ENGINE MECHANICAL

SERVICE DATA

030F4–02

Balance shaft		
Thrust clearance	Standard	0.050 – 0.090 mm (0.0020 – 0.0035 in.)
	Maximum	0.090 mm (0.0035 in.)
Oil clearance	Standard	0.004 – 0.031 mm (0.0002 – 0.0012 in.)
	Maximum	0.031 mm (0.0012 in.)
Housing journal bore diameter	Mark 1	26.000 – 26.006 mm (1.0236 –1.0239 in.)
	Mark 2	26.007 – 26.012 mm (1.0239 –1.0241 in.)
	Mark 3	26.013 – 26.018 mm (1.0241 –1.0243 in.)
Journal diameter		22.985 – 23.000 mm (0.9049 – 0.9055 in.)
Bearing center wall thickness	Mark 1	1.486 – 1.489 mm (0.0585 – 0.0586 in)
	Mark 2	1.489 – 1.492 mm (0.0586 – 0.0587 in)
	Mark 3	1.492 – 1.495 mm (0.0587 – 0.0589 in)
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	161.3 – 162.7 mm (6.350 – 6.406 in.)
	Maximum	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	Maximum	0.03 mm (0.0012 in.)
Cam lobe height	Standard	46.495 – 46.595 mm (1.8305 – 1.8345 in.)
	Minimum	46.385 mm (1.8262 in.)
Camshaft No.2		
Circle runout	Maximum	0.03 mm (0.0012 in.)
Cam lobe height	Standard	45.983 – 46.083 mm (1.8104 – 1.8143 in.)
	Minimum	45.873 mm (1.8060 in.)
No. 1 journal diameter		35.971 – 35.985 mm (1.4165 – 1.4167 in.)
Other journal diameter		22.959 – 22.975 mm (0.9039 – 0.9045 in.)
Thrust clearance		
Intake	Standard	0.040 – 0.095 mm (0.0016 – 0.0037 in.)
	Maximum	0.11 mm (0.0043 in.)
Exhaust	Standard	0.080 – 0.135 mm (0.0032 – 0.0053 in.)
	Maximum	0.15 mm (0.0059 in.)
Oil clearance		
Intake No. 1 journal bearing mark 1	Standard	0.007 – 0.038 mm (0.0028 – 0.00150 in.)
Intake No. 1 journal bearing mark 2	Standard	0.008 – 0.038 mm (0.0031 – 0.00150 in.)
Intake No. 1 journal bearing mark 3	Standard	0.008 – 0.038 mm (0.0031 – 0.00150 in.)
Exhaust No. 1 journal	Standard	0.040 – 0.079 mm (0.00157 – 0.00311 in.)
Other journals	Standard	0.025 – 0.062 mm (0.00098 – 0.00244 in.)
Intake No. 1 journal	Maximum	0.07 mm (0.0028 in.)
Other journals	Maximum	0.10 mm (0.0039 in.)
Valve clearance		
Intake	(Cold)	0.19 – 0.29 mm (0.0075 – 0.0114 in.)
Exhaust		0.30 – 0.40 mm (0.0118 – 0.0157 in.)

Cylinder head		
Warpage		
Cylinder block side	Maximum	0.05 mm (0.0020 in.)
Intake manifold side	Maximum	0.08 mm (0.0031 in.)
Exhaust manifold side	Maximum	0.08 mm (0.0031 in.)
Inner compression spring		
Free length		45.7 mm (1.799 in.)
Deviation	Maximum	1.6 mm (0.063 in.)
Angle (reference)	Maximum	2°
Intake valve		
Overall length	Standard	101.71 mm (4.0043in.)
	Minimum	101.21 mm (3.9846in.)
Valve stem diameter		5.470 – 5.485 mm (0.2154 – 0.2159 in.)
Margin thickness	Standard	1.05 – 1.45 mm (0.041 – 0.057 in.)
	Minimum	0.5 mm (0.020 in.)
Exhaust valve		
Overall length	Standard	101.15 mm (3.9823in.)
	Minimum	100.70 mm (3.9646 in.)
Valve stem diameter		5.465 – 5.480 mm (0.2152 – 0.2157 in.)
Margin thickness	Standard	1.2 – 1.6 mm (0.047 – 0.063 in.)
	Minimum	0.5 mm (0.020 in.)
Intake valve guide bush		
Bushing inside diameter		5.510 – 5.530 mm (0.2169 – 0.2177 in.)
Oil clearance	Standard	0.025 – 0.060 mm (0.0098 – 0.00236 in.)
	Maximum	0.08 mm (0.0031 in.)
Diameter		10.285 – 10.306 mm (0.4049 – 0.4057 in.)
Protrusion height		9.6 – 10.0 mm (0.3779 – 0.3937 in.)
Exhaust valve guide bush		
Bushing inside diameter		5.510 – 5.530 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.)
Diameter		10.285 – 10.306 mm (0.4049 – 0.4057 in.)
Protrusion height		9.6 – 10.0 mm (0.3779 – 0.3937 in.)
Valve lifter		
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	0.07 mm (0.0028 in.)
Ring w/head pin		
Protrusion height		3 mm (0.12 in.)
Connecting rod		
Thrust clearance	Standard	0.160 – 0.362 mm (0.0063 – 0.0143 in.)
	Maximum	0.362 mm (0.0143 in.)
Oil clearance	Standard	0.024 – 0.048 mm (0.0009 – 0.0019 in.)
	Maximum	0.08 mm (0.0031 in.)
Bushing inside diameter		22.005 – 22.014 mm (0.8663 – 0.8667 in.)
Oil clearance	Standard	0.001 – 0.007 mm (0.00004 – 0.00028 in.)
	Maximum	0.010 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 (1AZ–FE)	Standard	86.000 – 86.013 mm (3.3858 – 3.3863 in.)
Bore diameter (2AZ–FE)	Standard	88.500 – 88.513 mm (3.4843 – 3.4848 in.)
Piston		
Piston diameter (1AZ–FE)		85.927 – 85.937 mm (3.3829 – 3.3833 in.)
Piston diameter (2AZ–FE)		88.439 – 88.449 mm (3.4818 – 3.4822 in.)
Piston oil clearance (1AZ–FE)	Standard	0.063 – 0.086 mm (0.0025 – 0.0034 in.)
Piston oil clearance (2AZ–FE)	Standard	0.051 – 0.074 mm (0.0020 – 0.0029 in.)
	Maximum	0.1 mm (0.0039 in.)

Piston ring		
Ring groove clearance (1AZ–FE/2AZ–FE)	No. 1	0.020 – 0.070 mm (0.0008 – 0.0028 in.)
	No. 2	0.020 – 0.060 mm (0.0008 – 0.0024 in.)
	Oil (side rail)	0.070 – 0.150 mm (0.0028 – 0.0059 in.)
End gap (1AZ–FE)	Standard No. 1	0.30 – 0.40 mm (0.0118 – 0.0157 in.)
	No. 2	0.47 – 0.62 mm (0.0185 – 0.0244 in.)
	Oil (side rail)	0.10 – 0.35 mm (0.0039 – 0.0138 in.)
	Maximum No. 1	0.89 mm (0.0350 in.)
	No. 2	1.35 mm (0.0531 in.)
	Oil (side rail)	0.73 mm (0.0287 in.)
End gap (2AZ–FE)	Standard No. 1	0.22 – 0.32 mm (0.0087 – 0.0126 in.)
	No. 2	0.50 – 0.60 mm (0.0197 – 0.0236 in.)
	Oil (side rail)	0.10 – 0.35 mm (0.0039 – 0.0138 in.)
	Maximum No. 1	0.89 mm (0.0350 in.)
	No. 2	1.35 mm (0.0531 in.)
	Oil (side rail)	0.73 mm (0.0287 in.)
Piston pin		
Bushing inside diameter		22.001 – 22.010 mm (0.8662 – 0.8665 in.)
Piston pin diameter		21.997 – 22.006 mm (0.8660 – 0.8664 in.)
Oil clearance	Standard	0.005 – 0.011 mm (0.0002 – 0.0004 in.)
	Maximum	0.010 mm (0.0020 in.)
Connecting rod bolt		
Diameter	Standard	7.2 – 7.3 mm (0.283 – 0.287 in.)
	Minimum	7.0 mm (0.276 in.)
Crankshaft		
Thrust clearance	Standard	0.040 – 0.240 mm (0.0016 – 0.0094 in.)
	Maximum	0.30 mm (0.0118 in.)
Thrust washer thickness		1.930 – 1.980 mm (0.0760 – 0.0780 in.)
Circle runout	Maximum	0.03 mm (0.0012 in.)
Main journal diameter		54.988 – 55.000 (2.1648 – 2.06535 in.)
Oil clearance	Standard	0.017 – 0.040 mm (0.0007 – 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 – 48.000 mm (1.8894 – 1.8898 in.)
Crankshaft bearing cap set bolt		
Diameter	Standard	7.5 – 7.6 mm (0.295 – 0.299 in.)
	Minimum	7.2 mm (0.283 in.)