VALVE CLEARANCE (3RZ–FE)

1411X–01

ADJUSTMENT

1. REMOVE ENGINE UNDER COVER SUB–ASSY NO.1

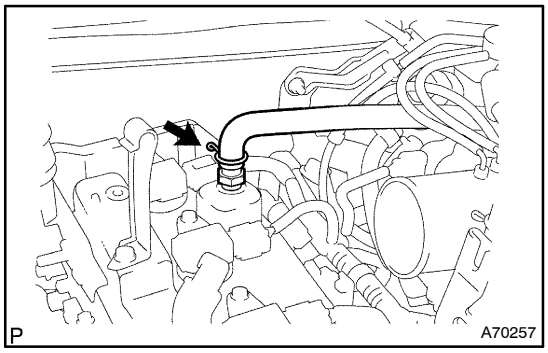
(a) Remove the 4 bolts and engine under cover.

2. SEPARATE ACCELERATOR CONTROL CABLE ASSY

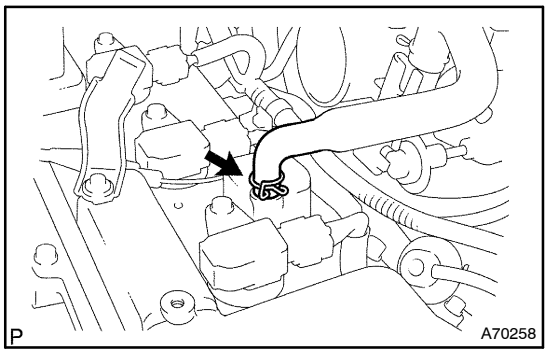
3. SEPARATE THROTTLE CABLE ASSY (A/T TRANSAXLE)

4. REMOVE AIR CLEANER CAP SUB–ASSY (See page 10–10)

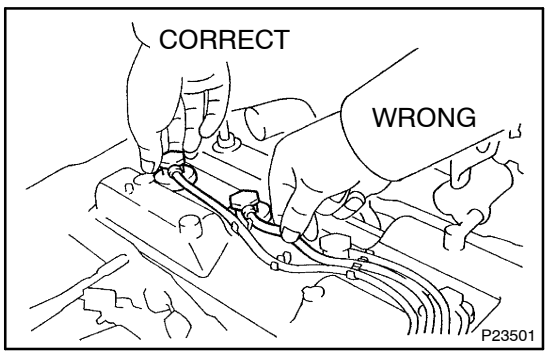
5. REMOVE INTAKE AIR CONNECTOR SUB–ASSY (See page 10–10)



6. DISCONNECT VENTILATION HOSE



7. DISCONNECT VENTILATION HOSE NO.2

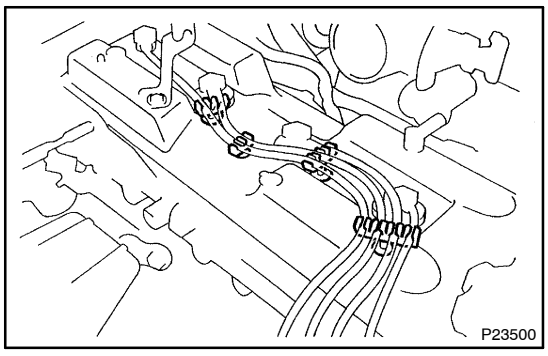


8. REMOVE COIL AND SPARK CORD SET W/RESISTIVE (LEADED GASOLINE)

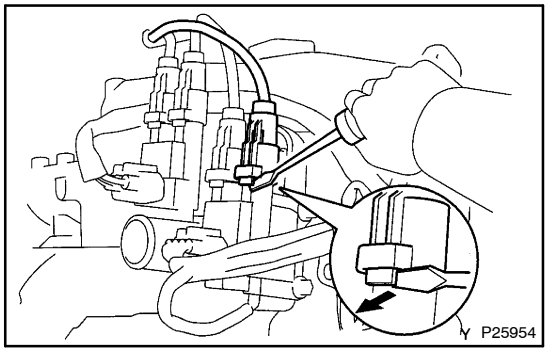
(a) Disconnect the resistive cord from the spark plugs.

NOTICE:

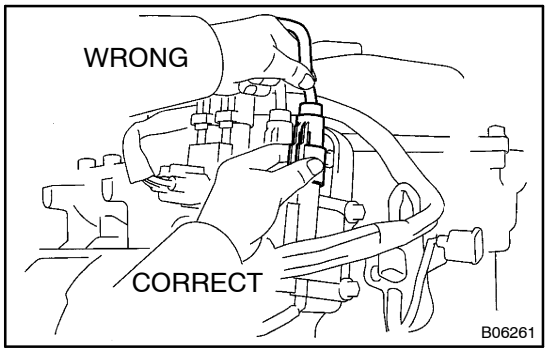
Pulling on or bending the resistive cord may damage the conductor inside.



(b) Remove the resistive cord from the clamps.



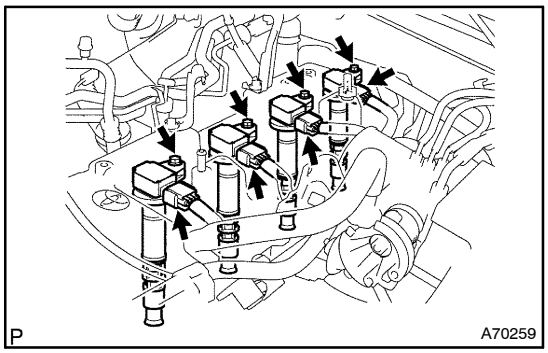
(c) Disconnect the resistive cord from ignition coils.
(1) Using a screwdriver lift up the lock claw and disconnect the holder from ignition coils.



(2) Disconnect the resistive cord at the grommet.

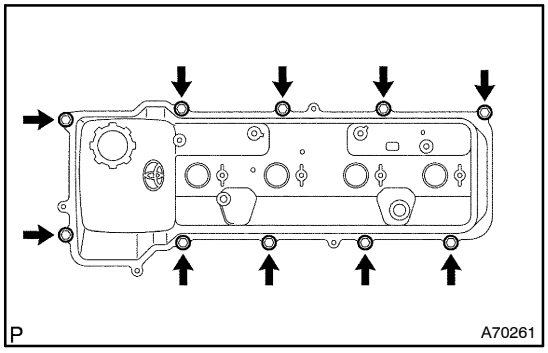
NOTICE:

- **Pulling on or bending the resistive core may damage the conductor inside.**
- **Do not wipe any of the oil from the grommet after the resistive cord is disconnected.**



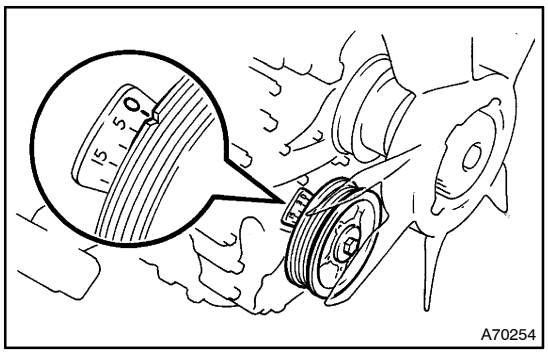
9. REMOVE IGNITION COIL NO.1 (UNLEADED GASOLINE)

(a) Disconnect the 4 ignition coil connectors.
(b) Remove the 4 bolts and 4 ignition coils.



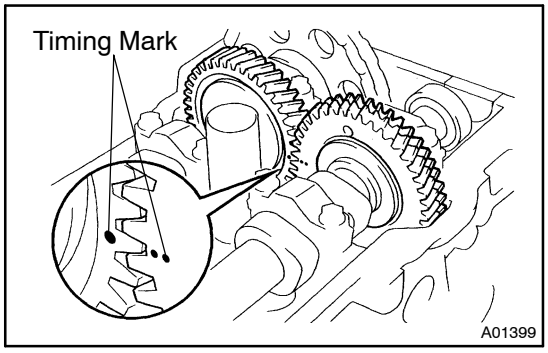
10. REMOVE CYLINDER HEAD COVER SUB–ASSY

(a) Remove the 5 wire harness clamps.
(b) Remove the 10 bolts, 10 seal washers and cylinder head cover.

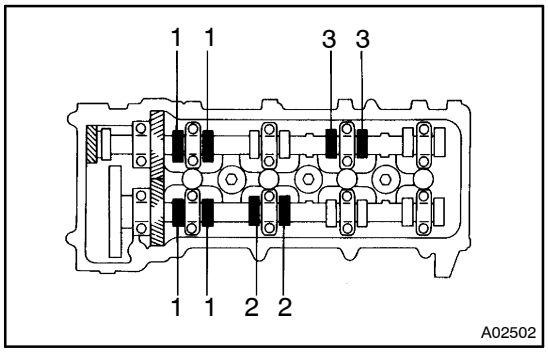


11. SET NO. 1 CYLINDER TO TDC/COMPRESSION

(a) Turn the crankshaft pulley clockwise and align its groove with the ”0” mark on the oil pump cover.



(b) Check that the timing marks (1 and 2 bolts) of the camshaft drive and driven gears are in straight line on the cylinder head surface as shown in the illustration. If not, turn the crankshaft 1 revolution (360°) and align the marks as above.



12. INSPECT VALVE CLEARANCE

(a) Check only the valves indicated.

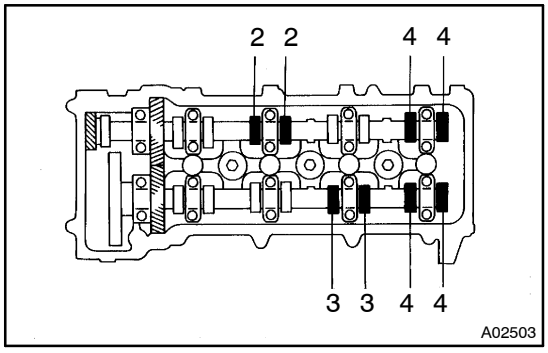
(1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.

(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 pulley 1 revolution (360°) and align its groove with timing mark ”0” of the oil pump cover.



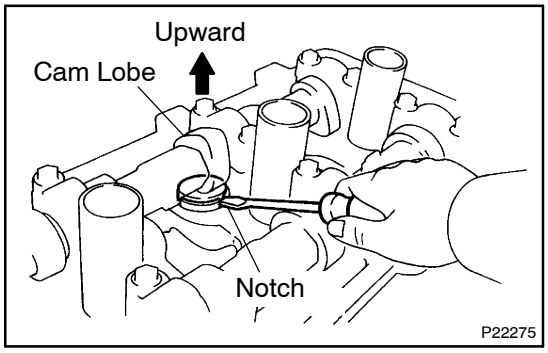
(c) Check only the valves indicated.

(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.)

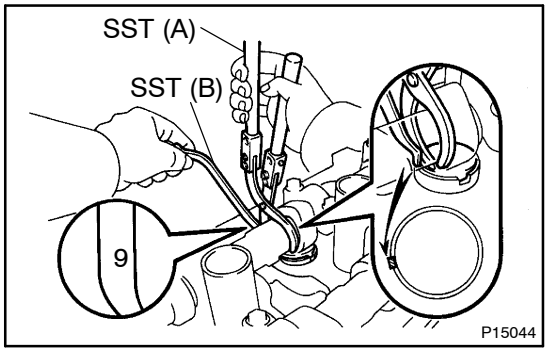


13. ADJUST VALVE CLEARANCE

(a) Remove valve adjusting shim.

(1) Turn the crankshaft to position the cam lobe of the camshaft on the adjusting valve upward.

(2) Position the notch of the valve lifter toward the spark plug side.

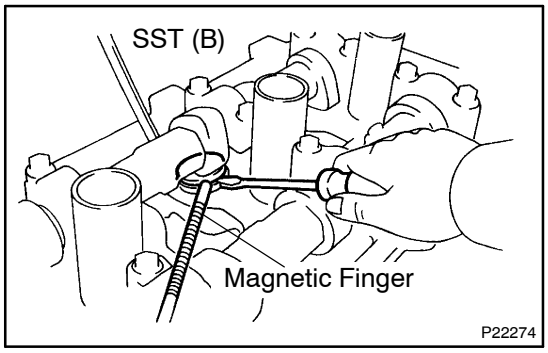


(3) Using SST (A), press down the valve lifter and place SST (B) between the camshaft and valve lifter flange. Remove SST (A).

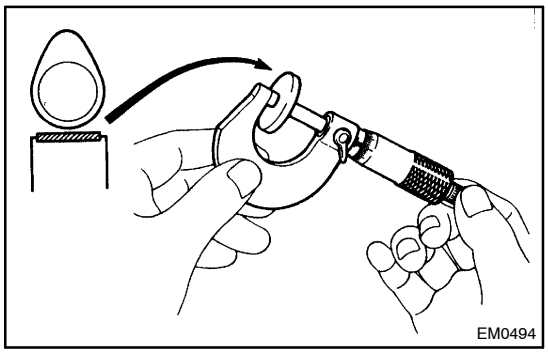
SST 09248–55040 (09248–05410, 09248–05420)

HINT:

Apply SST (B) at slight angle on the side marked with ”9”, at the position shown in the illustration.



(4) Remove the valve adjusting shim with a small screwdriver and magnetic finger.



(b) Determine the replacement valve adjusting shim size by these Formula or Chart:

(1) Using a micrometer, measure the thickness of the removed valve adjusting shim.

(2) Calculate the thickness of a new valve adjusting shim so that the valve clearance comes within the specified valve.

T..... Thickness of remove shim

A..... Measured valve clearance

N..... Thickness of new shim

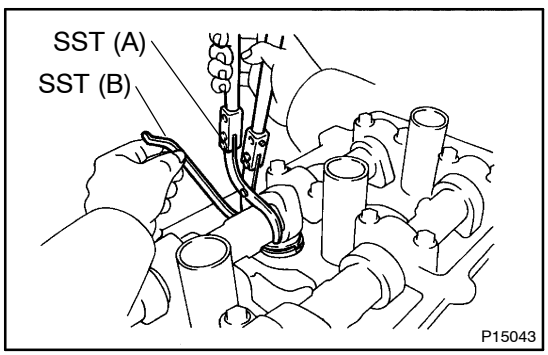
Intake N = T + (A – 0.20 mm (0.008 in.))

Exhaust N = T + (A – 0.30 mm (0.012 in.))

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

HINT:

The valve adjusting shims are available in 17 sized in increments of 0.05 mm (0.0020 in.), from 2.50 mm (0.0984 in.) to 3.30 mm (0.1299 in.).



(c) Install a new valve adjusting shim.

(1) Place a new valve adjusting shim on the valve lifter.

(2) Using SST (A), press down the valve lifter and remove SST (B).

SST 09248–55040 (09248–05410, 09248–05420)

(d) Recheck the valve clearance.

Adjusting Shim Selection Chart (Intake)

Measured clearance mm (in.) \ Installed shim thickness mm (in.)	2.500 (0.0984)	2.520 (0.0992)	2.540 (0.1000)	2.550 (0.1004)	2.560 (0.1008)	2.580 (0.1016)	2.600 (0.1024)	2.620 (0.1031)	2.640 (0.1039)	2.650 (0.1043)	2.660 (0.1047)	2.680 (0.1055)	2.700 (0.1063)	2.710 (0.1067)	2.720 (0.1071)	2.730 (0.1075)	2.740 (0.1079)	2.750 (0.1083)	2.760 (0.1087)	2.770 (0.1091)	2.780 (0.1094)	2.790 (0.1098)	2.800 (0.1102)	2.810 (0.1106)	2.820 (0.1110)	2.830 (0.1114)	2.840 (0.1118)	2.850 (0.1122)	2.860 (0.1126)	2.870 (0.1130)	2.880 (0.1134)	2.890 (0.1138)	2.900 (0.1142)
0.000 – 0.030 (0.0000 – 0.0012)										1	1	1	1	2	2	2	2	2	3	3	3	3	3	4	4	4	4	4	5	5	5	5	5
0.031 – 0.050 (0.0012 – 0.0020)								1	1	1	1	1	2	2	2	2	3	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6
0.051 – 0.070 (0.0020 – 0.0028)							1	1	1	1	1	2	2	2	3	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6
0.071 – 0.090 (0.0028 – 0.0035)						1	1	1	1	2	2	2	3	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6	6	7
0.091 – 0.110 (0.0036 – 0.0043)					1	1	1	1	2	2	2	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6	6	7	7	7
0.111 – 0.130 (0.0044 – 0.0051)			1	1	1	1	1	2	2	2	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6	6	7	7	7	7	7
0.131 – 0.149 (0.0052 – 0.0059)		1	1	1	1	1	2	2	3	3	3	3	4	4	4	4	5	5	5	5	5	6	6	6	6	6	7	7	7	7	7	8	8
0.150 – 0.250 (0.0059 – 0.0098)																																	
0.251 – 0.270 (0.0099 – 0.0106)	2	3	3	3	3	4	4	5	5	5	5	6	6	6	7	7	7	7	7	8	8	8	8	8	9	9	9	9	9	10	10	10	10
0.271 – 0.290 (0.0107 – 0.0114)	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	7	7	8	8	8	8	8	9	9	9	9	9	10	10	10	10	10	11
0.291 – 0.310 (0.0115 – 0.0122)	3	3	4	4	4	5	5	5	6	6	6	7	7	7	7	8	8	8	8	8	9	9	9	9	9	10	10	10	10	10	11	11	11
0.311 – 0.330 (0.0122 – 0.0130)	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	8	8	8	9	9	9	9	10	10	10	10	10	11	11	11	11	11
0.331 – 0.350 (0.0130 – 0.0138)	4	4	5	5	5	5	6	6	7	7	7	7	8	8	8	8	9	9	9	9	9	10	10	10	10	10	11	11	11	11	11	12	12
0.351 – 0.370 (0.0138 – 0.0146)	4	5	5	5	5	6	6	7	7	7	7	8	8	8	9	9	9	9	9	10	10	10	10	10	11	11	11	11	11	12	12	12	12
0.371 – 0.390 (0.0146 – 0.0154)	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	9	9	10	10	10	10	10	11	11	11	11	11	12	12	12	12	12	13
0.391 – 0.410 (0.0154 – 0.0161)	5	5	6	6	6	7	7	7	8	8	8	9	9	9	9	10	10	10	10	10	11	11	11	11	11	12	12	12	12	12	13	13	13
0.411 – 0.430 (0.0162 – 0.0169)	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	10	10	11	11	11	11	11	12	12	12	12	12	13	13	13	13	13
0.431 – 0.450 (0.0170 – 0.0177)	6	6	7	7	7	7	8	8	9	9	9	9	10	10	10	10	11	11	11	11	11	12	12	12	12	12	13	13	13	13	13	14	14
0.451 – 0.470 (0.0178 – 0.0185)	6	7	7	7	7	8	8	9	9	9	9	10	10	10	11	11	11	11	11	12	12	12	12	12	13	13	13	13	13	14	14	14	14
0.471 – 0.490 (0.0185 – 0.0193)	7	7	7	8	8	8	9	9	9	10	10	10	11	11	11	11	11	12	12	12	12	12	13	13	13	13	13	14	14	14	14	14	15
0.491 – 0.510 (0.0193 – 0.0201)	7	7	8	8	8	9	9	9	10	10	10	11	11	11	11	12	12	12	12	12	13	13	13	13	13	14	14	14	14	14	15	15	15
0.511 – 0.530 (0.0201 – 0.0209)	8	8	8	8	9	9	9	10	10	10	11	11	11	12	12	12	12	12	13	13	13	13	13	14	14	14	14	14	15	15	15	15	15
0.531 – 0.550 (0.0209 – 0.0217)	8	8	9	9	9	9	10	10	11	11	11	11	12	12	12	12	13	13	13	13	13	14	14	14	14	14	15	15	15	15	15	16	16
0.551 – 0.570 (0.0217 – 0.0224)	8	9	9	9	9	10	10	11	11	11	11	12	12	12	13	13	13	13	13	14	14	14	14	14	15	15	15	15	15	16	16	16	16
0.571 – 0.590 (0.0225 – 0.0232)	9	9	9	10	10	10	11	11	11	12	12	12	13	13	13	13	13	14	14	14	14	14	15	15	15	15	15	16	16	16	16	16	17
0.591 – 0.610 (0.0233 – 0.0240)	9	9	10	10	10	11	11	11	12	12	12	13	13	13	13	14	14	14	14	14	15	15	15	15	15	16	16	16	16	16	17	17	17
0.611 – 0.630 (0.0241 – 0.0248)	10	10	10	10	11	11	11	12	12	12	13	13	13	14	14	14	14	14	15	15	15	15	15	16	16	16	16	16	17	17	17	17	17
0.631 – 0.650 (0.0248 – 0.0256)	10	10	11	11	11	11	12	12	13	13	13	13	14	14	14	14	15	15	15	15	15	16	16	16	16	16	17	17	17	17	17	17	17
0.651 – 0.670 (0.0256 – 0.0264)	10	11	11	11	11	12	12	13	13	13	13	14	14	14	15	15	15	15	15	16	16	16	16	16	17	17	17	17	17	17	17		
0.671 – 0.690 (0.0264 – 0.0272)	11	11	11	11	12	12	13	13	13	14	14	14	15	15	15	15	15	16	16	16	16	16	17	17	17	17	17	17	17				
0.691 – 0.710 (0.0272 – 0.0280)	11	11	12	12	12	13	13	13	14	14	14	15	15	15	15	16	16	16	16	16	17	17	17	17	17	17	17						
0.711 – 0.730 (0.0280 – 0.0287)	12	12	12	12	13	13	13	14	14	14	15	15	15	16	16	16	16	16	17	17	17	17	17	17	17								
0.731 – 0.750 (0.0288 – 0.0295)	12	12	13	13	13	13	14	14	15	15	15	15	16	16	16	16	17	17	17	17	17	17	17										
0.751 – 0.770 (0.0296 – 0.0303)	12	13	13	13	13	14	14	15	15	15	15	16	16	16	16	17	17	17	17	17	17												
0.771 – 0.790 (0.0304 – 0.0311)	13	13	13	13	14	14	15	15	15	16	16	16	17	17	17	17	17	17	17														
0.791 – 0.810 (0.0311 – 0.0319)	13	13	14	14	14	15	15	15	16	16	16	17	17	17	17	17	17																
0.811 – 0.830 (0.0319 – 0.0327)	14	14	14	14	15	15	15	16	16	16	17	17	17	17	17																		
0.831 – 0.850 (0.0327 – 0.0335)	14	14	15	15	15	15	16	16	17	17	17	17	17																				
0.851 – 0.870 (0.0335 – 0.0343)	14	15	15	15	15	16	16	17	17	17	17	17																					
0.871 – 0.890 (0.0343 – 0.0350)	15	15	15	15	16	16	17	17	17	17	17																						
0.891 – 0.910 (0.0351 – 0.0358)	15	15	16	16	16	17	17	17	17																								
0.911 – 0.930 (0.0359 – 0.0366)	16	16	16	16	17	17	17	17																									
0.931 – 0.950 (0.0367 – 0.0374)	16	16	17	17	17	17	17																										
0.951 – 0.970 (0.0374 – 0.0382)	16	17	17	17	17	17																											
0.971 – 0.990 (0.0382 – 0.0390)	17	17	17	17																													
0.991 – 1.010 (0.0390 – 0.0398)	17	17	17																														
1.011 – 1.030 (0.0398 – 0.0406)	17	17																															
1.031 – 1.050 (0.0406 – 0.0413)	17																																

Measured clearance mm (in.) \ Installed shim thickness mm (in.)	2.910 (0.1146)	2.920 (0.1150)	2.930 (0.1154)	2.940 (0.1157)	2.950 (0.1161)	2.960 (0.1166)	2.970 (0.1169)	2.980 (0.1173)	2.990 (0.1177)	3.000 (0.1181)	3.010 (0.1185)	3.020 (0.1189)	3.030 (0.1193)	3.040 (0.1197)	3.050 (0.1201)	3.060 (0.1205)	3.070 (0.1209)	3.080 (0.1213)	3.090 (0.1217)	3.100 (0.1220)	3.120 (0.1228)	3.140 (0.1236)	3.150 (0.1240)	3.160 (0.1244)	3.180 (0.1252)	3.200 (0.1260)	3.220 (0.1268)	3.240 (0.1276)	3.250 (0.1280)	3.260 (0.1283)	3.280 (0.1291)	3.300 (0.1299)
0.000 – 0.030 (0.0000 – 0.0012)	6	6	6	6	6	7	7	7	7	7	8	8	8	8	8	9	9	9	9	9	10	10	10	11	11	11	12	12	12	13	13	13
0.031 – 0.050 (0.0012 – 0.0020)	6	6	6	7	7	7	7	7	8	8	8	8	8	9	9	9	9	9	10	10	10	11	11	11	11	12	12	13	13	13	13	14
0.051 – 0.070 (0.0020 – 0.0028)	6	7	7	7	7	7	8	8	8	8	8	9	9	9	9	9	10	10	10	10	11	11	11	11	12	12	13	13	13	13	14	14
0.071 – 0.090 (0.0028 – 0.0035)	7	7	7	7	8	8	8	8	8	9	9	9	9	9	10	10	10	10	10	11	11	11	12	12	12	13	13	13	14	14	14	15
0.091 – 0.110 (0.0036 – 0.0043)	7	7	8	8	8	8	8	9	9	9	9	9	10	10	10	10	10	11	11	11	11	12	12	12	13	13	13	14	14	14	15	15
0.111 – 0.130 (0.0044 – 0.0051)	8	8	8	8	8	9	9	9	9	9	10	10	10	10	10	11	11	11	11	11	12	12	12	13	13	13	14	14	14	15	15	15
0.131 – 0.149 (0.0052 – 0.0059)	8	8	8	9	9	9	9	9	10	10	10	10	10	11	11	11	11	11	12	12	12	13	13	13	13	14	14	15	15	15	15	16
0.150 – 0.250 (0.0059 – 0.0098)																																
0.251 – 0.270 (0.0099 – 0.0106)	10	11	11	11	11	11	12	12	12	12	12	13	13	13	13	13	14	14	14	14	15	15	15	15	16	16	17	17	17	17	17	
0.271 – 0.290 (0.0107 – 0.0114)	11	11	11	11	12	12	12	12	12	13	13	13	13	13	14	14	14	14	14	15	15	15	16	16	16	17	17	17	17	17		
0.291 – 0.310 (0.0115 – 0.0122)	11	11	12	12	12	12	12	13	13	13	13	13	14	14	14	14	14	15	15	15	15	16	16	16	17	17	17	17				
0.311 – 0.330 (0.0122 – 0.0130)	12	12	12	12	12	13	13	13	13	13	14	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17					
0.331 – 0.350 (0.0130 – 0.0138)	12	12	12	13	13	13	13	13	14	14	14	14	14	15	15	15	15	15	16	16	16	16	17	17	17	17						
0.351 – 0.370 (0.0138 – 0.0146)	12	13	13	13	13	13	14	14	14	14	14	15	15	15	15	15	16	16	16	16	17	17	17	17	17							
0.371 – 0.390 (0.0146 – 0.0154)	13	13	13	13	14	14	14	14	14	15	15	15	15	15	16	16	16	16	16	17	17	17	17	17								
0.391 – 0.410 (0.0154 – 0.0161)	13	13	14	14	14	14	14	15	15	15	15	15	16	16	16	16	16	17	17	17	17	17										
0.411 – 0.430 (0.0162 – 0.0169)	14	14	14	14	14	15	15	15	15	15	16	16	16	16	16	17	17	17	17	17	17											
0.431 – 0.450 (0.0170 – 0.0177)	14	14	14	15	15	15	15	15	16	16	16	16	16	17	17	17	17	17	17	17												
0.451 – 0.470 (0.0178 – 0.0185)	14	15	15	15	15	15	16	16	16	16	16	17	17	17	17	17	17	17														
0.471 – 0.490 (0.0185 – 0.0193)	15	15	15	15	16	16	16	16	16	17	17	17	17	17	17	17																
0.491 – 0.510 (0.0193 – 0.0201)	15	15	16	16	16	16	16	17	17	17	17	17	17	17																		
0.511 – 0.530 (0.0201 – 0.0209)	16	16	16	16	16	17	17	17	17	17	17	17																				
0.531 – 0.550 (0.0209 – 0.0217)	16	16	16	17	17	17	17	17	17	17																						
0.551 – 0.570 (0.0217 – 0.0224)	16	17	17	17	17	17	17	17																								
0.571 – 0.590 (0.0225 – 0.0232)	17	17	17	17	17	17																										
0.591 – 0.610 (0.0233 – 0.0240)	17	17	17	17																												
0.611 – 0.630 (0.0241 – 0.0248)	17	17																														
0.631 – 0.650 (0.0248 – 0.0256)																																
0.651 – 0.670 (0.0256 – 0.0264)																																
0.671 – 0.690 (0.0264 – 0.0272)																																
0.691 – 0.710 (0.0272 – 0.0280)																																
0.711 – 0.730 (0.0280 – 0.0287)																																
0.731 – 0.750 (0.0288 – 0.0295)																																
0.751 – 0.770 (0.0296 – 0.0303)																																
0.771 – 0.790 (0.0304 – 0.0311)																																
0.791 – 0.810 (0.0311 – 0.0319)																																
0.811 – 0.830 (0.0319 – 0.0327)																																
0.831 – 0.850 (0.0327 – 0.0335)																																
0.851 – 0.870 (0.0335 – 0.0343)																																
0.871 – 0.890 (0.0343 – 0.0350)																																
0.891 – 0.910 (0.0351 – 0.0358)																																
0.911 – 0.930 (0.0359 – 0.0366)																																
0.931 – 0.950 (0.0367 – 0.0374)																																
0.951 – 0.970 (0.0374 – 0.0382)																																
0.971 – 0.990 (0.0382 – 0.0390)																																
0.991 – 1.010 (0.0390 – 0.0398)																																
1.011 – 1.030 (0.0398 – 0.0406)																																
1.031 – 1.050 (0.0406 – 0.0413)																																

V00831

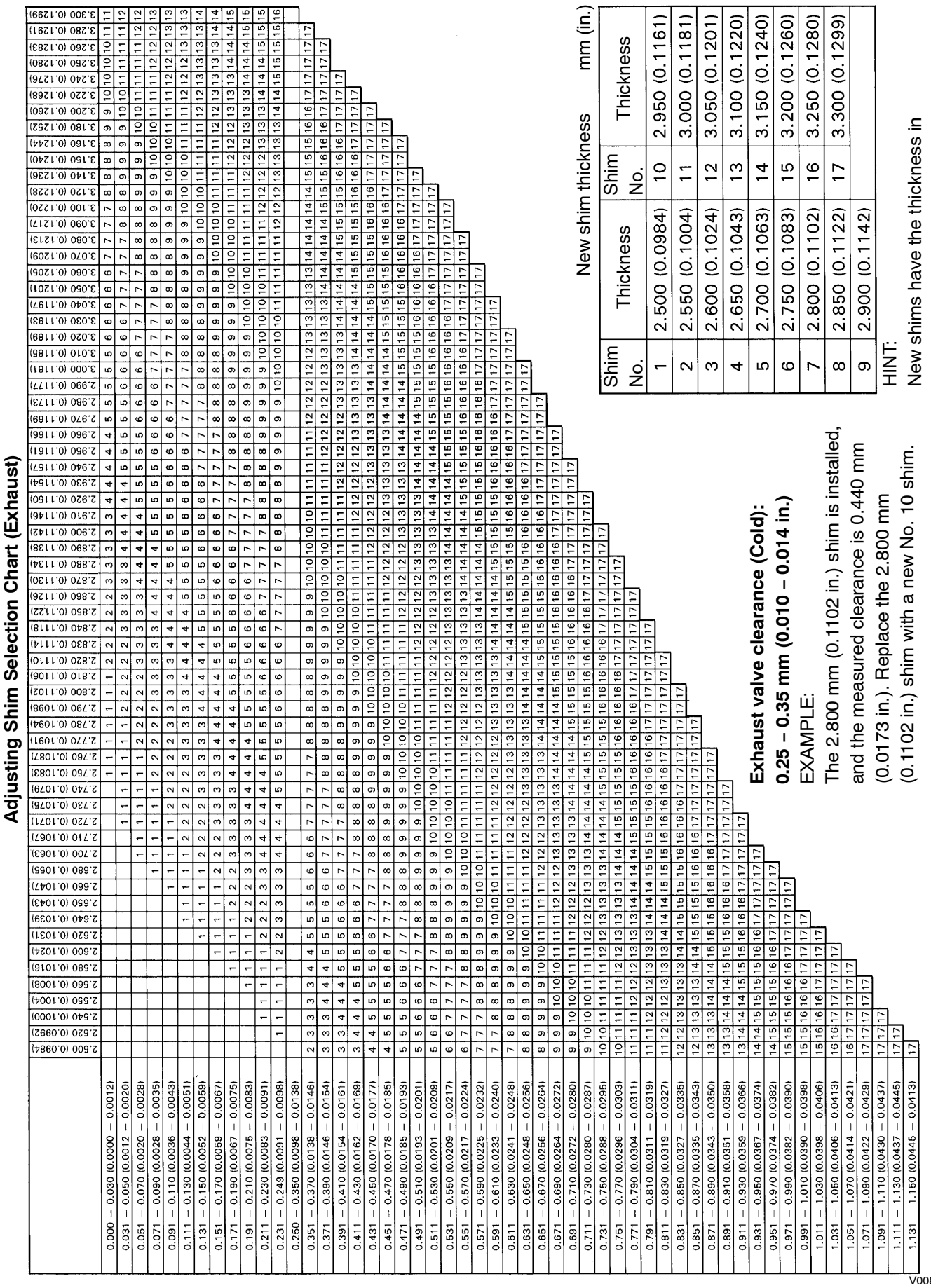
Intake valve clearance (Cold):
0.15 – 0.25 mm (0.006 – 0.010 in.)

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 new No. 12 shim.

New shim thickness mm (in.)

Shim No.	Thickness	Shim No.	Thickness
1	2.500 (0.0984)	10	2.950 (0.1161)
2	2.550 (0.1004)	11	3.000 (0.1181)
3	2.600 (0.1024)	12	3.050 (0.1201)
4	2.650 (0.1043)	13	3.100 (0.1220)
5	2.700 (0.1063)	14	3.150 (0.1240)
6	2.750 (0.1083)	15	3.200 (0.1260)
7	2.800 (0.1102)	16	3.250 (0.1280)
8	2.850 (0.1122)	17	3.300 (0.1299)
9	2.900 (0.1142)		

HINT:
New shims have the thickness in millimeters imprinted on the face.



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

EXAMPLE:

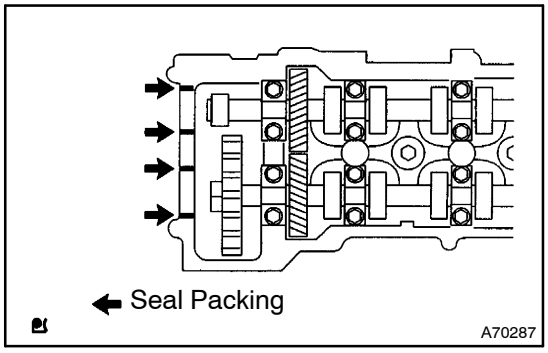
The 2.800 mm (0.1102 in.) shim is installed, and the measured clearance is 0.440 mm (0.0173 in.). Replace the 2.800 mm (0.1102 in.) shim with a new No. 10 shim.

New shim thickness mm (in.)

Shim No.	Thickness	Shim No.	Thickness
1	2.500 (0.0984)	10	2.950 (0.1161)
2	2.550 (0.1004)	11	3.000 (0.1181)
3	2.600 (0.1024)	12	3.050 (0.1201)
4	2.650 (0.1043)	13	3.100 (0.1220)
5	2.700 (0.1063)	14	3.150 (0.1240)
6	2.750 (0.1083)	15	3.200 (0.1260)
7	2.800 (0.1102)	16	3.250 (0.1280)
8	2.850 (0.1122)	17	3.300 (0.1299)
9	2.900 (0.1142)		

HINT:

New shims have the thickness in millimeters imprinted on the face.



14. INSTALL CYLINDER HEAD COVER SUB–ASSY

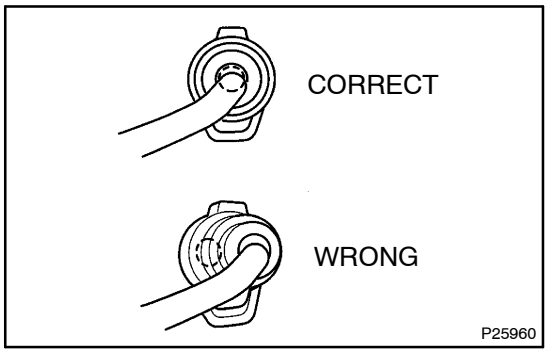
(a) Apply seal packing to the 4 locations as shown.
Seal packing: Part No. 08826–00080 or equivalent

NOTICE:

- **Remove any oil from the contact surface**
- **Install the cylinder head cover within 3 minutes after applying seal packing.**
- **Do not start the engine within 2 hours after installing.**

(b) Install the cylinder head cover with 10 seal washers and 10 bolts.
Torque: 5.5 N·m (55 kgf·cm, 48 in.·lbf)

(c) Install the 5 wire harness clamps.



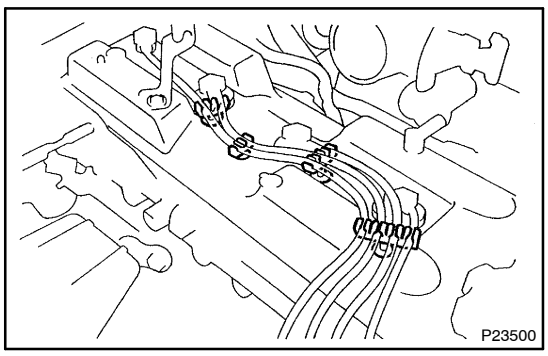
15. INSTALL COIL AND SPARK CORD SET W/RESISTIVE (LEADED GASOLINE)

(a) Connect the resistive cord to the ignition coils.
(1) Assemble the holder and grommet.
(2) Align the spline of the ignition coil with the spline of the holder, and push in the resistive cord.

NOTICE:
Check that the holder is correctly installed to the grommet and ignition coil as shown in the illustration.

(3) Check that the lock claw of the holder is engaged by lightly pulling the holder.

(b) Connect the resistive cord to the spark plugs.



(c) Secure the resistive cord with the clamps as shown in the illustration.

16. INSTALL IGNITION COIL NO.1 (UNLEADED GASOLINE)

(a) Install the 4 ignition coils with the 4 bolts.
Torque: 9.0 N·m (90 kgf·cm, 78 in.·lbf)

(b) Connect the 4 ignition coil connectors.

17. CONNECT VENTILATION HOSE NO.2

18. CONNECT VENTILATION HOSE

19. INSTALL INTAKE AIR CONNECTOR SUB–ASSY (See page 10–10)

20. INSTALL AIR CLEANER CAP SUB–ASSY

21. INSTALL THROTTLE CABLE ASSY (A/T TRANSAXLE)

22. INSTALL ACCELERATOR CONTROL CABLE ASSY

23. INSTALL ENGINE UNDER COVER SUB–ASSY NO.1

(a) Install the engine under cover with the 4 bolts.
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)