

**SECTION 303-01C Engine — 6.0L Diesel**

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**IN-VEHICLE REPAIR**

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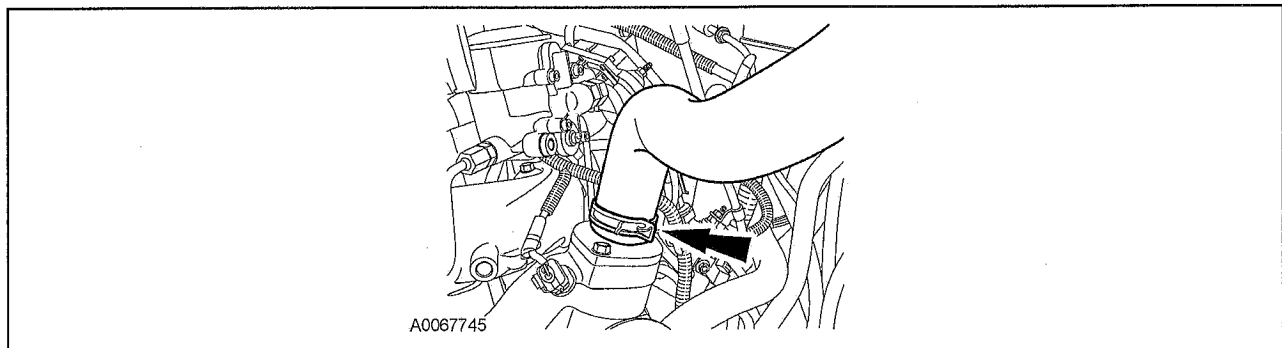
303-01C-2

**IN-VEHICLE REPAIR****Intake Manifold****Material**

Item	Specification
Motorcraft Premium Gold Engine Coolant VC-7-A (in Oregon VC-7-B, in Canada VC-7-C)	WSS-M97B51-A1

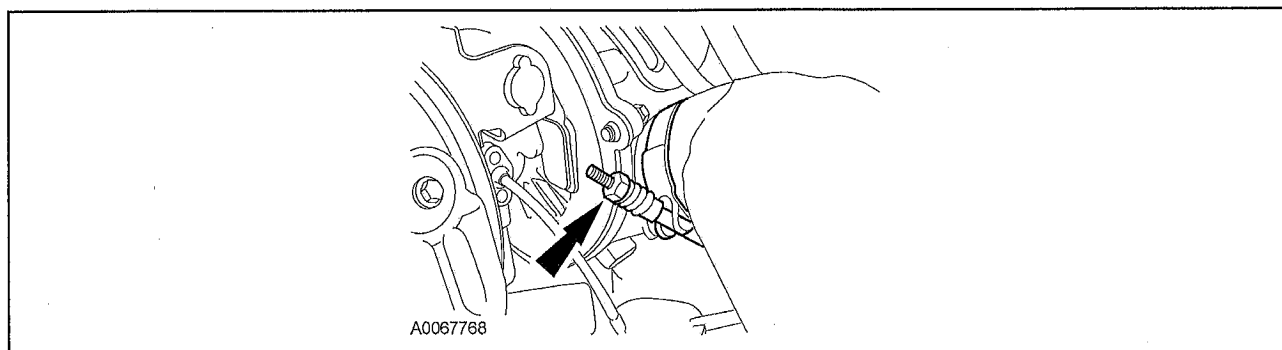
**Removal****All vehicles**

1. Remove the auxiliary battery. For additional information, refer to Section 414-01.
2. Remove the cooling fan stator — 6.0L diesel engine. For additional information, refer to Section 303-03.
3. Remove the degas bottle. For additional information, refer to Section 303-03.
4. Remove the upper radiator hose.



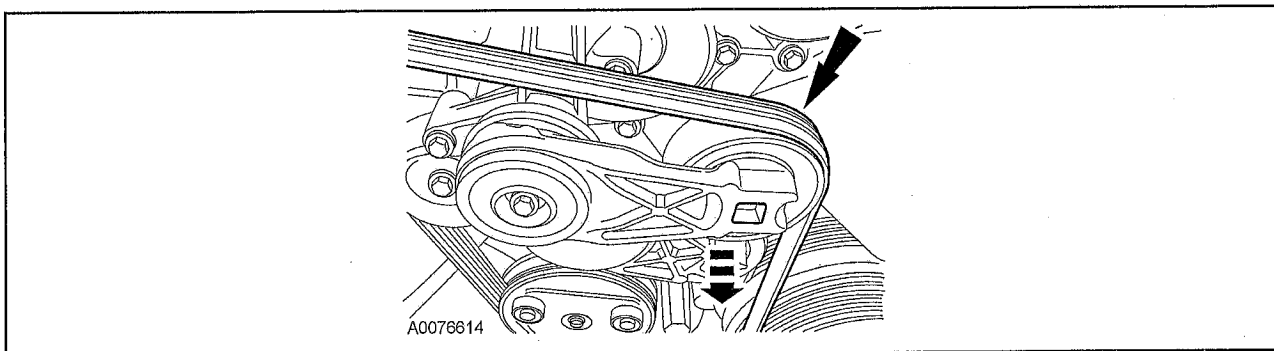
5. **NOTE:**  
Engine side shown, charge air cooler side similar.

Remove the turbocharger-to-charge air cooler duct.

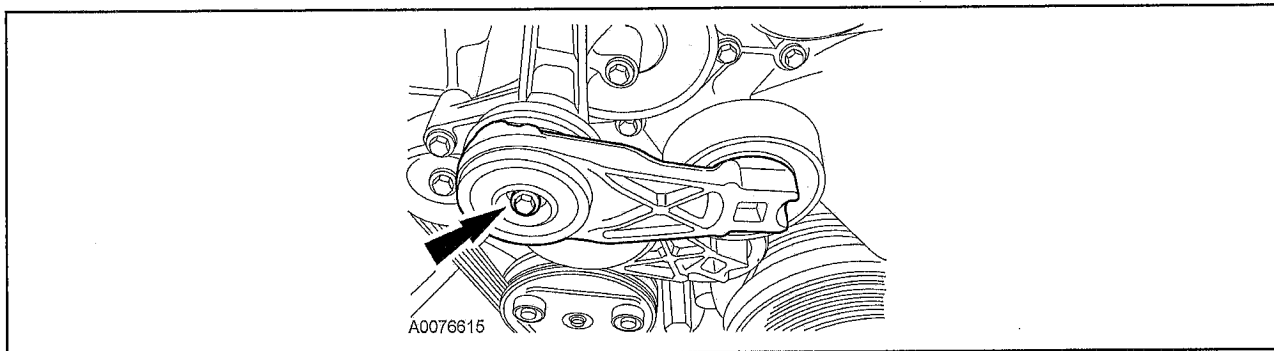
**Vehicles with dual generators**

6. Remove the accessory drive belt.

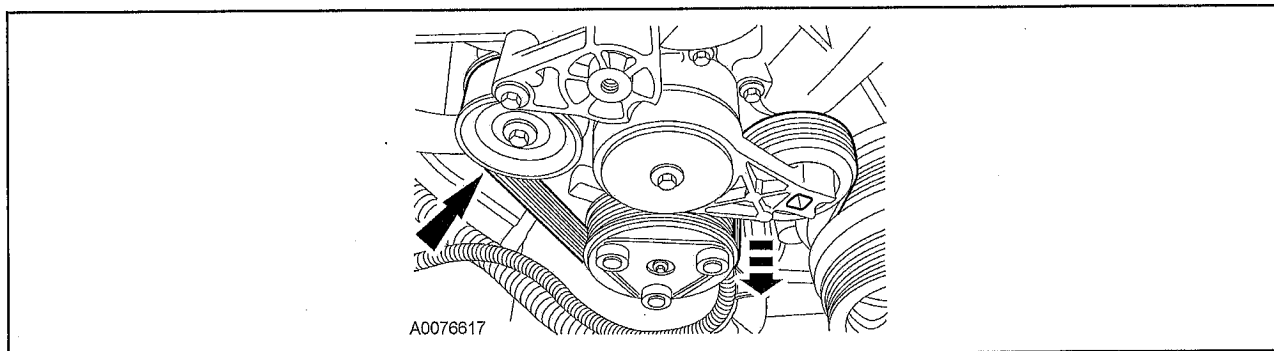
IN-VEHICLE REPAIR (Continued)



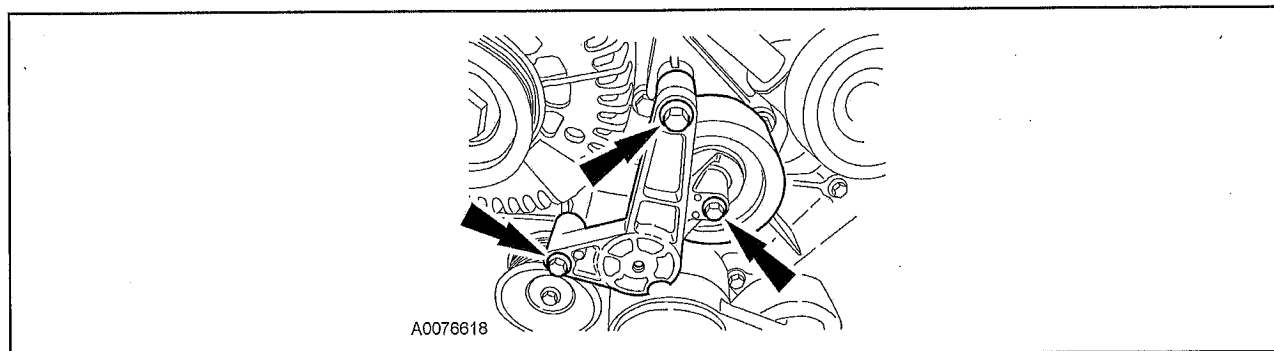
7. Remove the bolt and the accessory drive belt tensioner.



8. Remove the accessory drive belt.

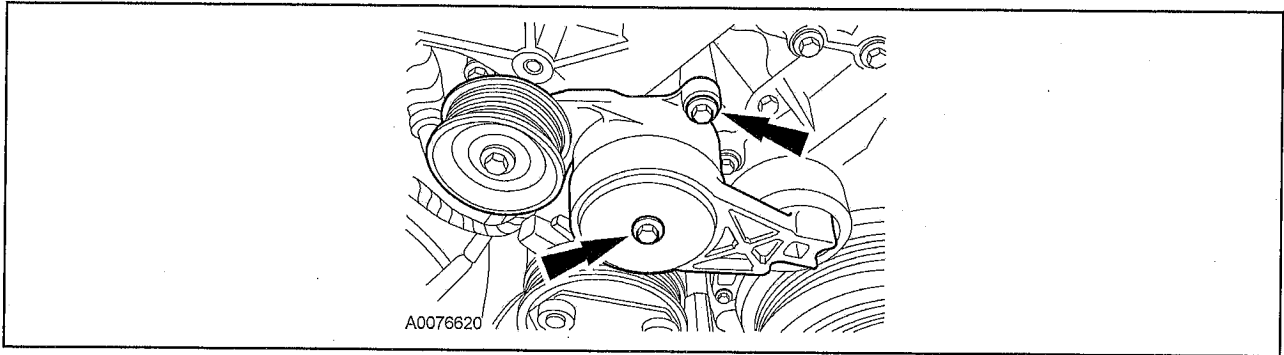


9. Remove the bolts, bracket and accessory drive belt idler pulley.

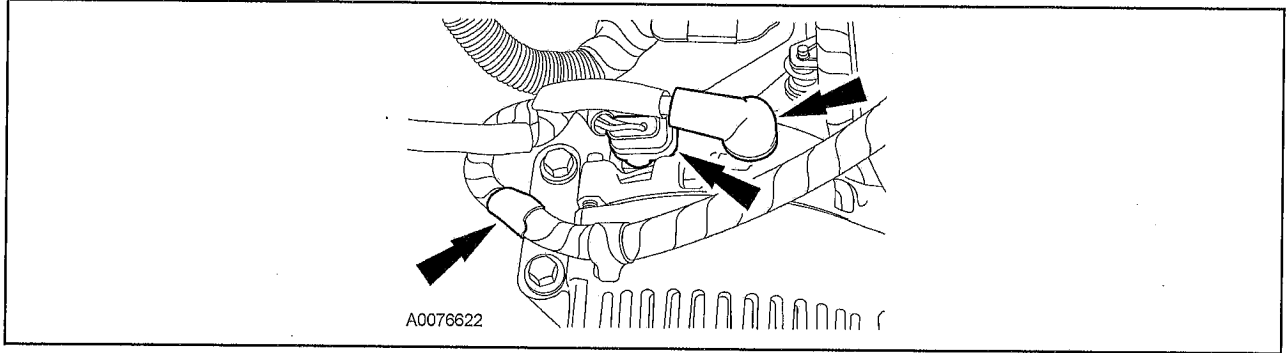


10. Remove the bolts and the accessory drive belt tensioner.

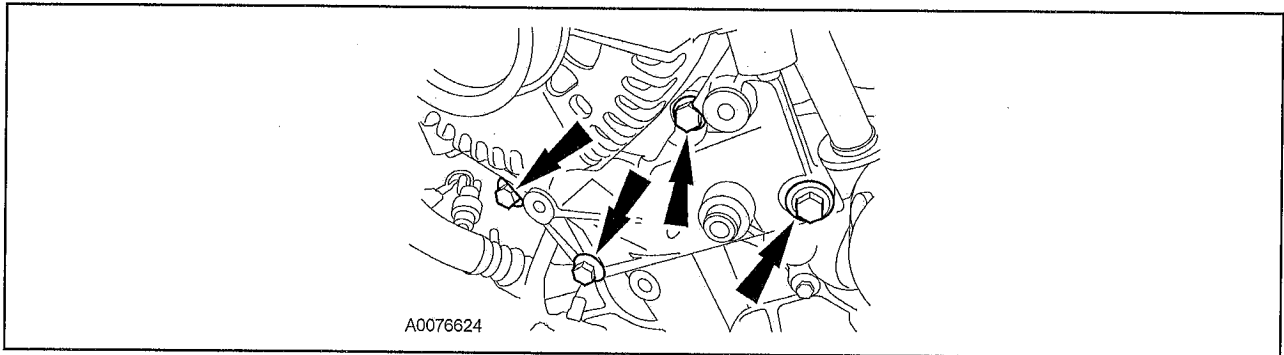
IN-VEHICLE REPAIR (Continued)



11. Disconnect the wire retainer, generator electrical connector and B+ wire.

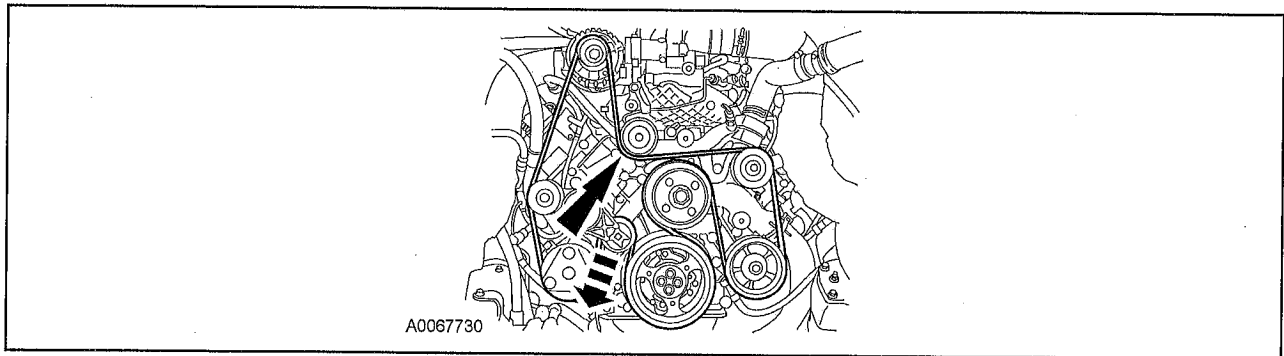


12. Remove the bolts and the generator with mounting bracket.



**Vehicles with single generator**

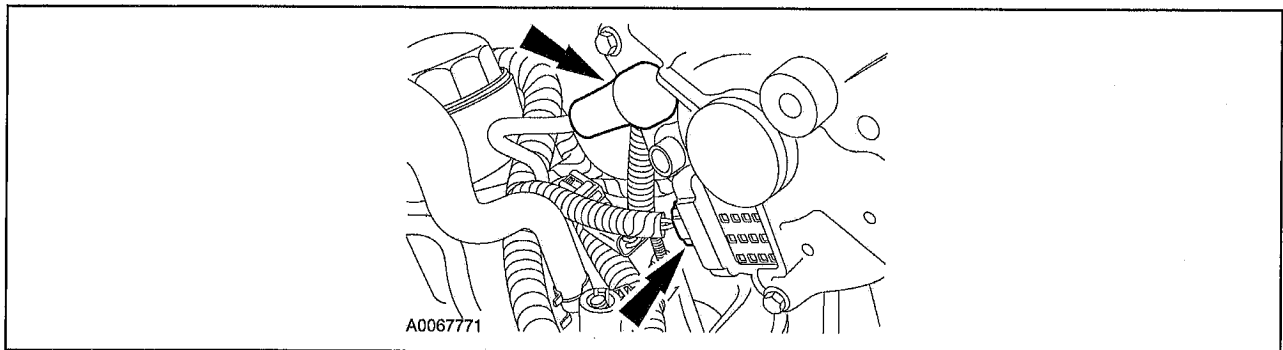
13. Remove the accessory drive belt.



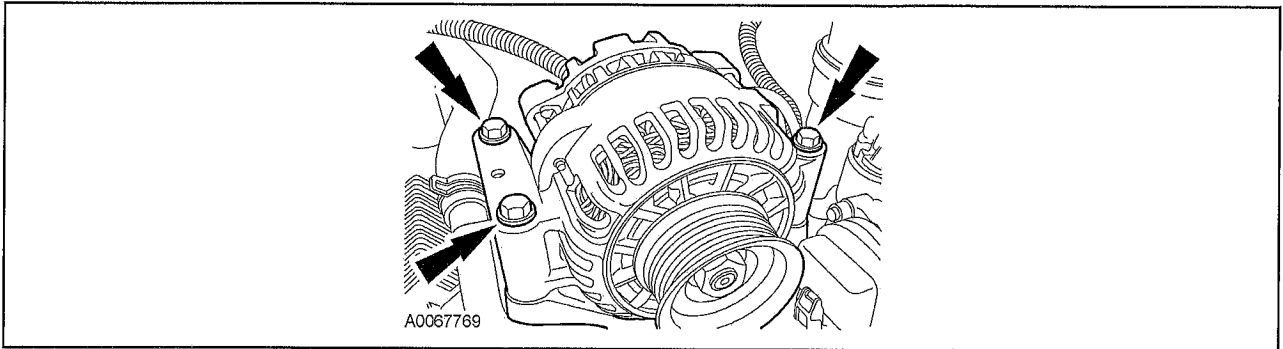
**All vehicles**

14. Position the boot back and disconnect the generator B+ wire and electrical connector.

## IN-VEHICLE REPAIR (Continued)



15. Remove the three bolts and the generator.

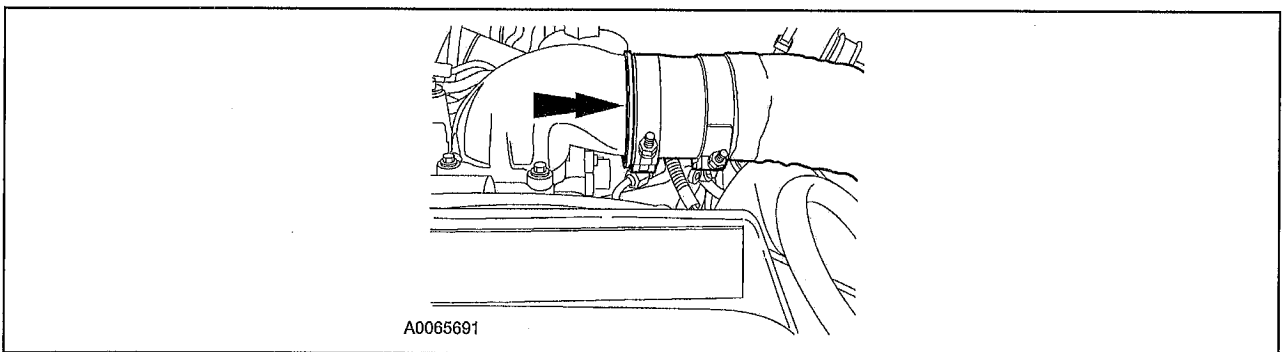


16. Remove the turbocharger and the turbocharger pedestal. For additional information, refer to Section 303-04D.

**Early build**

17. **NOTE:**  
Engine side shown, charge air cooler side similar.

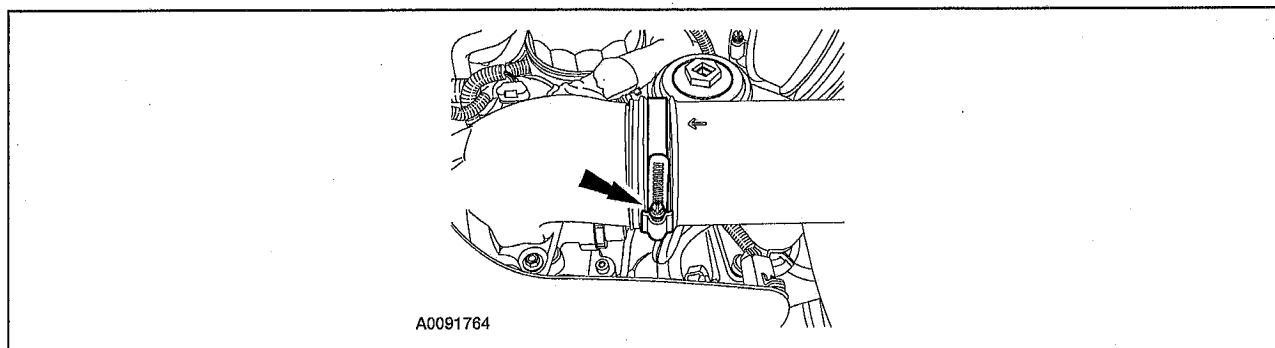
Loosen the clamps and remove the charge air cooler duct.

**Late build**

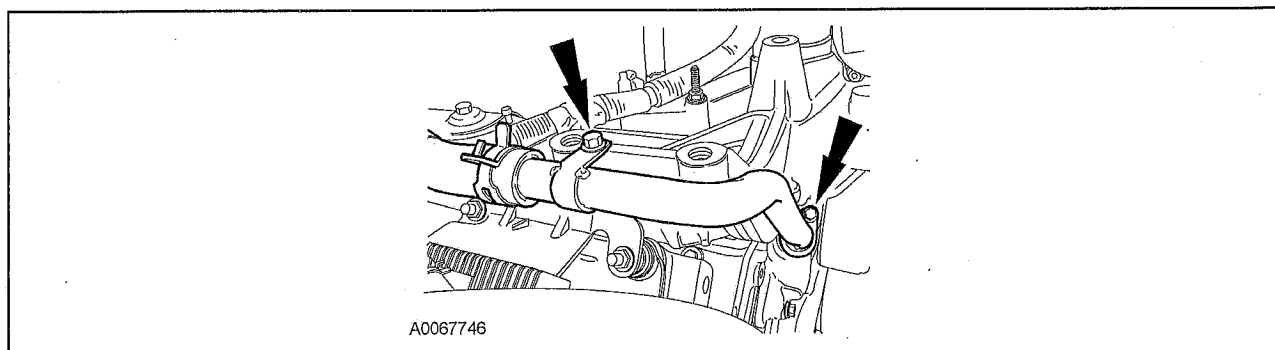
18. **NOTE:**  
Engine side shown, charge air cooler side similar.

Loosen the clamps and remove the charge air cooler duct.

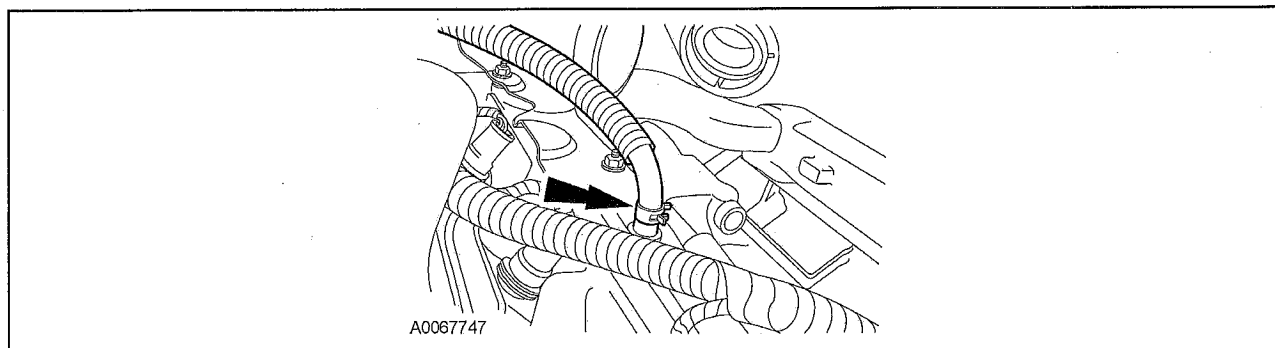
## IN-VEHICLE REPAIR (Continued)



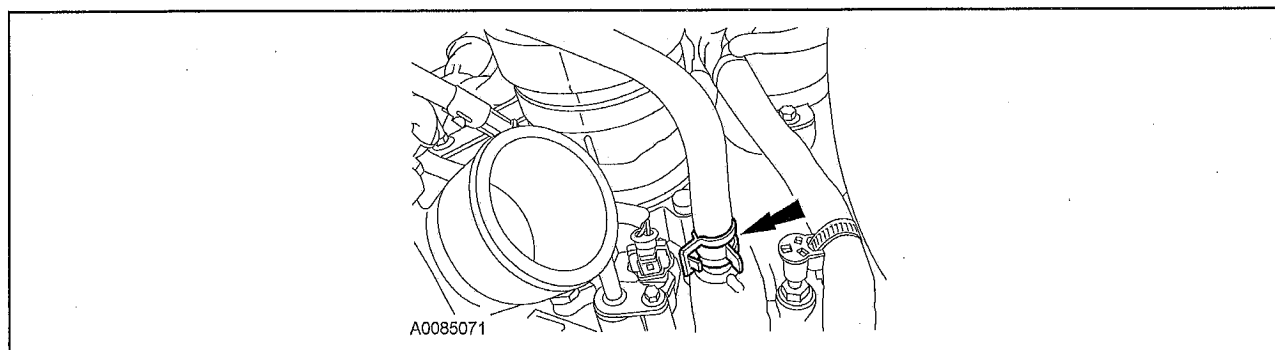
19. Remove the bolts and position the heater hose tube aside.
- Remove and discard the O-ring.



20. Disconnect the manifold absolute pressure (MAP) sensor hose.

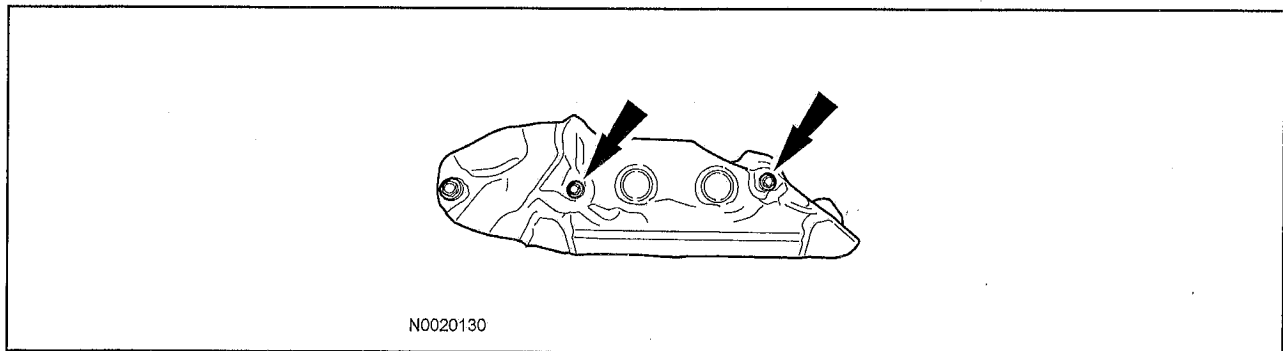


21. Disconnect the engine coolant vent hose.

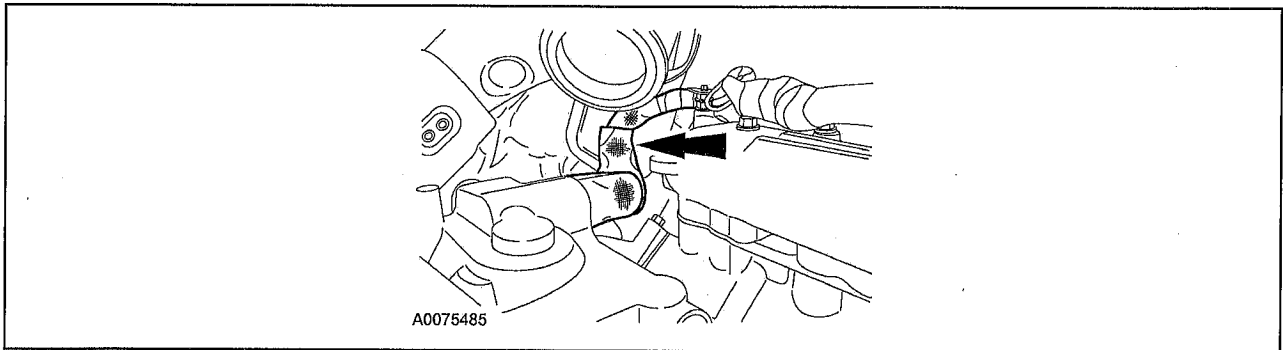


22. Remove the fuel injector control module. For additional information, refer to Section 303-14B.
23. Remove the top two bolts from the injector pressure regulator (IPR) heat shield.

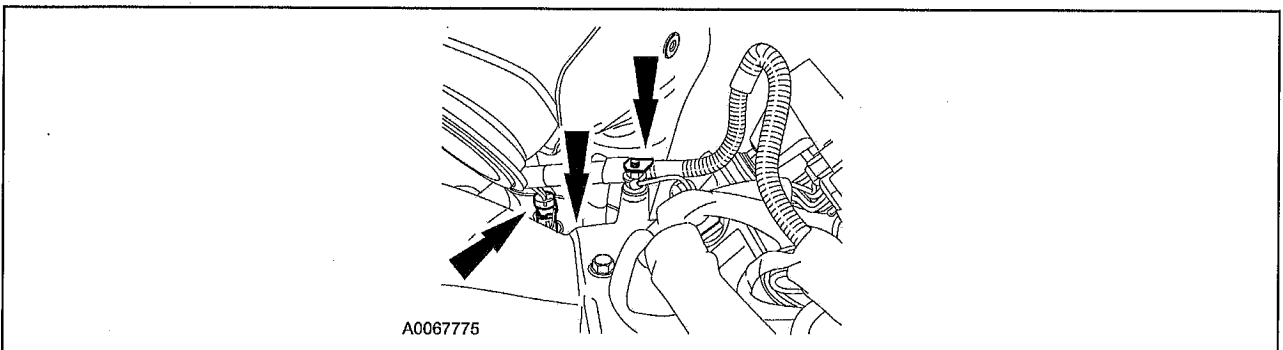
## IN-VEHICLE REPAIR (Continued)



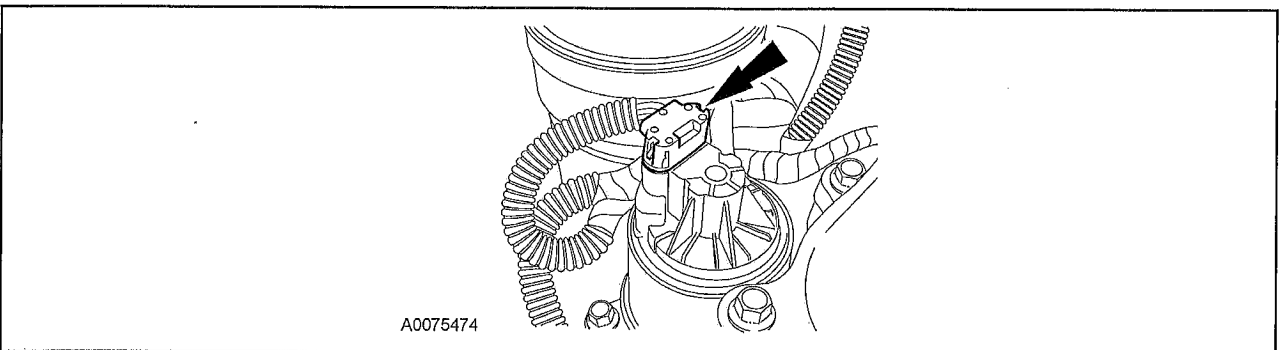
24. Remove or position aside the heat insulating wrap.



25. Disconnect the wiring retainer, IPR valve and injector control pressure (ICP) sensor (if equipped) electrical connectors.

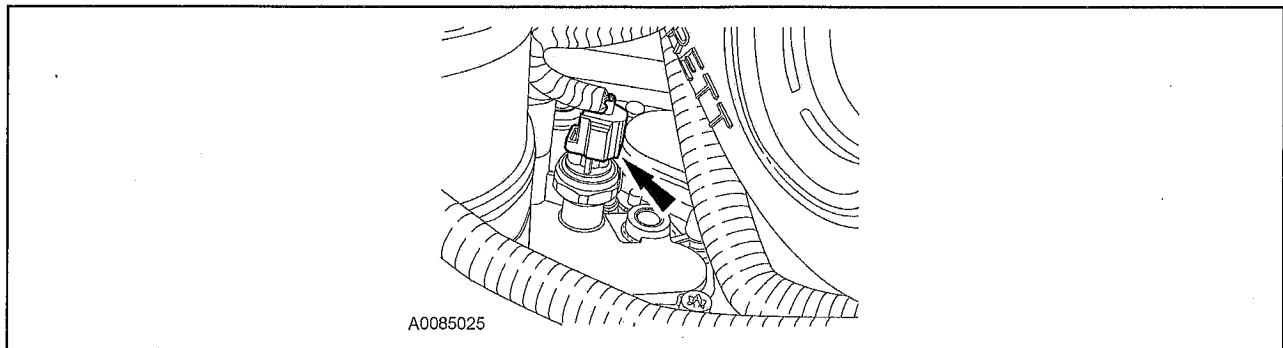


26. Disconnect the exhaust gas recirculation (EGR) valve electrical connector.

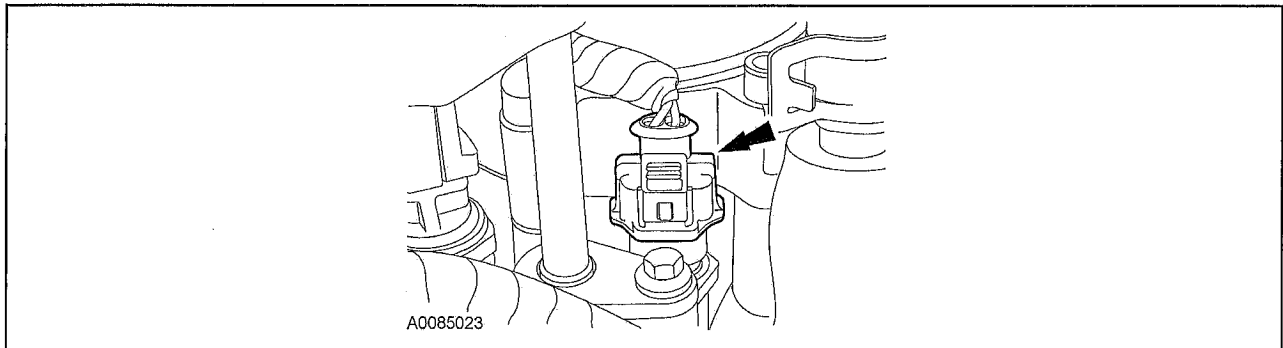


27. Disconnect the engine oil pressure (EOP) sensor electrical connector.

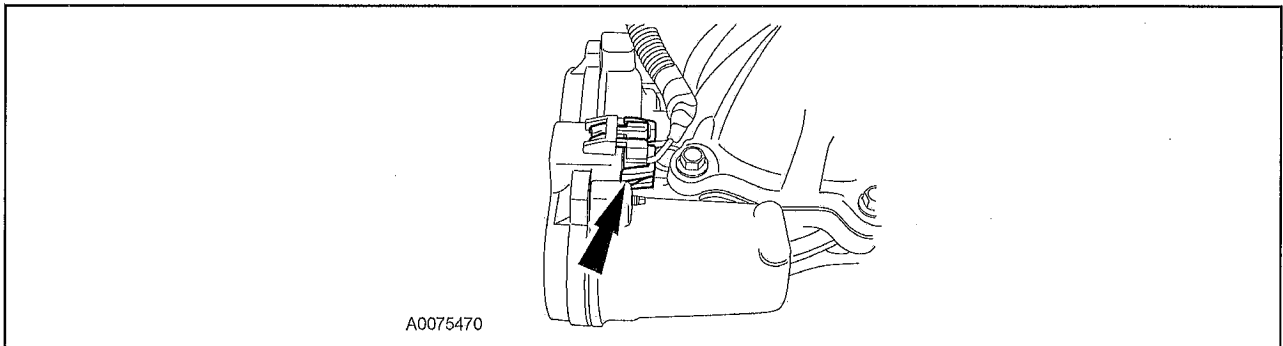
## IN-VEHICLE REPAIR (Continued)



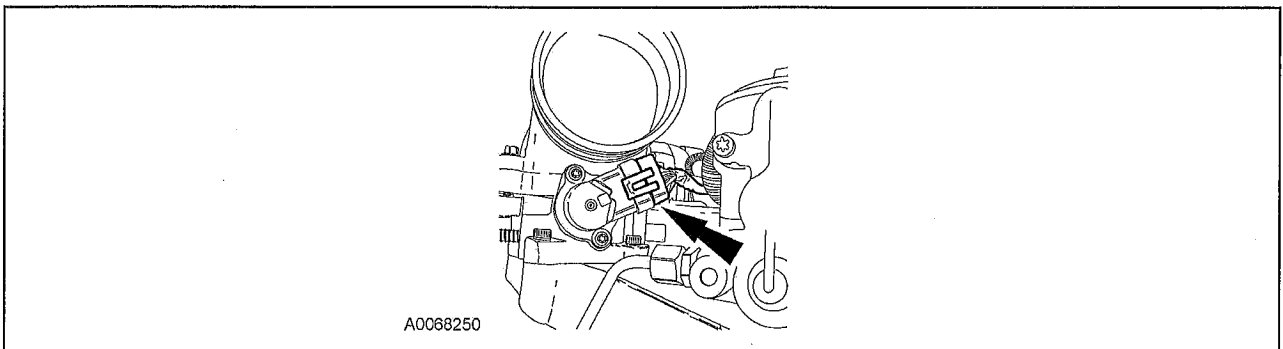
28. Disconnect the engine oil temperature (EOT) sensor electrical connector.



29. Disconnect the exhaust gas recirculation (EGR) throttle position control module electrical connector.



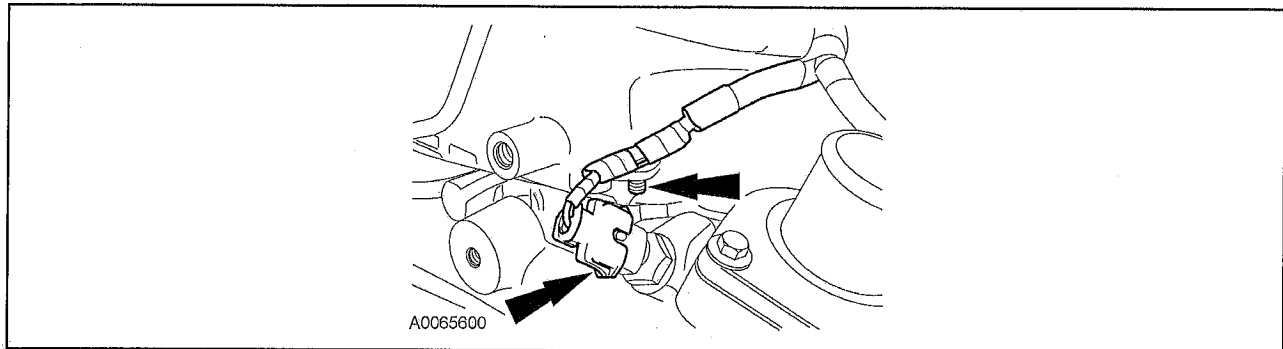
30. Disconnect the EGR throttle position sensor electrical connector.



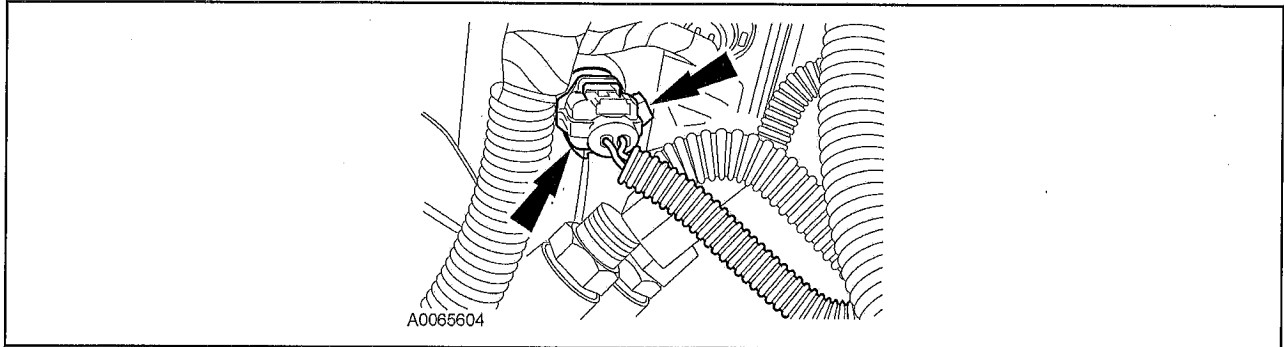
31. Disconnect the pin-type retainer and engine coolant temperature (ECT) sensor.



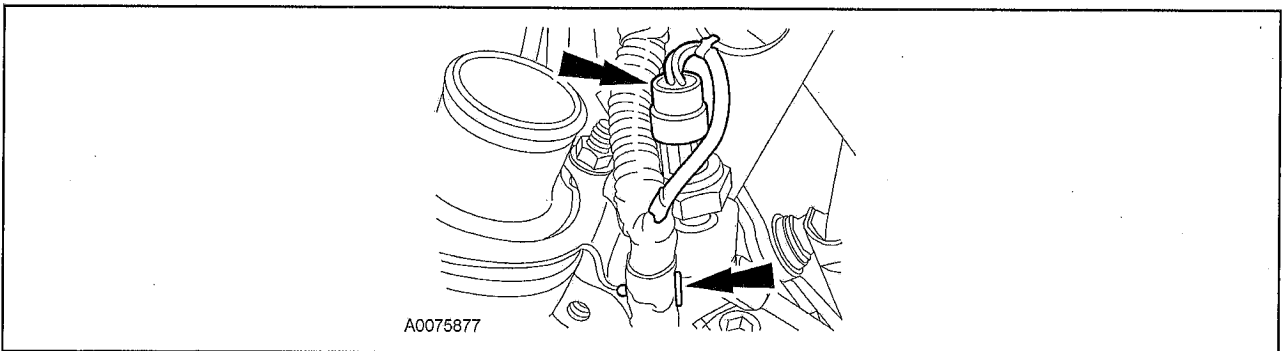
## IN-VEHICLE REPAIR (Continued)



32. Disconnect the intake air temperature (IAT2) sensor electrical connector and wiring connector.



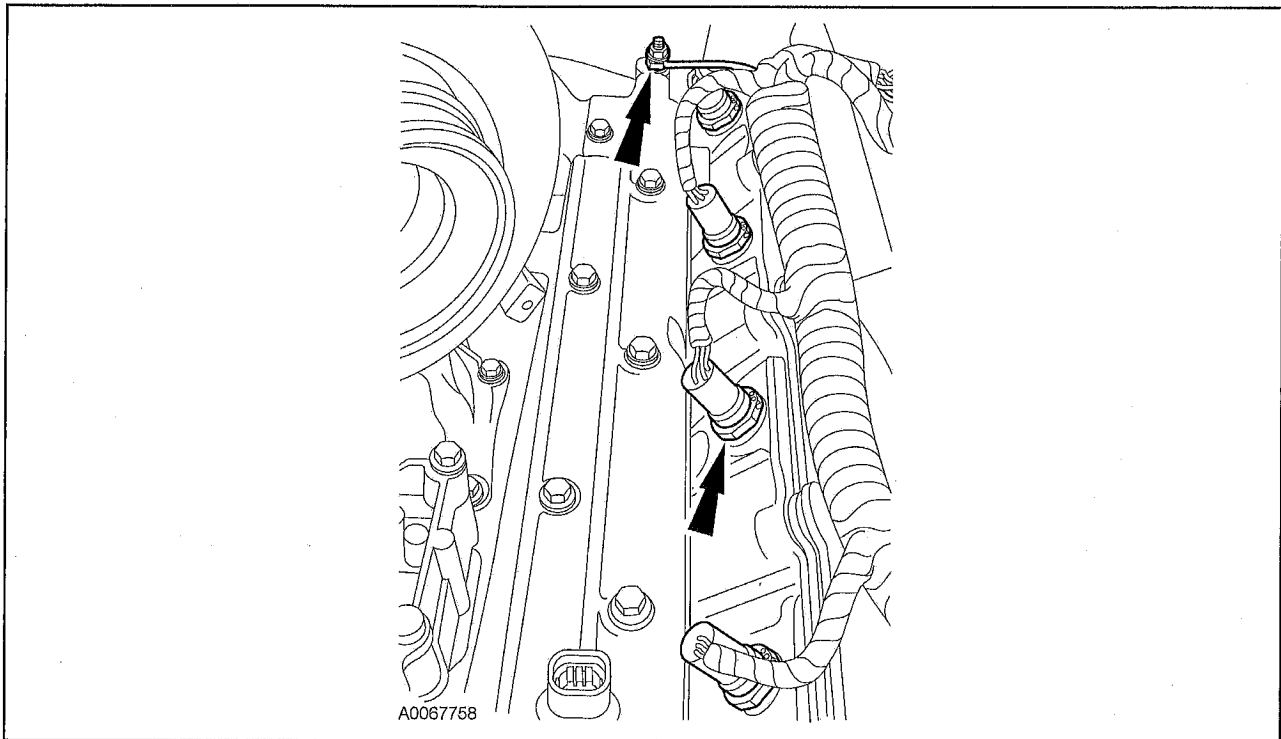
33. Disconnect the exhaust backpressure sensor and retaining clip.



34. **NOTE:**  
Left side shown, right side similar.

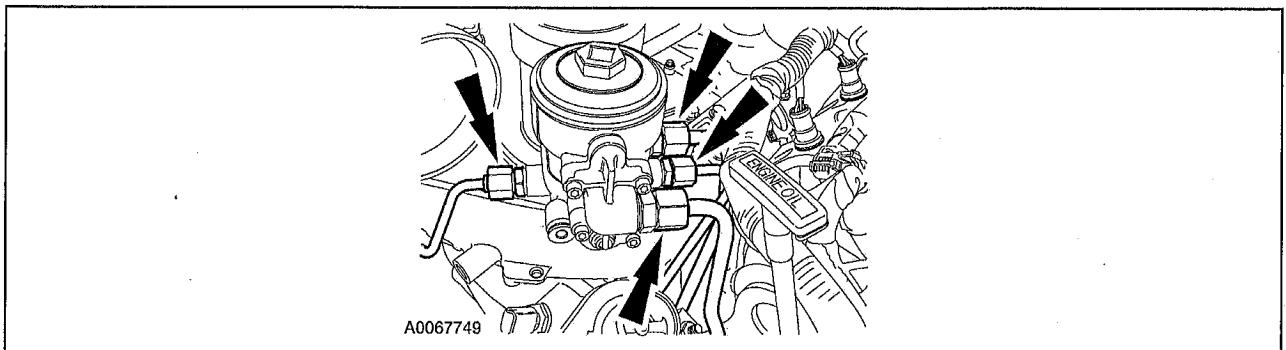
Disconnect the eight fuel injectors electrical connectors. Remove the nut and the fuel injector wiring harness.

## IN-VEHICLE REPAIR (Continued)



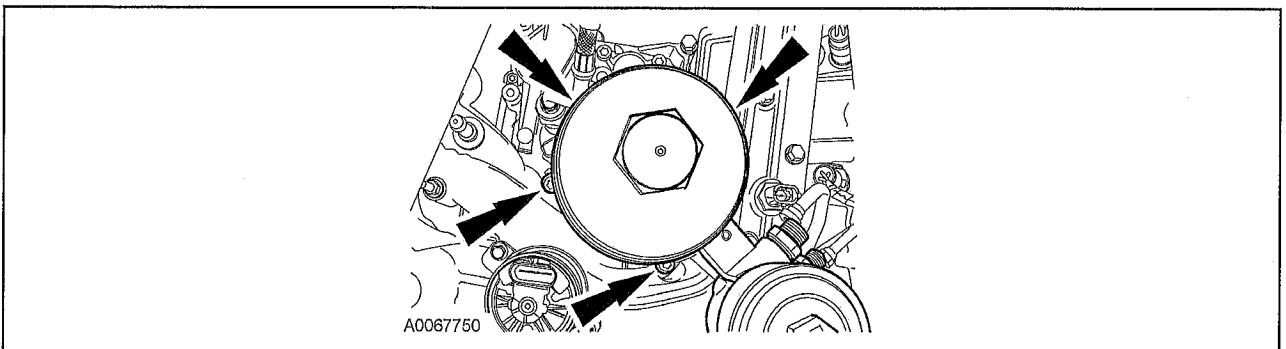
35. **NOTE:**  
It is necessary to remove the fuel filter and drain the housing.

Disconnect the fuel tube fittings.



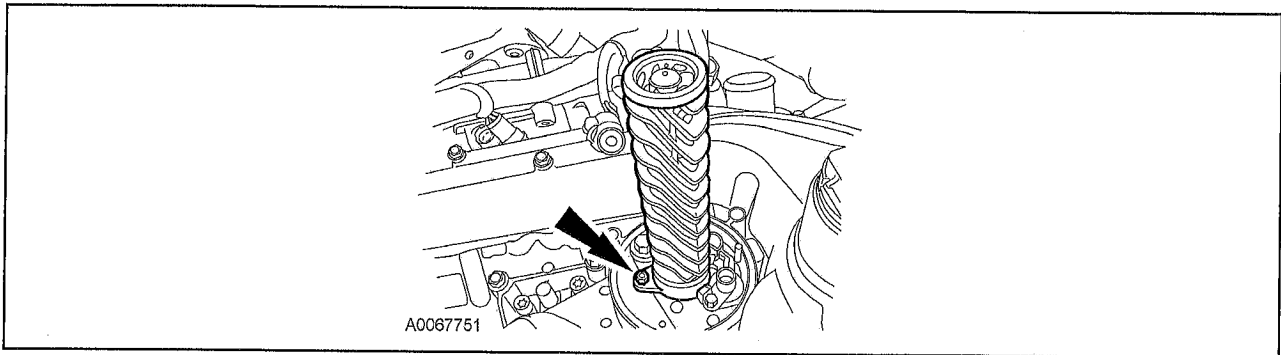
36. **NOTE:**  
It is necessary to remove the oil filter and drain the housing.

Remove the four bolts and the oil filter housing.

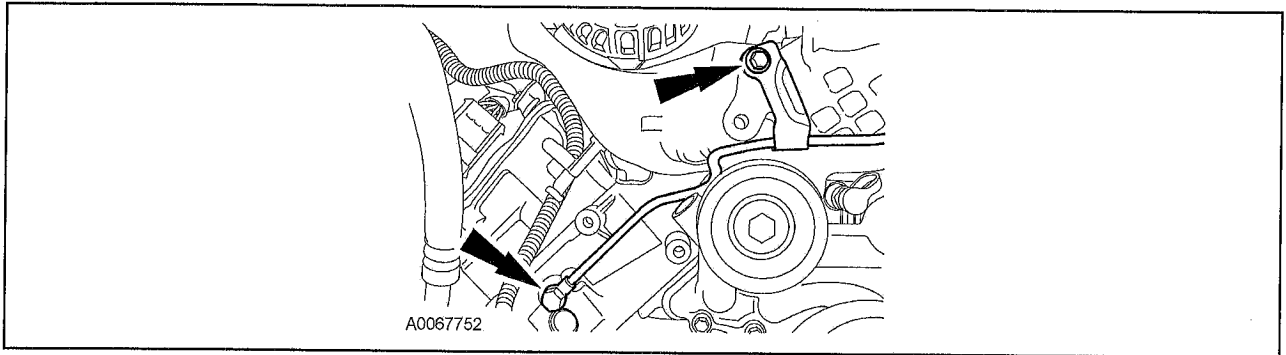


37. Remove the bolt and the oil filter return tube.

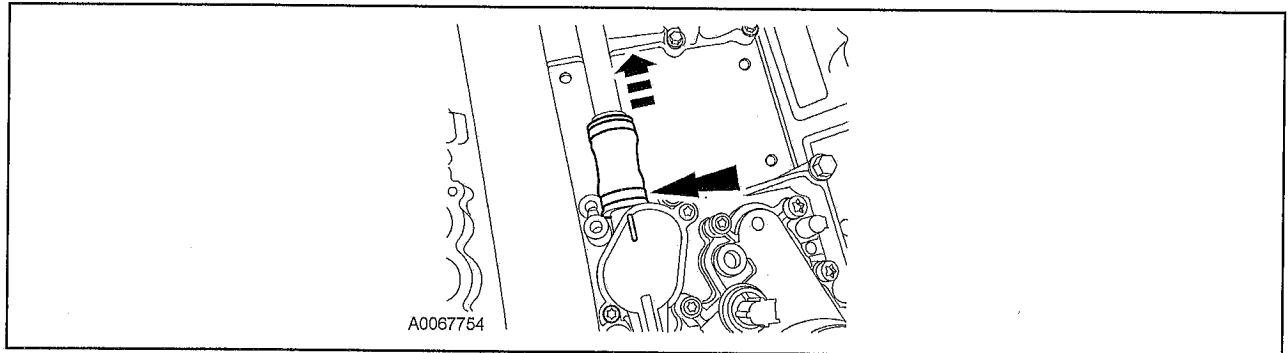
## IN-VEHICLE REPAIR (Continued)



38. Remove the fuel tube.
- Remove the bolt, and the banjo bolt from the fuel tube.
  - Discard the sealing washers and remove the fuel tube.

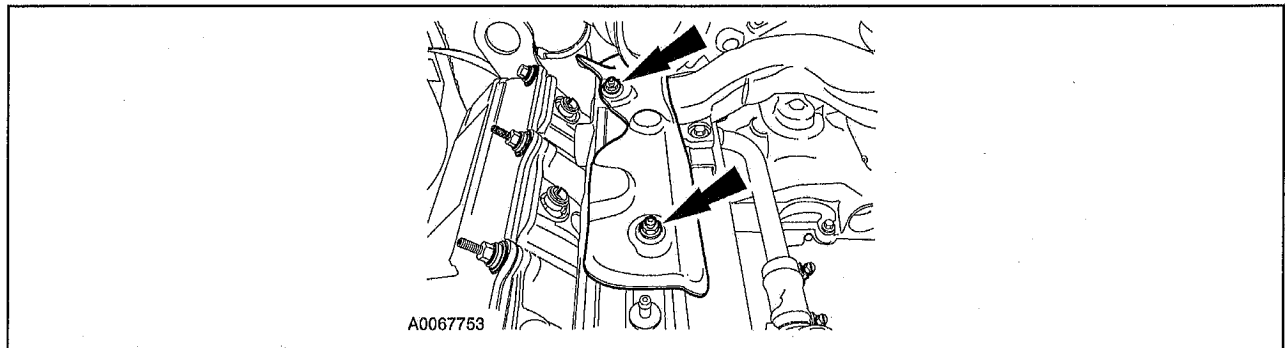


39. **NOTE:**  
Align the flat edge with the index feature located on the coolant supply port.
- Pull the EGR cooler clamp forward, twist and then slide the EGR cooler hose rearward to remove.

**Early build**

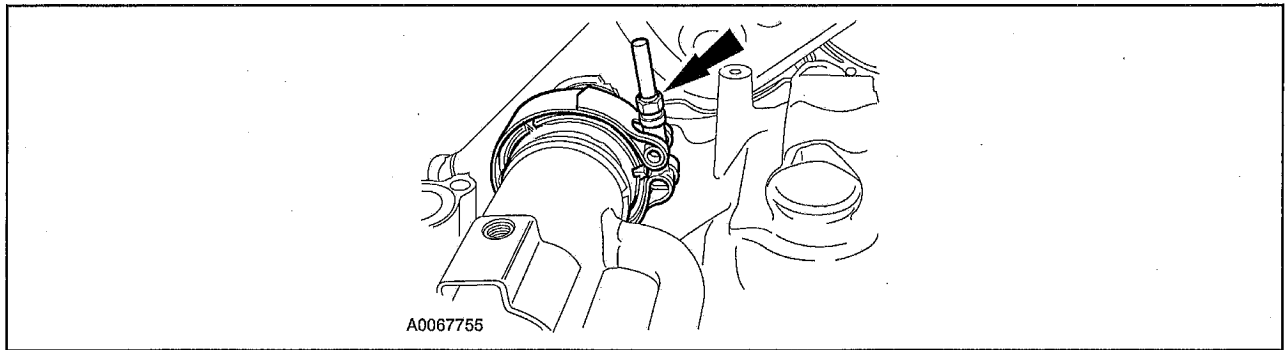
40. Remove the nuts and the turbocharger heat shield.

IN-VEHICLE REPAIR (Continued)

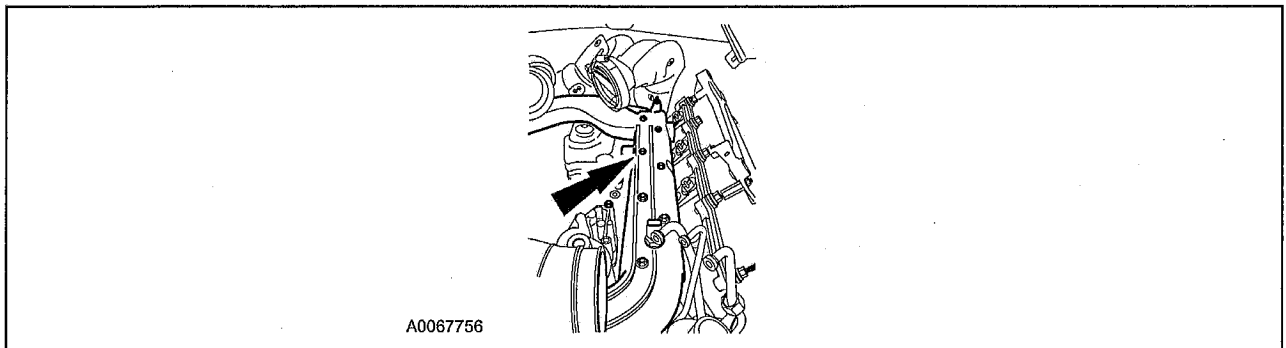


- 41. **NOTE:**  
Intake removed for clarity.

Remove the EGR cooler V-clamp and gasket.

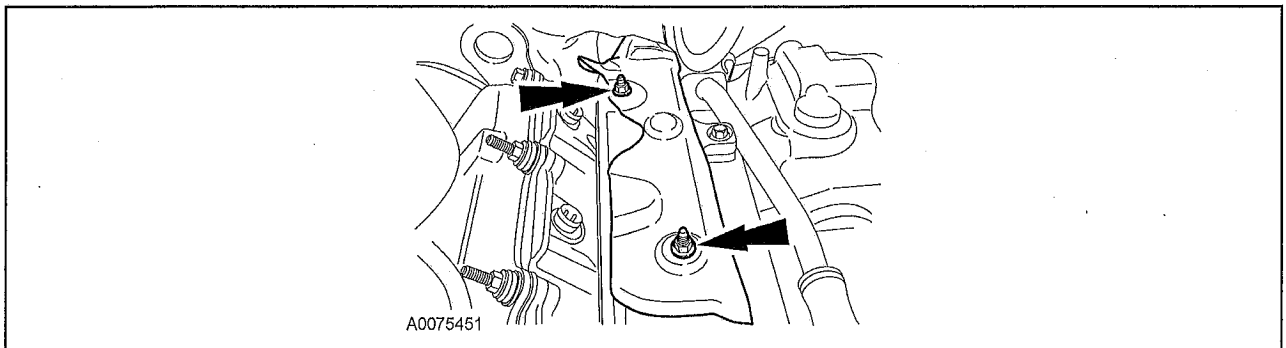


- 42. Remove the bolts and the intake manifold.



Late build

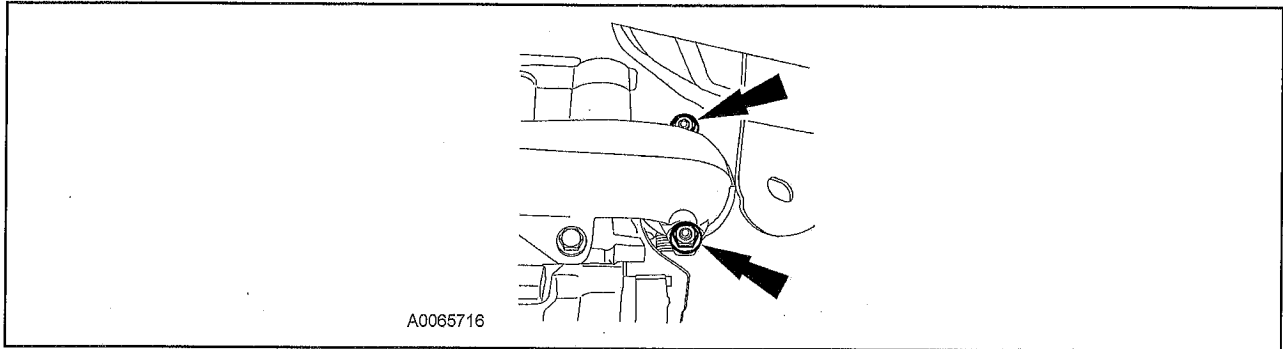
- 43. Remove the nuts and the turbocharger heat shield.



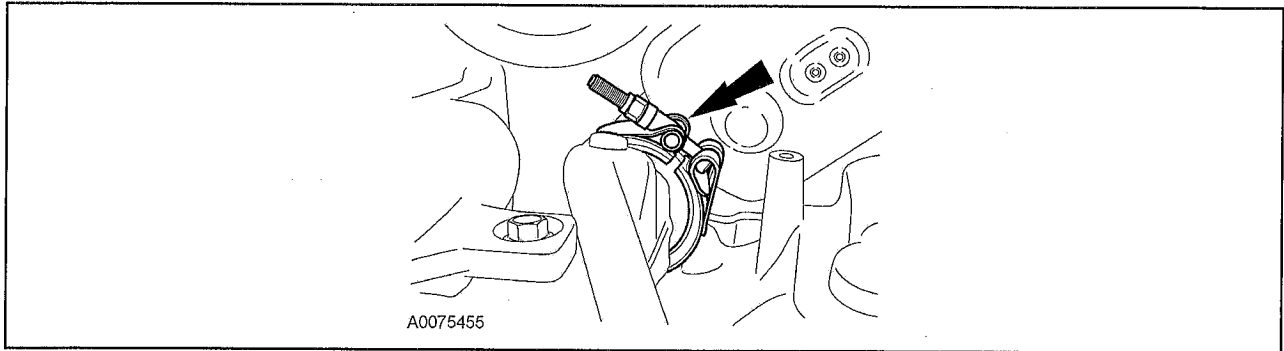
- 44. **NOTE:**  
LH shown, RH similar.

**IN-VEHICLE REPAIR (Continued)**

Loosen the nuts and bolts from the turbocharger adapter pipe.

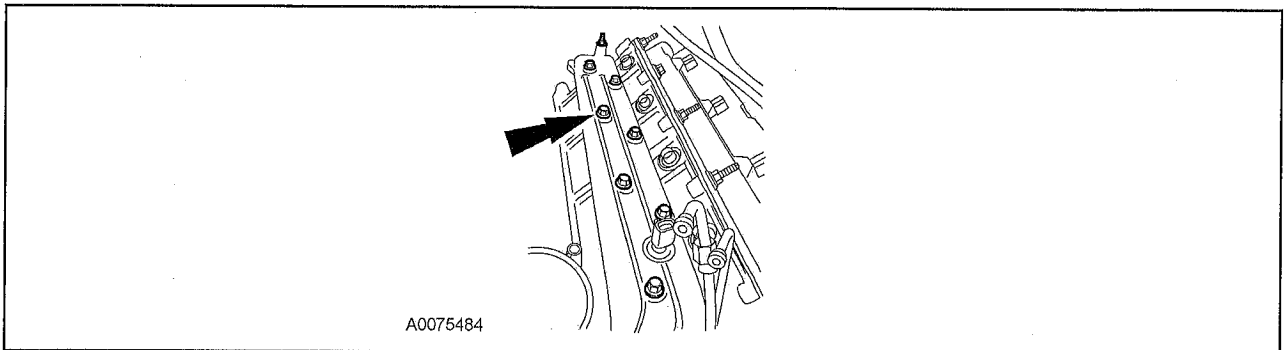


45. Loosen the EGR cooler V-clamp.

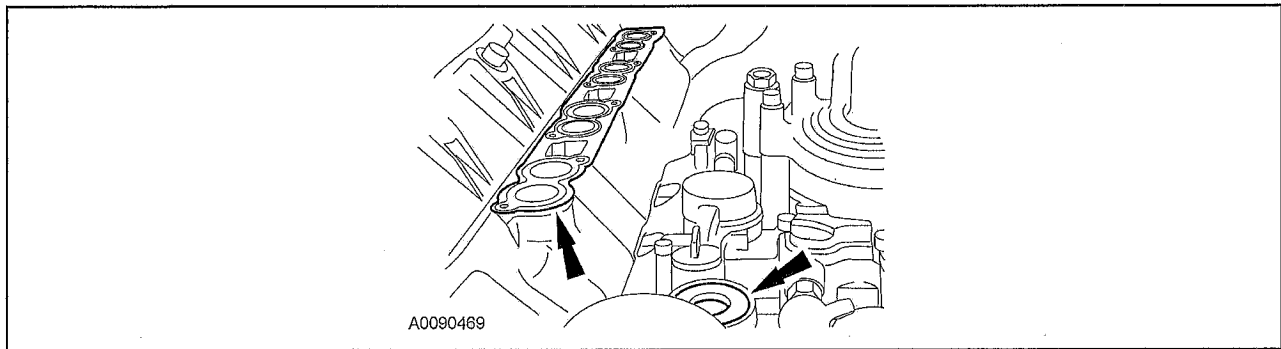


46. **NOTE:**  
Keep the EGR cooler V-clamp with the turbo adapter pipe.

Remove the bolts and the intake manifold.

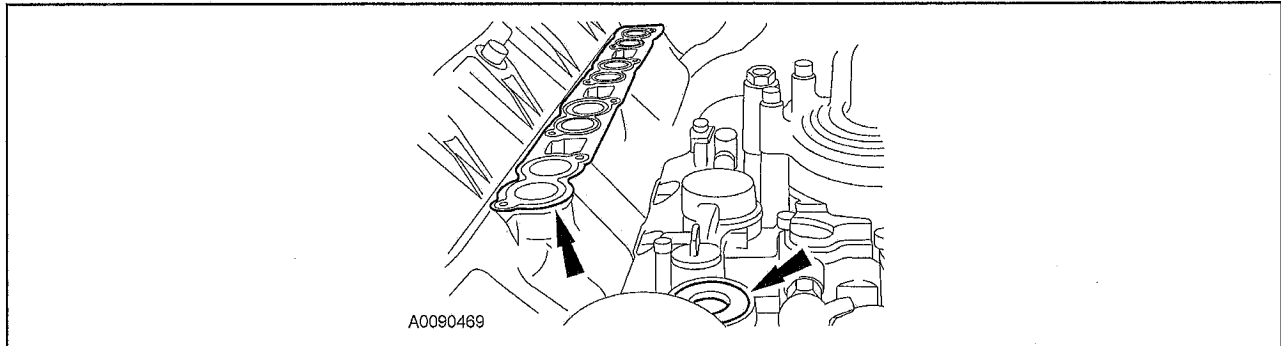
**All vehicles**

47. Remove the intake manifold gaskets.
- Clean and inspect the gaskets. Install new gaskets if necessary.
  - Clean and inspect the sealing surfaces.
  - Remove and discard the front module O-ring seal.

**IN-VEHICLE REPAIR (Continued)****Installation****All vehicles**

1. **NOTE:**  
The locating tabs on the gaskets must be up and toward the center of the engine, or a leak will occur.

Install the intake manifold gaskets and front module O-ring seal.

**Late build**

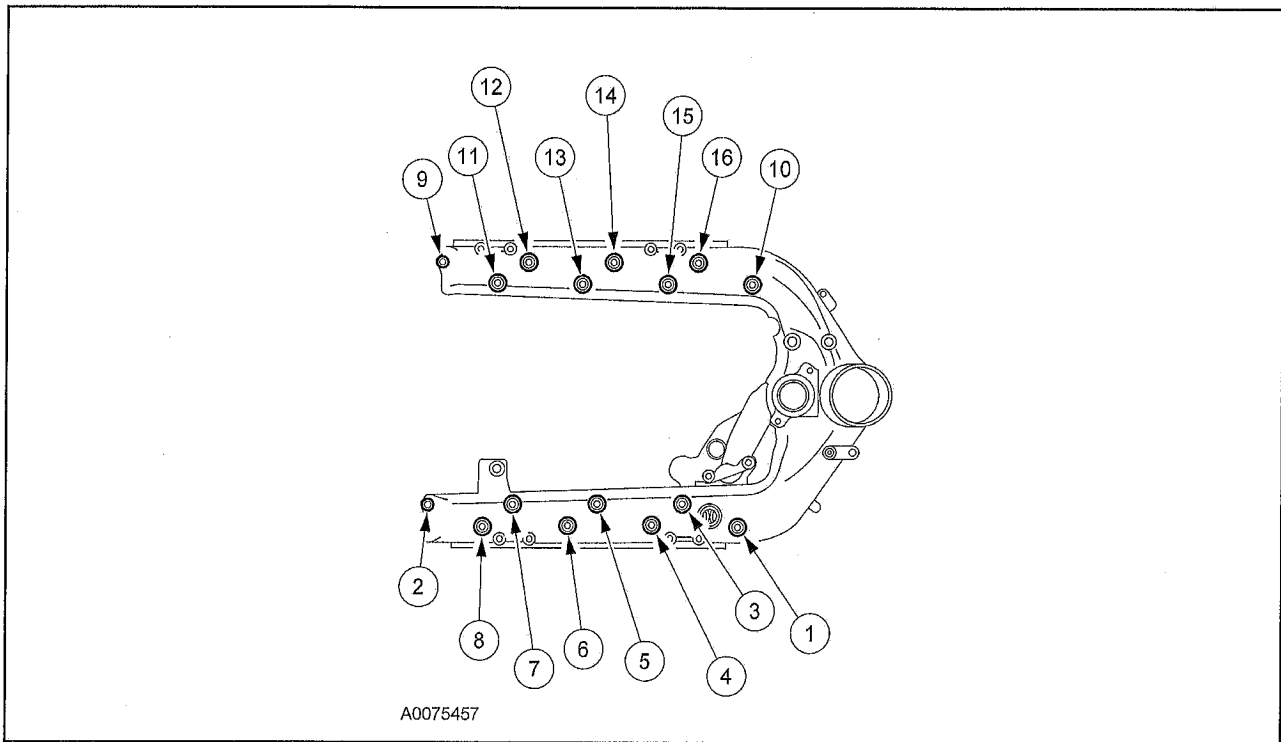
2. **NOTE:**  
To keep the EGR gasket in place when installing the manifold, apply a slight amount of all purpose grease to the mating surface of the EGR tube.

**NOTE:**  
Install the EGR cooler V-clamp loosely in place on the turbo adapter pipe.

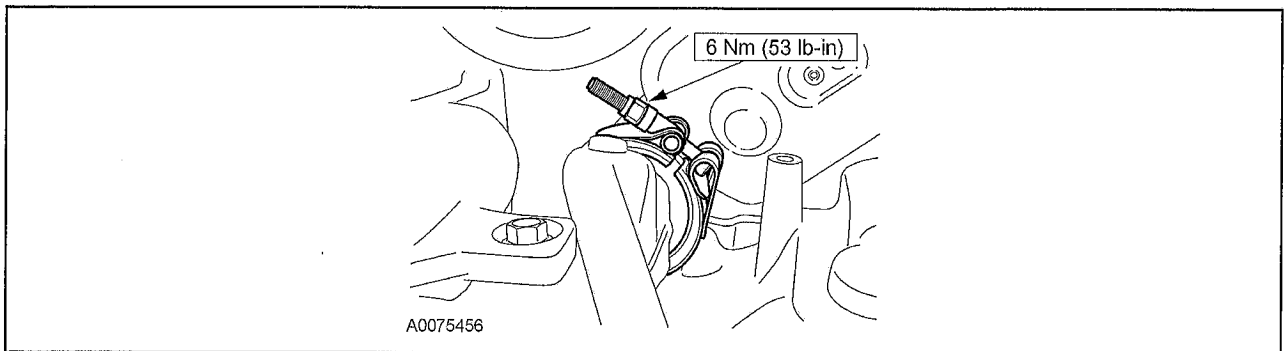
Install the intake manifold and loosely install the bolts. Tighten the intake manifold bolts in the sequence shown.

- 1 Tighten bolts 9-16 to 11 Nm (8 lb-ft).
- 2 Tighten all bolts to 11 Nm (8 lb-ft) in the sequence shown.

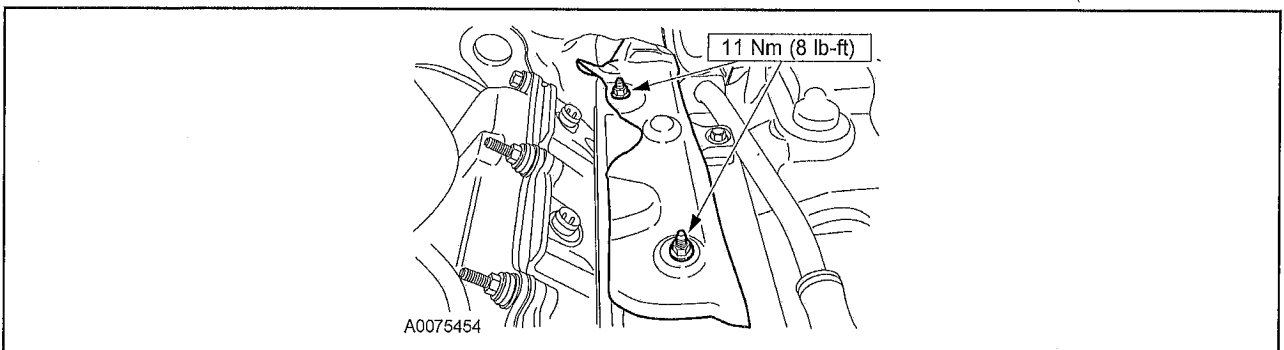
## IN-VEHICLE REPAIR (Continued)



3. Position the EGR cooler V-clamp over the EGR tube.
4. Install the gasket and the EGR cooler V-clamp.



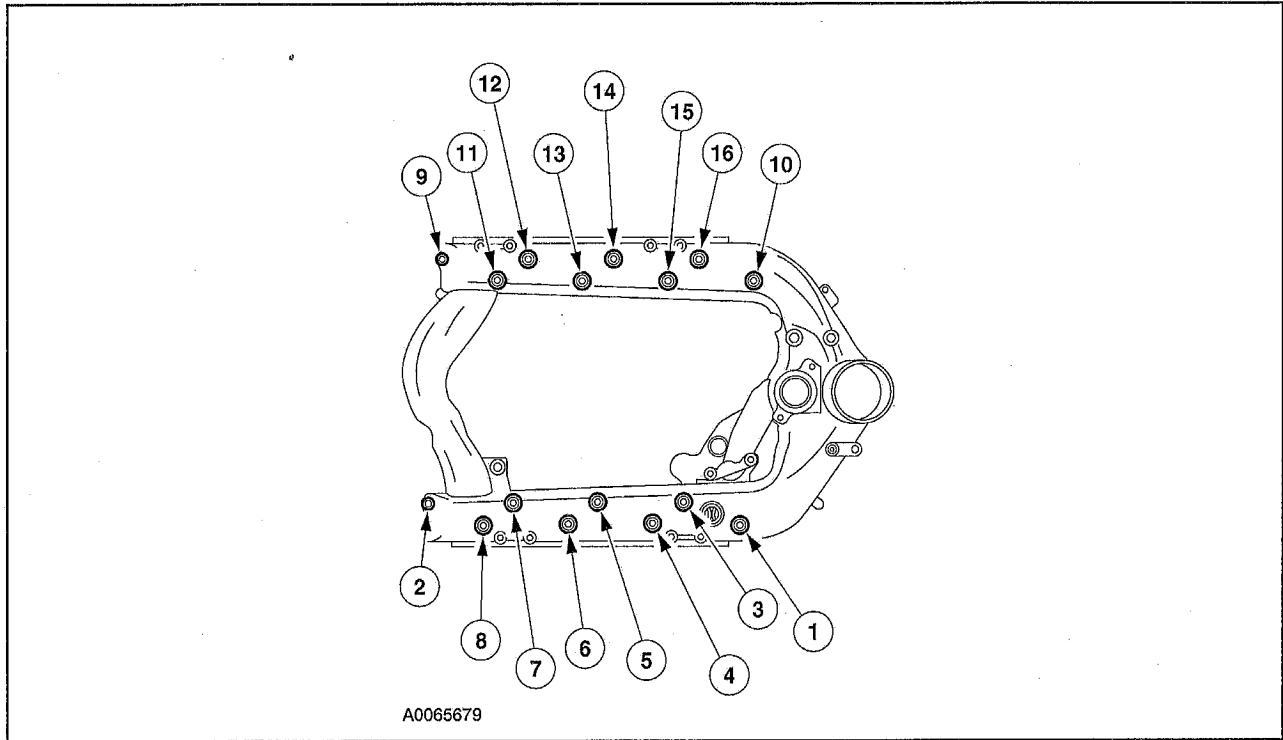
5. Install the turbocharger heat shield and the nuts.

**Early build**

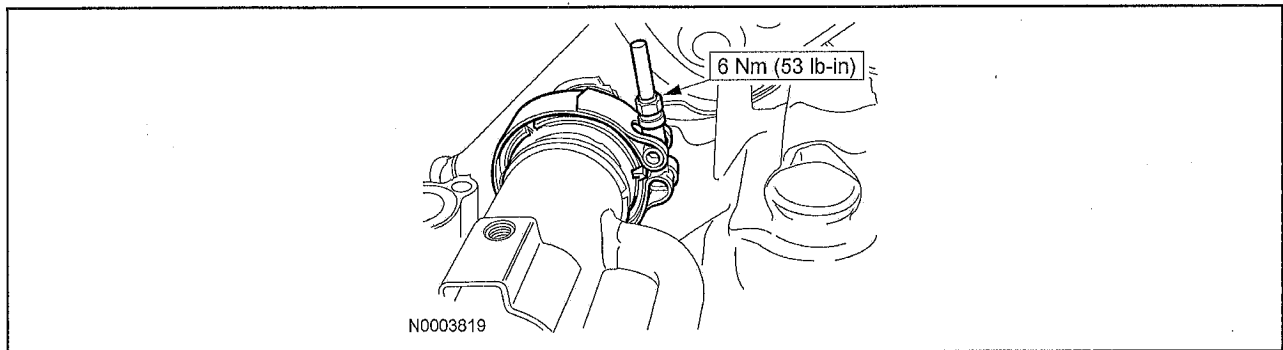
6. Install the intake manifold and bolts and tighten in the following sequence.
  - 1 Loosely install bolts 1-8.

**IN-VEHICLE REPAIR (Continued)**

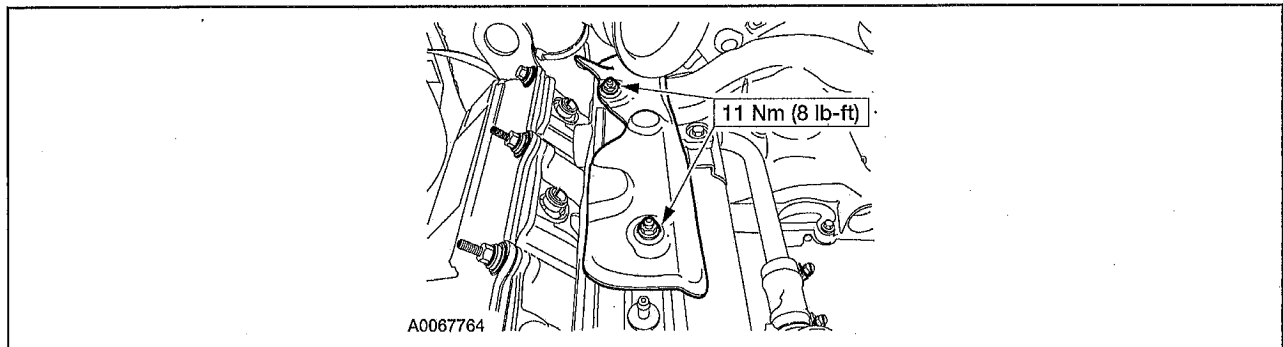
- 2 Tighten bolts 9-16 to 11 Nm (8 lb-ft).
- 3 Tighten all bolts to 11 Nm (8 lb-ft) in the sequence shown.



- 7. Tighten the EGR cooler V-clamp.



- 8. Install the turbocharger heat shield and the nuts.

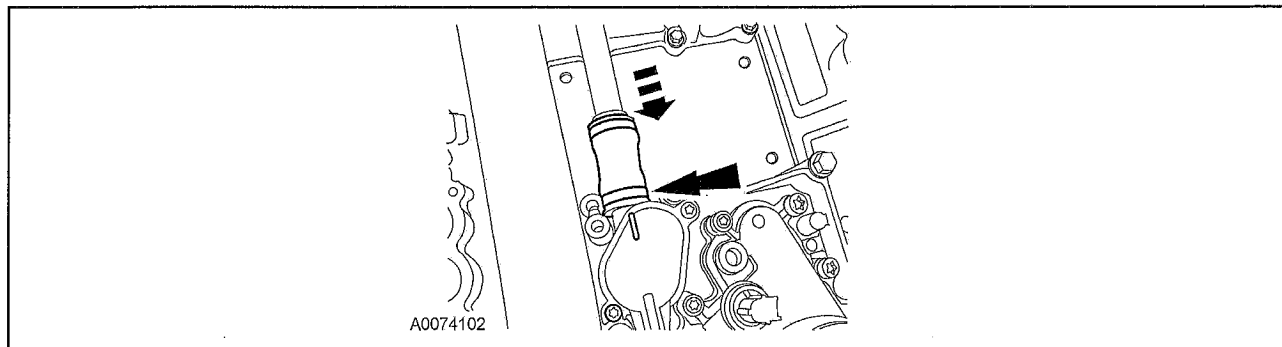


**All vehicles**

- 9. Slide the EGR cooler hose forward and rotate flat to lock.



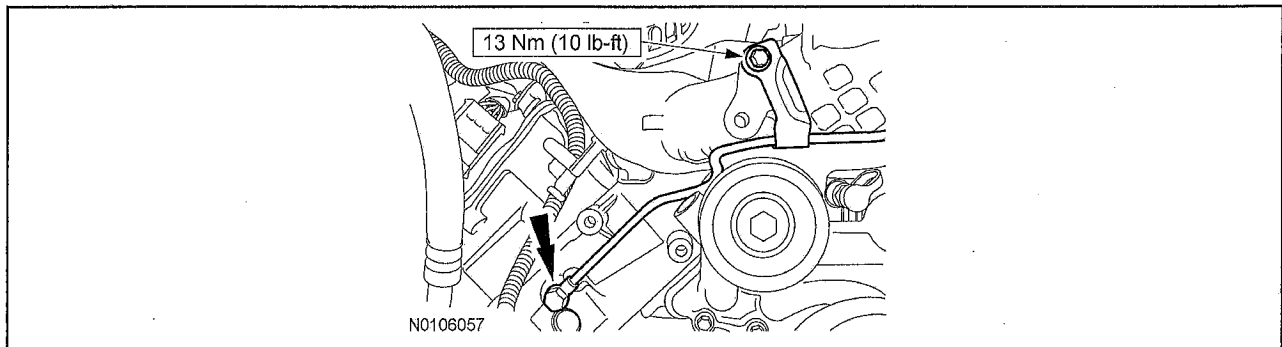
## IN-VEHICLE REPAIR (Continued)



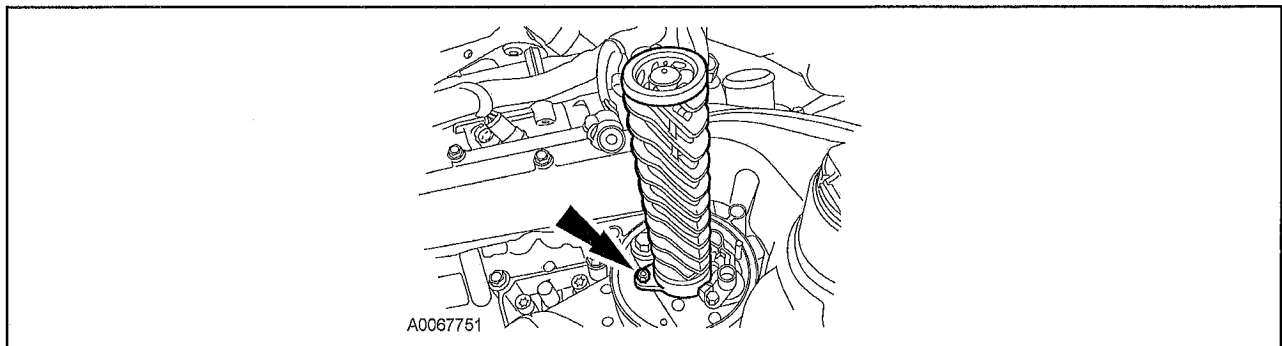
10. **NOTE:**  
Install new sealing washers on the banjo bolt.

Install the fuel tube.

- Install the bolt.
- Install the banjo bolt.
  - For Viton® sealing washers, tighten to 25 Nm (18 lb-ft).
  - For copper sealing washers, tighten to 38 Nm (28 lb-ft).

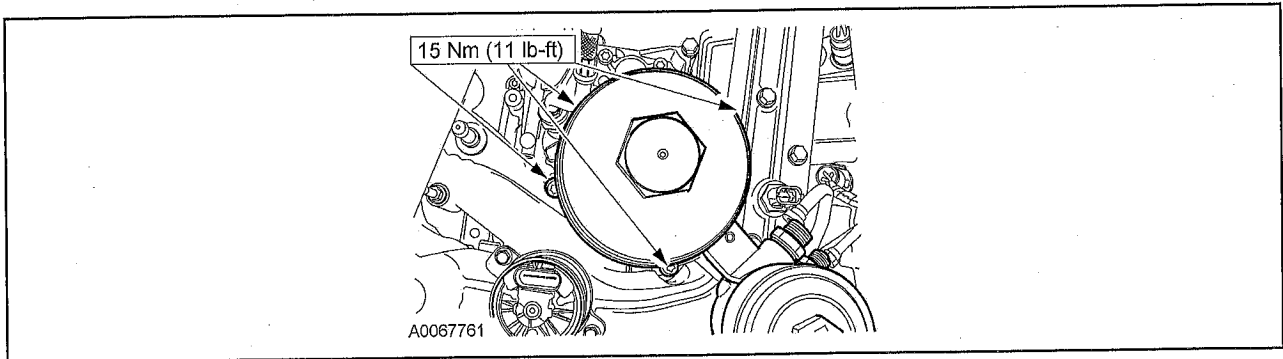


11. Install the oil filter return tube and bolt.
- On new oil filter return tubes, tighten to 6 Nm (53 lb-in).
  - On used oil filter return tubes, tighten to 3 Nm (27 lb-in).

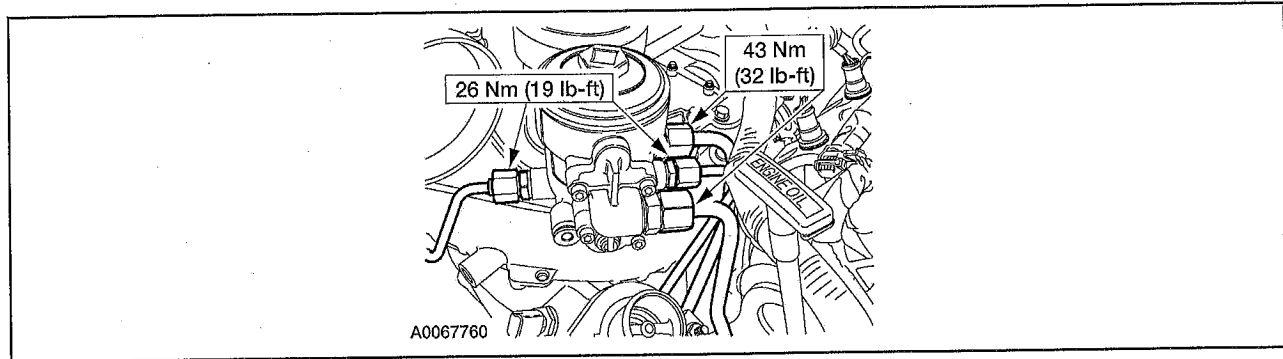


12. Install the oil filter housing and the four bolts.
- Clean and inspect the housing O-rings. Install new O-rings if necessary.

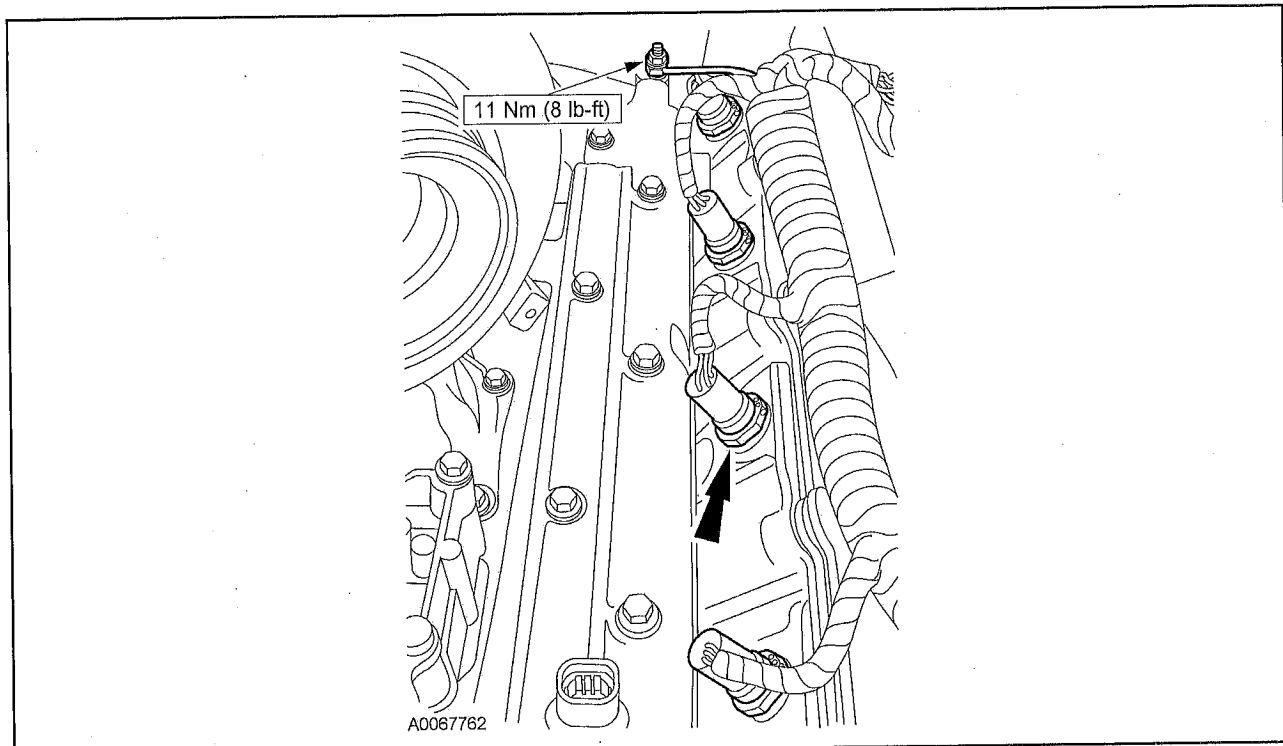
IN-VEHICLE REPAIR (Continued)



13. Connect the fuel tube fittings.

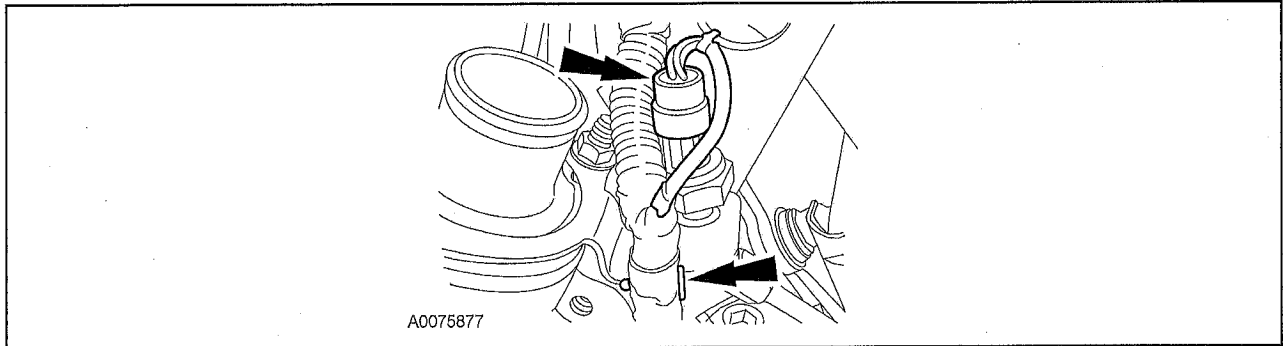


14. Position the fuel injector harness and install the retaining nut. Connect the eight fuel injectors electrical connectors.

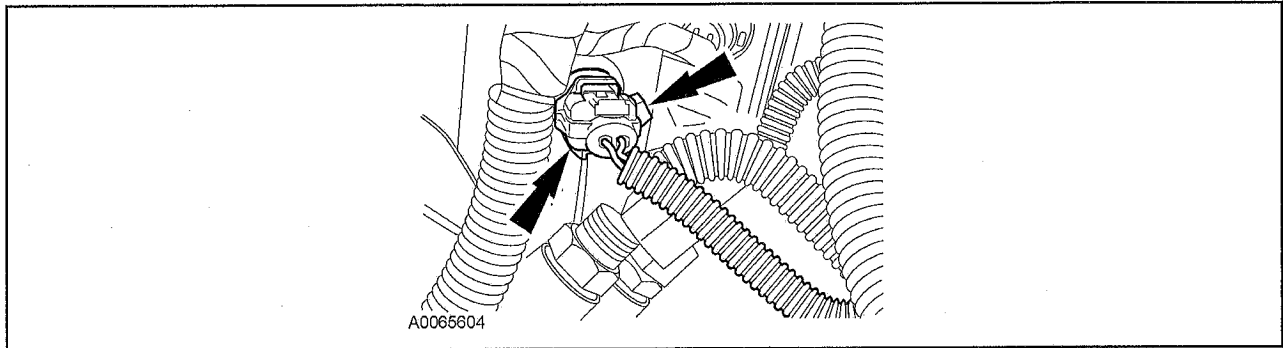


15. Connect the retaining clip and exhaust backpressure sensor electrical connector.

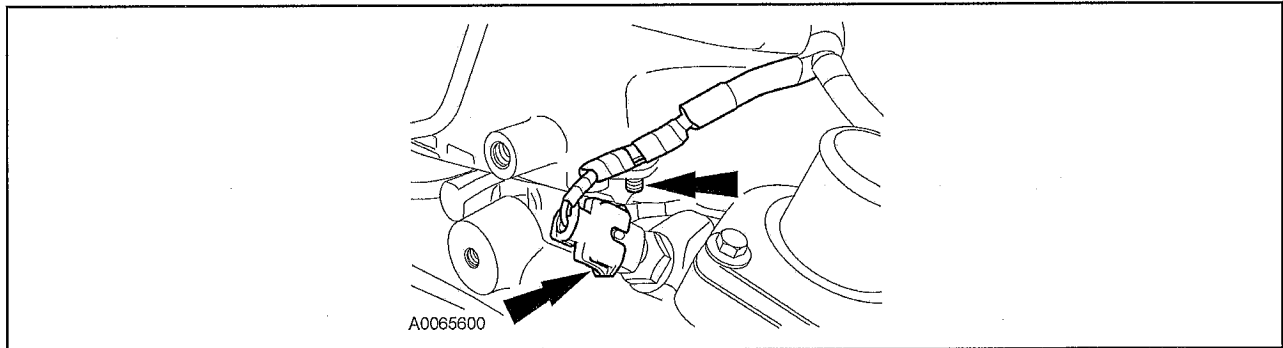
IN-VEHICLE REPAIR (Continued)



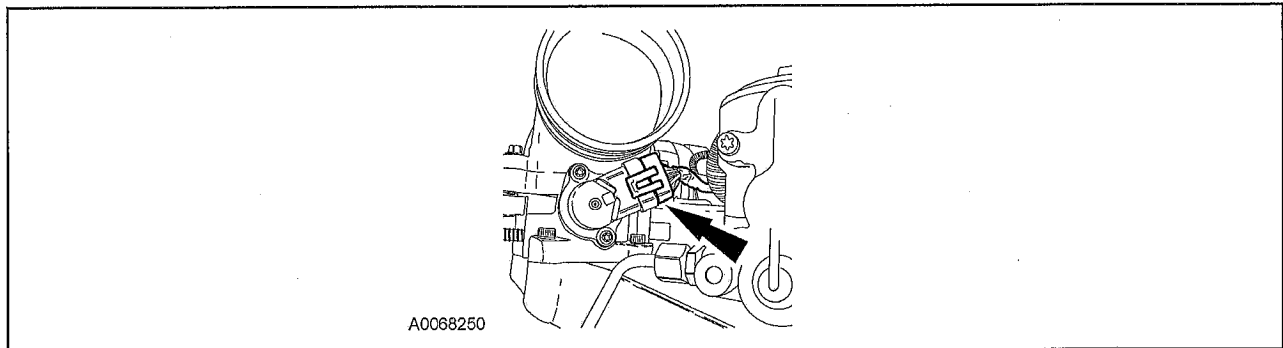
16. Connect the wiring retainer and the IAT2 sensor electrical connector.



17. Connect the engine coolant temperature (ECT) sensor and the pin-type retainer.

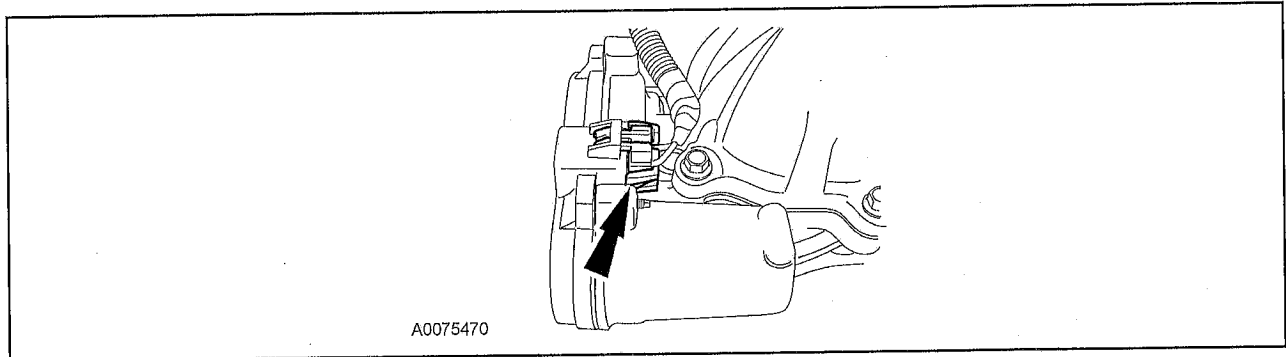


18. Connect the EGR throttle position sensor electrical connector.

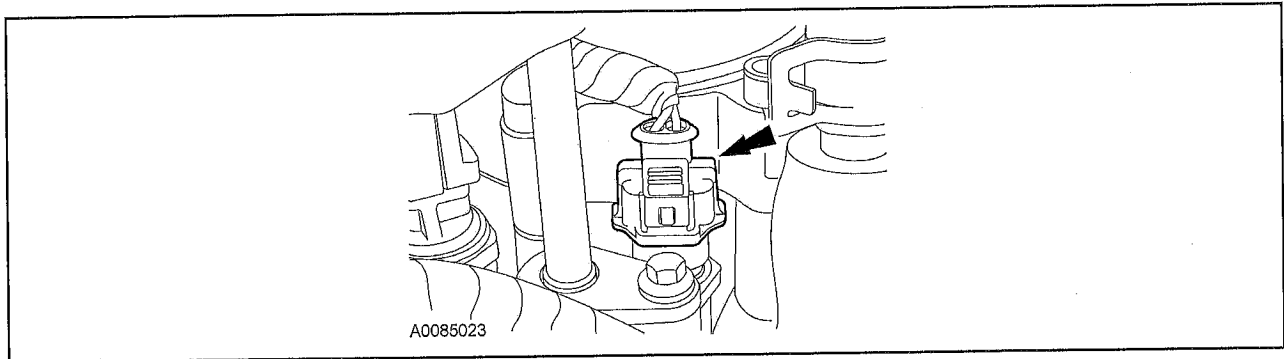


19. Connect the EGR throttle position control module electrical connector.

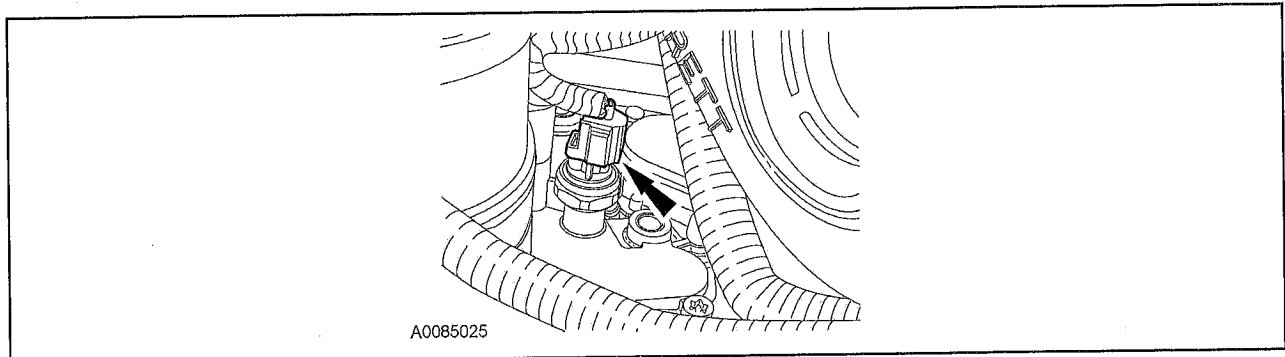
## IN-VEHICLE REPAIR (Continued)



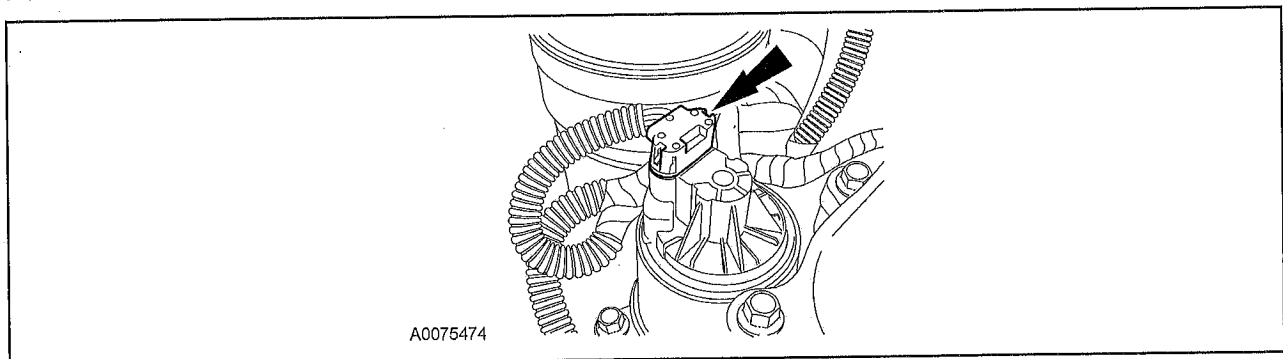
20. Connect the engine oil temperature (EOT) sensor electrical connector.



21. Connect the engine oil pressure (EOP) sensor electrical connector.

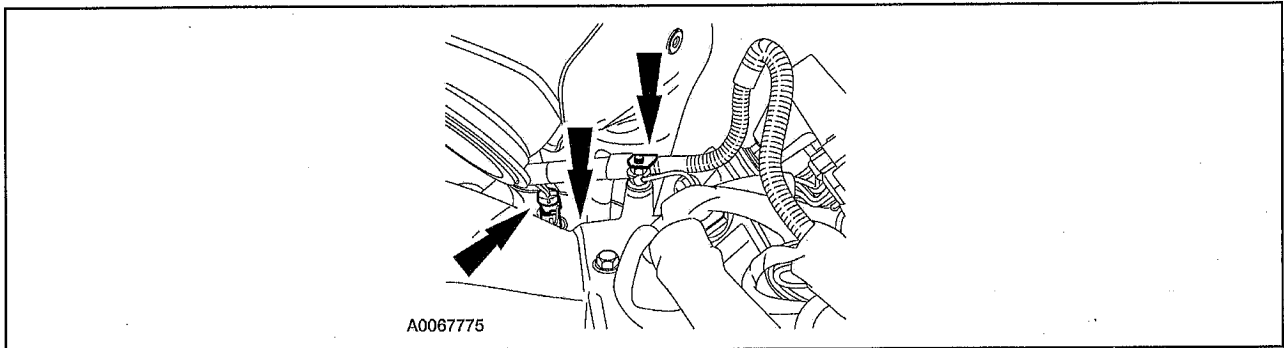


22. Connect the EGR valve electrical connector.

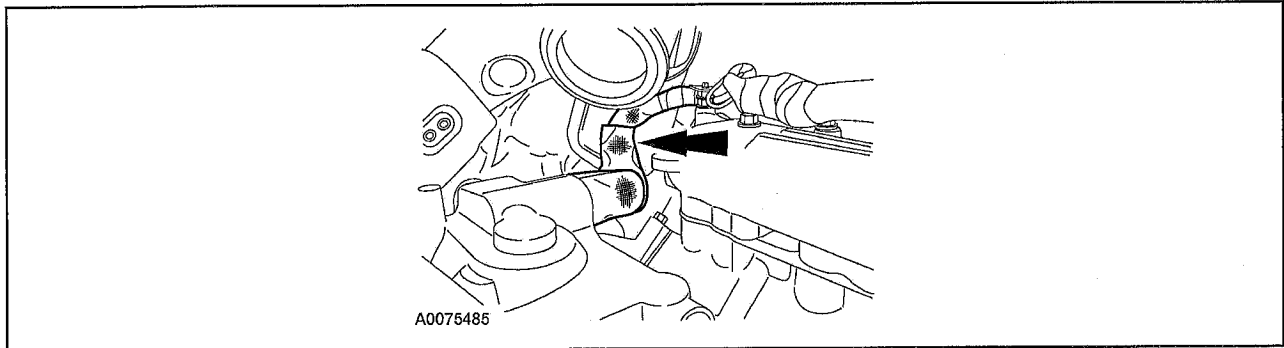


23. Connect the wiring retainer, injector pressure regulator and ICP sensor (if equipped) electrical connectors.

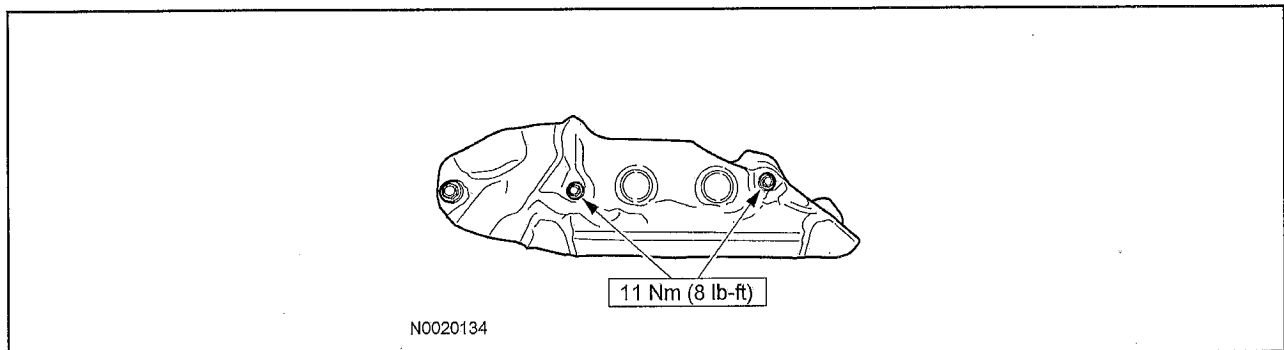
## IN-VEHICLE REPAIR (Continued)



24. Position back or install the heat insulating wrap.

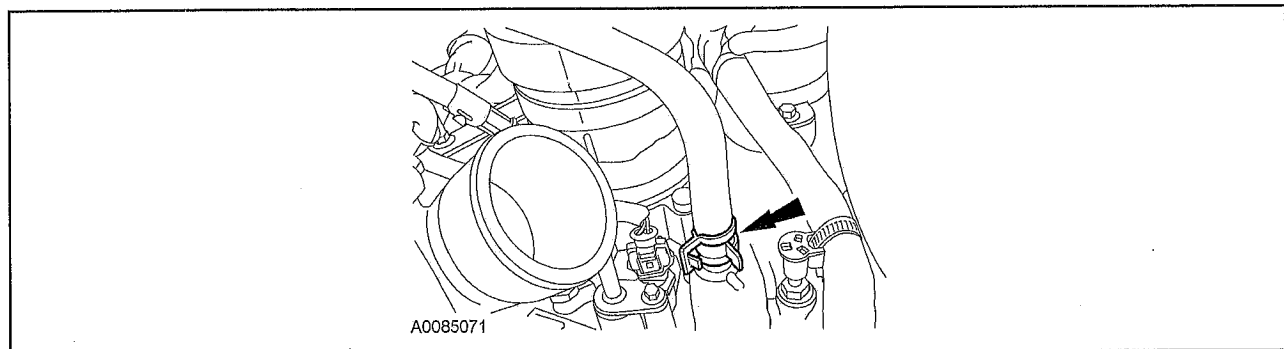


25. Install the top two bolts to the injector IPR heat shield.



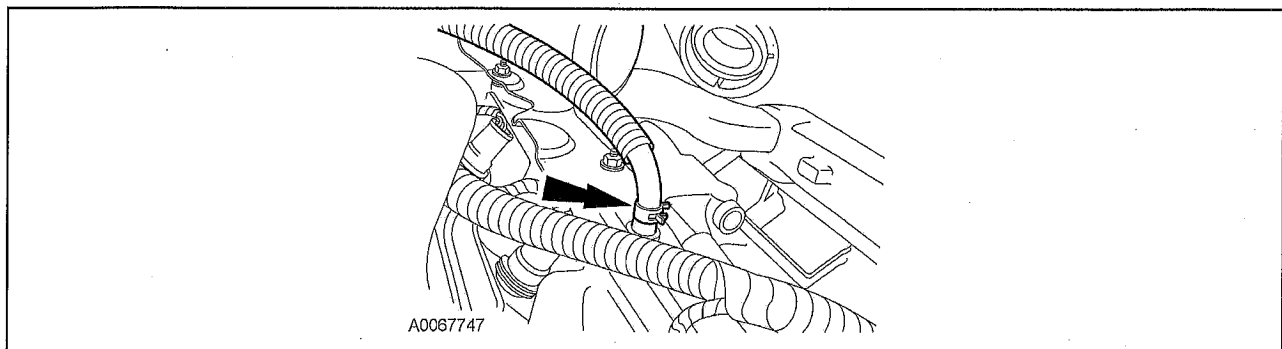
26. Install the fuel injector control module. For additional information, refer to Section 303-14B.

27. Connect the engine coolant vent hose and clamp.



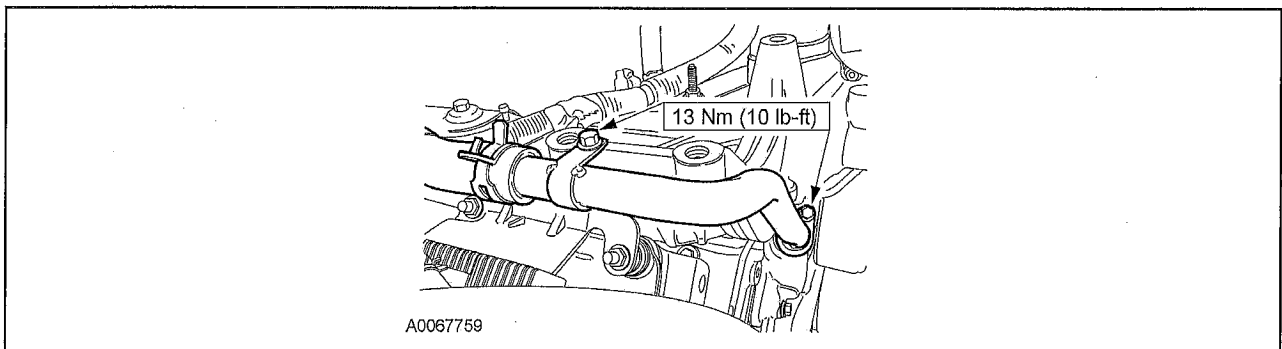
28. Connect the MAP sensor hose.

## IN-VEHICLE REPAIR (Continued)



29. **NOTE:**  
Install a new O-ring on the heater hose tube.

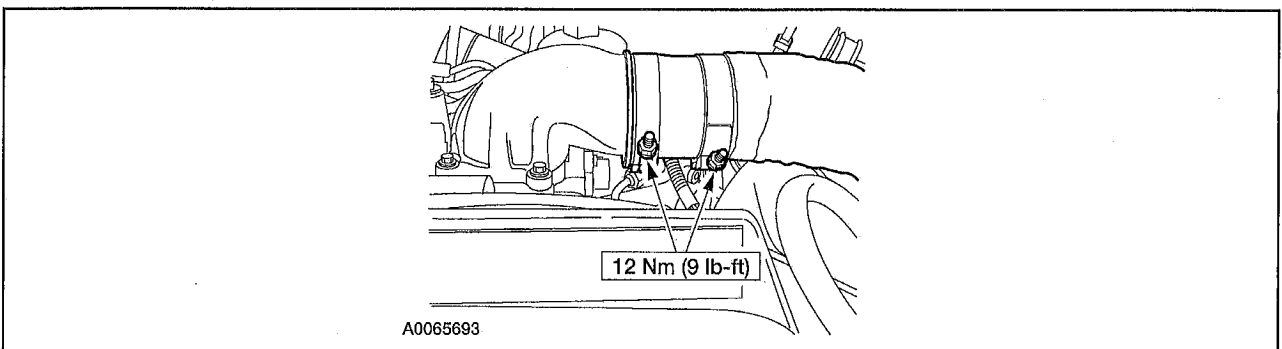
Install the heater hose tube and bolts.

**Early build**

30. **NOTE:**  
Engine side shown, charge air cooler side similar.

**NOTE:**  
If there is any oil residue, clean both connecting ports and the inside surface of the charge air cooler duct to prevent the duct from blowing off.

Install the charge air cooler duct and tighten the clamps.

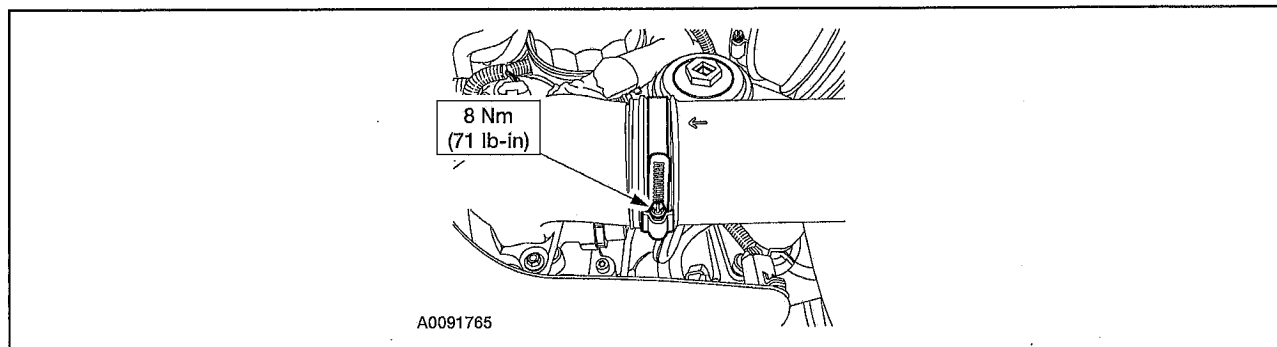
**Late build**

31. **NOTE:**  
Engine side shown, charge air cooler side similar.

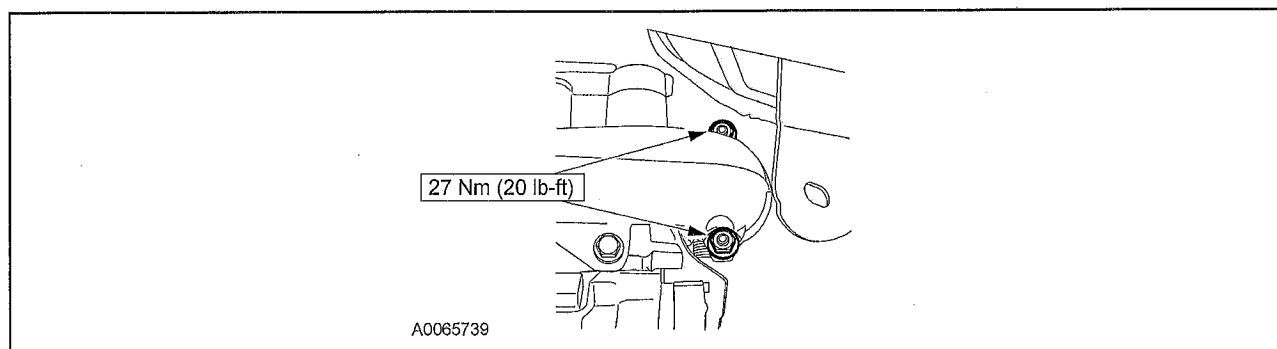
**NOTE:**  
If there is any oil residue, clean both connecting ports and the inside surface of the charge air cooler duct to prevent the duct from blowing off.

Install the charge air cooler duct and tighten the clamp.

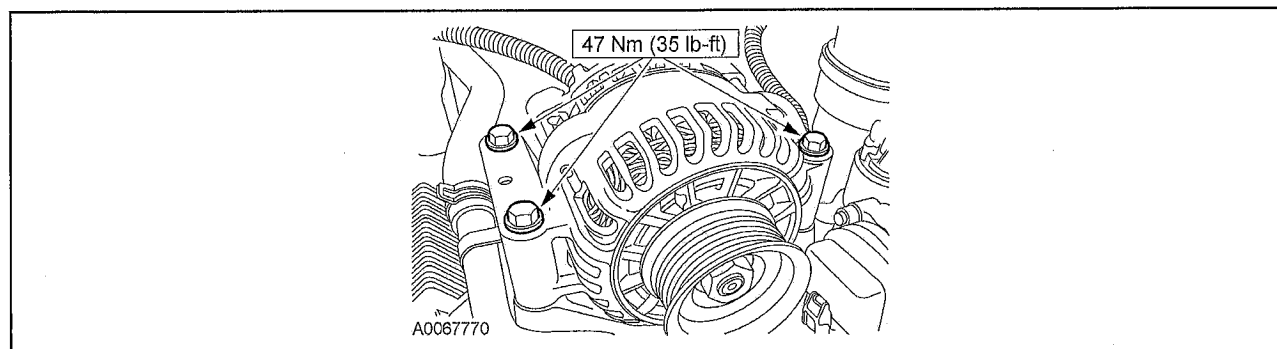
## IN-VEHICLE REPAIR (Continued)



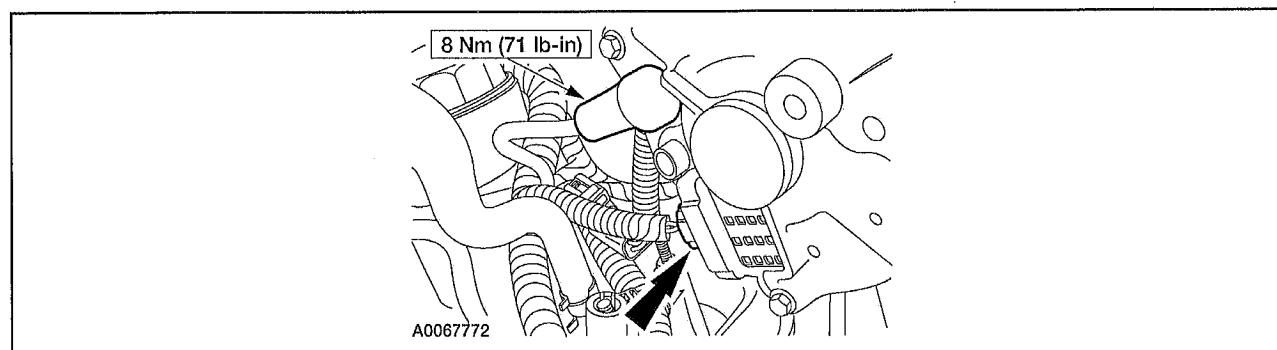
32. Install the turbocharger pedestal and turbocharger. For additional information, refer to Section 303-04D.
33. Tighten the nuts and bolts in the adapter pipe.



34. Install the generator and the three bolts.

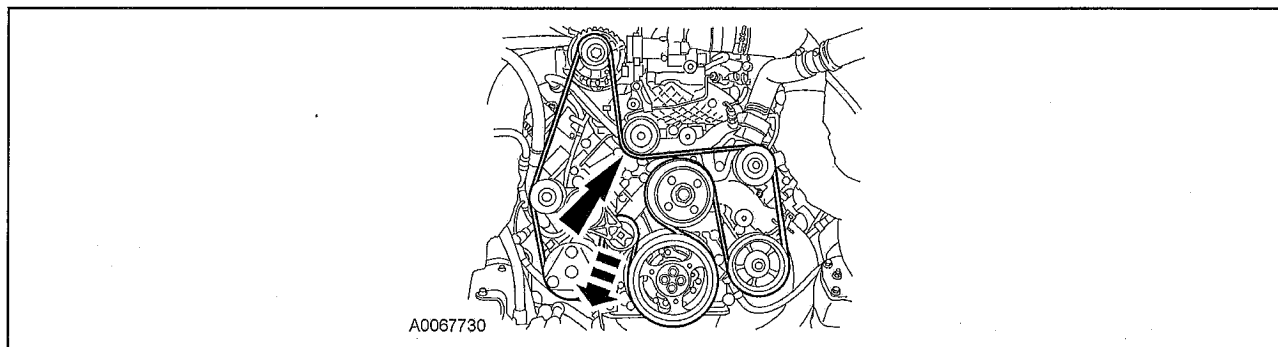


35. Connect the generator B+ wire land electrical connector and position the boot back.

**Vehicles with single generator**

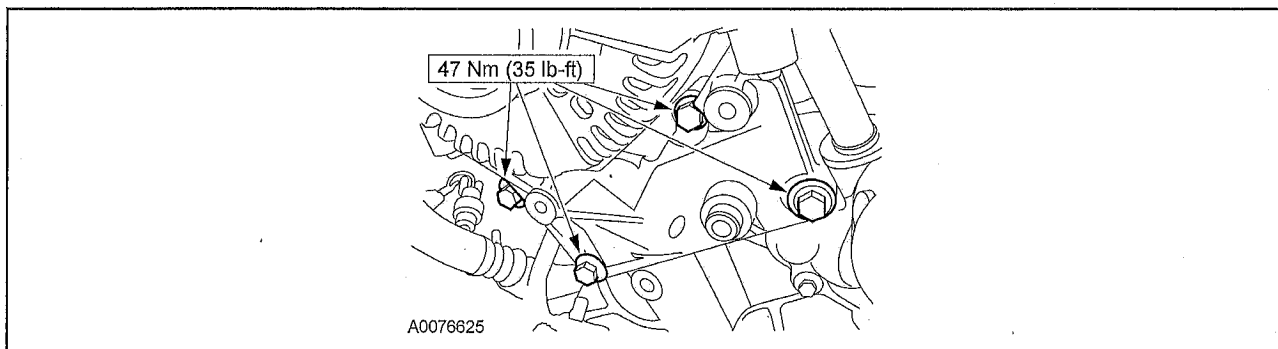
36. Install the accessory drive belt.

IN-VEHICLE REPAIR (Continued)

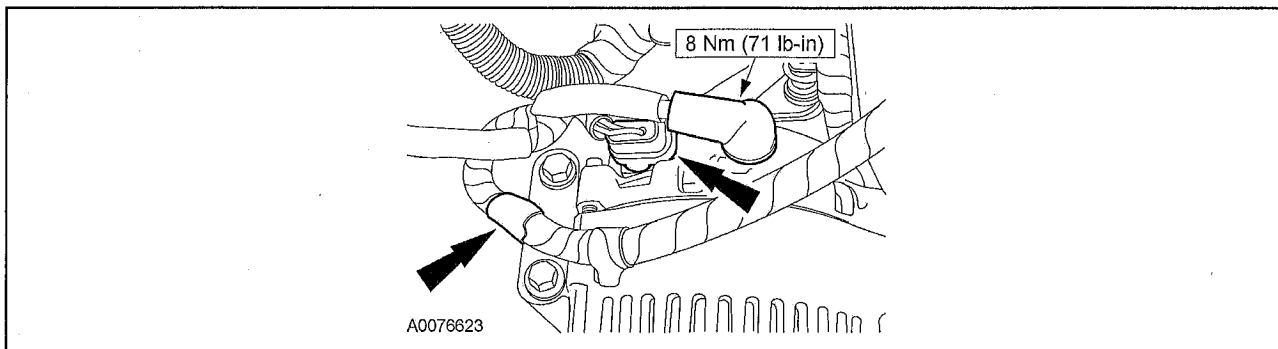


Vehicles with dual generators

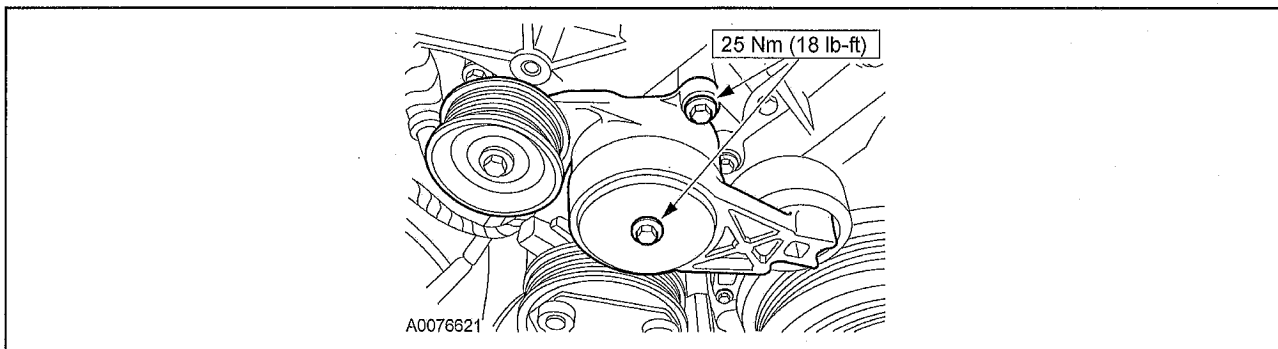
37. Install the generator with mounting bracket and bolts.



38. Connect the B+ wire, generator electrical connector and wire retainer.



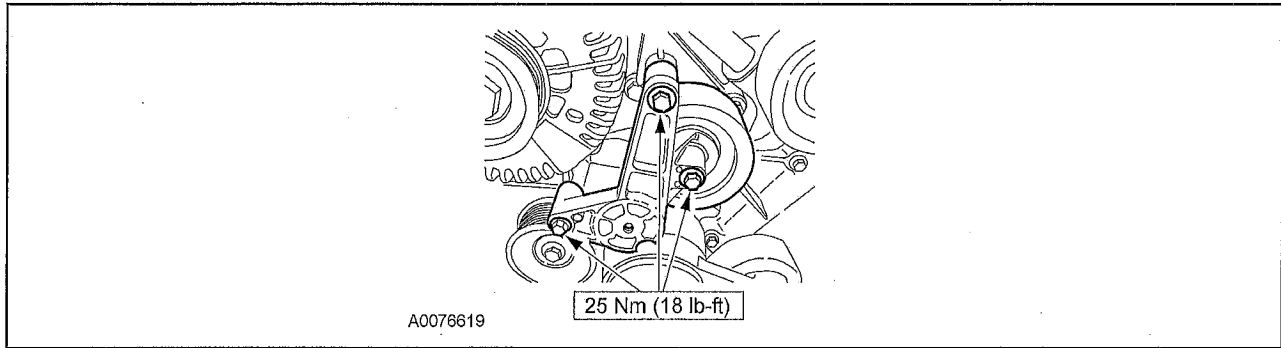
39. Install the accessory drive belt tensioner and bolts.



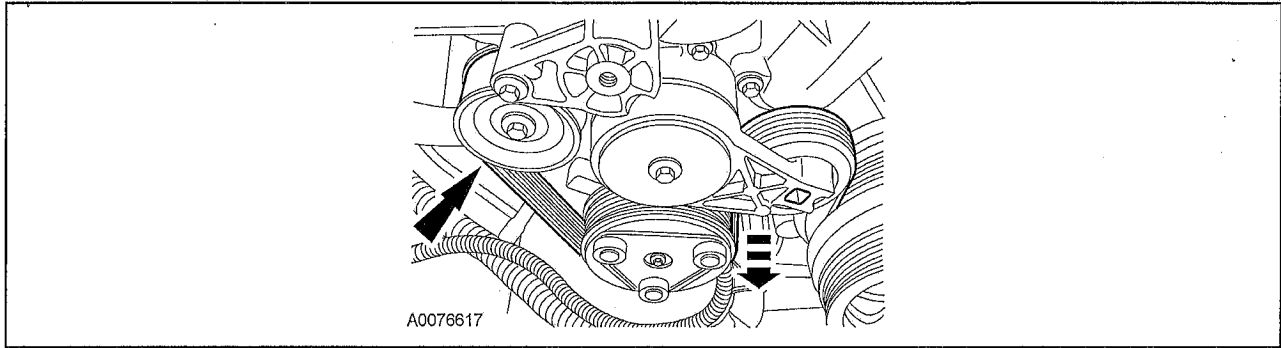
40. Position the accessory drive belt idler pulley. Install the bracket and bolts.



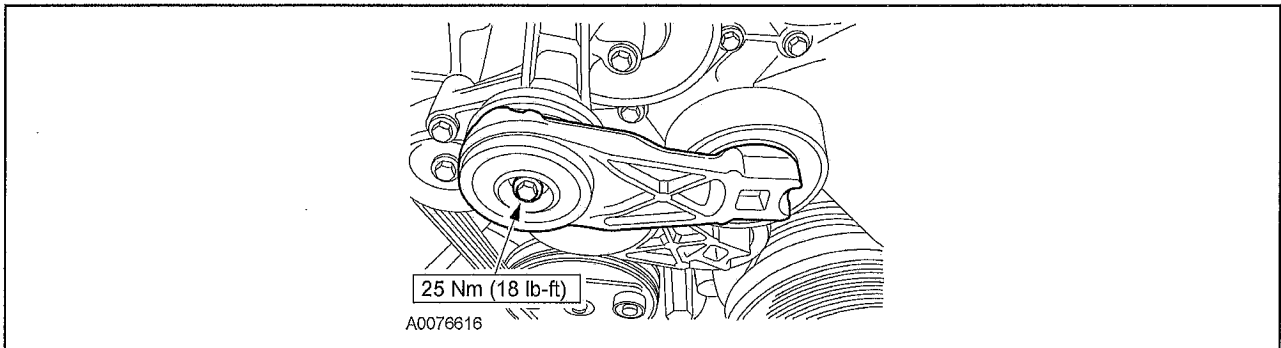
IN-VEHICLE REPAIR (Continued)



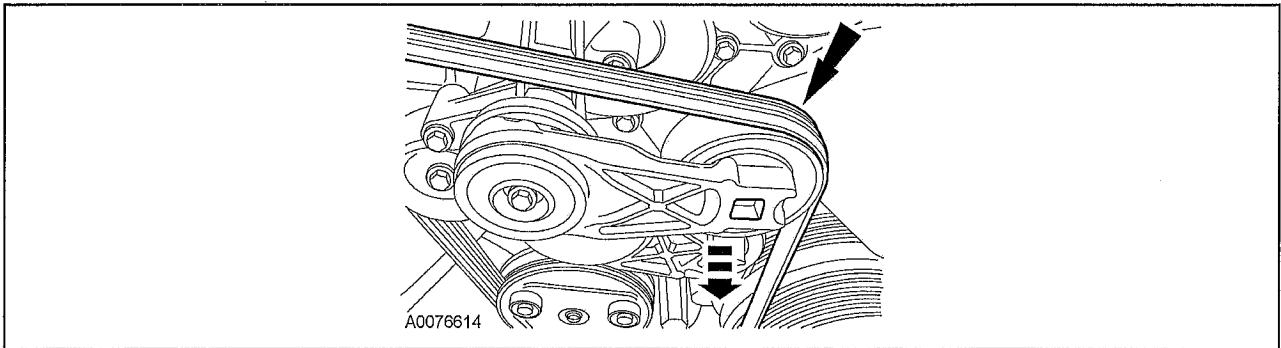
41. Install the accessory drive belt.



42. Install the accessory drive belt tensioner and bolt.



43. Install the accessory drive belt.

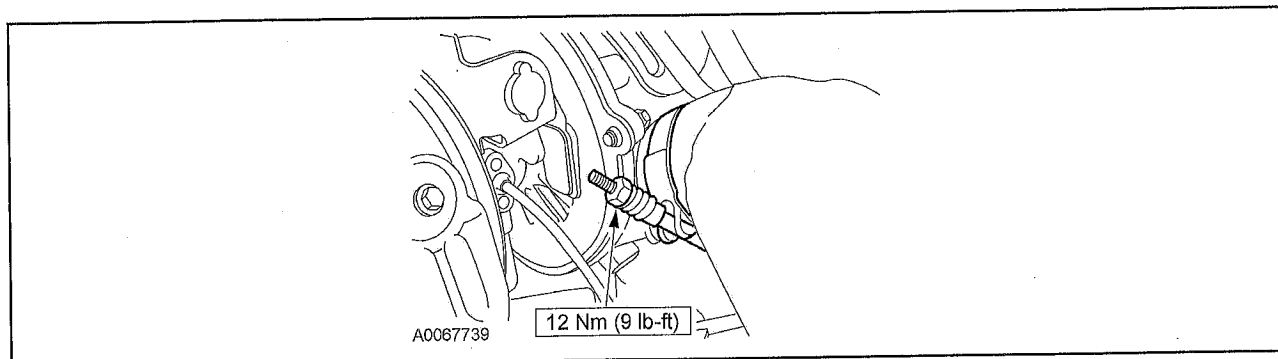


All vehicles

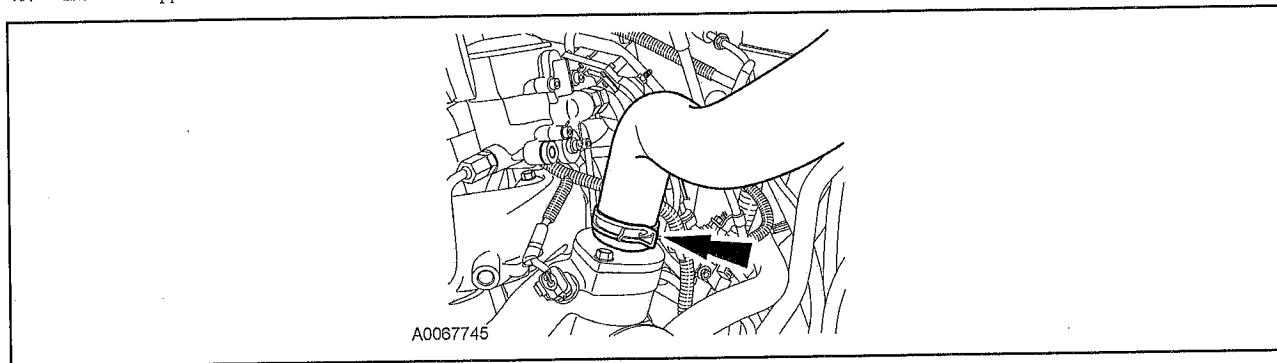
44. **NOTE:**  
Engine side shown, charge air cooler side similar.

Install the turbocharger-to-charge air cooler duct.

## IN-VEHICLE REPAIR (Continued)



45. Install the upper radiator hose.



46. Install the degas bottle. For additional information, refer to Section 303-03.
47. Install the auxiliary battery. For additional information, refer to Section 414-01.
48. Install the cooling fan stator — 6.0L diesel engine. For additional information, refer to Section 303-03.