ENGINE MECHANICAL

SERVICE DATA

03196–02

Valve clearance		
Intake	(cold)	0.15 – 0.25 mm (0.006 – 0.010 in.)
Exhaust		0.29 – 0.39 mm (0.011 – 0.015 in.)
Camshaft timing gear assy		
Diameter (w/ chain)	Large gear	115.5 mm (4.547 in.)
	Small gear	73.1 mm (2.878 in.)
Camshaft timing gear or sprocket		
Diameter (w/ chain)		73.1 mm (2.878 in.)
Crankshaft timing gear or sprocket		
Diameter (w/ chain)		61.0 mm (2.402 in.)
Idle gear No. 1		
Diameter (w/ chain)		61.0 mm (2.402 in.)
Cylinder head set bolt		
Outside diameter	Standard	10.85 – 11.00 mm (0.4272 – 0.4331 in.)
	Minimum	10.7 mm (0.421 in.)
Chain		
Elongation	Maximum	146.8 mm (5.780 in.)
No. 2 chain		
Elongation	Maximum	146.8 mm (5.780 in.)
Idle gear shaft		
Idle gear shaft diameter		22.987 – 23.000 mm (0.9050 – 0.9055 in.)
Idle gear inside diameter		23.02 – 23.03 mm (0.9063 – 0.9067 in.)
Oil clearance	Standard	0.020 – 0.043 mm (0.0008 – 0.0017 in.)
	Maximum	0.093 mm (0.0037 in.)
Chain tensioner assy No. 2		
Worn depth	Maximum	1.0 mm (0.039 in.)
Chain tensioner assy No. 3		
Worn depth	Maximum	1.0 mm (0.039 in.)
Chain tensioner slipper		
Worn depth	Maximum	1.0 mm (0.039 in.)
Chain vibration damper No. 1		
Worn depth	Maximum	1.0 mm (0.039 in.)
Chain vibration damper No. 2		
Worn depth	Maximum	1.0 mm (0.039 in.)
Cylinder head sub–assy		
Warpage	Maximum	0.10 mm (0.0039 in.)
Intake valve		
Valve stem diameter		5.470 – 5.485 mm (0.2154 – 0.2159 in.)
Valve face angle		44.5°
Margin thickness	Standard	1.0 mm (0.039 in.)
	Minimum	0.5 mm (0.020 in.)
Overall length	Standard	106.95 mm (4.2106 in.)
	Minimum	106.40 mm (4.1890 in.)
Exhaust valve		
Valve stem diameter		5.465 – 5.480 mm (0.2152 – 0.2158 in.)
Valve face angle		44.5°
Margin thickness	Standard	1.0 mm (0.039 in.)
	Minimum	0.5 mm (0.020 in.)
Overall length	Standard	105.80 mm (41654 in.)
	Minimum	105.30 mm (4.1457 in.)
Inner compression spring		
Deviation	Maximum	2.0 mm (0.079 in.)
Free length		47.80 mm (1.8819 in.)
Tension	at 33.3 mm (1.311 in.)	186.2 – 205.8 N (19.0 – 21.0 kgf, 41.9 – 46.3 lbf)

Intake valve guide bush		
Inside diameter		5.51 – 5.53 mm (0.2169 – 0.2177 in.)
Oil clearance	Standard	0.025 – 0.060 mm (0.0010 – 0.0024 in.)
	Maximum	0.08 mm (0.0031 in.)
Bush bore diameter		10.295 – 10.315 mm (0.4053 – 0.4061 in.)
Protrusion height		9.3 – 9.7 mm (0.366 – 0.382 in.)
Exhaust valve guide bush		
Inside diameter		5.51 – 5.53 mm (0.2169 – 0.2177 in.)
Oil clearance	Standard	0.030 – 0.065 mm (0.0012 – 0.0026 in.)
	Maximum	0.10 mm (0.0039 in.)
Bush bore diameter		10.295 – 10.315 mm (0.4053 – 0.4061 in.)
Protrusion height		9.3 – 9.7 mm (0.366 – 0.382 in.)
Valve lifter		
Diameter		30.966 – 30.976 mm (1.2191 – 1.2195 in.)
Lifter bore diameter		31.009 – 31.025 mm (1.2208 – 1.2215 in.)
Oil clearance	Standard	0.033 – 0.059 mm (0.0013 – 0.0023 in.)
	Maximum	0.08 mm (0.0031 in.)
No. 1 camshaft		
Journal diameter	No. 1 journal	35.971 – 35.985 mm (1.4162 – 1.4167 in.)
	Other journals	22.959 – 22.975 mm (0.9039 – 0.9045 in.)
Circuit runout	Maximum	0.06 mm (0.0024 in.)
Cam lobe height	Standard	44.168 – 44.268 mm (1.7389 – 1.7428 in.)
	Minimum	44.018 mm (1.7330 in.)
Oil clearance	Standard No. 1 journal	0.008 – 0.038 mm (0.0003 – 0.0015 in.)
	Other journals	0.025 – 0.062 mm (0.0010 – 0.0024 in.)
	Maximum No. 1 journal	0.07 mm (0.0028 in.)
	Other journals	0.10 mm (0.0039 in.)
Thrust clearance	Standard	0.04 – 0.09 mm (0.016 – 0.035 in.)
	Maximum	0.11 mm (0.0043 in.)
No. 2 camshaft		
Journal diameter	No. 1 journal	35.971 – 35.985 mm (1.4162 – 1.4167 in.)
	Other journals	22.959 – 22.975 mm (0.9039 – 0.9045 in.)
Circuit runout	Maximum	0.06 mm (0.0024 in.)
Cam lobe height	Standard	44.580 – 44.680 mm (1.7551 – 1.7591 in.)
	Minimum	44.430 mm (1.7492 in.)
Oil clearance	Standard No. 1 journal	0.040 – 0.079 mm (0.0016 – 0.0031 in.)
	Other journals	0.025 – 0.062 mm (0.0010 – 0.0024 in.)
	Maximum	0.10 mm (0.0039 in.)
Thrust clearance	Standard	0.04 – 0.09 mm (0.016 – 0.035 in.)
	Maximum	0.11 mm (0.0043 in.)
No. 3 camshaft sub–assy		
Journal diameter	No. 1 journal	35.971 – 35.985 mm (1.4162 – 1.4167 in.)
	Other journals	22.959 – 22.975 mm (0.9039 – 0.9045 in.)
Circuit runout	Maximum	0.06 mm (0.0024 in.)
Cam lobe height	Standard	44.168 – 44.268 mm (1.7389 – 1.7428 in.)
	Minimum	44.018 mm (1.7330 in.)
Oil clearance	Standard No. 1 journal	0.040 – 0.079 mm (0.0016 – 0.0031 in.)
	Other journals	0.025 – 0.062 mm (0.0010 – 0.0024 in.)
	Maximum	0.10 mm (0.0039 in.)
Thrust clearance	Standard	0.04 – 0.09 mm (0.016 – 0.035 in.)
	Maximum	0.11 mm (0.0043 in.)
No. 4 camshaft sub–assy		
Journal diameter	No. 1 journal	35.971 – 35.985 mm (1.4162 – 1.4167 in.)
	Other journals	22.959 – 22.975 mm (0.9039 – 0.9045 in.)
Circuit runout	Maximum	0.06 mm (0.0024 in.)
Cam lobe height	Standard	44.580 – 44.680 mm (1.7551 – 1.7591 in.)
	Minimum	44.430 mm (1.7492 in.)
Oil clearance	Standard No. 1 journal	0.040 – 0.079 mm (0.0016 – 0.0031 in.)
	Other journals	0.025 – 0.062 mm (0.0010 – 0.0024 in.)
	Maximum	0.10 mm (0.0039 in.)
Thrust clearance	Standard	0.04 – 0.09 mm (0.016 – 0.035 in.)
	Maximum	0.11 mm (0.0043 in.)

Ring pin for cylinder head sub–assy and cylinder head LH Protrusion height		 2.7 – 3.3 mm (0.106 – 0.130 in.)
Straight pin for cylinder head sub–assy and cylinder head LH Protrusion height (See page 14–55)	 A B C	 17.5 – 19.5 mm (0.689 – 0.768 in.) 7.5 – 8.5 mm (0.295 – 0.335 in.) 7.0 – 9.0 mm (0.276 – 0.354 in.)
Tight plug for cylinder head sub–assy and cylinder head LH Depth		 1.5 mm (0.059 in.)
Connecting rod thrust clearance Connecting rod oil clearance	Standard Maximum Standard Maximum	0.15 – 0.30 mm (0.0059 – 0.0118 in.) 0.35 mm (0.0138 in.) 0.026 – 0.046 mm (0.0010 – 0.0018 in.) 0.066 mm (0.0025 in.)
Crankshaft thrust clearance	Standard Maximum	0.04 – 0.24 mm (0.0016 – 0.0094 in.) 0.30 mm (0.0118 in.)
Cylinder block warpage	Maximum	0.05 mm (0.0020 in.)
Cylinder bore diameter	Standard Difference limit	94.000 – 94.012 mm (3.7008 – 3.7013 in.) 0.10 mm (0.0039 in.)
Piston diameter Oil clearance	 Standard Maximum	93.910 – 93.920 mm (3.6972 – 3.6976 in.) 0.080 – 0.102 mm (0.0031 – 0.0040 in.) 0.13 mm (0.0051 in.)
Connecting rod out–of alignment Connecting rod twist	Maximum Maximum	0.05 mm (0.0020 in.) per 100 mm (3.94 in.) 0.15 mm (0.0059 in.) per 100 mm (3.94 in.)
Connecting rod bushing inside diameter Piston pin diameter Oil clearance	 Standard Maximum	22.005 – 22.014 mm (0.8663 – 0.8667 in.) 21.997 – 22.006 mm (0.8660 – 0.8664 in.) 0.005 – 0.011 mm (0.0002 – 0.0004 in.) 0.050 mm (0.0020 in.)
Piston ring groove clearance	No.1 No.2 Oil	0.02 – 0.07 mm (0.0008 – 0.0028 in.) 0.02 – 0.06 mm (0.0008 – 0.0024 in.) 0.07 – 0.15 mm (0.0028 – 0.0060 in.)
Piston ring end gap	Standard No.1 No.2 Oil (Side rail) Maximum No.1 No.2 Oil (Side rail)	0.30 – 0.40 mm (0.0118 – 0.0157 in.) 0.40 – 0.50 mm (0.0157 – 0.0197 in.) 0.10 – 0.40 mm (0.0039 – 0.0157 in.) 1.0 mm (0.039 in.) 1.1 mm (0.043 in.) 1.0 mm (0.039 in.)
Connecting rod bolt diameter	Standard Minimum	7.2 – 7.3 mm (0.283 – 0.287 in.) 7.0 mm (0.276 in.)
Crankshaft bearing cap set bolt diameter	Standard	10.0 – 10.2 mm (0.393 – 0.402 in.)
Crankshaft circle runout Main journal diameter Main journal taper and out–of–round Crank pin diameter Crank pin taper and out–of–round	Maximum Maximum Maximum	0.06 mm (0.0024 in.) 71.988 – 72.000 mm (2.8342 – 2.8346 in.) 0.02 mm (0.0008 in.) 55.992 – 56.000 mm (2.2044 – 2.2047 in.) 0.02 mm (0.0008 in.)
Crankshaft oil clearance	Standard Maximum	0.018 – 0.030 mm (0.0007 – 0.0012 in.) 0.046 mm (0.0018 in.)