



**M-6004-A464  
4.6L 4V AL Timing Kit  
INSTRUCTION SHEET**

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Please contact the Tech Line for the most current instruction information (800) 367-3788

!!! PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY PRIOR TO INSTALLATION !!!

**Verify kit contents before starting.**

**Kit Contents:**

<b>Qty.</b>		<b>Part Name</b>
1	1R3E-6L253-AA	LH TENSIONER ARM
1	1R3E-6L253-BA	RH TENSIONER ARM
1	1R3E-6M256-AA	RH CHAIN GUIDE
1	2C5E-6B274-AB	LH CHAIN GUIDE
1	2R3V-6D081-AA	LH FRONT COVER GASKET
1	2R3V-6D081-BB	CENTER FRONT COVER GASKET
1	2R3V-6D081-CA	RH FRONT COVER GASKET
1	F3AE-6700-AA	FRONT SEAL
2	5W7E-6268-AA	PRIMARY TIMING CHAIN
2	F2LE-6268-BB	SECONDARY TIMING CHAIN
1	F7OE-6C270-EA	RH SECONDARY TENSIONER
1	F7OE-6C271-EA	LH SECONDARY TENSIONER
1	F81E-6L266-AA	RH CHAIN TENSIONER
1	F81E-6M269-AA	LH CHAIN TENSIONER
1	F8AE-6256-AA	RH CAM SPROCKET
1	F8AE-6256-BA	LH CAM SPROCKET
4	F8ZE-6256-AA	CAM SPROCKET
2	F2LE-6265-AD	CAM SPACER
4	N806164-S	CAM WASHER
1	XL3E-6306-AB	CRANKSHAFT SPROCKET

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## Kit Contents (Cont.):

### TIMING COMPONENT BOLT SET

2	N605893-S309	CHAIN GUIDE BOLT (M6 X 20)
1	N606527-S2	CHAIN GUIDE BOLT (M6 X 67)
4	N606543-S2	CHAIN TENSIONER BOLT (M8 X 53)
1	N804958-S2	CHAIN GUIDE BOLT AND WASHER (M6 X 20)
2	W500215-S437	LH SECONDARY CHAIN TENSIONER BOLT (M6 X 27.5)
2	W500304-S300	RH SECONDARY CHAIN TENSIONER BOLT (M6 X 47)
2	W705803-S	TENSIONER ARM STUD
4	N811085-S2	CAM BOLT (10 X 47.5)

### FRONT COVER BOLT SET

1	W701512-S430	DAMPER BOLT
1	N806165-S2	DAMPER WASHER
8	N806177-S437	FRONT COVER BOLT (M8 X 53)
5	N806300-S2	FRONT COVER STUD (M8 X 68 + M 8 X 30)
1	W706560-S437	FRONT COVER STUD (M8 X 65 + M8 X 16)
1	W705128-S437	FRONT COVER BOLT (M8 X 41)
1	W706508-S437	FRONT COVER STUD (M8 X 60 + M6 X 10)
1	N808586-S437	FRONT COVER STUD (M8 X 51 + M6 X 26)
1	XW1E-12A227-AC	TRIGGER WHEEL

## **This instruction sheet has three sections.**

The first section is overview of component locations.

The second section is camshaft gear and chain installation.

The third section is timing chain and tensioner installation.

**WARNING:** The installation of all gears and chains is done with the cam followers removed. Follower installation is done after the gears and chains are in place and properly timed.

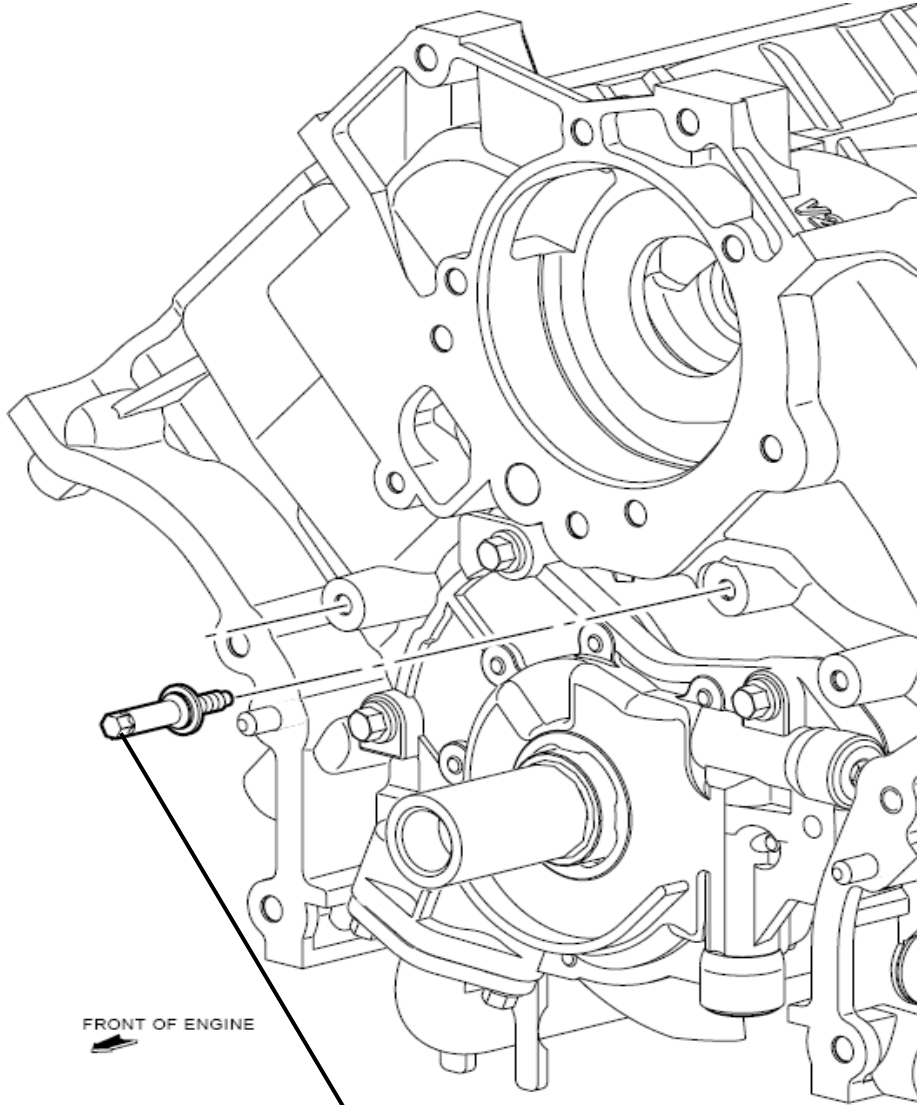
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FRONT OF ENGINE

**TENSIONER DOWEL (2)**

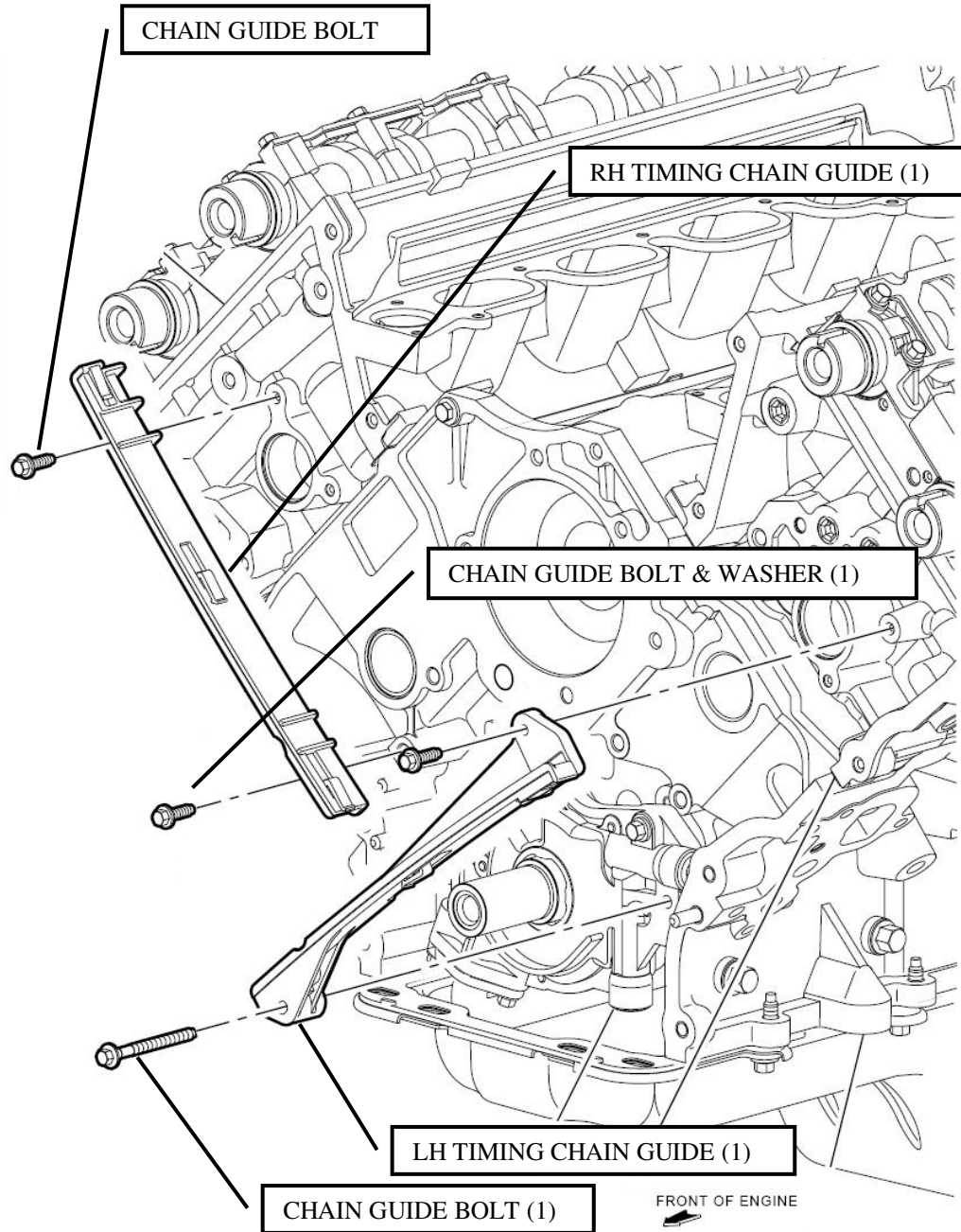
Torque 10 Nm (89 lb-in)

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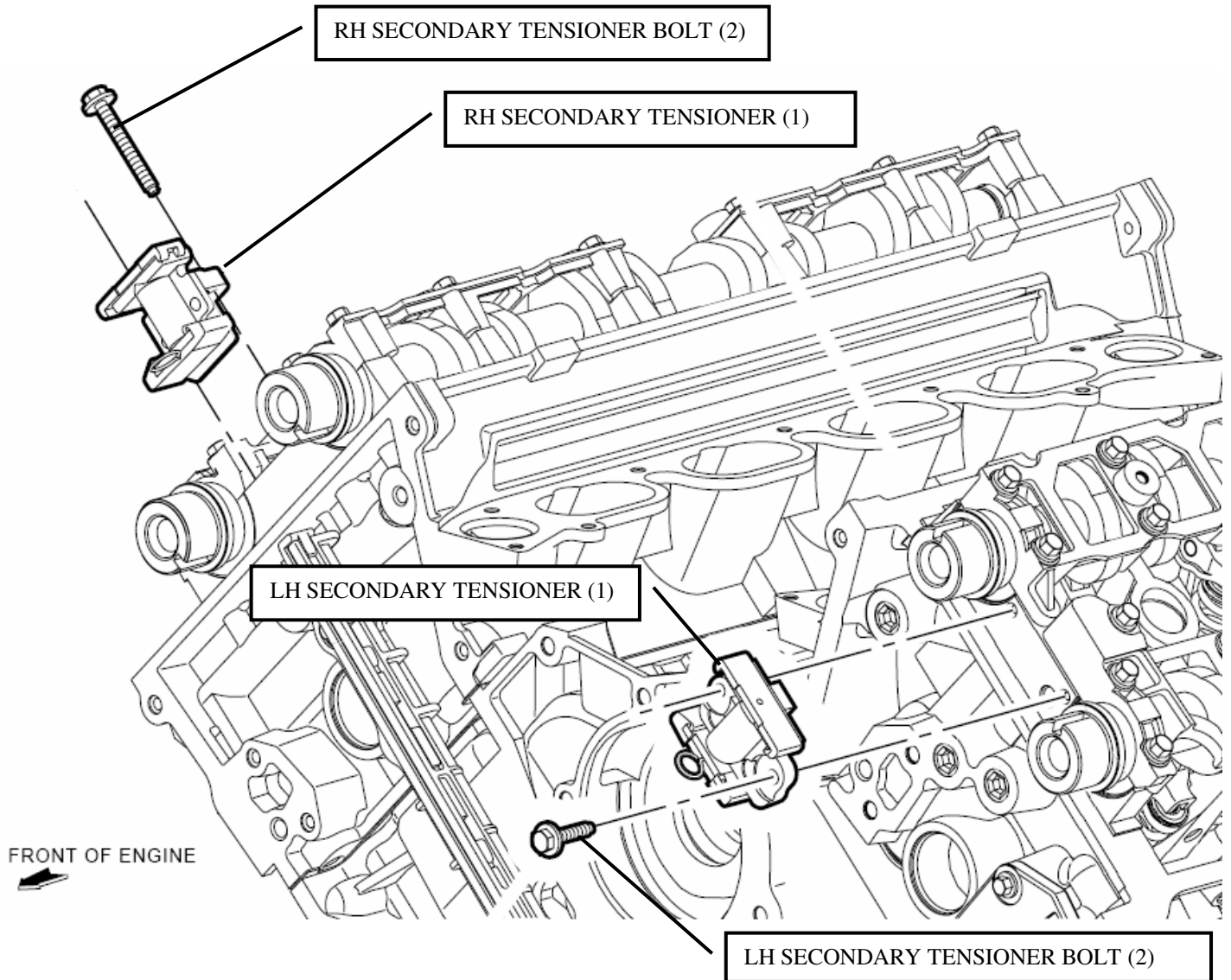
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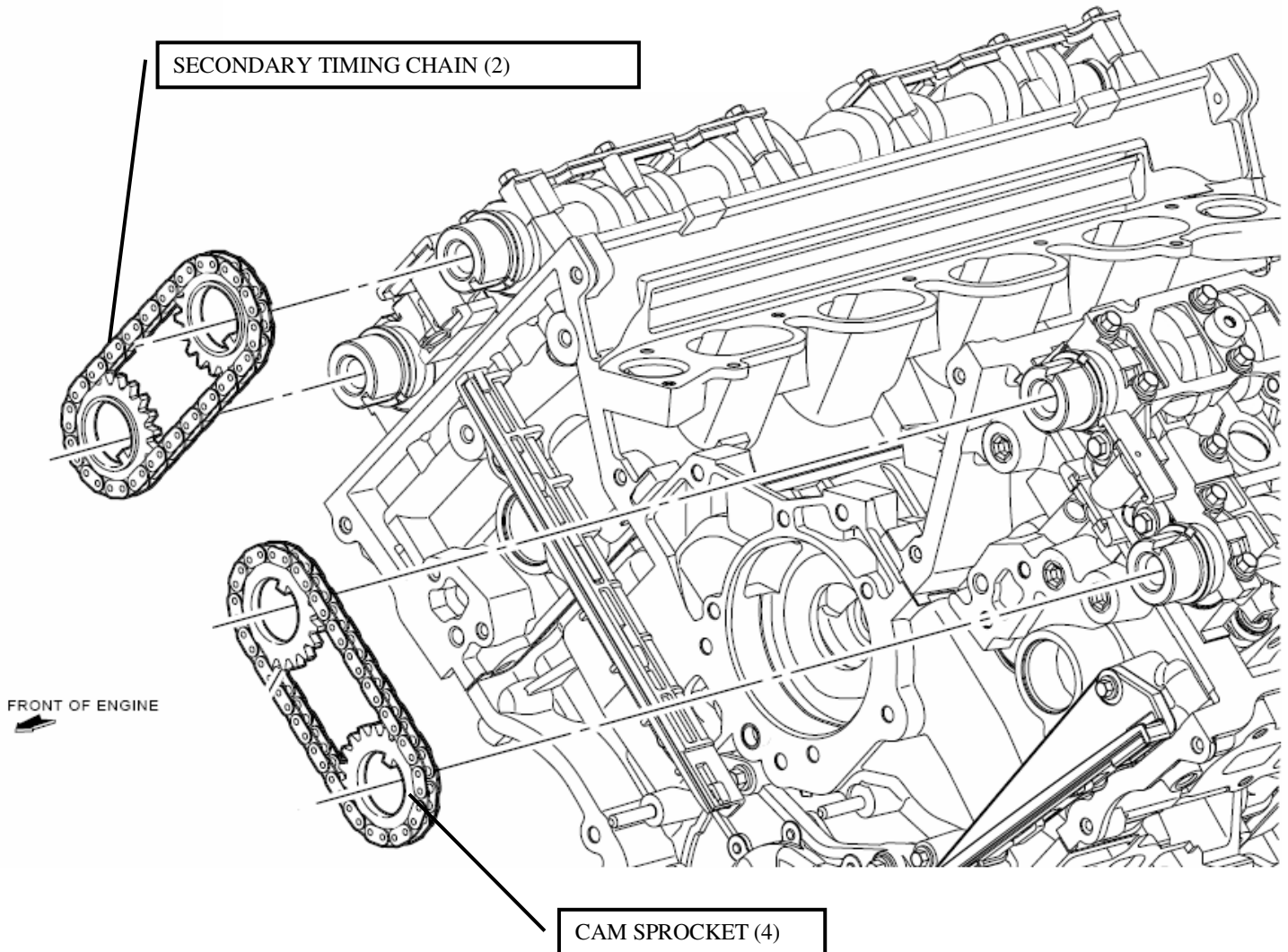
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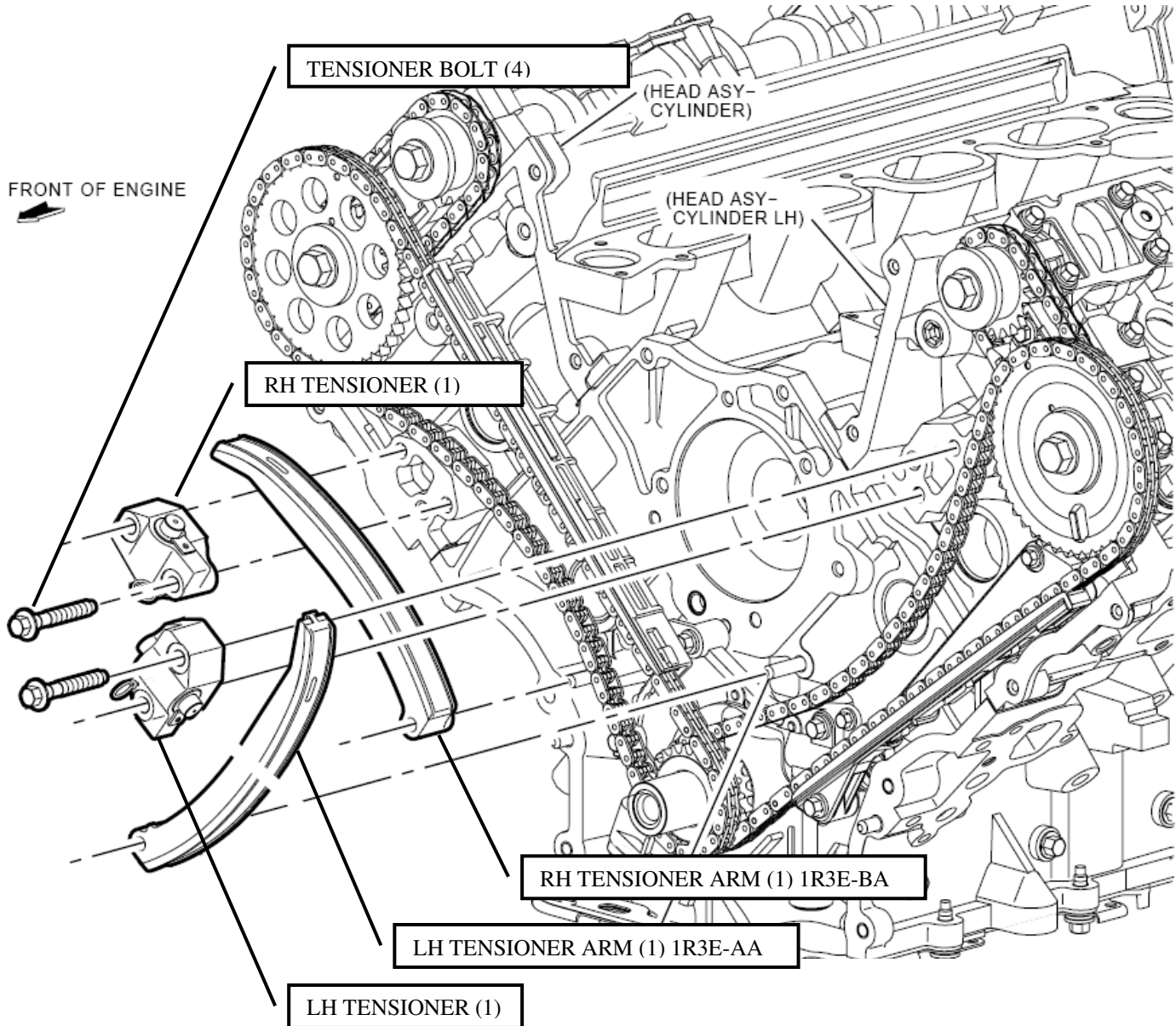


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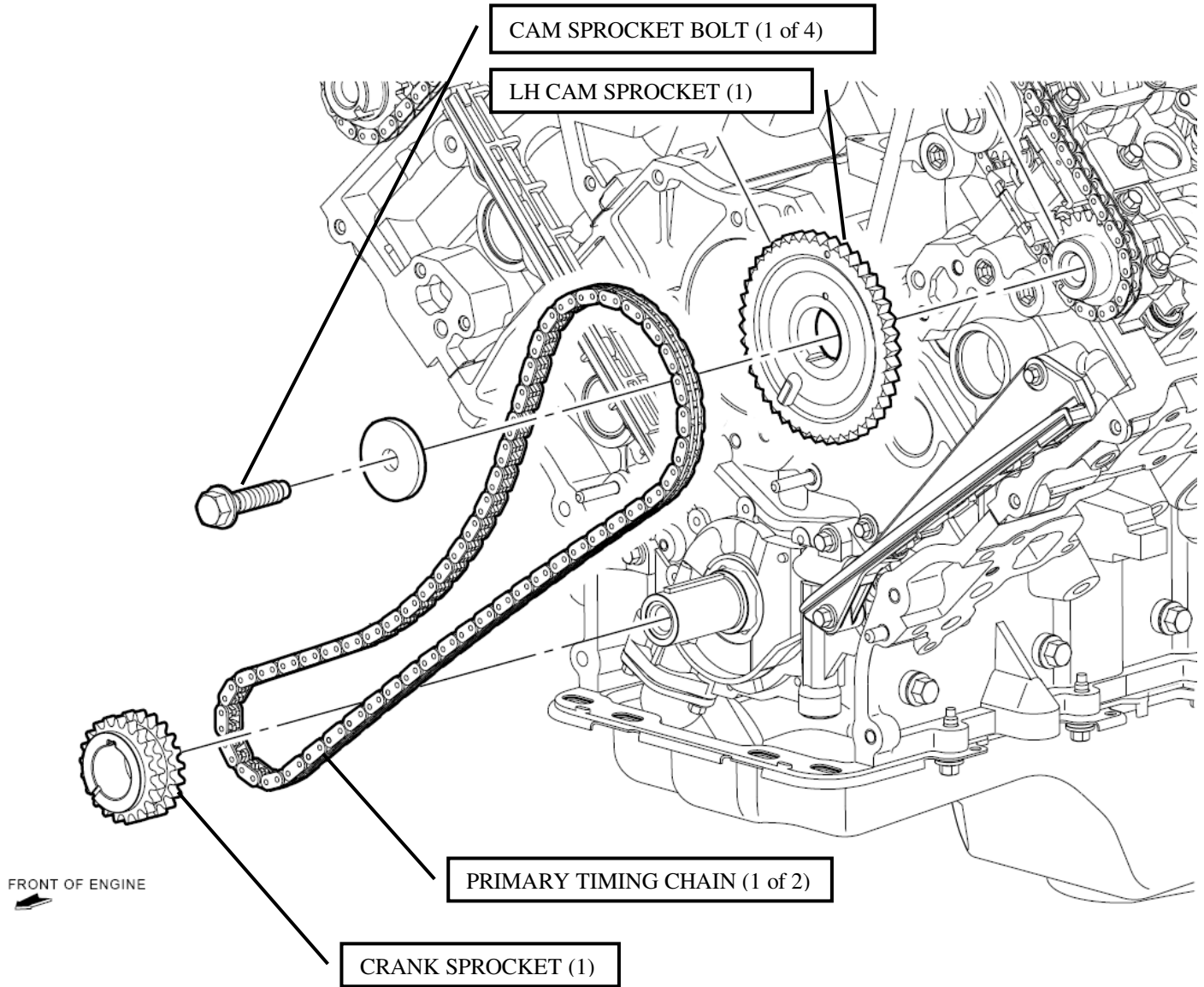
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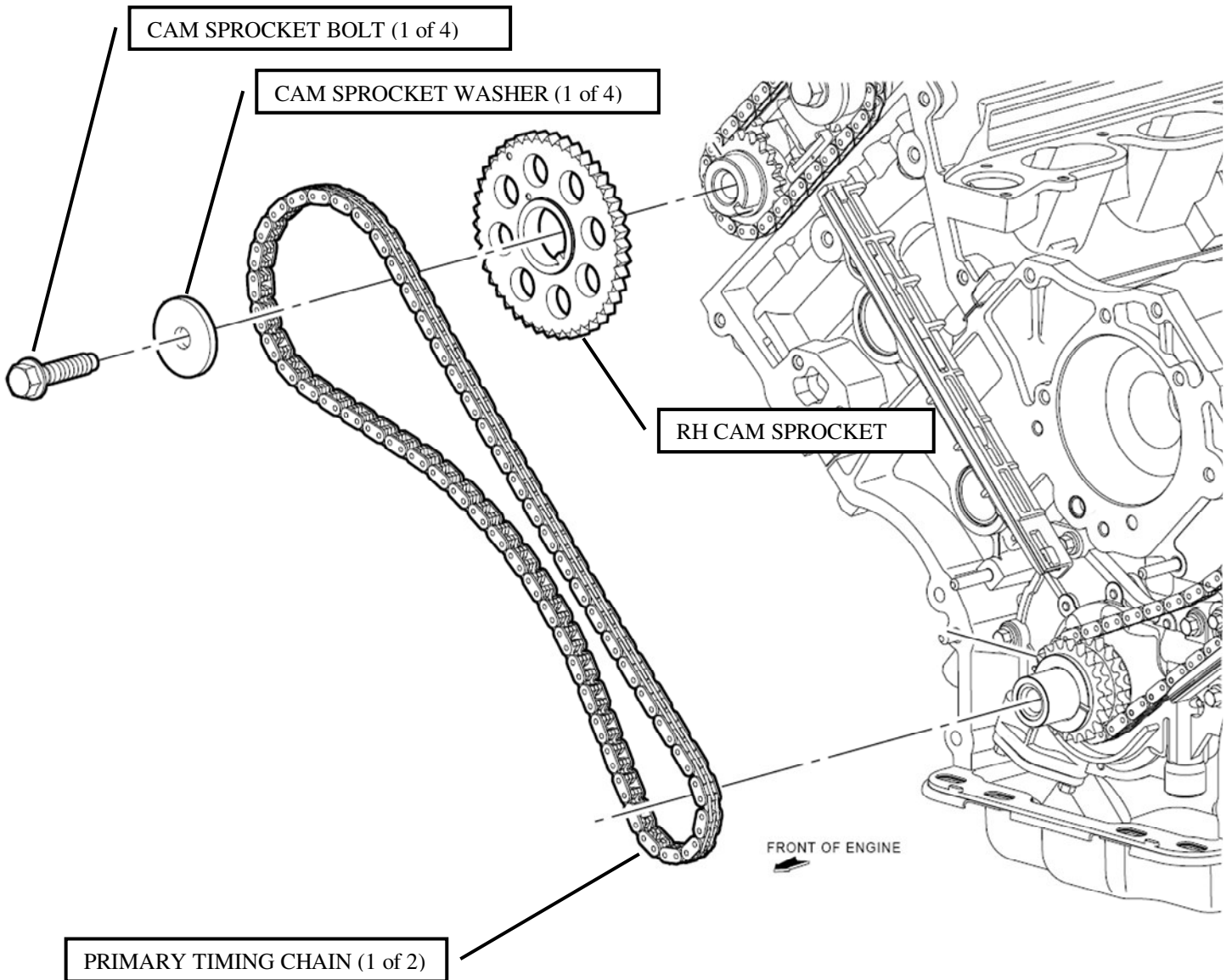


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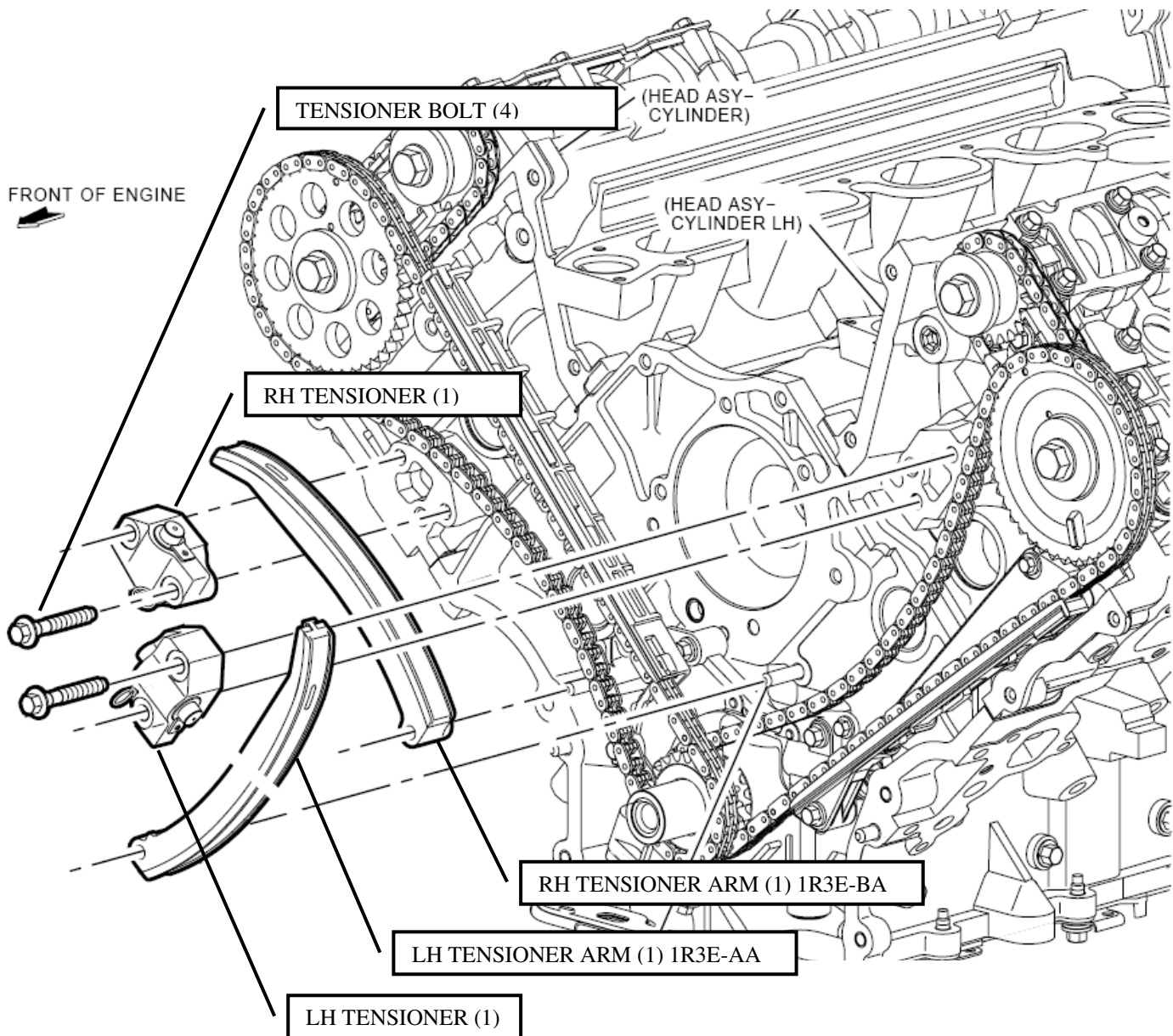


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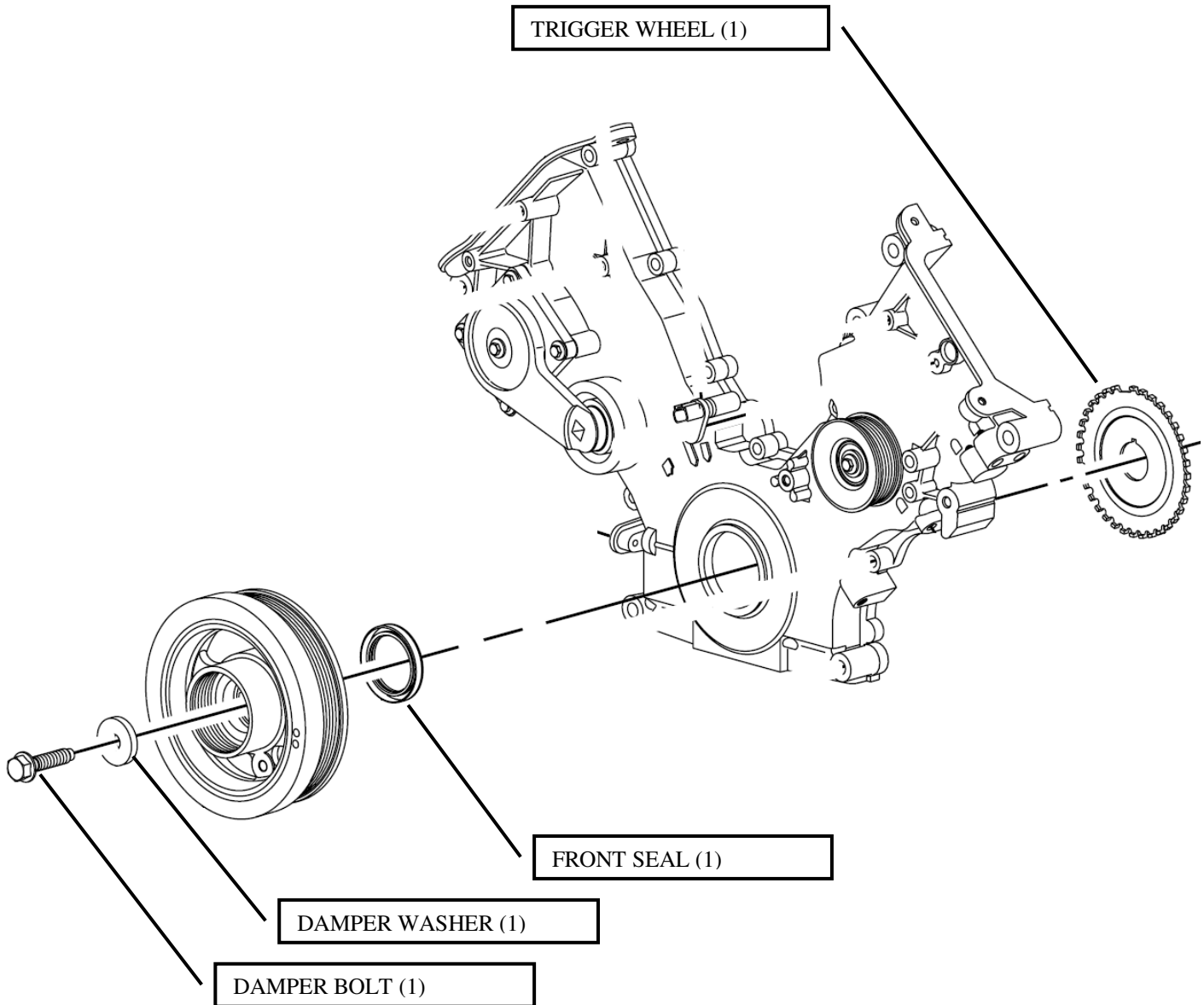
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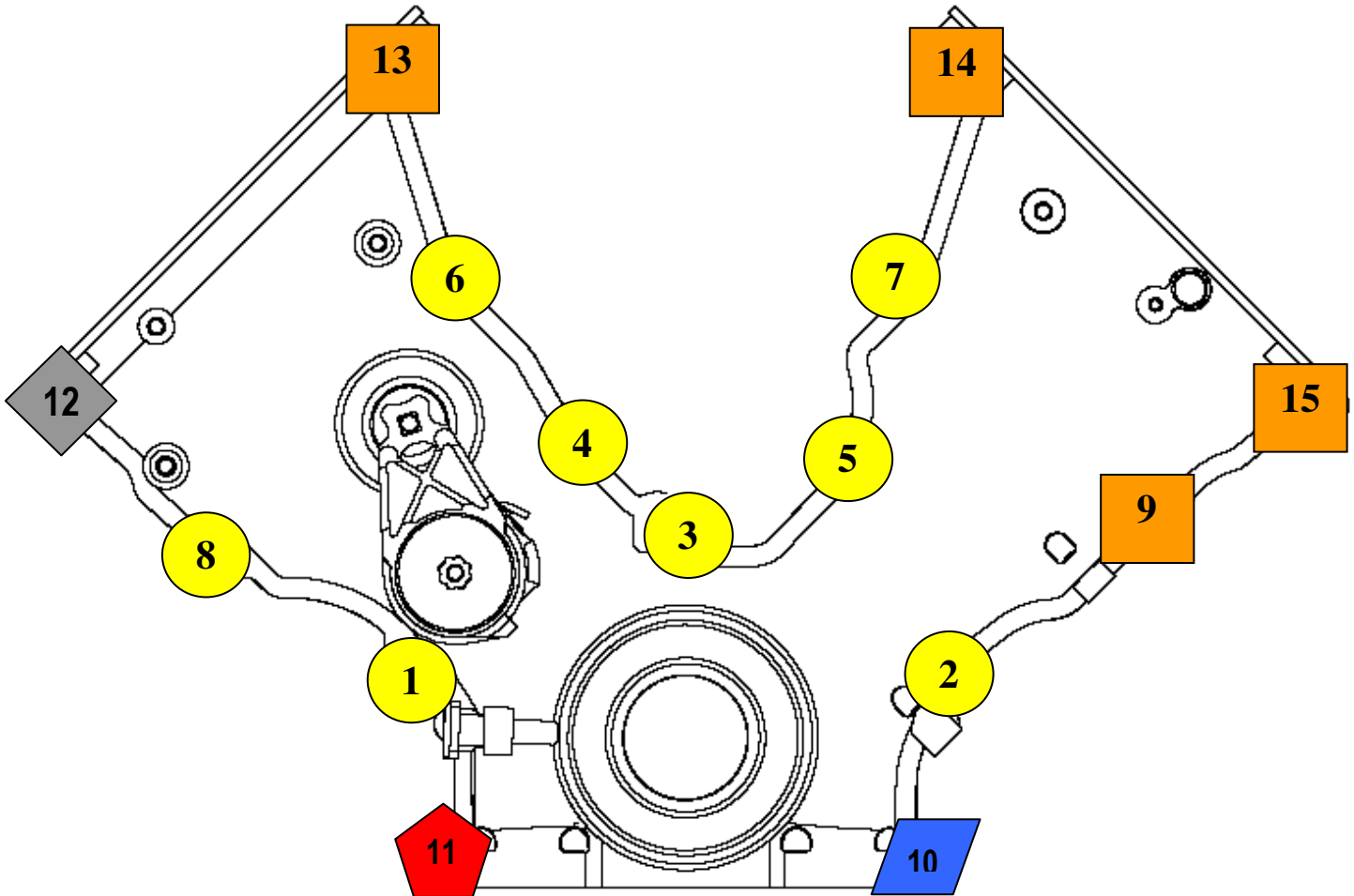
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## 4.6R (4V) Ford Racing - Naturally Aspirated Front Cover Bolt Placement

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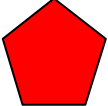
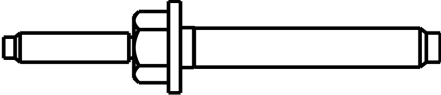
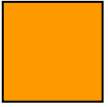
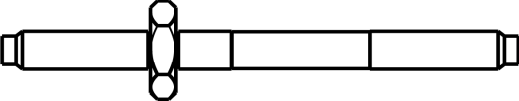
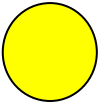
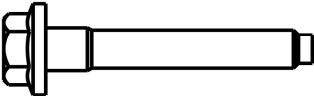
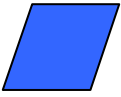
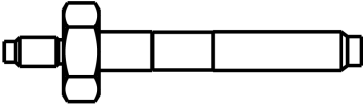
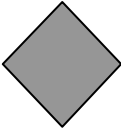
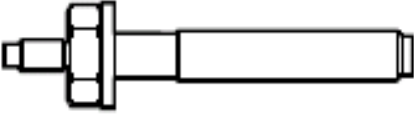
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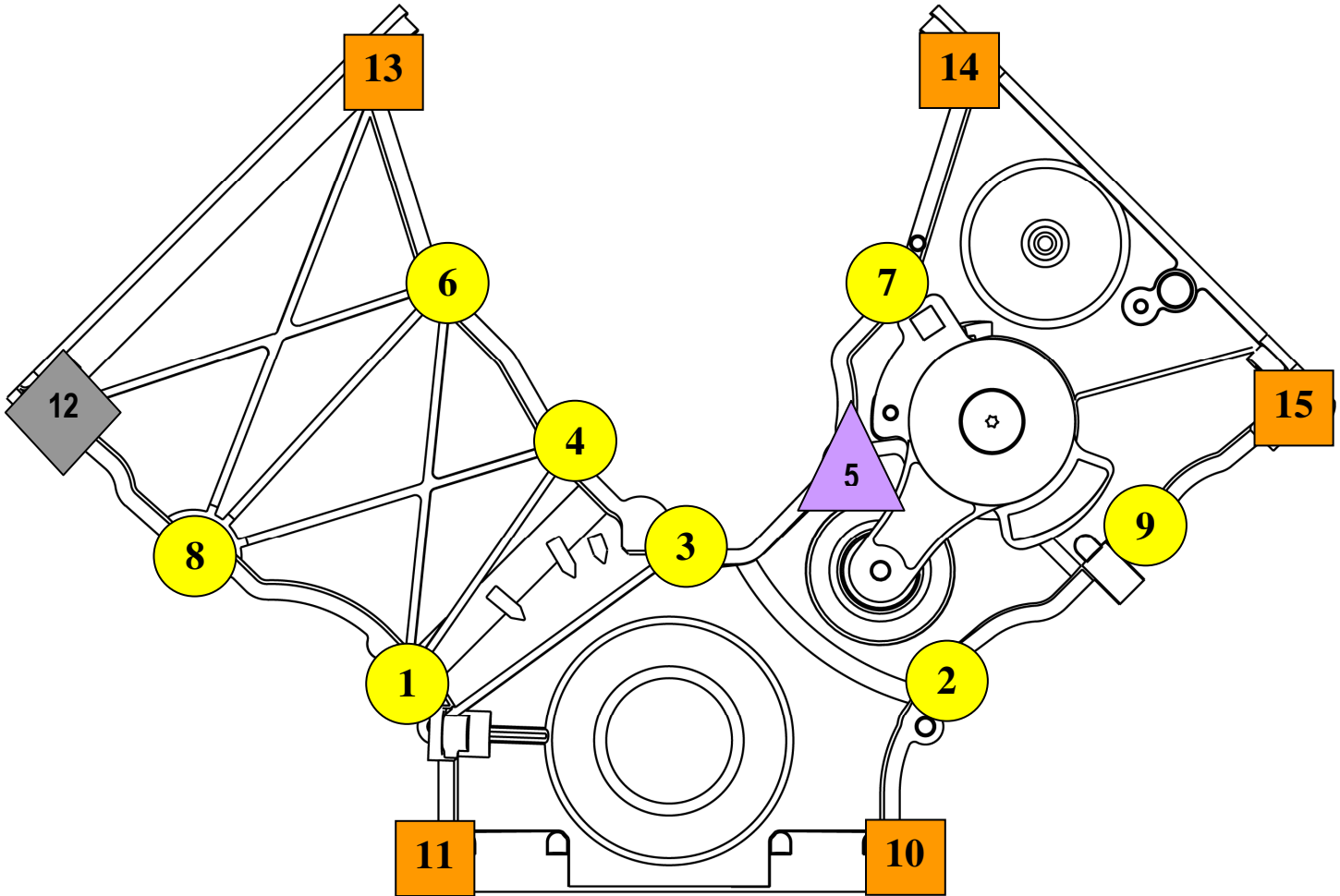
## 4.6R (4V) Ford Racing - Naturally Aspirated Front Cover Bolt Placement

HOLE NO.	FASTENER	PART NUMBER	TORQUE
		N808586	20-30 Nm
		N806300	20-30 Nm
		N806177	20-30 Nm
		W706508	20-30 Nm
		W706560	20-30 Nm

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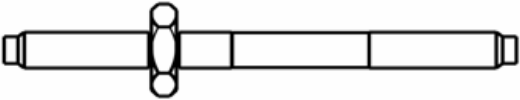

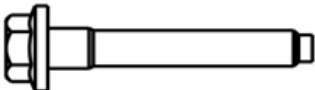
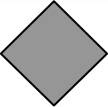
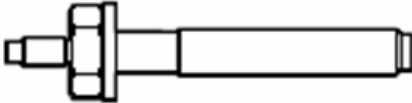
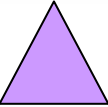
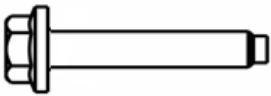
## 4.6R (4V) Ford Racing – Supercharged Front Cover Bolt Placement

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## 4.6R (4V) Ford Racing – Supercharged Front Cover Bolt Placement

HOLE NO.	FASTENER	PART NUMBER	TORQUE
		N806300	20-30 Nm
		N806177	20-30 Nm
		W706560	20-30 Nm
		W705128	20-30 Nm

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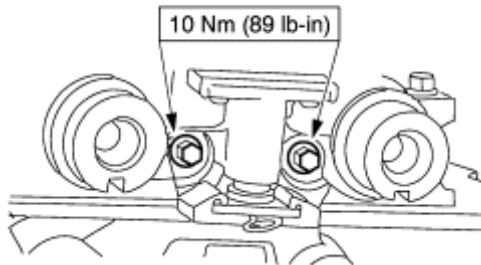
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## CAMSHAFT GEAR AND CHAIN INSTALLATION:

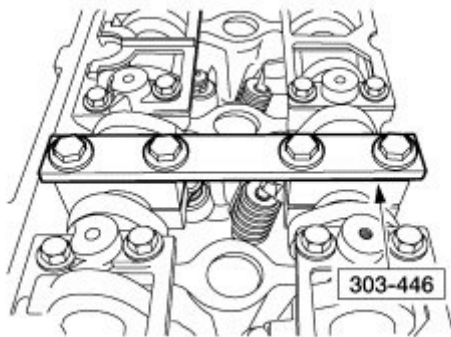
**STEP 1:** Install the tensioner. **NOTE:** LH tensioner is shown, RH tensioner is similar.



**STEP 2:** Install the camshaft sprockets and the chain as an assembly.

**!!! CAUTION: Timing marks must be at 12 o'clock and camshaft keyways indexed at 6 o'clock. !!!**

**STEP 3:** Install the special tool. Tool is designed to hold the camshafts stationary. (TOOL NOT INCLUDED)



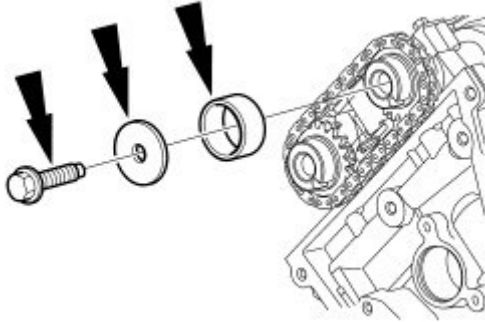
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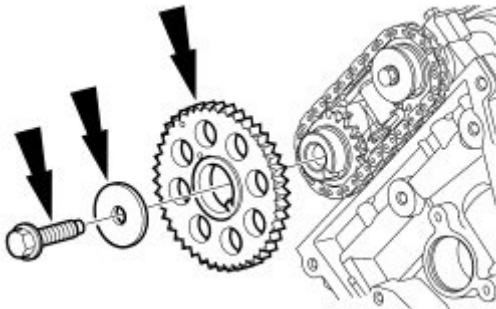


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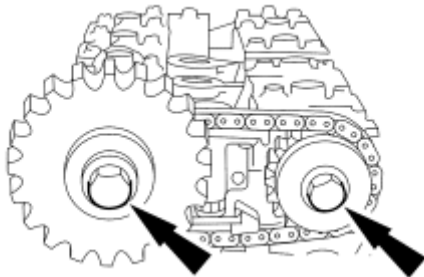
**STEP 4:** Install the camshaft spacer, washer and bolt, and hand-tighten the bolt.



**STEP 5:** Install the camshaft sprocket, washer and bolt, and hand-tighten the bolt.



**STEP 6:** Tighten the bolts in two stages:  
a. Stage 1: Tighten to 40 Nm (30 lb-ft).  
b. Stage 2: Tighten an additional 90 degrees.



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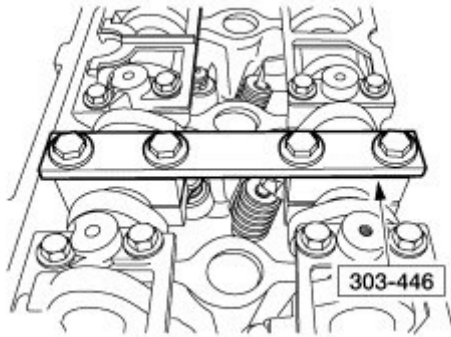
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**STEP 7:** Remove the special tool.



**INSTALLATION OF TIMING COMPONENTS:**

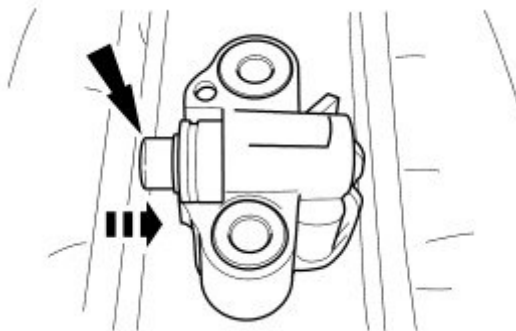
Engines with non-ratcheting timing chain tensioners:

**WARNING:** The installation of all gears and chains is done with the cam followers removed. Follower installation is done after the gears and chains are in place and properly timed.

**!!! CAUTION:** Timing chain procedures must be followed exactly or damage to the pistons or valves may result. !!!

**NOTE:** Tensioners ship with clip installed

**STEP 1:** Compress the tensioner plunger, using a soft-jawed vise.

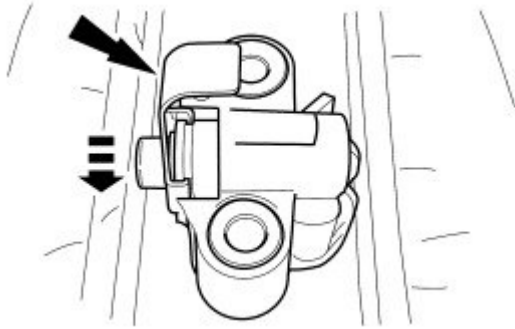


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- STEP 2:** Install a retaining clip on the tensioner to hold the plunger in during installation.
- Remove the tensioner from the vise.

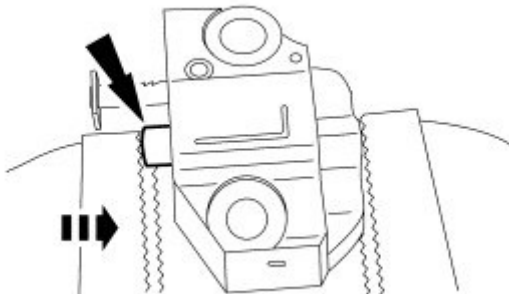


**Engines with ratcheting timing chain tensioners:**

**!!! CAUTION: Timing chain procedure must be followed exactly or damage to valves and pistons will result. !!!**

**!!! CAUTION: Do not compress the ratchet assembly. This will damage the ratchet assembly. !!!**

- STEP 3:** Compress each tensioner plunger using an edge of a vise. **NOTE:** LH shown, RH similar.

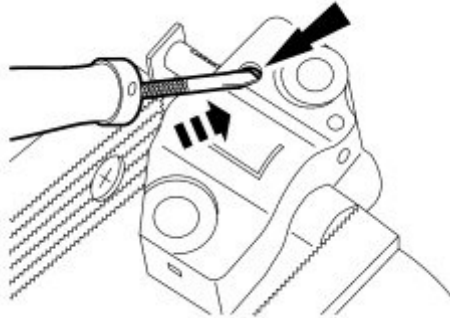


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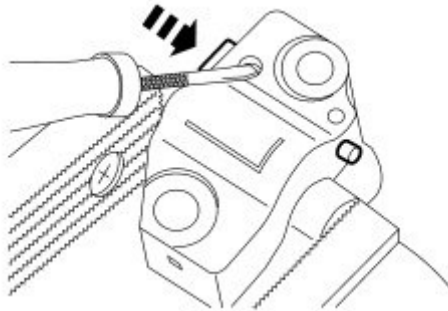
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**STEP 4:** Using a small screwdriver or pick, push back and hold the ratchet mechanism.

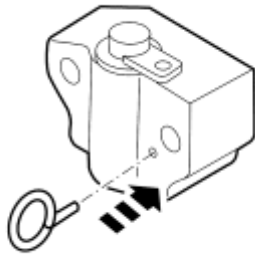


**STEP 5:** While holding the ratchet mechanism, push the ratchet arm back into the tensioner housing.



**STEP 6:** Insert a paper clip into the hole of each tensioner housing to hold the ratchet assembly and plunger in during installation.

- Remove the tensioner from the vise.

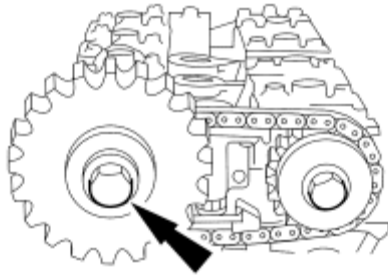


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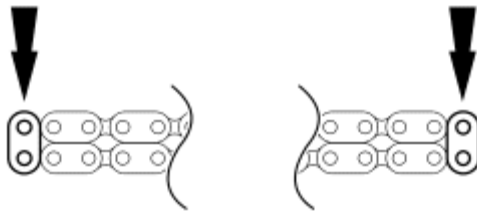
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- STEP 7:** Install the exhaust camshaft sprocket.
- Stage 1: Tighten to 40 Nm (30 lb-ft).
  - Stage 2: Tighten an additional 90 degrees.

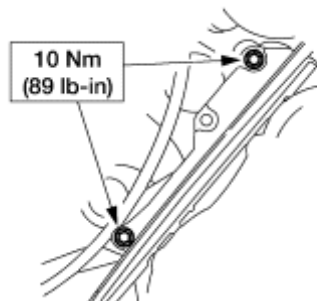


**All engines:**

- STEP 8:** If the copper links are not visible, mark one link on one end and one link on the other end, and use as timing marks.



- STEP 9:** Install the timing chain guides.

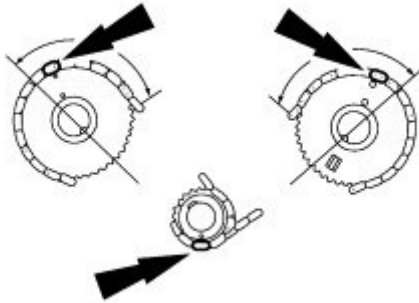


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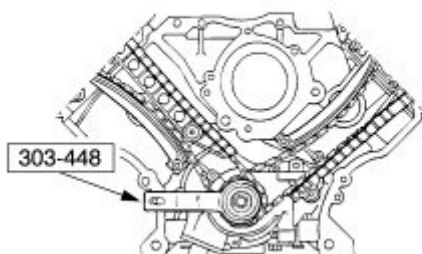
- STEP 10:** Rotate the LH camshaft sprocket until the timing mark is approximately at the 12 o'clock position. Rotate the RH camshaft timing sprocket until the timing mark is approximately in the 11 o'clock position.



**!!! CAUTION:** Unless otherwise instructed, at no time when the timing chains are removed and the cylinder heads are installed is the crankshaft or the camshaft to be rotated. Severe piston and valve damage will occur if cam followers are installed. !!!

**!!! CAUTION:** Rotate the crankshaft counterclockwise only. Do not rotate past position shown or severe piston or valve damage will occur if cam followers are installed. !!!

- STEP 11:** Using the special tool, position the crankshaft so that the number one cylinder is at top dead center (TDC). (TOOL NOT INCLUDED)  
**NOTE:** The number one cylinder is at TDC when the stud on the engine block fits into the slot in the handle of the special tool.

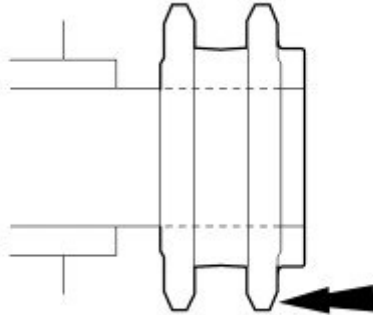


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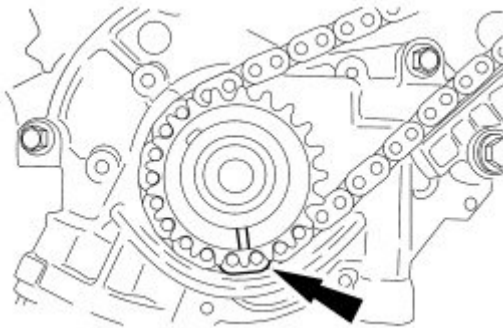
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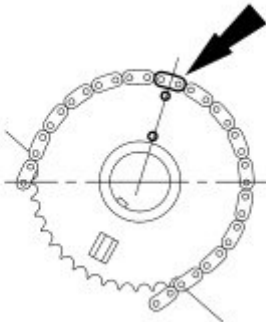
**STEP 12:** Install the crankshaft sprocket with the flange facing forward.



**STEP 13:** Position the LH (inner) timing chain on the crankshaft sprocket, aligning the copper (marked) link with the timing mark on the sprocket.



**STEP 14:** Install the LH timing chain onto the crankshaft sprocket, aligning the copper (marked) link with the timing marks on the sprocket.

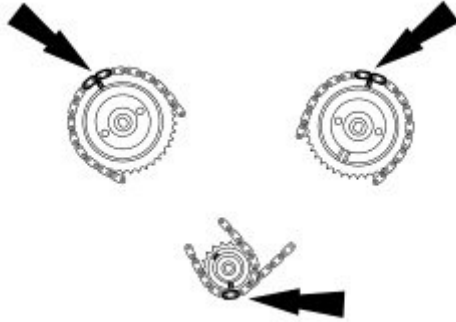


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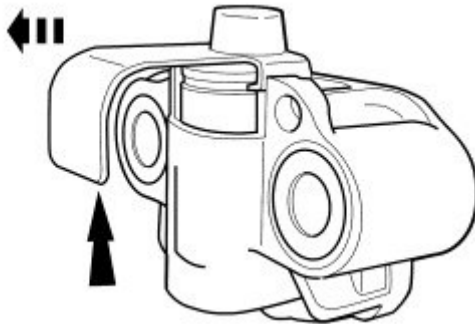
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- STEP 15:** Position the LH timing chain tensioner arm on the dowel pin and install the LH timing chain tensioner.  
**NOTE:** The LH timing chain tensioner arm has a bump near the dowel hole for identification.



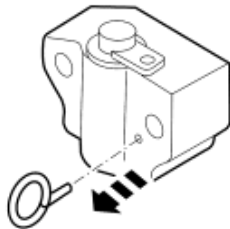
**Engines with non-ratcheting timing chain tensioners:**

- STEP 16:** Remove the retaining clips from the LH timing chain tensioner.



**Engines with ratcheting timing chain tensioners:**

- STEP 17:** Remove the retaining clip from the LH timing chain tensioner.



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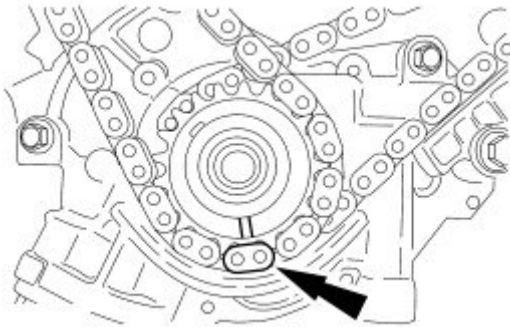
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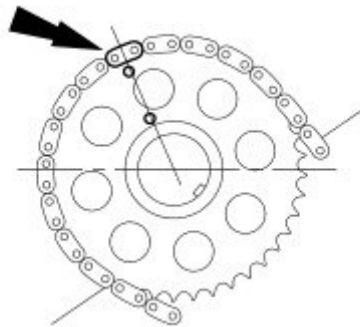
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**All engines:**

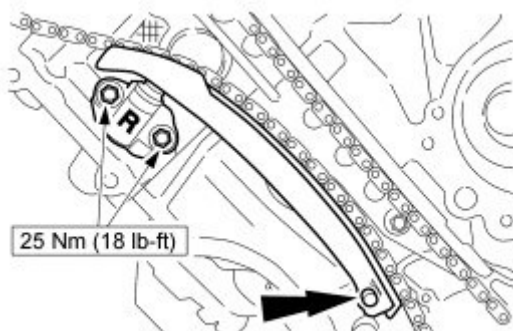
**STEP 18:** Position the RH (outer) timing chain on the crankshaft sprocket, aligning the copper (marked) link with the timing mark on the sprocket.



**STEP 19:** Install the RH timing chain onto the crankshaft sprocket, aligning the copper (marked) link with the timing marks on the sprocket.



**STEP 20:** Position the RH timing chain tensioner arms on the dowel pin and install the RH timing chain tensioner.



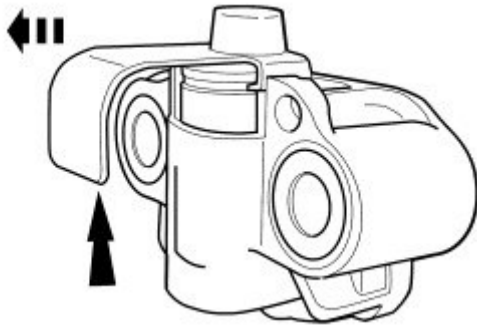
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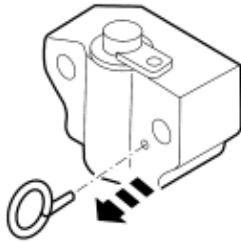
**Engines with non-ratcheting timing chain tensioners:**

**STEP 21:** Remove the retaining clips from the RH timing chain tensioner.



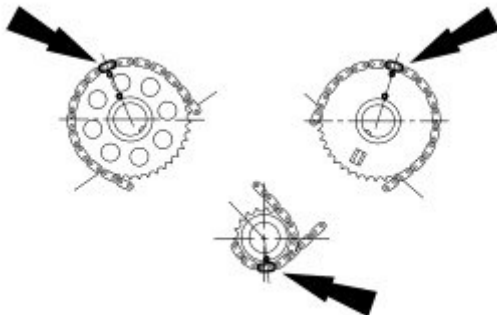
**Engines with ratcheting timing chain tensioners:**

**STEP 22:** Remove the retaining clip from the RH timing chain tensioner.



**All engines:**

**STEP 23:** Make sure that the copper (marked) chain links are lined up with the dots on the crankshaft sprockets and the camshaft sprocket.



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**M-6004-A464**  
**4.6L 4V AL Timing Kit**  
**INSTRUCTION SHEET**

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- STEP 24:** Position the piston of the cylinder you are installing the cam followers on at the bottom of the stroke and the camshaft lobe at the base circle.
- STEP 25:** Using the proper tool, compress the intake valve spring and install the roller followers in their original locations.

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