6. Remove the chain tensioner assembly from the front of the cylinder block. This is accomplished by pulling back on the ratcheting mechanism and installing a pin through the hole in the bracket to relieve tension.

➡The front cover houses the oil pump. If a new front cover is to be installed, remove the water pump and oil pump from the old front cover.

To install:

7. Lightly oil all bolt and stud threads before installation. Clean all gasket surfaces on the front cover, cylinder block, and fuel pump. If reusing the front cover, replace crankshaft front oil seal.

8. If a new front cover is to be installed, complete the following:
   a. Install the oil pump gears.
   b. Clean the water pump gasket surface. Position a new water pump gasket on the front cover and install water pump. Install the pump attaching bolts and tighten to 15–22 ft. lbs. (20–30 Nm).

9. Rotate the crankshaft as necessary to position piston No. 1 at TDC and the crankshaft keyway at the 12 o' clock position.

10. Install the tensioner assembly. Make sure the ratcheting mechanism is in the retracted position with the pin pointing outward from the hole in the bracket assembly. Tighten the retaining bolts to 6–10 ft. lbs. (8–14 Nm).

11. Lubricate timing chain with clean engine oil. Install the camshaft sprocket, crankshaft sprocket, and timing chain.

12. Remove the pin from the tensioner/vibration damper assembly to load the timing chain vibration damper arm against the timing chain. Make certain the timing marks are positioned across from each other.

13. Install the distributor drive gear.

14. Install the camshaft sprocket washer and bolt at the end of the camshaft, then tighten to 30–37 ft. lbs. (41–50 Nm).

15. Install the timing chain/engine front cover, using a new gasket. For details regarding this procedure, please refer to timing chain cover removal and installation earlier in this section.

16. Connect battery ground cable. Start the engine and check for leaks.

4.6L Engine

➧ See Figures 139 thru 147

➡This is not a free wheeling engine. If it has "jumped time," there will be damage to the valves and/or pistons and will require the removal of the cylinder heads.

⁂ WARNING

The camshafts and/or crankshaft must never be rotated when the cylinder heads are installed and the timing chain is removed. Failure to heed this warning will result in valve and/or piston damage.

1. Disconnect the negative battery cable.

2. Remove the valve covers and the timing chain front cover.

3. Remove the crankshaft position sensor tooth wheel.

4. Rotate the engine to set the No. 1 piston at TDC on the compression stroke.

5. Install cam positioning, on the flats of the camshaft. This will prevent accidental rotation of the camshafts.

6. Remove the 2 bolts retaining the right tensioner to the cylinder head and remove the tensioner. Remove the right tensioner arm.

7. Remove the 2 bolts retaining the right chain guide to the cylinder head and remove the chain guide. Remove the right chain and right crankshaft sprocket. If necessary, remove the right camshaft sprocket retaining bolt, washer, sprocket, and spacer.

➡Cam positioning tools must be installed on the camshaft to prevent the camshaft from rotating.

8. Remove the 2 bolts retaining the left tensioner to the cylinder head and remove the tensioner. Remove the left tensioner arm.

9. Remove the 2 bolts retaining the left chain guide to the cylinder head and remove the chain guide. Remove the left chain and left crankshaft sprocket. If necessary, remove the left camshaft sprocket retaining bolt, washer, sprocket, and spacer.

➡Cam positioning tools, must be installed on the camshaft to prevent the camshaft from rotating.

10. Inspect the friction material on the tensioner arms and chain guides. If worn or damaged, remove and clean the oil pan and replace the oil pickup tube.

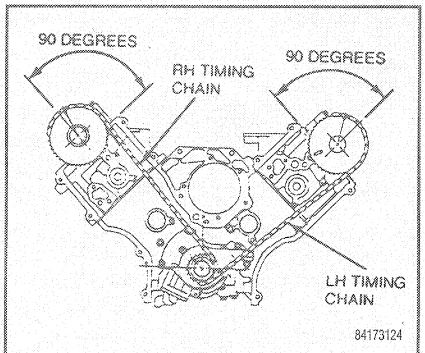

Fig. 139 Engine positioned for timing chain removal (No. 1 TDC)—4.6L engine

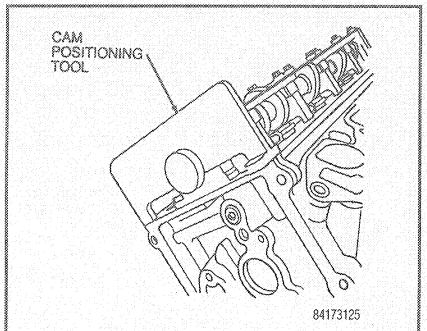

Fig. 140 Camshaft positioning tool installed—4.6L engine

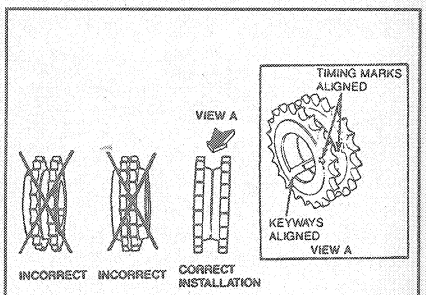

Fig. 141 Crankshaft sprocket positioning—4.6L engine

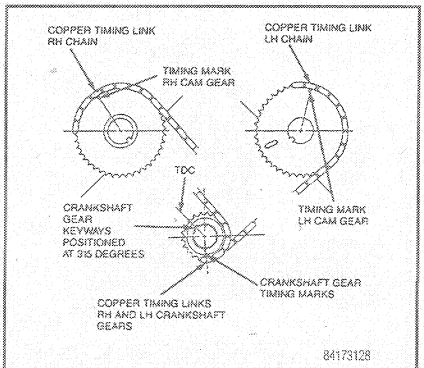

Fig. 142 Timing chain and sprocket alignment—4.6L engine

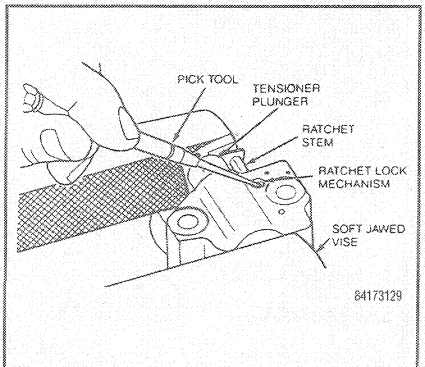

Fig. 143 Timing chain tensioner bleeding procedure—4.6L engine

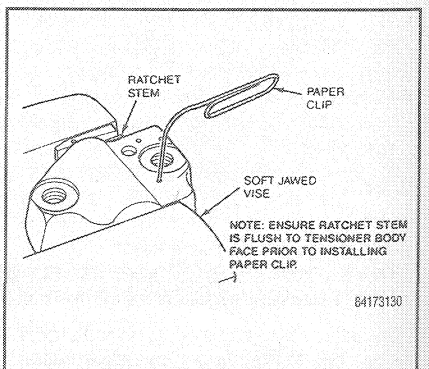

Fig. 144 Timing chain tensioner locking procedure—4.6L engine