

Illustrations in this manual may be used to replace written step instructions. Color-coding (see color scheme in this document) is used to communicate the required step action or actions. Service action icons (see [Symbols Glossary](#)) are used to add additional information regarding the required action.

- The color scheme in a step graphic (an illustration used in removal or installation steps) indicates servicing information as follows:
 - ♦ Fasteners (including panel retainers) or electrical connectors - Magenta (Purple)
 - ♦ Target component that is to be removed - Blue
 - ♦ Components that must be removed prior to the target component shown in blue - Brown or Green
 - ♦ Components placed aside for access, but not removed; highlighted areas such as inspection areas, adjustments or measurements - Yellow
 - ♦ Essential Special Service Tools (ESSTs) and other tools - Pale Blue
 - ♦ Chemical or Sealer apply areas - Alternating blue and white dashes (see illustration 4)
 - ♦ Sectioned or cut-away areas - Red
 - ♦ Remaining components - Grey

Callouts in graphics indicate removal (or tightening) order, or identify individual instructions in substeps of the same number (such as different torque values).

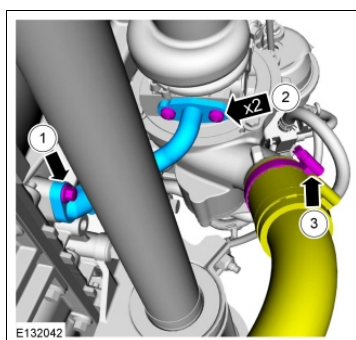
Arrows containing x numbers (Illustration 2) indicate the number of identical fasteners or connectors to be removed or installed in the graphic.

In Illustration 2, two identical fasteners are indicated by the x2 arrow, with another arrow illustrating a third fastener of a different type. Because the different fasteners require different torques, callouts are used to identify those two torque values in the associated step text. The hose clamp is another fastener to be removed. The yellow coloring of the hose indicates it is to be moved aside (not removed).

The following written steps would be necessary if the illustration did not have color coding:

1. Remove the engine oil pipe fastener at the engine connection.
2. Remove the two engine oil pipe fasteners from the turbocharger and remove the pipe.
3. Remove the air inlet hose from the turbocharger and position aside.

Illustration 2



Hidden fasteners, such as panel retainers, are identified in the illustration by a magenta disc. An inset detail view illustrating the fastener type may be included (Illustration 3).

		recall or save the position of the RH exterior mirror glass.
Personality data	BCM	When a memory save or recall is initiated by an IA key, the BCM sends the save or recall command over the MS-CAN . This information is used to recall or save the position of the RH exterior mirror glass.

Module Network Input Messages - DDM

Broadcast Message	Originating Module	Message Purpose
Personality Data	BCM	When a memory save or recall is initiated by an IA key, the BCM sends the save or recall command over the MS-CAN . This information is used to recall or save the position of the LH exterior mirror glass.

Power Mirror Operation

When the vehicle is in park or neutral and the exterior mirror control switch is pressed up, down, left or right a voltage signal is sent to the DDM to indicate the desired movement. If the LH mirror is selected when the exterior mirror control switch is pressed, the DDM will supply voltage and ground to the appropriate LH exterior mirror motor. If the RH mirror is selected when the exterior mirror control switch is pressed, the DDM sends the movement request over the MS-CAN to the DSM . The DSM will then supply voltage and ground to the appropriate RH exterior mirror motor.

Memory Recall

The memory function recalls the preferred position of the exterior mirrors when the transmission is in PARK or NEUTRAL and the memory set switch or IA key is activated. When a memory recall is initiated, the DDM and DSM recall the corresponding preferred exterior mirror glass positions. The DDM and DSM supply voltage and ground to the appropriate exterior mirror motors to achieve the desired memory positions based on feedback from the mirror motor potentiometers. If the exterior mirror control switch is activated in any direction during a memory recall, the recall is aborted and the selected exterior mirror will respond to switch inputs. For more information about the operation of the memory feature, refer to [Section 501-10](#) .

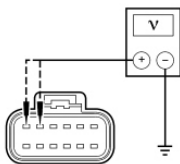
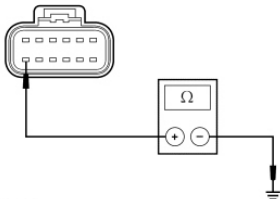
Component Description

Exterior Mirror

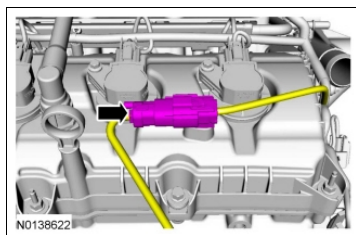
Each exterior mirror is equipped 2 bi-directional motors that are used to control the up/down and left/right position of the exterior mirror glass. Each exterior mirror motor has an integral potentiometer that is monitored by the DDM (LH mirror) or DSM (RH mirror). The exterior mirrors use a jumper harness between the vehicle wiring harness and the exterior mirror motors. The jumper harness is integral to the exterior mirror. If a concern with the exterior mirror jumper harness exists and cannot be repaired, a new exterior mirror must be installed.

Exterior Mirror Control Switch

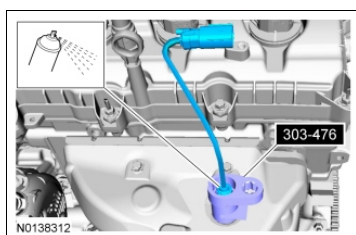
The exterior mirror control switch is a rocker-type switch that is integral to the master window control switch. The LH and RH mirror selection buttons on the exterior mirror control switch have a indicator to show which mirror is selected.

	C3066. CONNECT passenger seat side air bag module C337. REPOWER the SRS . REFER to <u>Section 501-20B</u> .
AA7 CHECK FOR VOLTAGE TO THE PCSM-2	
• Disconnect: PCSM-2 C3365A. • Measure voltage between: ◆ PCSM-2 C3365A-E, circuit SBB29 (GY/RD), harness side and ground. ◆ PCSM-2 C3365A-F, circuit SBB29 (GY/RD), harness side and ground.  N0042997 • Are the voltages greater than 11 volts?	Yes GO to <u>AA8</u> . No VERIFY BJB fuse 29 (30A) is OK. If OK, REPAIR the circuit. If not OK, REFER to the Wiring Diagram manual to identify possible causes of the circuit short. CLEAR all CMDTCs . REPEAT the self-test.
AA8 CHECK THE PCSM-2 GROUND CIRCUIT FOR AN OPEN	
• Ignition OFF. • Measure the resistance between PCSM-2 C3365A-M, circuit GD349 (BK/GY), harness side and ground.  N0057120 • Repeat this measurement while wiggling the harness. • Is the resistance less than 3 ohms?	Yes GO to <u>AA9</u> . No REPAIR the circuit. CLEAR all CMDTCs . REPEAT the self-test.
AA9 CHECK FOR CORRECT PCSM-2 OPERATION	
• Check the harness and component side connectors for the following: ◆ corrosion. ◆ damaged pins. ◆ pushed-out pins. • Connect: PCSM-2 C3365A. • Make sure the PCSM-2 connector is seated correctly. • Start the engine.	Yes INSTALL a new PCSM-2 . REFER to <u>Passenger Climate - Controlled Seat Module (PCSM-2)</u> in this section. CLEAR all CMDTCs . REPEAT the self-test. No The system is operating correctly at this time. The concern may have been caused

C2 CHECK THE ROOF OPENING PANEL REAR TRIM RING	
• Verify that the roof opening panel rear trim ring is not damaged and is securely fastened. • Is the roof opening panel rear trim ring OK?	Yes GO to <u>C3</u> . No REINSTALL the roof opening panel rear trim ring or INSTALL a new roof opening panel rear trim ring. REFER to <u>Roof Opening Panel - Exploded View</u> or <u>Roof Opening Panel Trim - Fixed Glass, Interior</u> in this section. TEST the system for normal operation.
C3 CHECK THE ROOF OPENING PANEL TRACKS	
• Verify that the roof opening panel guide tracks, shade tracks and idler tracks and mechanism are not damaged and are securely fastened. • Are the roof opening panel tracks OK?	Yes GO to <u>C4</u> . No REPAIR or TIGHTEN the roof opening panel track that is affected. If the roof opening panel track cannot be repaired, INSTALL a new roof opening panel track. REFER to <u>Roof Opening Panel - Exploded View</u> , <u>Roof Opening Panel Guide Track and Mechanism</u> , <u>Roof Opening Panel Idler Track Mechanism</u> , <u>Roof Opening Panel Idler Track and Mechanism</u> or <u>Roof Opening Panel Shade Track and Mechanism</u> in this section. TEST the system for normal operation.
C4 CHECK THE ROOF OPENING PANEL SUNSHADES	
• Check the roof opening panel sunshades for correct installation or damage. • Are the roof opening panel sunshades OK?	Yes GO to <u>C5</u> . No REINSTALL the roof opening panel shade or INSTALL a new roof opening panel shade. REFER to <u>Roof Opening Panel - Exploded View</u> and <u>Roof Opening Panel Shade Assembly</u> in this section. TEST the system for normal operation.
C5 CHECK THE ROOF OPENING PANEL AIR DEFLECTOR ASSEMBLY	
• Check the roof opening panel air deflector assembly for correct installation or damage. • Is the roof opening panel air deflector assembly OK?	Yes GO to <u>C6</u> . No REINSTALL the roof opening panel air deflector assembly or INSTALL a new roof opening panel air deflector assembly. REFER to <u>Roof Opening Panel - Exploded View</u> and <u>Air Deflector</u> in this section. TEST the system for normal operation.



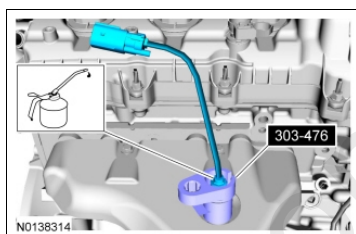
5. Apply the specified chemical with a spray can.
 Penetrating and Lock Lubricant (US); Penetrating Fluid (Canada) XL-1 (US); CXC-51-A (Canada).
 Special Tool(s): Socket, Exhaust Gas Oxygen Sensor 303-476 (T94P-9472-A).



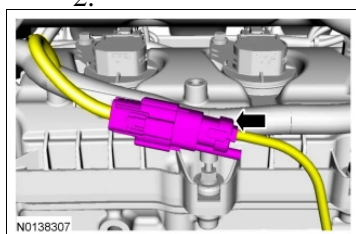
Installation

RH sensor

1. Apply the specified lubricant to the specified component.
 High Temperature Nickel Anti-Seize Lubricant XL-2.
 Special Tool(s): Socket, Exhaust Gas Oxygen Sensor 303-476 (T94P-9472-A).
 - Calculate the correct torque wrench setting for the following torque. Refer to the Torque Wrench Adapter Formulas in the Appendix.
 - Tighten to 48 Nm (35 lb-ft).



2.



LH sensor

3. Apply the specified lubricant to the specified component.
 High Temperature Nickel Anti-Seize Lubricant XL-2.
 Special Tool(s): Socket, Exhaust Gas Oxygen Sensor 303-476 (T94P-9472-A).
 - Calculate the correct torque wrench setting for the following torque. Refer to the Torque Wrench Adapter Formulas in the Appendix.
 - Tighten to 48 Nm (35 lb-ft).

Pinpoint Test G: U0121:87**Diagnostic Overview**

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 about these practices.

Refer to Wiring Diagrams Cell 41 , Vehicle Dynamic Suspension for schematic and connector information.

Normal Operation and Fault Conditions

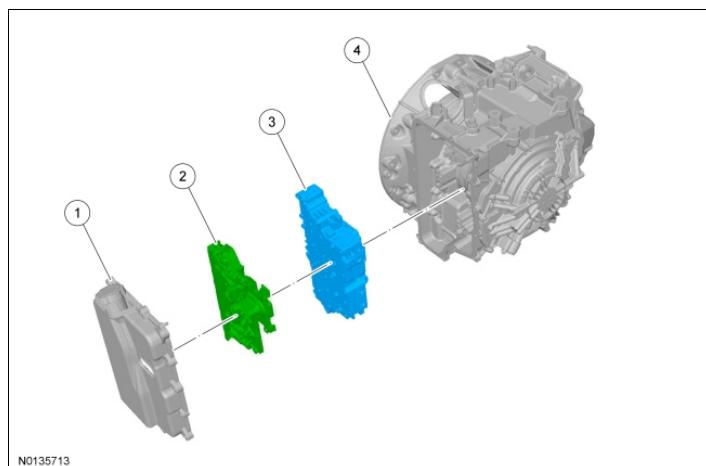
With the ignition ON, the ABS module sends the VDM messages over the HS-CAN . If the VDM does not receive these messages within a certain time frame, the module sets DTCs. For information on the messages sent to the VDM from the ABS module, refer to the Network Message Chart in Vehicle Dynamic Suspension .

DTC Fault Trigger Conditions

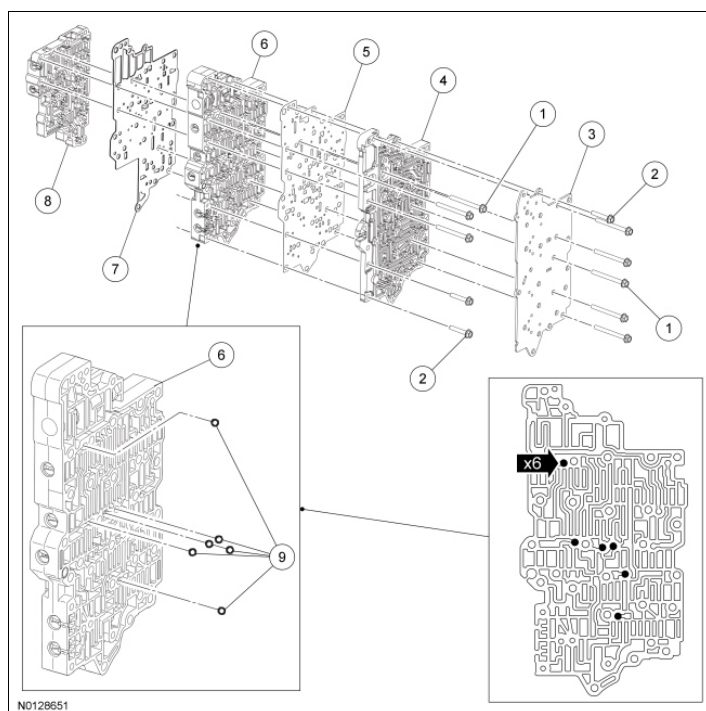
DTC	Description	Fault Trigger Conditions
U0121:87	Lost Communication With ABS Control Module: Missing Message	This DTC sets in continuous memory if any one of the following anti-lock control messages is missing: ABS active, brake torque request, stability control status, vehicle lateral acceleration, vehicle longitudinal acceleration or yaw stability index.

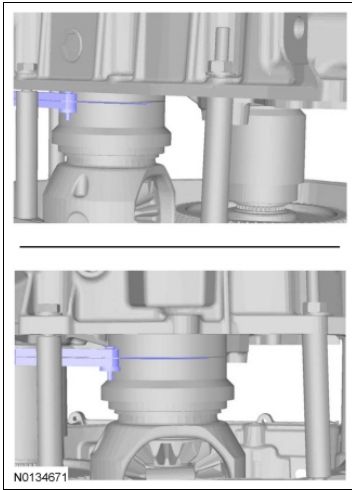
PINPOINT TEST G: U0121:87

Test Step	Result / Action to Take
G1 CHECK THE COMMUNICATION NETWORK	
- Ignition ON. - Using a scan tool, carry out the network test. Does the ABS module pass the network test?	Yes GO to <u>G2</u> . No REFER to <u>Section 418-01</u> to diagnose the ABS module does not respond to the scan tool.
G2 CHECK THE VDM CMDTCs	
- Enter the following diagnostic mode on the scan tool: Self Test - VDM . - Clear the DTCs. - Ignition OFF. - Ignition ON.	Yes GO to <u>G3</u> . 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.



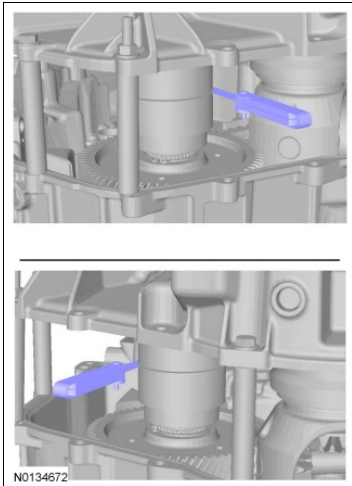
Item	Description
1	Main control cover assembly
2	Solenoid body
3	Main control valve body
4	Transmission case



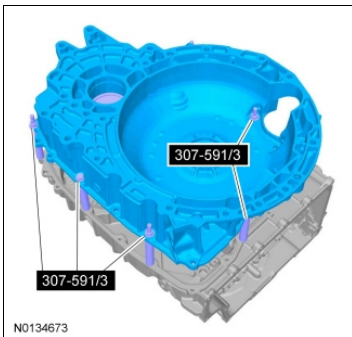


10. Measure and record the smallest and largest preload gap on Shim Gauge, Differential/Transfer Gear Bearing 307-591/2. Average the 2 measurements to get the thickness of the transfer shaft bearing preload shim. Refer to Specifications in this section for the transfer gear bearing preload shim part number.

General Equipment: Feeler Gauge.



11. Special Tool(s): Shim Gauge, Differential/Transfer Gear Bearing 307-591/3 (4 nuts, bolts and spacers and 8 washers)



12. Special Tool(s): Shim Gauge, Differential/Transfer Gear Bearing 307-591/3 (4 spacers)

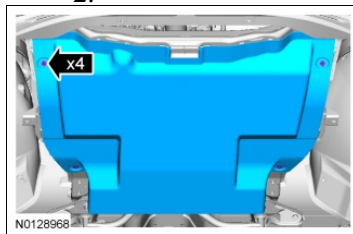
Transmission Fluid Drain and Refill

Material

Item	Specification
Motorcraft® MERCON® LV Automatic Transmission Fluid XT-10-QLVC	MERCON® LV

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to [Section 100-02](#).

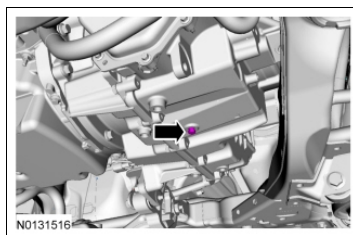
2.



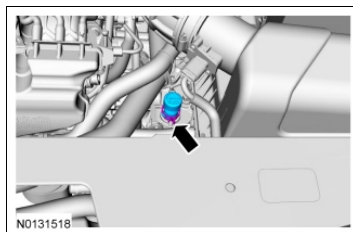
3. **NOTE:** If an internal problem is suspected, drain the transmission fluid through a paper filter. A small amount of metal or friction particles may be found from normal wear. If an excessive amount of metal or friction material is present, the transmission will need to be overhauled.

Remove the drain plug and drain the transmission fluid. Install the drain plug.

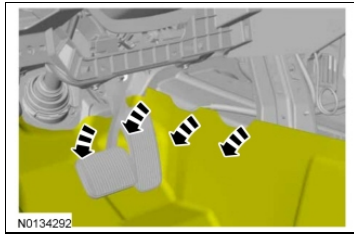
- Tighten to 12 Nm (106 lb-in).



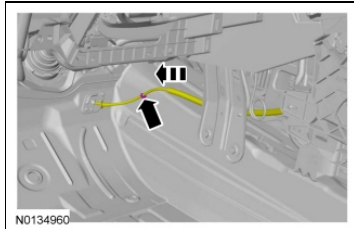
4. Compress the constant tension clamp and remove the transmission vent from the fill tube.



5. **NOTICE:** Use only transmission fluid specific for this transmission. Do not use any supplemental transmission fluid additives or cleaning agents. The use of these products can cause internal transmission components to fail, which will affect the operation of the



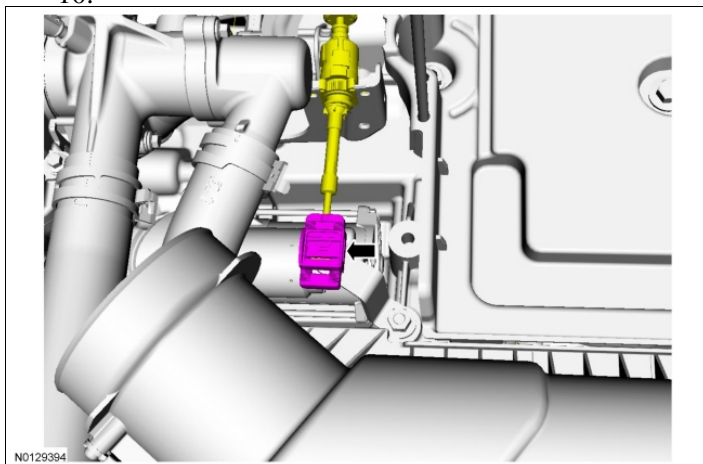
8. **NOTE:** Note the routing of the selector lever cable under the heater housing for assembly.



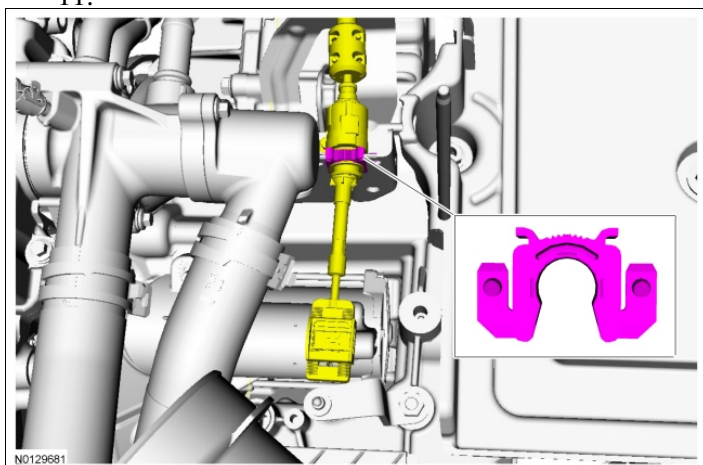
6F50/6F55

9. Remove the ACL and outlet pipe. Refer to [Section 303-12](#) .

10.

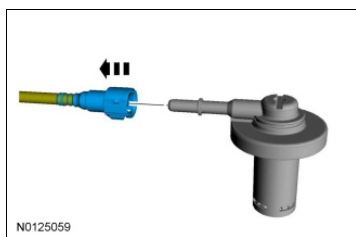


11.



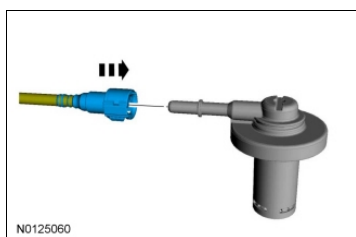
6F35

12. Remove the ACL assembly. Refer to [Section 303-12](#) .



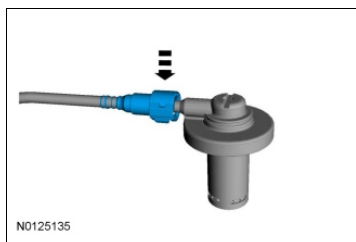
Connect - Type II

1. Inspect and clean both quick connect coupling ends.
2. Install the quick connect coupling onto the tube until fully seated.



3. **NOTE:** Visually inspect and verify that the locking mechanism is flush with the quick connect coupling housing and that the locking tabs are securely fastened.

Depress the quick connect coupling locking mechanism into the locked position.



4. Pull on the quick connect coupling and the tube to make sure it is securely fastened.
5. Connect the battery ground cable. For additional information, refer to [Section 414-01](#).

Disconnect - Type III

⚠ WARNING: Do not smoke, carry lighted tobacco or have an open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in serious personal injury.

⚠ WARNING: Do not carry personal electronic devices such as cell phones, pagers or audio equipment of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in serious personal injury.

⚠ WARNING: Before working on or disconnecting any of the fuel tubes or fuel system components, relieve the fuel system pressure to prevent accidental spraying of fuel. Fuel in the fuel system remains under high pressure, even when the engine is not running. Failure to follow this instruction may result in serious personal injury.

Steering Column Switches**DTC Charts**

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 about these practices.

Steering Column Control Module (SCCM) DTC Chart

DTC	Description	Action
B1007:09	High-Beam Headlamp Switch: Component Failure	REFER to Section 417-01 .
B1008:09	Wiper Mode Switch: Component Failure	REFER to Section 501-16 .
B1051:09	Front Washer Switch: Component Failure	REFER to Section 501-16 .
B1052:09	Rear Washer Switch: Component Failure	REFER to Section 501-16 .
B10A6:09	Main Light Switch: Component Failure	REFER to Section 417-01 .
B10AD:02	Rain Sensor: General Signal Failure	REFER to Section 501-16 .
B10AD:08	Rain Sensor: Bus Signal/Message Failure	REFER to Section 501-16 .
B10AD:49	Rain Sensor: Internal Electronic Failure	REFER to Section 501-16 .
B10AD:55	Rain Sensor: Not Configured	CARRY OUT PMI using As-Built Data on the SCCM . RETRIEVE SCCM DTCs. If B10AD:55 returns, INSTALL a new SCCM . REFER to Steering Column Control Module (SCCM) .
B1124:09	Lamp Fade Control: Component Failure	REFER to Section 413-00 .
B1131:02	Wiper Motor Module: General Signal Failure	REFER to Section 501-16 .
B1131:08	Wiper Motor Module: Bus Signal / Message Failure	REFER to Section 501-16 .
B11D9:16	Vehicle Battery: Circuit Below Threshold	GO to Pinpoint Test G .
B11D9:17	Vehicle Battery: Circuit Above Threshold	GO to Pinpoint Test H .
B1298:09	Steering Column Adjust Up Switch: Component	REFER to Section 211-04 .

- AM/FM antenna cable
- Ignition system
- Charging system
- No channel found in the selected category
- RDS settings
- Antenna module
- ACM

PINPOINT TEST A: POOR RECEPTION - AM/FM

Test Step	Result / Action to Take
A1 CHECK THE AUDIO SYSTEM RECEPTION	
• Operate the audio system in radio tuner (AM/FM) mode. • Check the reception with the engine running, and with the engine off. Does the poor reception only occur with the engine running?	Yes GO to <u>A2</u> . No GO to <u>A4</u> .
A2 CHECK THE GENERATOR	
NOTE: If the engine is operated at greater than 2,000 rpm momentarily, the generator self-excites. Make sure when the generator is disconnected the engine rpm stays below 2,000 rpm. If it does rise above 2,000 rpm, turn the ignition to the OFF position and start the test over again. • Ignition OFF. • Disconnect the wiring harness from the generator voltage regulator. • Start the engine. • Operate the audio system in radio tuner (AM/FM) mode. • Is the reception OK?	Yes INSTALL a new generator. REFER to <u>Section 414-00</u> . No GO to <u>A3</u> .
A3 CHECK THE IGNITION CIRCUITS	
• Ignition OFF. • Connect the wiring harness to the voltage regulator. • Visually inspect the engine compartment and make sure all ignition coils are correctly and securely connected, and that there are no visible cracks in the coil housings. • Inspect all the wiring harnesses and connectors for damaged insulation and loose or broken conditions. • Are the ignition components OK?	Yes USE a jumper cable to ground various parts of the vehicle to the frame (for example: engine, fenders, quarter panels, stone deflectors, air cleaner, body sheet metal). When the noise is eliminated, PROVIDE a permanent ground where necessary. No REPAIR the ignition system as necessary.
A4 CHECK THE ANTENNA ENABLE CIRCUIT	

• Is DTC U2013:63 present?	
AJ2 RETRIEVE ALL CONTINUOUS MEMORY DTCs	
- Using a scan tool, retrieve all continuous memory DTCs. - Is DTCs U0155:00 or U0184:00 present in any audio system module?	Yes REFER to DTC Charts in this section. No GO to <u>AJ3</u> .
AJ3 CHECK FOR CORRECT AUDIO RCU MODULE OPERATION	
- Disconnect and inspect the audio RCU module connector. - Repair: - corrosion (install new connector or terminals - clean module pins) - damaged pins - install new terminals/pins - pushed-out pins - install new pins as necessary - Reconnect the audio RCU module connector. Make sure it seats and latches correctly. - Operate the system and determine if the concern is still present. - Is the concern still present?	Yes CHECK OASIS for any applicable TSBs. If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no TSBs address this concern, INSTALL a new audio RCU module. REFER to <u>Audio Rear Control Unit (RCU) Module</u> . No The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

Pinpoint Test AK: The Subwoofer Speaker Is Inoperative

Diagnostic Overview

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 about these practices.

Refer to Wiring Diagrams Cell 130 , Audio System/Navigation for schematic and connector information.

Normal Operation and Fault Conditions

Refer to Subwoofer Amplifier in Information and Entertainment System .

An open in the enable/clip circuit causes the subwoofer to produce no sound, because the enable signal does not reach the subwoofer amplifier. A short to ground or short to voltage can cause severe distortion to be heard in the subwoofer.

NOTE: This diagnostic routine is only for vehicles without active noise control.

Possible Sources

- Wiring, terminals or connectors
- Speaker
- ACM
- Subwoofer amplifier

Normal Operation and Fault Conditions

Refer to System Operation - Low Beams in [Headlamps](#) .

Refer to Component Description - Headlamp Assembly in [Headlamps](#) .

Refer to Component Description - Ballast in [Headlamps](#) .

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B1D00:11	Left Low Beam: Circuit Short To Ground	Sets when the BCM detects a short to ground from the LH low beam output circuit.
B1D00:15	Left Low Beam: Circuit Short To Battery or Open	Sets when the BCM detects an open from the LH low beam output circuit.
B1D01:11	Right Low Beam: Circuit Short To Ground	Sets when the BCM detects a short to ground from the RH low beam output circuit.
B1D01:15	Right Low Beam: Circuit Short To Battery or Open	Sets when the BCM detects an open from the RH low beam output circuit.

Possible Sources

- BCM fuses 17 (10A) (left low beam) and 16 (10A) (right low beam)
- BJB fuses 57 (20A) (left ballast) and 78 (20A) (right ballast)
- Bulb
- Wiring, terminals or connectors
- Ballast
- Headlamp assembly
- BCM

PINPOINT TEST A: ONE OR BOTH LOW BEAMS ARE INOPERATIVE

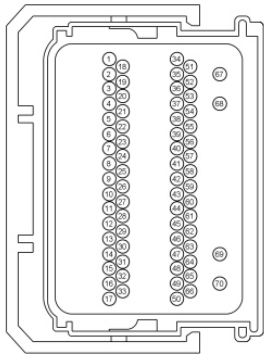
Test Step	Result / Action to Take		
A1 CHECK FOR VOLTAGE TO THE HEADLAMP ASSEMBLY			
• Ignition OFF. • Disconnect: Inoperative LH Headlamp C1021 or RH Headlamp C1041. • Place the headlamp switch in the HEADLAMPS ON position. • Measure the voltage between: <table border="1" data-bbox="292 1993 778 2072"> <tr> <td>Positive Lead</td><td>Negative Lead</td></tr> </table>	Positive Lead	Negative Lead	Yes GO to A2 . No VERIFY the BCM fuse 17 (10A) (LH low beam) or fuse 16 (10A) (RH low beam) is OK. If OK, GO to A6 . If not OK, REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short.
Positive Lead	Negative Lead		

- Do the PID values agree with the brake pedal position?

B3 CHECK THE BRAKE PEDAL POSITION SWITCH CIRCUIT

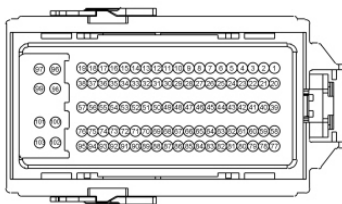
- Ignition OFF.
- Disconnect: PCM C175B (3.7L Ti-VCT) or C1381B (2.0L or 3.5L GTDI).
- Ignition ON.
- For 3.7L Ti-VCT , measure the **voltage** between:

Positive	Lead	Negative	Lead
Pin	Circuit	Pin	Circuit
C175B-13	CCB08 (VT/WH)	-	Ground



- For 2.0L or 3.5L GTDI , measure the **voltage** between:

Positive	Lead	Negative	Lead
Pin	Circuit	Pin	Circuit
C1381B-66	CCB08 (VT/WH)	-	Ground



Yes
GO to **B8** .

No
REPAIR the circuit for an open.