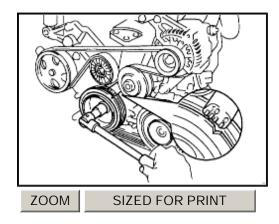
Adjustments

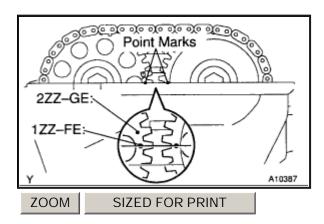
ADJUSTMENT

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

- 1. REMOVE CYLINDER HEAD COVER
- 2. SET NO. 1 CYLINDER TO TDC/COMPRESSION

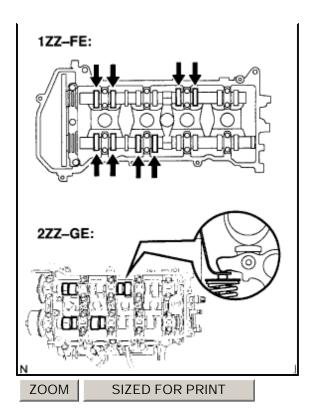


a. Turn the crankshaft pulley, and align its groove with the timing mark "0" of the timing chain cover.



- b. Check that the point marks of the camshaft timing sprockets are in straight line on the timing chain cover surface as shown in the illustration. If not, turn the crankshaft 1 revolution (360°) and align the marks as above.
 - 3. INSPECT VALVE CLEARANCE





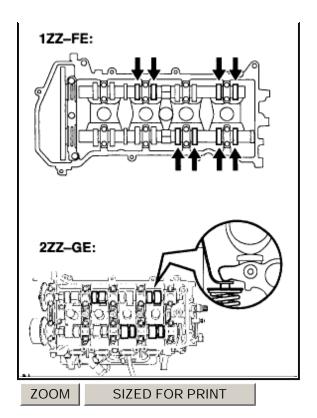
- a. Check only the valves indicated.
 - Using a feeler gauge, measure the clearance between the valve lifter and camshaft.
 - Record the out-of-specification valve clearance measurements. They will be used later to determine the required replacement adjusting shim. Valve clearance (Cold):

1ZZ-FE:

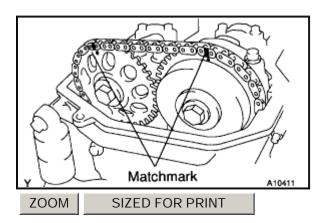
Intake: 0.15 - 0.25 mm (0.006 - 0.010 inch) Exhaust: 0.25 - 0.35 mm (0.010 - 0.014 inch)

2ZZ-GE:

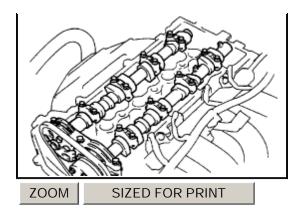
Intake: 0.15 - 0.25 mm (0.006 - 0.010 inch) Exhaust: 0.35 - 0.45 mm (0.014 - 0.018 inch)



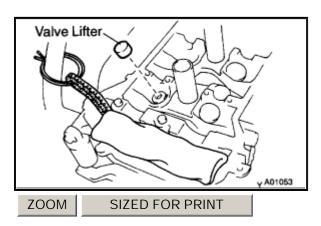
- b. Turn the crankshaft **1 revolution** (**360**°) and align the mark as above (See procedure in step 2).
- c. Check only the valves indicated as shown. Measure the valve clearance (See procedure in step (a)).
 - 4. 1ZZ-FE: ADJUST VALVE CLEARANCE
 - a. Set the No. 1 cylinder to the TDC/compression (See procedure in step 2).



- b. Place matchmarks on the timing chain and camshaft timing sprockets.
- c. Remove the 2 bolts and chain tensioner.



- d. Remove the camshaft and timing sprocket assemblies.
 - 1. 19 camshaft bearing cap bolts
 - 2. 9 camshaft bearing caps (No. 1 & No. 3)
 - 3. Exhaust camshaft and timing sprocket assembly
 - 4. Intake camshaft and timing sprocket assembly **HINT:** When disconnect the timing chain from the camshaft timing sprocket, holding the timing chain.



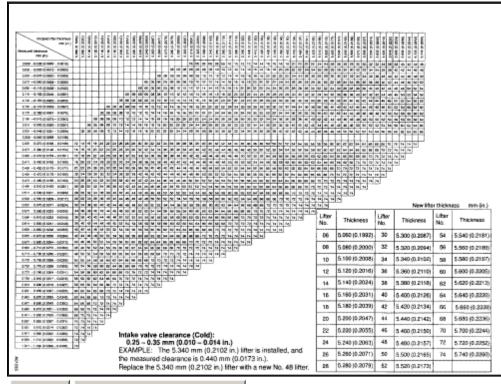
- e. Tie the timing chain with a string as shown in the illustration. NOTICE:
- Be careful not to drop anything inside the timing chain cover.
- Do not allow the chain to come into contact with water or dust.
 - f. Remove the valve lifters.

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ZOOM

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Valve Lifter Selection Chart (Intake)

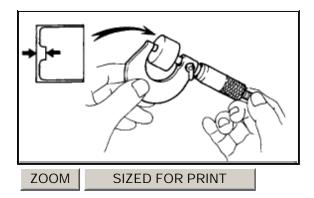


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Valve Lifter Selection Chart (Exhaust)

g. 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 mm (0.008 inch))

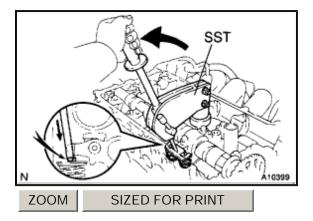
Exhaust: N = T + (A - 0.30 mm (0.012 inch))

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

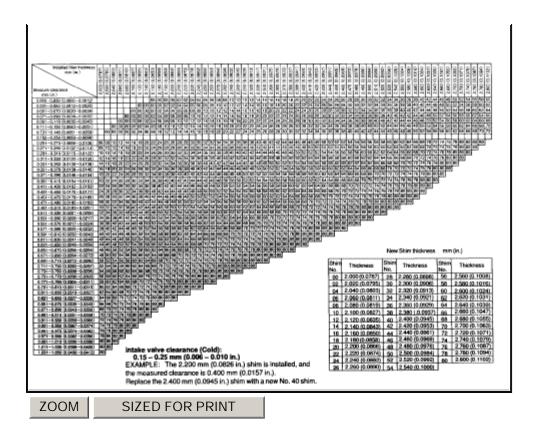
HINT: Lifter are available in 35 sizes in increments of **0.020 mm** (**0.0008 inch**), from **5.060 mm** (**0.1992 inch**) to **5.740 mm** (**0.2260 inch**).

5. 2ZZ-GE: ADJUST VALVE CLEARANCE

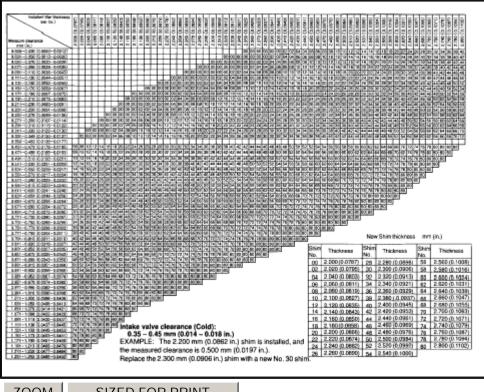
- a. Remove the adjusting shim.
 - 1. Turn the crankshaft so that the cam lobe of camshaft on the adjusting valve points upward.



- 2. Using Special Service Tool (SST), press down the valve.
- 3. Using (SST), remove the adjusting shim.



Valve Lifter Selection Chart (Intake)

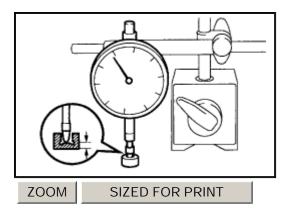


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SIZED FOR PRINT

Valve Lifter Selection Chart (Exhaust)

Determine the replacement shim size according to these Formula or Charts:



• Using dial indicator, measure the thickness of the removed shim.

 Calculate the thickness of a new shim so the valve clearance comes within the specified value. T: Thickness of used shim

A: Measured valve clearance

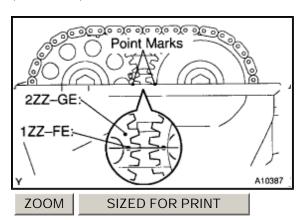
N: Thickness of new shim

Intake:N = T + (A - 0.20 mm (0.008 inch))

Exhaust: N = T + (A - 0.40 mm (0.016 inch))

• Select a new shim with a thickness as close as possible to the calculated values.

HINT: Shim are available in 41 size in increments of **0.020 mm (0.0008 inch)**, from **2.000 mm (0.0787 inch)** to **2.800 mm (0.1102 inch)**.



6. 1ZZ-FE: REINSTALL CAMSHAFT

- a. Reinstall the valve lifters.
- b. Align the crankshaft pulley groove with the timing mark "0" of the timing chain cover.
- c. Hold the timing chain, and place the intake camshaft and timing sprocket assembly.
- d. Align the matchmarks on the timing chain and camshaft timing sprocket.
- e. Reinstall the camshaft and timing sprocket assemblies.
- f. Check that the point marks of the camshaft timing sprockets are in straight line on the timing chain cover surface as shown in the illustration.
- g. Check that the matchmarks on the timing chain and camshaft timing sprockets.
- h. Install the chain tensioner.
- i. Recheck the valve clearance.
- j. Check the valve timing.

7. REINSTALL CYLINDER HEAD COVER