Last Modified: 9-29-2009	5.6 N	From: 200501	
Model Year: 2006	Model: Hiace	Doc ID: RM00000122Z000X	
Title: 5L-E ENGINE MECHANICAL: VALVE CLEARANCE: ADJUSTMENT (2006-2010 Hiace)			

# **ADJUSTMENT**

- 1. REMOVE AIR CLEANER HOSE NO.2
- 2. REMOVE INTAKE AIR CONNECTOR SUB-ASSEMBLY

## 3. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY

- (a) Disconnect the ventilation hose.
- (b) Remove the 9 bolts, nut, cylinder head cover and gasket.

### 4. SET NO.1 CYLINDER TO TDC/ COMPRESSION



- (a) Turn the crankshaft pulley and align its groove with the timing pointer.
- (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.

#### 5. INSPECT VALVE CLEARANCE



- (a) Check only the valves indicated in the illustration.
  - 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	0.20 to 0.30 mm (0.008 to 0.012 in.)
Exhaust	0.40 to 0.50 mm (0.016 to 0.020 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 in the illustration. Measure the valve clearance. (See procedure in step (a))

#### Valve clearance (Cold):

Intake	0.20 to 0.30 mm (0.008 to 0.012 in.)
Exhaust	0.40 to 0.50 mm (0.016 to 0.020 in.)

#### 6. ADJUST VALVE CLEARANCE

(a) Remove the adjusting shim.



(1) Turn the crankshaft so that the cam lobe of the camshaft on the adjusting valve points upward.

(2) Using SST, press down the valve lifter.

#### SST: 09248-64011

(3) Position the notch of the valve lifter with it facing the exhaust manifold side.



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

(b) Determine the replacement adjusting shim size by following the formula or charts:



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

Intake	N = T + (A - 0.25  mm  (0.010  in.))
Exhaust	N = T + (A - 0.45  mm  (0.018  in.))

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

#### HINT:

Shims are available in 17 sizes in increments of 0.05 mm (0.0020 in.), from 2.50 mm (0.0984 in.) to 3.30 mm (0.1299 in.).

Measured clearance	0984 01000 01000 01000 01000 01000 0000 00			
mm (in.)	2 5500 2 5500 2 5500 2 5500 2 5500 2 5500 2 7500 2 7500			
0.000 - 0.020 (0.0000 - 0.0008)	010101010101424206000684343111111111444416161616454521212121464626262626474			
0.021 - 0.040 (0.0008 · 0.0016)	010101010142424205060643434343111111144444466161616454545221212126464646252226474747313			
0.061 - 0.080 (0.0024 - 0.0031)	01,01,01,01,01,01,42,42,42,06,06,43,43,43,11,11,11,44,44,41,61,61,645,45,45,21,21,21,45,46,96,26,26,26,47,47,47,31,31,3			
0.081 - 0.100 (0.0032 0.0039)	01 (01(01)01 (01)(01)(01)(01)(02)(02)(06)(06)(06)(06)(06)(06)(06)(06)(06)(06			
0.121 - 0.140 (0.0048 0.0055)	0101010101424242060606434343111111444444161616164546452121214646462626264747478131314848483			
0.141 - 0.160 (0.0056 - 0.0063)	01010101010142424206060643434311011144444446666645464512121212546666626262647474731313131484848468636			
0.181 - 0.199 (0.0071 - 0.0078)	010101010142420606060606434311111111444416161616464521212121214646262626262647473131314848363636364			
0.200 - 0.300 (0.0079 - 0.0118)	en en la production de la servicio de la calacita de la c			
0.321 - 0.340 (0.0119 - 0.0126) 0.321 - 0.340 (0.0126 - 0.0134)	06060664343(43)111111144444641616166464656212121464646262626474747473131314848548363636494848414141414141			
0.341 - 0.360 (0.0134 0.0142)	0605434343111111 4444441616161645454545212121 464645262626347474781313168484836363636484949494141414141			
0.381 - 0.385 (0.0142 - 0.0150) 0.381 - 0.400 (0.0150 - 0.0157)	4343)111111111444416[16]16[16]16[16]164546[21]21[21]21[46]46[26]26[26]47[47]47[31]31]31[31]31[48]46[36]36[36]36[36]49[49]41[41]41[41]41			
0.401 0.420 (0.0158 0.0165)	4311111111444466161616464521212121464625262647473131313131448485656364949414141414141			
0.441 - 0.460 (0.0166 - 0.0173) 0.441 - 0.460 (0.0174 - 0.0181)	111114444441616164646454521212146464626262647474731313141484848565636494949494141414141			
D.461 - 0.480 (0.0181 0.0189)	1144k444166016454645212121464646262626847474791313131484848863636849494941414141			
0.481 0.500 (0.0189 0.0197) 0.501 0.520 (0.0197 0.0205)	444416//61616/6464645212121212146/462626262647470131313131484836363636364949414141414141			
0.521 - 0.540 (0.0205 0.0213)	1606164545551212121464546262626474747313131484848363636494849494141414141			
0.541 - 0.560 (0.0213 0.0220) 0.561 - 0.580 (0.0221 - 0.0228)	16/16/16/16/16/16/16/16/16/16/16/16/16/1			
0.581 - 0.600 (0.0229 - 0.0236)	45 45 21 21 21 21 24 46 46 26 26 26 26 47 47 31 31 31 48 48 36 36 36 36 36 36 49 49 41 41 41 41 41 41			
0.601 0.620 (0.0237 - 0.0244)	45[21]21]21]21]21]46[46]26[26]26[26]26[26]47[47]31]31]31]48[48]36]36]36]36]36]36]49[49]41]41]41]41]41]41]41] 23 [23 [23 [23 [23 [23 [23 [23 [23 [23 [			
0.641 0.660 (0.0252 - 0.0260)	212146465462626264747474731313148484836363638484949414141414141			
0.661 - 0.680 (0.0260 0.0268)	21 46/46/26/26/26/26/47/37/31/31/31/31/36/46/46/36/36/36/36/49/49/41/41/41/41/ 			
0.701 - 0.720 (0.0278 - 0.0283)	46262626474731313131448483636363649494141414141			
0.721 - 0.740 (0.0284 - 0.0291)	2626/264 7 4 7 4 7 13 1 3 1 4 9 48 48 36 36 36 56 49 49 49 41 4 1 4 1 4 1			
0.761 - 0.780 (0.0292 0.0299)	26474747313131484848365636366649494941414141			
0.781 - 0.800 (0.0307 0.0315)	474731313131318488883636365648494141414141			
0.821 - 0.840 (0.0323 - 0.0323)	31 31 31 31 31 31 31 31 31 31 31 31 31 3			
0.841 0.860 (0.0331 0.0339)	31314849483858684949494141414141			
0.861 - 0.880 (0.0339 - 0.0346)	31 #6#8#8566.29356#3#9#8#41#14141			
0.901 - 0.920 (0.0355 - 0.0362)	483636363643434141414141			
0.921 - 0.940 (0.0363 - 0.0370) 0.941 - 0.960 (0.0370 - 0.0378)	3606566454544541414141			
0.961 - 0.980 (0.0378 0.0385)	364394394141141 1			
1.001 - 1.000 (0.0386 0.0394) 1.001 - 1.020 (0.0394 - 0.0402)	494141414141			
1.021 - 1.040 (0.0402 0.0409)	an an an an an			
1.061 - 1.080 (0.0410 0.0417) 1.061 - 1.080 (0.0418 0.0425)	41 41 41 41 41			
1.081 1.100 (0.0426 - 0.0433)	41			
	Adjust Shim Selection Using Chart (Intake)			
	Aujust ommit beletiton baing onart (make)			

## New shim thickness mm (in.)

SHIM NO.	THICKNESS	SHIM NO.	THICKNESS
01	2.50 (0.0984)	46	2.95 (0.1161)
42	2.55 (0.1004)	26	3.00 (0.1181)
06	2.60 (0.1024)	47	3.05 (0.1201)

43	2.65 (0.1043)	31	3.10 (0.1220)
11	2.70 (0.1063)	48	3.15 (0.1240)
44	2.75 (0.1083)	36	3.20 (0.1260)
16	2.80 (0.1102)	49	3.25 (0.1280)
45	2.85 (0.1122)	41	3.30 (0.1299)
21	2.90 (0.1142)		

Intake valve clearance (Cold):

0.20 to 0.30 mm (0.008 to 0.012 in.)

EXAMPLE:

The 2.800 mm (0.1102 in.) shim is installed and the measured clearance is 0.350 mm (0.0138 in.). Replace the 2.800 mm (0.1102 in.) shim with a No.21 shim.

Measured clearance	Removed shim thickness mm (in.)
mm (in.)	2500 2566 2567 2562 2562 2562 2566 2566 2566
0.021 - 0.020 (0.0006 - 0.0008) 0.021 - 0.040 (0.0008 - 0.0016) 0.041 - 0.060 (0.0018 - 0.0024)	0101010142424206606683434311111114444446161616454545452121 010101010142424206606683434311111114444444161616164545452121
0.061 - 0.080 (0.0024 - 0.0031) 0.061 - 0.100 (0.0032 - 0.0039)	01010101014242420606606434343111111444444161616464645452121212 0101010101014242060660606434311111111444416161616164545212121214
0.101 - 0.120 (0.0040 - 0.0047) 0.121 - 0.140 (0.0048 - 0.0055)	01b10101010101424206060606434301111111444416001664546212121464668 0101010104242276666664343311111144441606645454521212146466866
0.141 - 0.180 (0.0058 - 0.0053) 0.161 - 0.180 (0.0063 - 0.0071) 0.181 - 0.200 (0.0071 - 0.0079)	01010101142/22/2000/06/20143/3311111111444/441616161645455212121464666226262
0.201 - 0.220 (0.0079 - 0.0087) 0.221 - 0.240 (0.0087 - 0.0094)	01010101010101424206060664343111111114444161616666454545212121214646262626264747 010101010142426206060643434311111144444466666645454545212121466466626262647474731
0.241 - 0.260 (0.0095 - 0.0102) 0.261 - 0.280 (0.0103 - 0.0110)	b1 b1 b1 b1 b1 b2 k2 k2 b6 b6 b6 k3 k3 k3 11 h1 h1 k4 k4 k4 k6 h6 h6 k6 k5 k5 k5 21 21 21 k4 k4 k6 k6 22 b2 k2 k7 k7 k7 31 31 b1 b1 b1 b1 b1 b1 b1 b1 k2 k2 k2 b6 b6 b6 k3 k3 k3 h1 h1 h1 k4 k4 k4 h6 h6 h6 k6 k5 k5 21 21 21 k6 k6 k6 22 b2 k7 k7 k7 31 31 b1 b1 b1 b1 b1 b1 b1 b1 b2 b2 b6 b6 b6 k3 k3 k3 k1 h1 h1 h1 k4 k4 k4 h6 h6 h6 k6 k5 k5 b2 12 12 12 k6 k6 k6 22 b2 k7 k7 k7 31 31 b1 b1 b1 b1 b1 b1 b1 b1 b1 b2 b2 b6 b6 k6 k3 k3 k3 k1 h1 h1 h1 k4 k4 k4 h6 h6 h6 k6 k5 k5 b2 12 12 12 k6 k6 k6 b2 b2 b6 k7 k7 k7 31 31 b1 b1 b1 b
0.281 - 0.300 (0.0111 - 0.018) 0.301 - 0.320 (0.0119 - 0.0126) 0.321 - 0.340 (0.0126 - 0.0134)	0101010110142/42/0000006/3431111111114444/610/0666454512121216602/202002/77313131313131314848 0101010121242/42/000006/343311111111444/46106/6664545451212124666462020264747313131313131314848
0.341 - 0.350 (0.0134 - 0.0142) 0.361 - 0.380 (0.0142 - 0.0150)	01 01 01 01 01 01 42 42 42 06 06 06 43 43 43 11 11 11 14 44 44 4 16 16 16 45 45 45 45 21 21 21 46 46 46 26 26 26 26 47 47 47 31 31 31 48 48 48 36 36 37 10 10 10 10 10 10 10 142 42 42 06 06 06 84 34 34 31 11 11 14 44 44 4 16 16 16 45 45 45 21 21 21 46 46 46 26 26 26 26 47 47 47 31 31 31 48 48 48 36 36 37 37 37 37 37 37 37 37 37 37 37 37 37
0.381 - 0.399 (0.0150 - 0.0157) 0.400 - 0.500 (0.0157 - 0.0197) 0.501 - 0.520 (0.0167 - 0.0197)	01010101010142420606060683430111111114444016166604692121212146462866262684747313131313148483635363649
0.501 - 0.520 (0.0197 - 0.0205) 0.521 - 0.540 (0.0205 - 0.0213) 0.541 - 0.560 (0.0213 - 0.0220)	05060643434311111144444461616164545454521212146464626262624747475131314846463636354544949494141414141 050664343431111114444441616164645454521212146464628262626474747813131484683636363644949494141414141
0.561 - 0.580 (0.0221 - 0.0228) 0.581 - 0.600 (0.0229 - 0.0236)	0643434311111144444416181645454512121212146464626262624747473131318184848483626262649494941414141 43431111111144444161616161646452121212174666262626247473313131484836565365649494141414141
0.601 = 0.620 (0.0237 - 0.0244) 0.621 = 0.640 (0.0244 - 0.0252) 0.641 = 0.660 (0.0252 - 0.0260)	Kan 11111111444441616161616494949212121121464648292629262976747913131314946489595959595959595959591911111111 1111111444441616161645454552121214646462526267474747313131464648505565649469494944141414141 11111444446161616454545552121214646462526264747173131314684649555656454949414141414141
0.661 - 0.680 (0.0260 - 0.0268) 0.681 - 0.700 (0.0268 - 0.0276)	1144444161616164545454212121214646862626264747313151464848363636364949441414141 44441616161664545212121214646262626262647473131313148482636363649494141414141
0.701 - 0.720 (0.0276 - 0.0283) 0.721 - 0.740 (0.0284 - 0.0291)	k41e1s6s6164845212121214646262626262674731313131434883653656565649494141414141 1e1s6365565652121212146666475626794747474713131484848365565564949494141414141 1e1s64555555555555555555555555555555555555
0.761 - 0.760 (0.0262 - 0.0269) 0.761 - 0.780 (0.0300 - 0.0307) 0.781 - 0.800 (0.0307 - 0.0315)	164545521212126645626262626474733331314548483656564949494941414141 4845212121216646262626262474733331314848565656549494141414141
0.801 - 0.820 (0.0315 - 0.0323) 0.821 - 0.840 (0.0323 - 0.0331)	45[21 21 21 21 24646[26]26[26]26[26]47[47]31 [31 [31 [31 [31 [31 [31 [31 [31 [31 [
0.841 - 0.860 (0.0331 - 0.0339) 0.861 - 0.880 (0.0339 - 0.0348) 0.881 - 0.900 (0.0347 - 0.0354)	21 21 462-6646 (25) 662 59 1767 47 (31 (31 (31 (31 (31 (31 (31 (31 (31 (31
0.901 - 0.920 (0.0355 - 0.0362) 0.921 - 0.940 (0.0363 - 0.0370)	462626262647473131313131314848963636565648494141414141 262626474747513131484848363636564949494141414141
0.941 - 0.960 (0.0370 - 0.0378) 0.961 - 0.980 (0.0378 - 0.0386)	2e(2e(x/7/7/4/3)3)1311431484888395858586494949411414/141411 2e(x/1/2)131313131484848363856649494941414141 
1.001 - 1.000 (0.0386 - 0.0394) 1.001 - 1.020 (0.0394 - 0.0402) 1.021 - 1.040 (0.0402 - 0.0409)	473135131314848365656665636494141414141 31313148488656566665656494141414141
1.041 - 1.060 (0.0410 - 0.0417) 1.061 - 1.080 (0.0418 - 0.0425)	31 31 48/48/36/36/36/36/49/49/41/41/41/41/ 31/48/48/36/36/36/36/36/94/9/41/41/41/41
1.081 - 1.100 (0.0426 - 0.0433) 1.101 - 1.120 (0.0433 - 0.0441) 1.121 - 1.140 (0.0441 - 0.0449)	Hase Bio Sciao populariani in 11 m 11 Hasia Bio Sciao populariani in 11 m 11 Bio Bio Bio Hasia Sciao Bio Martini II m 11 Bio Bio Bio Hasia Sciao Bio Martini II m 11
1.141 - 1.180 (0.0449 - 0.0457) 1.161 - 1.180 (0.0457 - 0.0465)	36[36]49[49]49[41]41]41]41 39[49]49[49]49[41]41]41
1.181 - 1.200 (0.0465 - 0.0472) 1.201 - 1.220 (0.0473 - 0.0480) 1.221 - 1.240 (0.0481 - 0.0488)	49949941141 41 141 141 49941 41 14 141 6 Januar Januar Januar
1.241 - 1.260 (0.0489 - 0.0496) 1.261 - 1.290 (0.0496 - 0.0504)	
1,281 - 1.300 (0.0604 - 0.0512)	Adjusting Shim Selection Using Chart (Exhaust)
	Aujusting Shim Selection Using Chart (Exhaust)

## New shim thickness mm (in.)

SHIM NO.	THICKNESS	SHIM NO.	THICKNESS

01	2.50 (0.0984)	46	2.95 (0.1161)
42	2.55 (0.1004)	26	3.00 (0.1181)
06	2.60 (0.1024)	47	3.05 (0.1201)
43	2.65 (0.1043)	31	3.10 (0.1220)
11	2.70 (0.1063)	48	3.15 (0.1240)
44	2.75 (0.1083)	36	3.20 (0.1260)
16	2.80 (0.1102)	49	3.25 (0.1280)
45	2.85 (0.1122)	41	3.30 (0.1299)
21	2.90 (0.1142)		

Exhaust valve clearance (Cold):

0.40 to 0.50 mm (0.016 to 0.020 in.)

EXAMPLE:

The 2.800 mm (0.1102 in.) shim is installed and the measured clearance is 0.350 mm (0.0138 in.). Replace the 2.800 mm (0.1102 in.) shim with a No.11 shim.



(c) Install a new adjusting shim.

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

(2) Remove the SST.

(d) Recheck the valve clearance.

#### 7. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY



(a) Remove the any oil packing (FIPG) material.

(b) Apply seal packing to the cylinder head as shown in the illustration.

Seal packing: Part No.08826-00080 or equivalent

- (c) Install the gasket to the cylinder head cover.
- (d) Install the cylinder head cover with the 9 bolts and nut. Uniformly tighten the bolts and nuts in several steps.

#### Torque: 12 N·m (120 kgf·cm, 9ft·lbf)

(e) Connect the ventilation hose.

## 8. INSTALL INTAKE AIR CONNECTOR SUB-ASSEMBLY

9. CONNECT AIR CLEANER HOSE NO.2

#### 10. CHECK IDLE SPEED

11. INSPECT MAXIMUM ENGINE SPEED

9

Э ТОУОТА