs ignition ACC (IGN_A_ECU), ignition OFF (IGN_O_ECU), ignition RUN (IGN_R_ECU), and ignition START (IGN_S_ECU) while cycling the ignition from ACC, OFF, RUN and START.

Do the SJB PIDs match the ignition mode?

| | |
|------------|--|
| Yes | INSTALL a new <u>SJB</u> . REFER to Section 419-10 . TEST the system for normal operation. |
| No | REFER to Section 211-05 to diagnose the ignition switch outputs to the <u>SJB</u> . |

AO4 CHECK THE KEY-IN-IGNITION INPUT FOR VOLTAGE

- Ignition OFF.
- Disconnect: SJB [C2280B](#) .
- Measure the voltage between the SJB [C2280B](#) Pin 35, circuit CDC30 (BU/GY), harness side and ground.

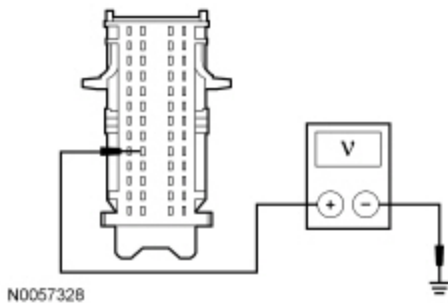


Is any voltage present?

| | |
|------------|--|
| Yes | GO to AO5 . |
| No | INSTALL a new <u>SJB</u> . REFER to Section 419-10 . TEST the system for normal operation. |

AO5 CHECK THE KEY-IN-IGNITION INPUT CIRCUIT FOR A SHORT TO VOLTAGE

- Disconnect: Ignition Switch [C250](#) .
- Measure the voltage between the SJB [C2280B](#) Pin 35, circuit CDC30 (BU/GY), 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. |

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

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

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

This pinpoint test is intended to diagnose the following:

- IPC configuration
- IPC

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

AP1 CHECK THE KEY-IN-IGNITION WARNING CHIME OPERATION

- Ignition OFF.
- Insert the key into the ignition lock cylinder.

- Open the LH front door and observe the key-in-ignition warning chime operation.

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

| | |
|------------|---|
| Yes | GO to AP2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

AP2 CHECK THE IPC CONFIGURATION

- Verify that the performance shift warning chime (tone) is configured on and that the desired rpm setting is configured. Refer to [Message Center Configuration](#) or the Owner's Literature for configuration of the performance shift warning chime.

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

| | |
|------------|--|
| Yes | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| No | CONFIGURE the performance shift warning chime (tone) on and configure the desired rpm setting. REFER to Message Center Configuration in this section or the Owner's Literature for additional information. TEST the system for normal operation. |

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

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The Instrument Panel Cluster (IPC) receives the safety belt and Belt-Minder® requests from the Restraints Control Module (RCM) over the High Speed Controller Area Network (HS-CAN) . The safety belt warning chime sounds for approximately 6 seconds when the driver safety belt is not fastened and the ignition is switched from the OFF or ACC to the RUN mode.

The Belt-Minder® feature supplements the safety belt warning function and is enabled after the safety belt warning is complete. The Belt-Minder® simultaneously sounds the chime and illuminates the safety belt warning lamp in the IPC once the vehicle speed has exceeded 5 km/h (3 mph), and remains active for 5 minutes from the time it is started.

There are 2 Belt-Minder® strategies used and implemented by the IPC as commanded by the RCM . The 2 strategies are designed to provide an increased chime tone activity. Belt-Minder® A provides 6 one-second sequences for the first minute of the Belt-Minder® warning. Belt-Minder® B provides 6 one-second sequences of 3 chime tones in rapid succession for the remainder of the Belt-Minder® warning.

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

The Belt-Minder® functions exactly the same for both administrator and MyKey® programmed keys except when a MyKey® programmed key is in use, the driver cannot configure the Belt-Minder® off. Once the Belt-Minder® is activated, the Belt-Minder® continues to chime periodically (without the 5 minute time out) with the audio system muted until the driver and passenger safety belts are fastened.

This pinpoint test is intended to diagnose the following:

- Safety belt warning indication concern
- Belt-Minder® deactivated
- Speedometer concern
- RCM
- IPC

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

AQ1 CHECK THE KEY-IN-IGNITION WARNING CHIME OPERATION

- Ignition OFF.

- Insert the key into the ignition lock cylinder.
- Open the LH front door and observe the key-in-ignition warning chime operation.

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

| | |
|------------|---|
| Yes | GO to AQ2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

AQ2 CHECK THE DRIVER AND FRONT PASSENGER SAFETY BELT BUCKLE SWITCHES

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: [RCM](#) PIDs .
- Monitor the [RCM](#) driver safety belt buckle PID (SBLT_D_ST) and the front passenger safety belt buckle PID (SBLT_P_ST) while buckling and unbuckling the driver and RH front passenger safety belts.

Do the PIDs display BUCKLED with the safety belt buckled and UNBUCKLED with the safety belt unbuckled?

| | |
|------------|--|
| Yes | GO to AQ3 . |
| No | REFER to Section 501-20B . |

AQ3 CHECK THE SAFETY BELT WARNING INDICATOR FOR CORRECT OPERATION

- Start the engine.
- Within one minute, buckle then unbuckle the LH front safety belt.
- With the engine running, verify the safety belt warning indicator illuminates with the safety belt unbuckled and turns off when buckled.

Does the safety belt warning indicator operate correctly?

| | |
|------------|---|
| Yes | GO to AQ4 . |
| No | GO to Pinpoint Test S . |

AQ4 CHECK THE SPEEDOMETER OPERATION

- Verify that the speedometer is operating correctly.

Does the speedometer operate correctly?

| | |
|------------|---|
| Yes | GO to AQ5 . |
| No | GO to Pinpoint Test G . |

AQ5 CHECK THE BELT-MINDER® CONFIGURATION

NOTE: Verify that an administrator key is used for this test and **not** a MyKey® programmed key. When a MyKey® programmed key is used, the Belt-Minder® is automatically turned on and cannot be disabled (if previously disabled by an administrator, the Belt-Minder® remains disabled when an administrator key is used).

- Verify that the Belt-Minder® is activated or configured on for the seating position in question. Refer to [Belt-Minder® Deactivating/Activating](#) in this section to configure without a scan tool.

Is the Belt-Minder® activated for the seating position in question?

| | |
|------------|--|
| Yes | INSTALL a new RCM . REFER to Section 501-20B . TEST the system for normal operation. |
| No | ACTIVATE the Belt-Minder® for the seating position in question. REFER to Belt-Minder® Deactivating/Activating in this section. TEST the system for normal operation. |

Pinpoint Test AR: The Turn Signal On Warning Chime Is Inoperative

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

The turn signal on warning chime sounds when the vehicle travels more than 3.2 km (2.0 miles) with the turn signal on. The Smart Junction Box (SJB) communicates the turn signal switch status to the Instrument Panel Cluster (IPC) over the Medium Speed Controller Area Network (MS-CAN) . The IPC receives the odometer rolling count data from the PCM over the High Speed Controller Area Network (HS-CAN) .

This pinpoint test is intended to diagnose the following:

- Odometer operation
- IPC

PINPOINT TEST AR : THE TURN SIGNAL ON WARNING CHIME IS INOPERATIVE

AR1 CHECK THE SAFETY BELT WARNING CHIME OPERATION

- Ignition OFF.
- Ignition ON.
- Monitor the safety belt warning chime when the ignition is transitioned from OFF to RUN for 6 seconds.

Does the safety belt warning chime operate for approximately 6 seconds?

| | |
|-----|---|
| Yes | GO to AR2 . |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

AR2 CHECK THE KEY-IN-IGNITION WARNING CHIME OPERATION

- Ignition OFF.
- Insert the key into the ignition lock cylinder.
- Open the LH front door and observe the key-in-ignition warning chime operation.

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

| | |
|-----|--|
| Yes | GO to AR3 . |
| No | GO to Pinpoint Test AM . |

AR3 CHECK THE TURN SIGNAL INDICATORS OPERATION

- Ignition ON.
- Verify the turn signal indicators operation.

Do the turn signal indicators operate correctly?

| | |
|-----|---|
| Yes | GO to AR4 . |
| No | GO to Pinpoint Test Z . |

AR4 CHECK THE ODOMETER FOR CORRECT OPERATION

- Drive the vehicle and observe the odometer for correct operation.

Does the odometer operate correctly?

| | |
|------------|--|
| Yes | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation |
| No | GO to Pinpoint Test L. |

Pinpoint Test AS: DTC U0100:87

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

- DTC U0100:87 (Lost Communication With ECM /PCM "A": Missing Message) — sets in the Instrument Panel Cluster (IPC) if data messages received from the PCM over the High Speed Controller Area Network (HS-CAN) are missing for more than 5 seconds. For a complete list of all network messages, refer to [Section 418-00](#).

NOTE: Once the IPC sets DTC U0100:87, multiple gauges or indicators are likely to be inoperative in the IPC . Other modules that require data from the IPC all set communication DTCs and may also exhibit system function concerns.

This pinpoint test is intended to diagnose the following:

- PCM
- IPC

PINPOINT TEST AS : DTC U0100:87

AS1 VERIFY THAT THE SCAN TOOL CAN COMMUNICATE WITH THE PCM

- Connect the scan tool.
- Check that a vehicle session can be established using the scan tool.

Can a vehicle session be established?

| | |
|------------|--|
| Yes | GO to AS2 . |
| No | REFER to Section 418-00 to diagnose no communication with the PCM. |

AS2 CHECK THE IPC CONTINUOUS MEMORY DTCS

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC Self-Test .
- Clear the DTCs. Repeat the IPC self-test.

Is DTC U0100:87 retrieved again?

| | |
|------------|---|
| Yes | GO to AS3 . |
| No | The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

AS3 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST AND THE PCM KOEO SELF-TEST

- Check for recorded DTCs from the IPC self-test and the PCM Key ON Engine OFF (KOEO) self-test.

Is DTC U3003:16 or DTC U3003:17 recorded in the IPC or DTC P0562 or P0563 recorded in the PCM?

| | |
|------------|--|
| Yes | For <u>IPC</u> DTC U3003:16, GO to Pinpoint Test BB . For <u>IPC</u> DTC U3003:17, GO to Pinpoint Test BC . For the PCM, REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. |
| No | GO to AS4 . |

AS4 CHECK FOR DTC U0100:87 SET IN OTHER MODULES

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Self-Test .
- Retrieve the continuous memory DTCs from all modules.

Is DTC U0100:87 set in the Restraints Control Module (RCM) ?

| | |
|------------|---|
| Yes | INSTALL a new PCM. REFER to Section 303-14 . CLEAR the DTCs. REPEAT the self-test. |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

Pinpoint Test AT: DTC U021:00 And U0121:87

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

- DTC U0121:87 (Lost Communication With Anti-Lock Brake System [ABS] Control Module: No Sub Type Information) — sets in the Instrument Panel Cluster (IPC) if data messages received from the ABS module over the High Speed Controller Area Network (HS-CAN) are missing for more than 5 seconds. For a complete list of all network messages, refer to [Section 418-00](#).
- DTC U0121:87 (Lost Communication With Anti-Lock Brake System [ABS] Control Module: Missing Message) — sets in the Instrument Panel Cluster (IPC) if data messages received from the ABS module over the High Speed Controller Area Network (HS-CAN) are missing for more than 5 seconds. For a complete list of all network messages, refer to [Section 418-00](#).

This pinpoint test is intended to diagnose the following:

- ABS module
- [IPC](#)

PINPOINT TEST AT : DTC U021:00 AND U0121:87

AT1 VERIFY THE CUSTOMER CONCERN

- Ignition ON.
- Verify that there is an observable symptom present.

Is an observable symptom present?

| | |
|------------|--|
| Yes | GO to AT2 . |
| No | The system is operating normally at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

AT2 CHECK THE COMMUNICATION NETWORK

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Network Test .
- Carry out the network test.

Does the ABS module pass the network test?

| | |
|------------|---|
| Yes | GO to AT3 . |
| No | REFER to Section 418-00 . |

AT3 RETRIEVE THE RECORDED DTCS FROM THE IPC AND ABS MODULE SELF-TESTS

- Check for recorded DTCs from the [IPC](#) and ABS module self-tests.

Is DTC U3003:16 or DTC U3003:17 recorded in the [IPC](#) or DTC B1317 or B1318 recorded in the ABS module?

| | |
|------------|---|
| Yes | For IPC DTC U3003:16, GO to Pinpoint Test BB . For IPC DTC U3003:17, GO to Pinpoint Test BC . For the ABS module, REFER to Section 206-09 . |
| No | GO to AT4 . |

AT4 RECHECK THE IPC DTCS

- Clear the DTCs. Repeat the [IPC](#) self-test.

Is DTC U021:00 or U0121:87 still present?

| | |
|------------|--|
| Yes | INSTALL a new ABS module. REFER to Section 206-09 . CLEAR the DTCs. REPEAT the IPC self-test. If DTC U021:00 or U0121:87 is still present, INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| No | The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

Pinpoint Test AU: DTC U0131:87

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

- DTC U0131:87 (Lost Communication With Power Steering Control Module: No Sub-Type Information) — sets in the Instrument Panel Cluster (IPC) if data messages received from the Power Steering Control Module (PSCM) over the High Speed Controller Area Network (HS-CAN) are missing for more than 5 seconds. For a complete list of all network messages, refer to [Section 418-00](#).

This pinpoint test is intended to diagnose the following:

- [PSCM](#) (part of the steering gear)
- [IPC](#)

PINPOINT TEST AU : DTC U0131:87

AU1 VERIFY THE CUSTOMER CONCERN

- Ignition ON.
- Verify that there is an observable symptom present.

Is an observable symptom present?

| | |
|------------|--|
| Yes | GO to AU2 . |
| No | The system is operating normally at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

AU2 CHECK THE COMMUNICATION NETWORK

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Network Test .
- Carry out the network test.

Does the [PSCM](#) pass the network test?

| | |
|------------|---|
| Yes | GO to AU3 . |
| No | REFER to Section 418-00 . |

AU3 RETRIEVE THE RECORDED DTCS FROM THE IPC AND PSCM SELF-TESTS

- Check for recorded DTCS from the [IPC](#) and [PSCM](#) self-tests.

Is DTC U3003:16 or DTC U3003:17 recorded?

| | |
|------------|--|
| Yes | For IPC DTC U3003:16, GO to Pinpoint Test BB . For IPC DTC U3003:17, GO to Pinpoint Test BC . For the PSCM , REFER to Section 211-00 . |
| No | GO to AU4 . |

AU4 RECHECK THE IPC DTCS

NOTE: *If new modules were installed prior to the DTC being set, the module configuration may be incorrectly set during the Programmable Module Installation (PMI) or the [PMI](#) may not have been carried out.*

- Clear the DTCS. Repeat the [IPC](#) self-test.

Is DTC U0131:87 still present?

| | |
|------------|---|
| Yes | GO to AU5 . |
| No | The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

AU5 CHECK FOR DTC U0131:87 SET IN OTHER MODULES

- Clear the DTCS.
- Ignition OFF.
- Ignition ON.
- Wait 10 seconds.
- Enter the following diagnostic mode on the scan tool: Self-Test .
- Retrieve the continuous memory DTCS from all modules.

Is DTC U0131:00 set in the ABS module?

| | |
|------------|--|
| Yes | INSTALL a new steering gear. REFER to Section 211-02 . CLEAR the DTCS. REPEAT the IPC self-test. |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01 . TEST the system for normal operation. |

Pinpoint Test AV: DTC U0140:87

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

- DTC U0140:87 (Lost Communication With Body Control Module: Missing Message) — sets in the Instrument Panel Cluster (IPC) if data messages received from the Smart Junction Box (SJB) over the High Speed Controller Area Network (HS-CAN) are missing for more than 5 seconds. For a complete list of all network messages, refer to [Section 418-00](#).

This pinpoint test is intended to diagnose the following:

- [SJB](#)

- [IPC](#)

PINPOINT TEST AV : DTC U0140:87

AV1 VERIFY THE CUSTOMER CONCERN

- Ignition ON.
- Verify that there is an observable symptom present.

Is an observable symptom present?

| | |
|------------|--|
| Yes | GO to AV2 . |
| No | The system is operating normally at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

AV2 CHECK THE COMMUNICATION NETWORK

- 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 AV3 . |
| No | REFER to Section 418-00 . |

AV3 RETRIEVE THE RECORDED DTCS FROM THE IPC AND SJB SELF-TESTS

- Check for recorded DTCs from the [IPC](#) and [SJB](#) self-tests.

Is DTC U3003:16 or DTC U3003:17 recorded in the [IPC](#) or DTC B1317 or B1318 set in the [SJB](#) ?

| | |
|------------|---|
| Yes | For IPC DTC U3003:16, GO to Pinpoint Test BB . For IPC DTC U3003:17, GO to Pinpoint Test BC . For the SJB , REFER to Section 419-10 . |
| No | GO to AV4 . |

AV4 RECHECK THE IPC DTCS

NOTE: *If new modules were installed prior to the DTC being set, the module configuration may be incorrectly set during the Programmable Module Installation (PMI) or PMI may not have been carried out.*

- Clear the DTCs. Repeat the [IPC](#) self-test.

Is DTC U0140:87 still present?

| | |
|------------|---|
| Yes | INSTALL a new SJB . REFER to Section 419-10 . CLEAR the DTCs. REPEAT the self-test. If DTC U0140:87 is still present, INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| No | The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

Pinpoint Test AW: DTC U0142:87

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

- DTC U0142:87 (Lost Communication With Body Control Module "B": Missing Message) — sets in the Instrument Panel Cluster (IPC) if data messages received from the Smart Junction Box (SJB) over the High Speed Controller Area Network (HS-CAN) are missing for more than 5 seconds. For a complete list of all network messages, refer to [Section 418-00](#).

This pinpoint test is intended to diagnose the following:

- [SJB](#)
- [IPC](#)

PINPOINT TEST AW : DTC U0142:87

AW1 VERIFY THE CUSTOMER CONCERN

- Ignition ON.
- Verify that there is an observable symptom present.

Is an observable symptom present?

| | |
|------------|--|
| Yes | GO to AW2 . |
| No | The system is operating normally at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

AW2 CHECK THE COMMUNICATION NETWORK

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Network Test .
- Carry out the network test.

Does the BCM-B pass the network test?

| | |
|------------|---|
| Yes | GO to AW3 . |
| No | REFER to Section 418-00 . |

AW3 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCs from the [IPC](#) self-test.

Is DTC U3003:16 or DTC U3003:17 recorded?

| | |
|------------|--|
| Yes | For IPC DTC U3003:16, GO to Pinpoint Test BB . For IPC DTC U3003:17, GO to Pinpoint Test BC . |
| No | GO to AW4 . |

AW4 RECHECK THE IPC DTCS

NOTE: *If new modules were installed prior to the DTC being set, the module configuration may be incorrectly set during the Programmable Module Installation (PMI) or PMI may not have been carried out.*

- Clear the DTCs. Repeat the [IPC](#) self-test.

Is DTC U0140:87 still present?

| | |
|------------|---|
| Yes | INSTALL a new BCM-B . REFER to Section 419-10 . CLEAR the DTCs. REPEAT the self-test. If DTC U0142:87 is still present, INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| No | The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

Pinpoint Test AX: DTC U0151:87

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

- DTC U0151:87 (Lost Communication With Restraints Control Module: No Sub-Type Information) — sets in the Instrument Panel Cluster (IPC) if data messages received from the Restraints Control Module (RCM) over the High Speed Controller Area Network (HS-CAN) are missing for more than 5 seconds. For a complete list of all network messages, refer to [Section 418-00](#).

This pinpoint test is intended to diagnose the following:

- [RCM](#)
- [IPC](#)

PINPOINT TEST AX : DTC U0151:87

AX1 VERIFY THE CUSTOMER CONCERN

- Ignition ON.
- Verify that there is an observable symptom present.

Is an observable symptom present?

| | |
|------------|--|
| Yes | GO to AX2 . |
| No | The system is operating normally at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

AX2 CHECK THE COMMUNICATION NETWORK

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Network Test .
- Carry out the network test.

Does the [RCM](#) pass the network test?

| | |
|------------|---|
| Yes | GO to AX3 . |
| No | REFER to Section 418-00 . |

AX3 RETRIEVE THE RECORDED DTCS FROM THE IPC AND RCM SELF-TESTS

- Check for recorded DTCs from the [IPC](#) and [RCM](#) self-tests.

Is DTC U3003:16 or DTC U3003:17 recorded?

| | |
|------------|--|
| Yes | For IPC DTC U3003:16, GO to Pinpoint Test BB . For IPC DTC U3003:17, GO to Pinpoint Test BC . For the RCM , REFER to Section 501-20B . |
| No | GO to AX4 . |

AX4 RECHECK THE IPC DTCS

NOTE: *If new modules were installed prior to the DTC being set, the module configuration may be incorrectly set during the Programmable Module Installation (PMI) or PMI may not have been carried out.*

- Clear the DTCs. Repeat the [IPC](#) self-test.

Is DTC U0151:87 still present?

| | |
|------------|---|
| Yes | GO to AX5 . |
| No | The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

AX5 CHECK FOR DTC U0151:87 SET IN OTHER MODULES

- Clear all DTCs.
- Ignition OFF.
- Ignition ON.
- Wait 10 seconds.
- Enter the following diagnostic mode on the scan tool: Self-Test .
- Retrieve the continuous memory DTCs from all modules.

Is DTC U0151:87 set in the Occupant Classification System Module (OCSM) ?

| | |
|------------|---|
| Yes | INSTALL a new <u>RCM</u> . REFER to Section 501-20B . CLEAR the DTCs. REPEAT the self-test. |
| No | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |

Pinpoint Test AY: DTC U0159:00

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

- DTC U0159:00 (Lost Communication With Parking Assist Control Module "A": No Sub Type Information — sets in continuous memory in the Instrument Panel Cluster (IPC) if data messages received from the Parking Aid Module (PAM) over the High Speed Controller Area Network (HS-CAN) are missing for greater than 5 seconds.

This pinpoint test is intended to diagnose the following:

- [PAM](#)
- [IPC](#)

PINPOINT TEST AY : DTC U0159:00

AY1 VERIFY THE CUSTOMER CONCERN

- Ignition ON.
- Verify that there is an observable symptom present.

Is an observable symptom present?

| | |
|------------|--|
| Yes | GO to AY2 . |
| No | The system is operating normally at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

AY2 CHECK THE COMMUNICATION NETWORK

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Network Test .
- Carry out the network test.

Does the [PAM](#) pass the network test?

| | |
|------------|---|
| Yes | GO to AY3 . |
| No | REFER to Section 418-00 . |

AY3 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCS from the IPC self-test.

Is DTC U3003:16 or DTC U3003:17 recorded?

| | |
|------------|--|
| Yes | For <u>IPC</u> DTC U3003:16, GO to Pinpoint Test BB . For <u>IPC</u> DTC U3003:17, GO to Pinpoint Test BC . |
| No | GO to AY4 . |

AY4 RECHECK THE IPC DTCS

NOTE: If new modules were installed prior to the DTC being set, the module configuration may be incorrectly set during the Programmable Module Installation (PMI) or the PMI may not have been carried out.

- Clear the DTCS. Repeat the IPC self-test.

Is DTC U0159:00 still present?

| | |
|------------|--|
| Yes | INSTALL a new PAM . REFER to Section 413-13 . CLEAR the DTCS. REPEAT the <u>IPC</u> self-test. If DTC U0159:00 is still present, INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| No | The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

Pinpoint Test AZ: DTC U0164:87

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

- DTC U0164:87 (Lost Communication With HVAC Control Module: Missing Message) — sets in the Instrument Panel Cluster (IPC) if data messages received from the HVAC module over the Medium Speed Controller Area Network (MS-CAN) are missing for more than 5 seconds. For a complete list of all network messages, refer to [Section 418-00](#).

This pinpoint test is intended to diagnose the following:

- HVAC module
- IPC

PINPOINT TEST AZ : DTC U0164:87

AZ1 VERIFY THE CUSTOMER CONCERN

- Ignition ON.
- Verify that there is an observable symptom present.

Is an observable symptom present?

| | |
|------------|--|
| Yes | GO to AZ2 . |
| No | The system is operating normally at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

AZ2 CHECK THE COMMUNICATION NETWORK

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Network Test .
- Carry out the network test.

Does the HVAC module pass the network test?

| | |
|------------|---|
| Yes | GO to AZ3 . |
| No | REFER to Section 418-00 . |

AZ3 RETRIEVE THE RECORDED DTCS FROM THE IPC AND HVAC MODULE SELF-TESTS

- Check for recorded DTCs from the [IPC](#) and HVAC module self-tests.

Is DTC U3003:16 or DTC U3003:17 recorded?

| | |
|------------|--|
| Yes | For IPC DTC U3003:16, GO to Pinpoint Test BB . For IPC DTC U3003:17, GO to Pinpoint Test BC . For the HVAC module, REFER to Section 412-00 . |
| No | GO to AZ4 . |

AZ4 RECHECK THE IPC DTCS

NOTE: If new modules were installed prior to the DTC being set, the module configuration may be incorrectly set during the Programmable Module Installation (PMI) or [PMI](#) may not have been carried out.

- Clear the DTCs. Repeat the [IPC](#) self-test.

Is DTC U0164:87 still present?

| | |
|------------|---|
| Yes | INSTALL a new HVAC module. REFER to Section 412-01 . CLEAR the DTCs. REPEAT the IPC self-test. If DTC U0164:87 is still present, INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01 . TEST the system for normal operation. |
| No | The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

Pinpoint Test BA: DTC U0184:87

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

- DTC U0184:87 (Lost Communication With Radio: Missing Message) — sets in the Instrument Panel Cluster (IPC) if data messages received from the Audio Front Control Module (ACM) over the High Speed Controller Area Network (HS-CAN) are missing for more than 5 seconds. For a complete list of all network messages, refer to [Section 418-00](#).

This pinpoint test is intended to diagnose the following:

- [ACM](#)
- [IPC](#)

PINPOINT TEST BA : DTC U0184:87

BA1 VERIFY THE CUSTOMER CONCERN

- Ignition ON.
- Verify that there is an observable symptom present.

Is an observable symptom present?

| | |
|------------|--|
| Yes | GO to BA2 . |
| No | The system is operating normally at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

BA2 CHECK THE COMMUNICATION NETWORK

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Network Test .
- Carry out the network test.

Does the **ACM** module pass the network test?

| | |
|------------|---|
| Yes | GO to BA3 . |
| No | REFER to Section 418-00 . |

BA3 RETRIEVE THE RECORDED DTCS FROM THE IPC AND ACM SELF-TESTS

- Check for recorded DTCs from the **IPC** and **ACM** self-tests.

Is DTC U3003:16 or DTC U3003:17 recorded?

| | |
|------------|--|
| Yes | For IPC DTC U3003:16, GO to Pinpoint Test BB . For IPC DTC U3003:17, GO to Pinpoint Test BC . For the ACM , REFER to Section 415-00 . |
| No | GO to BA4 . |

BA4 RECHECK THE IPC DTCS

NOTE: *If new modules were installed prior to the DTC being set, the module configuration may be incorrectly set during the Programmable Module Installation (PMI) or PMI may not have been carried out.*

- Clear the DTCs. Repeat the **IPC** self-test.

Is DTC U0184:87 still present?

| | |
|------------|--|
| Yes | INSTALL a new ACM . REFER to Section 415-00 . CLEAR the DTCs. REPEAT the IPC self-test. If DTC U0184:87 is still present, INSTALL a new IPC . Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| No | The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

Pinpoint Test BB: DTC U3003:16

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Refer to Wiring Diagrams Cell [60](#), Instrument Cluster for schematic and connector information.

Normal Operation

- DTC U3003:16 (Battery Voltage: Circuit Voltage Below Threshold) — sets in the Instrument Panel Cluster (IPC) in continuous memory if the **IPC** detects battery voltage below 9 volts.

This pinpoint test is intended to diagnose the following:

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

PINPOINT TEST BB : DTC U3003:16

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

NOTE: Failure to disconnect the battery when instructed results in false resistance readings. Refer to [Section 414-01](#).

BB1 RECHECK THE IPC DTCS

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: IPC Self-Test .
- Clear the DTCs. Repeat the IPC self-test.

Is DTC U3003:16 still present?

| | |
|------------|--|
| Yes | GO to BB2 . |
| No | The system is operating correctly at this time. The DTC may have been set due to a previous low battery voltage condition. |

BB2 CHECK FOR CHARGING SYSTEM DTCS IN THE PCM

- Enter the following diagnostic mode on the scan tool: PCM Self-Test .
- Carry out the PCM Key ON Engine OFF (KOEO) self-test.
- Retrieve the continuous memory DTCs from all modules.

Is DTC P0620, P0622, P0625, P0626 or P065B set in the PCM?

| | |
|------------|---|
| Yes | REFER to Section 414-00 . |
| No | GO to BB3 . |

BB3 CHECK THE BATTERY CONDITION AND STATE OF CHARGE

- Check the battery condition and verify that the battery is fully charged. Refer to [Section 414-01](#).

Is the battery OK and fully charged?

| | |
|------------|---|
| Yes | GO to BB4 . |
| No | REFER to Section 414-01 . |

BB4 CHECK THE IPC VOLTAGE INPUT

- Measure and record the voltage at the battery.
- Enter the following diagnostic mode on the scan tool: IPC DataLogger .
- Select the IPC voltage input PID (MODULE_VOLT). Monitor the voltage PID and compare the reading with the recorded battery voltage.

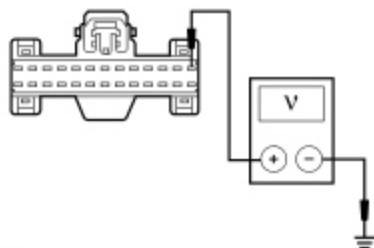
Is the voltage within 0.2 volt of the recorded battery voltage?

| | |
|------------|-----------------------------|
| Yes | GO to BB6 . |
| No | GO to BB5 |

BB5 CHECK THE IPC VOLTAGE SUPPLY

- Ignition OFF.

- Disconnect: [IPC C220](#) .
- Ignition ON.
- Measure the voltage between the [IPC C220](#) Pin 1, circuit SBP26 (YE/RD), harness side and ground.



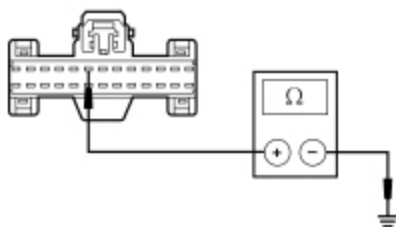
N0099725

Is the voltage within 0.2 volt of the recorded battery voltage?

| | |
|------------|--|
| Yes | GO to BB6 . |
| No | REPAIR the circuit for high resistance. CLEAR the DTC. REPEAT the self-test. |

BB6 CHECK THE IPC GROUND CIRCUIT

- Ignition OFF.
- Disconnect: Negative Battery Cable .
- Measure the resistance between the [IPC C220](#) Pin 8, circuit GD116 (BK/VT), harness side and ground.



N0090375

Is the resistance less than 5 ohms?

| | |
|------------|---|
| Yes | GO to BB7 . |
| No | REPAIR the circuit for high resistance. CLEAR the DTCs. REPEAT the self-test. |

BB7 CHECK FOR CORRECT IPC OPERATION

- Disconnect the [IPC](#) connector.
- Check for:
 - corrosion
 - damaged pins
 - pushed-out pins
- Connect the [IPC](#) 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 IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. 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 BC: DTC U3003:17

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Refer to Wiring Diagrams Cell [60](#), Instrument Cluster for schematic and connector information.

Normal Operation

- DTC U3003:17 (Battery Voltage: Circuit Voltage Above Threshold) — sets in the Instrument Panel Cluster (IPC) in continuous memory if the [IPC](#) detects battery voltage above 16 volts.

This pinpoint test is intended to diagnose the following:

- Charging system concern
- [IPC](#)

PINPOINT TEST BC : DTC U3003:17

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

NOTE: DTC U3003:17 may be stored in the module memory due to past battery charging or vehicle jump starting events.

BC1 CHECK FOR DTC B1317, B1676, P0563 (PCM) OR U3003:17 SET IN OTHER MODULES

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Self-Test .
- Retrieve the continuous memory DTCs from all modules.

Is DTC B1317, B1676, P0563 (PCM) or U3003:17 set in more than one module?

| | |
|------------|--|
| Yes | REFER to Section 414-00 to diagnose an overcharging condition. |
| No | GO to BC2 . |

BC2 CHECK THE BATTERY VOLTAGE

- Turn off all interior/exterior lights and accessories.
- Start and run the engine at approximately 2,000 rpm for 3 minutes while monitoring the battery voltage.

Does the battery voltage rise to 15.5 volts or higher?

| | |
|------------|--|
| Yes | REFER to Section 414-00 to diagnose an overcharging condition. |
| No | GO to BC3 . |

BC3 RECHECK FOR DTC U3003:17

- Turn the engine off.
- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Self-Test .
- Clear the continuous memory DTCs.
- Carry out the [IPC](#) self-test.

Is DTC U3003:17 still present?

| | |
|------------|---|
| Yes | INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| No | The system is operating normally at this time. The DTC may have been set previously during battery |

charging or while jump starting the vehicle.

Pinpoint Test BD: DTC U300A:94

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

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 Panel Cluster (IPC) receives voltage from the Smart Junction Box (SJB). With the ignition switch in the OFF position, the IPC receives its keep-alive voltage from the SJB. The IPC also receives a networked ignition status from the SJB over the Medium Speed Controller Area Network (MS-CAN) communication bus.

- DTC U300A:94 (Ignition Switch: Unexpected Operation) — a continuous and on-demand DTC that sets in the IPC when the IPC detects a discrepancy between the hardwired voltage input and the messaged ignition state inputs from the SJB. The SJB messaged input indicates RUN while the hardwired input indicates RUN/START for more than 5 seconds.

This pinpoint test is intended to diagnose the following:

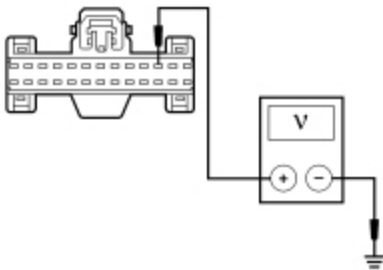
- Fuse
- Wiring, terminals or connectors
- IPC

PINPOINT TEST BD : DTC U300A:94

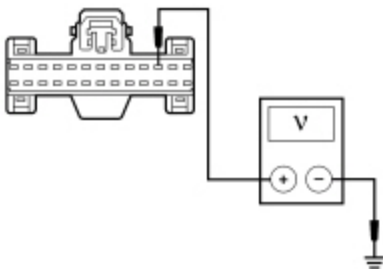
NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

BD1 CHECK THE IPC RUN/START VOLTAGE SUPPLY

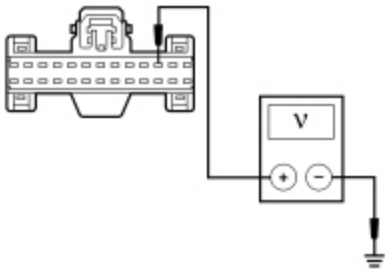
- Ignition OFF.
- Disconnect: [IPC C220](#).
- Measure the voltage between the [IPC C220](#) Pin 3, circuit CBP36 (BU/BN), harness side and ground.



- Ignition ON.
- Measure the voltage between the [IPC C220](#) Pin 3, circuit CBP36 (BU/BN), harness side and ground.



- Place the ignition in the START position.
- Measure the voltage between the [IPC C220](#) Pin 3, circuit CBP36 (BU/BN), harness side and ground.



N0099732

Is the voltage 0 volts in the OFF position and greater than 10 volts in the RUN and START positions?

| | |
|------------|--|
| Yes | GO to BD2 . |
| No | VERIFY the SJB fuse 36 (5A) is OK. If OK, REPAIR the circuit for an open. TEST the system for normal operation. If not OK, REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short. |

BD2 CHECK THE SJB INPUT PIDS FROM THE IGNITION SWITCH

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: [SJB](#) DataLogger .
- Select the [SJB](#) PIDs: ignition ACC (IGN_A_ECU), ignition OFF (IGN_O_ECU), ignition RUN (IGN_R_ECU), and ignition START (IGN_S_ECU). Monitor the ignition PIDs while switching the ignition from ACC, OFF, RUN and START.

Do the [SJB](#) PIDs match the ignition switch positions?

| | |
|------------|---|
| Yes | GO to BD3 . |
| No | REFER to Section 211-05 to diagnose the ignition outputs to the SJB . |

BD3 CHECK THE IPC DTCS

- Enter the following diagnostic mode on the scan tool: [IPC](#) Self-Test .
- Repeat the [IPC](#) self-test. Clear the DTCs.

Is DTC U300A:94 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 DTC may have been set due to high network traffic or an intermittent fault condition. |

Pinpoint Test BE: DTC U0122:87

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Normal Operation

- DTC U0122:87 (Lost Communication With Vehicle Dynamics Control Module: Missing Message) — sets in the Instrument Panel Cluster (IPC) if data messages received from the Vehicle Dynamics Module (VDM) over the High Speed Controller Area Network (HS-CAN) are missing for more than 5 seconds. For a complete list of all network messages, refer to [Section 418-00](#).

This pinpoint test is intended to diagnose the following:

- [VDM](#)
- [IPC](#)

BE1 VERIFY THE CUSTOMER CONCERN

- Ignition ON.
- Verify that there is an observable symptom present.

Is an observable symptom present?

| | |
|------------|--|
| Yes | GO to BE2 . |
| No | The system is operating normally at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

BE2 CHECK THE COMMUNICATION NETWORK

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: Network Test .
- Carry out the network test.

Does the VDM pass the network test?

| | |
|------------|---|
| Yes | GO to BE3 . |
| No | REFER to Section 418-00 . |

BE3 RETRIEVE THE RECORDED DTCS FROM THE IPC SELF-TEST

- Check for recorded DTCs from the IPC self-test.

Is DTC U3003:16 or DTC U3003:17 recorded?

| | |
|------------|--|
| Yes | For <u>IPC</u> DTC U3003:16, GO to Pinpoint Test BB . For <u>IPC</u> DTC U3003:17, GO to Pinpoint Test BC . |
| No | GO to BE4 . |

BE4 RETRIEVE THE RECORDED DTCS FROM THE VDM SELF-TEST

- Check for recorded DTCs from the VDM self-test.

Is DTC U3003:16 or DTC U3003:17 recorded?

| | |
|------------|---|
| Yes | REFER to Section 204-05 . |
| No | GO to BE5 . |

BE5 RECHECK THE IPC DTCS

NOTE: *If new modules were installed prior to the DTC being set, the module configuration may be incorrectly set during the Programmable Module Installation (PMI) or the PMI may not have been carried out.*

- Clear the DTCs. Repeat the IPC self-test.

Is DTC U0122:87 still present?

| | |
|------------|--|
| Yes | INSTALL a new <u>VDM</u> . REFER to Section 204-05 . CLEAR the DTCs. REPEAT the self-test. If DTC U0122:87 is still present, INSTALL a new IPC. Refer to the appropriate Removal and Installation procedure in Section 413-01. TEST the system for normal operation. |
| No | The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition. |

Pinpoint Test BF: The LOW OIL LEVEL Warning Message Is Always On (The Oil Level Is OK [5.0L Only])

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. Refer to Diagnostic Methods in [Section 100-00](#) for information regarding these diagnostic practices.

Refer to Wiring Diagrams Cell [24](#), Electronic Engine Controls - 5.0L for schematic and connector information.

Normal Operation

The PCM controls the display of the low oil level warning message. The PCM requires the following criteria be met before sending the IPC a request to display the low oil level warning message.

- The vehicle must be driven at least 1 km (0.625 miles).
- Then the engine must be shut off for 3 minutes.
- Then at key ON, if low oil level is detected, the PCM starts a counter.
- When the above conditions have occurred 5 times, the PCM sends the low oil level warning message.

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Low oil level switch
- PCM

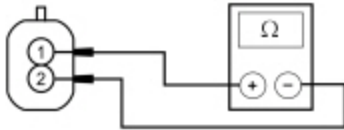
PINPOINT TEST BF : THE LOW OIL LEVEL WARNING MESSAGE IS ALWAYS ON (THE OIL LEVEL IS OK [5.0L ONLY])

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

NOTE: Verify the engine oil level is full before beginning diagnostics.

BF1 CHECK THE LOW OIL LEVEL SWITCH

- Ignition OFF.
- Disconnect: Low Oil Level Switch [C1149](#) .
- Measure the resistance between the low oil level switch [C1149](#) Pin 1, circuit LE142 (GN/WH), component side and the low oil level switch [C1149](#) Pin 2, circuit RE405 (GN/WH), component side.



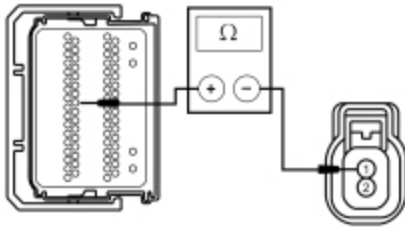
N0152476

Is the resistance less than 3 ohms?

| | |
|------------|---|
| Yes | GO to BF2 . |
| No | INSTALL a new low oil level switch. TEST the system for normal operation. |

BF2 CHECK THE LOW OIL LEVEL INPUT CIRCUIT TO THE PCM

- Disconnect: PCM [C175E](#) .
- Measure the resistance between the PCM [C175E](#) Pin 25, circuit LE142 (GN/WH), harness side and the low oil level switch [C1149](#) Pin 1, circuit LE142 (GN/WH), harness side.



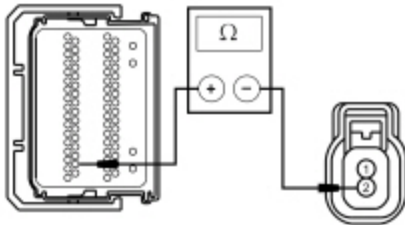
N0152477

Is the resistance less than 3 ohms?

| | |
|------------|---|
| Yes | GO to BF3 . |
| No | REPAIR the circuit. TEST the system for normal operation. |

BF3 CHECK THE LOW OIL LEVEL RETURN CIRCUIT TO THE PCM

- Measure the resistance between the [PCM C175E](#) Pin 32, circuit RE405 (GN/WH), harness side and the low oil level switch [C1149](#) Pin 2, circuit RE405 (GN/WH), harness side.



N0152478

Is the resistance less than 3 ohms?

| | |
|------------|---|
| Yes | GO to BF4 . |
| No | REPAIR the circuit. TEST the system for normal operation. |

BF4 CHECK FOR CORRECT PCM OPERATION

- Disconnect the [PCM](#) connectors.
- Check for:
 - corrosion
 - damaged pins
 - pushed-out pins
- Connect 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. CLEAR the DTCs. REPEAT the self-test. |

