

NOTE: To obtain accurate readings, valve lash measurements AND adjustments should only be performed on a cool engine with the engine coolant temperature less than 140° F (60° C).

The 24-valve overhead system is a “low-maintenance” design. Routine adjustments are not necessary, however, measurement should still take place when trouble-shooting performance problems, or upon completion of a repair that includes removal and installation of the valve train components.

The recommended interval is 150,000 under schedule A, and 135,000 under schedule B.

#### TOOLS NEEDED:

- Barring tool (or a 22mm or 7/8 socket, and long-handled ratchet, for turning engine backwards via alternator)
- 15mm ratchet wrench or socket, for removing valve cover
- 14mm or 9/16 wrench and socket, for adjuster nuts.
- 5 mm hex key, for adjusters
- Mirror and flashlight to see the timing mark

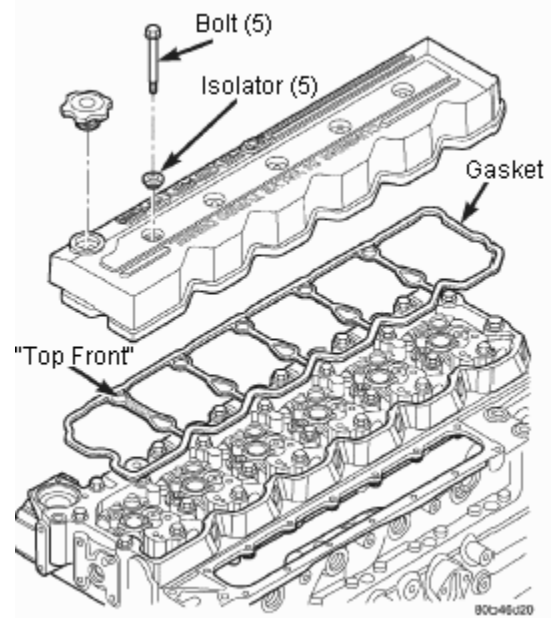
#### TIME REQUIRED:

- About 1 hour (plus tool chasing and cleanup)

(1) Disconnect battery negative cables. Note: I usually don't disconnect the battery. YMMV!

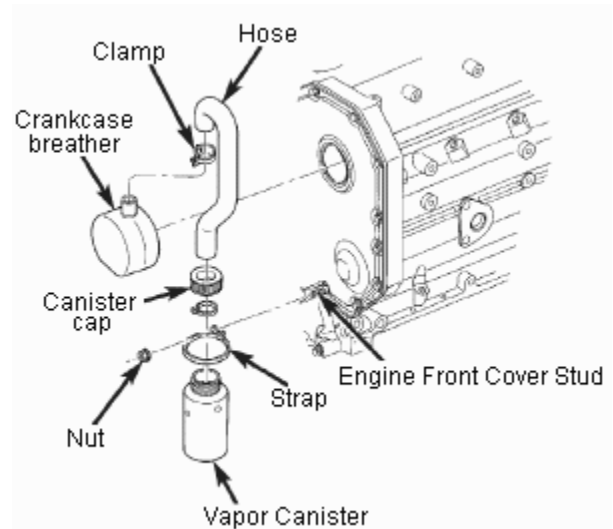
(2) Remove cylinder head valve cover.

- Loosen the five (5) cylinder head cover bolts
- Remove the front three bolts and leave the rear two bolts in the cover.
  - TDR Tip: Take all of the bolts out of the cover and it will slip right off and right back on. If you don't take the rear bolts out, you'll have to slip the cover over the heater hose and work it out from over the valves. Don't put the bolts in until the cover is back in place.
- Lift cover off of cylinder head (be careful or you may lose the two rear bolts).

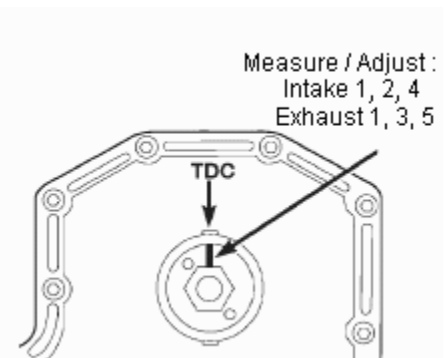


Clean and inspect the cover gasket and isolators, they are reusable if they are not cracked.

(3) Remove the crankcase breather and vapor canister. Grip the plastic breather adapter firmly and turn it CCW to unscrew the adapter from the timing gear cover.



(4) Using the crankshaft barring tool #7471-B, rotate the engine and align the pump gear mark with the top dead center (TDC) mark on the gear housing cover. "TDC" is stamped at 12 o'clock inside the case and the mark is on the fuel pump timing gear. Put that mark on the 12 o'clock TDC position. You may need a flashlight and mirror to see the timing mark.



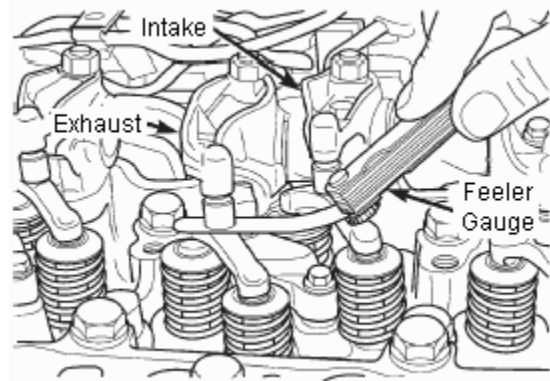
If you do not have a barring tool (about \$40), a

22mm or 7/8" socket can turn the alternator backwards. Some tight engines will slip the fan belt, but you can turn the crankshaft vibration damper/pulley with a 15mm wrench.

(5) With the engine in this position (pump gear mark at 12 o'clock), valve lash can be measured at the following rocker arms:

INTAKE 1-2-4 / EXHAUST 1-3-5.

Measure the valve lash by inserting a feeler gauge between the rocker arm socket and crosshead (Fig. 50). The intake valves have the short bar and the exhaust have the long bar.



Acceptable Intake lash range: 0.006 in. (0.152 mm) to 0.015 in. (0.381 mm)

Acceptable Exhaust lash range: 0.015 in. (0.381 mm) to 0.030 in. (0.762 mm )

If the measurement falls within the limits, adjustment/resetting is not necessary. Engine operation within these ranges has no adverse affect on performance, emissions, fuel economy or level of engine noise.

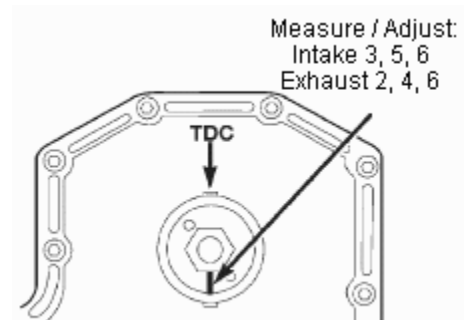
If measurement finds the lash outside of the limits, adjustment/resetting is required.

(6) If adjustment/resetting is required, loosen the lock nut on rocker arms and turn the adjusting screw until the desired lash is obtained:

- INTAKE 0.010 in. (0.254 mm)
- EXHAUST 0.020 in. (0.508 mm)

Tighten the lock nut to 18 ft lbs. and re-check the valve lash. The feeler gauge should move with a slight drag or resistance.

(7) Using the crankshaft barring tool, rotate the crankshaft one revolution (360°) to align the pump gear mark to the 6 o'clock position in relation to the TDC mark on the gear housing cover



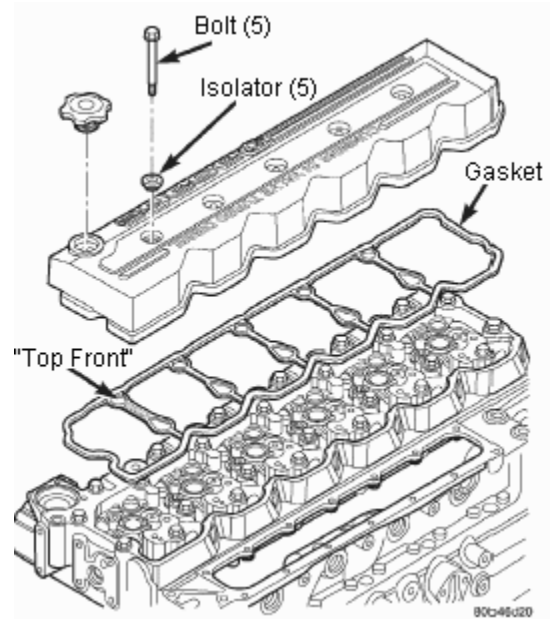
(8) With the engine in this position (pump gear mark at 6 o'clock), valve lash can be measured at the remaining rocker arms:

## INTAKE 3-5-6 / EXHAUST 2-4-6.

Use the same method as above for determining whether adjustment is necessary, and adjust those that are found to be outside of the limits.

(9) Install the cylinder head cover.

- Using a suitable solvent, Clean and dry gasket mating surfaces on cylinder head and cover. Wipe gasket dry and inspect for re-use.
- Install the gasket as shown on the right. Make sure the gasket is properly located around the cylinder head bolts, with the words “top front” facing up and towards front of engine.
- Place two bolts and isolators into the rear two mounting holes and install the cover.
- Install the remaining bolts and isolators. Starting with the center bolt, torque in a circular pattern to 18 ft. lbs. (24 N·m).



(10) Install the fuel pump gear access cover.

(11) Connect the battery negative cables.

Fast and easy method developed by Chad Sheets:

If you do decide to adjust them here is how to do it THE RIGHT WAY to do it.

1. Put cyl #1 on TDC by using the TDC mark behind the crank case breather on the front of the engine.
2. Remove the valve cover, and mark the following INTAKE valves with a paint marker, 1, 2, 4.
3. Now mark EXHAUST valves 1,3,5. with the paint marker. You should have 6 rockers marked.

Back all the adjustment nuts off on all rockers, then run them down with your fingers until they touch (you will only be able to run down the rockers with no tension on them...the ones with tension will have to wait their turn on the next round when you rotate the engine 360 degrees. Zero your gage (dial indicator) and adjust for ever how many mm or whatever measurement you want to use.

4. Adjust the INTAKE valves somewhere between .15mm and .38mm., I shoot for the middle of

the road .25mm.

5. Adjust the EXHAUST valves now between .38mm and .76mm., again I shoot for middle of the road about .57mm.

6. Give all the rockers a good wiggle before removing the gage to make sure all the play is out of them.

**NOW ROLL THE ENGINE OVER 360 DEGREES AND ADJUST THE 6 ROCKERS NOT PAINTED WITH A DOT.**