

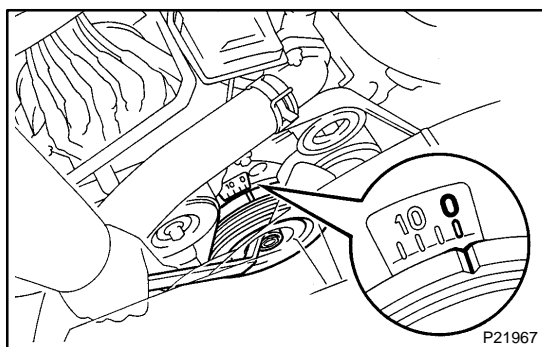
VALVE CLEARANCE INSPECTION

EM1GE-01

HINT:

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

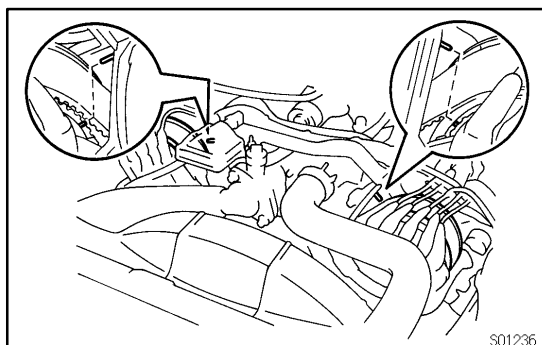
1. **DRAIN ENGINE COOLANT**
2. **REMOVE BATTERY CLAMP COVER**
3. **REMOVE V-BANK COVER**
4. **REMOVE AIR CLEANER AND INTAKE AIR CONNECTOR ASSEMBLY**
5. **REMOVE NO. 3 TIMING BELT COVERS**
(See page [EM-18](#))
6. **REMOVE CYLINDER HEAD COVERS**
 - (a) Remove the RH cylinder head cover.
 - (1) Remove the throttle body (See page [SF-40](#)).
 - (2) Disconnect the high-tension cords and clamps from the cylinder head cover (See page [EM-40](#)).
 - (3) Remove the 8 bolts, 8 seal washers and cylinder head cover.
 - (b) Remove the LH cylinder head cover.
 - (1) Remove the oil dipstick for the transmission.
 - (2) Disconnect the EVAP hose (from the charcoal canister) from the VSV.
 - (3) Disconnect the engine wire clamp from the wire bracket on the delivery pipe.
 - (4) Disconnect the high-tension cords and clamps from the cylinder head cover (See page [EM-40](#)).
 - (5) Remove the 8 bolts, 8 seal washers and cylinder head cover.



P21967

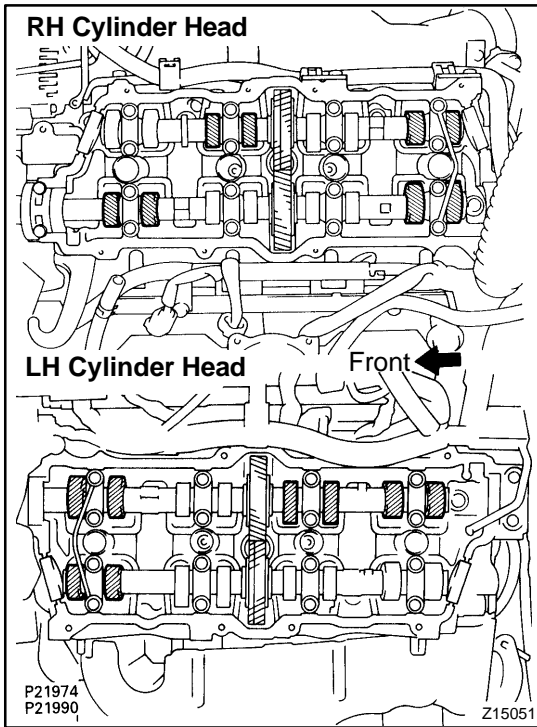
7. SET NO. 1 CYLINDER TO TDC/COMPRESSION

- (a) Turn the crankshaft pulley, and align its groove with timing mark "0" of the No. 1 timing belt cover.



S01236

- (b) Check that the timing marks of the camshaft timing pulleys and timing belt rear plates are aligned.
If not, turn the crankshaft 1 revolution (360°) and align the mark as above.

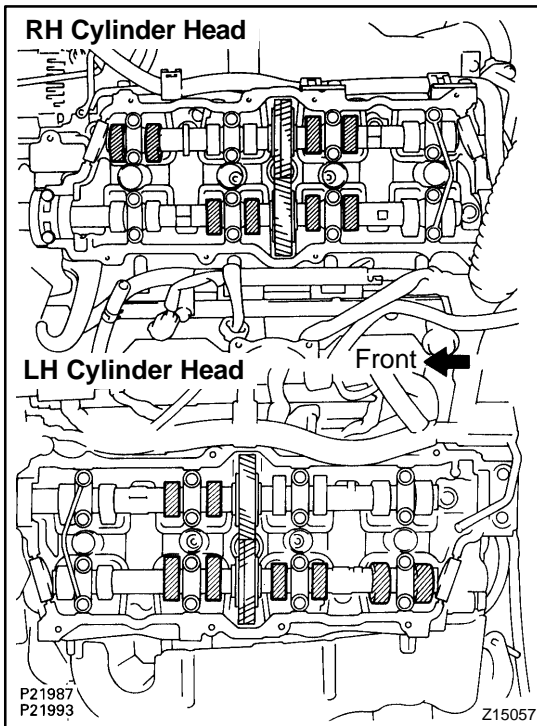


8. INSPECT VALVE CLEARANCE

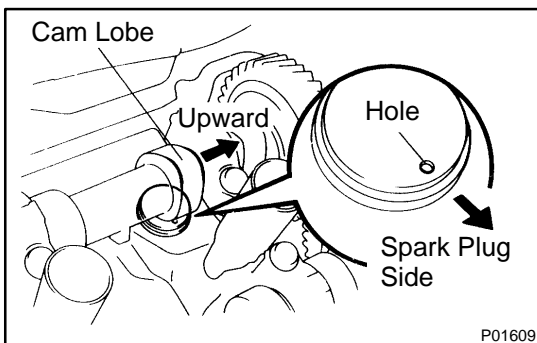
- (a) Check only the valves indicated.
 - (1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.
 - (2) Record the out-of-specification valve clearance measurements. They will be used later to determine the required replacement adjusting shim.

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.)

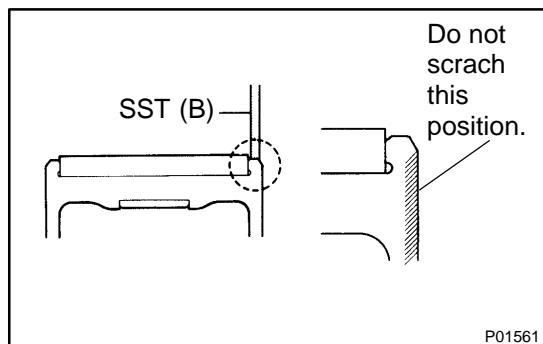


- (b) Turn the crankshaft 1 revolution (360°) and align the mark as above (See procedure in step 7).
- (c) Check only the valves indicated as shown. Measure the valve clearance (See procedure in step (a)).



9. ADJUST VALVE CLEARANCE

- (a) Disconnect the fuel return hose from the return hose.
- (b) Remove the adjusting shim.
 - (1) Turn the crankshaft so that the cam lobe of the camshaft on the adjusting valve upward.
 - (2) Position the hole of the adjusting shim facing the spark plug side.



- (3) Using SST (A), press down the valve lifter and place SST (B) between the camshaft and valve lifter flange. Remove SST (A).

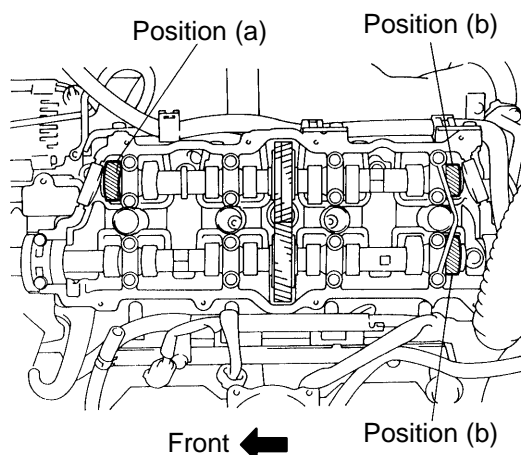
SST 09248-55040 (09248-05410), 09248-05021

NOTICE:

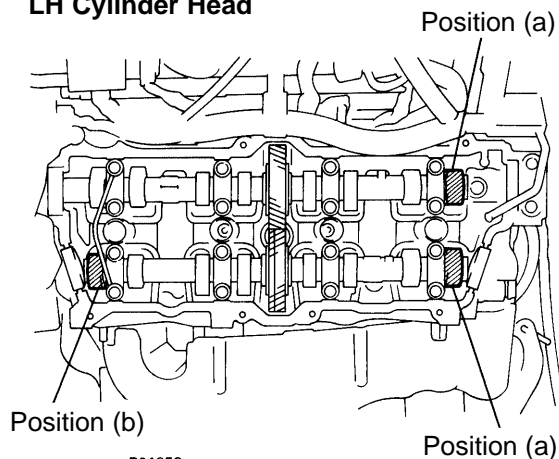
The valve lifter is made of aluminum, which is easily scratched. So when setting SST (B), take care not to scratch the face of the valve lifter.

Setting Method for SST for Camshaft End Portions

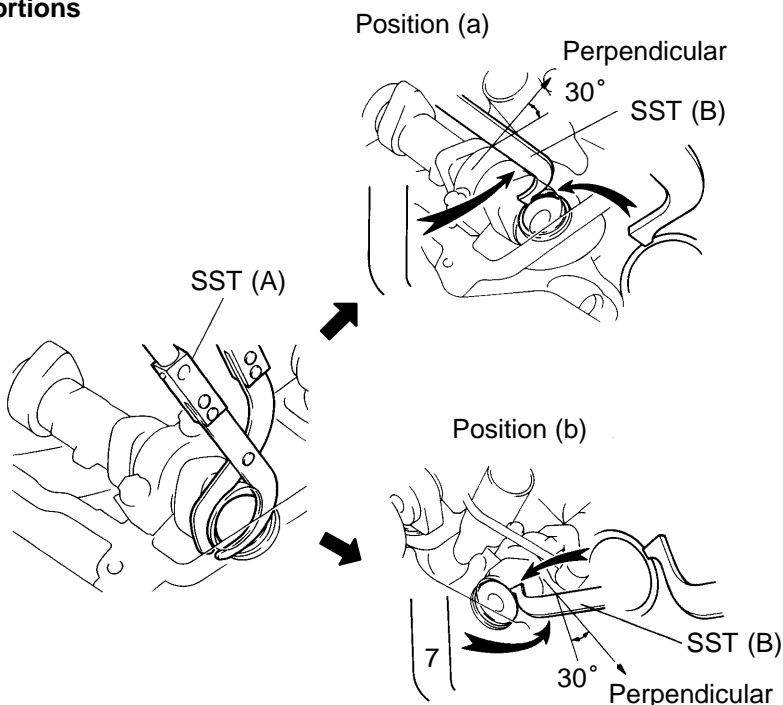
RH Cylinder Head



LH Cylinder Head



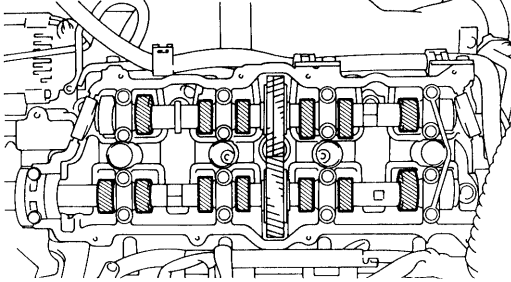
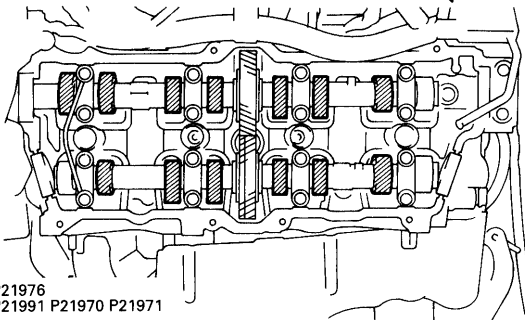
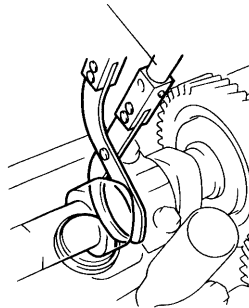
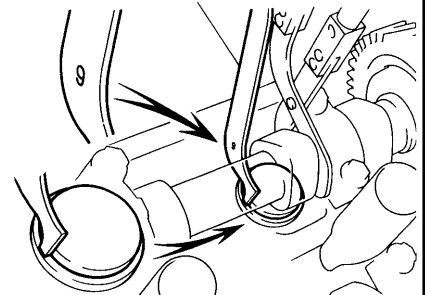
P21975 P21853
P21989 P21969 P21854



HINT:

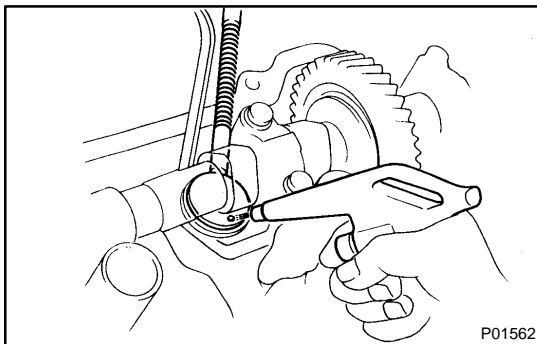
- The width for insertion of SST (A) at the end portion of the exhaust camshaft is narrow, but SST (A) can be inserted easily by moving the cam lobe in the direction opposite to the side from which SST (B) is inserted.
- Apply SST (B) on the side marked with "7".
- It is easier to apply SST (B) when it is inserted at the angle shown in the illustration.

Z15053

Setting Method for SST for Camshaft End Portions**RH Cylinder Head****LH Cylinder Head****Front** ←P21976
P21991 P21970 P21971**SST (A)****SST (B)**

HINT:
Apply SST (B) on the side marked with "9".

Z15054

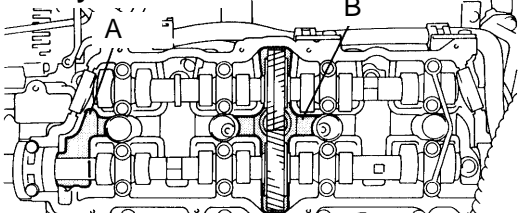
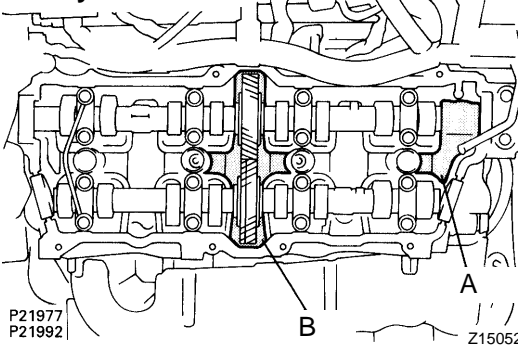


P01562

- (4) Using compressed air and a magnetic finger, remove the adjusting shim by blowing air into the shim hole.

HINT:

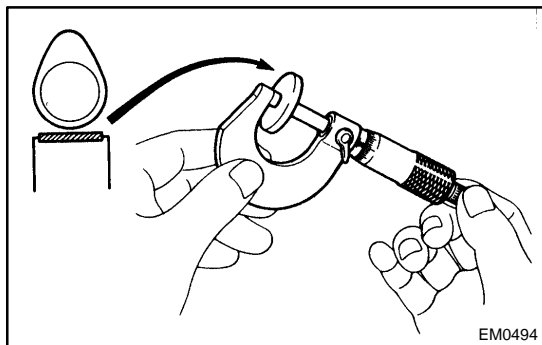
Remove the adjusting shim from the intake manifold side.

RH Cylinder Head**LH Cylinder Head****Front** ←P21977
P21992

Z15052

NOTICE:

Do not drop the adjusting shim into portions A and B. If dropped into portion A, the adjusting shim will pass through the cylinder head and cylinder block into the oil pan. If dropped into portion B, the adjusting shim cannot be recovered without removing the exhaust camshaft.



(c) Determine the replacement adjusting shim size according to these Formula or Charts:

- (1) Using a micrometer, measure the thickness of the removed shim.
- (2) Calculate the thickness of a new shim so that the valve clearance comes within specified value.

T Thickness of removed shim

A Measured valve clearance

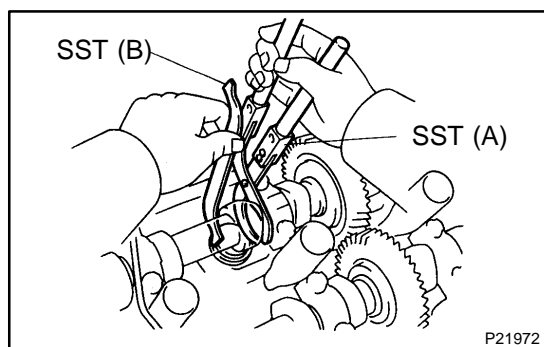
N Thickness of new shim

Intake	$N = T + (A - 0.20 \text{ mm (0.008 in.)})$
Exhaust	$N = T + (A - 0.30 \text{ mm (0.012 in.)})$

- (3) Select a new shim with a thickness as close as possible to the calculated value.

HINT:

Shims are available in 33 increments of 0.025 mm (0.0010 in.), from 2.50 mm (0.0984 in.) to 3.30 mm (0.1299 in.).



- (d) Install a new adjusting shim.
 - (1) Place a new adjusting shim on the valve lifter.
 - (2) Using SST (A), press down the valve lifter and remove SST (B).

SST 09248-55040 (09248-05410), 09248-05021

- (e) Recheck the valve clearance.
- (f) Reconnect the fuel return hose to the return hose.

10. REINSTALL CYLINDER HEAD COVERS

(See page [EM-66](#))

11. REINSTALL NO. 3 TIMING BELT COVERS (See page [EM-26](#))

12. REINSTALL AIR CLEANER AND INTAKE AIR CONNECTOR ASSEMBLY

13. REFILL WITH ENGINE COOLANT

14. START ENGINE AND CHECK FOR LEAKS

15. RECHECK ENGINE COOLANT LEVEL

16. REINSTALL V-BANK COVER

17. REINSTALL BATTERY CLAMP COVER

1997 LEXUS SC400/SC300 (RM513U)

Date :

2028

[illegible]

Intake valve clearance (Cold):
0.15 – 0.25 mm (0.006 – 0.010 in.)

EXAMPLE:

The 2.800 mm (0.1102 in.) shim is installed, and the measured clearance is 0.440 mm (0.0173 in.). Replace the 2.800 mm (0.1102 in.) shim with a No. 48 shim.

New shim thickness				mm (in.)	
Shim No.	Thickness	Shim No.	Thickness	Shim No.	Thickness
01	2.500 (0.0984)	19	2.775 (0.1093)	48	3.050 (0.1201)
62	2.525 (0.0994)	23	2.800 (0.1102)	75	3.075 (0.1211)
63	2.550 (0.1004)	70	2.825 (0.1112)	51	3.100 (0.1220)
64	2.575 (0.1014)	28	2.850 (0.1122)	76	3.125 (0.1230)
06	2.600 (0.1024)	71	2.875 (0.1132)	77	3.150 (0.1240)
65	2.625 (0.1033)	33	2.900 (0.1142)	78	3.175 (0.1250)
66	2.650 (0.1043)	72	2.925 (0.1152)	56	3.200 (0.1260)
67	2.675 (0.1053)	38	2.950 (0.1161)	79	3.225 (0.1270)
13	2.700 (0.1063)	73	2.975 (0.1171)	80	3.250 (0.1280)
68	2.725 (0.1073)	43	3.000 (0.1181)	81	3.275 (0.1289)
18	2.750 (0.1083)	74	3.025 (0.1191)	61	3.300 (0.1299)

Exhaust valve clearance (Cold):
0.25 – 0.35 mm (0.010 – 0.014 in.)

The 2.800 mm (0.1102 in.) shim is installed, and the measured clearance is 0.440 mm (0.0173 in.). Replace the 2.800 mm (0.1102 in.) shim with a No. 38 shim.

Measured clearance mm (in.)	Installed shim thickness mm (in.)	New shim thickness																																															
		Shim No.												Thickness												Shim No.												Thickness											
0.000 – 0.030 (0.0000 – 0.0012)	2.500 (0.0984)																																																
0.031 – 0.050 (0.0012 – 0.0020)	2.525 (0.0994)																																																
0.051 – 0.070 (0.0020 – 0.0028)	2.550 (0.1004)																																																
0.071 – 0.090 (0.0028 – 0.0035)	2.575 (0.1014)																																																
0.091 – 0.110 (0.0036 – 0.0043)	2.600 (0.1024)																																																
0.111 – 0.130 (0.0044 – 0.0051)	2.625 (0.1034)																																																
0.131 – 0.150 (0.0052 – 0.0059)	2.650 (0.1043)																																																
0.151 – 0.170 (0.0059 – 0.0067)	2.675 (0.1053)																																																
0.171 – 0.190 (0.0067 – 0.0075)	2.700 (0.1063)																																																
0.191 – 0.210 (0.0075 – 0.0083)	2.725 (0.1073)																																																
0.211 – 0.230 (0.0083 – 0.0091)	2.750 (0.1083)																																																
0.231 – 0.249 (0.0091 – 0.0098)	2.775 (0.1093)																																																
0.250 – 0.350 (0.0098 – 0.0138)	2.800 (0.1102)																																																
0.351 – 0.370 (0.0138 – 0.0146)	2.825 (0.1112)																																																
0.371 – 0.390 (0.0146 – 0.0154)	2.850 (0.1122)																																																
0.391 – 0.410 (0.0154 – 0.0161)	2.875 (0.1132)																																																
0.411 – 0.430 (0.0162 – 0.0169)	2.900 (0.1142)																																																
0.431 – 0.450 (0.0170 – 0.0177)	2.925 (0.1152)																																																
0.451 – 0.470 (0.0178 – 0.0185)	2.950 (0.1162)																																																
0.471 – 0.490 (0.0185 – 0.0193)	2.975 (0.1172)																																																
0.491 – 0.510 (0.0193 – 0.0201)	2.990 (0.1181)																																																
0.511 – 0.530 (0.0201 – 0.0209)	3.000 (0.1181)																																																
0.531 – 0.550 (0.0209 – 0.0217)	3.010 (0.1185)																																																
0.551 – 0.570 (0.0217 – 0.0224)	3.020 (0.1189)																																																
0.571 – 0.590 (0.0225 – 0.0232)	3.030 (0.1193)																																																
0.591 – 0.610 (0.0233 – 0.0240)	3.040 (0.1197)																																																
0.611 – 0.630 (0.0241 – 0.0248)	3.050 (0.1205)																																																
0.631 – 0.650 (0.0248 – 0.0256)	3.060 (0.1211)																																																
0.651 – 0.670 (0.0256 – 0.0264)	3.070 (0.1215)																																																
0.671 – 0.690 (0.0264 – 0.0272)	3.080 (0.1224)																																																
0.691 – 0.710 (0.0272 – 0.0280)	3.090 (0.1228)																																																
0.711 – 0.730 (0.0280 – 0.0287)	3.100 (0.1230)																																																
0.731 – 0.750 (0.0288 – 0.0296)	3.110 (0.1236)																																																
0.751 – 0.770 (0.0296 – 0.0303)	3.120 (0.1240)																																																
0.771 – 0.790 (0.0304 – 0.0311)	3.130 (0.1244)																																																
0.791 – 0.810 (0.0311 – 0.0319)	3.140 (0.1250)																																																
0.811 – 0.830 (0.0319 – 0.0327)	3.150 (0.1256)																																																
0.831 – 0.850 (0.0327 – 0.0335)	3.160 (0.1260)																																																
0.851 – 0.870 (0.0335 – 0.0343)	3.170 (0.1264)																																																
0.871 – 0.890 (0.0343 – 0.0350)	3.180 (0.1268)																																																
0.891 – 0.910 (0.0351 – 0.0358)	3.190 (0.1272)																																																
0.911 – 0.930 (0.0359 – 0.0366)	3.200 (0.1276)																																																
0.931 – 0.950 (0.0367 – 0.0374)	3.210 (0.1280)																																																
0.951 – 0.970 (0.0374 – 0.0382)	3.220 (0.1284)																																																
0.971 – 0.990 (0.0382 – 0.0390)	3.230 (0.1288)																																																
0.991 – 1.010 (0.0390 – 0.0398)	3.240 (0.1292)																																																
1.011 – 1.030 (0.0398 – 0.0406)	3.250 (0.1296)																																																
1.031 – 1.050 (0.0406 – 0.0413)	3.260 (0.1300)																																																
1.051 – 1.070 (0.0414 – 0.0421)	3.270 (0.1304)																																																
1.071 – 1.090 (0.0422 – 0.0429)	3.280 (0.1308)																																																
1.091 – 1.110 (0.0430 – 0.0437)	3.290 (0.1312)																																																
1.111 – 1.130 (0.0437 – 0.0445)	3.300 (0.1316)																																																
1.131 – 1.150 (0.0445 – 0.0453)	3.310 (0.1320)																																																

Exhaust valve clearance (Cold):
0.25 – 0.35 mm (0.010 – 0.014 in.)
EXAMPLE:
The 2.800 mm (0.1102 in.) shim is installed,
and the measured clearance is 0.440 mm
(0.0173 in.). Replace the 2.800 mm (0.1102

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64	2.575 (0.1014)	28	2.850 (0.1122)	76
06	2.600 (0.1024)	71	2.875 (0.1132)	77
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