

ENGINE MECHANICAL (1GR-FE)

SS1MH-01

SERVICE DATA

Compression pressure	Minimum	1.3 MPa (13.3 kgf-cm ² , 189 psi) or more 1.0 MPa (10.2 kgf-cm ² , 145 psi) 0.1 MPa (1.0 kgf-cm ² , 15 psi) or less
	Difference of pressure between each cylinder	
Valve clearance	at cold intake Exhaust Valve clearance adjusting shim No. 06 08 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74	0.15 to 0.25 mm (0.006 to 0.010 in.) 0.29 to 0.39 mm (0.011 to 0.015 in.) 5.060 mm (0.1992 in.) 5.080 mm (0.2000 in.) 5.100 mm (0.2008 in.) 5.120 mm (0.2016 in.) 5.140 mm (0.2024 in.) 5.160 mm (0.2031 in.) 5.180 mm (0.2039 in.) 5.200 mm (0.2047 in.) 5.220 mm (0.2055 in.) 5.240 mm (0.2063 in.) 5.260 mm (0.2071 in.) 5.280 mm (0.2079 in.) 5.300 mm (0.2087 in.) 5.320 mm (0.2094 in.) 5.340 mm (0.2102 in.) 5.360 mm (0.2110 in.) 5.380 mm (0.2118 in.) 5.400 mm (0.2126 in.) 5.420 mm (0.2134 in.) 5.440 mm (0.2142 in.) 5.460 mm (0.2150 in.) 5.480 mm (0.2157 in.) 5.500 mm (0.2165 in.) 5.520 mm (0.2173 in.) 5.540 mm (0.2181 in.) 5.560 mm (0.2189 in.) 5.580 mm (0.2197 in.) 5.600 mm (0.2205 in.) 5.620 mm (0.2213 in.) 5.640 mm (0.2220 in.) 5.660 mm (0.2228 in.) 5.680 mm (0.2236 in.) 5.700 mm (0.2244 in.) 5.720 mm (0.2252 in.) 5.740 mm (0.2260 in.)
Ignition timing	w/ Terminals TC and CG connected of DLC3 w/o Terminals TC and CG connected of DLC3	8 to 12° BTDC at idle 7 to 24° BTDC at idle
Idle speed		650 to 750 rpm
Timing chain	No. 1 and No. 2 Timing chain elongation Maximum Camshaft timing gear diameter (w/ No. 1 chain) Minimum Camshaft timing gear diameter (w/ No. 2 chain) Minimum Camshaft timing sprocket (w/ No. 2 chain) Minimum Crankshaft timing gear diameter (w/ chain) Minimum Idle gear No. 1 diameter (w/ chain) Minimum	146.8 mm (5.780 in.) 115.5 mm (4.547 in.) 73.1 mm (2.878 in.) 73.1 mm (2.878 in.) 61.0 mm (2.402 in.) 61.0 mm (2.402 in.)
Idle gear shaft oil clearance	Idle gear shaft diameter Idle gear inside diameter Oil clearance Standard Maximum	22.987 to 23.000 mm (0.9050 to 0.9055 in.) 23.02 to 23.03 mm (0.9063 to 0.9067 in.) 0.020 to 0.043 mm (0.0008 to 0.0017 in.) 0.093 mm (0.0037 in.)

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Chain tensioner	No. 2 depth	Maximum	1.0 mm (0.039 in.)
	Slipper depth	Maximum	1.0 mm (0.039 in.)
Chain vibration damper	Depth	Maximum	1.0 mm (0.039 in.)
Cylinder head	Warpage	Maximum	0.10 mm (0.0039 in.)
	Cylinder head bolt thread outside diameter	Standard	10.85 to 11.00 mm (0.4272 to 0.4331 in.)
		Minimum	10.7 mm (0.421 in.)
	Valve guide bushing bore diameter	Standard	10.295 to 10.315 mm (0.4053 to 0.4061 in.)
	Valve guide busing diameter	Standard	10.333 to 10.344 mm (0.4068 to 0.4072 in.)
		O/S 0.05	10.383 to 10.394 mm (0.4088 to 0.4092 in.)
	Protrusion height		9.3 to 9.7 mm (0.366 to 0.382 in.)
Intake manifold	Warpage		
	Intake air surge tank side:	Maximum	0.8 mm (0.031 in.)
	Cylinder head side:	Maximum	0.2 mm (0.008 in.)
Exhaust manifold	Warpage	Maximum	0.7 mm (0.028 in.)
Valve	Stem diameter	Intake	5.470 to 5.485 mm (0.2154 to 0.2159 in.)
		Exhaust	5.465 to 5.480 mm (0.2152 to 0.2158 in.)
	Valve face angle		44.5°
	Margin thickness	Standard	1.0 mm (0.039 in.)
		Minimum	0.5 mm (0.020 in.)
	Stem oil clearance	Standard Intake	0.025 to 0.060 mm (0.0010 to 0.0024 in.)
		Exhaust	0.030 to 0.065 mm (0.0012 to 0.0026 in.)
		Maximum Intake	0.08 mm (0.0031 in.)
		Exhaust	0.10 mm (0.0039 in.)
	Valve overall length	Standard Intake	106.95 mm (4.2106 in.)
		Exhaust	105.80 mm (4.1654 in.)
		Minimum Intake	106.40 mm (4.1890 in.)
		Exhaust	105.30 mm (4.1457 in.)
Valve spring	Deviation	Maximum	2.0 mm (0.079 in.)
	Free length		47.80 mm (1.8819 in.)
	Installed tension at 33.3 mm (1.311 in.)		186.2 to 205.8 N (19.0 to 21.0 kgf, 41.9 to 46.3 lbf)
Valve guide bushing	Inside diameter		5.51 to 5.53 mm (0.2169 to 0.2177 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 (0.0031 in.)
Camshaft	Thrust clearance	Standard	0.04 to 0.09 mm (0.016 to 0.035 in.)
		Maximum	0.11 mm (0.0043 in.)
	Circle runout		0.06 mm (0.0024 in.)
	Cam lobe height	Standard Intake	44.168 to 44.268 mm (1.7389 to 1.7428 in.)
		Exhaust	44.580 to 44.680 mm (1.7551 to 1.7591 in.)
		Minimum Intake	44.018 mm (1.7330 in.)
		Exhaust	44.430 mm (1.7492 in.)
	Journal diameter	No. 1	35.971 to 35.985 mm (1.4162 to 1.4167 in.)
		Other	22.959 to 22.975 mm (0.9039 to 0.9045 in.)
	Oil clearance	Standard	
		RH side No. 1 (Intake)	0.008 to 0.038 mm (0.0003 to 0.0015 in.)
		RH side No. 1 (Exhaust)	0.040 to 0.079 mm (0.0016 to 0.0031 in.)
		LH side No. 1 (Intake)	0.040 to 0.079 mm (0.0016 to 0.0031 in.)
		Other	0.025 to 0.062 mm (0.0010 to 0.0024 in.)
		Maximum	
		RH side No. 1 (Intake)	0.07 mm (0.0028 in.)
		Other	0.10 mm (0.0039 in.)

Connecting rod	Thrust clearance	Standard	0.15 to 0.30 mm (0.0059 to 0.0118 in.)
		Maximum	0.35 mm (0.0138 in.)
	Connecting rod oil clearance	Standard	0.026 to 0.046 mm (0.0010 to 0.0018 in.)
		Maximum	0.066 mm (0.0025 in.)
	Connecting rod bolt tension portion diameter	Standard	7.2 to 7.3 mm (0.283 to 0.287 in.)
		Minimum	7.0 mm (0.276 in.)
	Connecting rod bearing center wall thickness	Mark	
		1	1.484 to 1.487 mm (0.0584 to 0.0585 in.)
		2	1.487 to 1.490 mm (0.0585 to 0.0587 in.)
		3	1.490 to 1.493 mm (0.0587 to 0.0588 in.)
		4	1.493 to 1.496 mm (0.0588 to 0.0589 in.)
	Rod alignment	Maximum per 100 mm (3.94 in.)	0.05 mm (0.0020 in.)
	Rod twist	Maximum per 100 mm (3.94 in.)	0.05 mm (0.0059 in.)
	Bushing inside diameter	Mark	
Crankshaft		A	22.005 to 22.008 mm (0.8663 to 0.8665 in.)
		B	22.009 to 22.011 mm (0.8665 to 0.8666 in.)
		C	22.012 to 22.014 mm (0.8666 to 0.8667 in.)
	Bushing oil clearance	Standard	0.005 to 0.011 mm (0.0002 to 0.0004 in.)
		Maximum	0.050 mm (0.0020 in.)
	Thrust clearance	Standard	0.04 to 0.24 mm (0.0016 to 0.0094 in.)
		Maximum	0.30 mm (0.0118 in.)
	Crankshaft bearing cap set bolt tension		
	portion diameter	Standard	10.0 to 10.2 mm (0.393 to 0.402 in.)
	Circuit runout	Maximum	0.06 mm (0.0024 in.)
	Main journal diameter		71.988 to 72.000 mm (2.8342 to 2.8346 in.)
	Main journal taper and out-of-round	Maximum	0.02 mm (0.0008 in.)
	Crank pin diameter		55.992 to 56.000 mm (2.2044 to 2.2047 in.)
	Crank pin taper and out-of-round	Maximum	0.02 mm (0.0008 in.)
	Oil clearance	Standard	0.018 to 0.030 mm (0.0007 to 0.0012 in.)
		Maximum	0.046 mm (0.0018 in.)
	Main journal bore diameter on cylinder block		77.000 to 77.016 mm (3.0315 to 3.0321 in.)
	Standard bearing center wall thickness	Mark	
		1	2.488 to 2.491 mm (0.0980 to 0.0981 in.)
		2	2.491 to 2.494 mm (0.0981 to 0.0982 in.)
		3	2.494 to 2.497 mm (0.0982 to 0.0983 in.)
		4	2.497 to 2.500 mm (0.0984 to 0.0985 in.)
		5	2.500 to 2.503 mm (0.0984 to 0.0985 in.)

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Cylinder block	Cylinder head surface warpage	Maximum	0.05 mm (0.0020 in.)	
	Cylinder bore diameter	Standard	94.000 to 94.012 mm (3.7008 to 3.7013 in.)	
		Maximum	94.132 mm (3.7060 in.)	
Piston and piston ring	Piston diameter		93.910 to 93.920 mm (3.6972 to 3.6976 in.)	
	Piston oil clearance	Standard	0.080 to 0.102 mm (0.0031 to 0.0040 in.)	
		Maximum	0.13 mm (0.0051 in.)	
	Piston pin hole inside diameter	Mark		
		A	22.001 to 22.004 mm (0.8662 to 0.8663 in.)	
		B	22.005 to 22.007 mm (0.8663 to 0.8664 in.)	
		C	22.008 to 22.010 mm (0.8665 to 0.8665 in.)	
	Piston pin diameter	Mark		
		A	21.997 to 22.000 mm (0.8660 to 0.8661 in.)	
		B	22.001 to 22.003 mm (0.8661 to 0.8663 in.)	
		C	22.004 to 22.006 mm (0.8663 to 0.8664 in.)	
	Bushing oil clearance	Standard	0.001 to 0.007 mm (0.00004 to 0.00028 in.)	
		Maximum	0.040 mm (0.0016 in.)	
	Piston ring groove clearance	No. 1	0.02 to 0.07 mm (0.0008 to 0.0028 in.)	
		No. 2	0.02 to 0.06 mm (0.0008 to 0.0024 in.)	
		Oil	0.07 to 0.15 mm (0.0028 to 0.0060 in.)	
	Piston ring end gap	Standard	No. 1	0.30 to 0.40 mm (0.0118 to 0.0157 in.)
			No. 2	0.40 to 0.50 mm (0.0157 to 0.0197 in.)
		Oil		
			(Side rail)	0.10 to 0.40 mm (0.0039 to 0.0157 in.)
		Maximum	No. 1	1.0 mm (0.039 in.)
			No. 2	1.1 mm (0.043 in.)
		Oil		
		(Side rail)	1.0 mm (0.039 in.)	