

GENERAL PROCEDURES

Camshaft Timing

Special Tool(s)

<p>ST1777-A</p>	<p>Holding Tool, Camshaft Sprocket 303-564 (T97T-6256-B)</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>
<p>ST1780-A</p>	<p>Extension, Torque Wrench 303-575 (T97T-6256-F)</p>
<p>ST1779-A</p>	<p>Adapter for 303-577 303-576 (T97T-6256-D)</p>
<p>ST1781-A</p>	<p>Socket, Camshaft Sprocket Nut 303-565 (T97T-6256-G) or equivalent</p>

(Continued)

Special Tool(s)


<p>ST1778-A</p>	<p>Holding Tool, Camshaft 303-577 (T97T-6303-C)</p>
<p>ST1776-A</p>	<p>Adapter for 303-564 303-578 (T97T-6256-C)</p>

Material

Item	Specification
<p>Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada Motorcraft SAE 5W-30 Super Premium Motor Oil CXO-5W30-LSP12) or equivalent</p>	<p>WSS-M2C929-A</p>

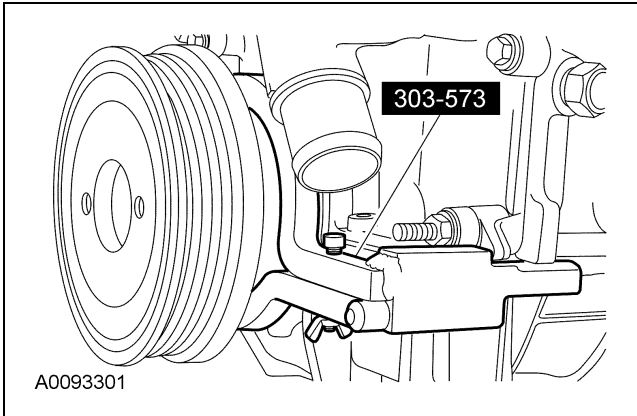
1. Remove the camshaft roller followers. For additional information, refer to Camshaft Roller Follower in this section.
2. Remove the generator. For additional information, refer to Section 414-02.
3. Remove the engine coolant temperature (ECT) sensor. For additional information, refer to Section 303-14.
4. **NOTE:** The LH and RH camshafts must be retimed when either camshaft is disturbed.
Turn the crankshaft clockwise to position the No. 1 cylinder at top dead center (TDC).

GENERAL PROCEDURES (Continued)

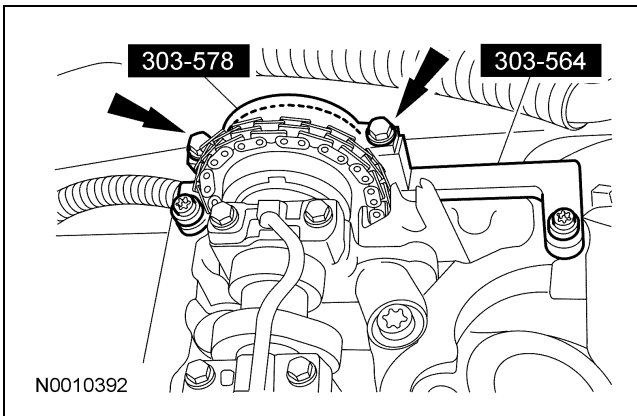
5.  **CAUTION:** Do not rotate the engine counterclockwise. Rotating the engine counterclockwise will result in incorrect timing of the engine.

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.

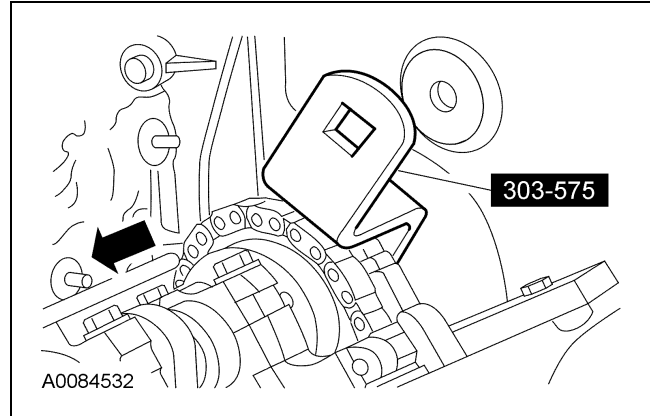


6. Install the special tools to the RH cylinder head and tighten the 2 top clamp bolts.
- Tighten to 10 Nm (89 lb-in).

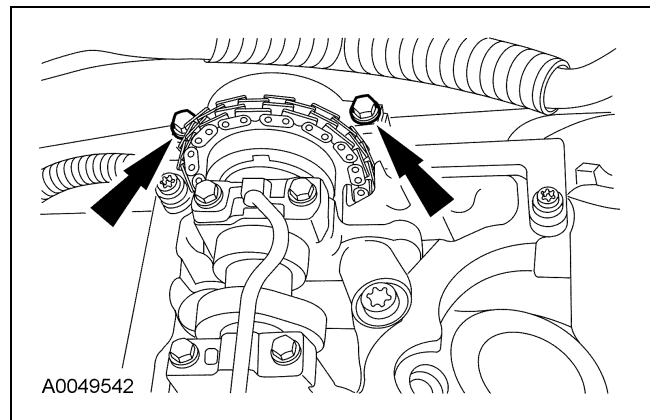


7.  **CAUTION:** The RH camshaft sprocket bolt is a LH-threaded bolt.

Using the special tool with the Camshaft Sprocket Nut Socket 303-565, loosen the RH camshaft sprocket bolt.

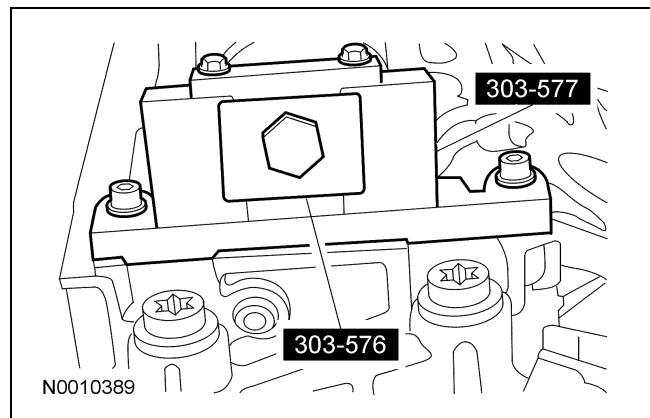


8. Loosen the top 2 special tool clamp bolts.



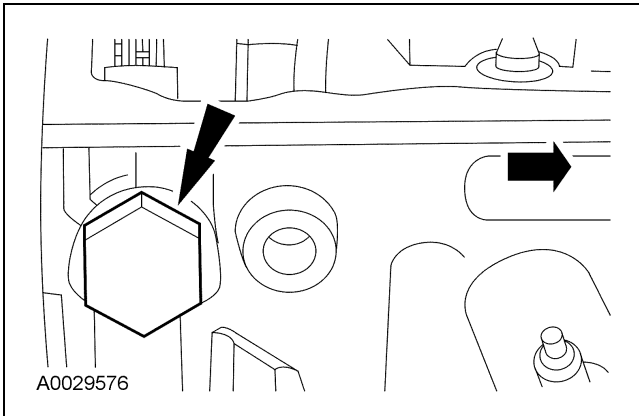
9. **NOTE:** The camshaft timing slots are off-center.

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.

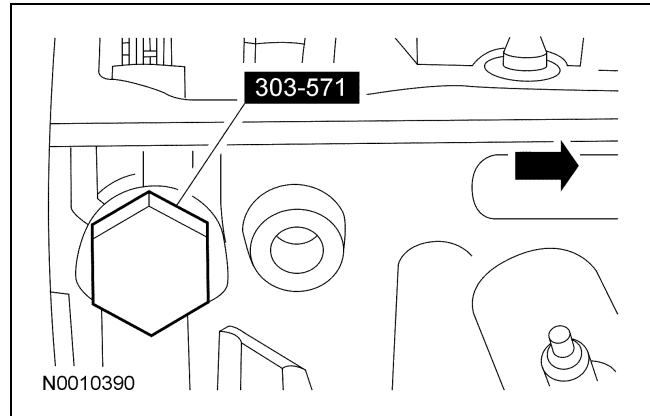


GENERAL PROCEDURES (Continued)

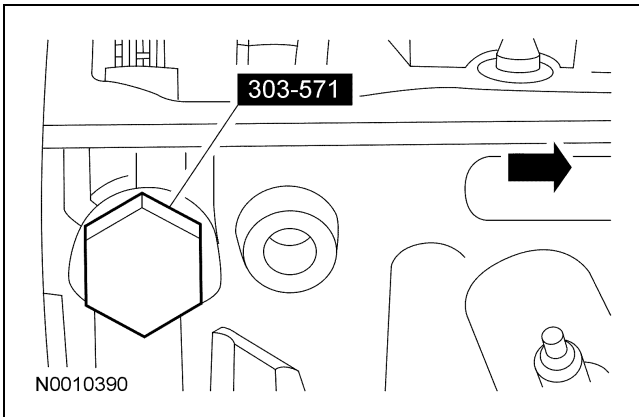
10. Remove the RH camshaft tensioner.



13. Remove the special tool.



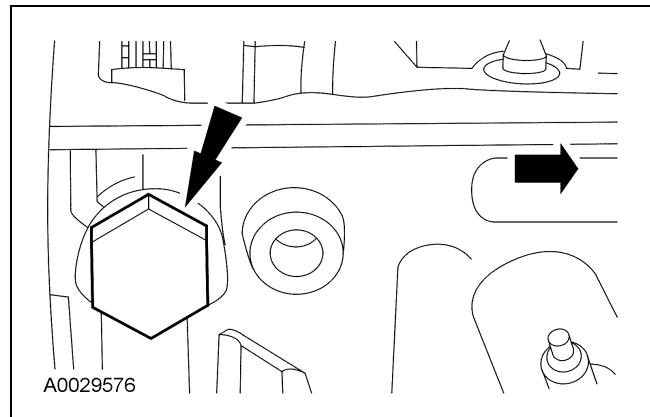
11. Install the special tool.




14. **NOTE:** Install a new O-ring seal on the tensioner and lubricate with clean engine oil.

Install the RH camshaft tensioner.

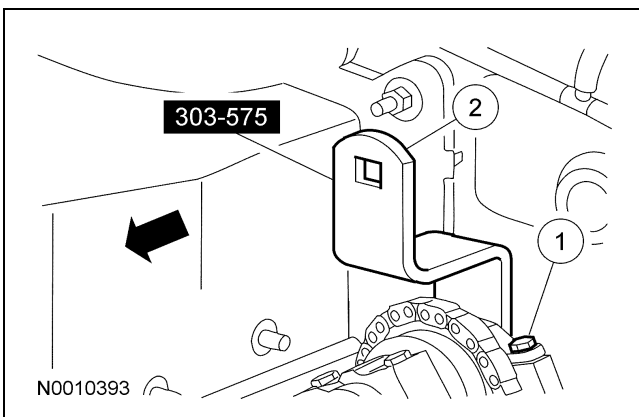
- Tighten to 44 Nm (32 lb-ft).



12.  **CAUTION:** The RH camshaft sprocket bolt is a LH-threaded bolt.

Tighten the bolts.

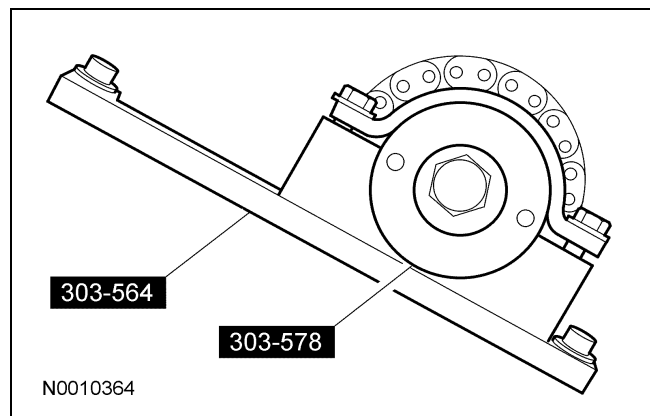
- 1 Tighten the special tool top 2 clamp bolts to 10 Nm (89 lb-in).
- 2 Using the special tool with the Camshaft Sprocket Nut Socket 303-565, tighten the camshaft bolt.



15. Remove the special tools from the RH cylinder head.

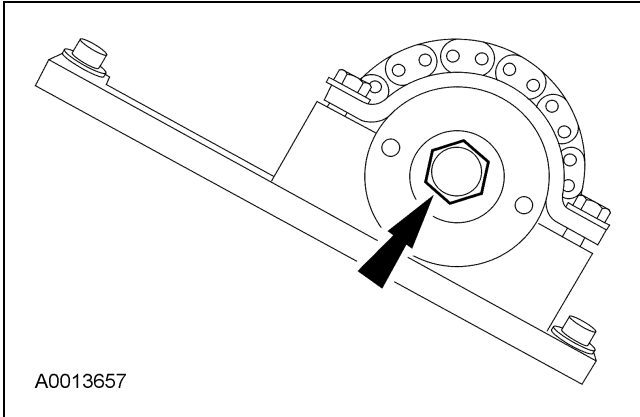
16. Install the special tools on the front of the LH cylinder head and tighten the top 2 clamp bolts.

- Tighten to 10 Nm (89 lb-in).

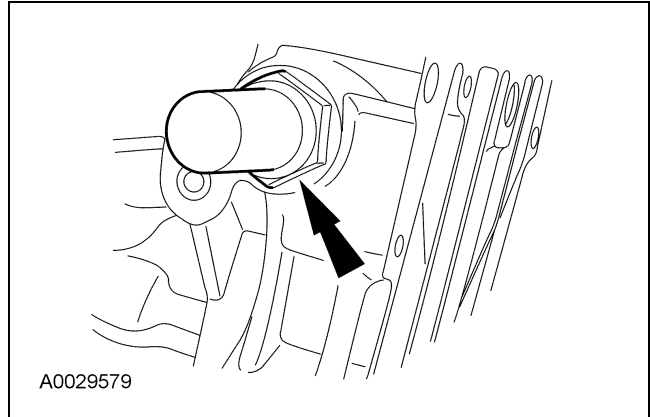


GENERAL PROCEDURES (Continued)

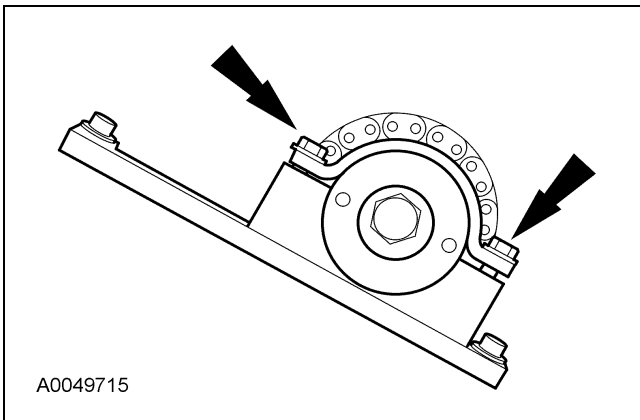
17. Loosen the LH camshaft sprocket bolt.



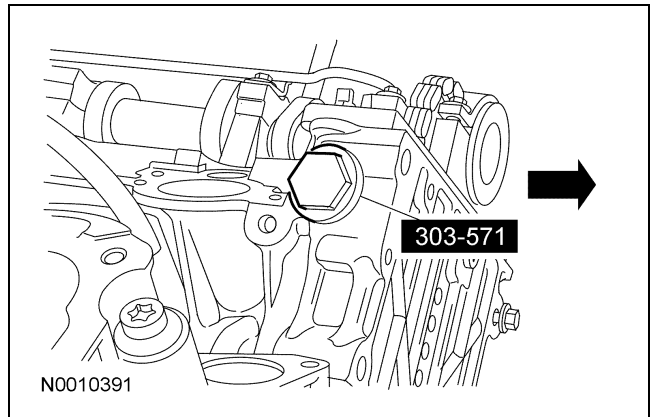
20. Remove the LH camshaft tensioner.



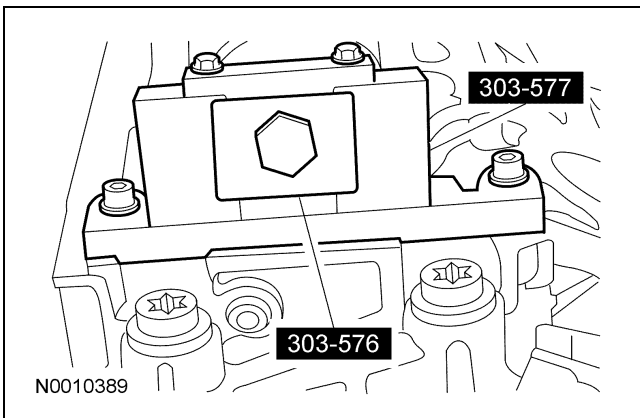
18. Loosen the top 2 clamp bolts on the special tool to allow the camshaft sprocket to rotate freely.



21. Install the special tool.

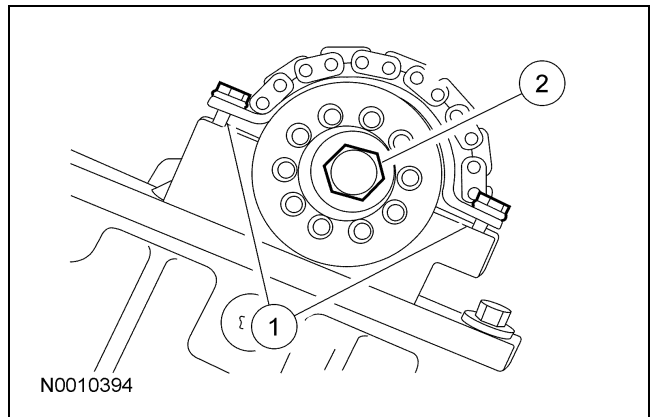


19. **NOTE:** The camshaft timing slots are off-center.
Position the camshaft timing slots below the centerline of the camshaft to correctly fit the special tools, and install the special tools on the rear of the LH cylinder head.



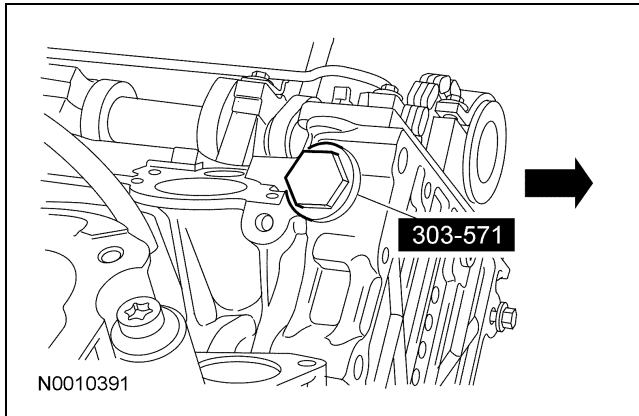
22. Tighten the bolts.

- 1 Tighten the special tool top 2 clamp bolts to 10 Nm (89 lb-in).
- 2 Tighten the LH camshaft bolt to 85 Nm (63 lb-ft).

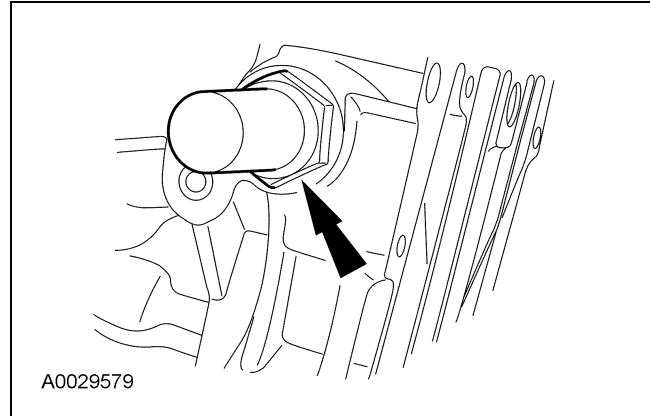


GENERAL PROCEDURES (Continued)

23. Remove the special tool.



24. **NOTE:** Install a new O-ring seal on the tensioner and lubricate with clean engine oil. Install the LH camshaft tensioner.
- Tighten to 44 Nm (32 lb-ft).



25. Remove the special tools from the LH cylinder head.
26. Install the engine coolant temperature (ECT) sensor. For additional information, refer to Section 303-14.
27. Install the generator. For additional information, refer to Section 414-02.
28. Install the camshaft roller followers. For additional information, refer to Camshaft Roller Follower in this section.