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GENERAL INFORMATION

Anti-Lock Brake Safety Precautions

* PLEASE READ THIS FIRST *

This article is intended for general information purposes only. This information may not apply to all makes and models. If vehicle is equipped with Anti-Lock Brake System (ABS), refer to appropriate ANTI-LOCK BRAKE SYSTEM article in the BRAKES section for description, operation, depressurizing, testing, system bleeding, trouble shooting and servicing of specific system.

ANTI-LOCK BRAKE SAFETY PRECAUTIONS

WARNING: **Failure to depressurize ABS could lead to physical injury.**

- NEVER open a bleeder valve or loosen a hydraulic line while ABS is pressurized.
- NEVER disconnect or reconnect any electrical connectors while ignition is on. Damage to ABS control unit may result.
- **DO NOT** attempt to bleed hydraulic system without first referring to the appropriate ANTI-LOCK BRAKE SYSTEM article in the BRAKES section.
- Only use specially designed brake hoses/lines on ABS equipped vehicles.
- **DO NOT** tap on speed sensor components (sensor, sensor rings). Sensor rings must be pressed into hubs, NOT hammered into hubs. Striking these components can cause demagnetization or a loss of polarization, affecting the accuracy of the speed signal returning to the ABS control unit.
- **DO NOT** mix tire sizes. Increasing the width, as long as tires remain close to the original diameter, is acceptable. Rolling diameter must be identical for all 4 tires. Some manufacturers recommend tires of the same brand, style and type. Failure to follow this precaution may cause inaccurate wheel speed readings.
- **DO NOT** contaminate speed sensor components with grease. Only use recommended coating, when system calls for an anti-corrosion coating.
- When speed sensor components have been removed, ALWAYS check sensor-to-ring air gaps when applicable. These specifications can be found in each appropriate article.
- ONLY use recommended brake fluids. **DO NOT** use silicone brake fluids in an ABS equipped vehicle.
- When installing transmission devices (CB's, telephones, etc.) on ABS equipped vehicles, **DO NOT** locate the antenna near the ABS control unit (or any control unit).
- Disconnect all on-board computers, when using electric welding equipment.
- **DO NOT** expose the ABS control unit to prolonged periods of high heat (185 B°F/85B°C for 2 hours is generally considered a maximum limit).

Does the power liftgate open?

Yes	The system is operating correctly. INFORM the customer of the operation of the hands-free liftgate actuation.

No	GO to J4

J4 CHECK THE POWER LIFTGATE HANDS-FREE ACTUATION MODULE VOLTAGE SUPPLY CIRCUIT FOR AN OPEN

- Disconnect Hands-Free Liftgate Actuation Module C4401.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C4401-2		Ground

Is the voltage greater than 11 volts?

Yes	GO to J5

No	REPAIR the circuit.

J5 CHECK THE POWER LIFTGATE HANDS-FREE ACTUATION MODULE GROUND CIRCUIT FOR AN OPEN

- Measure:

Positive Lead	Measurement / Action	Negative Lead
C4401-2		C4401-3

Is the voltage greater than 11 volts?

Yes	GO to J6

No	REPAIR the circuit.

J6 BYPASS THE HANDS-FREE LIFTGATE ACTUATION MODULE

NOTE: **If the fuse in the jumper wire fails, refer to OEM Electrical Wiring Diagram Introduction to identify the possible causes of the circuit short.**

- Place a programmed passive key within 1 meter (3 feet) of the rear bumper.
- Connect:

Positive Lead	Measurement / Action	Negative Lead
C4401-1		C4401-3

- Remove the fused jumper wire.

Does the power liftgate open?

Yes	GO to J9

No	GO to J7

- Check the vehicle service history for recent service actions related to the RFA module and the module in question (GWM) setting the DTC. If recent service history is found:
    - verify correct replacement module was installed
        - vehicle parts build list may be used to verify correct part fitment
    - verify the configuration of replacement module was correct
        - re-configure module using as-built data if prior configuration is suspect
    - verify the module was not obtained from a like vehicle and installed into vehicle with concern
        - 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?

Yes	GO to AS7

No	The system is operating correctly at this time. The concern may have been due to incorrect parts replacement procedures or incorrect module configuration.

AS7 CHECK FOR CORRECT RFA (REMOTE FUNCTION ACTUATOR) MODULE OPERATION

- Ignition OFF.
- Disconnect and inspect the RFA module connector.
- Repair:
    - corrosion (install new connectors or terminals - clean module pins)
    - damaged or bent pins - install new terminals pins
    - pushed-out pins - install new pins as necessary
- Reconnect the RFA 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 service articles: TSB, GSB, SSM or FSA. If a service article exists for this concern, DISCONTINUE this test and FOLLOW the service article instructions. If no service articles address this concern, INSTALL a new RFA module. REFER to: **Remote Function Actuator (RFA) Module** .

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 AT: U1A01:00

Refer to **Module Communications Network** for schematic and connector information.

Normal Operation and Fault Conditions

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Condition
GWM U1A01:00	Communication Link: No Sub Type Information	Sets in continuous memory and during the on-demand self-test when GWM communication cannot be established.

Possible Sources

- GWM

AT1 RETRIEVE GWM (GATEWAY MODULE A) DIAGNOSTIC TROUBLE CODES (DTCS)

B15 CHECK THE SCMB (PASSENGER FRONT SEAT MODULE) OUTPUT VOLTAGE TO THE FRONT HEIGHT MOTOR

- Connect: SCMB C3696A and C3696F.
- Ignition ON.
- **NOTE:** **During the following step, the voltage being measured changes polarity dependent upon which direction the seat control is activated.**

  While pushing the front height switch upward and downward, measure:

Positive Lead	Measurement / Action	Negative Lead
C3074-1		C3074-3

Is the voltage greater than 11 volts when the seat control switch is operated in both directions?

Yes	INSTALL a new passenger seat track. REFER to: **Front Seat Track** . GO to B53.
No	GO to B52.

B16 CHECK THE REAR HEIGHT MOTOR CIRCUITS FOR A SHORT TO VOLTAGE

- REFER to: **Supplemental Restraint System (SRS) Depowering** .
- Disconnect: Passenger Side Airbag In-line C339.
- Disconnect: SCMB C3696A and C3696C.
- Ignition ON.
- Measure:

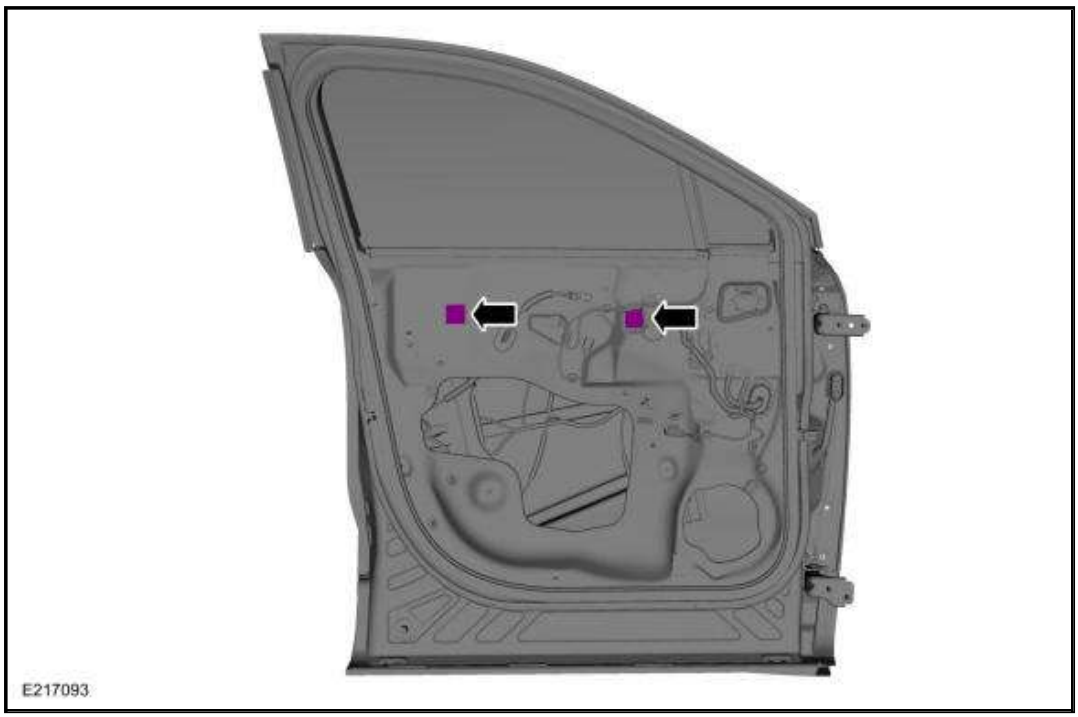
Positive Lead	Measurement / Action	Negative Lead
C3696C-1		Ground
C3696C-2		Ground

Is any voltage present?

Yes	GO to B17.
No	GO to B18.

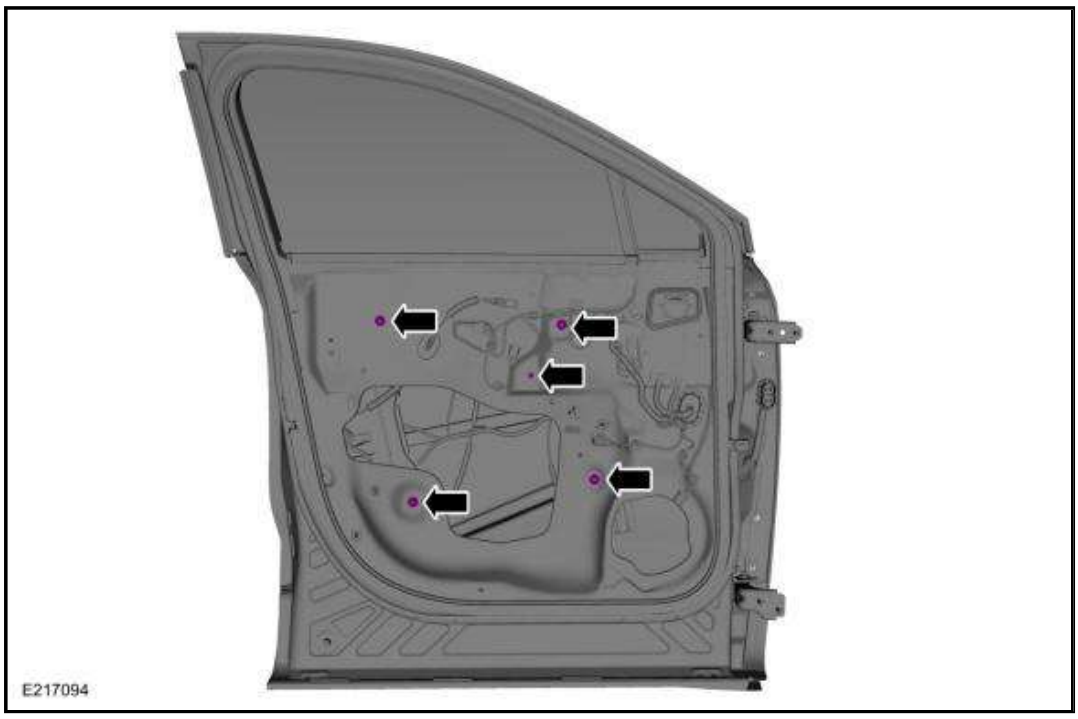
B17 CHECK THE REAR HEIGHT MOTOR CIRCUITS FOR A SHORT TO VOLTAGE WITH THE MOTOR DISCONNECTED

- Ignition OFF.
- Disconnect: Passenger Seat Rear Height Motor C3075.
- Ignition ON.
- Measure:

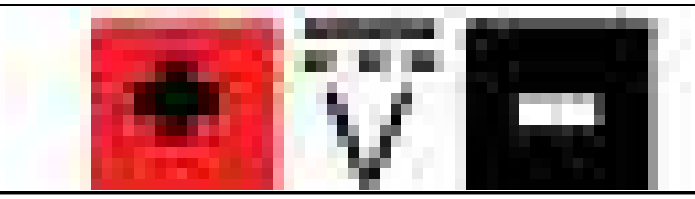


3. Remove the front door window regulator bolt and nuts.

   Torque: 93 lb.in (10.5 Nm)



4. Remove the front door window regulator.
    1. Disconnect the electrical connector and the position aside the wiring harness.
    2. Rotate the front half of the window regulator rearward.
    3. Rotate the rear half of the window regulator forward.
    4. Remove the front door window regulator.

Positive Lead	Measurement / Action	Negative Lead
C254-1		Ground

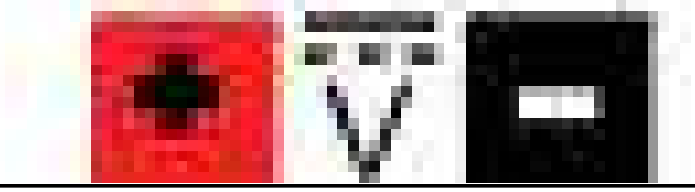
Is the voltage greater than 11 volts?

Yes	GO to E9

No	REPAIR the circuit.

E9 CHECK THE GLOVE COMPARTMENT LAMP GROUND CIRCUIT FOR AN OPEN

- Measure:

Positive Lead	Measurement / Action	Negative Lead
C254-1		C254-2

Is the voltage greater than 11 volts?

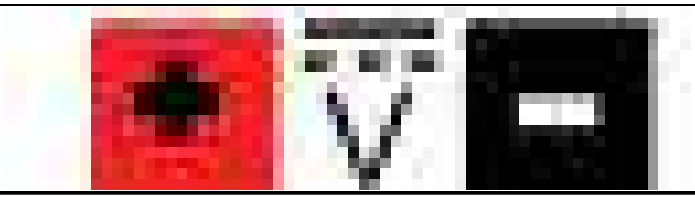
Yes	INSTALL a new glove compartment lamp.

No	REPAIR the circuit.

E10 CHECK THE OVERHEAD INTERIOR LAMP VOLTAGE SUPPLY CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect Inoperative Overhead Console C930.
- Disconnect For vehicles without a vista roof, Inoperative Rear Interior Lamp C901.
- Disconnect For vehicles with a vista roof, Inoperative LH Rear Interior Lamp C963 or Inoperative RH Rear Interior Lamp C964.
- Ignition ON.
- Measure:

  Overhead Console (North America)

Positive Lead	Measurement / Action	Negative Lead
C930-12		Ground

  Overhead Console (China)

DTC Charts

DTC Charts

Diagnostics in this service information assume a certain skill level and knowledge of Ford-specific diagnostic practices. REFER to: **Diagnostic Methods** .

BCM DTC Chart

DTC	Description	Action
B109F:01	Intrusion Sensor Module: General Electrical Failure	**GO to Pinpoint Test B**
B109F:02	Intrusion Sensor Module: General Signal Failure	**GO to Pinpoint Test B**
B109F:08	Intrusion Sensor Module: Bus Signal / Message Failure	**GO to Pinpoint Test B**
B109F:49	Intrusion Sensor Module: Internal Electronic Failure	**GO to Pinpoint Test H**
B109F:55	Intrusion Sensor Module: Not Configured	**GO to Pinpoint Test I**
B109F:97	Intrusion Sensor Module: Component or System Operation Obstructed or Blocked	**GO to Pinpoint Test B**
B109F:9A	Intrusion Sensor Module: Component or System Operating Conditions	**GO to Pinpoint Test B**
B1305:01	Hood Switch: General Electrical Failure	**GO to Pinpoint Test F**
B1305:11	Hood Switch: Circuit Short to Ground	**GO to Pinpoint Test A**
B1305:15	Hood Switch: Circuit Short to Battery or Open	**GO to Pinpoint Test F**
All other Diagnostic Trouble Codes (DTCs)	-	REFER to: **Body Control Module (BCM)** .

Diagnostics in this service information assume a certain skill level and knowledge of Ford-specific diagnostic practices. REFER to: **Diagnostic Methods** .

DDM DTC Chart

DTC	Description	Action
B11DA:23	Driver Door Key Cylinder Switch: Signal Stuck Low	DISREGARD this DTC. This vehicle is not equipped to support the arm/disarm inputs.
All other Diagnostic Trouble Codes (DTCs)	-	REFER to: **Locks, Latches and Entry Systems** .

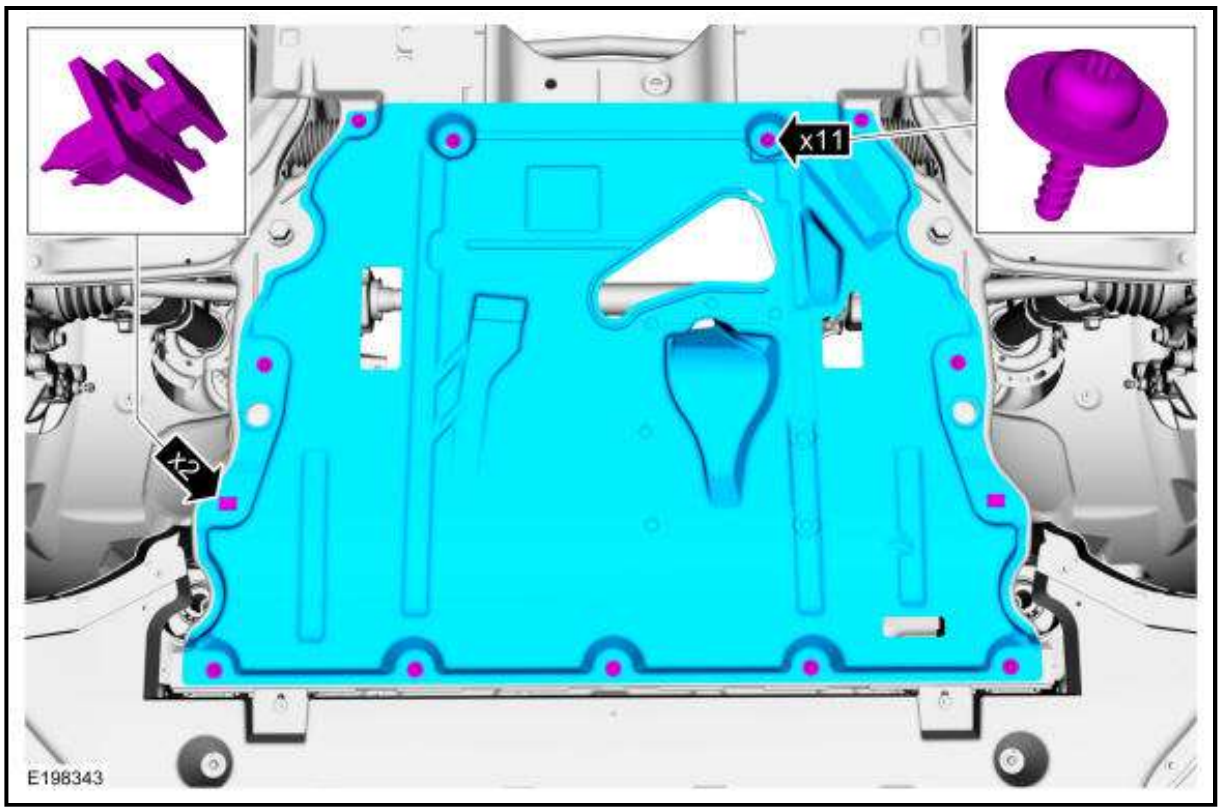
Symptom Chart

Symptom Chart: Anti-Theft - Perimeter

Diagnostics in this service information assume a certain skill level and knowledge of Ford-specific diagnostic practices. REFER to: **Diagnostic Methods** .

Symptom Chart

Condition	Actions
The alarm system does not activate from an unauthorized entry at the hood	**GO to Pinpoint Test A**
The alarm system does not activate from an unauthorized entry at a door	DIAGNOSE the courtesy lamps not illuminating when a door is open. REFER to: **Interior Lighting** .
The alarm system does not activate from an unauthorized entry at the liftgate	DIAGNOSE the courtesy lamps not illuminating when a liftgate is open. REFER to: **Interior Lighting** .
The alarm system does not activate from the intrusion sensor	**GO to Pinpoint Test B**



11. Install the wheel and tire. Refer to: **Wheel and Tire** .
12. Calibrate the suspension system. Connect the scan tool and carry out the Ride Height Calibration routine. Follow the scan tool directions.

FRONT HALFSHAFT RH - 2.7L ECOBOOST (238KW/324PS), ALL-WHEEL DRIVE (AWD)

For information on Ford Color Coded Illustrations refer to **OEM COLOR CODING**

Special Tool(s) / General Equipment

	**204-161 (T97P-1175-A) Installer, Halfshaft** **TKIT-1997-LM2** **TKIT-1997-F/FM2** **TKIT-1997-FLM2**
	205-D070 (D93P-1175-B) Remover, Front Wheel Hub

REMOVAL

1. Remove the wheel and tire. Refer to: **Wheel and Tire** .
2. Remove and discard the wheel hub nut.

Yes	No
INSTALL a new HO2S in question. REFER to the appropriate Electronic Engine Controls article. RESET the keep alive memory (KAM). Refer to **Resetting The Keep Alive Memory (KAM).** REPEAT the self-test.	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

PINPOINT TESTS DX: ENGINE COOLANT TEMPERATURE (ECT) SENSOR

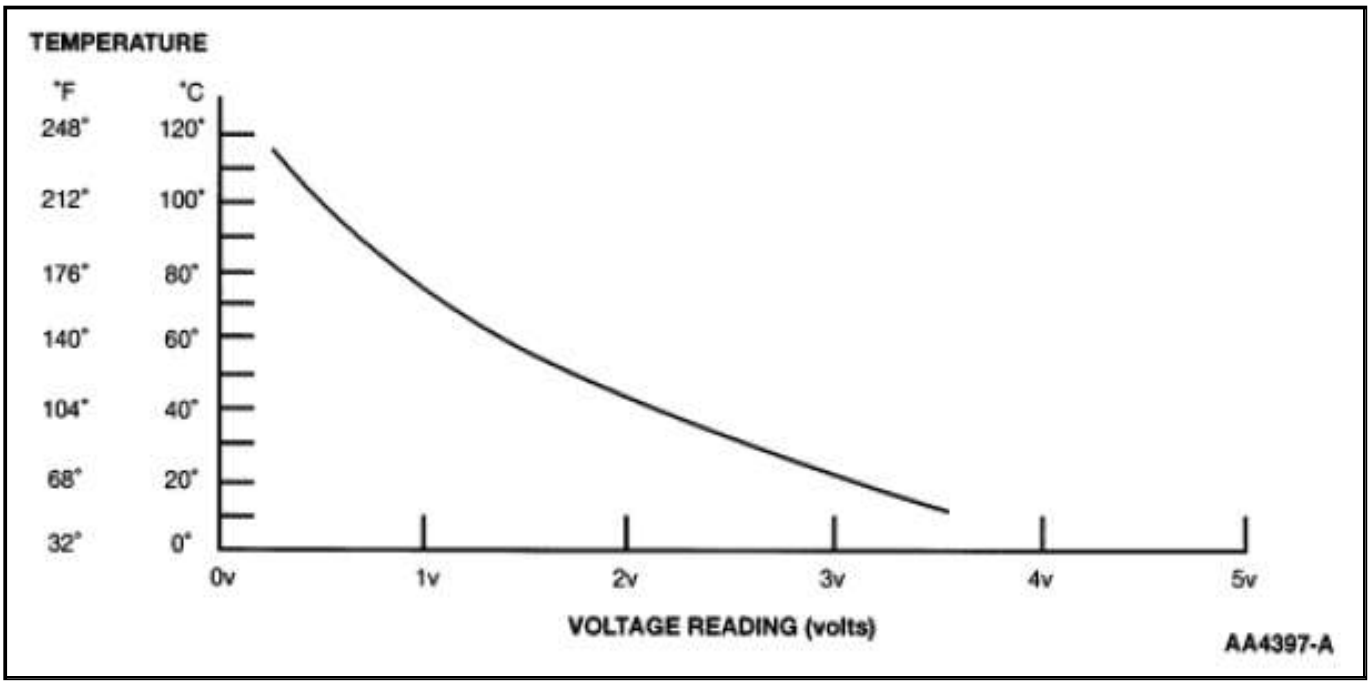
INTRODUCTION

NOTE: **Engine coolant temperature must be greater than 10B°C (50B°F) to pass the KOEO self-test and greater than 82B°C (180B°F) to pass the KOER self-test.**

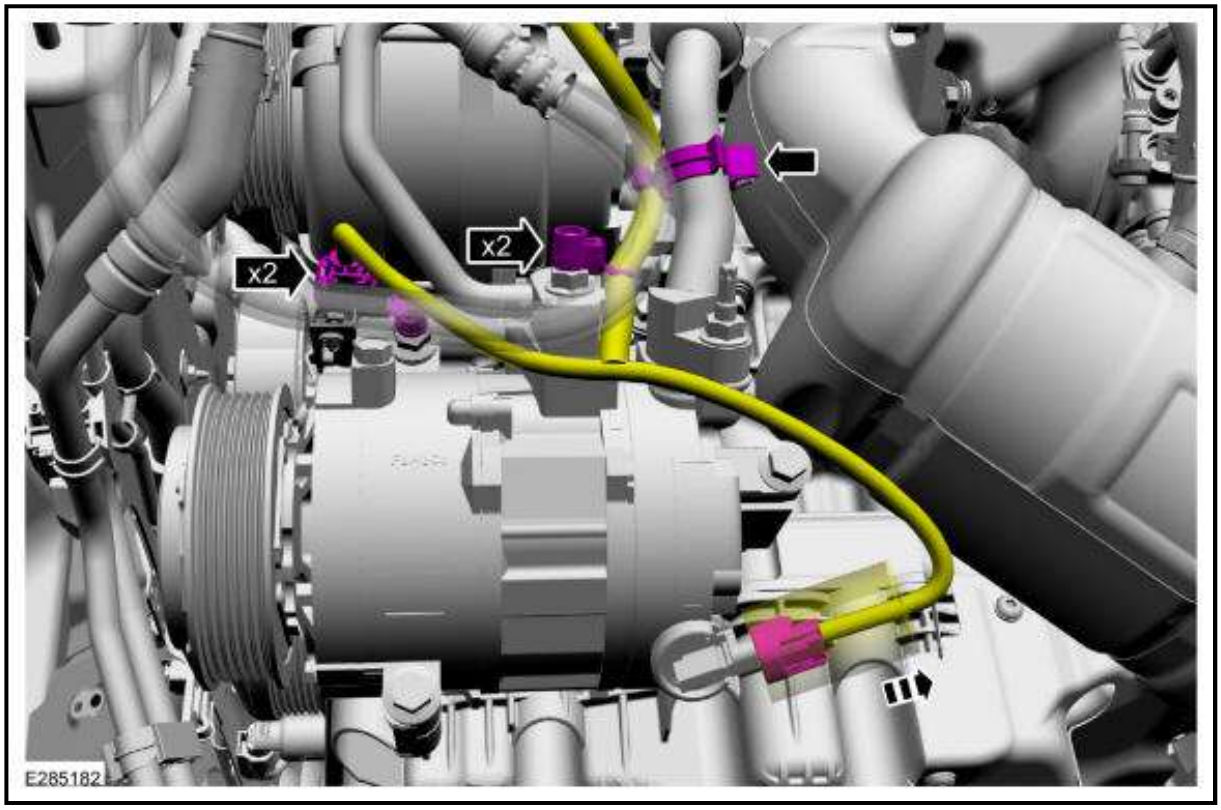
This pinpoint test is intended to diagnose the following:

- ECT sensor (12A648)
- harness circuits: ECT and SIGRTN
- powertrain control module (PCM) (12A650)

Voltage values calculated for VREF equals 5 volts. These values may vary by 15% due to sensor and VREF variations.



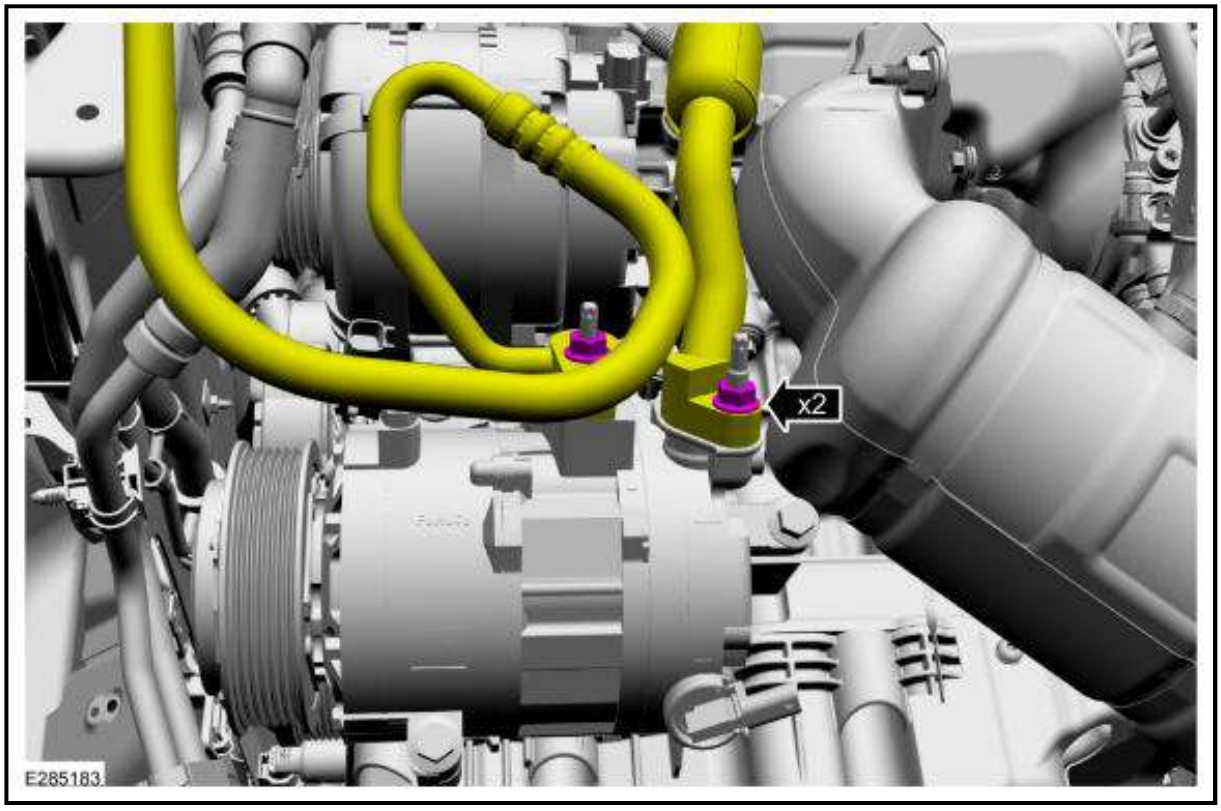
Temperature		Temperature Sensor Values
B°C	B°F	Resistance (K ohms)
120	248	1.18
110	230	1.55
100	212	2.07
90	194	2.80
80	176	3.84
70	158	5.37
60	140	7.70
50	122	10.97
40	104	16.15
30	86	24.27
20	68	37.30
10	50	58.75
0	32	95.85



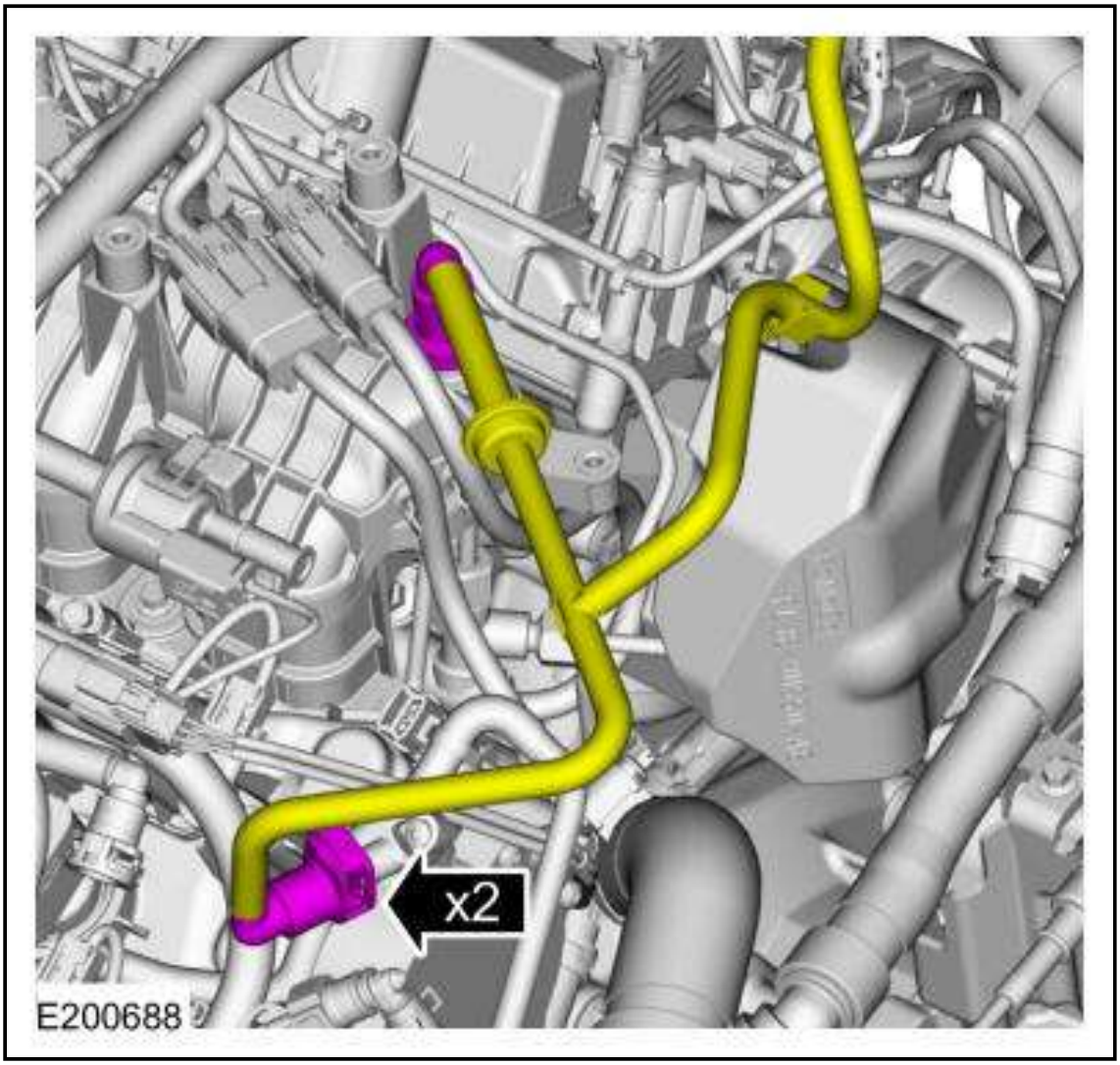
NOTE: **During the removal of components, cap, tape or otherwise appropriately protect all openings to prevent the ingress of dirt or other contamination. Remove protective materials prior to installation.**

47. Remove the A/C compressor inlet and outlet line nuts and disconnect the fittings.

- Discard the O-ring seals and gaskets.
- Make sure to cover any open ports to prevent debris from entering the system.

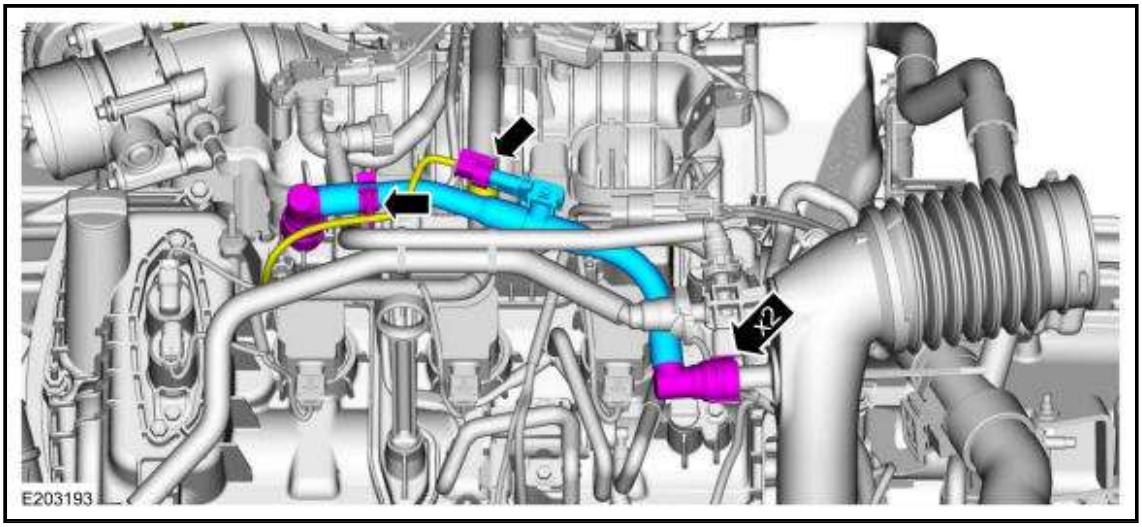


48. Remove the bolts, stud bolt and the A/C compressor.



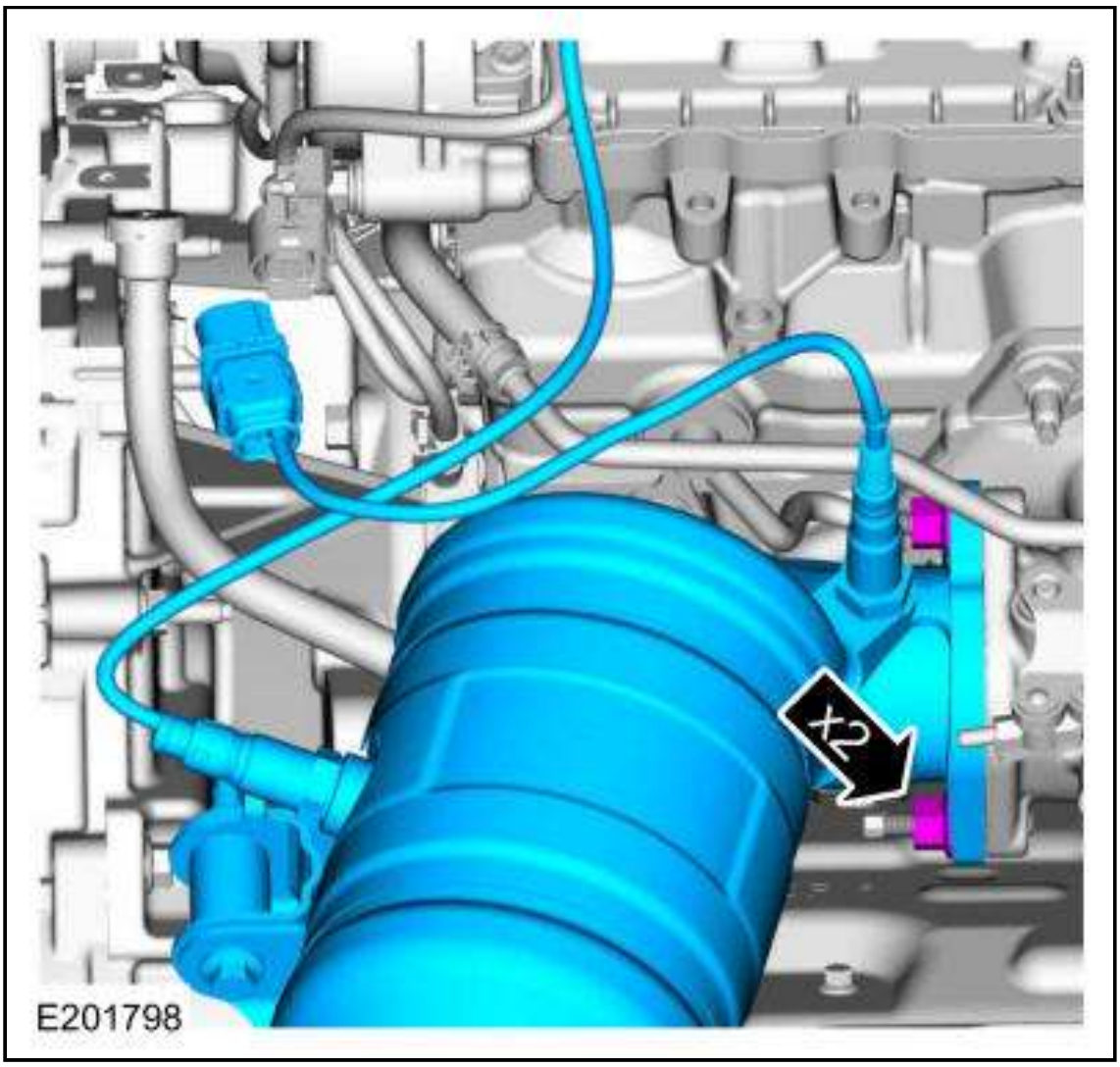
9.

- Position the PCV tube and connect the quick release couplings. Refer to: **QUICK RELEASE COUPLING**
- Attach the PCV tube retainer. Refer to: **QUICK RELEASE COUPLING**
- Connect the crankcase pressure sensor electrical connector.



10.

1. Slide the EVAP purge valve onto the intake manifold mounting tab.
2. Connect the EVAP purge valve electrical connector.
3. Connect the EVAP tube quick release coupling. Refer to: **QUICK RELEASE COUPLING**



31.

1. Install.

   Torque: 22 lb.ft (30 Nm)

2. Tighten.

   Torque: 35 lb.ft (48 Nm)

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Condition
PCM U0151:00	Lost Communication With Restraints Control Module: No Sub Type Information	The PCM sets this DTC if data messages from the RCM through the GWM are missing.

Possible Sources

- Communications network concern
- RCM
- GWM
- PCM

G1 VERIFY THE CUSTOMER CONCERN

- Ignition ON.
- Verify there is an observable symptom present.

Is an observable symptom present?

Yes	GO to **G2**

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.

G2 CHECK THE COMMUNICATION NETWORK

- Using a diagnostic scan tool, perform a network test.

Did the RCM pass the network test?

Yes	GO to **G3**

No	REFER to: **Controller Area Network (CAN) Module Communications Network** .

G3 PERFORM RCM (RESTRAINTS CONTROL MODULE) SELF-TEST

- Using a diagnostic scan tool, perform a RCM self-test.

Are any Diagnostic Trouble Codes (DTCs) recorded?

Yes	REFER to: **Airbag Supplemental Restraint System (SRS)** .

No	GO to **G4**

G4 CHECK THE GWM (GATEWAY MODULE A) DIAGNOSTIC TROUBLE CODES (DTCS)

- Using a diagnostic scan tool, retrieve the GWM Diagnostic Trouble Codes (DTCs).

Are any Diagnostic Trouble Codes (DTCs) recorded?

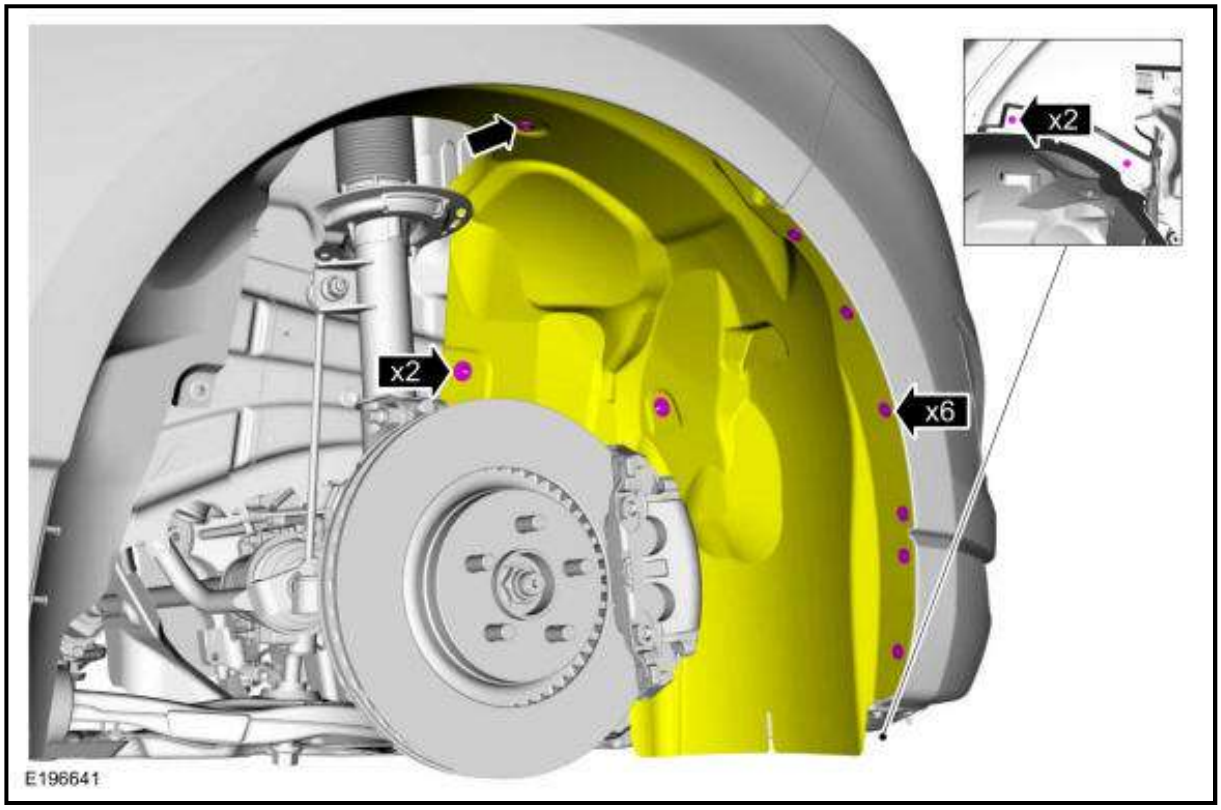
Yes	REFER to: **Controller Area Network (CAN) Module Communications Network** .

No	GO to **G5**

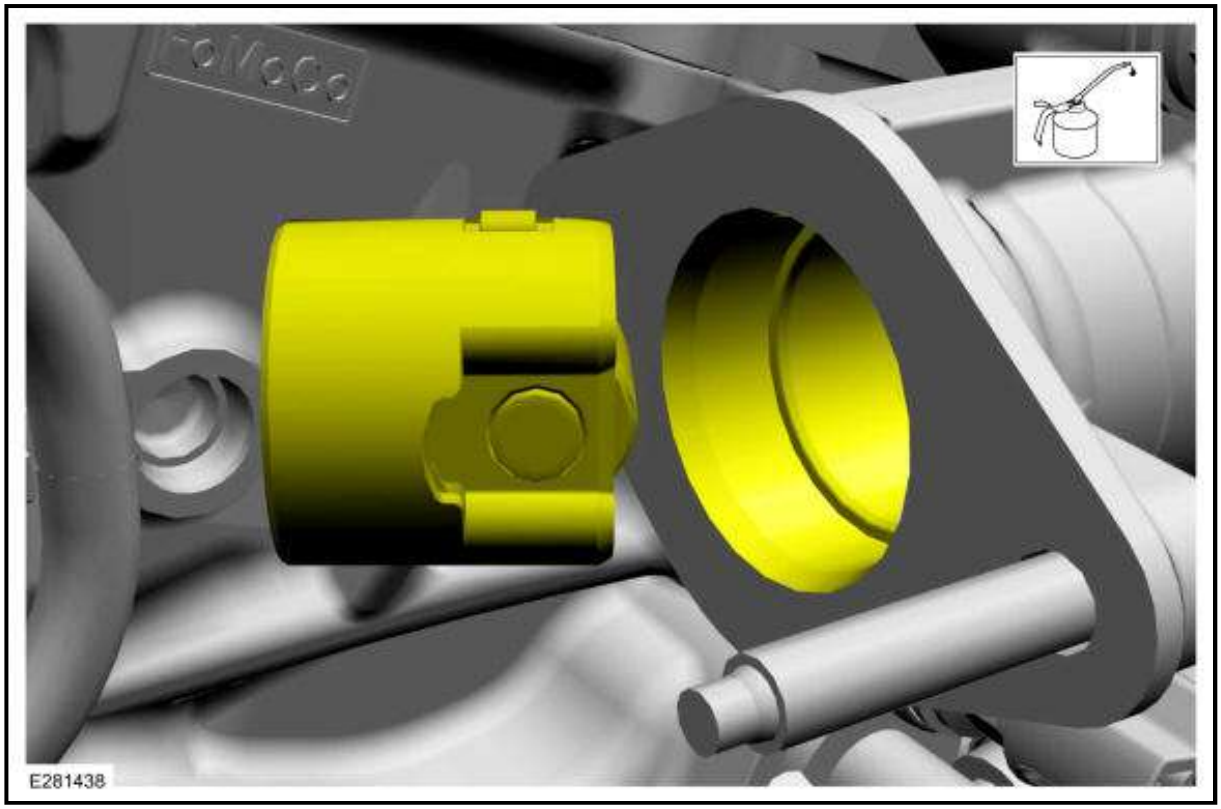
G5 PERFORM THE PCM (POWERTRAIN CONTROL MODULE) SELF-TEST

- Using a diagnostic scan tool, perform the PCM self-test.

Are any non-network Diagnostic Trouble Codes (DTCs) present?



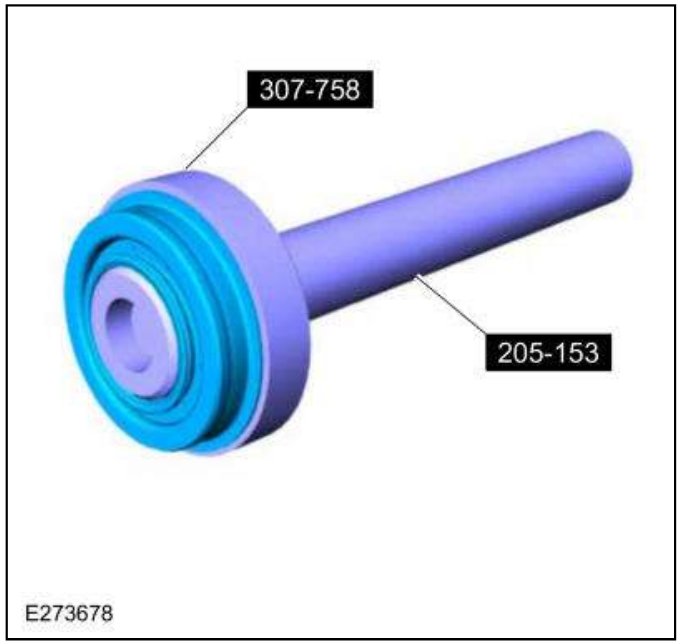
4. Apply clean engine oil to the high-pressure fuel pump drive unit bore, the drive lobe and the roller tappet.



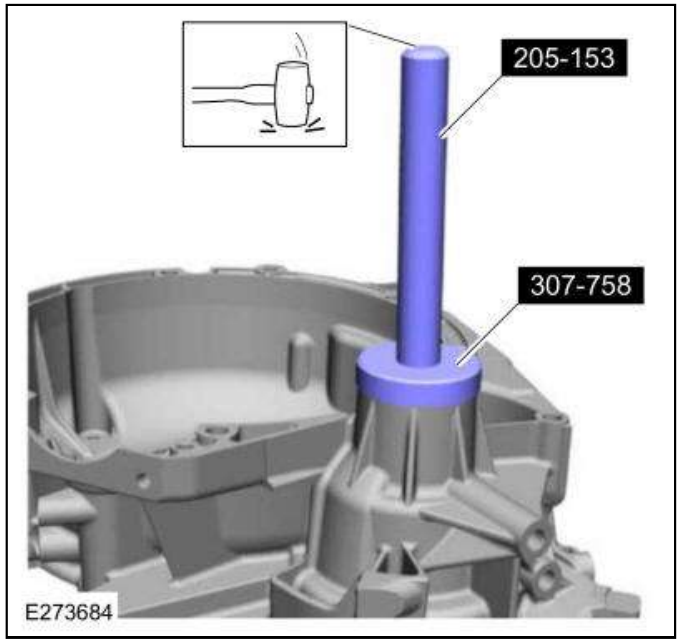
5. **NOTE:** **Align the notch on the high-pressure fuel pump tappet and with the groove in the high-pressure fuel pump drive unit bore.**

Install the high-pressure fuel pump tappet.

37. Assemble the special tools and install a new RH halfshaft seal on the special tool. Use Special Service Tool: 307-758 Installer, Axle Seal -FWD, 205-153 (T80T-4000-W) Handle.



38. Using the special tools, install the new RH halfshaft seal. Use Special Service Tool: 205-153 (T80T-4000-W) Handle, 307-758 Installer, Axle Seal -FWD.



39. Place a new torque converter hub seal on the special tool. Use Special Service Tool: 307-760 Installer, Converter Seal, 205-199 (T83T-3132-A1) Installer, Spindle/Axle Shaft.