9. Check and adjust the ignition timing and idle speed, as necessary.

Camshaft, Bearings and Lifters

REMOVAL & INSTALLATION

3.8L Engine

See Figure 149

1. Disconnect the negative battery cable.
2. Properly relieve the fuel system pressure.
3. Drain the cooling system and crankcase.
4. Remove the engine from the vehicle and position in a suitable holding fixture.
5. Remove the intake manifold.
6. Remove the rocker arm covers, rocker arms, pushrods, and lifters.
7. Remove the oil pan.
8. Remove the front cover and timing chain.
9. Remove the thrust plate. Remove the camshaft through the front of the engine, being careful not to damage bearing surfaces.

To install:

10. Lightly oil all attaching bolts and studs threads before installation. Lubricate the cam lobes, thrust plate and bearing surfaces with suitable heavy engine oil.
11. Install the camshaft being careful not to damage bearing surfaces while sliding into position. Install the thrust plate and tighten the bolts to 6–10 ft. lbs. (8–14 Nm).
12. Install the front cover and timing chain.
13. Install the oil pan.
14. Install the lifters.
15. Install the upper and lower intake manifolds.
16. Install the engine assembly.
17. Fill the cooling system and crankcase to the proper level and connect the negative battery cable.
18. Start the engine. Check and adjust the ignition timing and engine idle speed as necessary. Check for leaks.

4.6L Engine

See Figures 150 thru 155

1. Disconnect the negative battery cable and drain the cooling system. Relieve the fuel system pressure as described in Section 5.

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 right and left valve covers.
3. Remove the timing chain front cover. Remove the timing chains.
4. Rotate the crankshaft counterclockwise 45 degrees from TDC to make sure all pistons are below the top of the engine block deck face.

WARNING

The crankshaft must be in this position before rotating the camshafts or damage to the pistons and/or valve train will result.

5. Install a valve spring compressor tool, under the camshaft and on top of the valve spring retainer.

A special valve spring spacer tool must be installed between the spring coils and the camshaft must be at the base circle before compressing the valve spring.

6. Compress the valve spring far enough to remove the roller follower. Repeat Steps 5 and 6 until all roller followers are removed.
7. Remove the bolts retaining the camshaft cap cluster assemblies to the cylinder heads. Tap upward on the camshaft caps at points near the upper bearing halves and gradually lift the camshaft clusters from the cylinder heads.
8. Remove the camshafts straight upward to avoid bearing damage.

To install:

9. Apply heavy engine oil to the camshaft journals and lobes. Position the camshafts on the cylinder heads.
10. Install and seat the camshaft cap cluster assemblies. Hand start the bolts.
11. Tighten the camshaft cluster retaining bolts in sequence to 6.0–8.8 ft. lbs. (8–12 Nm).

Each camshaft cap cluster assembly is tightened individually.

12. Loosen the camshaft cap cluster retaining bolts approximately 2 turns or until the heads of the bolts are free. Retighten all bolts, in sequence, to 6.0–8.8 ft. lbs. (8–12 Nm).

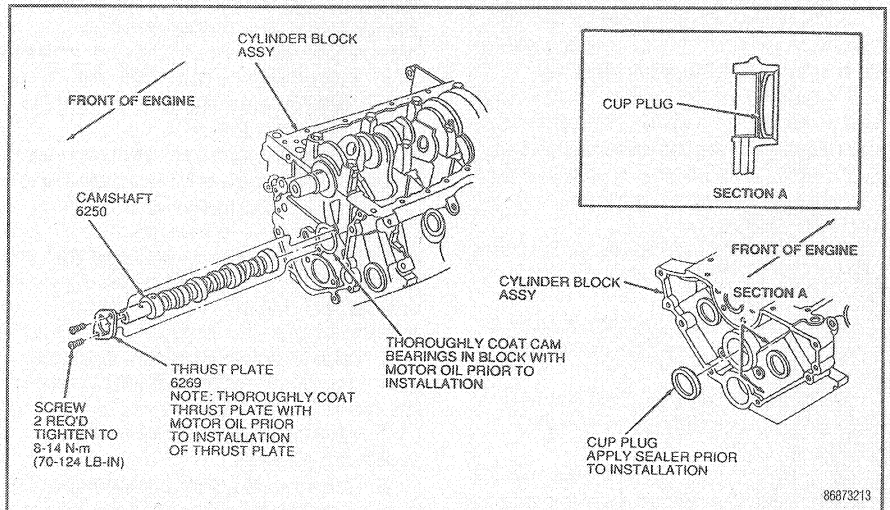

Fig. 149 Remove the camshaft through the front of the engine, but be careful not to damage the bearing surfaces

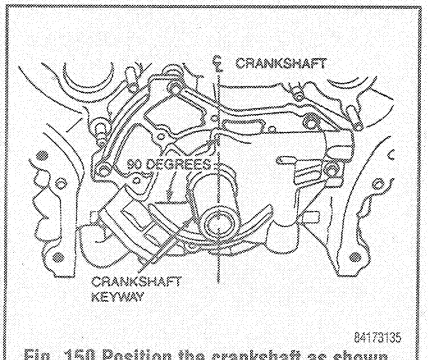

Fig. 150 Position the crankshaft as shown before rotating the camshafts—4.6L engine

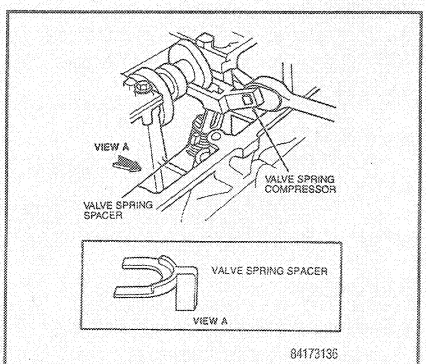

Fig. 151 Compressing the valve spring—4.6L engine

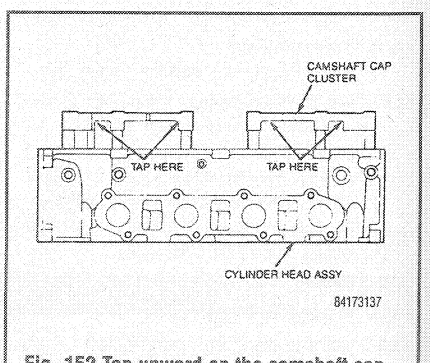

Fig. 152 Tap upward on the camshaft cap cluster assemblies at the points shown—4.6L engine