

VALVE CLEARANCE ADJUSTMENT

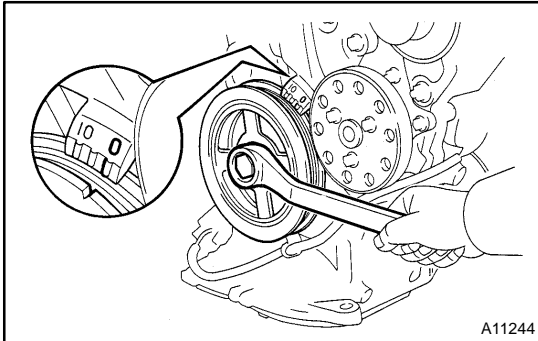
EM169-01

HINT:

Inspect and adjust the valve clearance when the engine is cold.

1. REMOVE CYLINDER HEAD COVER

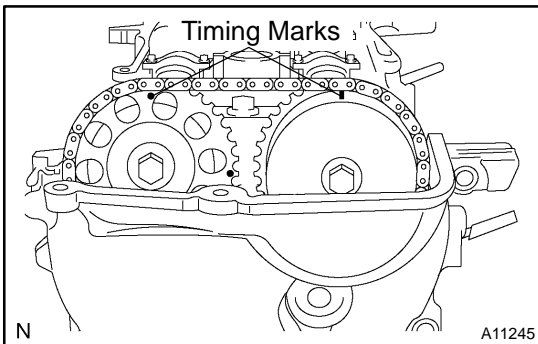
(See page [EM-15](#))



A11244

2. SET NO.1 CYLINDER TO TDC/COMPRESSION

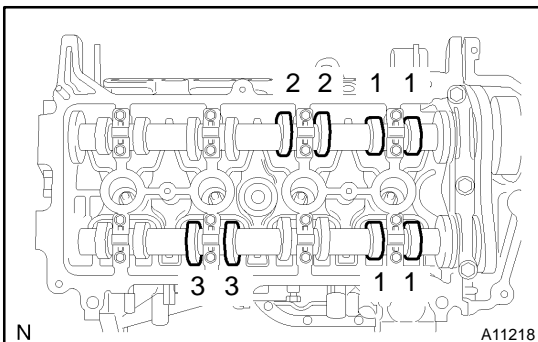
- (a) Turn the crankshaft pulley, and align its groove with the timing mark "0" of the timing chain cover.



A11245

- (b) Check that both timing marks on the camshaft timing sprocket and valve timing controller assembly are facing right up as shown in the illustration.

If not, turn the crankshaft 1 revolution (360°) and align the marks as above.



A11218

3. INSPECT VALVE CLEARANCE

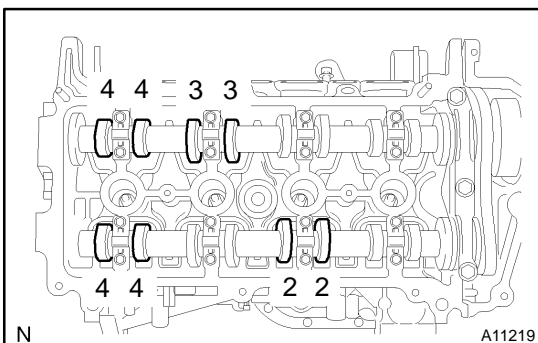
- (a) Check only the valves indicated.
- Using a feeler gauge, measure the clearance between the valve lifter and camshaft.
 - Record the out-of-specification valve clearance measurements. They will be used later to determine the required replacement adjusting shim.

Valve clearance (Cold):

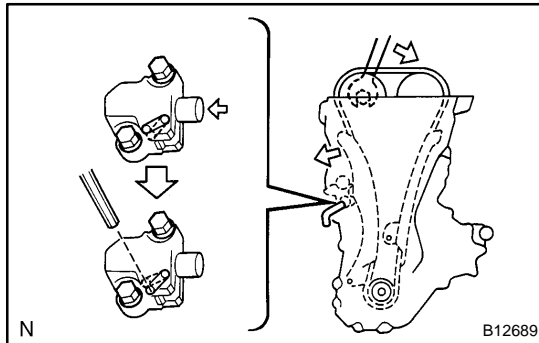
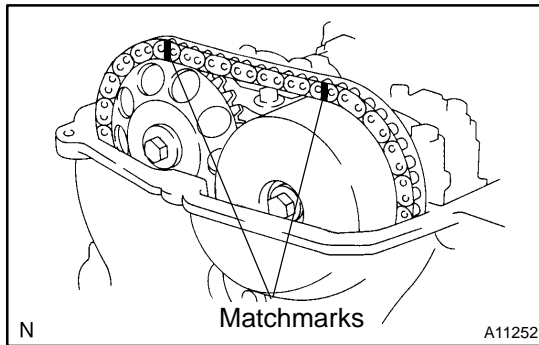
Intake 0.15 - 0.25 mm (0.006 - 0.010 in.)

Exhaust 0.25 - 0.35 mm (0.010 - 0.014 in.)

- (b) Turn the crankshaft 1 revolution (360°) and align the mark as above. (See procedure in step 2)
- (c) Check only the valves indicated as shown. Measure the valve clearance. (See procedure in step (a))



A11219



4. ADJUST VALVE CLEARANCE

- (a) Set the No.1 cylinder to the TDC/compression (See procedure in step 2).
- (b) Place matchmarks on the timing chain and camshaft timing sprockets.
- (c) Rotate the crankshaft counterclockwise 40° from the TDC.
- (d) Remove the plug from the timing chain cover.
- (e) Using driver to hold the stopper plate of tensioner above the chain tensioner service hole.
- (f) Turn the exhaust camshaft a little clockwise.
- (g) Remove the driver from the chain tensioner service hole to lower the stopper plate, then insert the bar of 2 - 3 mm (0.08 - 0.12 in.).

NOTICE:

- **When the bar does not get inserted, turn the exhaust camshaft a little counterclockwise, then clockwise to insert it.**
 - **Fix the bar with tape or others so that it does not be dropped off.**
- (h) Hold the hexagonal portion of camshaft with a wrench, and loosen the bolt for camshaft timing sprocket.
 - (i) Remove the 19 bolts, No. 1 and No. 2 camshaft bearing caps.
 - (j) Remove the bolt and valve timing sprocket with the chain.
 - (k) Hold the hexagonal portion of the camshaft with a wrench, and remove the bolt and valve timing controller assembly with the chain.

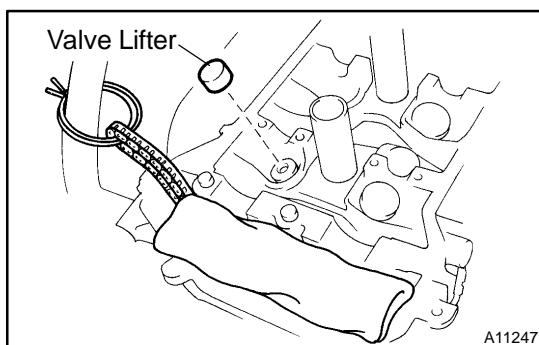
NOTICE:

Do not disassembled the valve timing controller assembly.

- (l) Remove the intake and exhaust camshaft assembly.

HINT:

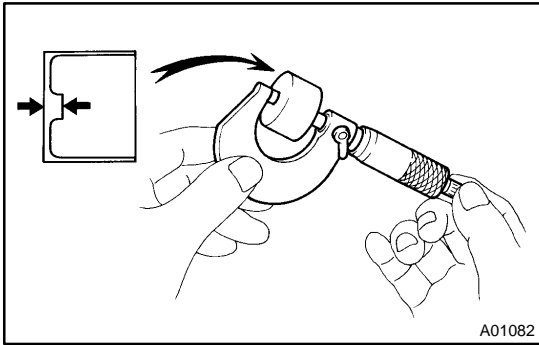
When disconnect the timing chain from the camshaft timing sprocket, holding the timing chain.



- (m) Tie the timing chain with a string as shown in the illustration.

NOTICE:

- **Be careful not to drop anything inside the timing chain cover.**
 - **Do not allow the chain to come into contact with water or dust.**
- (n) Remove the valve lifters.



(o) Determine the replacement valve lifter size according to these Formula or Charts:

- Using a micrometer, measure the thickness of the removed lifter.
- Calculate the thickness of a new lifter so the valve clearance comes within the specified value.

T..... Thickness of used lifter

A..... Measured valve clearance

N..... Thickness of new lifter

Intake $N = T + (A - 0.20 \text{ mm (0.008 in.)})$

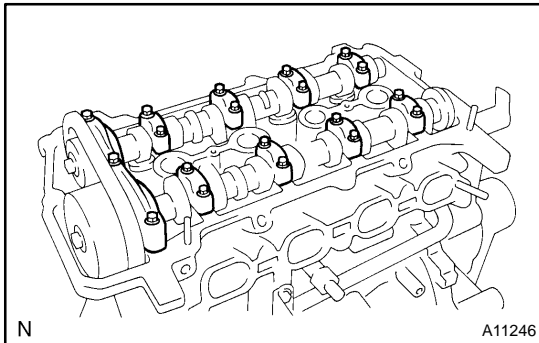
Exhaust $N = T + (A - 0.30 \text{ mm (0.012 in.)})$

- Select a new lifter with a thickness as close as possible to the calculated values.

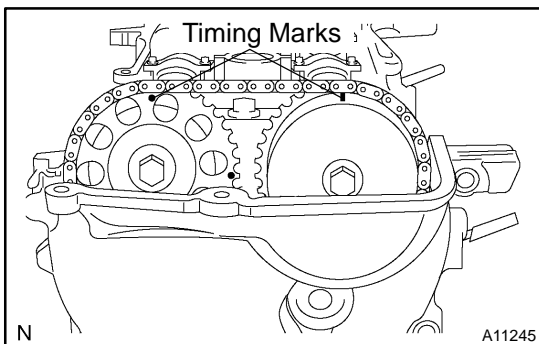
HINT:

Lifter are available in 35 sizes in increments of 0.020 mm (0.0008 in.), from 5.060 mm (0.1992 in.) to 5.740 mm (0.2260 in.).

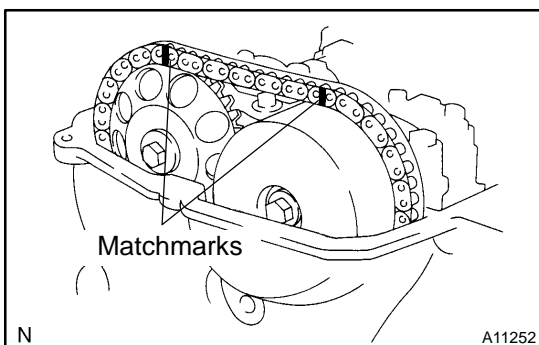
- (p) Reinstall the valve lifters (See page [EM-42](#)).
- (q) Align the crankshaft pulley groove with the timing mark "0" of the timing chain cover.
- (r) Hold the timing chain, and place the exhaust camshaft and timing sprocket assembly.
- (s) Align the matchmarks on the timing chain and camshaft timing sprocket.



- (t) Reinstall the intake camshaft, valve timing controller assembly and camshaft bearing caps (See page [EM-44](#)).
- (u) Remove the bar from the timing chain tensioner.



- (v) Check that both timing marks on the camshaft timing sprocket and valve timing controller assembly are facing right up as shown in the illustration.



- (w) Check that the matchmarks on the timing chain and camshaft timing sprockets.
- (x) Install a new plug to the timing chain cover.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)
- (y) Recheck the valve clearance (See procedure in step 3).
- (z) Check the valve timing (See page [EM-18](#)).

**5. REINSTALL CYLINDER HEAD COVER
(See page [EM-20](#))**