

Fig. 145 Crankshaft positioning tool installation—4.6L engine

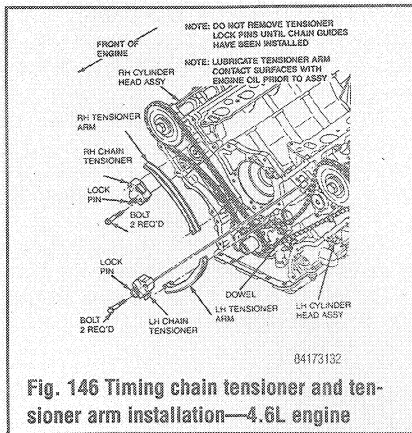


Fig. 146 Timing chain tensioner and tensioner arm installation—4.6L engine

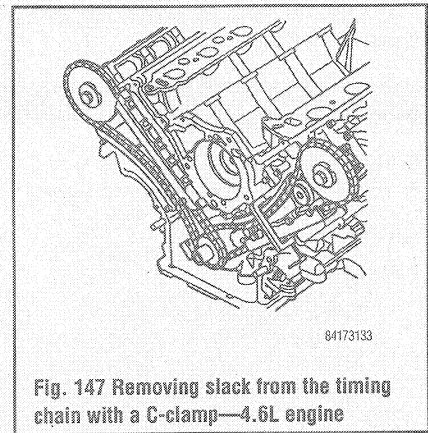


Fig. 147 Removing slack from the timing chain with a C-clamp—4.6L engine

**\*\* WARNING**

Do not rotate the crankshaft and/or camshafts.

**To install:**

11. Make sure cam positioning tools, are installed on the camshafts to prevent them from rotating.

12. If removed, position the camshaft spacers and sprockets on the camshafts and install the washers and retaining bolts. Do not tighten at this time.

13. Install the left crankshaft sprocket with the tapered part of the sprocket facing away from the engine block.

➤ **The crankshaft sprockets are identical. They may only be installed 1 way, with the tapered part of the sprocket facing each other.**

14. Install the left timing chain on the camshaft and crankshaft sprockets. Make sure the copper links of the chain line up with the timing marks of the sprockets.

➤ **If the copper links of the timing chain are not visible, pull the chain taught until the opposite sides of the chain contact one another and lay it on a flat surface. Mark the links at each end of the chain and use them in place of the copper links.**

15. Install the right crankshaft sprocket with the tapered part of the sprocket facing the left crankshaft sprocket.

16. Install the right timing chain on the camshaft and crankshaft sprockets. Make sure the copper links of the chain line up with the timing marks of the sprockets.

17. It is necessary to bleed the timing chain tensioners before installation. Proceed as follows:

a. Position the timing chain tensioner in a soft-jawed vice.

b. Using a small pick or similar tool, hold the ratchet lock mechanism away from the ratchet stem and slowly compress the tensioner plunger by rotating the vise handle.

**\*\* WARNING**

The tensioner must be compressed slowly or damage to the internal seals will result.

c. Once the tensioner plunger bottoms in the tensioner bore, continue to hold the ratchet lock mechanism and push down on the ratchet stem until flush with the tensioner face.

d. While holding the ratchet stem flush to the tensioner face, release the ratchet lock mechanism and install a paper clip or similar tool in the tensioner body to lock the tensioner in the collapsed position.

e. The paperclip must not be removed until the timing chain, tensioner, tensioner arm and timing chain guide is completely installed on the engine.

18. Install the right and left timing chain tensioners and secure with 2 bolts on each. Tighten the bolts to 15–22 ft. lbs. (20–30 Nm).

19. On 1993 and later vehicles, install a crankshaft positioning tool, over the crankshaft and front cover alignment dowel, to position the crankshaft.

20. Lubricate the tensioner arm contact surfaces with engine oil and install the right and left tensioner arms on their dowels.

21. Install the right and left timing chain guides and secure with 2 bolts on each. Tighten the bolts to 6–9 ft. lbs. (8–12 Nm).

22. Position a suitable C-clamp around the tensioner arm and chain guide, to remove all slack from the chain.

23. Remove the paper clips from the timing chain tensioners and make sure all timing marks are aligned.

24. Using a camshaft positioning tool, align the camshaft, tighten the camshaft sprocket-to-camshaft bolt to 81–95 ft. lbs. (110–130 Nm).

25. On 1993 and later vehicles, position a suitable dial indicator in the No. 1 cylinder spark plug hole. Check that the camshaft is at maximum lift for the intake valve when the piston is at 114° after TDC. If it is not, loosen the camshaft sprocket bolt and repeat Steps 18–22.

26. Remove the camshaft and crankshaft positioning tools.

27. Installation of the remaining components is the reverse of removal.

28. Connect the negative battery cable, start the engine and check for leaks and proper operation.

**5.0L Engines**

➤ **See Figure 148**

1. Disconnect the negative battery cable and drain the cooling system.

**\*\* CAUTION**

Never open, service, or drain the radiator or cooling system when hot; serious burns can occur from the steam and hot coolant. In addition, when draining engine coolant, keep in mind that cats and dogs are attracted to ethylene glycol antifreeze and could drink any that is left in an uncovered container or in puddles on the ground. This will prove fatal in sufficient quantities. Always drain coolant into a sealable container. Coolant should be reused unless it is contaminated or is several years old.

2. Remove the timing chain front cover.

3. Rotate the crankshaft until the timing marks on the sprockets are aligned.

4. Remove the camshaft retaining bolt, washer, and eccentric. Slide both sprockets and the timing chain forward and remove them as an assembly.

**To install:**

5. Position the sprockets and timing chain on the camshaft and crankshaft simultaneously. Make sure the timing marks on the sprockets are aligned.

6. Install the washer, eccentric, and camshaft sprocket-retaining bolt. Tighten the bolt to 40–45 ft. lbs. (54–61 Nm).

7. Install the timing chain front cover and remaining components.

8. Fill the cooling system. Connect the negative battery cable, start the engine, and check for leaks.

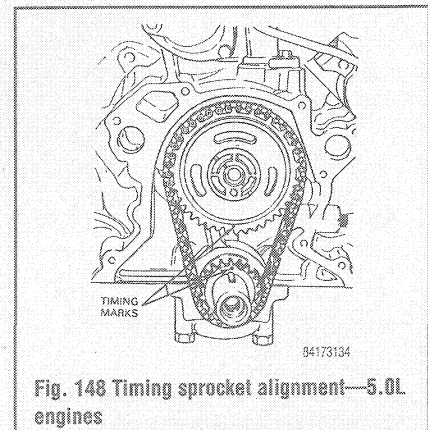


Fig. 148 Timing sprocket alignment—5.0L engines