

ENGINE MECHANICAL

SERVICE DATA

03000-02

Chain sub-assy Length at 16 links	Maximum	112.6 mm (4.433 in.)
Camshaft timing gear or sprocket Diameter (w/ chain)	Minimum	97.3 mm (3.831 in.)
Crankshaft timing gear or sprocket Diameter (w/ chain)	Minimum	51.6 mm (2.032 in.)
Chain tensioner slipper Wear	Maximum	1.0 mm (0.039 in.)
Chain vibration damper No. 1 Wear	maximum	1.0 mm (0.039 in.)
Cylinder head set bolt Length	Standard Maximum	156.0 – 159.0 mm (6.142 – 6.260 in.) 159.5 mm (6.280 in.)
Camshaft Circle runout Lobe height	Maximum Standard Intake Exhaust Minimum Intake Exhaust	0.03 mm (0.0012 in.) 44.333 – 44.433 mm (1.7454 – 1.7493 in.) 43.761 – 43.861 mm (1.7229 – 1.7268 in.) 44.18 mm (1.7394 in.) 43.61 mm (1.7169 in.)
Journal diameter	No. 1 Others	34.449 – 34.465 mm (1.3563 – 1.3569 in.) 22.949 – 22.965 mm (0.9035 – 0.9041 in.)
Thrust clearance	Standard Maximum	0.040 – 0.095 mm (0.0009 – 0.0023 in.) 0.110 mm (0.0043 in.)
Oil clearance	Standard Maximum	0.035 – 0.072 mm (0.0014 – 0.0028 in.) 0.10 mm (0.0039 in.)
Valve clearance (Cold)	Intake Exhaust	0.15 – 0.25 mm (0.006 – 0.010 in.) 0.25 – 0.35 mm (0.010 – 0.014 in.)
Cylinder head sub-assy Warpage	Maximum Cylinder block side Intake manifold side Exhaust manifold side	0.05 mm (0.0020 in.) 0.10 mm (0.0040 in.) 0.10 mm (0.0040 in.)
Valve guide bushing Inside diameter Oil clearance	Standard Intake Exhaust Maximum Intake Exhaust	5.510 – 5.530 mm (0.2169 – 0.2177 in.) 0.025 – 0.060 mm (0.0010 – 0.0024 in.) 0.030 – 0.065 mm (0.0012 – 0.0026 in.) 0.08 mm (0.0031 in.) 0.01 mm (0.0039 in.)
Bore diameter Protrusion height		10.285 – 10.306 mm (0.4049 – 0.4057 in.) 8.7 – 9.1 mm (0.342 – 0.358 in.)
Valve stem Diameter	Intake Exhaust	5.470 – 5.485 mm (0.2154 – 0.2159 in.) 5.465 – 5.480 mm (0.2152 – 0.2158 in.)
Inner compression spring Free length Deviation Angle (reference)	Maximum Maximum	43.40 mm (1.7087 in.) 2.0 mm (0.078 in.) 2°
Valve Overall length	Standard Intake Exhaust Minimum Intake Exhaust	88.65 mm (3.4902 in.) 88.69 mm (3.4917 in.) 88.35 mm (3.4874 in.) 88.39 mm (3.4799 in.)
Head margin thickness	Standard Minimum	1.0 mm (0.039 in.) 0.7 mm (0.028 in.)

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Valve lifter		
Diameter		30.966 – 30.976 mm (1.2191 – 1.2195 in.)
Bore diameter		31.000 – 31.025 mm (1.2205 – 1.2215 in.)
Oil clearance	Standard	0.024 – 0.059 mm (0.0016 – 0.0037 in.)
	Maximum	0.1 mm (0.0039 in.)
Straight pin		
Protrusion height		5 mm (0.20 in.)
Union protrusion		
Protrusion height	Standard A	29 mm (1.14 in.)
	B	66.5 mm (2.62 in.)
	C	24 mm (0.95 in.)
Connecting rod sub-assy		
Thrust clearance	Standard	0.160 – 0.342 mm (0.063 – 0.0135 in.)
	Maximum	0.342 mm (0.0135 in.)
Oil clearance	Standard	0.028 – 0.060 mm (0.0011 – 0.0024 in.)
	Maximum	0.080 mm (0.0031 in.)
Out-of-alignment	Maximum per/100 mm (3.94 in.)	0.05 mm (0.0020 in.)
Twist	Maximum per/100 mm (3.94 in.)	0.05 mm (0.0020 in.)
Connecting rod bearing		
Center wall thickness	Reference Mark 1	1.486 – 1.490 mm (0.0585 – 0.0587 in.)
	Mark 2	1.490 – 1.494 mm (0.0587 – 0.0588 in.)
	Mark 3	1.494 – 1.498 mm (0.0588 – 0.0590 in.)
Crankshaft		
Thrust clearance	Standard	0.04 – 0.24 mm (0.0016 – 0.0094 in.)
	Maximum	0.30 mm (0.0118 in.)
Circle runout	Maximum	0.03 mm (0.0012 in.)
Main journal diameter		47.988 – 48.000 mm (1.8893 – 1.8898 in.)
	Maximum taper and out-of-round	0.02 mm (0.0008 in.)
Oil clearance	Standard	0.013 – 0.030 mm (0.0005 – 0.0012 in.)
	Maximum	0.05 mm (0.0020 in.)
Cylinder block sub-assy		
Warpage	Maximum	0.05 mm (0.0020 in.)
Bore diameter	Standard	79.000 – 79.013 mm (3.1073 – 3.1108 in.)
	Maximum	79.013 mm (3.1108 in.)
Piston		
Diameter (at 29.8 mm (1.173 in.) from the piston head)	1ZZ-FE	78.925 – 78.935 mm (3.1073 – 3.1077 in.)
	3ZZ-FE	78.955 – 78.965 mm (3.1085 – 3.1089 in.)
Oil clearance	Standard 1ZZ-FE	0.065 – 0.088 mm (0.0026 – 0.0035 in.)
	3ZZ-FE	0.035 – 0.058 mm (0.0014 – 0.0023 in.)
	Maximum 1ZZ-FE	0.088 mm (0.0035 in.)
	3ZZ-FE	0.058 mm (0.0023 in.)
Piston ring		
Groove clearance	No. 1	0.020 – 0.070 mm (0.0008 – 0.0028 in.)
	No. 2	0.030 – 0.070 mm
End gap	Standard No. 1	0.25 – 0.35 mm (0.0098 – 0.0138 in.)
	No. 2	0.35 – 0.50 mm (0.0138 – 0.0197 in.)
	Maximum No. 1	0.74 mm (0.029 in.)
	No. 2	0.89 mm (0.035 in.)
Piston pin		
Diameter		20.004 – 20.013 mm (0.7876 – 0.7879 in.)
Connecting rod bolt		
Diameter	Standard	6.6 – 6.7 mm (0.260 – 0.264 in.)
	Maximum	6.4 mm (0.252 in.)
Crank pin		
Diameter		43.992 – 44.000 mm (1.7320 – 1.7323 in.)
	Maximum taper and out-of-round	0.02 mm (0.0008 in.)
Crankshaft bearing cap set bolt		
Diameter	Standard	7.3 – 7.5 mm (0.287 – 0.295 in.)
	Maximum	7.2 mm (0.283 in.)

Straight pin	
Timing chain or belt cover sub-assy x cylinder block sub-assy	
length 15 mm (0.59 in.)	5 mm (0.20 in.)
length 12 mm (0.47 in.)	6 mm (0.24 in.)
Transaxle housing x Cylinder block sub-assy	12 mm (0.47 in.)
Cylinder head sub-assy x Cylinder block sub-assy	7 mm (0.28 in.)
Crankshaft bearing cap sub-assy x Cylinder block sub-assy	7.5 mm (0.30 in.)
Oil pump assy x Cylinder block sub-assy	10 mm (0.39 in.)
Driveshaft bracket x Cylinder block sub-assy	8 mm (0.31 in.)
Connecting rod small end bush	
Oil clearance	0.005 – 0.011 mm (0.0002 – 0.0004 in.)