

VALVE CLEARANCE INSPECTION

HINT:

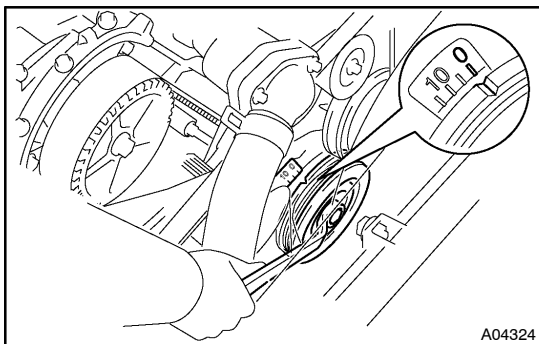
Inspect and adjust the valve clearance when the engine is cold.

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-15](#))
6. **REMOVE IGNITION COILS** (See page [IG-6](#))
7. **REMOVE RH CYLINDER HEAD COVER**

Remove the 9 bolts, the 9 seal washers and the cylinder head cover.

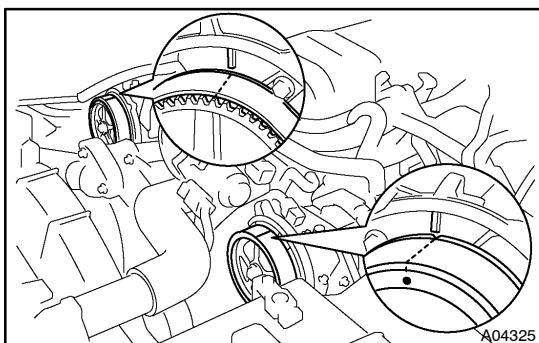
8. REMOVE LH CYLINDER HEAD COVER

- (a) Remove the oil dipstick for the transmission.
- (b) Disconnect the PCV hose.
- (c) Disconnect the engine wire clamp from the wire bracket on the cylinder head cover.
- (d) Remove the 9 bolts, the 9 seal washers and the cylinder head cover.

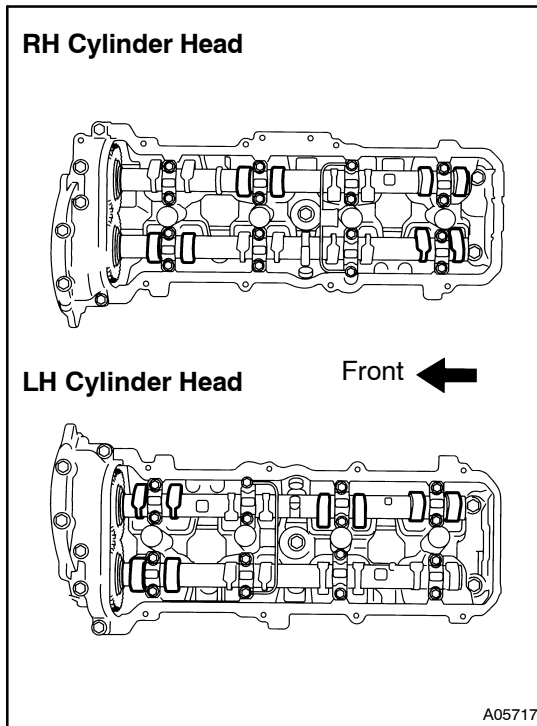


9. SET NO.1 CYLINDER TO TDC/COMPRESSION

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



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

**10. INSPECT VALVE CLEARANCE**

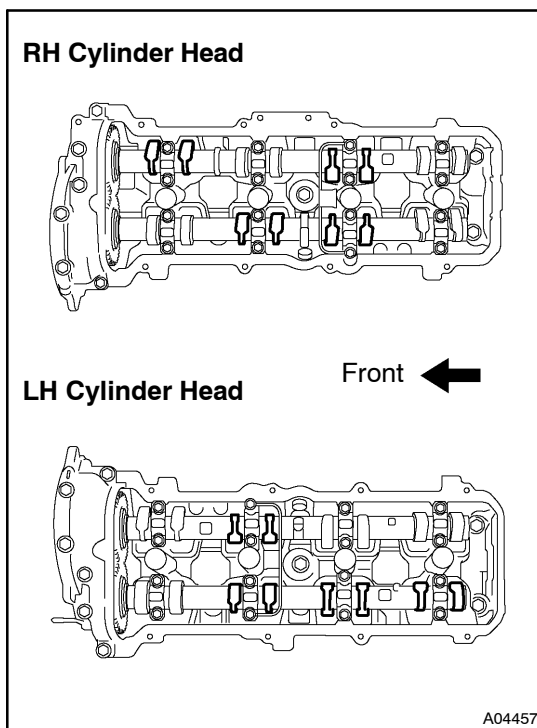
- (a) Check only the valves indicated.
- Using a feeler gauge, measure the clearance between the valve lifter and the camshaft.
 - Record the out-of-specification valve clearance measurements. They will be used later to determine the required replacement adjusting shim.

Valve clearance (Cold):**Intake**

0.15 – 0.25 mm (0.006 – 0.010 in.)

Exhaust

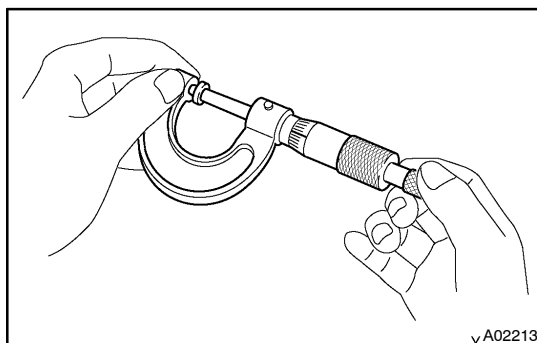
0.25 – 0.35 mm (0.010 – 0.014 in.)



- (b) Turn the crankshaft 1 revolution (360°) and align the mark as above (See procedure in step 9).
- (c) Check only the valves indicated as shown. Measure the valve clearance (See procedure in step (a)).

11. ADJUST VALVE CLEARANCE

- (a) Remove the timing belt (See page [EM-15](#)).
- (b) Remove the camshafts (See page [EM-44](#)).
- (c) Remove the valve lifter and adjusting shim.



- (d) Determine the replacement adjusting shim size according to the following Formula and Charts:
- Using a micrometer, measure the thickness of the removed shim.
 - Calculate the thickness of a new shim so that the valve clearance comes within the 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:

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

- Select a new shim with the closest thickness as close as possible to the calculated value.

HINT:

Shims are available in 41 increments of 0.020 mm (0.0008 in.), from 2.00 mm (0.0787 in.) to 2.80 mm (0.1102 in.).

- (e) Place a new adjusting shim on the valve.
- (f) Place the valve lifter.
- (g) Reinstall the camshafts (See page [EM-57](#)).
- (h) Reinstall the timing belt (See page [EM-22](#)).
- (i) Recheck the valve clearance.

12. REINSTALL CYLINDER HEAD COVERS**13. REINSTALL IGNITION COILS****14. REINSTALL NO.3 TIMING BELT COVERS (See page [EM-22](#))****15. REINSTALL AIR CLEANER AND INTAKE AIR CONNECTOR ASSEMBLY****16. REFILL WITH ENGINE COOLANT****17. START ENGINE AND CHECK FOR LEAKS****18. RECHECK ENGINE COOLANT LEVEL****19. REINSTALL V-BANK COVER****20. REINSTALL BATTERY CLAMP COVER**

Adjusting Shim Selection Chart (Intake)

Installed shim thickness mm (in.)	Measured clearance mm (in.)		New shim thickness																mm (in.)	
	Shim No.	Thickness	Shim No.	Thickness	Shim No.	Thickness	Shim No.	Thickness	Shim No.	Thickness	Shim No.	Thickness	Shim No.	Thickness	Shim No.	Thickness	Shim No.	Thickness		
0.000 - 0.030 (0.0000 - 0.0012)	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000		
0.031 - 0.050 (0.0012 - 0.0020)	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000		
0.051 - 0.070 (0.0020 - 0.0028)	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000		
0.071 - 0.090 (0.0028 - 0.0035)	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000		
0.091 - 0.110 (0.0035 - 0.0043)	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000		
0.111 - 0.130 (0.0044 - 0.0051)	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000		
0.131 - 0.149 (0.0052 - 0.0059)	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000	00	0.000		
0.150 - 0.250 (0.0059 - 0.0098)	06	0.081	10	0.121	14	0.161	18	0.201	22	0.241	26	0.281	30	0.321	34	0.361	38	0.401		
0.251 - 0.270 (0.0099 - 0.0106)	06	0.081	10	0.121	14	0.161	18	0.201	22	0.241	26	0.281	30	0.321	34	0.361	38	0.401		
0.271 - 0.290 (0.0107 - 0.0114)	08	0.101	12	0.141	16	0.181	20	0.221	24	0.261	28	0.301	32	0.341	36	0.381	40	0.421		
0.291 - 0.310 (0.0115 - 0.0122)	10	0.121	14	0.161	18	0.201	22	0.241	26	0.281	30	0.321	34	0.361	38	0.401	42	0.441		
0.311 - 0.330 (0.0122 - 0.0130)	12	0.141	16	0.181	20	0.221	24	0.261	28	0.301	32	0.341	36	0.381	40	0.421	44	0.461		
0.331 - 0.350 (0.0130 - 0.0138)	14	0.161	18	0.201	22	0.241	26	0.281	30	0.321	34	0.361	38	0.401	42	0.441	46	0.481		
0.351 - 0.370 (0.0138 - 0.0146)	16	0.181	20	0.221	24	0.261	28	0.301	32	0.341	36	0.381	40	0.421	44	0.461	48	0.501		
0.371 - 0.390 (0.0146 - 0.0154)	18	0.201	22	0.241	26	0.281	30	0.321	34	0.361	38	0.401	42	0.441	46	0.481	48	0.501		
0.391 - 0.410 (0.0154 - 0.0161)	20	0.221	24	0.261	28	0.301	32	0.341	36	0.381	40	0.421	44	0.461	48	0.501	52	0.541		
0.411 - 0.430 (0.0162 - 0.0169)	22	0.241	26	0.281	30	0.321	34	0.361	38	0.401	42	0.441	46	0.481	50	0.52	54	0.56		
0.431 - 0.450 (0.0170 - 0.0177)	24	0.261	28	0.301	32	0.341	36	0.381	40	0.421	44	0.461	48	0.501	52	0.54	56	0.58		
0.451 - 0.470 (0.0178 - 0.0185)	26	0.281	30	0.321	34	0.361	38	0.401	42	0.441	46	0.481	50	0.52	54	0.56	58	0.60		
0.471 - 0.490 (0.0185 - 0.0193)	28	0.301	32	0.341	36	0.381	40	0.421	44	0.461	48	0.501	52	0.54	56	0.58	60	0.62		
0.491 - 0.510 (0.0193 - 0.0201)	30	0.321	34	0.361	38	0.401	42	0.441	46	0.481	50	0.52	54	0.56	58	0.60	62	0.64		
0.511 - 0.530 (0.0201 - 0.0209)	32	0.341	36	0.381	40	0.421	44	0.461	48	0.501	52	0.54	56	0.58	60	0.62	64	0.66		
0.531 - 0.550 (0.0209 - 0.0217)	34	0.361	38	0.401	42	0.441	46	0.481	50	0.52	54	0.56	58	60	62	64	66	68		
0.551 - 0.570 (0.0217 - 0.0224)	36	0.381	40	0.421	44	0.461	48	0.501	52	0.54	56	58	60	62	64	66	68	70		
0.571 - 0.590 (0.0225 - 0.0232)	38	0.401	42	0.441	46	0.481	50	0.52	54	56	58	60	62	64	66	68	70	72		
0.591 - 0.610 (0.0233 - 0.0240)	40	0.421	44	0.461	48	0.501	52	54	56	58	60	62	64	66	68	70	72	74		
0.611 - 0.630 (0.0241 - 0.0248)	42	0.441	46	0.481	50	0.52	54	56	58	60	62	64	66	68	70	72	74	76		
0.631 - 0.650 (0.0248 - 0.0256)	44	0.461	48	0.501	52	54	56	58	60	62	64	66	68	70	72	74	76	78		
0.651 - 0.670 (0.0256 - 0.0264)	46	0.481	50	0.52	54	56	58	60	62	64	66	68	70	72	74	76	78	80		
0.671 - 0.690 (0.0264 - 0.0272)	48	0.501	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	80		
0.691 - 0.710 (0.0272 - 0.0280)	50	0.52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	80	80		
0.711 - 0.730 (0.0280 - 0.0287)	52	0.54	56	58	60	62	64	66	68	70	72	74	76	78	80	80	80	80		
0.731 - 0.750 (0.0288 - 0.0295)	54	0.56	58	60	62	64	66	68	70	72	74	76	78	80	80	80	80	80		
0.751 - 0.770 (0.0296 - 0.0303)	56	0.58	60	62	64	66	68	70	72	74	76	78	80	80	80	80	80	80		
0.771 - 0.790 (0.0304 - 0.0311)	58	0.60	62	64	66	68	70	72	74	76	78	80	80	80	80	80	80	80		
0.791 - 0.810 (0.0311 - 0.0319)	60	0.62	64	66	68	70	72	74	76	78	80	80	80	80	80	80	80	80		
0.811 - 0.830 (0.0319 - 0.0327)	62	0.64	66	68	70	72	74	76	78	80	80	80	80	80	80	80	80	80		
0.831 - 0.850 (0.0327 - 0.0335)	64	0.66	68	70	72	74	76	78	80	80	80	80	80	80	80	80	80	80		
0.851 - 0.870 (0.0335 - 0.0343)	66	0.68	70	72	74	76	78	80	80	80	80	80	80	80	80	80	80	80		
0.871 - 0.890 (0.0343 - 0.0350)	68	0.70	72	74	76	78	80	80	80	80	80	80	80	80	80	80	80	80		
0.891 - 0.910 (0.0351 - 0.0358)	70	0.72	74	76	78	80	80	80	80	80	80	80	80	80	80	80	80	80		
0.931 - 0.950 (0.0367 - 0.0374)	74	0.76	78	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80		
0.951 - 0.970 (0.0374 - 0.0382)	78	0.80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80		
0.971 - 0.990 (0.0382 - 0.0390)	78	0.80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80		
0.991 - 1.010 (0.0390 - 0.0398)	80	0.80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80		
1.011 - 1.030 (0.0398 - 0.0406)	80	0.80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80		
1.031 - 1.050 (0.0406 - 0.0413)	80	0.80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80		

Intake valve clearance (Cold):

0.15 - 0.25 mm (0.006 - 0.010 in.)

CVAMPB L

Intake valve clearance (Cold):

0.15 – 0.25 mm (0.006 – 0.010 in.)

EXAMPLE:

The 2.300 mm (0.0906 in.) shim is installed, and the measured clearance is 0.440 mm (0.0173 in.). Replace the 2.300 mm (0.0906 in.) shim with a No. 54 shim.

New shim thickness				mm (in.)	
Shim No.	Thickness	Shim No.	Thickness		
00	2.000 (0.0787)	28	2.280 (0.0898)	Shim No.	Thickness
02	2.020 (0.0795)	30	2.300 (0.0906)	56	2.560 (0.1008)
04	2.040 (0.0803)	32	2.320 (0.0913)	58	2.580 (0.1016)
06	2.060 (0.0811)	34	2.340 (0.0921)	60	2.600 (0.1024)
08	2.080 (0.0819)	36	2.360 (0.0929)	62	2.620 (0.1031)
10	2.100 (0.0827)	38	2.380 (0.0937)	64	2.640 (0.1039)
12	2.120 (0.0835)	40	2.400 (0.0945)	66	2.660 (0.1047)
14	2.140 (0.0843)	42	2.420 (0.0953)	68	2.680 (0.1055)
16	2.160 (0.0850)	44	2.440 (0.0961)	70	2.700 (0.1063)
18	2.180 (0.0858)	46	2.460 (0.0969)	72	2.720 (0.1071)
20	2.200 (0.0866)	48	2.480 (0.0976)	74	2.740 (0.1079)
22	2.220 (0.0874)	50	2.500 (0.0984)	76	2.760 (0.1087)
24	2.240 (0.0882)	52	2.520 (0.0992)	78	2.780 (0.1094)
26	2.260 (0.0890)	54	2.540 (0.1000)	80	2.800 (0.1102)

2005 LEXUS LX470 (RM1134U)

New shim thickness				mm (in.)	
Shim No.	Thickness	Shim No.	Thickness	Shim No.	Thickness
00	2.000 (0.0787)	28	2.280 (0.0898)	56	2.560 (0.1008)
02	2.020 (0.0795)	30	2.300 (0.0906)	58	2.580 (0.1016)
04	2.040 (0.0803)	32	2.320 (0.0913)	60	2.600 (0.1024)
06	2.060 (0.0811)	34	2.340 (0.0921)	62	2.620 (0.1031)
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10	2.100 (0.0827)	38	2.380 (0.0937)	66	2.660 (0.1047)
12	2.120 (0.0835)	40	2.400 (0.0945)	68	2.680 (0.1055)
14	2.140 (0.0843)	42	2.420 (0.0953)	70	2.700 (0.1063)
16	2.160 (0.0850)	44	2.440 (0.0961)	72	2.720 (0.1071)
18	2.180 (0.0858)	46	2.460 (0.0969)	74	2.740 (0.1079)
20	2.200 (0.0866)	48	2.480 (0.0976)	76	2.760 (0.1087)
22	2.220 (0.0874)	50	2.500 (0.0984)	78	2.780 (0.1094)
24	2.240 (0.0882)	52	2.520 (0.0992)	80	2.800 (0.1102)
26	2.260 (0.0890)	54	2.540 (0.1000)		

EXAMPLE:

The 2.300 mm (0.0906 in.) shim is installed, and the measured clearance is 0.440 mm (0.0173 in.). Replace the 2.300 mm (0.0906 in.) shim with a No. 44 shim.