

ENGINE MECHANICAL

SERVICE DATA

031FM-01

Oil pump drive gear Gear diameter (w/chain)	Minimum	48.2 mm (1.898 in.)
Oil pump drive shaft gear Gear diameter (w/chain)	Minimum	48.2 mm (1.898 in.)
Crankshaft timing gear or sprocket Gear diameter (w/chain)	Minimum	51.6 mm (2.031 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 Bolt length	Standard Maximum	161.3 to 162.7 mm (6.350 to 6.406 in.) 164.2 mm (6.465 in.)
Chain sub-assy Elongation	Maximum	115.4 mm (4.543 in.)
Camshaft timing gear or sprocket Sprocket diameter (w/chain)	Minimum	97.3 mm (3.831 in.)
Camshaft Circle runout Cam lobe height	Maximum Standard Minimum	0.05 mm (0.0020 in.) 45.510 to 45.610 mm (1.7917 to 1.7957 in.) 45.400 mm (1.7874 in.)
Camshaft No.2 Circle runout Cam lobe height	Maximum Standard Minimum	0.05 mm (0.0020 in.) 45.983 to 46.083 mm (1.8104 to 1.8143 in.) 45.873 mm (1.8060 in.)
No. 1 journal diameter Other journal diameter Thrust clearance		35.971 to 35.985 mm (1.4162 to 1.4167 in.) 22.959 to 22.975 mm (0.9040 to 0.9045 in.)
Intake	Standard Maximum	0.040 to 0.095 mm (0.0016 to 0.0037 in.) 0.11 mm (0.0043 in.)
Exhaust	Standard Maximum	0.080 to 0.135 mm (0.0032 to 0.0053 in.) 0.15 mm (0.0059 in.)
Oil clearance Intake No. 1 journal bearing mark 1 Intake No. 1 journal bearing mark 2 Intake No. 1 journal bearing mark 3 Exhaust No. 1 journal Other journals Intake No. 1 journal Other journals	Standard Standard Standard Standard Standard Maximum Maximum	0.007 to 0.038 mm (0.0028 to 0.00150 in.) 0.008 to 0.038 mm (0.0031 to 0.00150 in.) 0.008 to 0.038 mm (0.0031 to 0.00150 in.) 0.015 to 0.054 mm (0.0006 to 0.0021 in.) 0.025 to 0.062 mm (0.00098 to 0.00244 in.) 0.07 mm (0.0028 in.) 0.10 mm (0.0039 in.)
Valve clearance Intake Exhaust	(Cold)	0.19 to 0.29 mm (0.007 to 0.0114 in.) 0.30 to 0.40 mm (0.012 to 0.0160 in.)
Cylinder head Warping Cylinder block side Intake manifold side Exhaust manifold side	Maximum Maximum Maximum	0.05 mm (0.0020 in.) 0.08 mm (0.0031 in.) 0.08 mm (0.0031 in.)
Inner compression spring Free length Deviation Angle (reference)	Maximum Maximum Maximum	45.7 mm (1.799 in.) 1.6 mm (0.063 in.) 2°

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Intake valve		
Overall length	Standard	101.71 mm (4.0043 in.)
	Minimum	101.21 mm (3.9846 in.)
Valve stem diameter		5.470 to 5.485 mm (0.2154 to 0.2159 in.)
Margin thickness	Standard	1.05 to 1.45 mm (0.041 to 0.057 in.)
	Minimum	0.5 mm (0.020 in.)
Exhaust valve		
Overall length	Standard	101.15 mm (3.9823 in.)
	Minimum	100.70 mm (3.9646 in.)
Valve stem diameter		5.465 to 5.480 mm (0.2152 to 0.2157 in.)
Margin thickness	Standard	1.2 to 1.6 mm (0.047 to 0.063 in.)
	Minimum	0.75 mm (0.030 in.)
Intake valve guide bush		
Bushing inside diameter		5.510 to 5.530 mm (0.2169 to 0.2177 in.)
Oil clearance	Standard	0.025 to 0.060 mm (0.00098 to 0.00236 in.)
	Maximum	0.08 mm (0.0031 in.)
Diameter		10.285 to 10.306 mm (0.4049 to 0.4057 in.)
Protrusion height		9.6 to 10.0 mm (0.3779 to 0.3937 in.)
Exhaust valve guide bush		
Bushing inside diameter		5.510 to 5.530 mm (0.2169 to 0.2177 in.)
Oil clearance	Standard	0.030 to 0.065 mm (0.0012 to 0.0026 in.)
	Maximum	0.10 mm (0.0039 in.)
Diameter		10.285 to 10.306 mm (0.4049 to 0.4057 in.)
Protrusion height		9.6 to 10.0 mm (0.3779 to 0.3937 in.)
Valve lifter		
Lifter diameter		30.966 to 30.976 mm (1.2191 to 1.2195 in.)
Lifter bore diameter		31.009 to 31.025 mm (1.2208 to 1.2215 in.)
Oil clearance	Standard	0.033 to 0.059 mm (0.0013 to 0.0023 in.)
	Maximum	0.08 mm (0.0032 in.)
Ring w/head pin		
Protrusion height		3.0 to 5.5 mm (0.118 to 0.217 in.)
Connecting rod		
Thrust clearance	Standard	0.160 to 0.362 mm (0.0063 to 0.0143 in.)
	Maximum	0.362 mm (0.0143 in.)
Oil clearance	Standard	0.024 to 0.048 mm (0.0009 to 0.0019 in.)
	Maximum	0.08 mm (0.0031 in.)
Bushing inside diameter		22.005 to 22.014 mm (0.8663 to 0.8667 in.)
Oil clearance	Standard	0.005 to 0.011 mm (0.0002 to 0.0004 in.)
	Maximum	0.05 mm (0.0020 in.)
Out-of-alignment	Maximum per 100 mm (3.94 in.)	0.05 mm (0.0020 in.)
Rod twist	Maximum per 100 mm (3.94 in.)	0.15 mm (0.0059 in.)
Cylinder block		
Warpage	Maximum	0.05 mm (0.0020 in.)
Bore diameter	Standard	86.000 to 86.013 mm (3.3858 to 3.3863 in.)
Piston		
Piston diameter		85.927 to 85.937 mm (3.3829 to 3.3833 in.)
Piston oil clearance	Standard	0.063 to 0.086 mm (0.0025 to 0.0034 in.)
	Maximum	0.1 mm (0.0039 in.)
Piston ring		
Ring groove clearance	No. 1	0.020 to 0.070 mm (0.0008 to 0.0028 in.)
	No. 2	0.020 to 0.060 mm (0.0008 to 0.0024 in.)
	Oil (side rail)	0.070 to 0.150 mm (0.0028 to 0.0059 in.)
	Standard	
End gap	No. 1	0.30 to 0.40 mm (0.0118 to 0.0157 in.)
	No. 2	0.47 to 0.62 mm (0.0185 to 0.0244 in.)
	Oil (side rail)	0.10 to 0.35 mm (0.0039 to 0.0138 in.)
	Maximum	
	No. 1	0.89 mm (0.0350 in.)
	No. 2	1.37 mm (0.0539 in.)
	Oil (side rail)	0.73 mm (0.0287 in.)

Piston pin		
Bushing inside diameter		22.005 to 22.014 mm (0.8663 to 0.8667 in.)
Piston pin diameter		21.997 to 22.006 mm (0.8660 to 0.8664 in.)
Oil clearance	Standard	0.005 to 0.011 mm (0.0002 to 0.0004 in.)
	Maximum	0.005 mm (0.0020 in.)
Connecting rod bolt		
Diameter	Standard	7.2 to 7.3 mm (0.283 to 0.287 in.)
	Minimum	7.0 mm (0.276 in.)
Crankshaft		
Thrust clearance	Standard	0.040 to 0.240 mm (0.0016 to 0.0094 in.)
	Maximum	0.30 mm (0.0118 in.)
Thrust washer thickness		1.930 to 1.980 mm (0.0760 to 0.0780 in.)
Circle runout	Maximum	0.03 mm (0.0012 in.)
Main journal diameter		54.988 to 55.000 (2.1648 to 2.06535 in.)
Oil clearance	Standard	0.017 to 0.040 mm (0.0007 to 0.0016 in.)
	Maximum	0.07 mm (0.0028 in.)
Crank pin taper and out- of -round	Maximum	0.003 mm (0.0001 in.)
Crank pin diameter		47.990 to 48.000 mm (1.8894 to 1.8898 in.)
Crankshaft bearing cap set bolt		
Diameter	Standard	7.5 to 7.6 mm (0.295 to 0.299 in.)
	Minimum	7.2 mm (0.283 in.)