ENGINE MECHANICAL

SERVICE DATA

0325R–01

Valve rocker arm and shaft		
Valve rocker arm bush inside diameter	STD	22.023 to 22.052 mm (0.8670 to 0.8681 in.)
	Maximum	22.08 mm (0.8692 in.)
Valve rocker shaft diameter	STD	21.959 to 21.980 mm (0.8645 to 0.8653 in.)
	Maximum	21.92 mm (0.8630 in.)
Oil clearance	STD	0.043 to 0.093 mm (0.0017 to 0.0036 in.)
	Maximum	0.15 mm (0.6059 in.)
Valve push rod		
Circle runout	Maximum	0.30 mm (0.0118 in.)
Cylinder head bolt		
Length (A)	Bolt No. position 1 to 18	129 mm (5.07 in.)
Idle gear No. 2 and shaft		
Idle gear No. 2 thrust clearance	STD	0.103 to 0.164 mm (0.0040 to 0.0064 in.)
	Maximum	0.30 mm (0.0118 in.)
Idle gear No. 2 backlash	STD	0.036 to 0.227 mm (0.0014 to 0.0089 in.)
	Maximum	0.30 mm (0.0118 in.)
Idle gear inside diameter	STD	50.000 to 50.025 mm (1.9685 to 1.9695 in.)
	Maximum	50.05 mm (1.9704 in.)
Idle gear shaft diameter	STD	49.950 to 49.975 mm (1.9665 to 1.9675 in.)
	Minimum	49.95 mm (1.9665 in.)
Oil clearance	STD	0.0125 to 0.0375 mm (0.0005 to 0.0014 in.)
	Maximum	0.10 mm (0.0039 in.)
Camshaft timing gear		
Gear backlash	STD	0.069 to 0.203 mm (0.0027 to 0.0079 in.)
	Maximum	0.30 mm (0.0118 in.)
Oil pump gear		
Gear backlash	STD	0.065 to 0.215 mm (0.0025 to 0.0084 in.)
	Maximum	0.30 mm (0.0118 in.)
Idle gear No. 1		
Idle gear No. 1 thrust clearance	STD	0.103 to 0.164 mm (0.0040 to 0.0064 in.)
	Maximum	0.30 mm (0.0118 in.)
Idle gear No. 1		
Idle gear No. 1 backlash	STD	0.035 to 0.193 mm (0.0014 to 0.0075 in.)
	Maximum	0.30 mm (0.0118 in.)
Idle gear No. 1 and shaft		
Idle gear No. 1 inside diameter	STD	50.000 to 50.025 mm (1.9685 to 1.9695 in.)
	Maximum	50.05 mm (1.9704 in.)
Idle gear shaft diameter	STD	49.950 to 49.975 mm (1.9665 to 1.9675 in.)
	Minimum	49.95 mm (1.9665 in.)
Oil clearance	STD	0.0125 to 0.0370 mm (0.0005 to 0.0014 in.)
	Maximum	0.10 mm (0.0039 in.)
Valve clearance (cold)	Intake	0.30 mm (0.012 in.)
	Exhaust	0.45 mm (0.018 in.)
Cylinder head		
Maximum warpage	Cylinder block side	2.0 mm (0.079 in.)
	Intake manifold side	2.0 mm (0.079 in.)
	Exhaust manifold side	2.0 mm (0.079 in.)
Valve seat		
Refacing angle	Intake	30°, 45°
	Exhaust	30°, 45°
Cylinder head dimension	Intake (A)	36.000 to 36.015 mm (1.4173 to 1.4179 in.)
	Intake (B)	8.400 to 8.600 mm (0.3307 to 0.3385 in.)
	Exhaust (A)	32.000 to 32.016 mm (1.2598 to 1.2604 in.)
	Exhaust (B)	7.600 to 7.800 mm (0.2992 to 0.3070 in.)
Contacting width	Intake	0.8 to 1.0 mm (0.031 to 0.039 in.)
	Exhaust	1.8 to 2.0 mm (0.070 to 0.078 in.)

Valve spring		
Maximum deviation		2.0 mm (0.079 in.)
Standard free length		85.1 mm (3.350 in.)
Maximum free length		82.1 mm (3.232 in.)
Valve guide bush and Valve		
Valve stem diameter	Intake	6.957 to 6.972 mm (0.2738 to 0.2744 in.)
	Exhaust	6.932 to 6.947 mm (0.2729 to 0.2735 in.)
Bush inside diameter (w/ Valve guide bush)	Intake	7.000 to 7.015 mm (0.2755 to 0.2761 in.)
	Exhaust	7.000 to 7.015 mm (0.2755 to 0.2761 in.)
Standard oil clearance	Intake	0.023 to 0.058 mm (0.0009 to 0.0022 in.)
	Exhaust	0.050 to 0.083 mm (0.0020 to 0.0032 in.)
Maximum oil clearance	Intake	0.12 mm (0.0047 in.)
	Exhaust	0.15 mm (0.0059 in.)
Bush inside diameter (w/o Valve guide bush)		13.000 to 13.018 mm (0.5118 to 0.5125 in.)
Protrusion height		26.4 to 26.8 mm (1.039 to 1.055 in.)
Valve sink		
Standard sink	Intake	0.8 to 1.0 mm (0.031 to 0.039 in.)
	Exhaust	1.8 to 2.0 mm (0.070 to 0.078 in.)
Maximum sink	Intake	1.1 mm (0.043 in.)
	Exhaust	2.1 mm (0.082 in.)
Injection nozzle seat		
Protrusion	STD	2.45 to 2.95 mm (0.0964 to 0.1161 in.)
	Minimum	2.95 mm (0.1161 in.)
Valve stem oil seal		
Standard height (A)		29.0 to 29.5 mm (1.141 to 1.161 in.)
Connecting rod bolt		
Bolt length	STD	59.00 mm (2.3228 in.)
	Minimum	61.5 mm (2.421 in.)
Connecting rod		
Connecting rod thrust clearance	STD	0.200 to 0.520 mm (0.0079 to 0.0204 in.)
	Maximum	0.60 mm (0.0236 in.)
Connecting rod bearing		
Big end inside diameter	STD	61.991 to 62.022 mm (2.446 to 2.4418 in.)
	Maximum	62.06 mm (2.4433 in.)
Oil clearance	STD	0.031 to 0.082 mm (0.0012 to 0.0032 in.)
	Maximum	0.20 mm (2.4433 in.)
	STD	61.94 to 61.96 mm (2.4385 to 2.4393 in.)
	U/S 0.25	61.69 to 61.71 mm (2.4287 to 2.4295 in.)
	U/S 0.50	61.44 to 61.46 mm (2.4188 to 2.4196 in.)
	U/S 0.75	61.19 to 61.21 mm (2.4090 to 2.4098 in.)
	U/S 1.00	60.94 to 60.96 mm (2.3992 to 2.3999 in.)
Crankshaft pin		3.50 to 4.00 mm (0.1378 to 0.1575 in.)
Cylinder liner		
Cylinder liner inside diameter	STD (A)	106.982 to 106.989 mm (4.2118 to 4.2121 in.)
	(B)	106.990 to 106.995 mm (4.2121 to 4.2123 in.)
	(C)	106.996 to 107.004 mm (4.2124 to 4.2127 in.)
Cylinder liner outside diameter	STD (A)	107.000 to 107.008 mm (4.2125 to 4.2129 in.)
	(B)	107.008 to 107.014 mm (4.2129 to 4.2131 in.)
	(C)	107.014 to 107.022 mm (4.2131 to 4.2134 in.)
Cylinder bore inside diameter	STD	104.012 to 104.036 mm (4.0950 to 4.0959 in.)
	Maximum	104.15 mm (4.1004 in.)
Oil clearance	STD	0.084 to 0.124 mm (0.0033 to 0.0048 in.)
Protrusion	STD	0.01 to 0.08 mm (0.0004 to 0.0031 in.)
	Maximum	0.08 mm (0.0031 in.)

Piston		
Piston diameter	STD	103.912 to 103.928 mm (4.0910 to 4.0916 in.)
Oil clearance	STD	0.084 to 0.124 mm (0.0033 to 0.0048 in.)
Piston ring groove clearance	STD 1st	0.11 to 0.15 mm (0.0043 to 0.0059 in.)
	2nd	0.07 to 0.11 mm (0.0028 to 0.0043 in.)
	Oil	0.02 to 0.06 mm (0.0008 to 0.0024 in.)
	Maximum	0.30 mm (0.0118 in.)
Piston ring groove width	STD 1st	2.58 to 2.60 mm (0.1016 to 0.1024 in.)
	2nd	2.06 to 2.08 mm (0.0811 to 0.0819 in.)
	Oil	4.01 to 4.03 mm (0.1579 to 0.1578 in.)
	Maximum 1st	3.10 mm (0.1220 in.)
	2nd	2.20 mm (0.0866 in.)
	Oil	4.08 mm (1.1606 in.)
Piston ring groove width	STD 1st	2.47 to 2.49 mm (0.0972 to 0.0980 in.)
	2nd	1.97 to 1.99 mm (0.0776 to 0.0783 in.)
	Oil	4.97 to 4.99 mm (0.1957 to 0.1965 in.)
	Maximum 1st	2.32 mm (0.0913 in.)
	2nd	1.82 mm (0.0717 in.)
	Oil	4.95 mm (1.1949 in.)
Piston pin		
Piston pin diameter	STD	36.989 to 37.000 mm (1.4563 to 1.4567 in.)
	Minimum	36.96 mm (1.4551 in.)
Bush inside diameter	STD	37.035 to 37.045 mm (1.4581 to 1.4585 in.)
	Maximum	37.10 mm (1.4606 in.)
Oil clearance	STD	0.035 to 0.056 mm (0.0014 to 0.0022 in.)
	Maximum	0.08 mm (0.0031 in.)
Piston pin boss inside diameter	STD	36.987 to 37.003 mm (1.4562 to 1.4568 in.)
	Maximum	37.05 mm (1.4587 in.)
Oil clearance	STD	0.013 to 0.014 mm (0.0051 to 0.0055 in.)
	Maximum	0.05 mm (0.0020 in.)
Crankshaft		
Crankshaft thrust clearance	STD	0.050 to 0.220 mm (0.0019 to 0.0086 in.)
	Maximum	0.40 mm (0.0157 in.)
Maximum bend		0.04 mm (0.0016 in.)
Crankshaft main journal diameter	STD	72.94 to 72.96 mm (2.8716 to 2.8724 in.)
	Minimum (New)	72.74 mm (2.8638 in.)
	(Old)	71.76 mm (2.8252 in.)
	Maximum taper and out–of–round	0.01 mm (0.0003 in.
Crankshaft main journal diameter	STD	61.94 to 61.96 mm (2.4385 to 2.4393 in.)
	Minimum (New)	61.74 mm (2.4307 in.)
	(Old)	60.76 mm (2.3921 in.)
	Maximum taper and out–of–round	0.01 mm (0.0003 in.)
Crankshaft No. 4 journal dimension	STD	34.00 to 34.08 mm (1.33858 to 1.3417 in.)
	Maximum	34.48 mm (1.3574 in.)
Cylinder block		
Maximum warpage		0.10 mm (0.0039 in.)
Crankshaft bearing cap bolt		
Bolt length (A)	STD	92.80 to 93.80 mm (3.6535 to 3.6929 in.)
	Maximum	95.00 mm (3.7401 in.)

Crankshaft bearing cap		
Crankshaft bearing cap inside diameter	STD	77.985 to 78.00 mm (3.0703 to 3.0709 in.)
	Maximum	78.20 mm (3.0787 in.)
Crankshaft bearing inside diameter	STD	73.01 to 73.04 mm (2.8744 to 2.8756 in.)
	Maximum	73.30 mm (2.8858 in.)
Oil clearance	STD	0.051 to 0.102 mm (0.0020 to 0.0004 in.)
	Maximum	0.20 mm (0.0078 in.)
	STD	72.94 to 72.96 mm (2.8716 to 2.8724 in.)
	U/S 0.25	72.69 to 72.71 mm (2.8618 to 2.8625 in.)
	U/S 0.50	72.44 to 72.46 mm (2.8519 to 2.8527 in.)
	U/S 0.75	72.19 to 72.21 mm (2.8421 to 2.8429 in.)
	U/S 1.00	71.94 to 71.96 mm (2.8322 to 2.8330 in.)
Main crankshaft journal		3.00 to 3.50 mm (0.1181 to 0.1378 in.)
Camshaft		
Maximum circle runout		0.06 mm (0.0023 in.)
Cam lobe height	STD Intake	50.6576 to 50.8596 mm (1.9943 to 2.0023 in.)
	Exhaust	49.3561 to 49.5581 mm (1.9431 to 1.9511 in.)
	Minimum Intake	50.20 mm (1.9763 in.)
	Exhaust	48.95 mm (1.9271 in.)
Journal outside diameter	No. 1	56.95 to 56.97 mm (2.2421 to 2.2429 in.)
	No. 2	56.75 to 56.77 mm (2.2342 to 2.2350 in.)
	No. 3	56.95 to 56.97 mm (2.2421 to 2.2429 in.)
Journal inside diameter	No. 1	57.035 to 57.135 mm (2.2454 to 2.2494 in.)
	No. 2	56.835 to 56.935 mm (2.2375 to 2.415 in.)
	No. 3	56.635 to 56.735 mm (2.2297 to 2.2336 in.)
Oil clearance	STD	0.030 to 0.120 mm (0.0011 to 0.0047 in.)
	Maximum	0.15 mm (0.0059 in.)
Camshaft bearing		
Bearing inside diameter	No. 1	57.0 mm (2.2440 in.)
	No. 2	56.8 mm (2.2362 in.)
	No. 3	56.6 mm (2.2283 in.)
Bearing outside diameter	No. 1	60.0 mm (2.3622 in.)
	No. 2	59.8 mm (2.3543 in.)
	No. 3	59.6 mm (2.3646 in.)