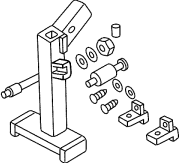
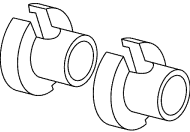
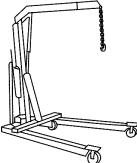
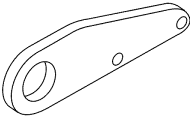
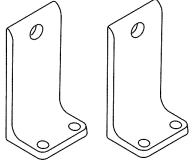
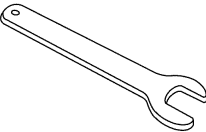


REMOVAL

Engine

Special Tool(s)

 <p>ST1663-A</p>	<p>Diesel Engine Lifting Bracket (D83T-6000-B) 303-D043</p>
 <p>ST1399-A</p>	<p>Fuel Line Tool (T90T-9550-S) 310-S039</p>
 <p>ST1341-A</p>	<p>Heavy Duty Floor Crane 014-00071</p>
 <p>ST2727-A</p>	<p>Adapter For 303-D043 303-D043-02</p>
 <p>ST2728-A</p>	<p>Adapter For 303-D043 303-D043-01</p>
 <p>ST2175-A</p>	<p>Wrench, Fan Clutch Nut 303-591</p>

Removal

All vehicles

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to Section 100-02.
2. Disconnect the LH and RH battery ground cables. For additional information, refer to Section 414-01.

Vehicles with manual transmission

3. **NOTE:** On vehicles equipped with manual transmissions, the transmission must be removed before the engine can be removed.

Remove the transmission. For additional information, refer to Section 308-03.

4. Remove the clutch disc and pressure plate. For additional information, refer to Section 308-01.

All vehicles

5. Remove the cooling fan stator. For additional information, refer to Section 303-03.
6. Remove the air cleaner assembly. For additional information, refer to Section 303-12.
7. Remove the charge air cooler. For additional information, refer to Section 303-12.

Vehicles with A/C

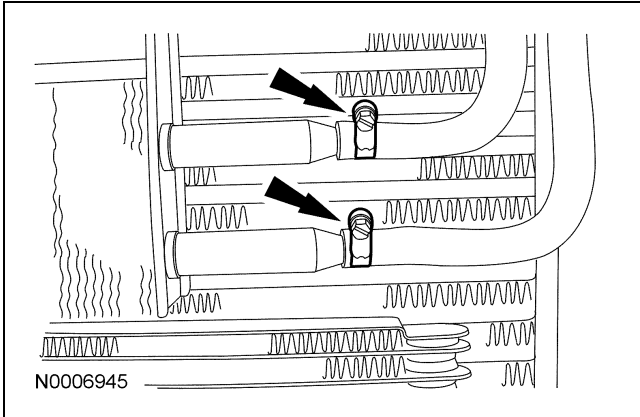
8. Remove the A/C condenser assembly. For additional information, refer to Section 412-03.

All vehicles

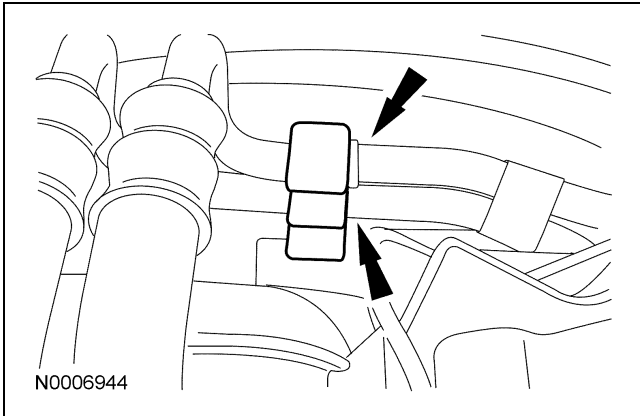
9. Remove the radiator grille opening panel reinforcement. For additional information, refer to Section 501-02.
10. Remove the front bumper.

REMOVAL (Continued)

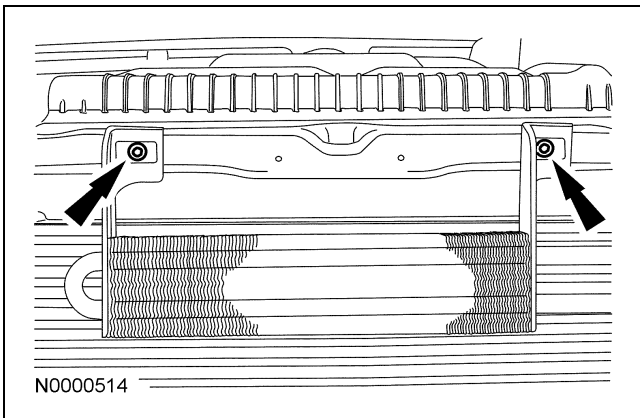
11. Loosen the clamps and disconnect the power steering cooler hoses.
 - Plug or cap the openings as needed.



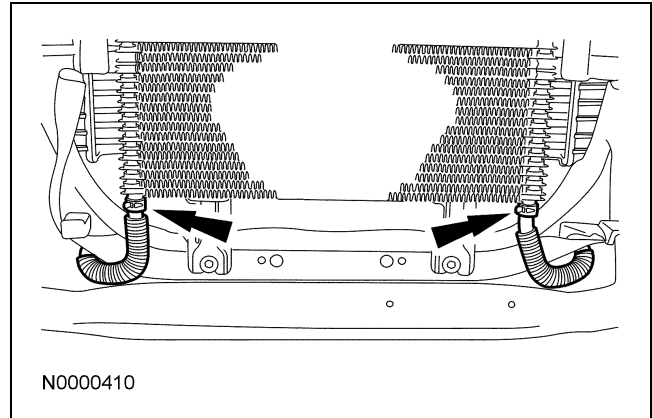
12. Disconnect the power steering tubes from the retaining clip and position aside.



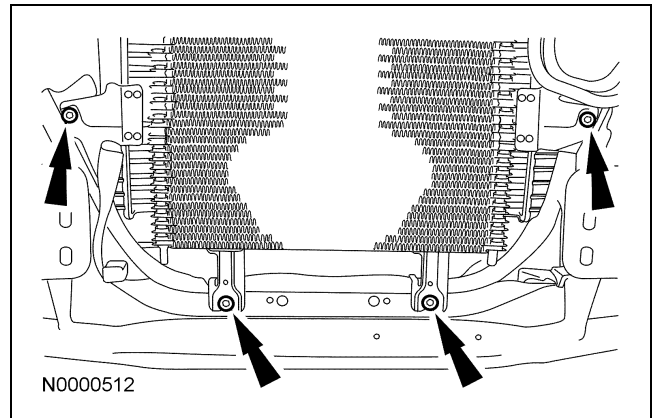
13. Remove the bolts and power steering cooler.



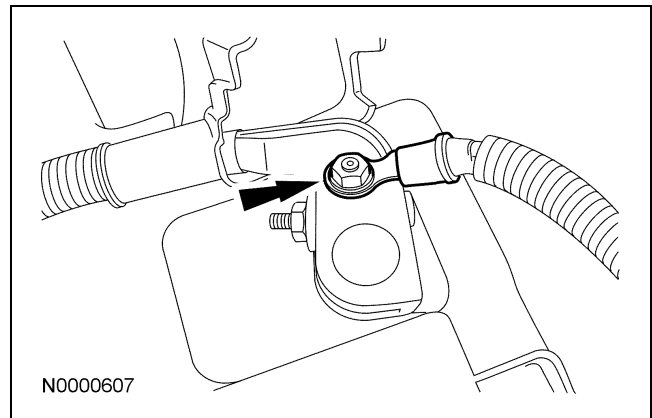
14. Disconnect the transmission cooler hoses.
 - Plug or cap the openings as needed.



15. Remove the bolts and the transmission oil cooler.

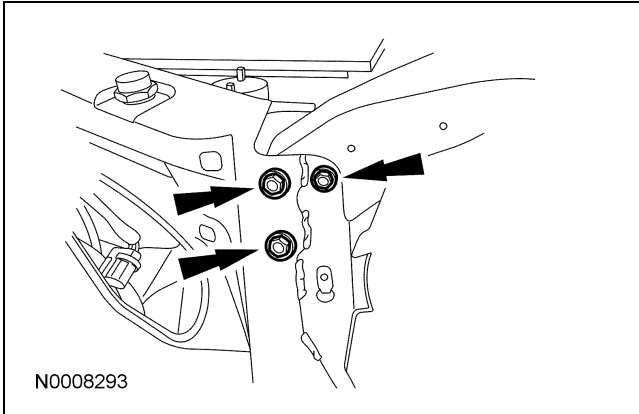


16. Remove the retaining nut and position the body feed cable aside.



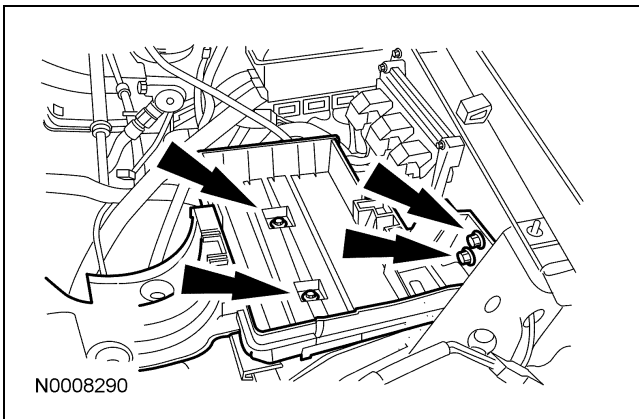
REMOVAL (Continued)

17. Remove the bolts and upper radiator support.

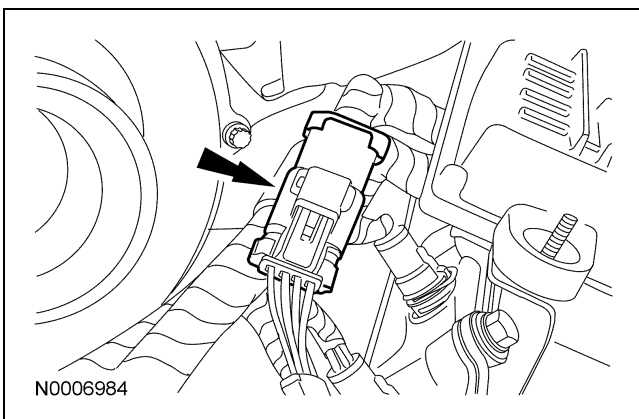


18. Remove the intake manifold. For additional information, refer to Intake Manifold in this section.

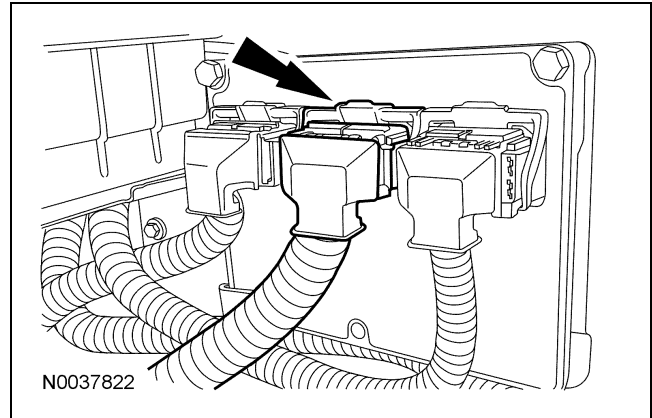
19. Remove the bolts and the battery tray.



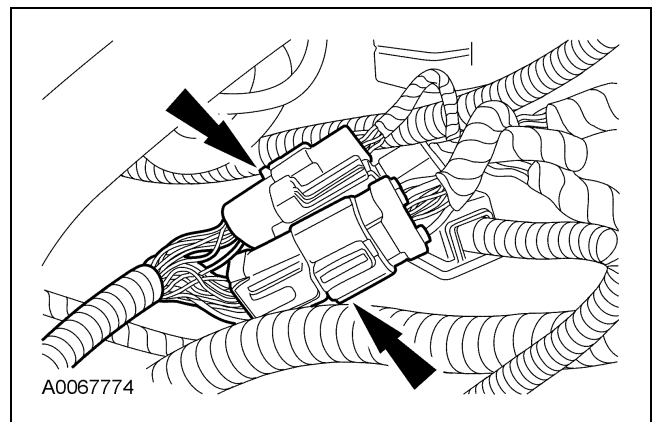
20. Disconnect the LH glow plug electrical connector.



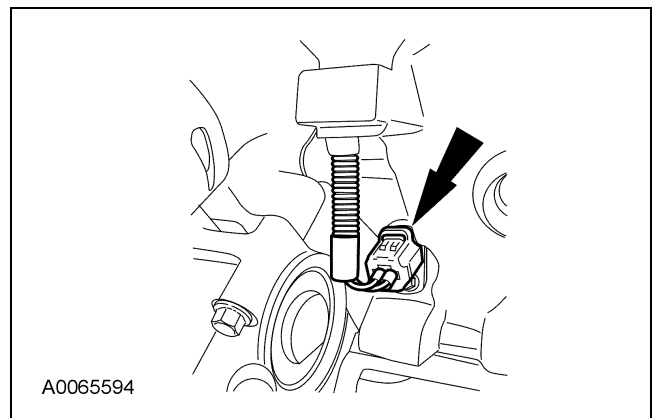
21. Disconnect the powertrain control module (PCM) electrical connectors.



22. Disconnect the 12-pin and 8-pin electrical connectors.

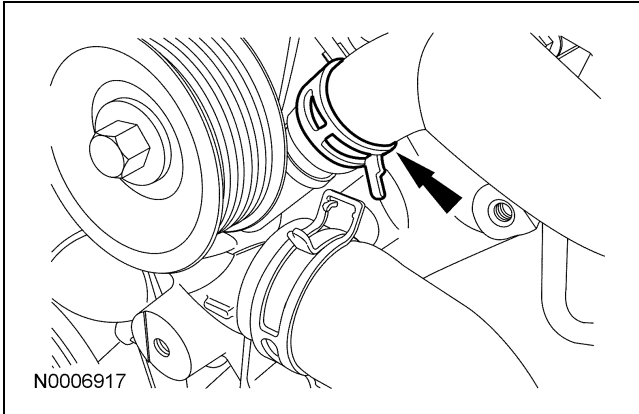


23. Disconnect the camshaft position (CMP) sensor electrical connector.

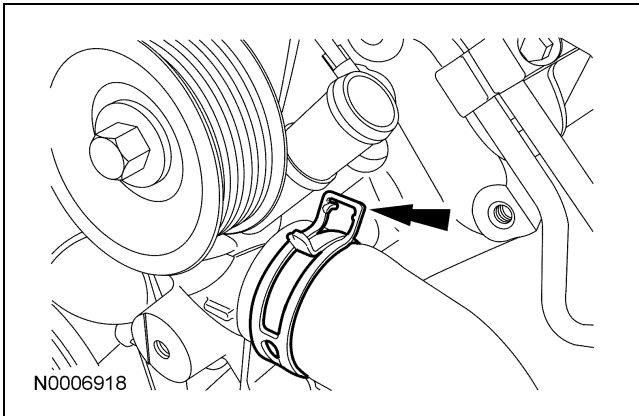


REMOVAL (Continued)

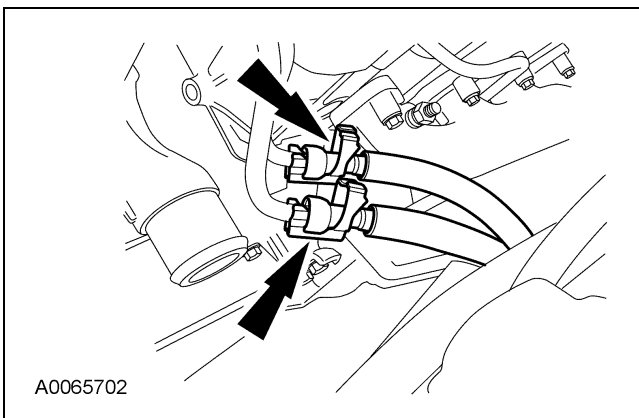
24. Disconnect the heater hose at the front cover.



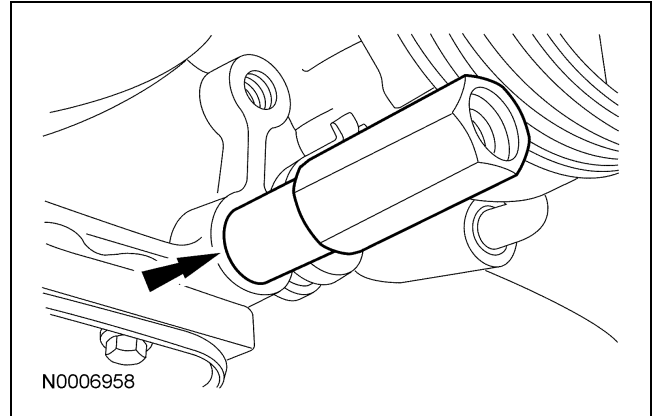
25. Remove the lower radiator hose clamp and the hose.



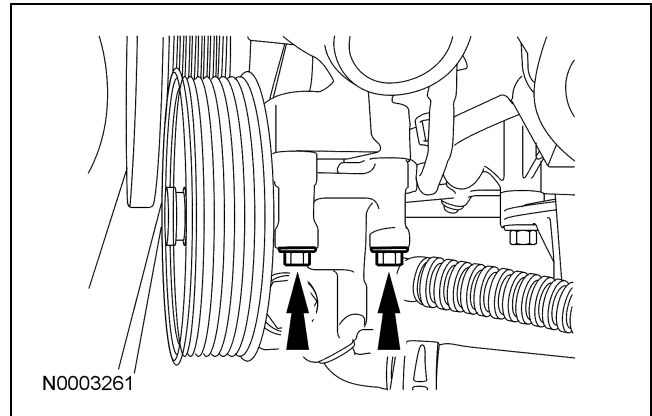
26. Remove the clips and disconnect the fuel lines.
For additional information, refer to Section 310-00.



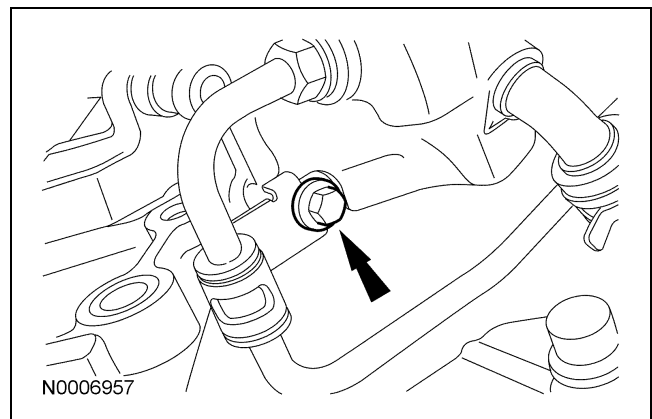
27. **NOTE:** Only one standoff shown.
Remove the stator standoffs.



28. Remove the power steering pump upper mounting bolts.

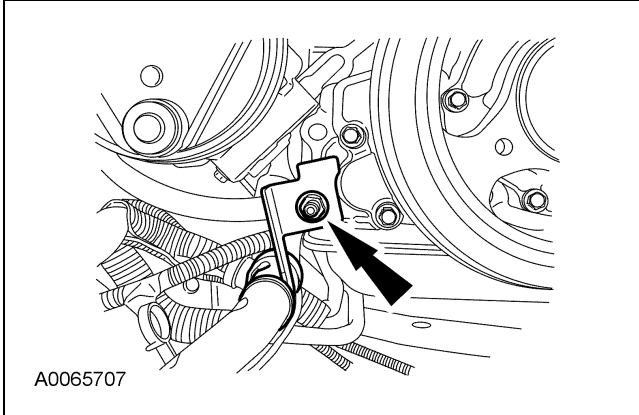


29. Remove the bolt and position the power steering pump aside.

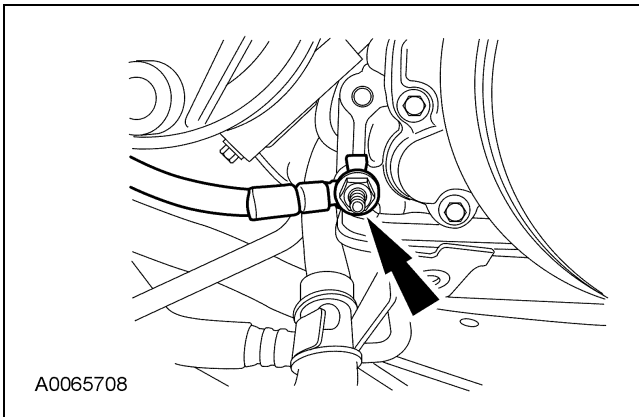


REMOVAL (Continued)

30. Remove the nut and the battery cable bracket.

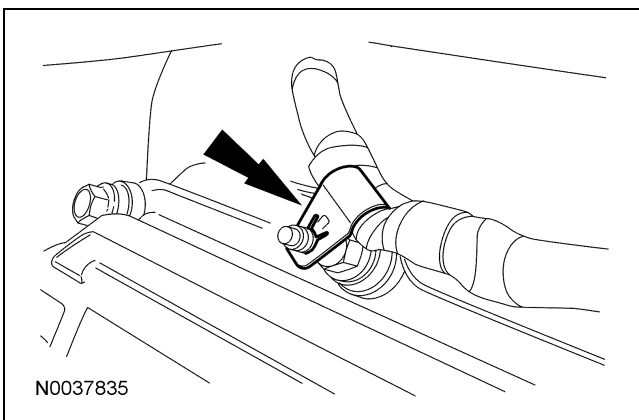


31. Remove the ground stud and the ground cable.

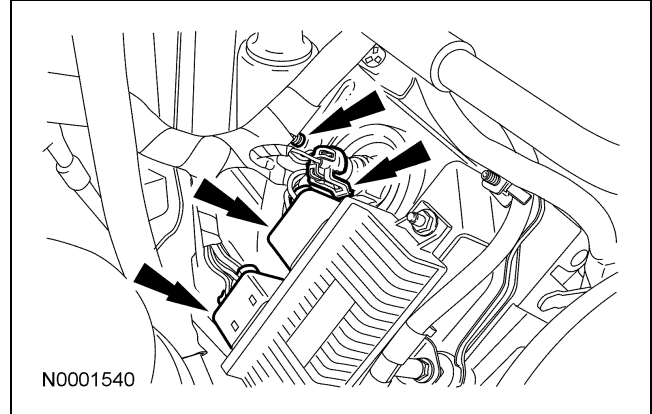


32. **NOTE:** Only one retainer shown.

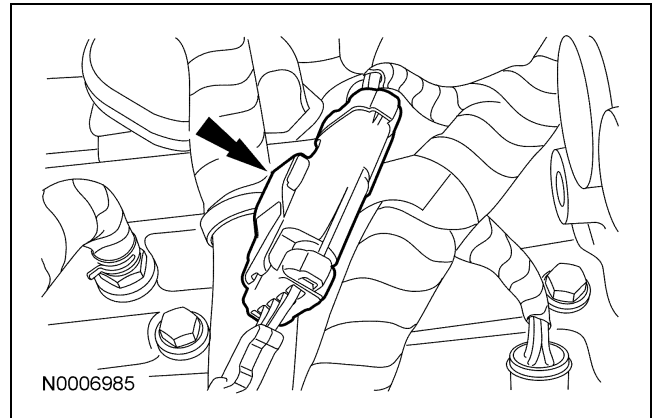
Disconnect the wire retainers from the valve cover studs.



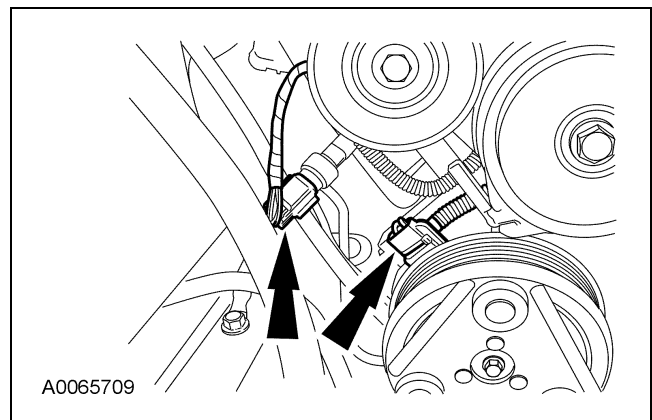
33. Disconnect the injection control pressure (ICP) sensor electrical connector and wiring retainer. Disconnect the glow plug module electrical connectors.



34. Disconnect the RH glow plug electrical connector.

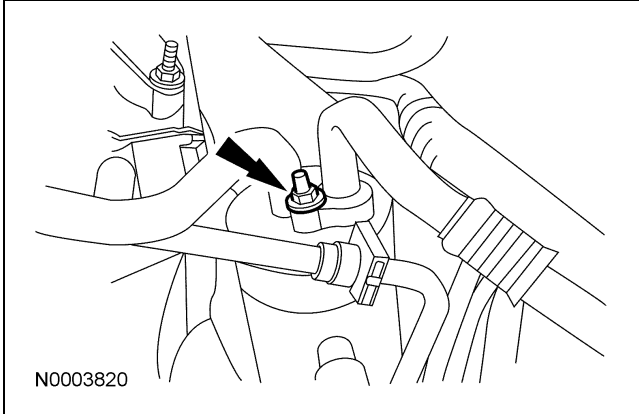
**Vehicles with A/C**

35. Disconnect the A/C high-pressure switch and the A/C clutch electrical connectors.

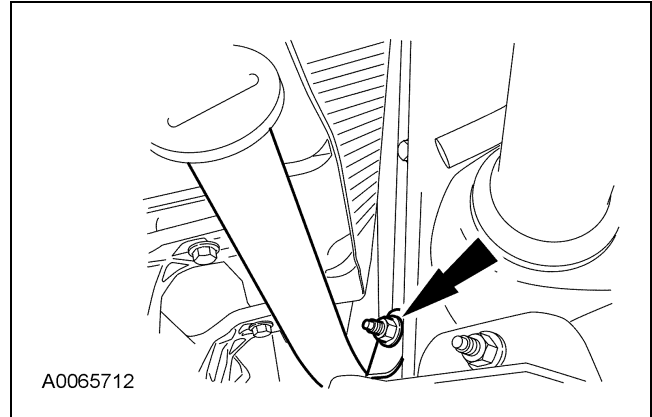


REMOVAL (Continued)

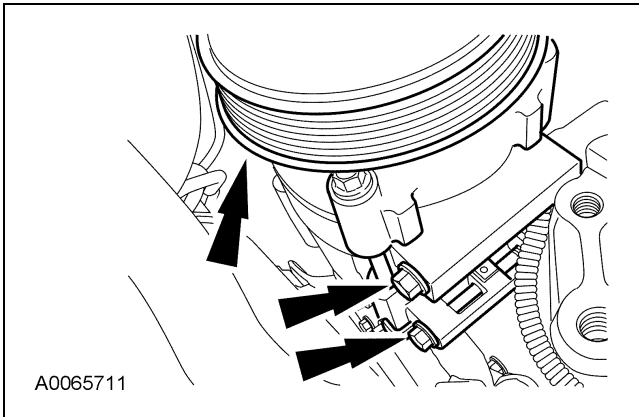
36. Remove the retaining nut and disconnect the A/C hose.
- Remove and discard the O-ring seal.
 - Plug or cap the openings as needed.

**Vehicles with automatic transmission**

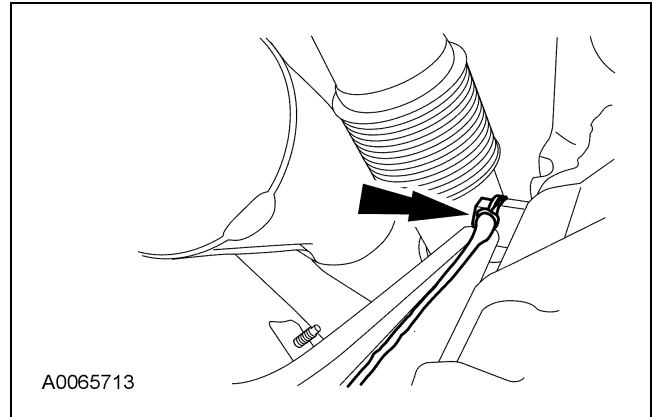
39. Remove the automatic transmission fluid indicator and tube.



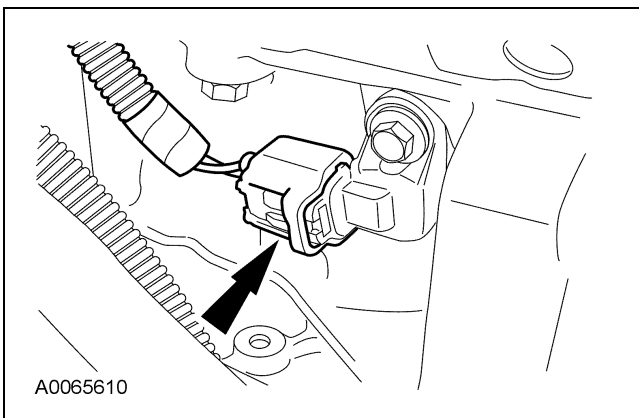
37. Remove the A/C compressor.

**All vehicles**

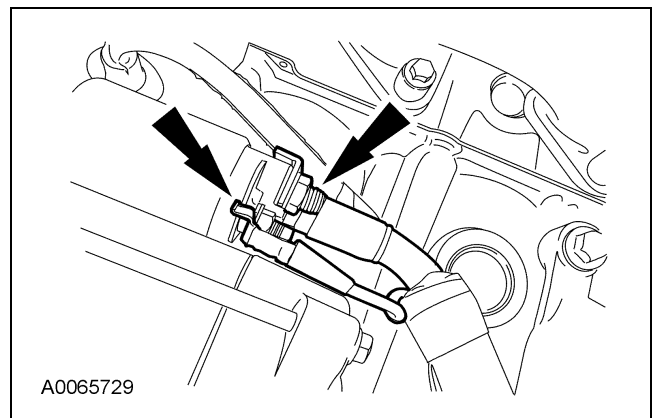
40. Remove the ground strap at the back of the right head.

**All vehicles**

38. Disconnect the crankshaft position (CKP) sensor electrical connector and position the wiring aside.

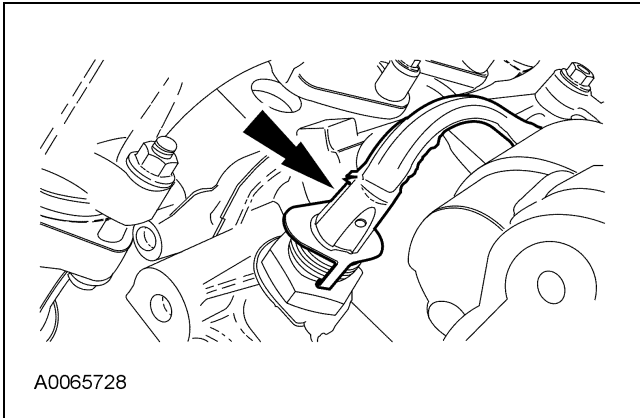


41. Remove the solenoid cap and disconnect the starter wiring.



REMOVAL (Continued)

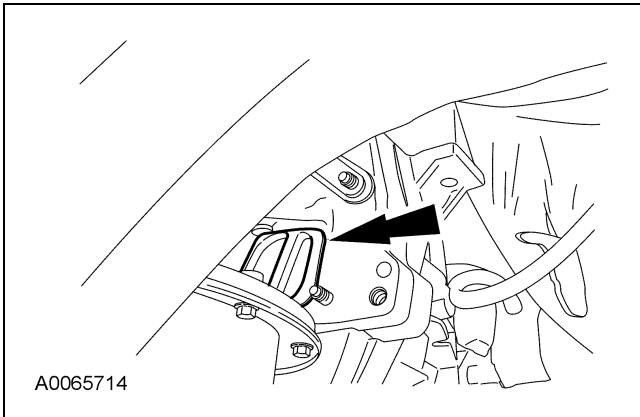
42. If equipped, disconnect the block heater electrical connector.



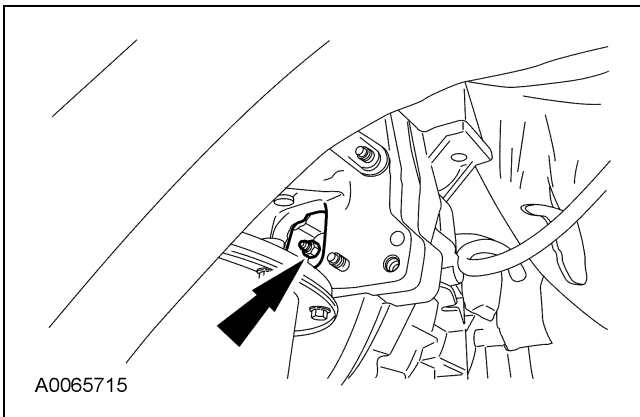
43. Position the block heater and starter wiring harness aside.

Vehicles with automatic transmission

44. Remove the torque converter cover.



45. Remove and discard the torque converter nuts.

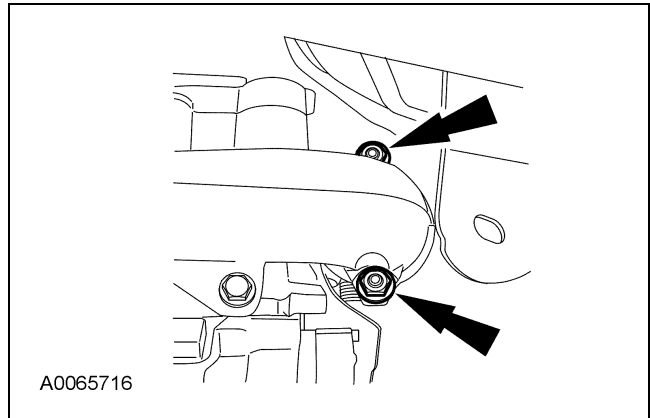


All vehicles

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

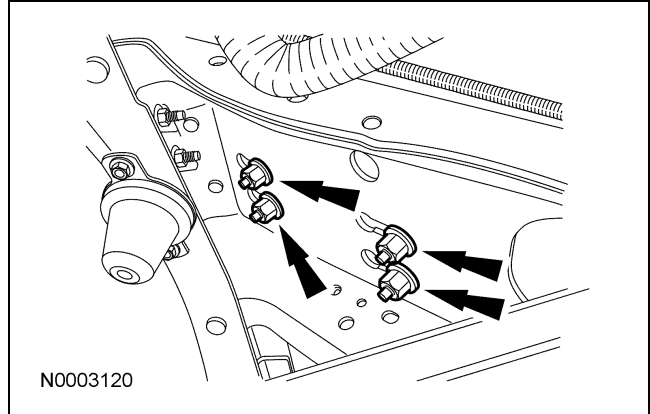
NOTE: Use a half -moon wrench to aid in accessing the fasteners.

Remove the bolts for the turbocharger adapter pipe.



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

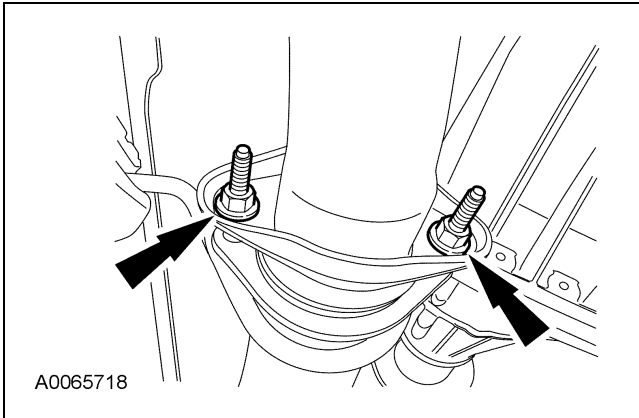
Remove the motor mount nuts.



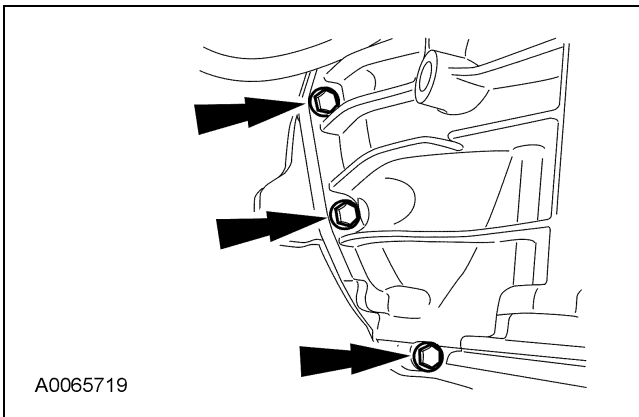
48. Drain the engine oil.

REMOVAL (Continued)

49. Loosen the nuts at the turbocharger adapter pipe flange.

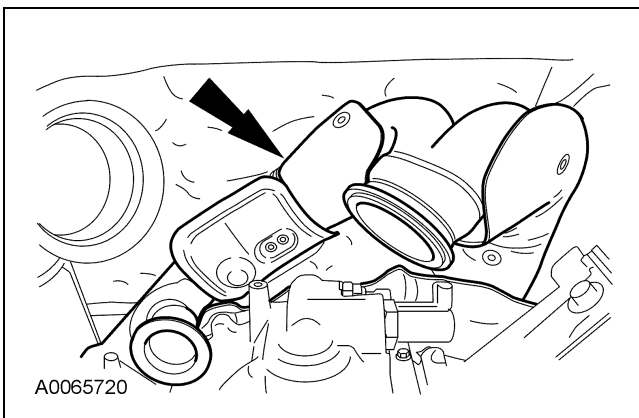
**Vehicles with automatic transmission**

50. Remove the nine bellhousing bolts.

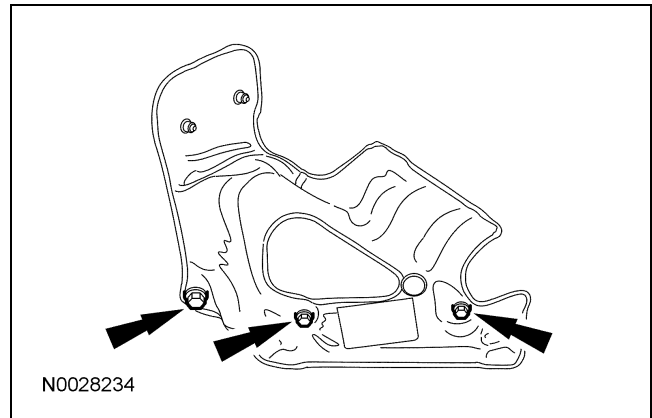
**All vehicles**

51. **NOTE:** It may be necessary to separate the pipe to remove it.

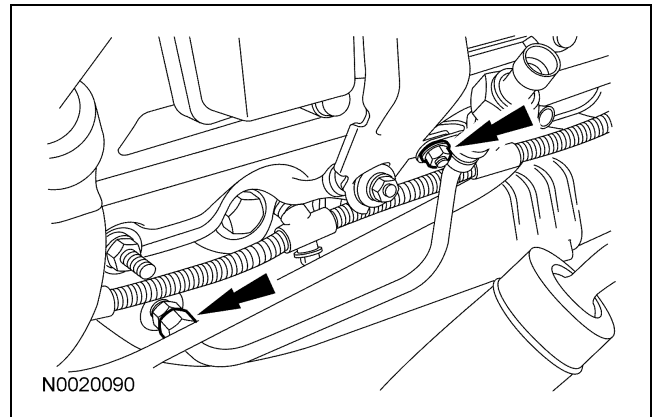
Remove the turbocharger adapter pipe.

**Late build vehicles**

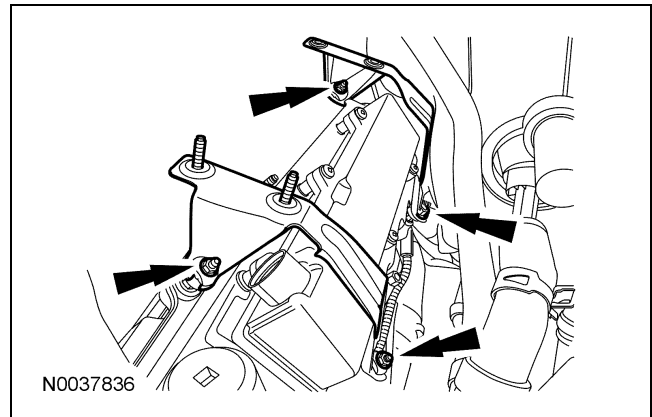
52. Remove the bolts and heat shield.



53. To remove the exhaust pressure sensor tube assembly, remove the exhaust pressure sensor tube retaining nut and disconnect the exhaust pressure sensor tube fitting at the exhaust manifold.

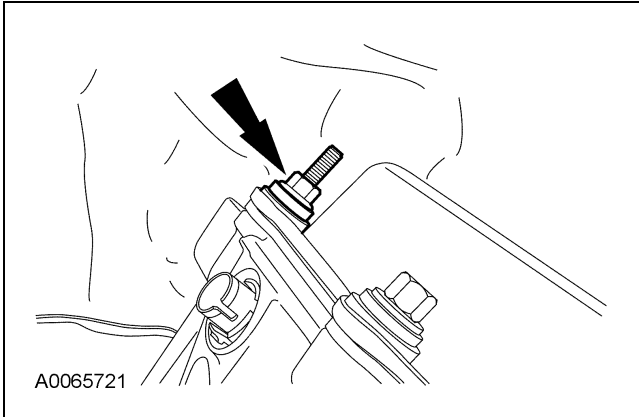
**All vehicles**

54. Remove the nuts and the fuel injector control module bracket.

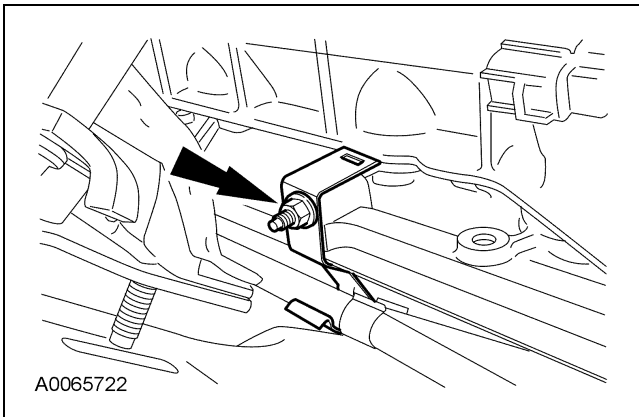


REMOVAL (Continued)

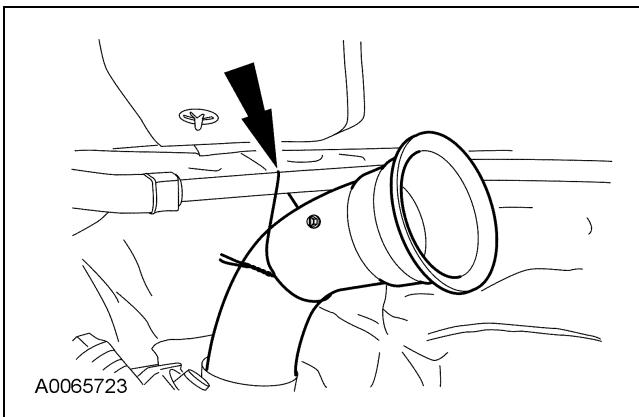
55. Remove the left rear valve cover stud.



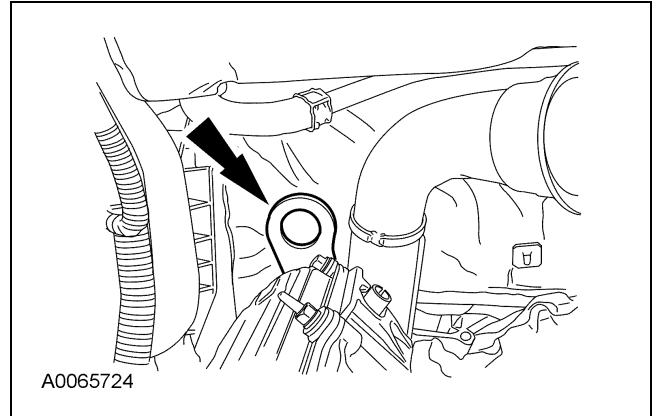
56. Remove the transmission cooler line bracket.



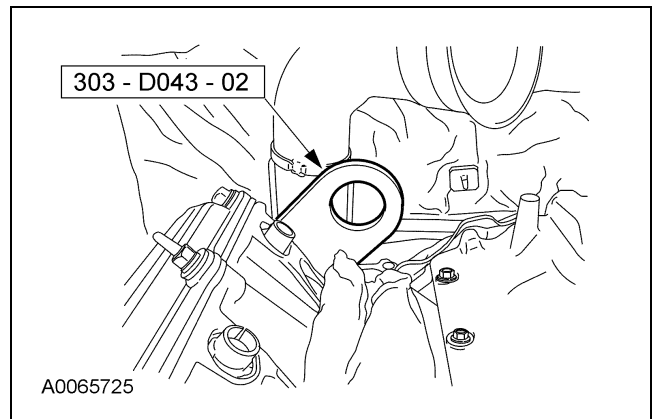
57. Secure the turbocharger outlet pipe.



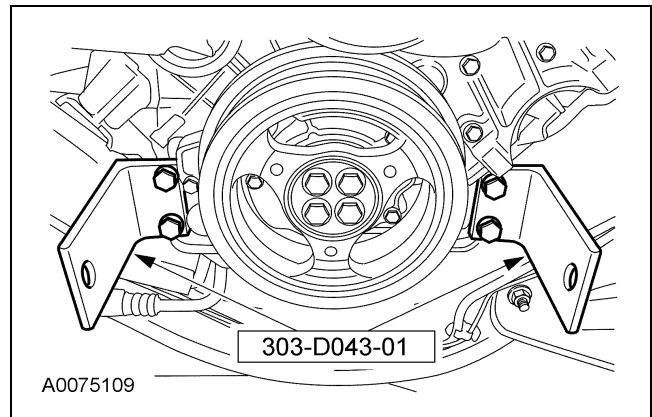
58. Remove the manufacturer's lifting eye.



59. Install the engine lifting eye on the RH cylinder head.



60. Install the front lifting brackets.

**Vehicles with automatic transmission**

61. Position a suitable jack under the transmission.

All vehicles

62. Install the Heavy Duty Floor Crane and Diesel Engine Lifting Bracket on the engine.

REMOVAL (Continued)

63. Raise the engine high enough to clear the No. 1 crossmember and pull the engine forward and clear of the vehicle.

64. Remove the engine lifting equipment from the engine.

