
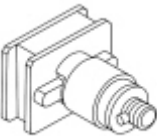
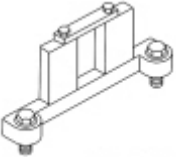
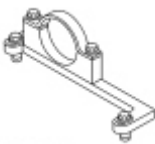






## Camshaft Timing

### Special Tool(s)

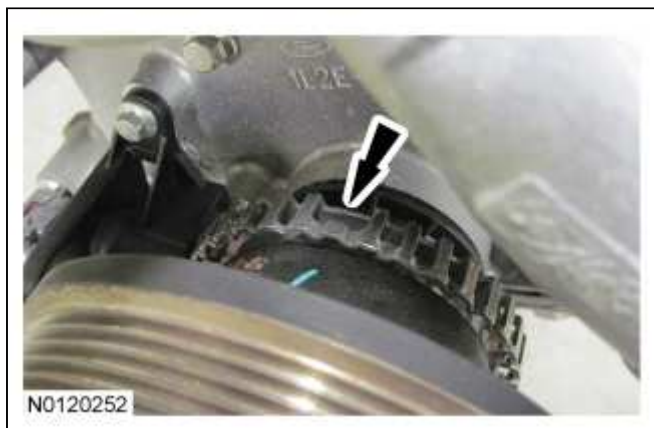
 <p>ST1776-A</p>	<p>Adapter for 303-564 303-578 (T97T-6256-C)</p>
 <p>ST1779-A</p>	<p>Adapter for 303-577 303-576 (T97T-6256-D)</p>
 <p>ST1778-A</p>	<p>Holding Tool, Camshaft 303-577 (T97T-6303-C)</p>
 <p>ST1777-A</p>	<p>Holding Tool, Camshaft Sprocket 303-564 (T97T-6256-B)</p>
 <p>ST1781-A</p>	<p>Socket, Camshaft Sprocket Nut 303-565 (T97T-6256-G)</p>
 <p>ST1438-A</p>	<p>Strap Wrench 303-D055 (D85L-6000-A) or equivalent</p>
 <p>ST1774-A</p>	<p>Tensioner, Timing Chain 303-571 (T97T-6K254-A)</p>
 <p>ST1775-A</p>	<p>Timing Tool, Crankshaft TDC 303-573 (T97T-6303-A)</p>



Torque Wrench Extension  
303-575 (T97T-6256-F)

1. Remove the camshaft roller followers. For additional information, refer to [Camshaft Roller Follower](#) in this section.
2. Remove the generator. For additional information, refer to [Section 414-00](#).
3. Remove the Engine Coolant Temperature (ECT) sensor. For additional information, refer to [Section 303-14](#).
4. Remove the camshaft roller followers. For additional information, refer to [Camshaft Roller Follower](#) in this section.
5. **NOTE:** The LH and RH camshafts must be retimed when either camshaft is disturbed.

Turn the crankshaft pulley clockwise until the crankshaft pulley timing ring slot is at the 12 o'clock position.



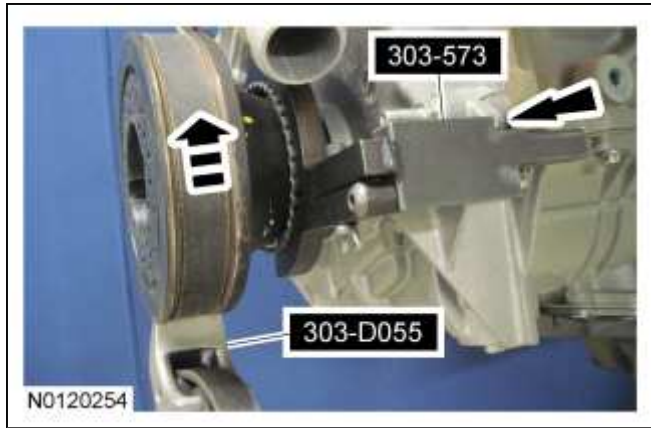
6. Install the Crankshaft [TDC](#) Timing Tool on the crankshaft pulley timing ring.



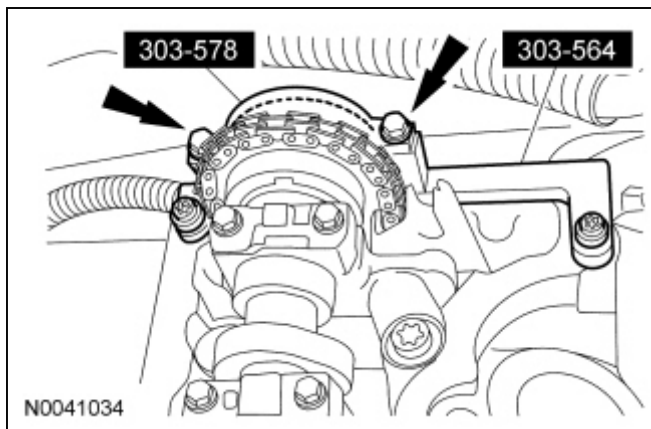
7. **NOTICE:** While turning the crankshaft pulley, take care to not overturn the crankshaft pulley or damage to the crankshaft pulley timing ring may occur.

**NOTE:** The Crankshaft [TDC](#) Timing Tool must be installed on the crankshaft pulley and should contact the engine block. This positions the engine at [TDC](#).

Using the Strap Wrench, slowly turn the crankshaft counterclockwise until the [TDC](#) Timing Tool contacts the engine block in the slot shown.

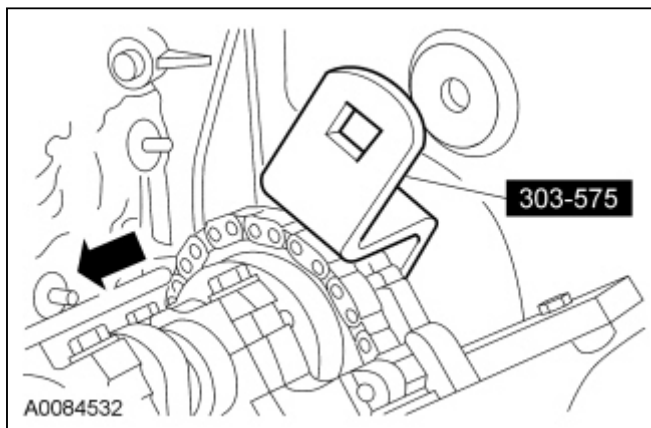


8. Install the Camshaft Sprocket Holding Tool and Adapter to the RH cylinder head and tighten the 2 top clamp bolts.
  - Tighten to 10 Nm (89 lb-in).

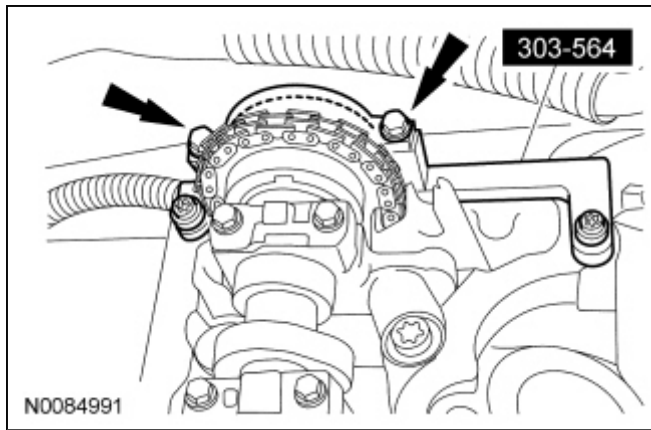


9. **NOTE:** The RH camshaft sprocket bolt is a LH-threaded bolt.

Using the Torque Wrench Extension with the Camshaft Sprocket Nut Socket 303-565, loosen the RH camshaft sprocket bolt.

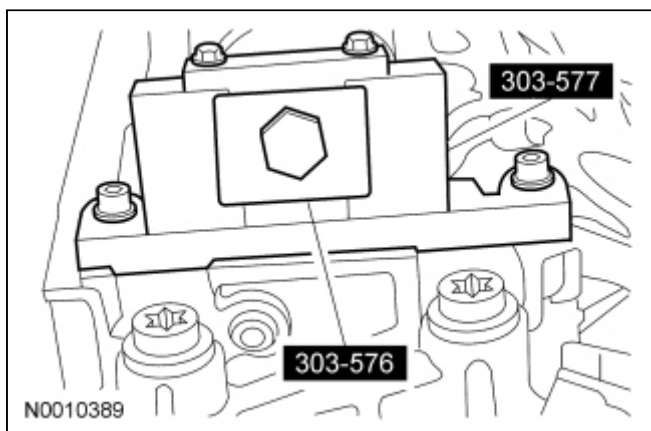


10. Loosen the top 2 Camshaft Sprocket Holding Tool clamp bolts.

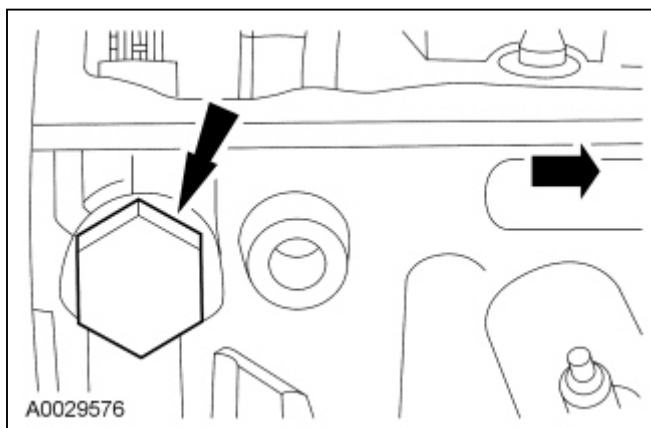


11. **NOTE:** The camshaft timing slots are off-center.

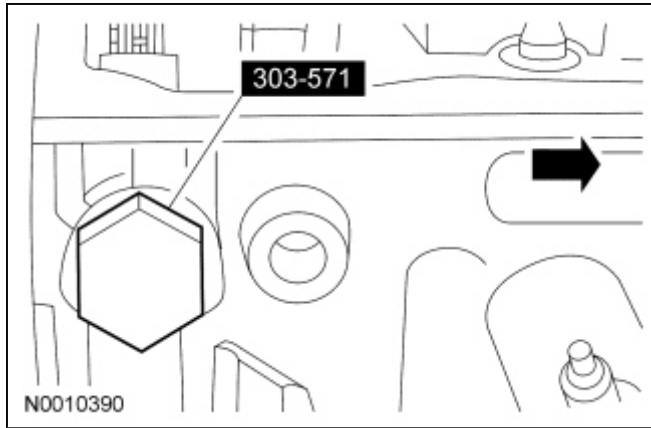
Position the camshaft timing slots below the centerline of the camshaft to correctly fit the Adapter and install the Camshaft Holding Tool and Adapter on the front of the RH cylinder head.



12. Remove the RH camshaft tensioner.
- Remove and discard the washer.



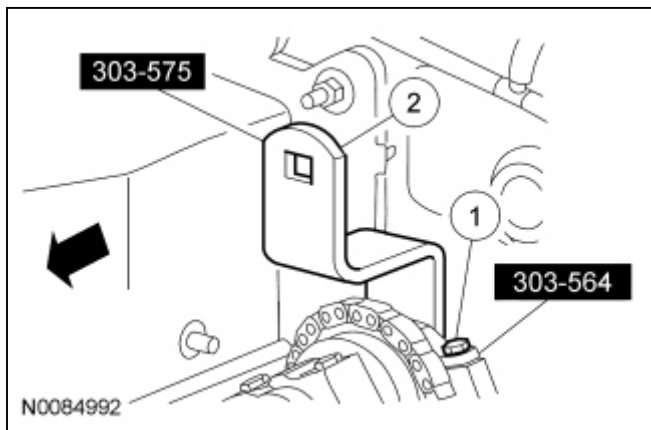
13. Install the Timing Chain Tensioner.



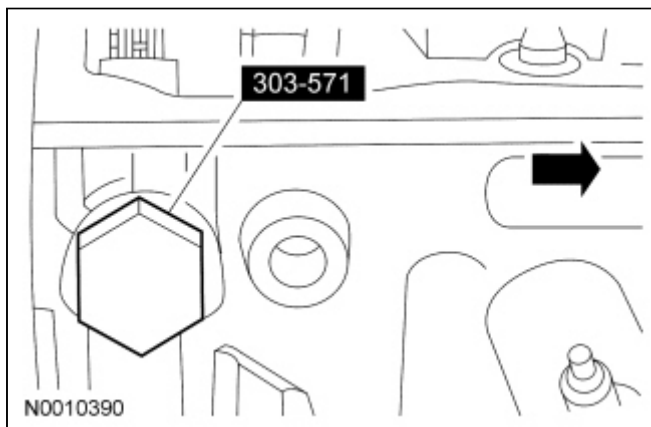
14. **NOTE:** The RH camshaft sprocket bolt is a LH-threaded bolt.

Tighten the bolts.

1. Tighten the Camshaft Sprocket Holding Tool top 2 clamp bolts to 10 Nm (89 lb-in).
2. Using the Torque Wrench Extension with the Camshaft Sprocket Nut Socket 303-565, tighten the camshaft bolt.



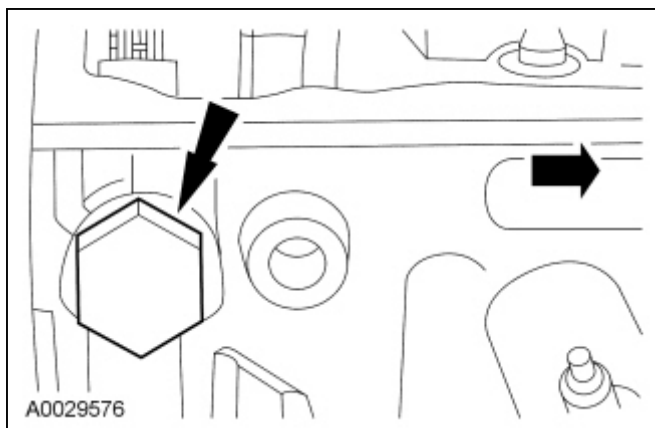
15. Remove the Timing Chain Tensioner.



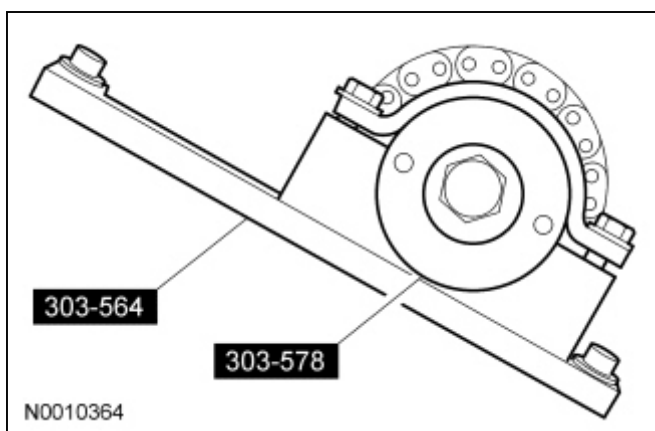
16. **NOTE:** Install a new washer on the tensioner.

Install the RH camshaft tensioner.

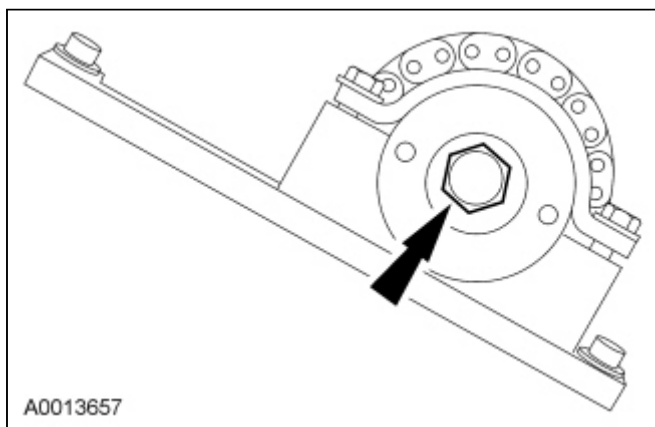
- Tighten to 44 Nm (32 lb-ft).



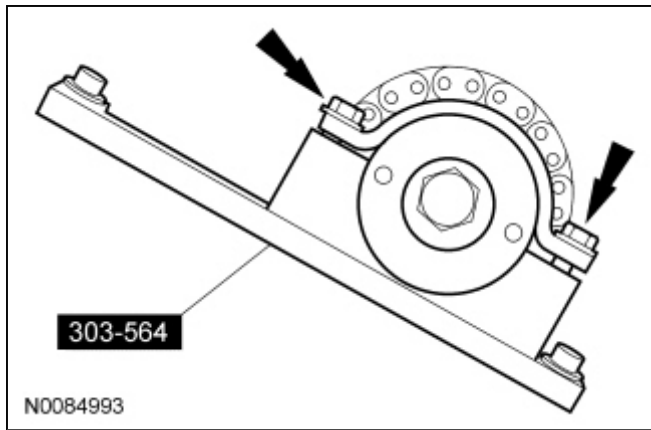
17. Install the Camshaft Sprocket Holding Tool and Adapter on the front of the LH cylinder head and tighten the top 2 clamp bolts.
  - Tighten to 10 Nm (89 lb-in).



18. Loosen the LH camshaft sprocket bolt.

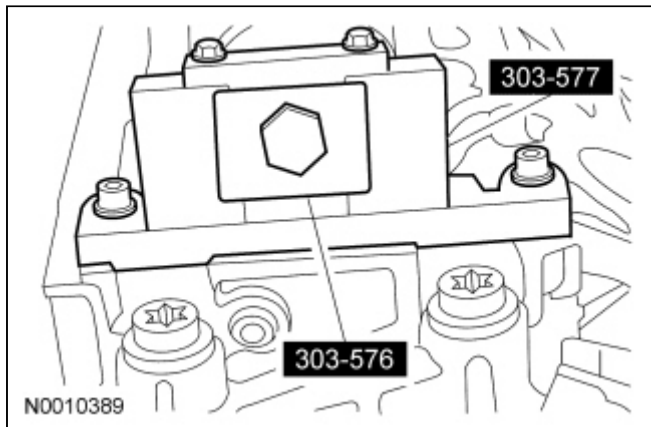


19. Loosen the top 2 clamp bolts on the Camshaft Sprocket Holding Tool to allow the camshaft sprocket to rotate freely.

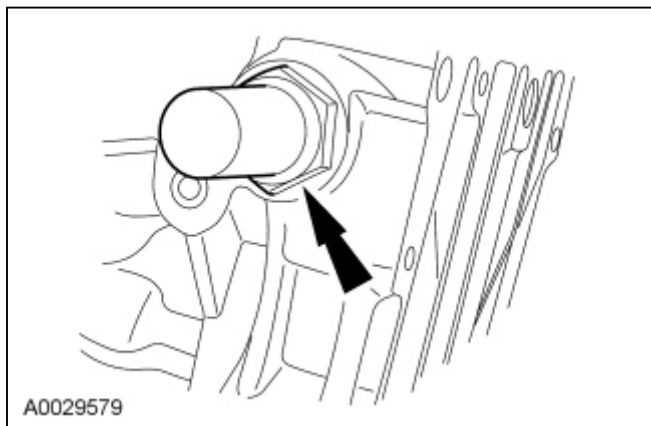


20. **NOTE:** The camshaft timing slots are off-center.

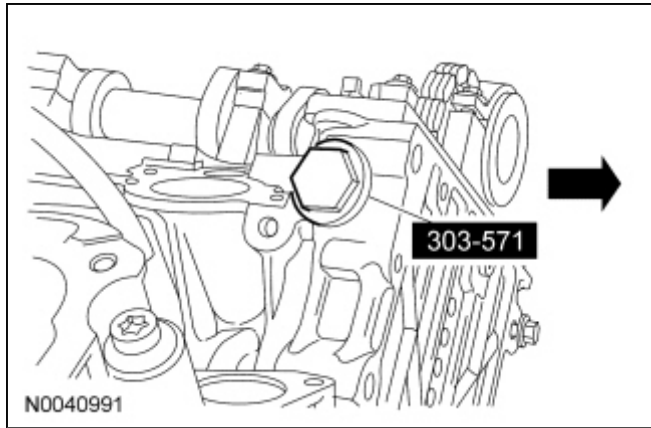
Position the camshaft timing slots below the centerline of the camshaft to correctly fit the Adapter, and install the Camshaft Holding Tool and Adapter on the rear of the LH cylinder head.



21. Remove the LH camshaft tensioner.
- Remove and discard the washer.

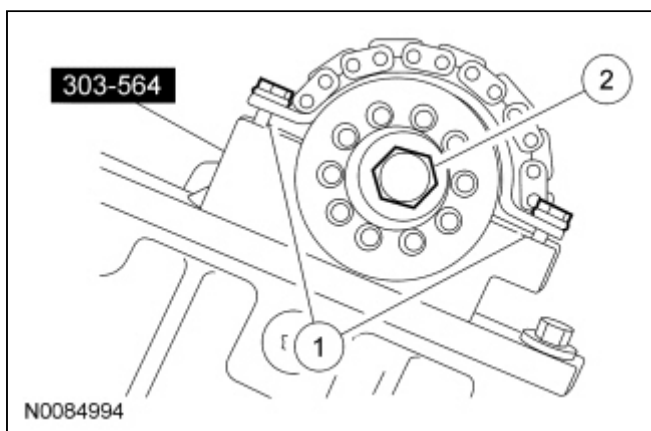


22. Install the Timing Chain Tensioner.

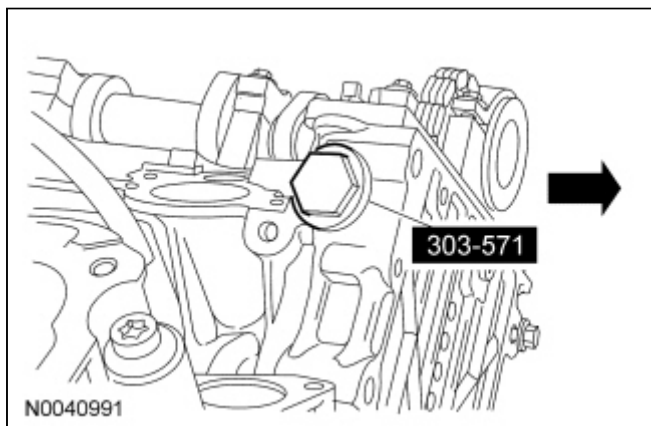


23. Tighten the bolts.

1. Tighten the Camshaft Sprocket Holding Tool top 2 clamp bolts to 10 Nm (89 lb-in).
2. Tighten the LH camshaft bolt to 85 Nm (63 lb-ft).



24. Remove the Timing Chain Tensioner.

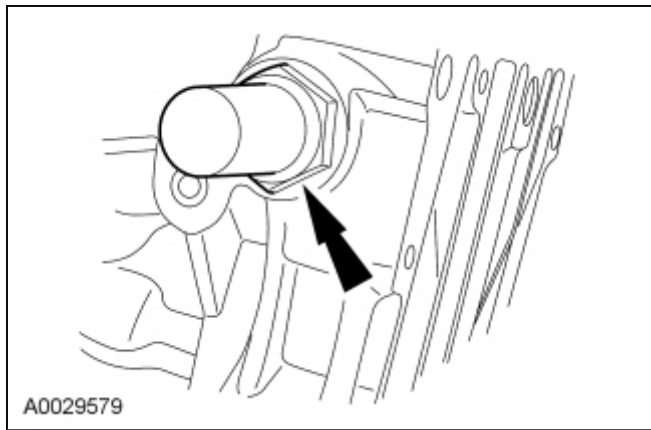


25. **NOTE:** Install a new washer on the tensioner.

Install the LH camshaft tensioner.

- Tighten to 44 Nm (32 lb-ft).





26. Install the [ECT](#) sensor. For additional information, refer to [Section 303-14](#).
  27. Install the generator. For additional information, refer to [Section 414-00](#).
  28. Install the camshaft roller followers. For additional information, refer to [Camshaft Roller Follower](#) in this section.
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