
2014-2015 FIESTA ST TECHNICAL INFORMATION

OVERVIEW

In the affected vehicles, localized overheating of the engine cylinder head may cause the cylinder head to crack, causing a pressurized oil leak that may result in a fire in the engine compartment.

Service parts and repair procedures are now available to address this safety recall. Dealers are to perform repairs following the technical information in this document that include enhancements to the engine cooling and control systems. This service must be performed on all affected vehicles at no charge to the vehicle owner.

Due to the complexity of this repair, the following considerations have been made to help the repair procedure go as smoothly as possible:

- Repair procedures have been divided alphabetically into multiple separate procedures.
- Parts have been packaged into kits.
- Each procedure includes:
  - Overview
  - List and photo of the parts required
  - List of unique tools needed
  - Service tips to help complete the repair

NOTE: Please read this procedure in its entirety, prior to performing repairs. Additionally, instructional videos have been developed to assist with the repair. Please refer to Attachment VII: Instructional Video Links to view the videos.
### Recommended Tools:

<table>
<thead>
<tr>
<th>General Tools</th>
<th>Special Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4&quot; Drive Ratchet (Power and Hand Tool)</td>
<td>13 mm and 15 mm Ratchet Wrench</td>
</tr>
<tr>
<td>1/4&quot; Drive 7, 8, and 10 mm Shallow Sockets</td>
<td>Hydrometer/Refractometer</td>
</tr>
<tr>
<td>1/4&quot; Drive 10 mm, 12 mm Deep Sockets</td>
<td>Vacuum Tester/Re-filler</td>
</tr>
<tr>
<td>1/4&quot; Drive 8 mm Swivel Socket</td>
<td>IDS and VCM II</td>
</tr>
<tr>
<td>1/4&quot; Drive E8 Inverted Torx Socket</td>
<td></td>
</tr>
<tr>
<td>1/4&quot; Drive 6 in (152 mm) and 12 in (304 mm) Extensions</td>
<td></td>
</tr>
<tr>
<td>1/4&quot; Drive 13 mm, and 15 mm Deep Impact Socket</td>
<td></td>
</tr>
<tr>
<td>3/8&quot; Drive 15 mm Shallow Impact Socket</td>
<td></td>
</tr>
<tr>
<td>3/8&quot; Drive 15 mm Swivel Impact Socket</td>
<td></td>
</tr>
<tr>
<td>3/8&quot; Drive 6 in (152 mm) Extension</td>
<td></td>
</tr>
<tr>
<td>3/8&quot; Drive Ratchet (Power and Hand Tool)</td>
<td></td>
</tr>
<tr>
<td>3/8&quot; Drive 13 mm, and 15 mm Deep Impact Socket</td>
<td></td>
</tr>
<tr>
<td>3/8&quot; Drive 15 mm Shallow Impact Socket</td>
<td></td>
</tr>
<tr>
<td>3/8&quot; Drive 15 mm Swivel Impact Socket</td>
<td></td>
</tr>
<tr>
<td>1/2&quot; Drive Ratchet Power Tool and Hand Tool</td>
<td></td>
</tr>
<tr>
<td>1/4&quot; and 1/2&quot; Drive Impact Swivel</td>
<td></td>
</tr>
<tr>
<td>1/2&quot; Drive 15mm Shallow Impact Socket</td>
<td></td>
</tr>
<tr>
<td>1/2&quot; Drive 6&quot; (152 mm) Impact Extension</td>
<td></td>
</tr>
<tr>
<td>1/2&quot; Drive Torque Wrench</td>
<td></td>
</tr>
<tr>
<td>1/4&quot; And 3/8&quot; Drive Torque Wrench</td>
<td></td>
</tr>
<tr>
<td>17 mm Wrench 15 in (381 mm)</td>
<td></td>
</tr>
<tr>
<td>Channel Lock Pliers</td>
<td></td>
</tr>
<tr>
<td>Trim Tool 7 in (177 mm) and 12 in (304 mm)</td>
<td></td>
</tr>
<tr>
<td>Inspection Mirror</td>
<td></td>
</tr>
<tr>
<td>Two Jaw Puller</td>
<td></td>
</tr>
<tr>
<td>Phillips Screwdriver 20 in (508 mm)</td>
<td></td>
</tr>
<tr>
<td>Paint Stick/Pen</td>
<td></td>
</tr>
<tr>
<td>Scissors</td>
<td></td>
</tr>
<tr>
<td>Cable Operated Hose Pliers</td>
<td></td>
</tr>
<tr>
<td>5 in (127 mm) and 12 in (304 mm) Pick Tool</td>
<td></td>
</tr>
<tr>
<td>Pocket Screwdriver</td>
<td></td>
</tr>
<tr>
<td>Side Cutters</td>
<td></td>
</tr>
<tr>
<td>Needle Nose Pliers 9 in (228 mm)</td>
<td></td>
</tr>
<tr>
<td>Hose Hook Tool</td>
<td></td>
</tr>
</tbody>
</table>
SERVICE PROCEDURE

Procedure A - Initial Disassembly and Preparation for Inspection

OVERVIEW: This procedure details the components to be removed to enable initial vehicle inspection.

PARTS / SUPPLIES REQUIRED: None

UNIQUE TOOL REQUIREMENTS: None

SERVICE TIPS: Please note the following:

• The Inspection / Check Sheet (Attachment V) must be printed and started during "Procedure A".
• Cover the turbocharger inlet opening to prevent dropping any parts or debris into the turbocharger while the turbocharger inlet pipe is off.

1. Print a copy of the Inspection / Check Sheet (Attachment V), to record vehicle information and inspection/repair information for the vehicle. The Inspection / Check Sheet is to be attached/filed with the recall repair order following completion, it does not need to be provided to Ford at this time.

2. Fill out top of Inspection / Check Sheet including:
   - VIN
   - Technician ID
   - Repair Order Number
   - Repair Date
   - Vehicle Mileage
   - Vehicle Build Date
   - Open Recalls


4. With the vehicle in NEUTRAL, position it on a hoist. Please follow the Workshop Manual (WSM) procedures in Section 100-02.

5. Using IDS/scan tool, retrieve and record DTCs on the Inspection / Check Sheet.
   - Any DTCs recorded will be used later in this procedure.

6. Remove the cowl panel grille and cowl panel. Please follow the WSM procedures in Section 501-02.
NOTICE: When working with liquid or vapor 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 can occur. Apply clean engine oil to the end of the tube before inserting the tube into the connector.

NOTICE: Whenever turbocharger air intake system components are removed, always cover open ports to protect from debris. It is important that no foreign material enter the system. The turbocharger compressor vanes are susceptible to damage from even small particles. All components should be inspected and cleaned, if necessary, prior to installation or reassembly.

7. Remove the air cleaner outlet pipe. Please follow the WSM procedures in Section 303-12C.

8. Remove the generator. Please follow the WSM procedures in Section 412-02.

9. Remove the turbocharger air inlet pipe. See Figure A1.

   1. Disconnect the crankcase ventilation tube quick release coupling. Please follow the WSM procedures in Section 310-00C.
   2. Remove the turbocharger air inlet pipe retaining nut, the ball stud.
   3. Loosen the turbocharger air inlet pipe clamp and remove the turbocharger air inlet pipe.
10. Detach the three wire harness retainers, disconnect the crankshaft position sensor, turbocharger wastegate regulating valve solenoid, and turbocharger bypass valve electrical connectors. See Figure A2.
Procedure B - Inspection / Check Sheet Completion

OVERVIEW: The Inspection must be completed and documented on the Inspection / Check Sheet. The inspection will check for obvious concerns that require correction with additional focus on cooling system concerns such as:

- Internal coolant leaks
- External coolant leaks
- Any DTC(s) that could indicate a recent engine overheat event or internal engine damage that may have resulted from a previous cooling system concern.

PARTS / SUPPLIES REQUIRED: None

UNIQUE TOOL REQUIREMENTS: Rotunda Cooling System Pressure Tester (STN12270) and adapter (Snap-On TA52, AST ASSFZ-47, Redline RDL95-0750 or equivalent).

SERVICE TIPS: Use standard Workshop Manual and PC/ED Diagnostics, if necessary, to diagnose any cooling system or misfire DTC(s) retrieved and for any coolant loss concerns.

NOTE: Perform an underhood visual inspection for any obvious coolant, oil, transmission, or fuel leaks.

NOTE: If any concerns are identified repair as related damage before proceeding. If the coolant pressure test identifies concerns with the degas bottle, turbocharger return tube, upper section of the degas bottle return hose, or quick connect T-fitting at the coolant shutoff solenoid valve; note the condition. These items will be replaced as part of this recall. Refer to Dealer Bulletin Attachment I, Related Damage, for related damage claiming.

Vehicle Inspection

1. Visually inspect the coolant level in the degas bottle.

   - If the coolant level is visible in the degas bottle, proceed to Step 2.
   - If the coolant level is not visible in the degas bottle, add coolant as necessary, and proceed to Step 2.

   NOTE: Any gross loss of coolant must be identified and repaired prior to proceeding.

2. Remove the degas bottle cap.

3. Install a coolant pressure tester with adapter onto the degas bottle. Pressurize to 138 kPa (20 psi). Once stabilized, pressure should hold at 138 kPa (20 psi) for a minimum of 2 minutes.

   - If cooling system pressure does not hold for a minimum of 2 minutes, the source of pressure loss must be identified and repaired as necessary before proceeding.

4. Visually check for coolant leaks with the system under pressure.
5. Check the engine oil level to ensure it is within normal range, note if it is overfilled. Visually check for engine oil leaks at the rear surface of the cylinder head, above exhaust manifold, that may be the result of a crack in the cylinder head. See Figure B1.

- If an oil leak is detected at the rear surface of the cylinder head, replace the complete cylinder head assembly before proceeding.

NOTE: The turbocharger coolant tubes and exhaust manifold heat shield are removed for clarity.
6. DTCs - Note and identify the cause of the following DTCs before proceeding:

- If additional DTCs are present, diagnose and repair as required.

**NOTE:** Diagnosis for any of the following DTCs may require reinstallation of the air intake components and battery. Perform diagnosis and repairs as necessary.

<table>
<thead>
<tr>
<th>Cooling System DTCs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P0217</strong></td>
</tr>
<tr>
<td><strong>P0218</strong></td>
</tr>
<tr>
<td><strong>P0219</strong></td>
</tr>
<tr>
<td><strong>P1299</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Engine Misfire DTCs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P0300</strong></td>
</tr>
<tr>
<td><strong>P030x</strong></td>
</tr>
<tr>
<td><strong>P0313</strong></td>
</tr>
<tr>
<td><strong>P0316</strong></td>
</tr>
</tbody>
</table>

7. Note any issues and/or repairs made on the Inspection / Check Sheet.
Procedure C - Not Required for Fiesta ST Vehicles

Procedure D - Coolant Stand-pipe Wire Harness Installation

OVERVIEW: The coolant stand-pipe wire harness is installed in this procedure. This is necessary to complete the connections which are a part of the CAN Network. The CAN Network must be complete to allow module programming.

PARTS / SUPPLIES REQUIRED:

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Coolant Stand-pipe Wire Harness</td>
</tr>
<tr>
<td>B</td>
<td>Connector Shell (which will receive the male pins)</td>
</tr>
<tr>
<td>C</td>
<td>Connector Shell with female pins and Wire Harness</td>
</tr>
<tr>
<td>D</td>
<td>Tie-Straps</td>
</tr>
<tr>
<td>E</td>
<td>Heat Shrink Tubing x5</td>
</tr>
</tbody>
</table>

UNIQUE TOOL REQUIREMENTS: Soldering Iron, Heat Gun

SERVICE TIPS: None
1. Remove the battery. Please follow the procedures in WSM Section 414-01.

2. Position the LH front door weatherstrip aside, remove the push-pins, the scuff plate and the lower cowl trim panel. See Figure D1.

3. Loosen the bolt and disconnect connector C211. Remove the two retainers and position aside connector C211. See Figure D2.
NOTICE: Use a blunt tip Phillips screwdriver and do not push far inward through the bulkhead insulation. Use caution to prevent damage to the wire harness on the interior side of the vehicle near the parking brake cable/bulkhead plug. See Figures D3 and D4.

4. Remove the bulkhead plug located on the driver's side of the vehicle near the hood release cable, by inserting a Phillips screw driver and push inward to dis-engage the plug. See Figure D3.

5. Continue pushing inward on the Phillips screw driver to push through the bulkhead insulation and then remove the Phillips screw driver from the hole. See Figure D4.
6. Widen the hole in the insulation using a utility knife. Use caution not to damage the surrounding wire harnesses or hood release cable. See Figure D5.

**NOTE:** Stand-pipe wire harness shown installed for reference.

![Figure D5](image)

**FIGURE D5**

7. Using the Coroplast® tape provided in the parts kit secure the stand-pipe wire harness pins and wires to a length of mechanics wire. See Figure D6.

![Figure D6](image)

**FIGURE D6**
8. Fish the stand-pipe wire harness through the bulkhead, pull the grommet through the bulkhead and then back out slightly to seat the slot in the grommet in the bulkhead sheet metal. See Figure D7.

9. Route the coolant stand-pipe wiring harness along the engine compartment wire harness, from the left-hand side of the engine compartment to the degas bottle area. Use tie-straps to secure the wiring harness to the engine compartment wiring harness. See Figure D8
NOTE: A completed view of the modified vehicle wiring is provided for reference during this procedure. Review the steps and diagrams below prior to proceeding. See Figure D9.
NOTE: A wire diagram of the modified vehicle wiring is provided for reference during this procedure. Review the steps and diagrams below prior to proceeding. See Figure D10.

**FIGURE D10**

1709GL

**CONNECTOR C210**

- **EXISTING WIRING HARNESS**
- **C210 PIN 13 - BLUE/GRAY (BODY SIDE)**
- **20 IN (508 MM) BLUE/GRAY JUMPER WIRE (CUT FROM END OF CONNECTOR SHELL WITH FEMALE PINS AND WIRE HARNESS)**
- **EXISTING WIRING HARNESS TO DLC**

**KIT CONNECTOR SHELL (WITH MALE PINS - BACK SIDE VIEW)**

- **SPlice**
- **C210 PIN 13 - BLUE/GRAY (CONNECTOR SIDE)**

**KIT CONNECTOR SHELL (WITH FEMALE PINS - BACK SIDE VIEW)**

- **SPlice**
- **ORGINAL DLC CONNECTOR PIN/WIRE PIN 4 - BLACK / GRAY WIRE**
- **SPlice**
- **ORGINAL DLC CONNECTOR PIN/WIRE PIN 6 - WHITE / BLUE WIRE**
- **SPlice**
- **ORGINAL DLC CONNECTOR PIN/WIRE PIN 14 - WHITE WIRE**

**NEW STAND-PIPE WIRE HARNESS**

**WIRES WITH LARGE TERMINALS**

- **BLUE/GRAY WIRE X2**
- **WHITE WIRE X2**
- **WHITE/BLUE WIRE X2**
- **BLACK/GRAY WIRE X2**

**WIRES WITH SMALL TERMINALS**

- **WHITE**
- **WHITE/BLUE WIRE**
- **BLACK/GRAY WIRE**

**OBDII/DLC (FACE VIEW)**

**1709GL**
10. Remove the two bolts and position the OBDII/Data Link Connector (DLC) aside.

11. From the DLC connector, remove the following wires/pins from the connector shell (see Figure D11):
   - Pin 4 - Black/Gray wire
   - Pin 6 - White/Blue wire
   - Pin 14 - White wire

12. Cut the metal terminal ends off of the three wires removed from the OBDII/DLC connector shell. The wires will be spliced later in this procedure. See Figure D12.
NOTICE: Review the wire diagrams and splicing locations shown in Figure 10, prior to proceeding. Follow the recommended splicing techniques found in the wire diagrams when splicing wires. Use only ES-1 dual wall heat shrink tubing on each wire to be spliced.

13. Insert the smaller terminal wires from the new stand-pipe wire harness into the OBDII/DLC connector as follows (See Figures D9 and D13):
   - Pin 4 - new Black/Gray wire
   - Pin 6 - new White/Blue wire
   - Pin 14 - new White wire

FIGURE D13

14. Insert the larger male terminal wires from the new stand-pipe wire harness into the new connector shell as follows (See Figures D9 and D13):
   - Pin 1 - new Double Blue/Gray wire
   - Pin 2 - new Double White/Blue wire
   - Pin 3 - new Double White wire
   - Pin 4 - new Double Black/Gray wire
15. Locate the C210 Pin 13 Blue/Gray wire and cut the wire so that at least 4 in (101.6 mm) of wire remains on the connector side. See Figure D9, D10 and D16.

- Remove wire harness tape if required.

16. From the Blue/Gray wire on the connector shell with female pins and wire harness, cut 20 in (508 mm) of the wire to create a jumper wire to be spliced in the following steps. See Figure D14.

17. Prepare the Blue/Gray jumper wire for splicing as follows. See Figure D15.

   a. Remove 1 in (25.4 mm) of insulation from each end of the wire.
   b. Position two (2) lengths of ES-1 dual wall heat shrink tubing onto the wire.
18. Splice the three Blue/Gray Wires together on the body side of the harness:
   - C210 Pin 13 body side
   - 20 in (508 mm) Jumper Wire
   - Blue/Gray wire from connector shell with female pins and wire harness

   Twist 13 mm (0.5 in.) of the ends of the wires together and bend the splice wire 90 degrees to the
   harness wire at the end of the twisted area.

   Solder the wires together using lead free electrical solder, with the heat being applied opposite of the
   applied solder. See Figure D16.

   ![Figure D16](1709HM)

19. Splice the other end of the 20 in (508 mm) Jumper Wire to C210 Pin 13 connector side Blue/Gray
    wire, using the same splicing instructions as the previous step. See Figure D17.

   ![Figure D17](1709HN)
20. Position the heat shrink tubing over both ends of the splice wires. Use a suitable heat gun such as Rotunda Shielded Flameless Heat Gun with Heat Deflector, number NAIAT-R5902, that is equipped with a shrink tubing attachment, to heat the heat shrink tubing until the sealant comes out of both ends. See Figure D18.

21. Loop the Blue Gray jumper wire and secure it with Coroplast® Tape along the main harness. See Figure D18.

22. Splice the three wires removed from the OBDII/DLC connector shell earlier in this procedure to the new connector shell with female pins and wire harness. Position heat shrink tubing onto the remaining wires to be spliced. Make the remaining splices following the splicing technique done for the Blue/Gray Jumper wire previously.

**NOTE:** Refer to Figure D10 for wire schematic.

- Pin 2 - *new* Black/Gray wire to the previously removed OBDII/DLC connector Black/Gray wire.
  - Previously OBDII/DLC connector Pin 4.
- Pin 3 - *new* White/Blue wire to the previously removed OBDII/DLC connector White/Blue wire.
  - Previously OBDII/DLC connector Pin 6.
- Pin 4 - *new* White wire to the previously removed OBDII/DLC connector White wire.
  - Previously OBDII/DLC connector Pin 14.

23. Position the heat shrink tubing over both ends of the three spliced wires. Use a suitable heat gun such as Rotunda Shielded Flameless Heat Gun with Heat Deflector, number NAIAT-R5902, that is equipped with a shrink tubing attachment, to heat the heat shrink tubing until the sealant comes out of both ends.
24. Position connector C211 back onto the retaining studs and install the two retainers. See Figure D2.

25. Connect connector C211.

26. Connect the male and female ends of the new connector shells together. See Figure D9.

27. Position the OBDII/Data Link Connector (DLC) back in its original position and install the two bolts.

28. Bundle the connector C210 harness wires and the new C210 Pin 13 spliced wire and wrap the harness with Coroplast® tape.

29. Secure the new wires along the existing vehicle connector C211 wire harness with tie straps.

30. Install the scuff plate and the lower cowl trim panel. Install the push pins. See Figure D1.

31. Position the LH front door weatherstrip back. See Figure D1.
Procedure E - Instrument Panel Cluster (IPC) Reprogramming
(Not Required for Fiesta ST Vehicles)

Procedure F - Turbocharger Wire Harness Taping

OVERVIEW: This procedure wraps the turbocharger wire harness with Coroplast® tape to prevent the entry/buildup of fluids and debris in the convolute which could ignite from an ignition source.

PARTS / SUPPLIES REQUIRED:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Coroplast® Tape</td>
</tr>
<tr>
<td>B</td>
<td>Wire Harness Retainer w/Tie-Strap</td>
</tr>
</tbody>
</table>

UNIQUE TOOL REQUIREMENTS: None

SERVICE TIPS: Tips for wrapping the harness are included in the procedure.
NOTE: Figure F1 is for reference only the harness retainers were previously disconnected in Procedure A.

1. Route the turbocharger wire harness to the top of the engine compartment. See Figure F2.

2. If broken, replace the wire harness retainer with the new one supplied in the vehicle parts kit. See Figures F1 and F2.
   - Mark the wire harness retainer location before removal.

FIGURE F1

TURBOCHARGER WIRE HARNESS RETAINER
TURBOCHARGER BYPASS VALVE
WIRE HARNESS RETAINERS
CRANKSHAFT POSITION SENSOR
TURBOCHARGER WASTEGATE REGULATING VALVE SOLENOID

1. Route the turbocharger wire harness to the top of the engine compartment. See Figure F2.

2. If broken, replace the wire harness retainer with the new one supplied in the vehicle parts kit. See Figures F1 and F2.
   - Mark the wire harness retainer location before removal.
3. Wrap the turbocharger wire harness convolute with the Coroplast® tape provided in the service kit. See Figure F2.

- Start and finish each length of tape applied with three (3) initial and three (3) finishing wraps.
- Apply each wrap of tape with a 50% overwrap.
- First, wrap the takeout for the crankshaft position sensor. Begin the wrap at the connector and end this portion of wrapping by going around the main harness at the takeout. See Figure F2, (A).
- Wrap the turbocharger harness starting at the side of the harness closest to the engine. Proceed down the remaining length of harness to the turbocharger wastegate regulating valve solenoid connector and turbocharger bypass valve electrical connectors. See Figure F2, (B).

4. Route the wire harness back down to the crankshaft position sensor, turbocharger wastegate regulating valve solenoid, and turbocharger bypass valve. See Figure F1.

5. Connect the crankshaft position sensor, turbocharger wastegate regulating valve solenoid, and turbocharger bypass valve electrical connectors. Attach the wire harness retainers to the engine. See Figure F1.
Procedure G - Thermostat Replacement

OVERVIEW: An updated 82° C (179.6° F) thermostat will be installed to improve cooling system performance.

PARTS / SUPPLIES REQUIRED:

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Thermostat</td>
</tr>
<tr>
<td>B</td>
<td>Thermostat housing to cylinder block O-rings (2 ea.)</td>
</tr>
<tr>
<td>C</td>
<td>Thermostat Housing to coolant valve O-Ring (1 ea.)</td>
</tr>
</tbody>
</table>

UNIQUE TOOL REQUIREMENTS: None

SERVICE TIPS: Make sure the air bleed hole in the thermostat is in the “UP” position when installed to allow any air trapped in the system to pass.
1. Remove the thermostat housing. Please follow the WSM procedures in 303-03.
   - Discard the thermostat housing gaskets.

2. Use a 13 mm (1/2 in) deep well socket to press downward on the thermostat retaining clip and rotate to remove it from the thermostat housing. Remove the thermostat spring. See Figure H2.
   - Note the position of the thermostat retaining clip and thermostat prior to removing. See Figures G1 and G2.

3. Remove and discard the thermostat. See Figure G2.

4. Position the new thermostat into the housing with the air bleed hole positioned upward. Use a 13 mm (1/2 in) deep well socket to install the thermostat spring and clip. The retaining clip must be in the same orientation that it was in prior to removal. See Figures G2 and G3.
NOTICE: Do not use pliers or other tools to install the thermostat.

NOTE: The thermostat retaining clip must be installed in the position as shown. See Figure G3.

5. Install the new thermostat housing gaskets and install the thermostat housing. Please follow the WSM procedures in 303-03.

- Do not re-connect the degas bottle to thermostat housing coolant hose at this time.
- Do not re-install the generator at this time.
- Do not refill the engine coolant at this time.
Procedure H - Engine Coolant Bypass Valve Replacement

OVERVIEW: The engine coolant bypass valve is being replaced in this procedure.

PARTS / SUPPLIES REQUIRED:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Engine Coolant Bypass Valve</td>
</tr>
<tr>
<td>B</td>
<td>Hose Clamp</td>
</tr>
</tbody>
</table>

UNIQUE TOOL REQUIREMENTS: None

SERVICE TIPS: None
1. Position the resonator assembly aside. See Figure H1.

![FIGURE H1](image1)

2. Remove and discard the engine coolant bypass valve. See Figure H2.
   1. Disconnect the electrical connector.
   2. Release the clamp and disconnect the coolant hose. Discard the clamp.
   3. Remove the bolts and the coolant bypass solenoid valve.
      - Torque: 89 lb.in (10 Nm)

![FIGURE H2](image2)

3. Install a new engine coolant bypass valve and O-ring seal by reversing the removal procedure.
Procedure I - Coolant Hose Replacement

OVERVIEW: In this procedure, the coolant hose that runs between the degas bottle and thermostat quick connect T-fitting is replaced with an updated hose that allows for connection to the turbocharger coolant return line and the new coolant stand-pipe. The engine degas tube is also being replaced with an updated assembly that allows for connection to the radiator degas hose and degas bottle.

PARTS / SUPPLIES REQUIRED:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Coolant Degas Bottle to Thermostat Housing Hose</td>
</tr>
<tr>
<td>B</td>
<td>Engine Degas Tube</td>
</tr>
</tbody>
</table>

UNIQUE TOOL REQUIREMENTS: None

SERVICE TIPS: None
1. Remove the nut and position the A/C compressor inlet line aside. See Figure I2.

FIGURE I2
2. Remove and discard the degas bottle and cap. See Figure I3.

3. Remove and discard the turbocharger coolant return hose. See Figure I4.
4. Detach the retainers, remove and discard the engine degas tube assembly. See Figure I5.

FIGURE I5

5. Disconnect the degas bottle hose from the engine oil cooler assembly. See Figure I6.

FIGURE I6
6. Detach the retainer, then remove and discard the degas hose assembly. See Figure I7.

![Figure I7](image1709gt.png)

**FIGURE I7**

7. Install the generator. Please follow the WSM procedures in Section 412-02.

   - Do not re-install the headlamps, connect the battery or install the engine cover at this time.

**NOTE:** Lubricating the new coolant hoses with coolant will aid in easier installation.

**NOTE:** Ensure the inside of the hose fittings are free from dirt and debris.

8. Install the *new* degas bottle hose and attach the retaining clip. Route the lower portion of the hose to the thermostat housing and oil cooler. Route the turbocharger coolant return hose upward to the top of the engine. See Figure I8.

![Figure I8](image1709gu.png)

**FIGURE I8**
9. Connect the thermostat quick connect fitting to the thermostat housing. See Figure I9.

10. Connect the new turbocharger coolant return hose. See Figure I10.
11. Install the new engine degas tube assembly and connect to the back of the engine. Attach the retaining clips. See Figure I11.

FIGURE I11

12. Connect the new degas bottle hose to the engine oil cooler assembly. See Figure I12.

FIGURE I12
Procedure J - Coolant Stand-pipe, Degas Bottle and Cap Installation

OVERVIEW: The coolant stand-pipe provides coolant level information to the PCM and IPC via the CAN network, this prevents overheat issues due to low coolant level by informing the driver when the coolant level is low. The coolant stand-pipe and bracket is installed using the engine mount rear fixing bolt. On installation, the wiring harness is routed across the engine bay wiring loom and the related coolant hoses are attached.

PARTS / SUPPLIES REQUIRED:

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Degas Bottle, Cap and Coolant Stand-pipe Assembly (Includes Coolant Level Sensor)</td>
</tr>
<tr>
<td>B</td>
<td>Degas Bottle Support Bracket</td>
</tr>
<tr>
<td>C</td>
<td>Coolant Stand-pipe Bracket</td>
</tr>
<tr>
<td>D</td>
<td>Coolant Stand-pipe to Bracket Bolt</td>
</tr>
</tbody>
</table>

SERVICE TIPS: Check that the stand-pipe is properly seated/set onto the degas bottle. Check the 4 degas bottle to stand-pipe clamps to ensure they are set.
1. Remove the engine mount bolt. See Figure J1.

2. Position the degas bottle support bracket on the engine mount. The bolt will center the bracket and the locating tab on the bottom of the bracket should be pressed against the engine mount. Hand start the bolt and then tighten both engine mount retaining bolt at this time. See Figure J2.

   • Tighten to 48 Nm (35 lb.ft).
NOTE: Lubricating the new coolant hoses with coolant will aid in easier installation.

NOTE: When connecting the coolant hoses to the stand-pipe ensure the hoses are fully installed and meet the hose stops, before securing in place with hose clamps.

3. NOTE: Do Not fill the cooling system at this time.

Install the new degas bottle and cap. Connect the coolant hoses. See Figure J3.
4. Install the stand-pipe bracket and position the A/C compressor inlet line back. See Figure J4 (1).
   • Tighten the nut to 10 Nm (89 lb.in).

5. Install the stand-pipe to bracket bolt. See Figure J4 (2).
   • Tighten the bolt to 5 Nm (44 lb.in).

6. If the coolant standpipe bracket does not mount properly, using a suitable cutting wheel cut the outer hole to remove the material to make a locating slot on the coolant standpipe bracket. See Figure J5.
7. Connect coolant stand-pipe wiring harness to the coolant stand-pipe. See Figure J6.
Procedure L - Vehicle Reassembly, PCV Tube Retention, and Powertrain Control Module (PCM) Reprogramming

OVERVIEW: The vehicle is reassembled, the cooling system is vacuum filled, pressure tested and bled; and a PCV tube retainer is installed. The PCM is reprogrammed and coolant level sensor operation is validated.

PARTS / SUPPLIES REQUIRED:

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>PCV Tube Retainer / Tie strap</td>
</tr>
<tr>
<td>B</td>
<td>Motorcraft® Metal Brake Parts Cleaner (PM-4-A or PM-4-B) (Dealer Procured) (Not Shown)</td>
</tr>
<tr>
<td>C</td>
<td>Motorcraft® Orange Antifreeze / Coolant Prediluted (VC-3DIL-B (U.S.) CVC-3DIL-B (Canada) / WSS-M97B44-D2) (Dealer Procured) (Not Shown)</td>
</tr>
</tbody>
</table>

UNIQUE TOOL REQUIREMENTS: Vacuum Filling Tool, Hydrometer and/or Refractometer, Cooling System Pressure Tester

SERVICE TIPS: Follow procedure steps to verify proper coolant fill.
NOTE: This procedure contains unique steps for reassembly, including installation of new components.

NOTE: Remove protective covers that were placed over the turbocharger air intake system before re-installing components.

1. Install the battery. Please follow the procedures in WSM Section 414-01.

2. Install the turbocharger inlet pipe and connect the PCV hose to the turbocharger inlet pipe. See Figure A1.
   - Tighten the turbocharger inlet pipe fasteners to 5 Nm (44 lb-in).
   - Tighten the turbocharger inlet pipe-to-turbocharger clamp to 5 Nm (44 lb-in).

3. Install the air cleaner outlet pipe. Please follow the WSM procedures in Section 303-12C.

4. Vacuum fill the cooling system. Refer to WSM Section 303-03 for coolant specifications.
   - Do not bleed the cooling system at this time.
   - Coolant level should be filled to the "MAX" mark on the degrad bottle.

5. Install a coolant pressure tester with adapter onto the degrad bottle. Pressurize to 138 kPa (20 psi). Once pressure stabilizes, pressure should hold at 138 kPa (20 psi) for a minimum of 2 minutes.
   - If pressure test fails, the source of pressure loss must be identified and repaired as appropriate before proceeding. Retest the cooling system, if required.

6. Install the PCV tube retainer / tie strap provided in the vehicle parts kit. See Figure L1.
   a. Attach the clamp onto the PCV tube and secure.
   b. Wrap the tie strap around the air intake tube center section and tighten.
   c. Trim the excess length from the tie strap.
7. Install the cowl panel and cowl panel grille. Please follow the WSM procedures in Section 501-02.

8. Bleed the cooling system. Please follow the WSM procedures in Section 303-03.

**Module Reprogramming**

**NOTE:** The IDS must be updated to software level 109.05 or later to perform the FSA. If the IDS is not updated when the FSA is performed, it may result in various DTCs and drivability concerns. It is important that all steps of this FSA are performed in the order listed. This will ensure proper operation of the vehicle once completed.

**NOTE:** Reprogram appropriate vehicle modules before performing diagnostics and clear all Diagnostic Trouble Codes (DTCs) after programming. For DTCs generated after reprogramming, follow normal diagnostic service procedures.

9. Reprogram the PCM using IDS release 109.05 or higher.

**NOTE:** Follow the IDS on-screen instructions to complete the reprogramming procedure.

**Important Information for Module Programming**

**NOTE:** When programming or reprogramming a module, use the following basic checks to ensure programming completes without errors.

- Make sure the 12V battery is fully charged before carrying out the programming steps and connect IDS/scan tool to a power source.

- Inspect Vehicle Communication Module (VCM) and cables for any damage. Make sure scan tool connections are not interrupted during programming.

- A hardwired connection is strongly recommended.

- Turn off all unnecessary accessories (radio, heated/cooled seats, headlamps, interior lamps, HVAC system, etc.) and close doors.

- Disconnect/depower any aftermarket accessories (remote start, alarm, power inverter, CB radio, etc.).

- Follow all scan tool on-screen instructions carefully.

- Disable IDS/scan tool sleep mode, screensaver, hibernation modes.

- Create all sessions key on engine off (KOEO). Starting the vehicle before creating a session will cause errors within the programming inhale process.

- Ensure the headlamps and accessories are turned off.
Recovering a module when programming has resulted in a blank module:
NEVER DELETE THE ORIGINAL SESSION!

a. Obtain the original IDS tool which will have the original IDS session, that was used when the
programming error occurred during module reprogramming (MR) or programmable module installation
(PMI).

b. Disconnect the VCM from the data link connector (DLC) and the IDS.

c. Reconnect the VCM to IDS and then connect to the DLC. Once reconnected, the VCM icon should
appear in the corner of the IDS screen. If it does not, troubleshoot the IDS to VCM connection.

d. Locate the original vehicle session when programming failed. This should be the last session used
in most cases. If not, use the session created on the date that the programming failed.

NOTE: If the original session is not listed in the previous session list, click the Recycle Bin icon at the
lower right of the previous session screen. This loads any deleted sessions and allows you to
look through them. Double-click the session to restore it.

e. Once the session is loaded, the failed process should resume automatically.

f. If programming does not resume automatically, proceed to the Module Programming menu and select
the previously attempted process, PMI or MR.

g. Follow all on-screen prompts/instructions.

h. The last screen on the IDS may list additional steps required to complete the programming process.
Make sure all applicable steps listed on the screen are followed in order.
Perform Coolant Level Sensor Check

10. Using IDS select "Coolant Level Sensor Check". See Figure L2.

- Follow the on screen instructions to complete the "Coolant Level Sensor Check" procedure.

FIGURE L2
NOTE: If the coolant level is too high, additional cooling system bleeding is needed. If it is proving difficult to bleed, it may be necessary to drive the vehicle up to 12.5 Miles (20 km) to remove the air from the system.

11. Check coolant concentration using the hydrometer/refractometer to make sure it is at 50%.

12. Perform any other open recalls.

13. Coolant level should be filled to the "MAX" mark on the degas bottle once the engine is cold, prior to returning the vehicle to the customer.