ENGINE TUNE–UP

INSPECTION OF ENGINE COOLANT
(See steps 1 and 2 on page CO–5)
INSPECTION OF ENGINE OIL
(See steps 1 and 2 on page LU–5)
INSPECTION OF BATTERY
(See steps 1 and 2 on page CH–2)

Standard specific gravity:
1.25 –1.27 when fully charged at 20°C (68°F)

INSPECTION OF AIR FILTER

(See step 3 on page MA–5)

INSPECTION OF HIGH–TENSION CORDS

(See page IG–7, 11 or 16)
Maximum resistance: 25 kΩper cord

INSPECTION OF SPARK PLUGS

(Conventional Type only (4A–FE))
(See page IG–7)

Correct electrode gap:	**0.8 mm (0.031 in.)**
Recommended spark plugs:	**ND a16R–U**
	NGK BCPRSEY

INSPECTION OF ALTERNATOR DRIVE BELT

(See step 3 on page CH–3)

Drive belt tension:

4A–FE		**New belt**	**160 ± 20 lbf**
		Used belt	**130 ± 20 lbf**
3S–GTE	**w/ A/C**	**New belt**	**165 ± 10 lbf**
		Used belt	**84 ± 15 lbf**
	w/o A/C	**New belt**	**150 ± 25 lbf**
		Used belt	**130 ± 25 lbf**
5S–FE	**w/ A/C**	**New belt**	**165 ± 10 lbf**
		Used belt	**110 ± 10 lbf**
	w/o A/C	**New belt**	**125 ± 25 lbf**
		Used belt	**95 ± 20 lbf**

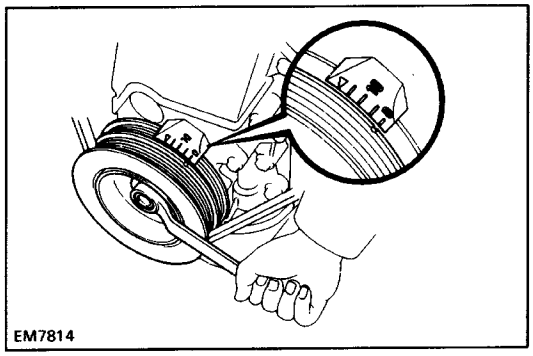
INSPECTION AND ADJUSTMENT OF VALVE CLEARANCE (4A–FE)

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

1. DISCONNECT HIGH–TENSION CORDS FROM SPARK PLUGS

2. REMOVE CYLINDER HEAD COVER

(See steps 18 and 24 on pages EM–85 and 87)

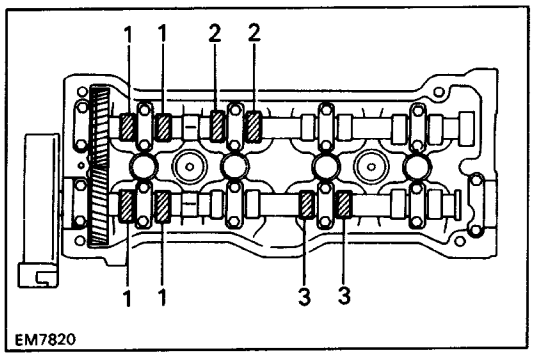


3. SET NO.1 CYLINDER TO TDC/COMPRESSION

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

(b) Check that the valve lifters on the No.1 cylinder are loose and valve lifters on the No.4 are tight.

If not, turn the crankshaft one revolution (360°) and align the mark as above.



4. 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.

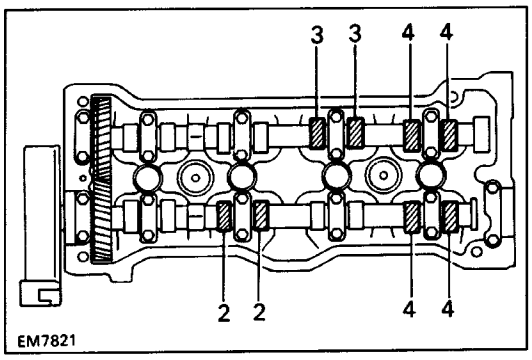
Valve clearance (Cold):

Intake 0.15 – 0.25 mm (0.006 – 0.010 in.)

Exhaust 0.20 – 0.30 mm (0.008 – 0.012 in.)

(b) Turn the crankshaft one revolution (360°) and align the mark as above. (See procedure in step 3)

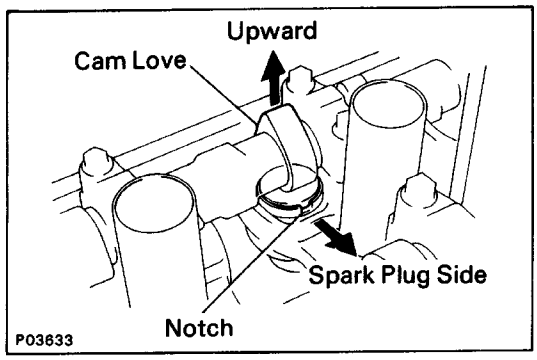
(c) Check only the valves indicated as shown. Measure the valve clearance. (See procedure in step (a))

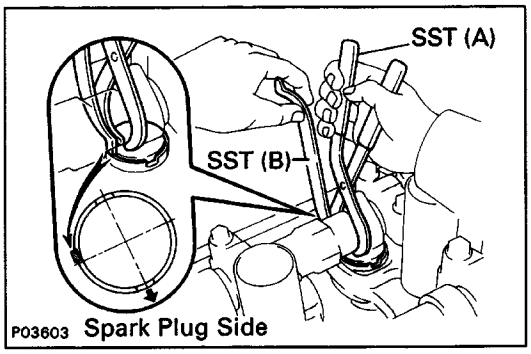


5. ADJUST VALVE CLEARANCE

(a) Remove the adjusting shim.

- Turn the crankshaft to position the cam lobe of the camshaft on the adjusting valve upward.
- Position the notch of the valve lifter facing the spark plug side.

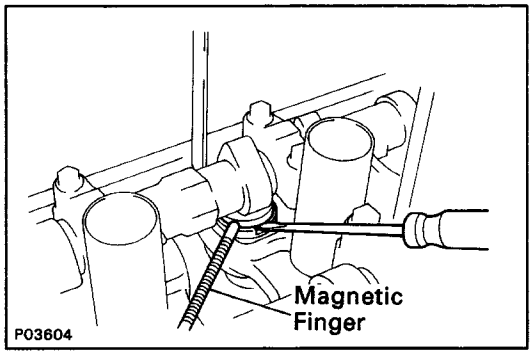




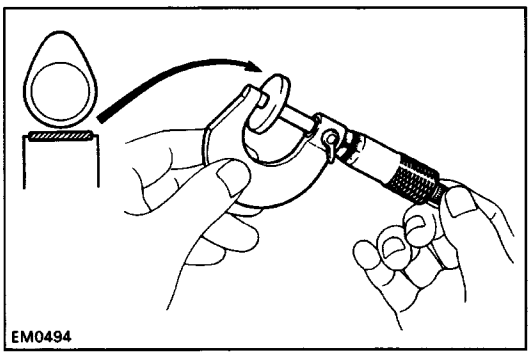
- Using SST (A), press down the valve lifter and place SST (B) between the camshaft and valve lifter. Remove SST (A).

SST 09248–55020 (09248–05011 (A), 09248–05021 (13))

HINT: Apply SST (B) on the side marked with “7”, at the position shown in the illustration.

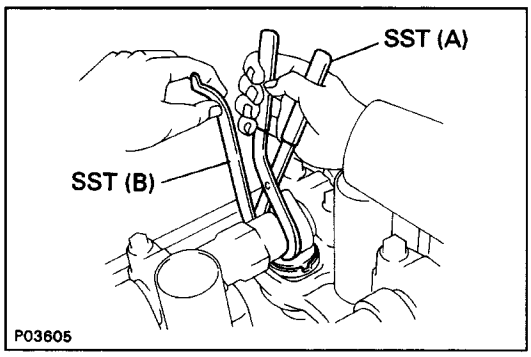


- Remove the adjusting shim with small screw–driver and magnetic finger.



(b) Determine the replacement adjusting shim size by following the Formula or 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 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 in.))
  Exhaust N = T + (A – 0.25 mm (0.010 in.))
- Select a new shim with a thickness as close as possible to the calculated value.
  HINT: Shims are available in seventeen sizes in incre–ments 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 adjusting shim.

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

SST 09248–55020 (09248–05011 (A), 09248–05021 (13))

(d) Recheck the valve clearance.

6. REINSTALL CYLINDER HEAD COVER
(See steps 11 and 17 on pages EM–109 and 111)

7. RECONNECT HIGH–TENSION CORDS TO SPARK PLUGS

Adjusting Shim Selection Chart (Intake)

Measured clearance mm (in.) \ Installed shim thickness mm (in.)	2.500 (0.0984)	2.525 (0.0994)	2.550 (0.1004)	2.575 (0.1014)	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)	2.720 (0.1071)	2.740 (0.1079)	2.750 (0.1083)	2.760 (0.1087)	2.780 (0.1094)	2.800 (0.1102)	2.820 (0.1110)	2.840 (0.1118)	2.850 (0.1122)	2.860 (0.1126)	2.880 (0.1134)	2.900 (0.1142)	2.920 (0.1150)	2.940 (0.1157)	2.950 (0.1161)	2.960 (0.1165)	2.980 (0.1173)	3.000 (0.1181)	3.020 (0.1189)	3.040 (0.1197)	3.050 (0.1201)	3.060 (0.1205)	3.080 (0.1213)	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)	3.225 (0.1270)	3.250 (0.1280)	3.275 (0.1289)	3.300 (0.1299)
0.000 – 0.020 (0.0000 – 0.0008)							02	02	02	02	02	04	04	04	04	06	06	08	08	08	08	10	10	12	12	12	14	14	16	16	16	16	18	18	20	20	20	20	22	22	24	24	26	26
0.021 – 0.040 (0.0008 – 0.0016)						02	02	02	02	02	04	04	04	06	06	06	08	08	08	10	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	26	26	28
0.041 – 0.060 (0.0016 – 0.0024)					02	02	02	02	02	04	04	04	06	06	06	08	08	08	10	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	26	26	28	28
0.061 – 0.080 (0.0024 – 0.0031)				02	02	02	02	02	04	04	04	06	06	06	08	08	08	10	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	26	26	28	28	
0.081 – 0.100 (0.0032 – 0.0039)			02	02	02	02	04	04	04	04	06	06	08	08	08	08	10	10	12	12	12	12	14	14	16	16	16	16	18	18	20	20	20	20	22	22	24	24	24	26	26	28	28	30	
0.101 – 0.120 (0.0040 – 0.0047)			02	02	02	04	04	04	04	06	06	08	08	08	08	10	10	12	12	12	12	14	14	16	16	16	16	18	18	20	20	20	20	22	22	24	24	24	24	26	26	28	28	30	30	
0.121 – 0.140 (0.0048 – 0.0055)		02	02	02	04	04	04	06	06	06	08	08	08	10	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	30	30	32	
0.141 – 0.149 (0.0056 – 0.0059)		02	02	02	04	04	06	06	06	08	08	08	10	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	32	
0.150 – 0.250 (0.0059 – 0.0098)																																													
0.251 – 0.260 (0.0099 – 0.0102)	04	06	06	08	08	10	10	10	10	12	12	14	14	14	14	16	16	18	18	18	18	20	20	22	22	22	22	24	24	26	26	26	26	28	28	30	30	30	30	32	32	34	34	34	
0.261 – 0.280 (0.0103 – 0.0110)	04	06	06	08	08	10	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	
0.281 – 0.300 (0.0111 – 0.0118)	06	06	08	08	10	10	12	12	12	12	14	14	16	16	16	16	18	18	20	20	20	20	22	22	24	24	24	24	26	26	28	28	28	28	30	30	32	32	32	32	34	34	34		
0.301 – 0.320 (0.0119 – 0.0126)	06	08	08	10	10	12	12	12	12	14	14	16	16	16	16	18	18	20	20	20	20	22	22	24	24	24	24	26	26	28	28	28	28	30	30	32	32	32	32	34	34	34			
0.321 – 0.340 (0.0126 – 0.0134)	08	08	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34				
0.341 – 0.360 (0.0134 – 0.0142)	08	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34				
0.361 – 0.380 (0.0142 – 0.0150)	08	10	10	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34					
0.381 – 0.400 (0.0150 – 0.0157)	10	10	12	12	14	14	16	16	16	16	18	18	20	20	20	20	22	22	24	24	24	24	26	26	28	28	28	28	30	30	32	32	32	32	34	34	34	34	34						
0.401 – 0.420 (0.0158 – 0.0165)	10	12	12	14	14	16	16	16	16	18	18	20	20	20	20	22	22	24	24	24	24	26	26	28	28	28	28	30	30	32	32	32	32	34	34	34	34								
0.421 – 0.440 (0.0166 – 0.0173)	12	12	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34									
0.441 – 0.460 (0.0174 – 0.0181)	12	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	30	32	32	32	34	34	34	34										
0.461 – 0.480 (0.0181 – 0.0189)	12	14	14	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	30	32	32	32	34	34	34	34											
0.481 – 0.500 (0.0189 – 0.0197)	14	14	16	16	18	18	20	20	20	20	22	22	24	24	24	24	26	26	28	28	28	28	30	30	32	32	32	32	34	34	34	34	34												
0.501 – 0.520 (0.0197 – 0.0205)	14	16	16	18	18	20	20	20	20	22	22	24	24	24	24	26	26	28	28	28	28	30	30	32	32	32	32	34	34	34	34														
0.521 – 0.540 (0.0205 – 0.0213)	16	16	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	30	32	32	32	32	34	34	34	34														
0.541 – 0.560 (0.0213 – 0.0220)	16	18	18	18	20	20	22	22	22	24	24	24	26	26	26	28	28	28	28	30	30	30	32	32	32	32	34	34	34	34	34														
0.561 – 0.580 (0.0221 – 0.0228)	16	18	18	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34																	
0.581 – 0.600 (0.0229 – 0.0236)	18	18	20	20	22	22	24	24	24	24	26	26	28	28	28	28	30	30	32	32	32	32	34	34	34	34	34																		
0.601 – 0.620 (0.0237 – 0.0244)	18	20	20	22	22	24	24	24	24	26	26	28	28	28	28	30	30	32	32	32	32	34	34	34	34																				
0.621 – 0.640 (0.0244 – 0.0252)	20	20	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34																					
0.641 – 0.660 (0.0252 – 0.0260)	20	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34																						
0.661 – 0.680 (0.0260 – 0.0268)	20	22	22	24	24	26	26	26	28	28	28	30	30	30	30	32	32	32	34	34	34	34	34																						
0.681 – 0.700 (0.0268 – 0.0276)	22	22	24	24	26	26	28	28	28	28	30	30	32	32	32	32	34	34	34	34	34																								
0.701 – 0.720 (0.0276 – 0.0283)	22	24	24	26	26	28	28	28	28	30	30	32	32	32	32	34	34	34	34																										
0.721 – 0.740 (0.0284 – 0.0291)	24	24	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34																											
0.741 – 0.760 (0.0292 – 0.0299)	24	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34																												
0.761 – 0.780 (0.0300 – 0.0307)	24	26	26	28	28	30	30	30	32	32	32	34	34	34	34	34																													
0.781 – 0.800 (0.0307 – 0.0315)	26	26	28	28	30	30	32	32	32	32	34	34	34	34	34																														
0.801 – 0.820 (0.0315 – 0.0322)	26	28	28	30	30	32	32	32	32	34	34	34	34	34																															
0.821 – 0.840 (0.0323 – 0.0331)	28	28	30	30	32	32	32	34	34	34	34	34																																	
0.841 – 0.860 (0.0331 – 0.0339)	28	30	30	32	32	32	34	34	34	34	34																																		
0.861 – 0.880 (0.0339 – 0.0346)	28	30	32	32	32	34	34	34	34	34																																			
0.881 – 0.900 (0.0347 – 0.0354)	30	30	32	32	34	34	34	34	34																																				
0.901 – 0.920 (0.0355 – 0.0362)	30	32	32	34	34	34	34																																						
0.921 – 0.940 (0.0363 – 0.0370)	32	32	34	34	34	34																																							
0.941 – 0.960 (0.0370 – 0.0378)	32	34	34	34	34																																								
0.961 – 0.980 (0.0378 – 0.0386)	32	34	34	34																																								
0.981 – 1.000 (0.0386 – 0.0394)	34	34	34																																									
1.001 – 1.020 (0.0394 – 0.0402)	34	34																																										
1.021 – 1.040 (0.0402 – 0.0409)	34	34																																										
1.041 – 1.050 (0.0410 – 0.0413)	34																																											

P03513

New shim thickness mm (in.)

Shim No.	Thickness	Shim No.	Thickness
02	2.500 (0.0984)	**20**	2.950 (0.1161)
04	2.550 (0.1004)	**22**	3.000 (0–1181)
06	2.600 (0.1024)	**24**	3.050 (0.1201)
08	2.650 (0.1043)	**26**	3.100 (0.1220)
10	2.700(0.1063)	**28**	3.150 (0.1240)
12	2.750(0.1083)	**30**	3.200 (0.1260)
14	2.800 (0.1102)	**32**	3.250 (0.1280)
16	2.850 (0.1122)	**34**	3.30010.1299j
18	2.900 (0.1142)		

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 0.450 mm (0.0177 in.). Replace the 2.800 mm (0.1102 in.) shim with a new No.24 shim.

Adjusting Shim Selection Chart (Exhaust)

Measured clearance mm (in.) \ Installed shim thickness mm (in.)	2.500 (0.0984)	2.525 (0.0994)	2.550 (0.1004)	2.575 (0.1014)	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)	2.720 (0.1071)	2.740 (0.1079)	2.750 (0.1083)	2.760 (0.1087)	2.780 (0.1094)	2.800 (0.1102)	2.820 (0.1110)	2.840 (0.1118)	2.850 (0.1122)	2.860 (0.1126)	2.880 (0.1134)	2.900 (0.1142)	2.920 (0.1150)	2.940 (0.1157)	2.950 (0.1161)	2.960 (0.1165)	2.980 (0.1173)	3.000 (0.1181)	3.020 (0.1189)	3.040 (0.1197)	3.050 (0.1201)	3.060 (0.1205)	3.080 (0.1213)	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)	3.225 (0.1270)	3.250 (0.1280)	3.275 (0.1289)	3.300 (0.1299)
0.000 – 0.020 (0.0000 – 0.0008)										02	02	02	02	02	02	04	04	04	06	06	06	06	08	08	10	10	10	12	12	14	14	14	16	16	18	18	18	18	20	20	22	22	24	24
0.021 – 0.040 (0.0008 – 0.0016)									02	02	02	02	02	04	04	04	06	06	06	08	08	08	10	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	24	24	26
0.041 – 0.060 (0.0016 – 0.0024)							02	02	02	02	02	02	04	04	04	06	06	06	08	08	08	10	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	24	24	26	26
0.061 – 0.080 (0.0024 – 0.0031)						02	02	02	02	02	02	04	04	04	06	06	06	08	08	08	10	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	26	26	28
0.081 – 0.100 (0.0032 – 0.0039)					02	02	02	02	02	02	04	04	06	06	06	06	08	08	10	10	10	10	12	12	14	14	14	16	16	18	18	18	20	20	22	22	22	22	24	24	26	26	28	28	30
0.101 – 0.120 (0.0040 – 0.0047)					02	02	02	02	02	04	04	06	06	06	06	08	08	10	10	10	10	12	12	14	14	14	16	16	18	18	18	18	20	20	22	22	22	22	24	24	26	26	28	28	30	30
0.121 – 0.140 (0.0048 – 0.0055)				02	02	02	02	04	04	04	06	06	06	08	08	08	10	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	28	28	30	30	30
0.141 – 0.160 (0.0056 – 0.0063)			02	02	02	02	04	04	04	06	06	06	08	08	08	10	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	28	28	30	30	30	32
0.161 – 0.180 (0.0063 – 0.0071)		02	02	02	02	04	04	04	06	06	06	08	08	08	10	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	30	30	32	32
0.181 – 0.199 (0.0071 – 0.0078)		02	02	02	04	04	06	06	06	06	08	08	10	10	10	10	12	12	14	14	14	14	16	16	18	18	18	18	20	20	22	22	22	22	24	24	26	26	26	26	28	28	30	30	32	32	34
0.200 – 0.300 (0.0079 – 0.0118)																																														
0.301 – 0.320 (0.0119 – 0.0126)	04	06	06	08	08	10	10	10	10	12	12	14	14	14	14	16	16	18	18	18	18	20	20	22	22	22	22	24	24	26	26	26	28	28	30	30	30	30	32	32	34	34	34	34		
0.321 – 0.340 (0.0126 – 0.0134)	06	06	08	08	10	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34		
0.341 – 0.360 (0.0134 – 0.0142)	06	08	08	10	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34				
0.361 – 0.380 (0.0142 – 0.0150)	06	08	08	10	10	12	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34					
0.381 – 0.400 (0.0150 – 0.0157)	08	08	10	10	12	12	14	14	14	14	16	16	18	18	18	18	20	20	22	22	22	22	24	24	26	26	26	26	28	28	30	30	30	32	32	34	34	34	34	34						
0.401 – 0.420 (0.0158 – 0.0165)	08	10	10	12	12	14	14	14	14	16	16	18	18	18	18	20	20	22	22	22	22	24	24	26	26	26	26	28	28	30	30	30	32	32	34	34	34	34	34							
0.421 – 0.440 (0.0166 – 0.0173)	10	10	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34							
0.441 – 0.460 (0.0174 – 0.0181)	10	12	12	14	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34								
0.461 – 0.480 (0.0181 – 0.0189)	10	12	12	14	14	16	16	16	18	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34									
0.481 – 0.500 (0.0189 – 0.0197)	12	12	14	14	16	16	18	18	18	18	20	20	22	22	22	24	24	26	26	26	26	28	28	30	30	30	30	32	32	34	34	34	34	34												
0.501 – 0.520 (0.0197 – 0.0205)	12	14	14	16	16	18	18	18	18	20	20	22	22	22	22	24	24	26	26	26	26	28	28	30	30	30	32	32	34	34	34	34	34													
0.521 – 0.540 (0.0205 – 0.0213)	14	14	16	16	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	34	34	34	34	34															
0.541 – 0.560 (0.0213 – 0.0220)	14	16	16	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34															
0.561 – 0.580 (0.0221 – 0.0228)	14	16	16	18	18	20	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	30	32	32	32	34	34	34	34															
0.581 – 0.600 (0.0229 – 0.0236)	16	16	18	18	20	20	22	22	22	22	24	24	26	26	26	26	28	28	30	30	30	30	32	32	34	34	34	34	34																	
0.601 – 0.620 (0.0237 – 0.0244)	16	18	18	20	20	22	22	22	22	24	24	26	26	26	26	28	28	30	30	30	30	32	32	34	34	34	34	34																		
0.621 – 0.640 (0.0244 – 0.0252)	18	18	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34																		
0.641 – 0.660 (0.0252 – 0.0260)	18	20	20	22	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34																				
0.661 – 0.680 (0.0260 – 0.0268)	18	20	20	22	22	24	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34																						
0.681 – 0.700 (0.0268 – 0.0276)	20	20	22	22	24	24	26	26	26	26	28	28	30	30	30	30	32	32	34	34	34	34	34																							
0.701 – 0.720 (0.0276 – 0.0283)	20	22	22	24	24	26	26	26	26	28	28	30	30	30	30	32	32	34	34	34	34	34																								
0.721 – 0.740 (0.0284 – 0.0291)	22	22	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34																									
0.741 – 0.760 (0.0292 – 0.0299)	22	24	24	26	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34	34																										
0.761 – 0.780 (0.0300 – 0.0307)	22	24	24	26	26	28	28	28	30	30	30	32	32	32	34	34	34	34																												
0.781 – 0.800 (0.0307 – 0.0315)	24	24	26	26	28	28	30	30	30	30	32	32	34	34	34	34	34																													
0.801 – 0.820 (0.0315 – 0.0322)	24	26	26	28	28	30	30	30	30	30	32	32	34	34	34	34	34																													
0.821 – 0.840 (0.0323 – 0.0331)	26	26	28	28	30	30	30	32	32	32	34	34	34	34	34																													
0.841 – 0.860 (0.0331 – 0.0339)	26	28	28	30	30	30	32	32	32	34	34	34	34	34																													
0.861 – 0.880 (0.0339 – 0.0346)	26	28	28	30	30	32	32	32	34	34	34	34																													
0.881 – 0.900 (0.0347 – 0.0354)	28	28	30	30	32	32	34	34	34	34	34																														
0.901 – 0.920 (0.0355 – 0.0362)	28	30	30	32	32	34	34	34	34	34																															
0.921 – 0.940 (0.0363 – 0.0370)	30	30	32	32	34	34	34	34	34																																
0.941 – 0.960 (0.0370 – 0.0378)	30	32	32	34	34	34	34	34																																	
0.961 – 0.980 (0.0378 – 0.0386)	30	32	32	34	34	34																																			
0.981 – 1.000 (0.0386 – 0.0394)	32	32	34	34	34																																				
1.001 – 1.020 (0.0394 – 0.0402)	32	34	34	34																																					
1.021 – 1.040 (0.0402 – 0.0409)	34	34	34	34																																					
1.041 – 1.060 (0.0410 – 0.0417)	34	34	34																																						
1.061 – 1.080 (0.0418 – 0.0425)	34	34																																							
1.081 – 1.100 (0.0426 – 0.0433)	34																																								

P03514

New shim thickness mm (in.)

Shim No.	Thickness	Shim No.	Thickness
02	2.500 (0.0984)	20	2.950 (0.1161)
04	2.550 (0.1004)	22	3.000 (0.1181)
06	2.600 (0.1024)	24	3.050 (0.1201)
08	2.650 (0.1043)	26	3.100 (0.1220)
10	2.700 (0.1063)	28	3.150 (0.1240)
12	2.750 (0.1083)	30	3.200 (0.1260)
14	2.800 (0.1102)	32	3.250 (0.1280)
16	2.850 (0.1122)	34	3.300 (0.1299)
18	2.900 (0.1142)		

Exhaust valve clearance (Cold):

0.20 – 0.30 mm (0.008 – 0.012 in.)

EXAMPLE: The 2.800 mm (0.1102 in.) shim is installed, and the measured clearance is 0.450 mm (0.0177 in.). Replace the 2.800 mm (0.1102 in.) shim with a new No.22 shim.

INSPECTION AND ADJUSTMENT OF VALVE CLEARANCE (3S–GTE)

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

1. REMOVE CHARGE AIR COOLER
(See steps 73 to 15 on pages TC–9 and 10)

2. DISCONNECT HIGH–TENSION CORDS FROM SPARK PLUGS

3. REMOVE EGR VACUUM MODULATOR AND VSV
(See step 20 on page EM–121)

4. REMOVE EGR VALVE AND PIPE
(See step 21 on page EM–121)

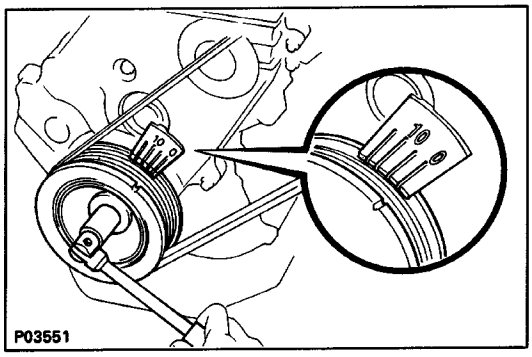
5. REMOVE THROTTLE BODY
(See steps 2, 3, 5 to 8, 10 and 11 on pages FI–194 and 195)

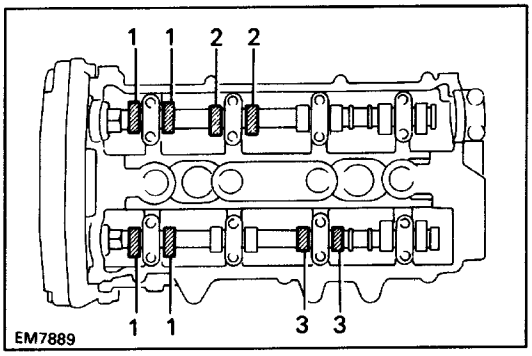
6. REMOVE CYLINDER HEAD COVER
(See step 33 on page EM –124)

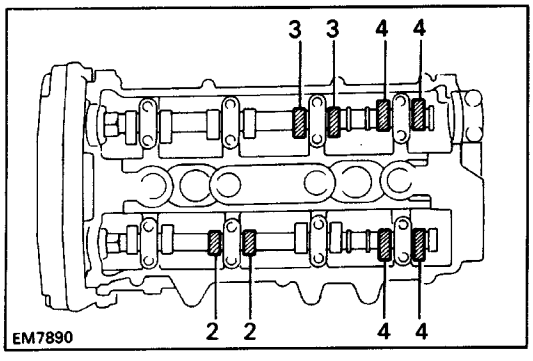
7. SET NO.1 CYLINDER TO TDC/COMPRESSION

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

(b) Check that the valve lifters on the No.1 cylinder are loose and valve lifters on No.4 are tight.
If not, turn the crankshaft one revolution (360°) and align the mark as above.







8. INSPECT VALVE CLEARANCE

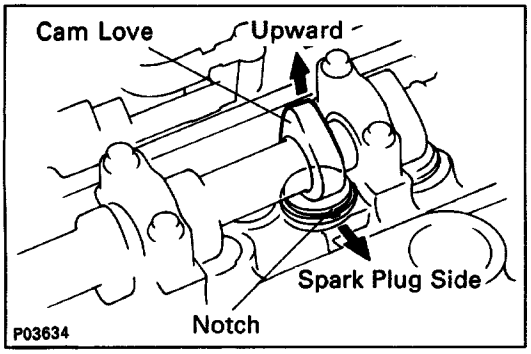
(a) Check only the valves indicated.

- 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):
Intake 0.15 – 0.25 mm (0.006 – 0.070 in.)
Exhaust 0.28 – 0.38 mm (0.011 – 0.015 in.)

(b) Turn the crankshaft one revolution (360°) and align the mark as above. (See procedure in step 7)

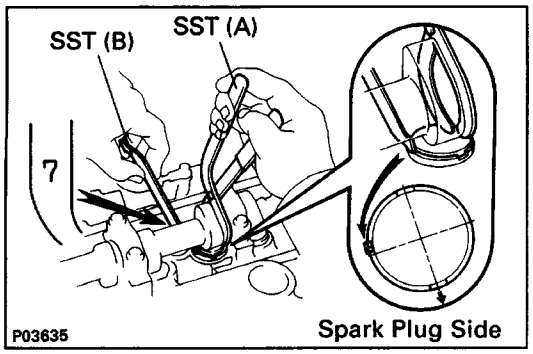
(c) Check only the valves indicated as shown.
Measure the valve clearance.
(See procedure in step (a))



9. ADJUST VALVE CLEARANCE

(a) Remove the adjusting shim.

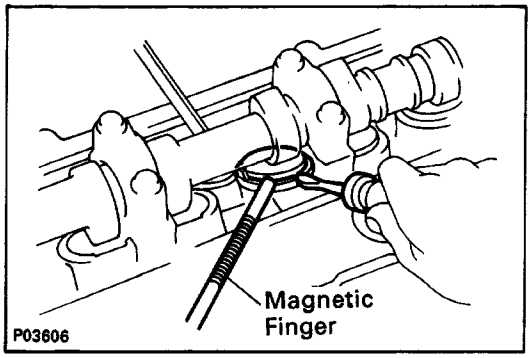
- Turn the crankshaft to position the cam lobe of the camshaft on the adjusting valve upward.
- Position the notch of the valve lifter facing the spark plug side.



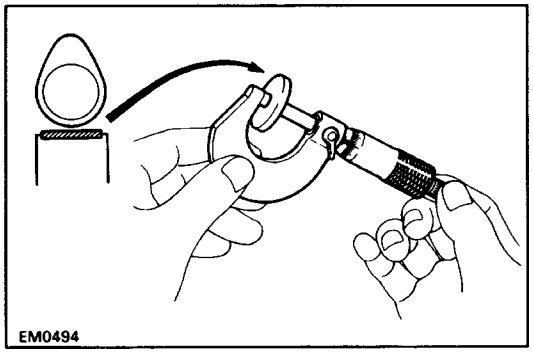
- Using SST (A), press down the valve lifter and place SST (B) between the camshaft and valve lifter. Remove SST (A).

SST 09248–55020 (09248–05011 (A), 09248–05021 (13))

HINT: Apply SST (B) at a slight angle on the side marked with “7”, at the position shown in the illustration.



- Remove the adjusting shim with small screw–driver and magnetic finger.



(b) Determine the replacement adjusting shim size by following the Formula or 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.

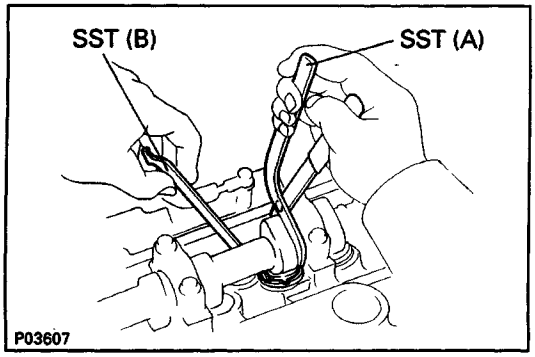
T ..... Thickness of used shim
A ..... Measured valve clearance
N ..... Thickness of new shim

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

Exhaust N = T + (A – 0.33 mm (0.013 in.))

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

HINT: Shims are available in seventeen sizes in incre–ments of 0.05 mm (0.0020 in.), from 2.50 mm (0.0984 in.) to 3.30 mm t0.1299 in.)



(c) Install a new adjusting shim.

- Place a new adjusting shim on the valve lifter.
- Using SST

(A), press down the valve lifter and remove SST

(B).

SST 09248–55020 (09248–05011

(A), 09248–05021 (B))

(d) Recheck the valve clearance.

10. REINSTALL CYLINQER HEAD COVER
(See step 7 on pages EM–143 and 144)

11. REINSTALL THROTTLE BODY
(See steps 2, 3, 5 to 8, 10 and 11 on pages FI–197 and 198)

12. REINSTALL EGR VALVE AND PIPE
(See step 19 on page EM–145)

13. REINSTALL EGR VACUUM MODULATOR AND VSV
(See step 20 on page EM –146)

14. RECONNECT HIGH–TENSION CORDS TO SPARK PLUGS

15. REINSTALL CHARGE AIR COOLER
(See steps 11 to 13 on page TC–17)

Adjusting Shim Selection Chart (Intake)

Measured clearance mm (in.) \ Installed shim thickness mm (in.)	2.000 (0.0787)	2.025 (0.0797)	2.050 (0.0807)	2.075 (0.0817)	2.100 (0.0827)	2.125 (0.0837)	2.150 (0.0846)	2.175 (0.0856)	2.200 (0.0866)	2.225 (0.0876)	2.250 (0.0886)	2.275 (0.0896)	2.300 (0.0905)	2.325 (0.0915)	2.350 (0.0925)	2.375 (0.0935)	2.400 (0.0945)	2.425 (0.0955)	2.450 (0.0965)	2.475 (0.0974)	2.500 (0.0984)	2.525 (0.0994)	2.550 (0.1004)	2.575 (0.1014)	2.600 (0.1024)	2.625 (0.1033)	2.650 (0.1043)	2.675 (0.1053)	2.700 (0.1063)	2.725 (0.1073)	2.750 (0.1083)	2.775 (0.1093)	2.800 (0.1102)	2.825 (0.1112)	2.850 (0.1122)	2.875 (0.1132)	2.900 (0.1142)	2.925 (0.1152)	2.950 (0.1161)	2.975 (0.1171)	3.000 (0.1181)	3.025 (0.1191)	3.050 (0.1201)	3.075 (0.1211)	3.100 (0.1220)	3.125 (0.1230)	3.150 (0.1240)	3.175 (0.1250)	3.200 (0.1260)	3.225 (0.1270)	3.250 (0.1280)	3.275 (0.1289)	3.300 (0.1299)
0.000 – 0.020 (0.0000 – 0.0008)																											1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13
0.021 – 0.040 (0.0008 – 0.0016)																										1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14
0.041 – 0.060 (0.0016 – 0.0024)																									1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14
0.061 – 0.080 (0.0024 – 0.0031)																								1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14
0.081 – 0.100 (0.0032 – 0.0039)																							1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15
0.101 – 0.120 (0.0040 – 0.0047)																							1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15
0.121 – 0.140 (0.0048 – 0.0055)																						1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16
0.141 – 0.149 (0.0056 – 0.0059)																						1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16
0.150 – 0.250 (0.0059 – 0.0098)																																																						
0.251 – 0.260 (0.0099 – 0.0102)																	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17
0.261 – 0.280 (0.0103 – 0.0110)																1	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17
0.281 – 0.300 (0.0111 – 0.0118)															1	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	
0.301 – 0.320 (0.0119 – 0.0126)															1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17		
0.321 – 0.340 (0.0126 – 0.0134)														1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17		
0.341 – 0.360 (0.0134 – 0.0142)													1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17		
0.361 – 0.380 (0.0142 – 0.0150)												1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17		
0.381 – 0.400 (0.0150 – 0.0157)											1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17			
0.401 – 0.420 (0.0158 – 0.0165)											1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17			
0.421 – 0.440 (0.0166 – 0.0173)										1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17				
0.441 – 0.460 (0.0174 – 0.0181)									1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17					
0.461 – 0.480 (0.0181 – 0.0189)								1	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17					
0.481 – 0.500 (0.0189 – 0.0197)							1	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17						
0.501 – 0.520 (0.0197 – 0.0205)							1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17							
0.521 – 0.540 (0.0205 – 0.0213)						1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17								
0.541 – 0.560 (0.0213 – 0.0220)					1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17									
0.561 – 0.580 (0.0221 – 0.0228)				1	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17										
0.581 – 0.600 (0.0229 – 0.0236)			1	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17											
0.601 – 0.620 (0.0237 – 0.0244)			1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17												
0.621 – 0.640 (0.0244 – 0.0252)		1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17													
0.641 – 0.660 (0.0252 – 0.0260)	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17														
0.661 – 0.680 (0.0260 – 0.0268)	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17														
0.681 – 0.700 (0.0268 – 0.0276)	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17															
0.701 – 0.720 (0.0276 – 0.0283)	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																
0.721 – 0.740 (0.0284 – 0.0291)	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																	
0.741 – 0.760 (0.0292 – 0.0299)	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																		
0.761 – 0.780 (0.0300 – 0.0307)	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																			
0.781 – 0.800 (0.0307 – 0.0315)	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																				
0.801 – 0.820 (0.0315 – 0.0322)	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																					
0.821 – 0.840 (0.0323 – 0.0331)	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																						
0.841 – 0.860 (0.0331 – 0.0339)	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																							
0.861 – 0.880 (0.0339 – 0.0346)	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																								
0.881 – 0.900 (0.0347 – 0.0354)	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																									
0.901 – 0.920 (0.0355 – 0.0362)	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																										
0.921 – 0.940 (0.0363 – 0.0370)	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																											
0.941 – 0.960 (0.0370 – 0.0378)	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																												
0.961 – 0.980 (0.0378 – 0.0386)	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																													
0.981 – 1.000 (0.0386 – 0.0394)	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																													
1.001 – 1.020 (0.0394 – 0.0402)	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																														
1.021 – 1.040 (0.0402 – 0.0409)	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																															
1.041 – 1.060 (0.0410 – 0.0417)	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																																
1.061 – 1.080 (0.0418 – 0.0425)	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																																
1.081 – 1.100 (0.0426 – 0.0433)	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																																	
1.101 – 1.120 (0.0433 – 0.0441)	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17																																		
1.121 – 1.140 (0.0441 – 0.0449)	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																																		
1.141 – 1.160 (0.0449 – 0.0457)	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																																		
1.161 – 1.180 (0.0457 – 0.0465)	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																																		
1.181 – 1.200 (0.0465 – 0.0472)	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																																		
1.201 – 1.220 (0.0473 – 0.0480)	11	12	12	13	13	14	14	15	15	16	16	17	17	17																																		
1.221 – 1.240 (0.0481 – 0.0488)	12	12	13	13	14	14	15	15	16	16	17	17	17																																		
1.241 – 1.260 (0.0489 – 0.0496)	12	13	13	14	14	15	15	16	16	17	17	17																																		
1.261 – 1.280 (0.0496 – 0.0504)	12	13	13	14	14	15	15	16	16	17	17																																			
1.281 – 1.300 (0.0504 – 0.0512)	13	13	14	14	15	15	16	16	17	17	17																																			
1.301 – 1.320 (0.0512 – 0.0520)	13	14	14	15	15	16	16	17	17	17																																			
1.321 – 1.340 (0.0520 – 0.0528)	14	14	15	15	16	16	17	17	17																																			
1.341 – 1.360 (0.0528 – 0.0535)	14	15	15	16	16	17	17	17																																			
1.361 – 1.380 (0.0536 – 0.0543)	14	15	15	16	16	17	17	17																																			
1.381 – 1.400 (0.0544 – 0.0551)	15	15	16	16	17	17	17																																				
1.401 – 1.420 (0.0552 – 0.0559)	15	16	16	17	17	17																																					
1.421 – 1.440 (0.0559 – 0.0567)	16	16	17	17	17	17																																					
1.441 – 1.460 (0.0567 – 0.0575)	16	17	17	17	17																																						
1.461 – 1.480 (0.0575 – 0.0583)	16	17	17	17																																							
1.481 – 1.500 (0.0583 – 0.0591)	17	17	17																																								
1.501 – 1.520 (0.0591 – 0.0598)	17	17																																									
1.521 – 1.540 (0.0599 – 0.0606)	17	17																																									
1.541 – 1.550 (0.0607 – 0.0610)	17																																										

P03531

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 milli–meters imprinted on the face.

Intake valve clearance (Cold): 0.15 – 0.25 mm (o.006 – 0.010 in.)

EXAMPLE: The 2.800 mm (0.1 102 in.) shim is installed, and the mea–sured clearance is 0.450 mm (0.0177 in.). Replace the 2.800 mm (0.1 102 in.) shim with a new No. 12 shim.

Adjusting Shim Selection Chart (Exhaust)

Measured clearance mm (in.) \ Installed shim thickness mm (in.)	2.000 (0.0787)	2.025 (0.0797)	2.050 (0.0807)	2.075 (0.0817)	2.100 (0.0827)	2.125 (0.0837)	2.150 (0.0846)	2.175 (0.0856)	2.200 (0.0866)	2.225 (0.0876)	2.250 (0.0886)	2.275 (0.0896)	2.300 (0.0905)	2.325 (0.0915)	2.350 (0.0925)	2.375 (0.0935)	2.400 (0.0945)	2.425 (0.0955)	2.450 (0.0965)	2.475 (0.0974)	2.500 (0.0984)	2.525 (0.0994)	2.550 (0.1004)	2.575 (0.1014)	2.600 (0.1024)	2.625 (0.1033)	2.650 (0.1043)	2.675 (0.1053)	2.700 (0.1063)	2.725 (0.1073)	2.750 (0.1083)	2.775 (0.1093)	2.800 (0.1102)	2.825 (0.1112)	2.850 (0.1122)	2.875 (0.1132)	2.900 (0.1142)	2.925 (0.1152)	2.950 (0.1161)	2.975 (0.1171)	3.000 (0.1181)	3.025 (0.1191)	3.050 (0.1201)	3.075 (0.1211)	3.100 (0.1220)	3.125 (0.1230)	3.150 (0.1240)	3.175 (0.1250)	3.200 (0.1260)	3.225 (0.1270)	3.250 (0.1280)	3.275 (0.1289)	3.300 (0.1299)
0.000 – 0.020 (0.0000 – 0.0008)																																1	1	1	2	2	3	3	4	5	5	6	6	7	7	8	8	9	9	10	10	11
0.021 – 0.040 (0.0008 – 0.0016)																															1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11
0.041 – 0.060 (0.0016 – 0.0024)																														1	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11
0.061 – 0.080 (0.0024 – 0.0031)																													1	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12
0.081 – 0.100 (0.0032 – 0.0039)																													1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12
0.101 – 0.120 (0.0040 – 0.0047)																												1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13
0.121 – 0.140 (0.0048 – 0.0055)																											1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13
0.141 – 0.160 (0.0056 – 0.0063)																										1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13
0.161 – 0.180 (0.0063 – 0.0071)																									1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14
0.181 – 0.200 (0.0071 – 0.0079)																									1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14
0.201 – 0.220 (0.0079 – 0.0087)																								1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15
0.221 – 0.240 (0.0087 – 0.0094)																							1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15
0.241 – 0.260 (0.0095 – 0.0102)																							1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15
0.261 – 0.279 (0.0103 – 0.0110)																							1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16
0.280 – 0.380 (0.0110 – 0.0150)																																																								
0.381 – 0.400 (0.0150 – 0.0157)																	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17
0.401 – 0.420 (0.0158 – 0.0165)																1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17
0.421 – 0.440 (0.0166 – 0.0173)															1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17
0.441 – 0.460 (0.0174 – 0.0181)														1	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17
0.461 – 0.480 (0.0181 – 0.0189)													1	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17	
0.481 – 0.500 (0.0189 – 0.0197)													1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17		
0.501 – 0.520 (0.0197 – 0.0205)												1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17			
0.521 – 0.540 (0.0205 – 0.0213)										1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17				
0.541 – 0.560 (0.0213 – 0.0220)									1	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17					
0.561 – 0.580 (0.0221 – 0.0228)								1	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17						
0.581 – 0.600 (0.0229 – 0.0236)								1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17							
0.601 – 0.620 (0.0237 – 0.0244)							1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17								
0.621 – 0.640 (0.0244 – 0.0252)						1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17									
0.641 – 0.660 (0.0252 – 0.0260)					1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17										
0.661 – 0.680 (0.0260 – 0.0268)				1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17											
0.681 – 0.700 (0.0268 – 0.0276)				1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17											
0.701 – 0.720 (0.0276 – 0.0283)			1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17												
0.721 – 0.740 (0.0284 – 0.0291)		1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17													
0.741 – 0.760 (0.0292 – 0.0299)	1	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17													
0.761 – 0.780 (0.0300 – 0.0307)	1	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17													
0.781 – 0.800 (0.0307 – 0.0315)	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17														
0.801 – 0.820 (0.0315 – 0.0322)	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17															
0.821 – 0.840 (0.0323 – 0.0331)	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																
0.841 – 0.860 (0.0331 – 0.0339)	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																
0.861 – 0.880 (0.0339 – 0.0346)	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																	
0.881 – 0.900 (0.0347 – 0.0354)	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																		
0.901 – 0.920 (0.0355 – 0.0362)	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																			
0.921 –0.940 (0.0363 – 0.0370)	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																				
0.941 – 0.960 (0.0370 – 0.0378)	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																				
0.961 – 0.980 (0.0378 – 0.0386)	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																					
0.981 – 1.000 (0.0386 – 0.0394)	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.001 – 1.020 (0.0394 – 0.0402)	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.021 – 1.040 (0.0402 – 0.0409)	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.041 – 1.060 (0.0410 – 0.0417)	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.061 – 1.080 (0.0418 – 0.0425)	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.081 – 1.100 (0.0426 – 0.0433)	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.101 – 1.120 (0.0433 – 0.0441)	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.121 – 1.140 (0.0441 – 0.0449)	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.141 – 1.160 (0.0449 – 0.0457)	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.161 – 1.180 (0.0457 – 0.0465)	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.181 – 1.200 (0.0465 – 0.0472)	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.201 – 1.220 (0.0473 – 0.0480)	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.221 – 1.240 (0.0481 – 0.0488)	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.241 – 1.260 (0.0489 – 0.0496)	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.261 – 1.280 (0.0496 – 0.0504)	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.281 – 1.300 (0.0504 – 0.0512)	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17																						
1.301 – 1.320 (0.0512 – 0.0520)	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17	17																						
1.321 – 1.340 (0.0520 – 0.0528)	11	12	12	13	13	14	14	15	15	16	16	17	17	17	17																							
1.341 – 1.360 (0.0528 – 0.0535)	11	12	12	13	13	14	14	15	15	16	16	17	17	17																								
1.361 – 1.360 (0.0536 – 0.0543)	12	12	13	13	14	14	15	15	16	16	17	17	17																									
1.381 – 1.400 (0.0544 – 0.0551)	12	13	13	14	14	15	15	16	16	17	17	17																										
1.401 – 1.420 (0.0552 – 0.0559)	13	13	14	14	15	15	16	16	17	17	17																											
1.421 – 1.440 (0.0559 – 0.0567)	13	14	14	15	15	16	16	17	17	17																												
1.441 – 1.460 (0.0567 – 0.0575)	13	14	14	15	15	16	16	17	17	17																												
1.461 – 1.480 (0.0575 – 0.0583)	14	14	15	15	16	16	17	17	17																													
1.481 – 1.500 (0.0583 – 0.0591)	14	15	15	16	16	17	17	17																														
1.501 – 1.520 (0.0591 – 0.0598)	15	15	16	16	17	17	17	17																														
1.521 – 1.540 (0.0599 – 0.0606)	15	16	16	17	17	17	17																															
1.541 – 1.560 (0.0607 – 0.0614)	15	16	16	17	17	17																																
1.561 – 1.580 (0.0615 – 0.0622)	16	16	17	17	17																																	
1.581 – 1.600 (0.0622 – 0.0630)	16	17	17	17																																		
1.601 – 1.620 (0.0630 – 0.0638)	17	17	17	17																																		
1.621 – 1.640 (0.0638 – 0.0646)	17	17	17																																			
1.641 – 1.660 (0.0646 – 0.0654)	17	17																																				
1.661 – 1.680 (0.0654 – 0.0661)	17																																					

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 milli–meters imprinted on the face.

Exhaust valve clearance (Cold): 0.28 – 0.38 mm (0.011 – 0.015 in.)

EXAMPLE: The 2.800 mm (0.1 102 in.) shim is installed, and the mea–sured clearance is 0.450 mm (0.0177 in.). Replace the 2.800 mm (0.1 102 in.) shim with a new No. 9 shim.

PO3532

INSPECTION AND ADJUSTMENT OF VALVE CLEARANCE (5S–FE)

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

1. REMOVE ACCELERATOR BRACKET

2. DISCONNECT HIGH–TENSION CORDS FROM SPARK PLUGS

3. DISCONNECT ENGINE WIRE PROTECTOR BETWEEN CYLINDER HEAD COVER AND NO.3 TIMING BELT COVER

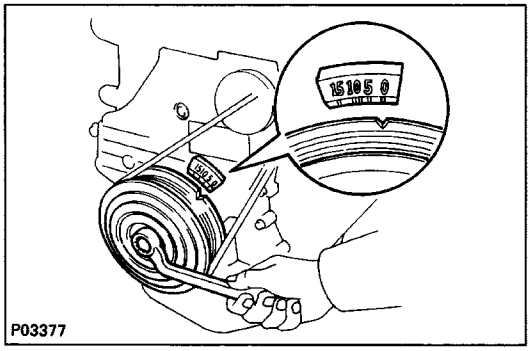
4. REMOVE CYLINDER HEAD COVER

(See step 33 on page EM–156)

5. SET NO.1 CYLINDER TO TDC/COMPRESSION

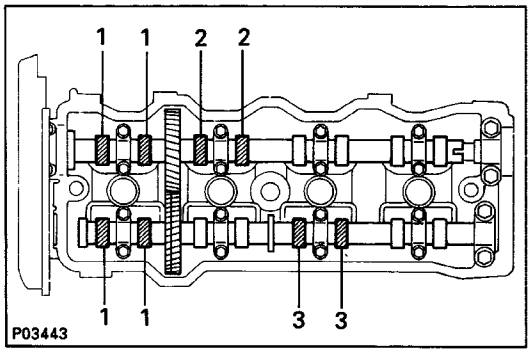
(a) Turn the crankshaft pulley and align its groove with timing mark “0” of the No.1 timing belt cover.

(b) Check that the valve lifters on the No.1 cylinder are loose and valve lifters on the No.4 are tight.
If not, turn the crankshaft one revolution (360°) and align the mark as above.



6. 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.

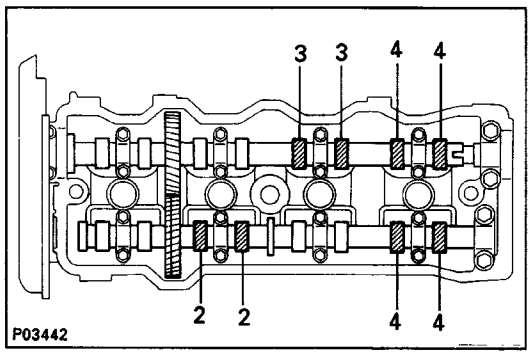
Valve clearance (Cold):

Intake 0.19 – 0.29 mm (0.007 – 0.011 in.)

Exhaust 0.28 – 0.38 mm (0.011 – 0.015 in.)

(b) Turn the crankshaft one revolution (360°) and align the mark as above. (See procedure in step 3)

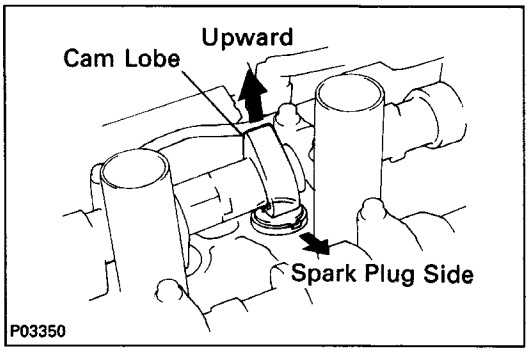
(c) Check only the valves indicated as shown. Measure the valve clearance. (See procedure in step (a))

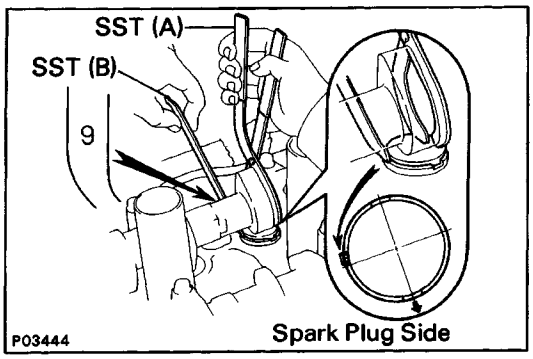


7. ADJUST VALVE CLEARANCE

(a) Remove the adjusting shim.

- Turn the crankshaft to position the cam lobe of the camshaft on the adjusting valve upward. Position the notch of the valve lifter facing the spark plug side.

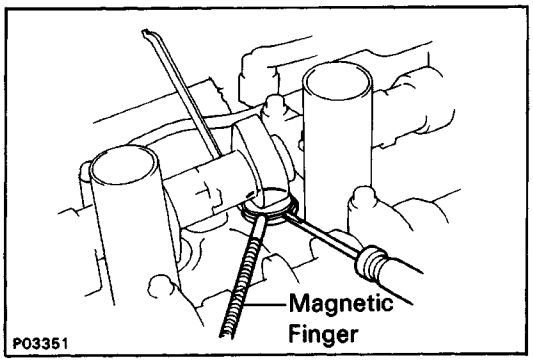




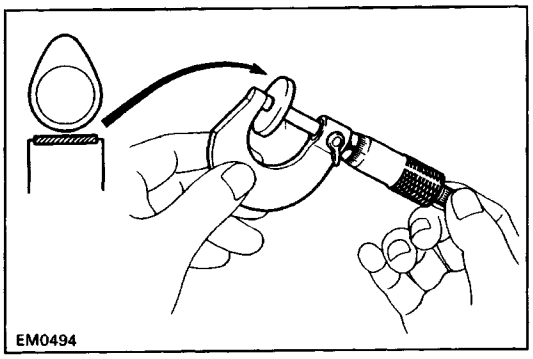
- Using SST (A), press down the valve lifter and place SST (B) between the camshaft and valve lifter. Remove SST (A).

SST 09248–55020 (09248–05011 (A), 09248–05021 (13)y

HINT: Apply SST (B) at a slight angle on the side marked with “9”, at the position shown in the illus–tration.



- Remove the adjusting shim with small screw–driver and magnetic finger.



(b) Determine the replacement adjusting shim size by following the Formula or 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 specified value.

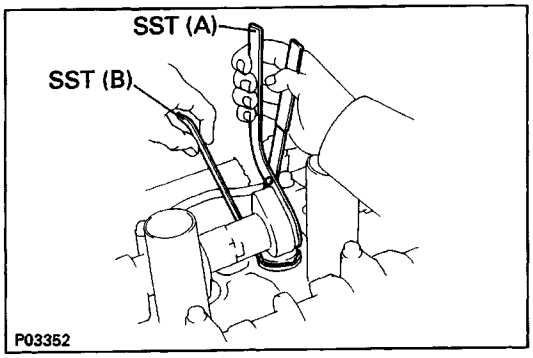
T ..... Thickness of used shim
A ..... Measured valve clearance
N ..... Thickness of new shim

Intake N = T + (A – 0.24 mm (0.009 in.))

Exhaust N = T + (A – 0.33 mm (0.013 in.))

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

HINT: Shims are available in seventeen sizes in incre–ments 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 adjusting shim.

- Place a new adjusting shim on the valve lifter.
- Using SST (A), press down the valve lifter and remove SST (13).

SST 09248–55020 (09248–05011 (A), 09248–05021 (13))

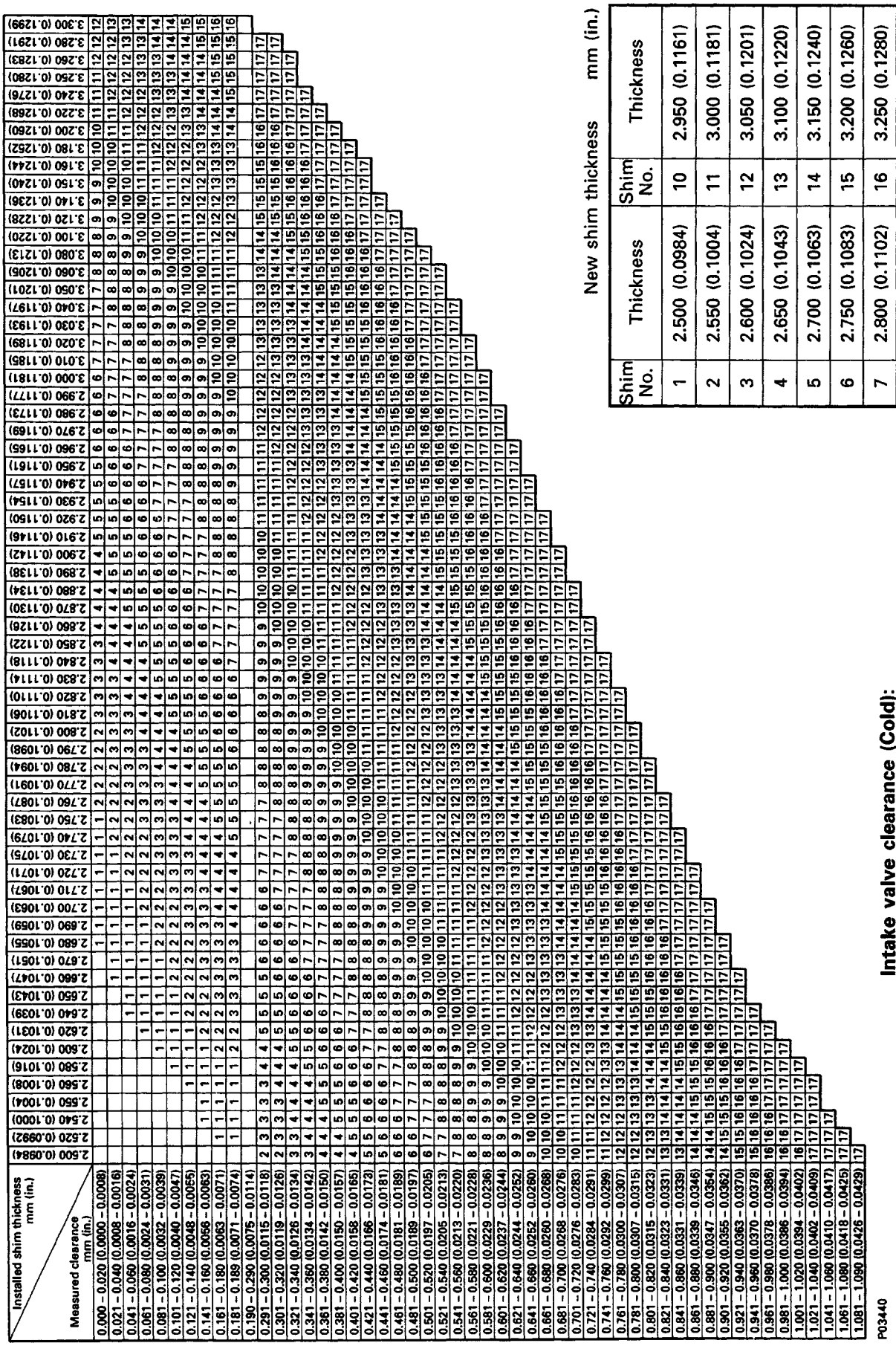
(d) Recheck the valve clearance.

8. REINSTALL CYLINDER HEAD COVER
(See step 8 on page EM–178)

9. INSTALL ENGINE WIRE PROTECTOR BETWEEN CYLINDER HEAD COVER AND NO.3 TIMING BELT COVER

10. RECONNECT HIGH–TENSION CORDS TO SPARK PLUGS

11. INSTALL ACCELERATOR BRACKET



P03440

Intake valve clearance (Cold):
0.19 – 0.29 mm (0.007 – 0.011 in.)

EXAMPLE: The 2.800 mm (0.1102 in.) shim is installed, and the measured clearance is 0.450 mm (0.0177 in.). Replace the 2.800 mm (0.1102 in.) shim with a new No.11 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.

| 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) | 2.670 (0.1051) | 2.680 (0.1055) | 2.690 (0.1059) | 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) | 2.910 (0.1146) | 2.920 (0.1150) | 2.930 (0.1154) | 2.940 (0.1157) | 2.950 (0.1161) | 2.960 (0.1165) | 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) | 3.080 (0.1213) | 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) |
|---|---|---

INSPECTION AND ADJUSTMENT OF IGNITION TIMING

4A–FE (See page IG–25)
3S–GTE (Seepage IG–29)
5S–FE (See page IG–37)
Ignition timing:
10°BTDC @ idle
(w/ Terminals TE1 and E1 connected)

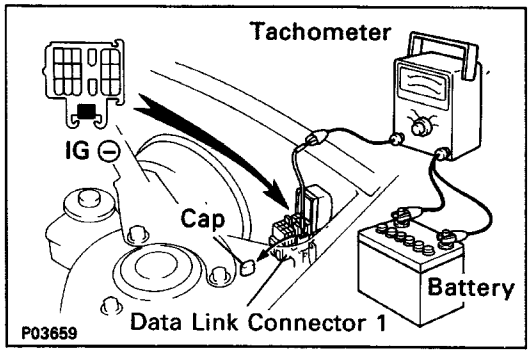
INSPECTION AND ADJUSTMENT OF IDLE SPEED (4A–FE)

(See page MA–8)
Idle speed: 800 rpm

INSPECTION OF IDLE SPEED (5S–FE and 3S–GTE)
HINT (5S–FE): Disconnecting the battery will cause the idling speed data in the IAC to be returned to the initial idling speed, causing the idling speed to rise above 750 rpm. Should this happen, either carry out a driving test, including stop–go several times at a speed above 10 km/h (6 mph), or start the engine, idle for 30 seconds and then turn the engine oft repeatedly. By doing this, idle data will be stored in the IAC and the idle rpm will be at specified value.

1. INITIAL CONDITIONS

(a) Engine at normal operating temperature
(b) Air cleaner installed
(c) All pipes and hoses of air induction system con–nected
(d) All vacuum lines connected
HINT: All vacuum hoses for EGR systems, etc. should be properly connected.
(e) MFI and SFI systems wiring connectors fully plugged
(f) All operating accessories switched OFF
(g) Transmission in neutral position

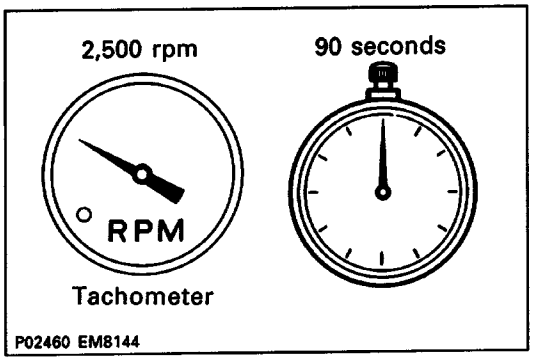


2. CONNECT TACHOMETER

Connect the test probe of a tachometer to terminal IG ⊖ of the data link connector 1.

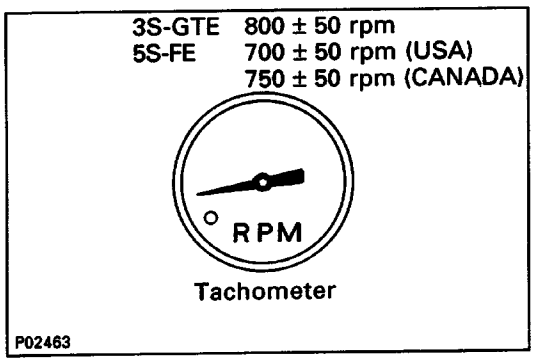
NOTICE:

- **Never allow the tachometer terminal to touch ground as it could result in damage to the igniter and/or ignition coil.**
- **As some tachometers are not compatible with this ignition system, we recommend that you confirm the compatibility of your unit before use.**



3. INSPECT IDLE SPEED

(a) Race the engine at 2,500 rpm for a pprox. 90 seconds.



(b) Check the idle speed.

Idle speed:

3S–GTE	**800 t 50 rpm**
5S–FE	**700 ± 50 rpm USA**
	750 ± 50 rpm CANADA

If the idle speed is not as specified, check the IAC system.

4. DISCONNECT TACHOMETER