




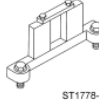

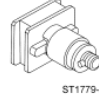


Cylinder Head  [Printable View \(1608 KB\)](#)**Special Tool(s)**

 ST1780-A	Torque Wrench Extension 303-575 (T97T-6256-F) or equivalent
 ST1781-A	Socket, Camshaft Sprocket Nut 303-565 (T97T-6256-G) or equivalent
 ST1777-A	Holding Tool, Camshaft Sprocket 303-564 (T97T-6256-B) or equivalent
 ST1776-A	Adapter for 303-564 303-578 (T97T-6256-A) or equivalent
 ST1774-A	Tensioner, Timing Chain 303-571 (T97T-6K254-A) or equivalent
 ST1778-A	Holding Tool, Camshaft 303-577 (T97T-6256-C) or equivalent
 ST1775-A	Timing Tool, Crankshaft TDC 303-573 (T97T-6303-A) or equivalent
 ST1779-A	Adapter for 303-577 303-576 (T97T-6256-D) or equivalent

Material

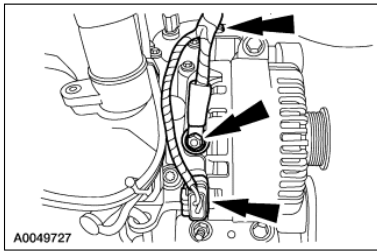
Item	Specification
Silicone Brake Caliper Grease and Dielectric Compound XG-3 or equivalent	ESE-M1C171-A

Removal**Both sides**

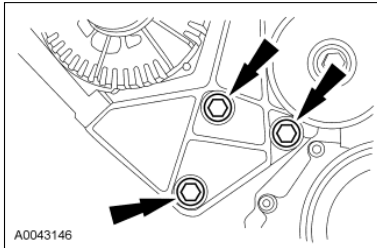
1. Drain the engine cooling system. For additional information, refer to [Section 303-03](#).
2. Remove the roller followers. For additional information, refer to [Camshaft Roller Follower and Hydraulic Lash Adjuster](#) in this section.
3. Remove the accessory drive belt tensioner. For additional information, refer to [Accessory Drive Belt, Tensioner and Pulley](#) in this section.

RH side

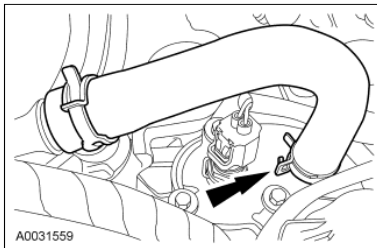
4. Disconnect the generator electrical connections and disconnect the pushpin.



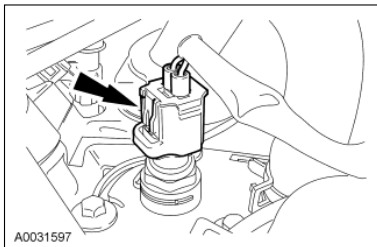
5. Remove the generator mounting bracket assembly.



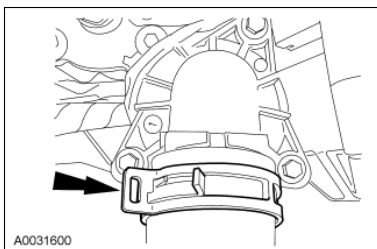
6. Remove the heater hose from the thermostat housing.



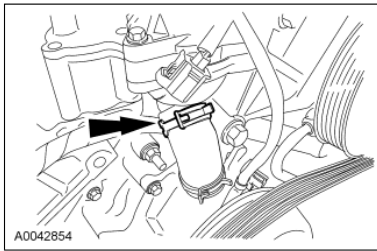
7. Disconnect the engine coolant temperature (ECT) sensor electrical connector.



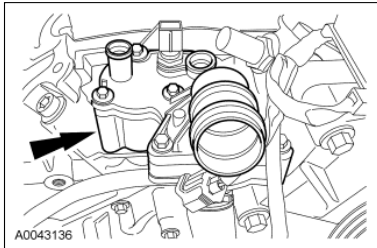
8. Disconnect the upper radiator hose.



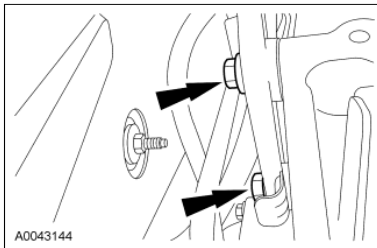
9. Position the coolant bypass hose clamp aside.



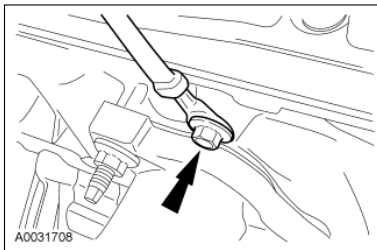
10. Remove the bolts and the thermostat housing.



11. Remove the engine wiring harness bolts and position the engine wiring harness aside.

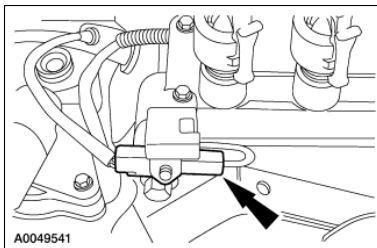


12. Remove the engine ground strap.

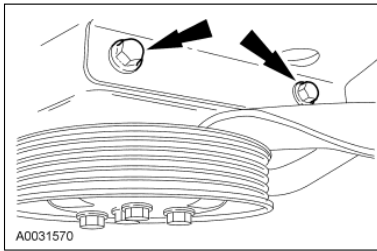


LH side

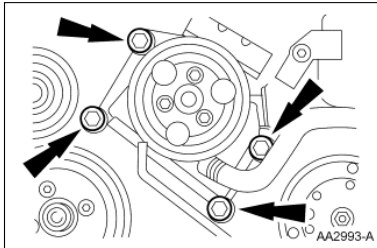
13. Disconnect the radio ignition interference capacitor electrical connector.



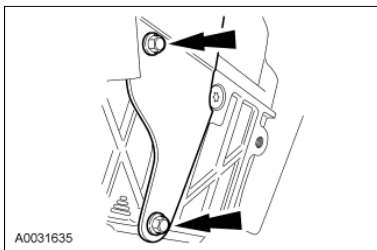
14. Remove the bolts.



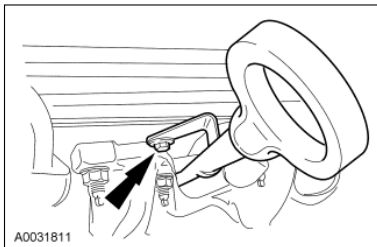
15. Remove the bolts and position the accessory bracket aside.




16. Remove the bolts and the coil bracket.



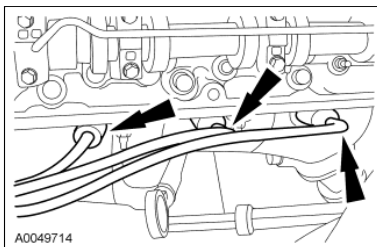
17. Remove the oil level indicator tube.



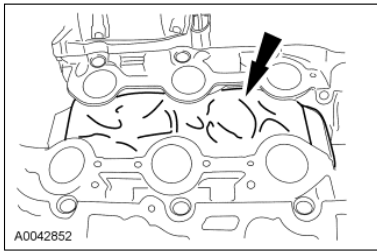
Both sides

18.  **CAUTION:** It is important to twist the spark plug wire boots while pulling upward to avoid possible damage to the spark plug wires.

Disconnect all of the spark plug wires from the spark plugs.



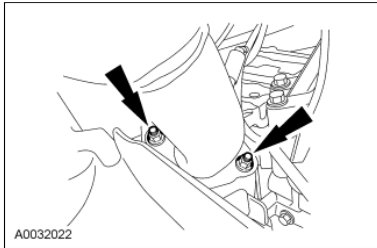
19. Remove the engine noise shield.



20. Raise and support the vehicle. For additional information, refer to [Section 100-00](#).

21. **NOTE:** LH side shown, RH side similar.

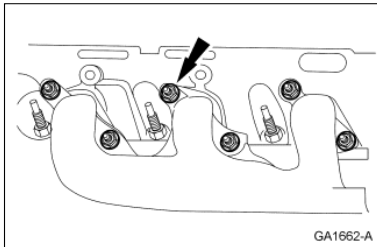
Remove the four catalytic converter-to-manifold nuts.



22. Lower the vehicle.

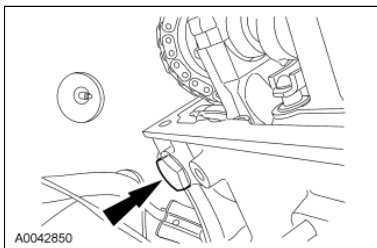
23. Remove both of the exhaust manifolds and gaskets.

- Discard the gaskets and the retaining nuts.

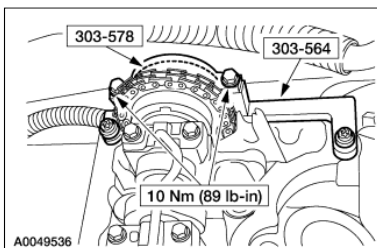


RH side

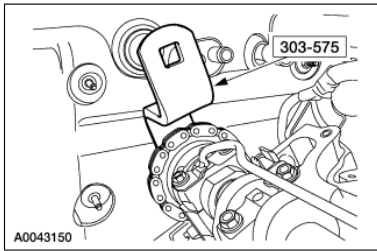
24. Remove the RH side hydraulic chain tensioner.



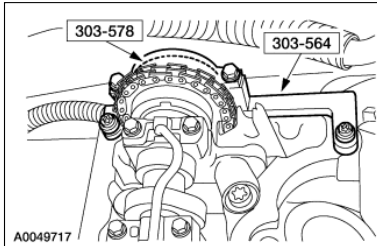
25. Install the special tools.



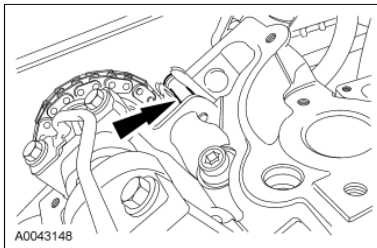
26. Using the special tool, remove the RH camshaft bolt.



27. Remove the special tools.



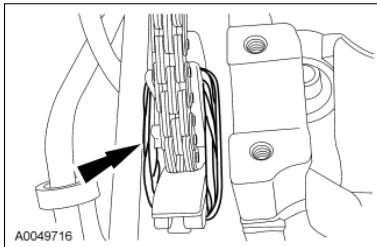
28. Remove the RH side cassette bolt.



29. **CAUTION:** Remove the camshaft sprocket from the timing chain to gain clearance to remove the cylinder head.

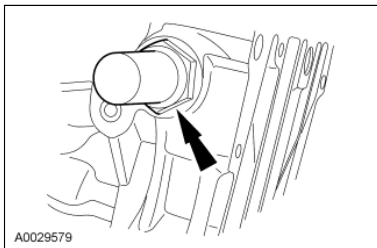
NOTE: Hold the timing chain and cassette with a rubber band to aid in removal and to prevent the timing chain from falling into the cylinder block.

Remove the RH camshaft sprocket from the timing chain. Install a rubber band around the cassette and the timing chain.

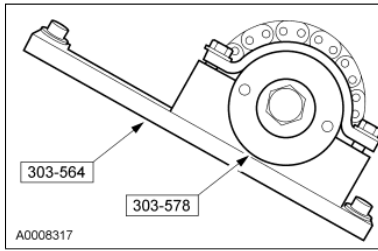


LH side

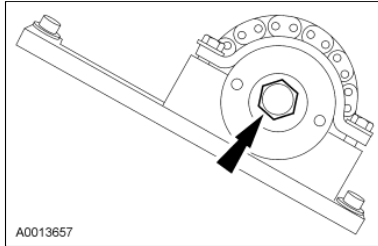
30. Remove the LH side hydraulic chain tensioner.



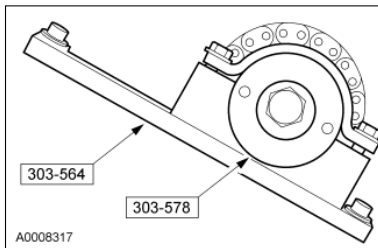
31. Install the special tools. Tighten the top clamp bolts to 10 Nm (89 lb-in).



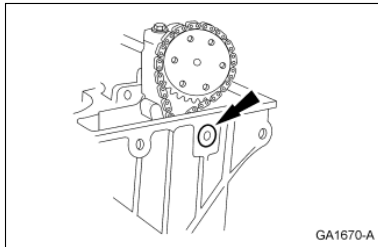
32. Remove the LH side camshaft sprocket bolt.



33. Remove the special tools.



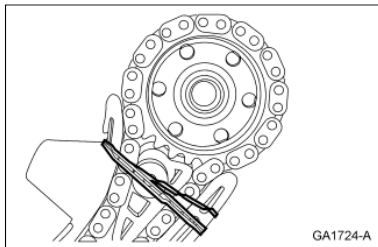
34. Remove the LH side cassette bolt.



35. **CAUTION:** Remove the camshaft sprocket from the timing chain to gain clearance to remove the cylinder head.

NOTE: Hold the timing chain and cassette with a rubber band to aid in removal and to prevent the timing chain from falling into the cylinder block.

Remove the LH camshaft sprocket from the timing chain. Install a rubber band around the cassette and the timing chain.



Both sides

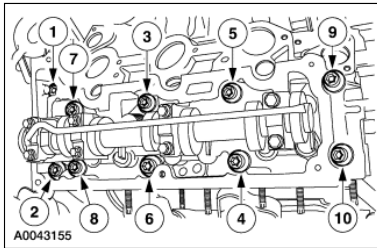
36. **CAUTION:** To avoid damage to the timing chain cassette an assistant will be required to help lift the cylinder head from the vehicle.

CAUTION: On the RH side, when lifting the cylinder head be careful to avoid contacting the A/C tube.

NOTE: New cylinder head bolts must be installed. They are a torque-to-yield design and cannot be reused.

Remove the cylinder heads.

- Remove the cylinder head bolts in the sequence shown. Discard all bolts.
- Remove and discard the head gasket.



37. **CAUTION:** Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges that make leak paths. Use a plastic scraping tool to remove all traces of the head gasket.

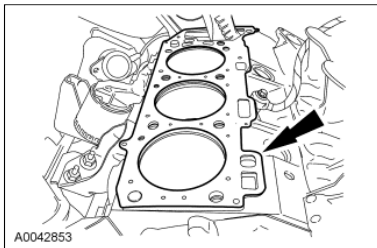
Clean and inspect the mating surfaces.

38. Inspect the cylinder head and the cylinder block for flatness. For additional information, refer to [Section 303-00](#).

Installation

Both sides

1. Position the cylinder head gasket on the block.



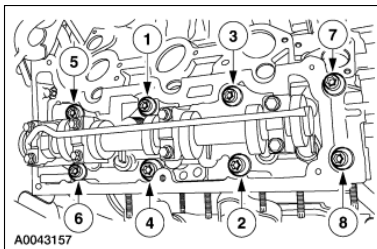
2. **CAUTION:** To avoid damage to the timing chain cassette an assistant will be required to help lift the cylinder head from the vehicle.

CAUTION: On the RH side, when lifting the cylinder head be careful to avoid contacting the A/C tube.

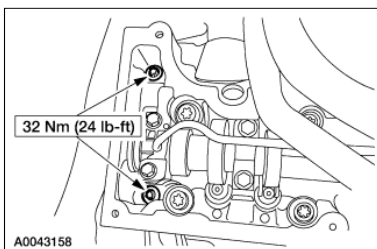
NOTE: New cylinder head bolts must be installed. They are a torque-to-yield design and cannot be reused.

Install the cylinder head. Install new 12 mm (0.48 in) bolts and tighten in the sequence shown in two stages.

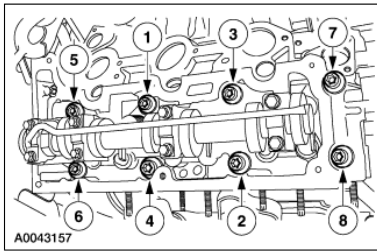
- Stage 1: Tighten to 12 Nm (9 lb-ft).
- Stage 2: Tighten to 25 Nm (18 lb-ft).




3. Install two new 8 mm (0.32 in) head bolts.

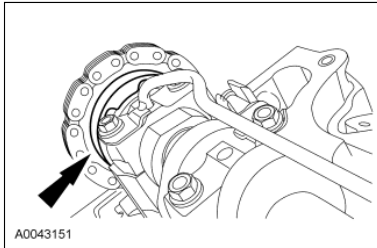


4. Tighten the eight 12 mm (0.48 in) bolts in the sequence shown in two stages.
- Tighten the bolts 90 degrees.
 - Tighten the bolts an additional 90 degrees.

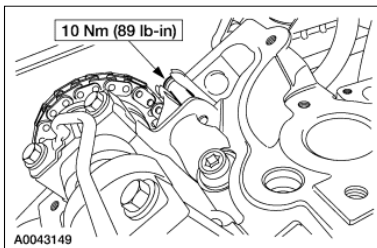
**RH side**


5.  **CAUTION:** The camshaft gear must turn freely on the camshaft. DO NOT tighten the bolt at this time

Remove the rubber band. Install the camshaft sprocket and bolt.

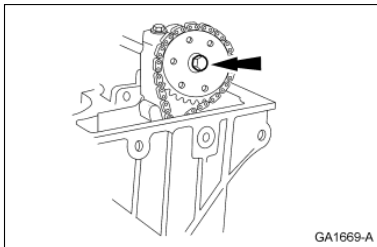


6. Install the RH side cassette bolt.

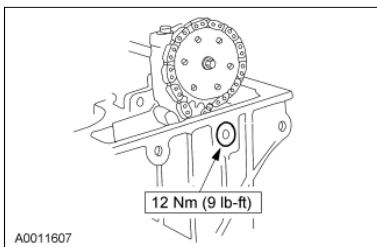
**LH side**

7.  **CAUTION:** The camshaft gear must turn freely on the camshaft. DO NOT tighten the bolt at this time.

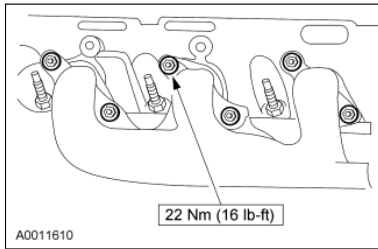
Remove the rubber band. Install the camshaft sprocket and bolt.



8. Install the LH side cassette bolt.

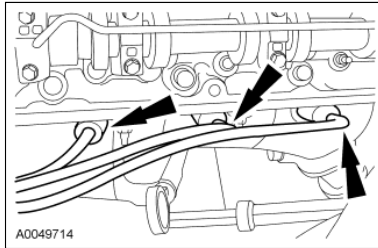
**Both sides**

9. Install both of the exhaust manifolds and gaskets.



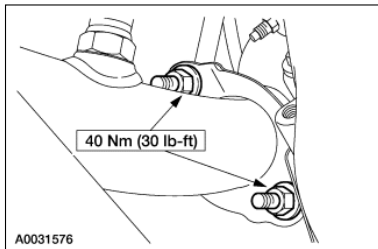
10. **NOTE:** Apply dielectric compound to the inside of the spark plug wire boots.

Connect all of the spark plug wires to the spark plugs.

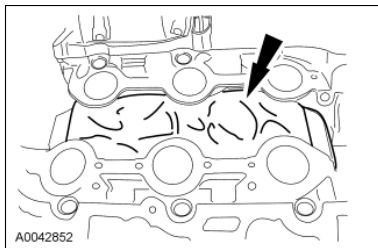


11. Raise and support the vehicle. For additional information, refer to [Section 100-00](#).
12. **NOTE:** LH side shown, RH side similar.

Install the four catalytic converter-to-exhaust manifold nuts.

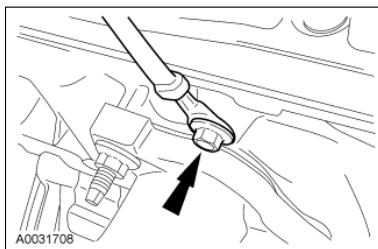


13. Lower the vehicle.
14. Install the engine noise shield.

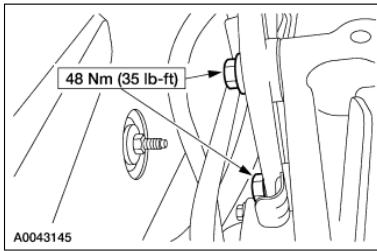


RH side

15. Install the engine ground strap.

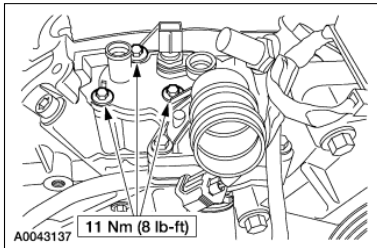


16. Position the engine wiring harness and install the bolts.

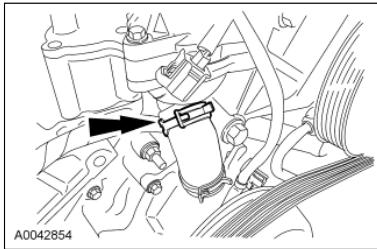


17. **NOTE:** Inspect the O-ring. Install a new O-ring if necessary.

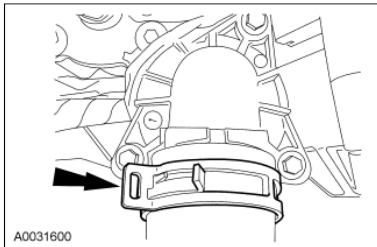
Install the thermostat housing.



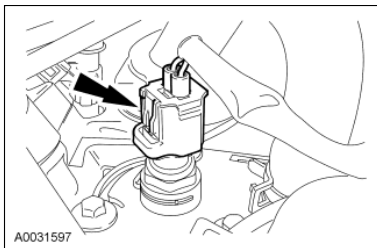
18. Position the coolant bypass hose clamp.



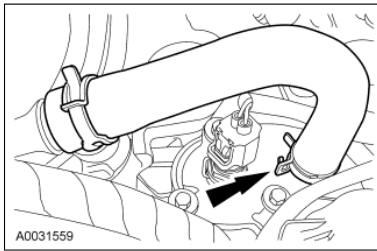
19. Install the upper radiator hose.



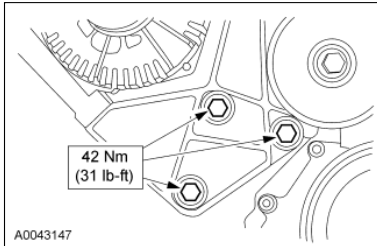
20. Connect the engine coolant temperature (ECT) sensor electrical connector.



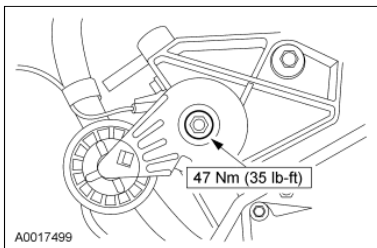
21. Install the heater hose to the thermostat housing.



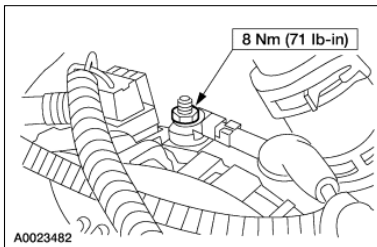
22. Install the generator mounting bracket assembly.



23. Install the accessory drive belt tensioner.

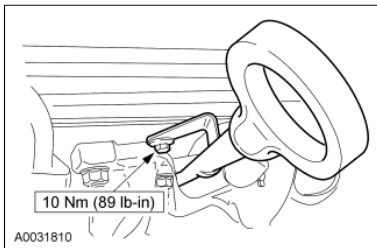


24. Connect the generator electrical connections and install the pushpin.

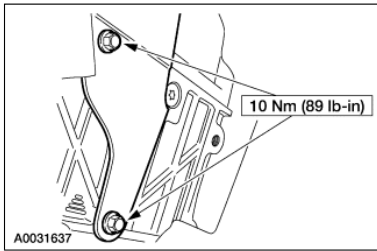


LH side

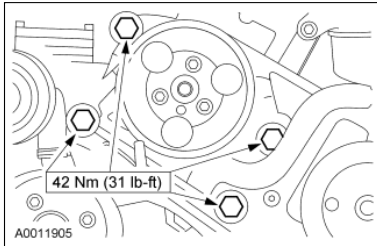
25. Install the oil level indicator tube and bolt.



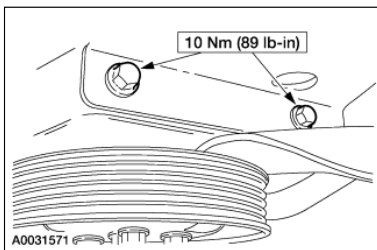
26. Install the coil bracket and the bolts.



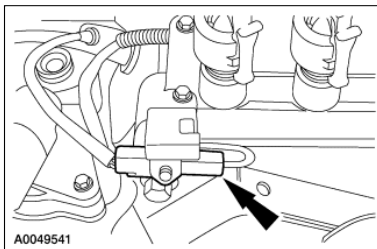
27. Install the accessory bracket.



28. Install the bolts.



29. Connect the radio ignition interference capacitor electrical connector.



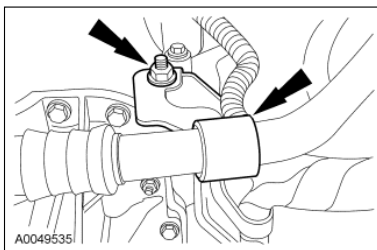
Both sides

30. Install the accessory drive belt. For additional information, refer to [Accessory Drive Belt, Tensioner and Pulley](#).

31. **NOTE:** You must retime the LH and RH camshafts when either camshaft is disturbed.

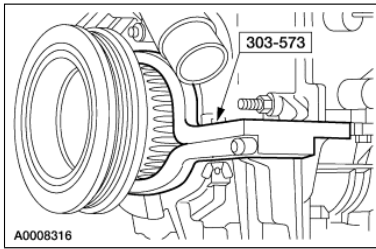
Turn the crankshaft clockwise to position the number one cylinder at top dead center (TDC).

32. Remove the retainer and position the A/C manifold tube bracket aside.



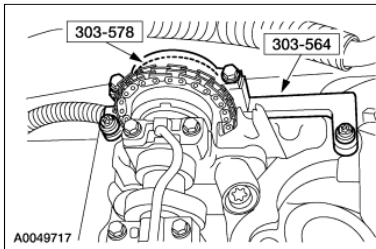
33. **NOTE:** The special tool must be installed on the damper and should contact the engine block, this positions the engine at TDC.

Install the special tool.



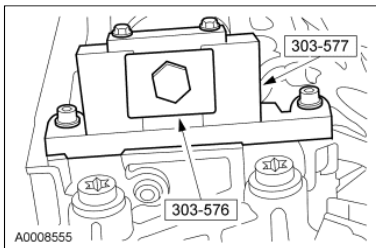
34. **NOTE:** Leave the top two special tool clamp bolts loose.

Install the special tools on the rear of the RH cylinder head.

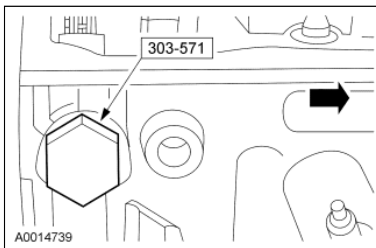


35. **NOTE:** The camshaft timing slots are off-center.

Position the camshaft timing slots below the centerline of the camshaft to correctly fit the special tools, and install the special tools on the front of the RH cylinder head.



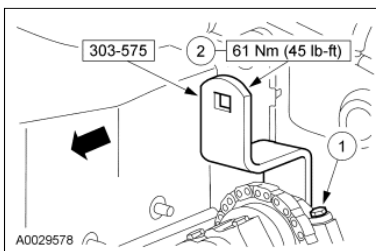
36. Install the special tool.



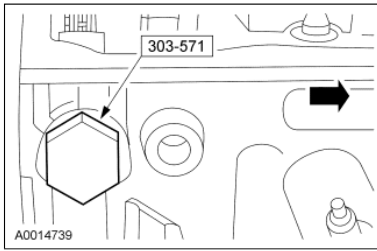
37. **⚠ CAUTION:** The RH camshaft sprocket bolt is a LH threaded bolt.

Tighten the bolts.

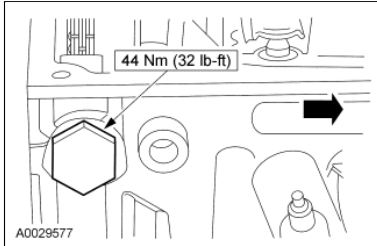
1. Tighten the special tool top clamp bolts to 10 Nm (89 lb-in).
2. Using the special tool, tighten the camshaft bolt.



38. Remove the special tool.

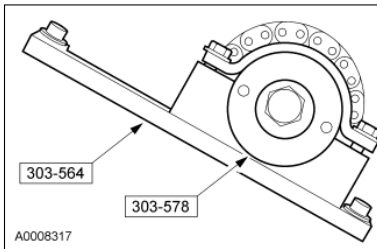


39. Install the RH camshaft tensioner.



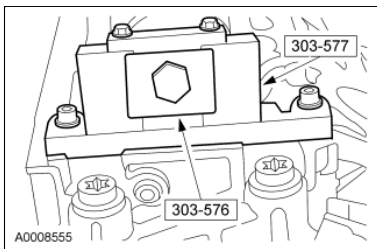
40. Remove the special tools from the RH cylinder head.
 41. **NOTE:** Leave the top two special tool clamp bolts loose.

Install the special tools on the front of the LH cylinder head.

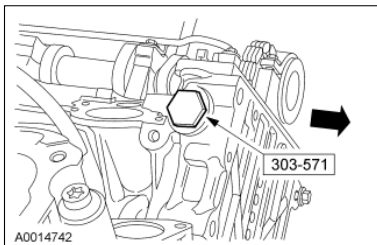


42. **NOTE:** The camshaft timing slots are off-center.

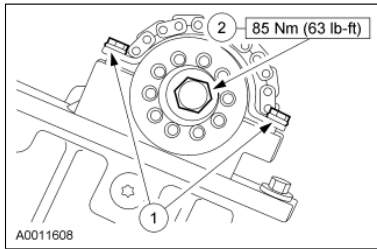
Position the camshaft timing slots below the centerline of the camshaft to correctly fit the special tools, and install the special tools on the rear of the LH cylinder head.



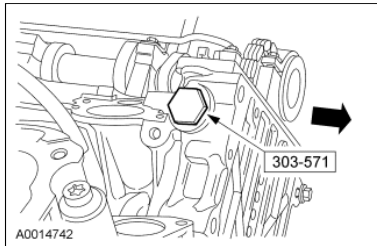
43. Install the special tool.



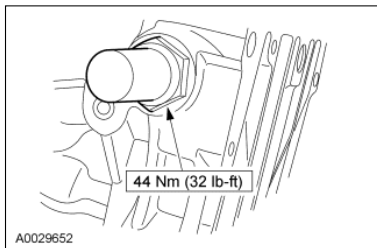
44. Tighten the bolts.
 1. Tighten the special tool top two clamp bolts to 10 Nm (89 lb-in).
 2. Tighten the camshaft bolt.



45. Remove the special tool.

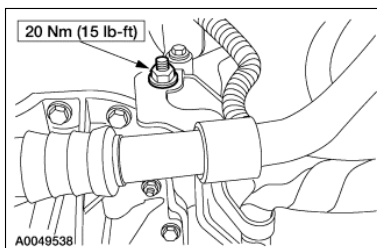


46. Install the LH camshaft tensioner.



47. Remove all of the special tools.

48. Install the A/C manifold tube assembly bracket.



49. Install the roller followers. For additional information, refer to [Camshaft Roller Follower and Hydraulic Lash Adjuster](#) in this section.

50. Fill the engine cooling system. For additional information, refer to [Section 303-03](#).