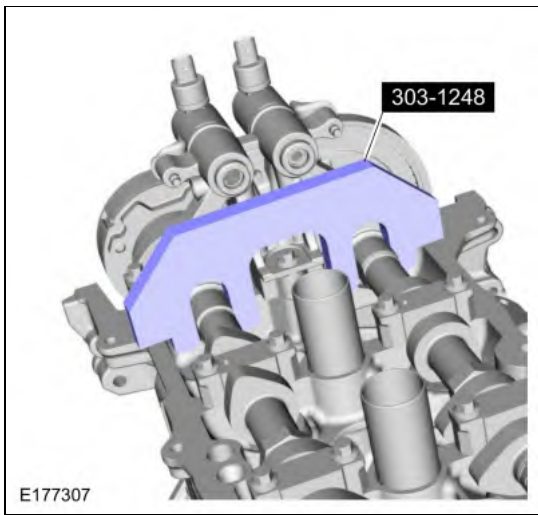
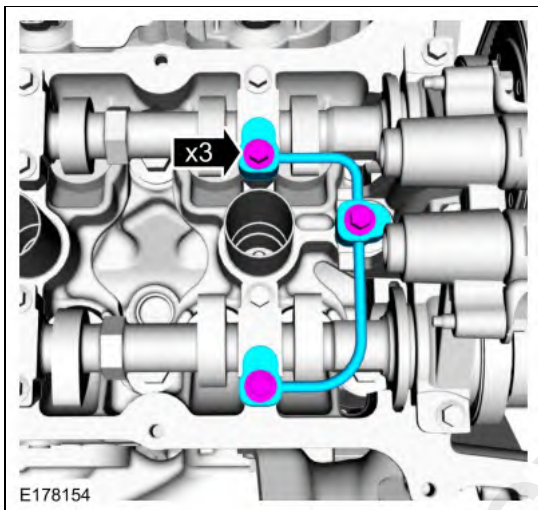


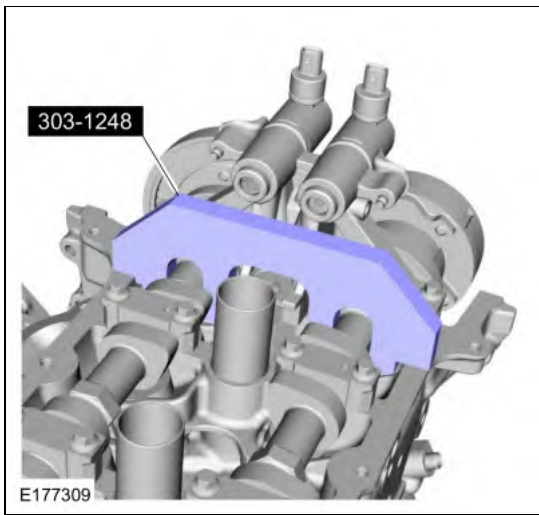


6. Remove the bolts and the RH oil tube.



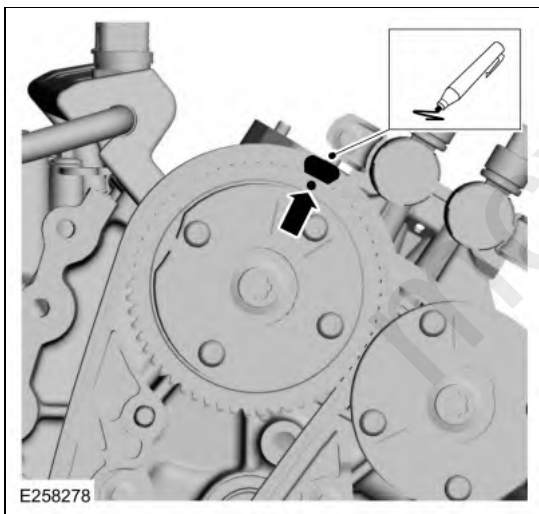
7. **NOTE:** The Camshaft Holding Tool will hold the camshafts in the TDC position.

Install Special Service Tool: 303-1248 Camshaft holding tools.

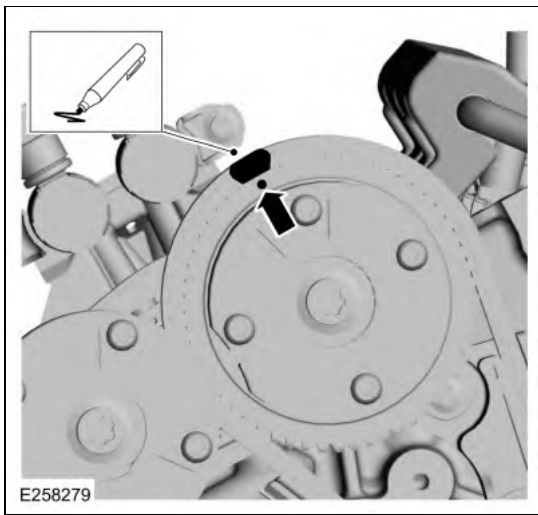


NOTE: The following 3 steps are for primary timing chains that the colored links are not visible.

8. Mark the timing chain link that aligns with the timing mark on the LH intake VCT unit as shown.

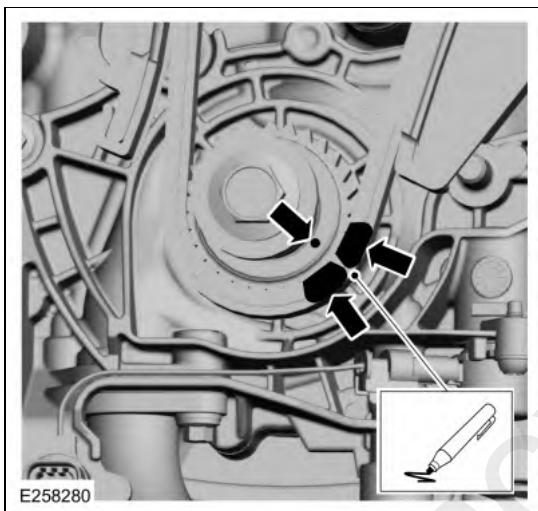


9. Mark the timing chain link that aligns with the timing mark on the RH intake VCT unit as shown.

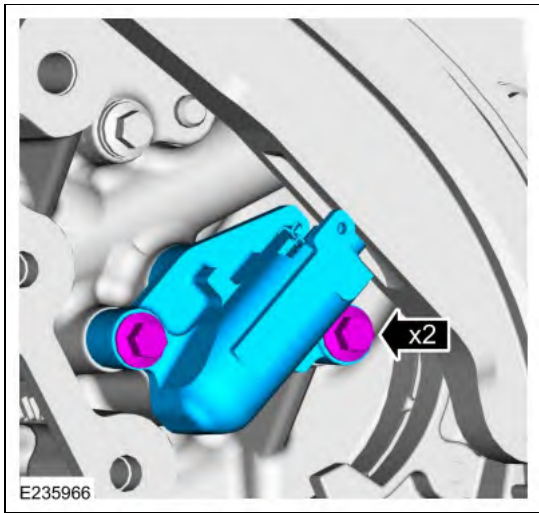


10. **NOTE:** The crankshaft sprocket timing mark should be between the 2 colored links.

Mark the timing chain links that aligns with the timing mark on the crankshaft sprocket as shown.



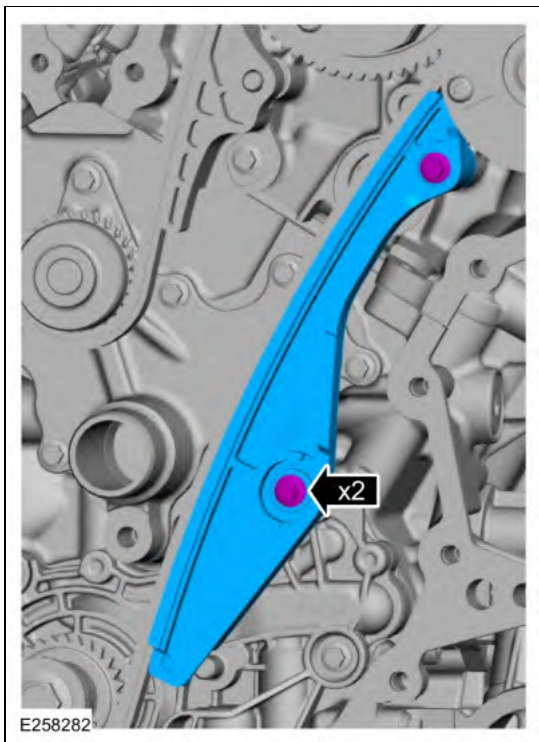
11. Remove the bolts and the timing chain tensioner.



12. Remove the timing chain tensioner arm.



13. Remove the bolts and the lower LH timing chain guide.

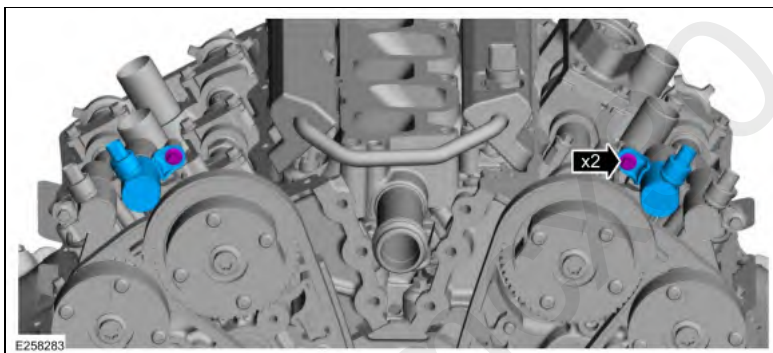


14. **NOTE:** Removal of the VCT oil control solenoid will aid in the removal of the timing chain.

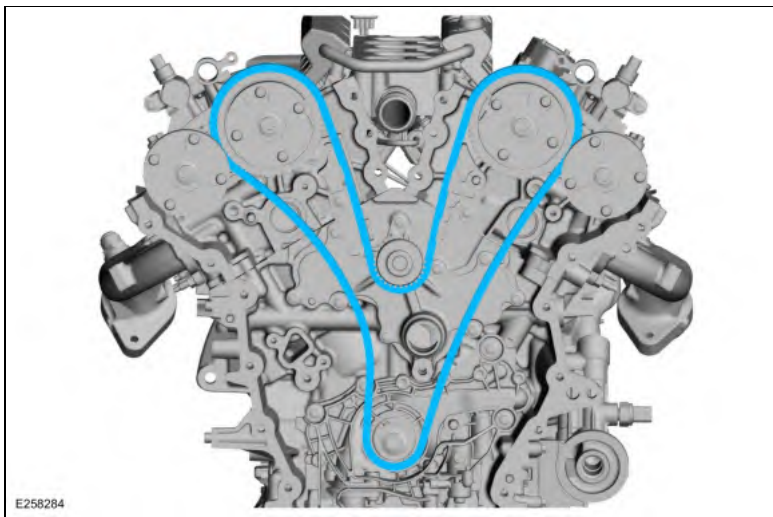
NOTE: A slight twisting motion will aid in the removal of the VCT oil control solenoids.

NOTE: Keep the VCT oil control solenoid clean of dirt and debris.

Remove the bolts and the VCT oil control solenoids.



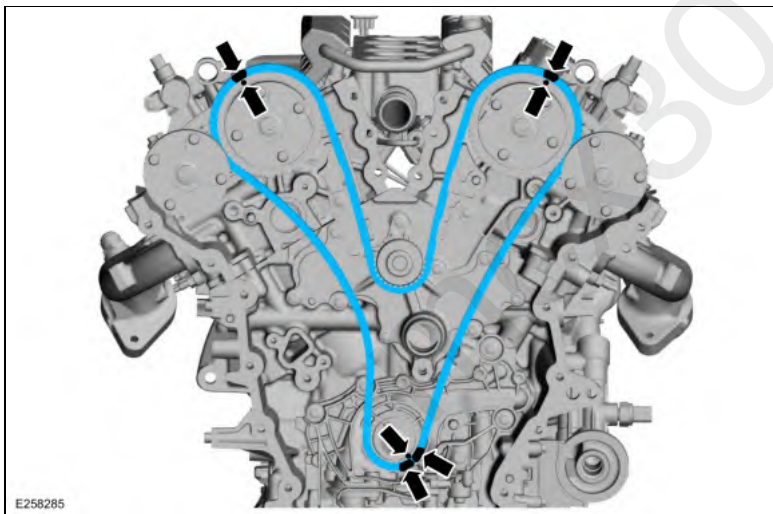
15. Remove the timing chain.



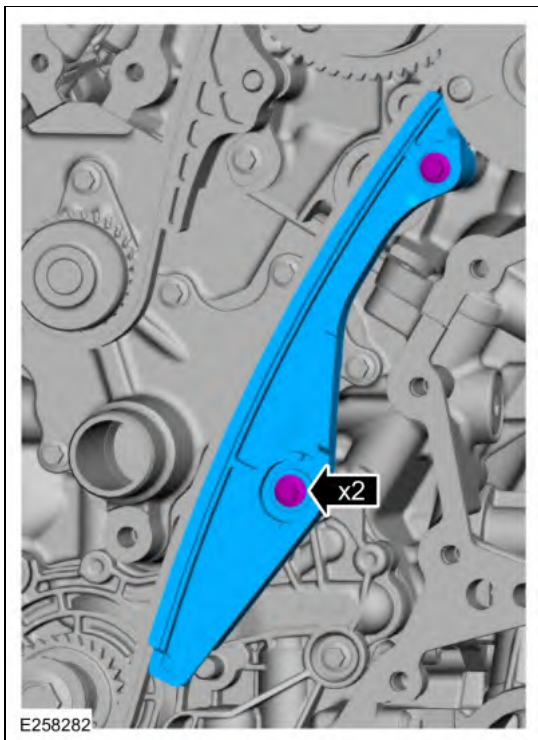
Installation

1. **NOTE:** It may be necessary to rotate the camshafts slightly, to align the timing marks.

Install the timing chain with the colored links aligned with the timing marks on the VCT units and the crankshaft sprocket.



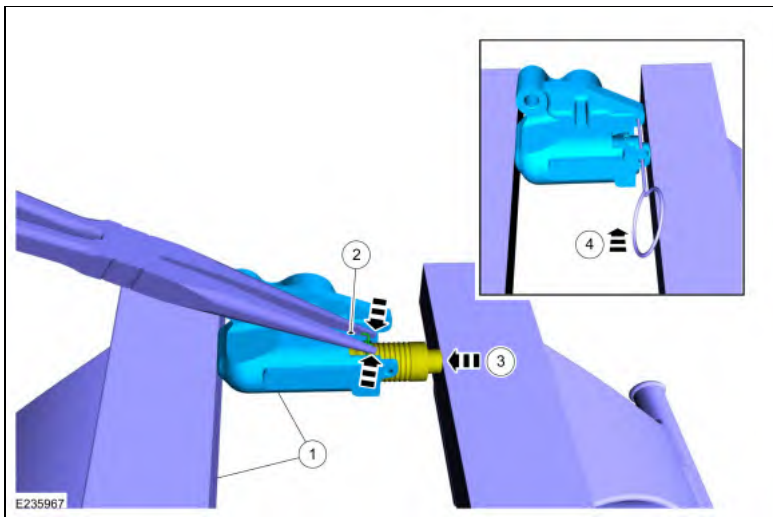
2. Install the lower LH timing chain guide and the bolts.
Torque: 89 lb.in (10 Nm)



3. Install the timing chain tensioner arm.

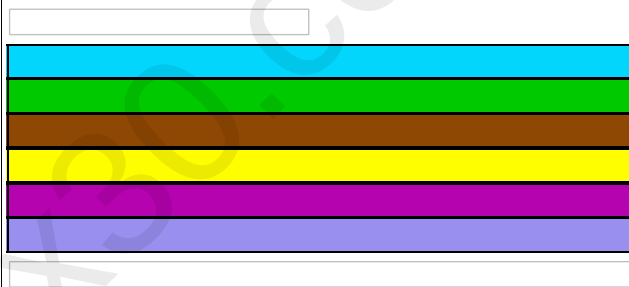
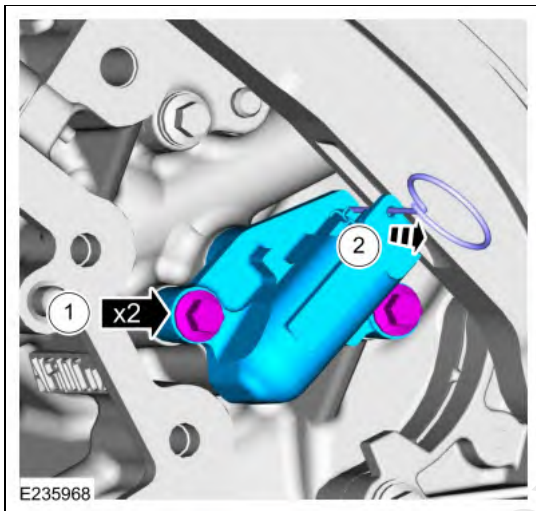


4.
 1. Position the tensioner in a soft-jawed vise.
 2. Using pliers, squeeze the ends of the ratchet wire clip together.
 3. Using the soft-jawed vise, compress the plunger to the reset position.
 4. Install a locking pin in the 2 holes of the tensioner body to hold the plunger in place.

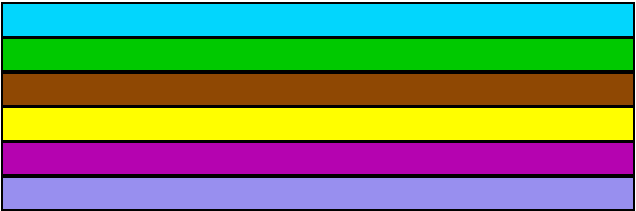
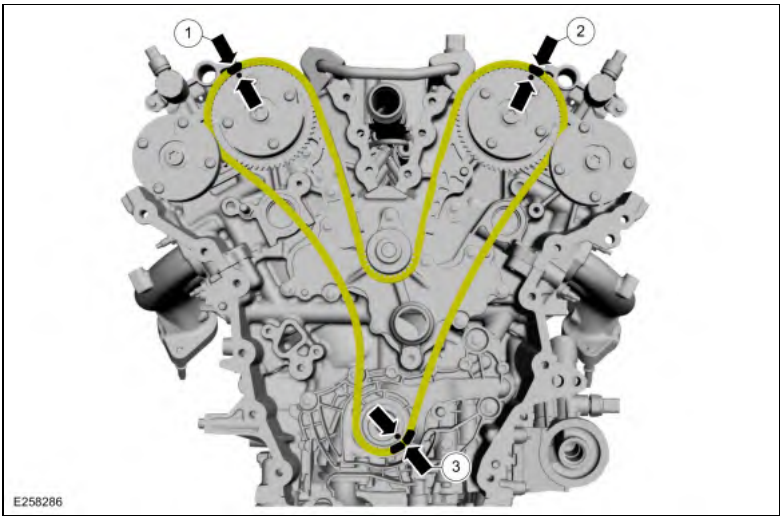


5. **NOTE:** It may be necessary to rotate the camshafts slightly to remove slack from the timing chain to install the tensioner.

1. Install the timing chain tensioner and the bolts.
Torque: 89 lb.in (10 Nm)
2. Remove the lockpin.



6.
 - As a post-check, verify correct alignment of all timing marks.
 - There are 48 links in between the RH intake VCT unit colored link (1) and the LH intake VCT unit colored link (2).
 - There are 35 links in between LH intake VCT unit colored link (2) and the 2 crankshaft sprocket links (3).



7. **NOTICE:** Do not use excessive force when installing the VCT oil control solenoid. Damage to the mega cap could cause the cylinder head to be inoperable. If difficult to install the VCT oil control solenoid, inspect the bore and VCT oil control solenoid to ensure there are no burrs, sharp edges or contaminants present on the mating surface. Only clean the external surfaces as necessary.

NOTE: A slight twisting motion will aid in the installation of the VCT oil control solenoid.

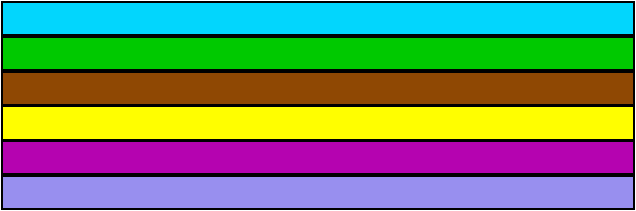
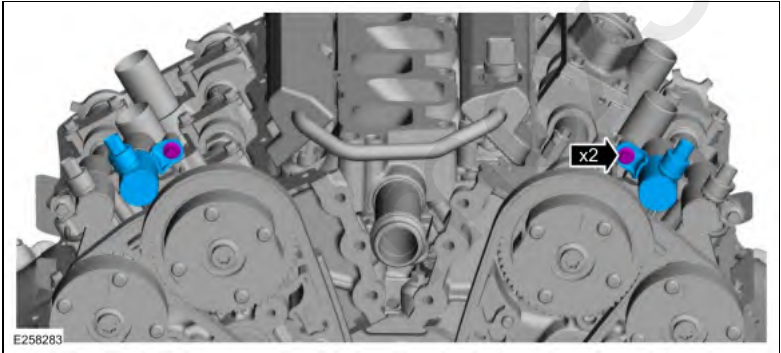
NOTE: Keep the VCT oil control solenoid clean of dirt and debris.

Install the VCT oil control solenoids and the bolts.

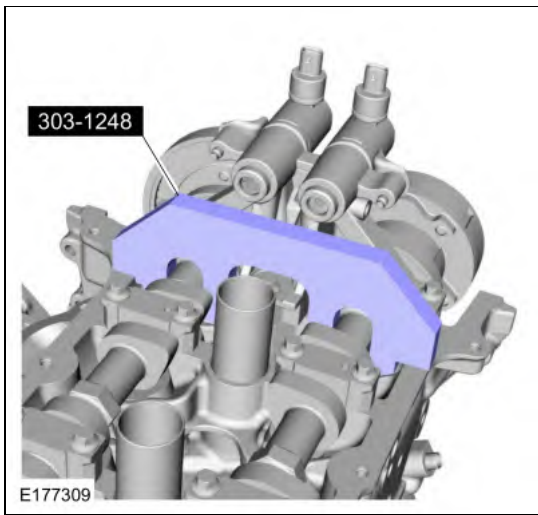
Torque:

Stage 1: 71 lb.in (8 Nm)

Stage 2: 20Â°



8. Remove Special Service Tool: 303-1248 Camshaft holding tools.



9. Install the RH oil tube and the bolts finger tight.

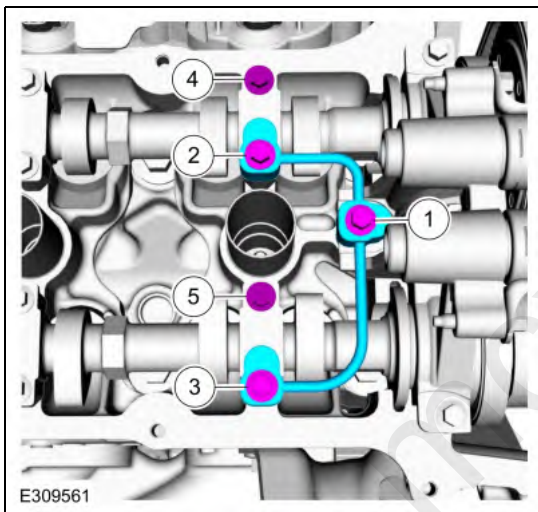
Torque:

Stage 1: Tighten bolts 1, 2 and 3 to: 71 lb.in (8 Nm)

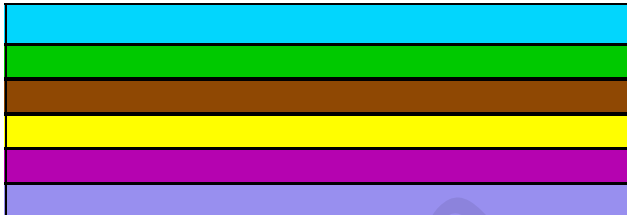
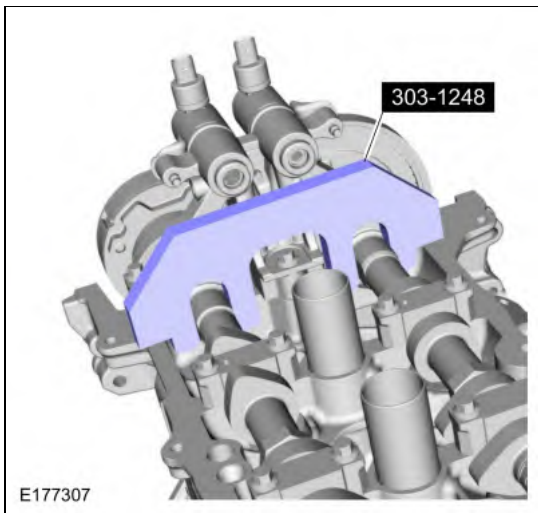
Stage 2: Tighten bolts 1, 2 and 3 an additional: 60°

Stage 3: If the camshafts have been removed and installed, tighten bolts 4 and 5 to: 71 lb.in (8 Nm)

Stage 4: If the camshafts have been removed and installed, tighten bolts 4 and 5 an additional: 45°



10. Remove Special Service Tool: 303-1248 Camshaft holding tools.



11. Install the LH oil tube and the bolts finger tight.

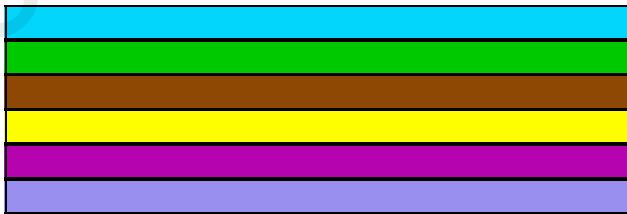
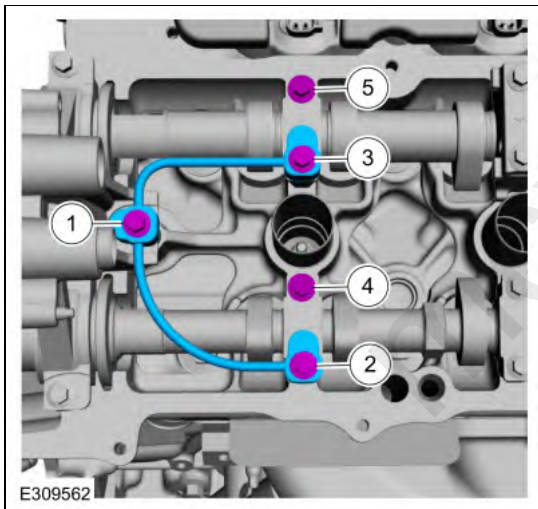
Torque:

Stage 1: Tighten bolts 1, 2 and 3 to: 71 lb.in (8 Nm)

Stage 2: Tighten bolts 1, 2 and 3 an additional: 60°

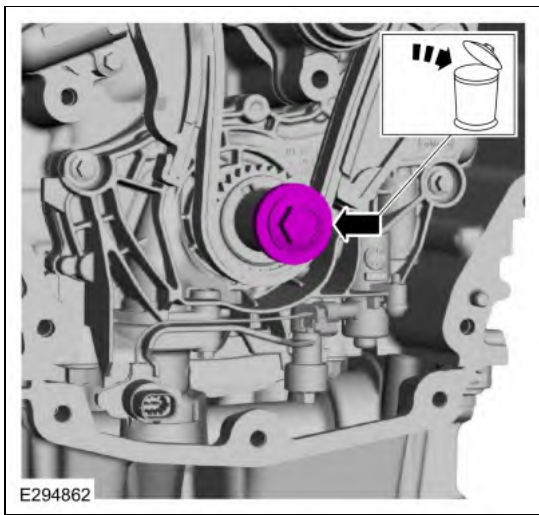
Stage 3: If the camshafts have been removed and installed, tighten bolts 4 and 5 to: 71 lb.in (8 Nm)

Stage 4: If the camshafts have been removed and installed, tighten bolts 4 and 5 an additional: 45°



12.

- Remove the original crankshaft pulley bolt and washer.
- Discard the crankshaft pulley bolt.

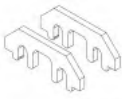


13. Install the engine front cover.
Refer to: Engine Front Cover (303-01D Engine - 3.3L Duratec-V6 Hybrid (BP), Removal and Installation).

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Timing Chain Tensioner

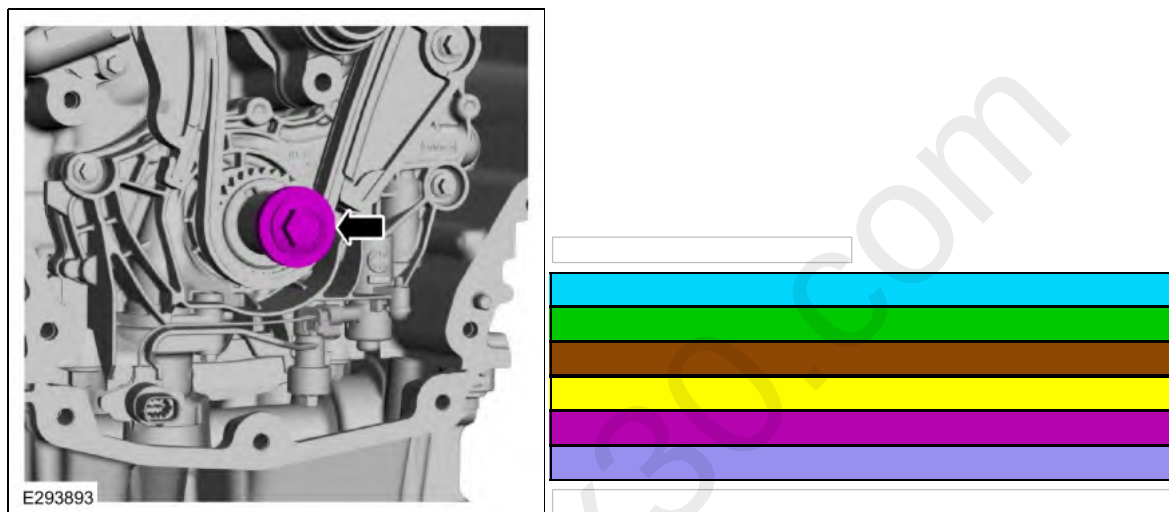
Special Tool(s) / General Equipment

 E216421	303-1248 Camshaft holding tools TKIT-2006UF-FLM TKIT-2006UF-ROW
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Removal

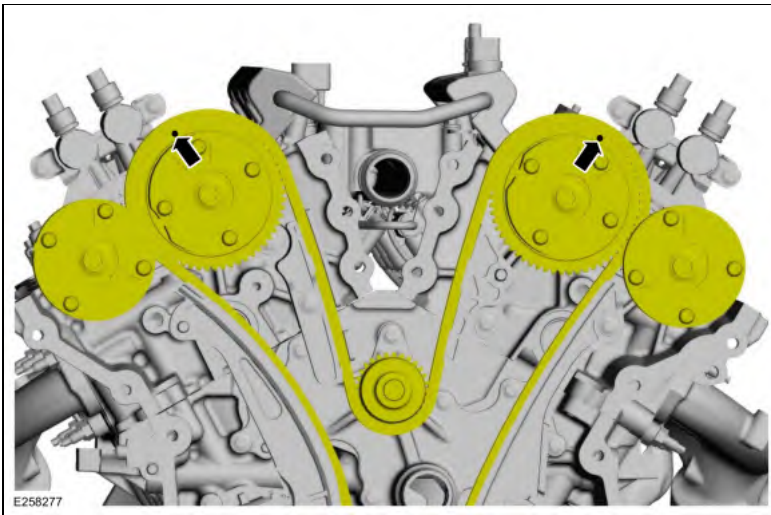
NOTICE: During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan can cause engine failure.

1. Remove the engine front cover.
Refer to: Engine Front Cover (303-01D Engine - 3.3L Duratec-V6 â€” Hybrid (BP), Removal and Installation).
2. Install the original crankshaft pulley bolt and washer.

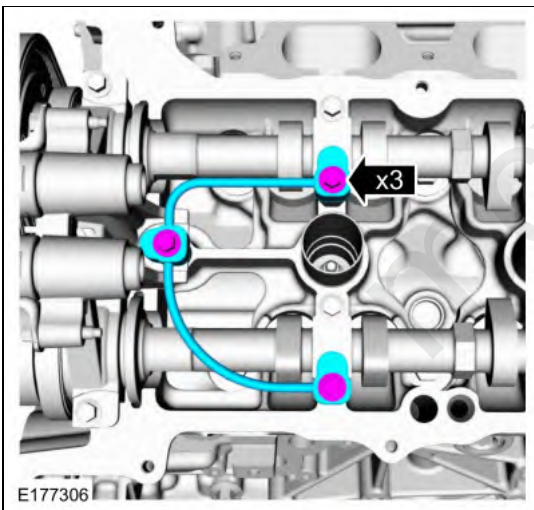


3. **NOTE:** Rotate the crankshaft in a clockwise direction only.

Using the crankshaft bolt, rotate the crankshaft clockwise and align the timing marks on the intake VCT units as shown.



4. Remove the bolts and the LH oil tube.



5. **NOTE:** The Camshaft Holding Tool will hold the camshafts in the TDC position.

Install Special Service Tool: 303-1248 Camshaft holding tools.