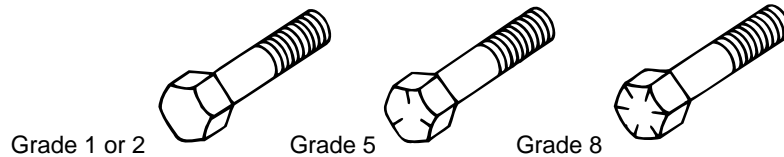


# METRICS

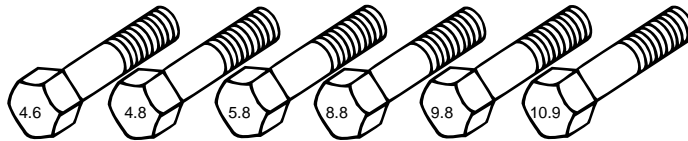
## BOLT STRENGTH IDENTIFICATION

### ENGLISH SYSTEM



**English bolts:** Identification marks on the bolt head represent Rockwell hardness. Generally, the bolt's grade is equal to the number of marks plus two. The higher the grade, the stronger the bolt.

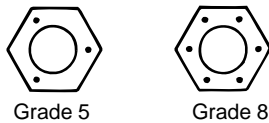
### METRIC SYSTEM



**Metric bolts:** Identification class numbers on bolt heads represent tensile strength. Higher numbers indicate stronger bolts. Common metric fastener bolt strength properties are 9.8 and 10.9.

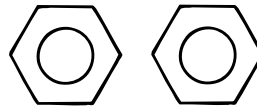
## HEX NUT STRENGTH IDENTIFICATION

### ENGLISH SYSTEM



Identification dots represent Rockwell hardness. The nut's grade is equal to the number of dots plus two. The higher the grade, the stronger the nut.

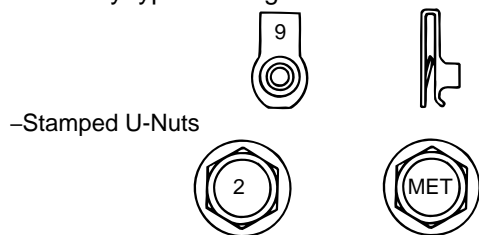
### METRIC SYSTEM



Identification class numbers on nuts represent tensile strength. Higher numbers indicate stronger nuts. Nuts may also have blue finish or paint daub on hex flat.

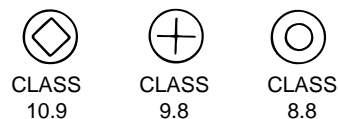
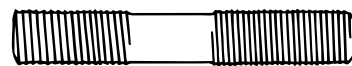
## OTHER TYPES OF PARTS

Metric identification schemes vary by type of part, most often a variation of that used for bolts and nuts. Note that many types of English and Metric fasteners carry no special identification if they are otherwise unique.



–Stamped U-Nuts

–Tapping, thread forming and certain other case hardened screws.



–Studs, Large studs may carry the property class number. Smaller studs use a geometric code on the end.

- Check the recorded Diagnostic Trouble Codes (DTCs) from the VDM self-test.

**Is DTC U3003:16 or U3003:17 present in the VDM?**

<b>Yes</b>	If DTC U3003:16 is present, <a href="#">GO to Pinpoint Test A</a> If DTC U3003:17 is present, <a href="#">GO to Pinpoint Test B</a>
<b>No</b>	GO to <a href="#">G4</a>

**G4 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCs) IN THE ABS (ANTI-LOCK BRAKE SYSTEM) MODULE**

- Using a diagnostic scan tool, carry out the ABS module self-test.

**Is DTC U3003:16 or U3003:17 present in the ABS module?**

<b>Yes</b>	DIAGNOSE the ABS module Diagnostic Trouble Codes (DTCs). REFER to: Anti-Lock Brake System (ABS) and Stability Control (206-09 Anti-Lock Brake System (ABS) and Stability Control, Diagnosis and Testing).
<b>No</b>	GO to <a href="#">G5</a>

**G5 CHECK FOR OTHER CAUSES OF COMMUNICATION NETWORK CONCERN**

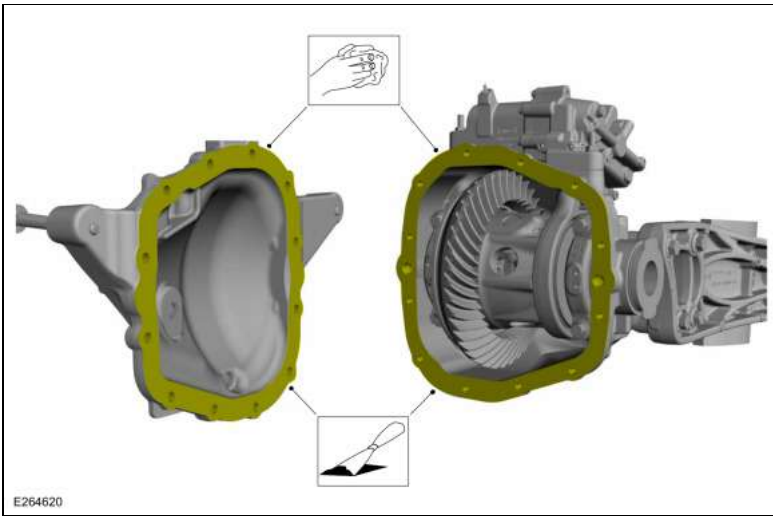
**NOTE:** *If new modules were installed prior to the DTC being set, the module configuration can be incorrectly set during the PMI or the PMI may not have been carried out.*

- Check the vehicle service history for recent service actions related to the ABS module or VDM. If recent service history is found:
  - verify the correct replacement module was installed.
    - HVBOM may be used to verify correct part fitment.
  - verify the configuration of replacement module was correct.
    - re-configure the module using as-built data if prior configuration is suspect.
  - verify the module was not obtained from a like vehicle and installed into customer vehicle.
    - return the swapped module to source vehicle and obtain new replacement module.
- Operate the system and determine if the observable symptom is still present.

**Is the observable symptom still present?**

<b>Yes</b>	GO to <a href="#">G6</a>
<b>No</b>	The system is operating correctly at this time. The concern may have been due to incorrect parts replacement procedures or incorrect module configuration.

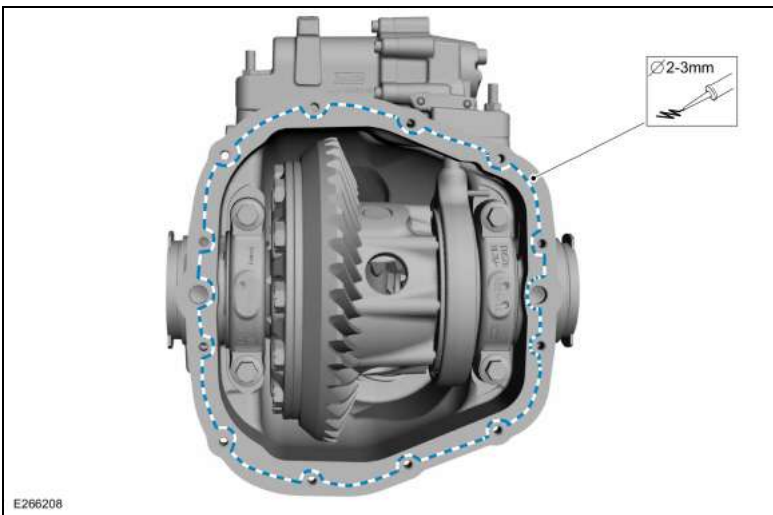
**G6 CHECK FOR DTC (DIAGNOSTIC TROUBLE CODE) U0121:XX SET IN OTHER MODULES**



**Installation**

- NOTE:** Care should be taken not to allow RTV sealant spillage in bowl of differential carrier.

Apply a new, continuous 2-3mm bead of sealant to the differential housing as shown.  
 Material: Motorcraft® Silicone Gasket and Sealant / TA-30 (WSE-M4G323-A4)



- NOTE:** The differential housing cover must be installed within 5 minutes of application of the silicone, or new sealant must be applied. If possible, allow one hour before filling with lubricant to make sure the silicone sealant has correctly cured.

Install the differential housing cover and the differential housing cover bolts.  
 Torque: 33 lb.ft (45 Nm)


**NOTICE:** The following step uses a test light to simulate normal circuit loads. To avoid connector terminal damage, use the correct probe adapter(s) for the test light probe connection to the vehicle. Do not use the test light probe directly on any connector.

**NOTE:** This test step causes Diagnostic Trouble Codes (DTCs) to set in the DSM.

**NOTE:** When the adjustable pedal motor connector is disconnected on vehicles with the memory feature, the DSM provides voltage in 2 seconds intervals only, due to the open circuit in the Hall-effect sensor circuit.

- Ignition OFF.
- Connect DSM [C3053](#).
- Ignition ON.
- Press the adjustable pedal control switch in both directions with a test light connected as indicated:

[Click to display connectors](#)

Positive Lead	Measurement / Action	Negative Lead
<a href="#">C2159-1</a>		<a href="#">C2159-2</a>

**Does the test light illuminate when the adjustable pedal switch is pressed in each direction?**

<b>Yes</b>	GO to <a href="#">B17</a>
<b>No</b>	GO to <a href="#">B19</a>

#### **B17 CHECK THE ADJUSTABLE BRAKE PEDAL CABLE INSTALLATION**

- Disconnect the adjustable brake pedal cable from the adjustable brake pedal worm gear.
- Operate the adjustable pedal control switch in both directions and observe the cable in the conduit.

**Does the adjustable brake pedal cable turn in the conduit when the switch is pressed?**

<b>Yes</b>	INSTALL a new brake pedal assembly. REFER to: Brake Pedal and Bracket (206-06) .
<b>No</b>	GO to <a href="#">B18</a>

#### **B18 ISOLATE THE ADJUSTABLE ACCELERATOR PEDAL ASSEMBLY**

- Operate the adjustable pedal control switch in both directions and observe the accelerator pedal.

**Does the accelerator pedal move when the switch is pressed?**

<b>Yes</b>	INSTALL a new adjustable pedal cable.
<b>No</b>	INSTALL a new adjustable pedal motor (the adjustable pedal motor is part of the accelerator pedal assembly). REFER to: Accelerator Pedal (310-02 Acceleration Control, Removal and Installation).

#### **B19 VERIFY ALL DSM (DRIVER FRONT SEAT MODULE) WIRING CONNECTIONS**

- Disconnect BCM fuse 18 (5A).
- Attempt to turn the ignition lock cylinder to the ON position and then back to the OFF-LOCK position and remove the key.

Can the ignition lock cylinder be turned to the OFF-LOCK position and the key removed?

Yes	GO to <a href="#">D3</a>
No	GO to <a href="#">D2</a>

## D2 CHECK THE IGNITION SWITCH FOR MECHANICAL DAMAGE

- Remove the ignition switch.  
REFER to: Ignition Switch (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).
- Attempt to turn the ignition lock cylinder to the OFF-LOCK position and remove the ignition key.

Does the ignition lock cylinder turn to the OFF-LOCK position and can the key be removed?


Yes	INSTALL a new ignition switch. REFER to: Ignition Switch (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).
No	INSTALL a new ignition lock cylinder. REFER to: Ignition Lock Cylinder (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).

## D3 CHECK THE KEY REMOVAL INHIBIT SOLENOID CIRCUIT FOR A SHORT TO GROUND

**NOTE:** The following pinpoint test step uses a test lamp to simulate normal circuit loads. Use only a Rotunda Test Lamp (SGT27000) or 250-300mA incandescent bulb test lamp. To avoid connector terminal damage, use the Rotunda Flex Probe kit for the test lamp probe connection to the vehicle. Do not use the test lamp probe directly on any connector.

- Connect BCM fuse 18 (5A).
- Select PARK.
- Disconnect Ignition Switch [C250](#) .
- Connect:

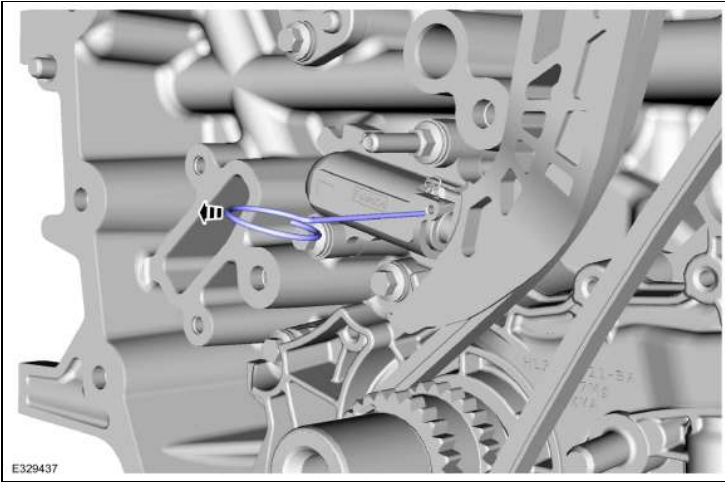
[Click to display connectors](#)

Positive Lead	Measurement / Action	Negative Lead
<a href="#">C250-4</a>		<a href="#">C250-3</a>

Does the test lamp illuminate?

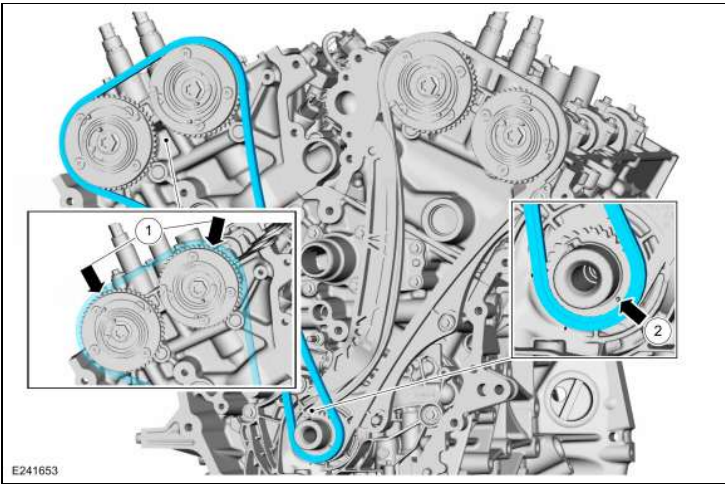
Yes	GO to <a href="#">D4</a>
No	INSTALL a new ignition switch. REFER to: Ignition Switch (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).

## D4 CHECK THE KEY REMOVAL INHIBIT SOLENOID CIRCUIT FOR A SHORT TO GROUND

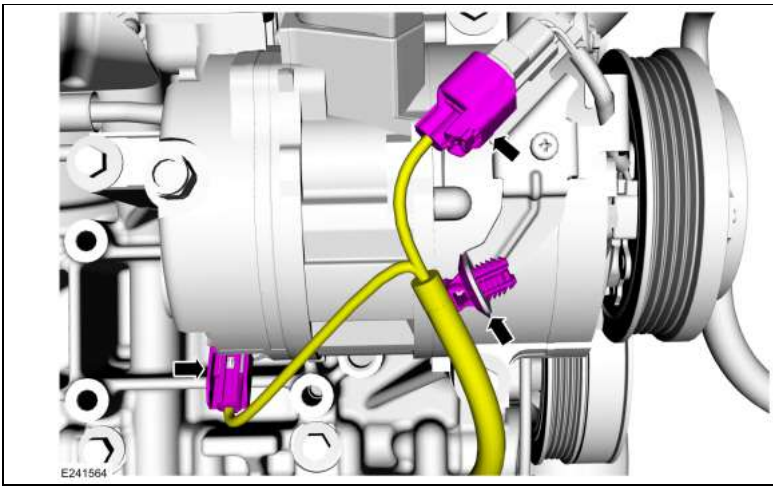


78. **NOTE:** The crankshaft sprocket is reversible with a timing mark on each face. For installation of each timing chain, utilize the timing mark on the front face of the crankshaft sprocket for chain alignment.

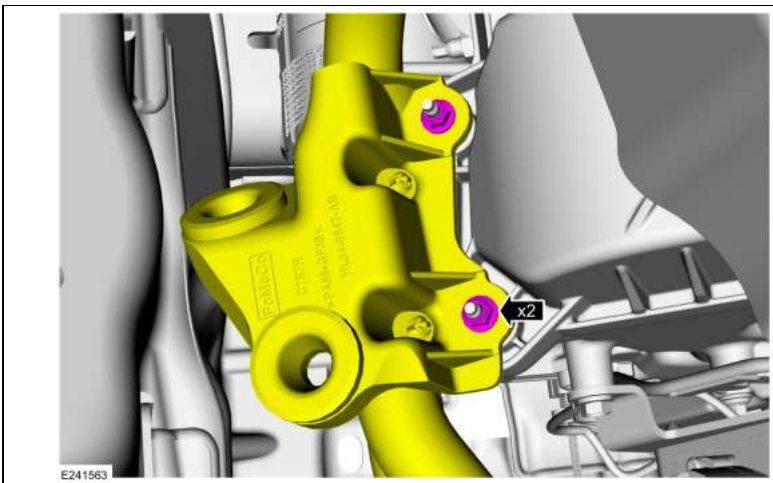
1. Install the RH timing chain with the single colored links aligned with the timing marks on the VCT units.
2. Install the double colored links so they straddle the timing mark on the crankshaft sprocket.



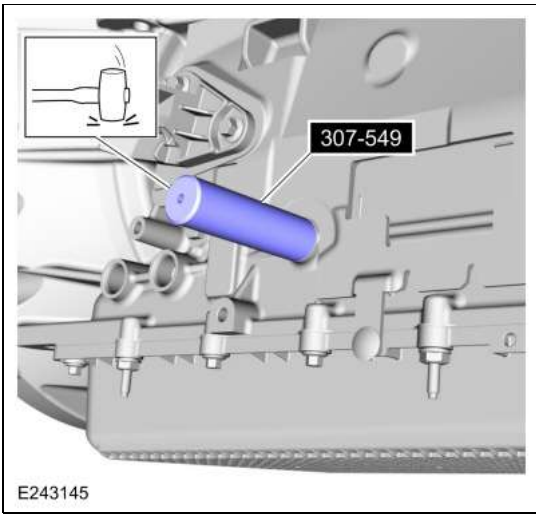
79. Install the RH timing chain tensioner arm.



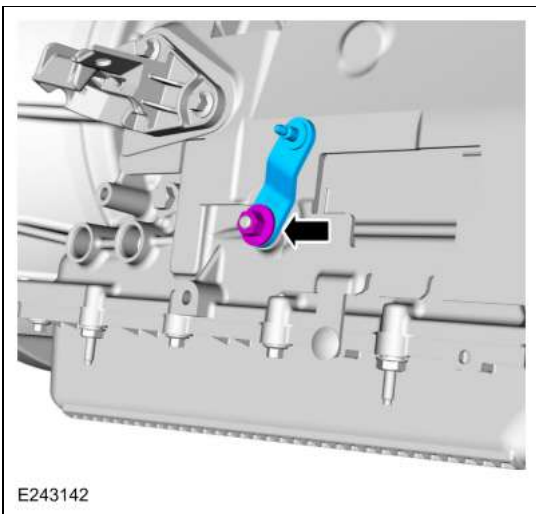
7. Install the air conditioning (A/C) compressor belt.  
Refer to: Air Conditioning (A/C) Compressor Belt (303-05 Accessory Drive - 3.5L EcoBoost (272kW/370PS), Removal and Installation).
8. Install charge air cooler tube bracket and coolant hoses, then install and tighten the charge air cooler tube bracket retainers.  
*Torque: 53 lb.in (6 Nm)*



9. Install the charge air cooler intake pipe - right side.  
Refer to: Charge Air Cooler (CAC) Intake Pipe (303-12 Intake Air Distribution and Filtering - 3.5L EcoBoost (272kW/370PS), Removal and Installation).
10. Install the air cleaner outlet pipe RH.  
Refer to: Air Cleaner Outlet Pipe RH (303-12 Intake Air Distribution and Filtering - 3.5L EcoBoost (272kW/370PS), Removal and Installation).
11. Install the right fender splash shield.  
Refer to: Fender Splash Shield (501-02 Front End Body Panels, Removal and Installation).
12.
  - If equipped, install the transmission housing cover and attach the retainer.
  - Install the bolts.  
*Torque: 71 lb.in (8 Nm)*

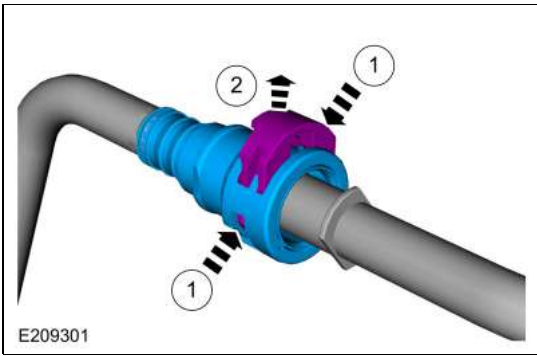


3. Install the manual control lever and nut.  
*Torque: 106 lb.in (12 Nm)*



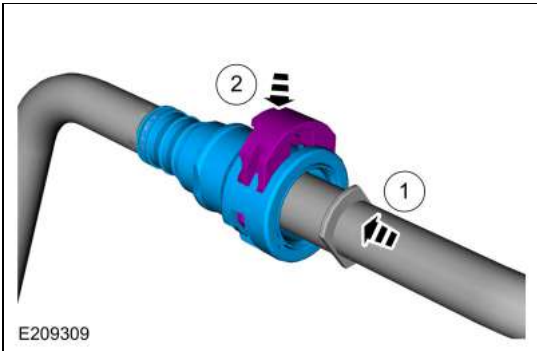
4. Connect the selector lever cable onto the manual control lever.
- Pull back on the selector lever cable to verify it is installed correctly to the manual lever.





**Connect**

1.
  1. **NOTE:** Pull on the quick release coupling and the fitting to make sure it is securely fastened.
 Snap the locking tab into place.



2. Connect the battery ground cable.  
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables - 3.5L Duratec (209kW/284PS)) .

**Disconnect**

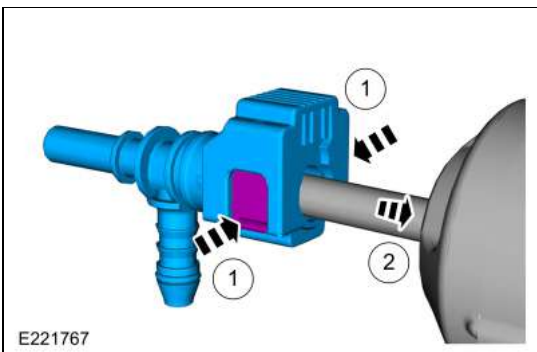
**NOTICE:** When reusing liquid tube connectors, make sure to use compressed air to remove any foreign material from the connector retaining clip area before separating from the tube or damage to the tube or connector retaining clip may occur.

**NOTICE:** Fuel injection equipment is manufactured to very precise tolerances and fine clearances. It is essential that absolute cleanliness is observed when working with these components or component damage may occur. Always install blanking plugs to any open orifices or tubes.

**NOTICE:** Do not use any tools. The use of tools may cause a deformity in the clip components which may cause fuel leaks.

**NOTE:** Type 20

1. If servicing a liquid fuel tube quick release coupling, release the fuel system pressure.  
Refer to: Fuel System Pressure Release (310-00 Fuel System - General Information - 3.5L Duratec (209kW/284PS)) .
2. Disconnect the battery ground cable.  
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables - 3.5L Duratec (209kW/284PS)) .
- 3.



**Connect**

1.
  1. **NOTE:** Pull on the quick release coupling and the fitting to make sure it is securely fastened.
 Snap the locking tab into place.

DTC	Description	Action
B1B71:15	Evaporator Temperature Sensor: Circuit Short To Battery or Open	<a href="#">GO to Pinpoint Test L</a>
B1B7D:11	Rear Air Distribution Actuator: Circuit Short To Ground	<a href="#">GO to Pinpoint Test S</a>
B1B7D:15	Rear Air Distribution Actuator: Circuit Short To Battery or Open	<a href="#">GO to Pinpoint Test S</a>
C1B14:11	Sensor Supply Voltage A: Circuit Short To Ground	<a href="#">GO to Pinpoint Test M</a>
C1B14:12	Sensor Supply Voltage A: Circuit Short To Battery	<a href="#">GO to Pinpoint Test M</a>
All Other FCIM Diagnostic Trouble Codes (DTCs) not listed in this chart	â€”	Refer to the appropriate section in Group 415 for the procedure.

#### DTC Chart: Powertrain Control Module (PCM)


Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.  
REFER to: Diagnostic Methods (100-00 General Information, Description and Operation).

**NOTE:** Some PCMDiagnostic Trouble Codes (DTCs) may inhibit A/C operation. If any PCMDiagnostic Trouble Codes (DTCs) are retrieved, diagnose those first. Refer to the DTC Chart: PCM.

#### Powertrain Control Module (PCM) DTC Chart


DTC	Description	Action
P0532	A/C Refrigerant Pressure Sensor "A" Circuit Low	<a href="#">GO to Pinpoint Test A</a>
P0533	A/C Refrigerant Pressure Sensor "A" Circuit High	<a href="#">GO to Pinpoint Test A</a>
P0645	A/C Clutch Relay Control Circuit	<a href="#">GO to Pinpoint Test B</a>
P06A0	Variable A/C Compressor Control Circuit	<a href="#">GO to Pinpoint Test R</a>
P1464	A/C Demand Out Of Self Test Range	If the HVAC selector was not powered off, POWER the HVAC off; CLEAR the Diagnostic Trouble Codes (DTCs) and REPEAT the self-test. If the DTC returns, <a href="#">GO to Pinpoint Test H</a>
P193E	A/C Clutch Request Signal	<a href="#">GO to Pinpoint Test N</a>
P2600	Coolant Pump "A" Control Circuit/Open	<a href="#">GO to Pinpoint Test O</a>
P2601	Coolant Pump "A" Control Circuit Performance/Stuck Off	<a href="#">GO to Pinpoint Test O</a>
P2602	Coolant Pump "A" Control Circuit Low	<a href="#">GO to Pinpoint Test O</a>

## Overhead console

Positive Lead	Measurement / Action	Negative Lead
<a href="#">C930-10</a>		<a href="#">C930-1</a>


[Click to display connectors](#)

### Active park assist switch

Positive Lead	Measurement / Action	Negative Lead
<a href="#">C3466-5</a>		<a href="#">C3466-3</a>


[Click to display connectors](#)

### Pro Trailer Backing Assist â,,ç (PTBA) switch

Positive Lead	Measurement / Action	Negative Lead
<a href="#">C2599-4</a>		<a href="#">C2599-6</a>


[Click to display connectors](#)

### Second row folding seat switch

Positive Lead	Measurement / Action	Negative Lead
<a href="#">C4512-3</a>		<a href="#">C4512-6</a>


[Click to display connectors](#)

### Third row folding seat switch

Positive Lead	Measurement / Action	Negative Lead
<a href="#">C4179-3</a>		<a href="#">C4179-6</a>

[Click to display connectors](#)

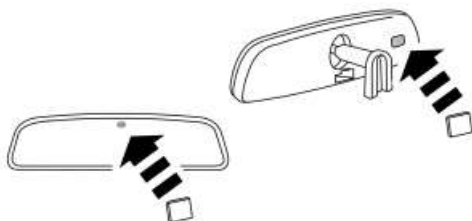
### LH second row seat release easy entry switch

Positive Lead	Measurement / Action	Negative Lead
<a href="#">C3788-3</a>		<a href="#">C3788-2</a>

<b>Network Message</b>	<b>Originating Module</b>	<b>Network Type</b>	<b>Receiving Module(s)</b>
Drive mode select message request	ABS module	HS-CAN2	• GWM
Drive mode select message request	GWM	HS-CAN3	• IPC
Drive mode select message reset	IPC	HS-CAN3	• GWM
Drive mode select message reset	GWM	HS-CAN2	• ABS module
Drive mode select position status	ABS module	HS-CAN2	• GWM
Drive mode select position status	GWM	HS-CAN3	• IPC
Drive mode select request	ABS module	HS-CAN2	• PSCM • VDM
Drive mode select status	PCM	HS-CAN1	• GWM
Drive mode select status	GWM	HS-CAN2	• ABS module
Drive mode select status	GWM	HS-CAN3	• IPC
Drive mode select switch status	PCM	HS-CAN1	• GWM
Drive mode select switch status	GWM	HS-CAN2	• ABS module
Drive mode select switch request	ATCM	HS-CAN2	• ABS module
Drive mode switch status	SCCM	HS-CAN2	• GWM
Drive mode switch status	GWM	HS-CAN3	• IPC
Driver door ajar status	BCM	HS-CAN1	• PCM • GWM
Driver door ajar status	GWM	HS-CAN3	• ACM • APIM • DACMC • IPC
Driver door ajar status	GWM	HS-CAN4	• TCU
Driver door ajar status	GWM	HS-CAN2	• ABS module • ATCM • IPMA • IPMB • GSM • TCCM
Driver door ajar status	GWM	MS-CAN	• DDM • FCIM • PDM • RBM • RSM
Driver door lock switch status	DDM	MS-CAN	• GWM
Driver door lock switch status	GWM	HS-CAN1	• BCM

- Select PARK.
- Ignition OFF.
- Disconnect: LH Exterior Mirror.
- Ignition ON.
- **NOTE:** *Covering the sensor(s) with a finger or hand is not adequate for this step.*

Cover the forward and rearward facing sensors with black electrical tape or other dark material. The mirror should adjust to a high reflectance state (mirror will be clear).



- E149155
- Measure:

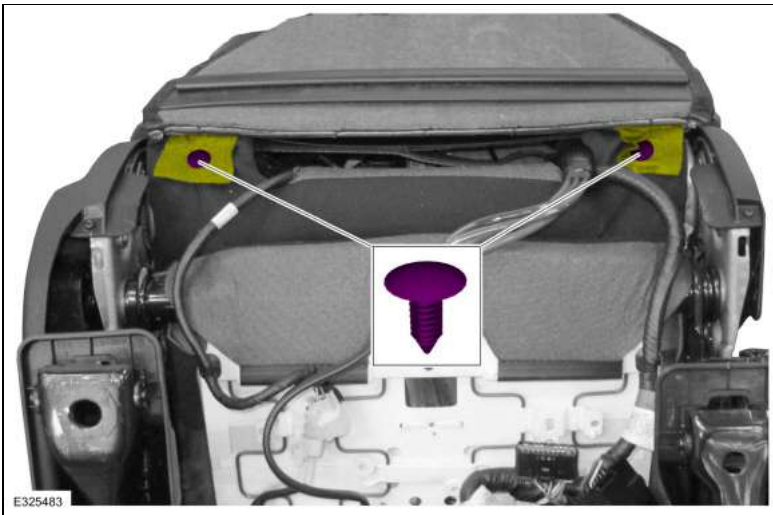
[Click to display connectors](#)

Positive Lead	Measurement / Action	Negative Lead
<a href="#">C516-1</a>		<a href="#">C516-9</a>

Is any voltage present?

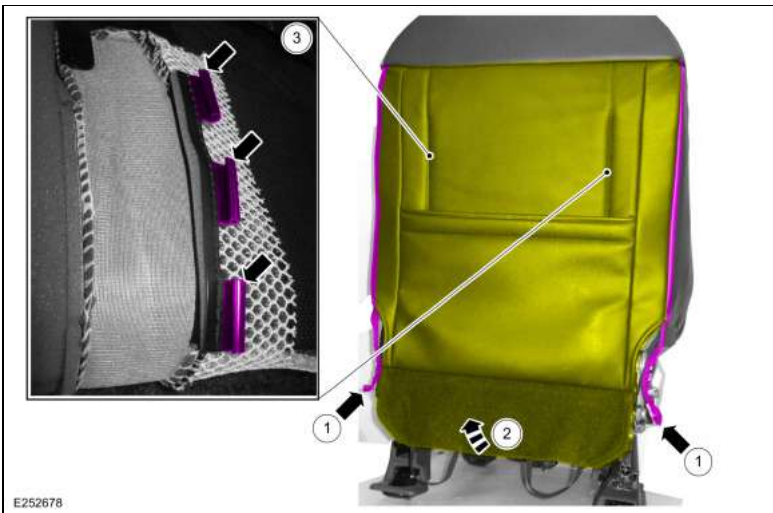
Yes	GO to <a href="#">F10</a>
No	GO to <a href="#">F12</a>

**F10 CHECK THE LH (LEFT-HAND) EXTERIOR AUTO-DIMMING MIRROR CIRCUITS FOR A SHORT TO VOLTAGE WITH THE INTERIOR AUTO DIMMING MIRROR DISCONNECTED**



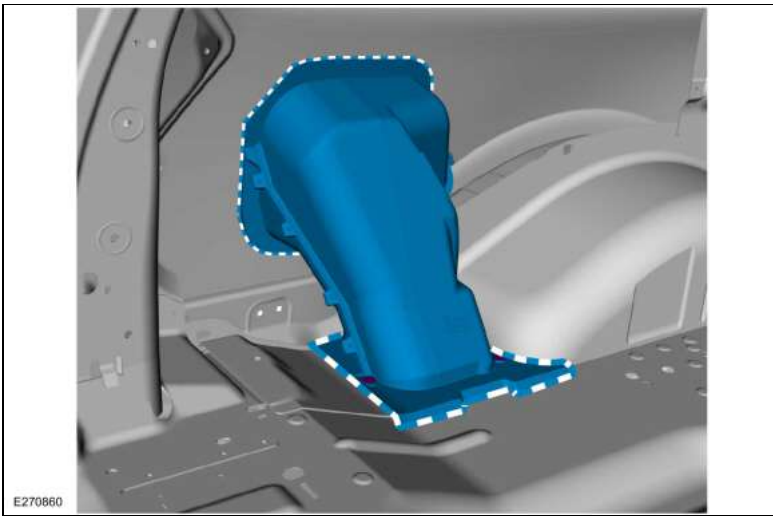
6. **NOTE:** To install, gradually alternate the left and right seat backrest cover zippers to prevent damage to the seat backrest cover.

1. Unzip the front seat backrest cover zipper on each side.
2. Position the front seat backrest cover upward.
3. Detach the J-clips from the lumbar wire.

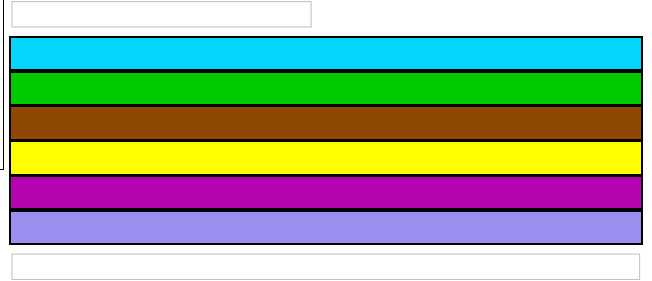


**All seats**

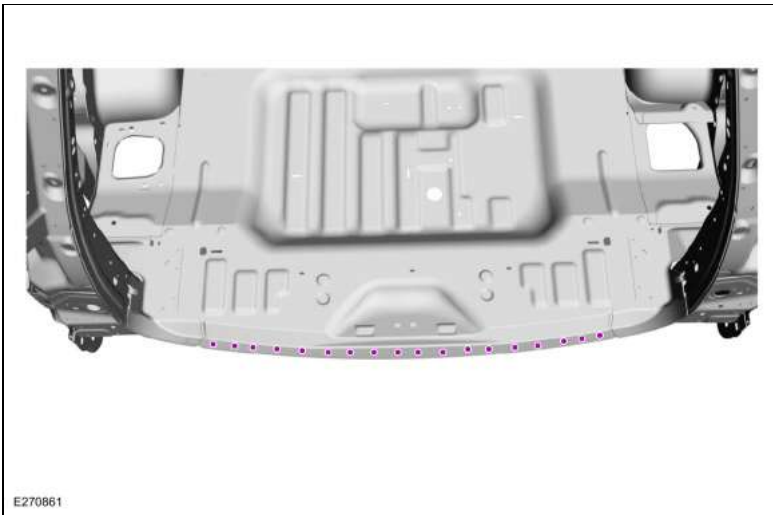
7. Disconnect the electrical connector, release the J-hooks, and remove the front seat power lumbar assembly.



E270860



- 8. Remove the rivet fasteners.  
 Use the General Equipment: Self-Piercing Rivet (SPR) Remover/Installer  
 Use the General Equipment: Belt Sander



E270861



- 9. Remove the rivet fasteners.  
 Use the General Equipment: Self-Piercing Rivet (SPR) Remover/Installer  
 Use the General Equipment: Belt Sander