

# ENGINE MECHANICAL (5S-FE)

SS0MI-07

## SERVICE DATA

Compression pressure	at 250 rpm STD Minimum Difference of pressure between each cylinder	1,226 kPa (12.5 kgf/cm <sup>2</sup> , 178 psi) or more 981 kPa (10.0 kgf/cm <sup>2</sup> , 142 psi) 98 kPa (1.0 kgf/cm <sup>2</sup> , 14 psi) or less
Valve clearance	at cold Intake Exhaust Adjusting shim (for repair part) Mark 2.500 Mark 2.550 Mark 2.600 Mark 2.650 Mark 2.700 Mark 2.750 Mark 2.800 Mark 2.850 Mark 2.900 Mark 2.950 Mark 3.000 Mark 3.050 Mark 3.100 Mark 3.150 Mark 3.200 Mark 3.250 Mark 3.300	0.19 – 0.29 mm (0.007 – 0.011 in.) 0.28 – 0.38 mm (0.011 – 0.015 in.) 2.500 mm (0.0984 in.) 2.550 mm (0.1004 in.) 2.600 mm (0.1024 in.) 2.650 mm (0.1043 in.) 2.700 mm (0.1063 in.) 2.750 mm (0.1083 in.) 2.800 mm (0.1102 in.) 2.850 mm (0.1122 in.) 2.900 mm (0.1142 in.) 2.950 mm (0.1161 in.) 3.000 mm (0.1181 in.) 3.050 mm (0.1201 in.) 3.100 mm (0.1220 in.) 3.150 mm (0.1240 in.) 3.200 mm (0.1260 in.) 3.250 mm (0.1280 in.) 3.300 mm (0.1299 in.)
Ignition timing	w/ Terminals TE1 and E1 connected of DLC1	10° BTDC @ idle
Idle speed	–	750 ± 50 rpm
Intake manifold vacuum	at idle speed	60 kPa (450 mmHg, 17.7 in.Hg)
Idler pulley tension spring	Free length Installed load at 50.5 mm (1.988 in.)	46.0 mm (1.811 in.) 32 – 37 N (3.25 – 3.75 kgf, 7.2 – 8.3 lbf)
Cylinder head	Warpage Cylinder block side Manifold side Valve seat Refacing angle Contacting angle Contacting width	Maximum Maximum 30°, 45°, 75° 45° 1.0 – 1.4 mm (0.039 – 0.055 in.)
Valve guide bushing	Inside diameter Outside diameter (for repair part) STD O/S 0.05	6.010 – 6.030 mm (0.2366 – 0.2374 in.) 11.000 – 11.027 mm (0.4331 – 0.4342 in.) 11.050 – 11.077 mm (0.4350 – 0.4361 in.)
Valve	Valve overall length STD Intake Exhaust Minimum Intake Exhaust Vale face angle Stem diameter Intake Exhaust Stem oil clearance STD Intake Exhaust Maximum Intake Exhaust Margin thickness STD Minimum	97.40 – 97.80 mm (3.8346 – 3.8504 in.) 98.25 – 98.65 mm (3.8681 – 3.8839 in.) 97.1 mm (3.823 in.) 98.0 mm (3.858 in.) 44.5° 5.970 – 5.985 mm (0.2350 – 0.2356 in.) 5.965 – 5.980 mm (0.2348 – 0.2354 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.) 0.10 mm (0.0039 in.) 0.8 – 1.2 mm (0.031 – 0.047 in.) 0.5 mm (0.020 in.)

SERVICE SPECIFICATIONS – ENGINE MECHANICAL (5S-FE)

Valve spring	Deviation Free length Installed tension at 34.7 mm (1.366 in.)	Maximum	2.0 mm (0.079 in.) 41.79 – 41.99 mm (1.6453 – 1.6531 in.) 164 – 189 N (16.7 – 19.3 kgf, 36.8 – 42.5 lbf)
Valve lifter	Lifter diameter Lifter bore diameter Oil clearance	STD Maximum	30.966 – 30.976 mm (1.2191 – 1.2195 in.) 31.000 – 31.018 mm (1.2205 – 1.2212 in.) 0.024 – 0.052 mm (0.0009 – 0.0020 in.) 0.07 mm (0.0028 in.)
Manifold	Warpage	Maximum	0.30 mm (0.0118 in.)
Camshaft	Thrust clearance  Journal oil clearance  Journal diameter Circle runout Cam lobe height  Camshaft gear backlash  Camshaft gear spring end free distance	STD Intake Exhaust Maximum Intake Exhaust STD Maximum Maximum STD Intake Exhaust Minimum Intake Exhaust STD Maximum	0.045 – 0.100 mm (0.0018 – 0.0039 in.) 0.030 – 0.085 mm (0.0012 – 0.0033 in.) 0.12 mm (0.0047 in.) 0.10 mm (0.0039 in.) 0.025 – 0.062 mm (0.0010 – 0.0024 in.) 0.10 mm (0.0039 in.) 26.959 – 26.975 mm (1.0614 – 1.0620 in.) 0.04 mm (0.0016 in.) 42.01 – 42.11 mm (1.6539 – 1.6579 in.) 40.06 – 40.16 mm (1.5772 – 1.5811 in.) 41.90 mm (1.6496 in.) 39.95 mm (1.5728 in.) 0.020 – 0.200 mm (0.0008 – 0.0079 in.) 0.30 mm (0.0188 in.) 22.5 – 22.9 mm (0.886 – 0.902 in.)
Cylinder block	Cylinder head surface warpage Cylinder bore diameter	Maximum STD Mark 1 Mark 2 Mark 3 Maximum STD O/S 0.50	0.05 mm (0.0020 in.) 87.000 – 87.010 mm (3.4252 – 3.4256 in.) 87.010 – 87.020 mm (3.4256 – 3.4260 in.) 87.020 – 87.030 mm (3.4260 – 3.4264 in.) 87.23 mm (3.4342 in.) 87.73 mm (3.4350 in.)
Piston and piston ring	Piston diameter  Piston oil clearance  Piston ring groove clearance  Piston ring end gap	STD Mark 1 Mark 2 Mark 3 O/S 0.50 STD Maximum No.1 No.2 STD No.1 No.2 Oil Maximum No.1 No.2 Oil	86.850 – 86.860 mm (3.4193 – 3.4197 in.) 86.860 – 86.870 mm (3.4197 – 3.4201 in.) 86.870 – 86.880 mm (3.4201 – 3.4205 in.) 87.350 – 87.380 mm (3.4390 – 3.4402 in.) 0.14 – 0.16 mm (0.0055 – 0.0063 in.) 0.18 mm (0.0071 in.) 0.040 – 0.080 mm (0.0016 – 0.0031 in.) 0.030 – 0.070 mm (0.0012 – 0.0028 in.) 0.270 – 0.500 mm (0.0106 – 0.0197 in.) 0.350 – 0.600 mm (0.0138 – 0.0236 in.) 0.200 – 0.550 mm (0.0079 – 0.0217 in.) 1.10 mm (0.0433 in.) 1.20 mm (0.0472 in.) 1.15 mm (0.0453 in.)

Connecting rod	Thrust clearance	STD	0.160 – 0.312 mm (0.0063 – 0.0123 in.)
		Maximum	0.35 mm (0.0138 in.)
	Connecting rod bearing center wall thickness		
	Reference	STD Mark 1	1.484 – 1.488 mm (0.0584 – 0.0586 in.)
		Mark 2	1.488 – 1.492 mm (0.0586 – 0.0587 in.)
		Mark 3	1.492 – 1.496 mm (0.0587 – 0.0589 in.)
	Connecting rod oil clearance	STD STD	0.024 – 0.055 mm (0.0009 – 0.0022 in.)
		U/S 0.25	0.023 – 0.069 mm (0.0009 – 0.0027 in.)
		Maximum	0.08 mm (0.0031 in.)
	Rod bend	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.)
	Bushing inside diameter		22.005 – 22.017 mm (0.8663 – 0.8668 in.)
	Piston pin diameter		21.997 – 22.009 mm (0.8660 – 0.8665 in.)
Piston pin oil clearance	STD	0.005 – 0.011 mm (0.0002 – 0.0004 in.)	
	Maximum	0.05 mm (0.0020 in.)	
Connecting rod bolt outside diameter	STD	7.860 – 8.000 mm (0.3094 – 0.3150 in.)	
	Minimum	7.60 mm (0.2992 in.)	
Crankshaft	Thrust clearance	STD	0.020 – 0.220 mm (0.0008 – 0.0087 in.)
		Maximum	0.30 mm (0.0118 in.)
	Thrust washer thickness		2.440 – 2.490 mm (0.0961 – 0.0980 in.)
	Main journal oil clearance	STD No.3 STD	0.025 – 0.044 mm (0.0010 – 0.0017 in.)
		U/S 0.25	0.027 – 0.067 mm (0.0011 – 0.0026 in.)
		Others STD	0.015 – 0.034 mm (0.0006 – 0.0013 in.)
		U/S 0.25	0.019 – 0.059 mm (0.0007 – 0.0023 in.)
		Maximum	0.08 mm (0.0031 in.)
	Main journal diameter	STD	54.988 – 55.003 mm (2.1653 – 2.1655 in.)
		U/S 0.25	54.745 – 54.755 mm (2.1553 – 2.1557 in.)
	Main bearing center wall thickness (Reference)		
		STD No.3 Mark 1	1.992 – 1.995 mm (0.0784 – 0.0785 in.)
		Mark 2	1.995 – 1.998 mm (0.0785 – 0.0787 in.)
		Mark 3	1.998 – 2.001 mm (0.0787 – 0.0788 in.)
		Mark 4	2.001 – 2.004 mm (0.0788 – 0.0789 in.)
		Mark 5	2.004 – 2.007 mm (0.0789 – 0.0790 in.)
		Others Mark 1	1.997 – 2.000 mm (0.0786 – 0.0787 in.)
		Mark 2	2.000 – 2.003 mm (0.0787 – 0.0789 in.)
		Mark 3	2.003 – 2.006 mm (0.0789 – 0.0790 in.)
		Mark 4	2.006 – 2.009 mm (0.0790 – 0.0791 in.)
		Mark 5	2.009 – 2.012 mm (0.0791 – 0.0792 in.)
Crank pin diameter	STD	51.985 – 52.000 mm (2.0466 – 2.0472 in.)	
	U/S 0.25	51.745 – 51.755 mm (2.0372 – 2.0376 in.)	
Circle runout	Maximum	0.06 mm (0.0024 in.)	
Main journal taper and out-of-round	Maximum	0.02 mm (0.0008 in.)	
Crank pin taper and out-of-round	Maximum	0.02 mm (0.0008 in.)	