### Item  Part Number  Description
1  8B274  Upper radiator hose
2  8W287  Upper radiator hose retainer
3  W503924  Power steering fluid reservoir assembly bolt
4  3A005  Power steering hose position retainer
5  3A713  Power steering hose position retainer
6  3A697  Power steering fluid reservoir assembly
7  8B273  Lower radiator hose
8  8W005  Degas bottle inlet hose
9  14A067  Power distribution box (PDB)
10  W701842  PDB support bracket bolt (4 required)
11  180107  PDB support bracket
1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **Section 100-02**.

2. Disconnect the battery ground cable. For additional information, refer to **Section 414-01**.

3. Drain the engine cooling system. For additional information, refer to **Cooling System Draining, Filling and Bleeding** in this section.

4. Remove the air cleaner outlet pipe. For additional information, refer to **Section 303-12**.

5. Remove the nut and disconnect the electrical cables.
   - To install, tighten to 10 Nm (89 lb-in).

6. Disconnect the wiring harness retainer.

7. Disconnect the upper radiator hose from the radiator.

8. Disconnect the upper radiator hose position retainer from the cooling fan shroud.

9. Disconnect the electrical connector and the wiring harness position retainer.

10. If equipped, disconnect the wiring harness position retainer from the vacuum reservoir.

11. If equipped, disconnect the vacuum connectors and the electrical connector on the LH side of the...
cooling fan shroud and remove the vacuum canister.

12. Disconnect the wiring harness retainer from the RH side of the radiator.

13. **NOTE:** LH shown, RH similar.

Remove the 2 cooling fan shroud bolts and the wiring harness retainers.

- To install, tighten to 10 Nm (89 lb-in).

14. Remove the 4 bolts and position the power distribution box (PDB) and support bracket aside.

- **NOTE:** Hand start the 4 PDB support bracket bolts or damage to the radiator support can result.

To install, tighten to 10 Nm (89 lb-in).

15. Disconnect the mass air flow (MAF) sensor electrical harness position retainer.

16. Disconnect the power steering fluid hose position retainers from the cooling shroud and radiator support.

17. Remove the bolt and position the power steering reservoir aside.

- To install, tighten to 11 Nm (8 lb-ft).

18. Disconnect the degas bottle coolant inlet hose from the radiator.

19. Release the lower cooling fan shroud position tab and rotate the lower cooling fan shroud upwards until the lower tab locks into position.
20. Remove the clip and disconnect the lower radiator hose quick connect coupling from the radiator.

21. Remove the cooling fan shroud.

22. To install reverse the removal procedure.
Material

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motorcraft Premium Gold Engine Coolant with Bittering Agent (US only) VC-7-B (US); CVC-7-A (Canada); or equivalent (yellow color)</td>
<td>WSS-M97B51-A1</td>
</tr>
</tbody>
</table>

Removal and Installation

1. Drain the engine cooling system. For additional information, refer to Cooling System Draining, Filling and Bleeding in this section.

2. Remove the air cleaner element. For additional information, refer to Section 303-12.

3. Disconnect the degas bottle inlet coolant hose from the radiator.

4. Remove the 2 bolts and the degas bottle/lower air cleaner housing assembly.
   - To install, tighten to 10 Nm (89 lb-in).

5. To install, reverse the removal procedure.
Disassembly and Assembly

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>W505425</td>
<td>Fan clutch bolts (4 required)</td>
</tr>
<tr>
<td>2</td>
<td>8600</td>
<td>Cooling fan</td>
</tr>
<tr>
<td>3</td>
<td>8A616</td>
<td>Fan clutch</td>
</tr>
</tbody>
</table>

1. Remove the cooling fan. For additional information, refer to Cooling Fan in this section.

2. Remove the 4 cooling fan-to-cooling fan clutch bolts and separate the clutch from the cooling fan.
   • To assemble, tighten to 7 Nm (62 lb-in).

3. To assemble, reverse the disassembly procedure.
General Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lubricants and Chemicals</strong></td>
<td></td>
</tr>
<tr>
<td>Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent</td>
<td>WSS-M2C930-A</td>
</tr>
<tr>
<td>Motorcraft Premium Gold Engine Coolant with Bittering Agent (US only) VC-7-B (US); CVC-7-A (Canada); or equivalent (yellow color)</td>
<td>WSS-M97B51-A</td>
</tr>
</tbody>
</table>

Torque Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Nm</th>
<th>lb-in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air cleaner outlet pipe-to-throttle body (TB) adapter bolt</td>
<td>10</td>
<td>89</td>
</tr>
<tr>
<td>Fuel rail bolts</td>
<td>10</td>
<td>89</td>
</tr>
<tr>
<td><strong>TB bolts</strong>&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Refer to the procedure.
DESCRIPTION AND OPERATION

Fuel Charging and Controls

WARNING: Do not smoke or carry lighted tobacco or 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 personal injury.

The fuel charging and controls system consists of the:

- throttle body.
- fuel injectors.
- fuel rail.

The fuel charging and controls system is:

- a sequential multi-port fuel injection (SFI) system.
- pulse width modulated (PWM).
- mass air flow (MAF) controlled.

Fuel is metered into each intake port in a sequential firing order. Fuel injectors pulse to follow engine firing order, in accordance with engine demand, on a tuned intake manifold.

The basic fuel requirement of the engine is determined from the data supplied to the powertrain control module (PCM) by the MAF sensor, which measures the amount of air being drawn into the engine.

The various sensors detect any changes in the operating conditions and send signals to the PCM. This permits the PCM to control the opening duration (pulse width) of the fuel injectors and maintain optimum exhaust emission control and engine performance for all operating conditions.

Throttle Body

CAUTION: Do not hold the throttle plate open with any object that could scratch the bore or plate while servicing or cleaning the throttle body.

The throttle body:

- controls air supply to the intake manifold by electronically positioning the throttle plate.
- is not adjustable.
- must be removed from the vehicle to be cleaned.

Refer to Throttle Body in this section.

Fuel Injectors

The fuel injectors:

- are electronically operated by the PCM.
- atomize the fuel as the fuel is delivered.
- each have an internal solenoid that opens a needle valve, which injects fuel into the intake port in the cylinder head.
are deposit resistant.

For removal and installation, refer to Fuel Rail and Fuel Injector — Exploded View and Fuel Rail in this section.

Fuel Rail

⚠️ CAUTION: The fuel injectors and the fuel rail must be handled with extreme care to prevent damage to sealing areas and sensitive fuel-metering orifices.

The fuel rail:

• receives fuel from the fuel supply tube.
• delivers fuel to the fuel injectors.

For removal and installation, refer to Fuel Rail and Fuel Injector — Exploded View and Fuel Rail in this section.
Fuel Charging and Controls

For driveability concerns, refer to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.