

BASIC INSPECTION

CAMSHAFT VALVE CLEARANCE

Inspection and Adjustment

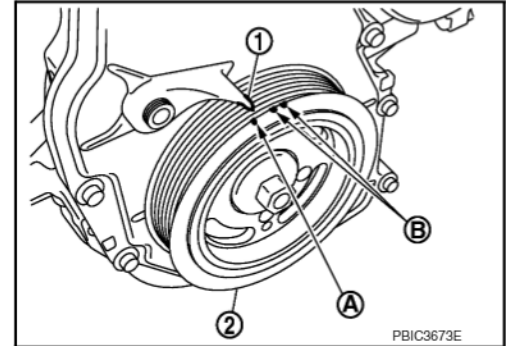
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INSPECTION

Perform inspection as follows after removal, replacement or installation of camshaft or valve-related parts, or if there are unusual engine conditions regarding valve clearance.

1. Remove rocker cover. Refer to [EM-48, "Removal and Installation"](#).
2. Measure the valve clearance with the following procedure:
 - a. Set No. 1 cylinder at TDC of its compression stroke.
 - Rotate crankshaft pulley (2) clockwise and align TDC mark (no paint) (A) to timing indicator (1) on front cover.

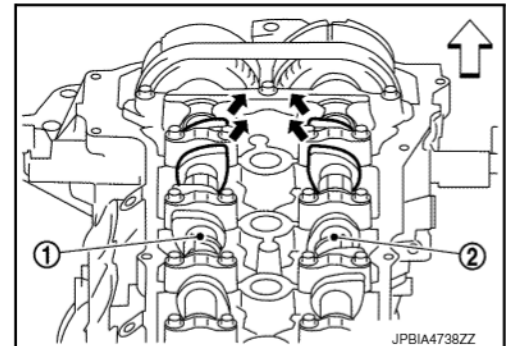
(B) : White paint mark (Not used for service)



- At the same time, check that both intake and exhaust cam lobes of No. 1 cylinder face inside (←) as shown.

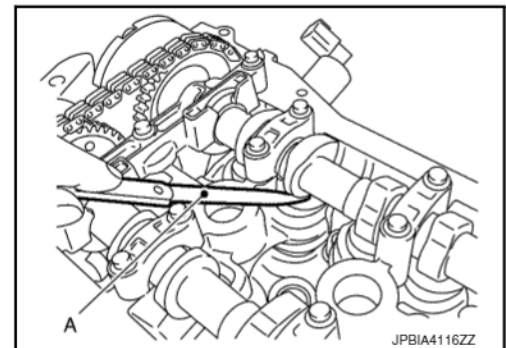
(1) : Camshaft (INT)
 (2) : Camshaft (EXH)
 ← : Engine front

- If the lobes do not face inside, rotate the crankshaft pulley 360 degrees to align as shown.



- b. Using suitable tool (A) measure the clearance between the valve lifter and camshaft.

Valve clearance : Refer to [EM-116, "Camshaft"](#).



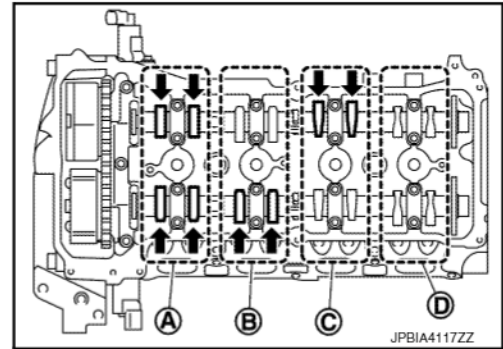
CAMSHAFT VALVE CLEARANCE

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- Measure the valve clearances at locations marked "x" [locations indicated with (↔)] as shown using suitable tool.

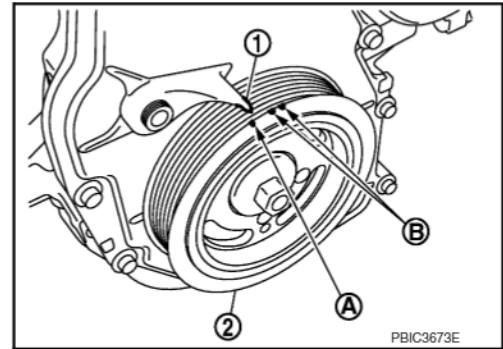
- (A) : No. 1 cylinder
(B) : No. 2 cylinder
(C) : No. 3 cylinder
(D) : No. 4 cylinder



Measuring position		No. 1 CYL.	No. 2 CYL.	No. 3 CYL.	No. 4 CYL.
No. 1 cylinder at compression TDC	EXH	x		x	
	INT	x	x		

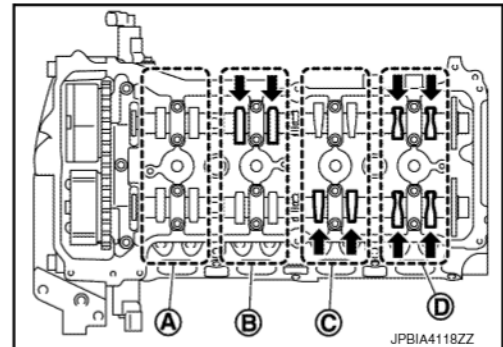
- c. Set No. 4 cylinder at TDC of its compression stroke.
- Rotate crankshaft pulley (2) one revolution (360 degrees) and align TDC mark (no paint) (A) to timing indicator (1) on front cover.

- (B) : White paint mark (Not use for service)



- Measure the valve clearances at locations marked "x" [locations indicated with (↔)] as shown using suitable tool.

- (A) : No. 1 cylinder
(B) : No. 2 cylinder
(C) : No. 3 cylinder
(D) : No. 4 cylinder



Measuring position		No. 1 CYL.	No. 2 CYL.	No. 3 CYL.	No. 4 CYL.
No. 4 cylinder at compression TDC	EXH		x		x
	INT			x	x

3. If out of the specifications, adjust as necessary. Refer to "ADJUSTMENT".

ADJUSTMENT

NOTE:

Proper valve clearance is obtained by selecting the correct valve lifter head thickness.

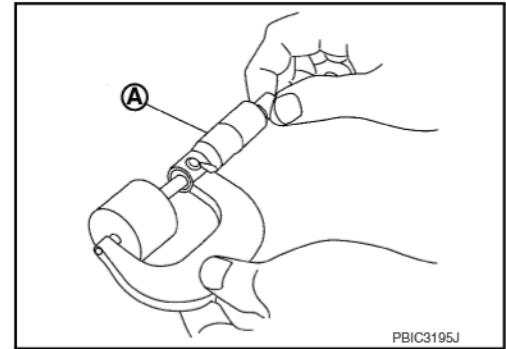
- Remove camshaft. Refer to [EM-60, "Exploded View"](#).
- Remove valve lifters from the locations that are out of the standard.

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3. Measure the center thickness of the removed valve lifters using a suitable tool (A).



4. Use the equation below to calculate valve lifter thickness for replacement.

Valve lifter thickness calculation: $t = t_1 + (C_1 - C_2)$

t = Valve lifter thickness to be replaced

t_1 = Removed valve lifter thickness

C_1 = Measured valve clearance

C_2 = Standard valve clearance at 20°C (68°F):

Intake : 0.30 mm (0.012 in)

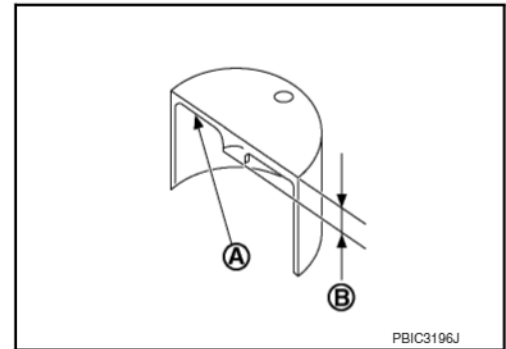
Exhaust : 0.33 mm (0.013 in)

- Crown surface thickness of new valve lifter (B) can be identified by stamp mark (A) on the under side of the lifter.

NOTE:

Available thickness of valve lifter: 26 sizes range 3.00 to 3.50 mm (0.1181 to 0.1378 in) in increments of 0.02 mm (0.0008 in) when manufactured at factory. Refer to [EM-116, "Camshaft"](#).

- Stamp mark "302" indicates 3.02 mm (0.1189 in) in thickness.



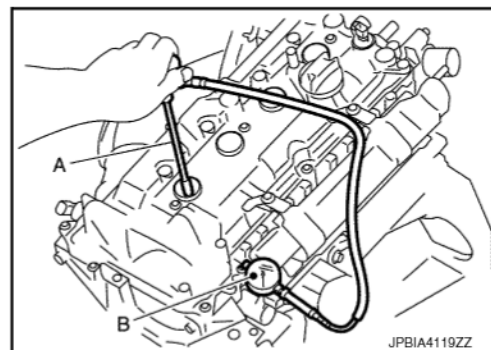
5. Install the correct thickness valve lifter.
6. Install camshaft. Refer to [EM-60, "Exploded View"](#).
7. Install timing chain. Refer to [EM-51, "Exploded View"](#).
8. Manually rotate crankshaft pulley a few rotations.
9. Check that valve clearances are within specification. Refer to "INSPECTION".
10. Installation of remaining components is in the reverse order of removal.
11. Warm up the engine, and check for unusual noise and vibration.

COMPRESSION PRESSURE

Inspection

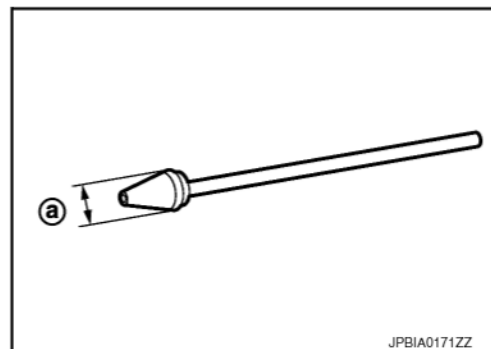
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1. Warm up engine to full operating temperature and then turn it off.
2. Release fuel pressure. Refer to [EC-122, "Work Procedure"](#).
3. Remove ignition coil and spark plug from each cylinder. Refer to [EM-48, "Exploded View"](#).
4. Connect engine tachometer (not required in use of CONSULT).
5. Install compression gauge (B) with an adapter (A) into spark plug hole.



- Use an adapter with a diameter (a) smaller than 20 mm (0.79 in). Otherwise, it may be caught by cylinder head during removal.

(a) : Less than 20 mm (0.79 in)



6. With accelerator pedal fully depressed, turn ignition switch to »»» for cranking. When the gauge pointer stabilizes, read the compression pressure and the engine rpm. Perform these steps to check each cylinder.

Compression pressure : Refer to [EM-115, "General Specification"](#).

CAUTION:

Always use a fully charged battery to obtain the specified engine speed.

- If the engine speed is out of the specified range, check the battery. Check the engine speed again with a fully charged battery.
 - If some cylinders have low compression pressure, pour a small amount of engine oil into the spark plug hole to recheck the compression.
 - If the added engine oil improves the compression, the piston rings may be worn or damaged. Check the piston rings and replace if necessary.
 - If the compression pressure remains low despite the addition of engine oil, the valves may be malfunctioning. Check the valves for damage. Replace the valve or valve seat as necessary.
 - If two adjacent cylinders have respectively low compression pressure and their compression remains low even after the addition of engine oil the head gasket may be leaking, or valves in adjacent cylinders may be damaged. Inspect and repair as required.
 - If the compression pressure is below the minimum value, check the valve clearances and parts associated with the combustion chamber (valve, valve seat, piston, piston ring, cylinder bore, cylinder head, cylinder head gasket). After repairing, measure the compression pressure again.
7. After inspection is completed, install removed parts.
 8. Start the engine, and ensure that the engine runs smoothly.
 9. Perform trouble diagnosis. If DTC appears, erase it. Refer to [EC-107, "Work Flow"](#).