

Fig. 106 Cylinder head bolt tightening sequence—3.8L engine

- a. Long cylinder head bolts: Loosen the bolts and back them out 2–3 turns. Retighten to 11–18 ft. lbs. (15–25 Nm). Then tighten the bolt an additional 85–95° and go to the next bolt in sequence.
- b. Short cylinder head bolts: Loosen the bolt and back them out 2–3 turns. Retighten to 7–15 ft. lbs. (10–20 Nm). Then tighten the bolt an additional 85–95°.

➔ **When cylinder head attaching bolts have been tightened using the above procedures, it is not necessary to retighten bolts after extended engine operation. However, bolts can be checked for tightness if desired.**

22. Dip each pushrod end in oil conditioner or heavy engine oil, then install the pushrods in their original position.
 23. For each valve, rotate crankshaft until the tappet rests on the heel (base circle) of the camshaft lobe. Torque the fulcrum attaching bolts to 44 inch lbs. (5 Nm) maximum.
 24. Lubricate all rocker arm assemblies with oil conditioner or heavy engine oil.
 25. Tighten the fulcrum bolts a second time to 19–25 ft. lbs. (26–34 Nm). For final tightening, camshaft may be in any position.
- ➔ **If original valve train components are being installed, a valve clearance check is not required. If a component has been replaced, perform a valve clearance check.**

26. Install the exhaust manifold(s) and the lower intake manifold. For details, please see these procedures located earlier in this section.
27. Install the injector fuel rail assembly. Tighten the retaining bolts to 71–97 inch lbs. (8–11 Nm).
28. Position the rocker arm/valve cover(s) and new gasket on cylinder head and install attaching bolts. Note location of spark plug wire routing clip stud bolts. Tighten attaching bolts to 80–106 inch lbs. (9–12 Nm).
29. Install the upper intake manifold, then connect the ignition wires to the spark plugs.
30. If the left cylinder head is being installed, perform the following: install oil fill cap, compressor mounting and support brackets, power steering pump mounting and support brackets and the alternator/support bracket.
31. If the right cylinder head is being installed,

- perform the following: install the PCV valve, alternator bracket, thermactor pump and pump pulley, accessory drive idler, thermactor air control valve or air bypass valve hose.
32. Install the accessory drive belt. Attach the thermactor tube(s) support bracket to the rear of the cylinder head. Tighten the attaching bolts to 30–40 ft. lbs. (40–55 Nm).
33. Install the air cleaner assembly, including the air intake duct and heat tube.
34. Connect the negative battery cable and fill the cooling system.
35. Start the engine and check for leaks.

4.6L Engine FWD

1. To remove the head on a 4.6L engine that is a front-wheel drive, it is first necessary to remove the engine from the vehicle. Since an explanation on how to remove the engine has already been given in this section and a detailed account of how to disassemble the head follows this, an abbreviated account on removal of the head is given here.
 2. Remove the engine from the vehicle.
 3. Remove the valve covers.
 4. Remove the front engine covers.
 5. Remove the intake manifold.
 6. Remove the crankshaft position sensor pulse wheel.
 7. Remove the rocker arms.
 8. Remove the exhaust manifolds.
 9. Drain the engine coolant from the cylinder block.
 10. Rotate the engine to No. 1 top dead center (TDC).
 11. Install the camshaft position tool in the rear D-slots of the camshafts.
 12. Remove the bolts retaining the RH and LH primary timing chain tensioners to the cylinder heads and remove the timing chain tensioners.
 13. Remove the LH and RH primary timing chains, timing chain tensioner arms, and timing chain guides. Do not loosen the camshaft-timing sprocket retaining bolts.
 14. Remove the outlet heater water hose retaining bolts from the rear of the RH cylinder head.
 15. Using the reverse of the torque sequence, loosen and remove the 10 cylinder head bolts.
 16. The cylinder head bolts are torque to yield and must be replaced. Do not re-use the old head bolts. Discard them.

17. Remove the heads. Remove the head gaskets.

➔ **The cylinder heads must not be set on the head face if the valves are open. Damage may occur to the valves.**

4.6L Engine RWD

➔ **See Figures 107 thru 116**

1. Disconnect the negative battery cable.
2. Drain the cooling system and remove the cooling fan and shroud.
3. Relieve the fuel system pressure and disconnect the fuel lines; refer to Section 5.
4. Remove the air inlet tube and the wiper module. Release the belt tensioner and remove the accessory drive belt.
5. Tag and disconnect the spark plug wires from the spark plugs. Disconnect the spark plug wire brackets from the valve cover studs and remove the 2 bolts retaining the spark plug wire tray to the coil brackets.
6. Remove the bolt retaining the air conditioner high-pressure line to the right coil bracket. Disconnect both ignition coils and CID sensor.
7. Remove the nuts retaining the coil brackets to the front cover. Slide the ignition coil brackets and spark plug wire assembly off the mounting studs and remove from the vehicle.
8. Remove the water pump pulley. Disconnect the alternator wiring harness from the junction block, fender apron, and alternator. Disconnect the bolts retaining the alternator to the intake manifold and engine block and remove the alternator.
9. Disconnect the positive battery cable at the power distribution box. Remove the retaining bolt from the positive battery cable bracket located on the side of the right cylinder head.
10. Disconnect the vent hose from the canister purge solenoid and position the positive battery cable out of the way. Disconnect the canister purge solenoid vent hose from the PCV valve and remove the PCV valve from the valve cover.
11. Remove the 42-pin engine harness connector from the retaining bracket on the brake vacuum booster, disconnect, and position out of the way.
12. Disconnect the crankshaft position sensor, air conditioning compressor clutch and canister purge solenoid connectors.
13. Raise and safely support the vehicle.
14. Remove the bolts retaining the power steering pump to the engine block and front cover. The

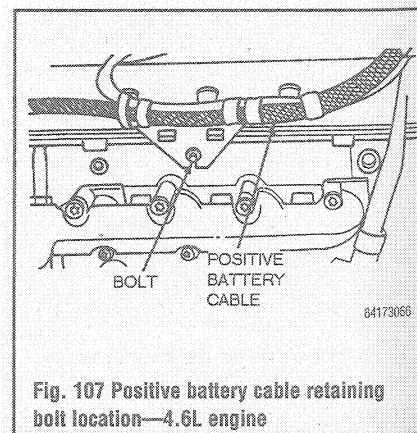


Fig. 107 Positive battery cable retaining bolt location—4.6L engine