1GR-FE ENGINE MECHANICAL

SERVICE DATA

Ignition timing		Terminals TC and CG of DLC3 connected	8 to 12° BTDC @ idle (Transmission in neutral position)
		Terminals TC and CG of DLC3 disconnected	7 to 24° BTDC @ idle (Transmission in neutral position)
Idle speed			650 to 750 rpm (Transmission in neutral position)
Compression		Compression pressure	1,300 kPa (13.3 kgf/cm^2, 189 psi) or more
		Minimum pressure	1,000 kPa (10.2 kgf/cm^2, 145 psi)
		Difference between each cylinder	100 kPa (1.0 kgf/cm^2, 15 psi) or less
Valve clearance	Intake	(cold)	0.15 to 0.25 mm (0.006 to 0.010 in.)
	Exhaust		0.29 to 0.39 mm (0.011 to 0.015 in.)
Intake manifold	Intake air surge tank side warpage	Maximum	0.8 mm (0.031 in.)
	Cylinder head side warpage		0.2 mm (0.008 in.)
Exhaust manifold	Warpage	Maximum	0.7 mm (0.028 in.)
Camshaft timing gear assembly	Diameter (with chain)	Large gear	115.5 mm (4.547 in.)
		Small gear	73.1 mm (2.878 in.)
Camshaft timing gear or sprocket	Diameter (with chain)		73.1 mm (2.878 in.)
Crankshaft timing gear or sprocket	Diameter (with chain)		61.0 mm (2.402 in.)
Idle sprocket	Diameter (with chain)		61.0 mm (2.402 in.)
Cylinder head set bolt	Outer diameter	Standard	10.85 to 11.00 mm (0.4272 to 0.4331 in.)
		Minimum	10.7 mm (0.421 in.)
Chain sub-assembly	Length	Maximum	146.8 mm (5.780 in.)
No. 2 chain sub-assembly	Length	Maximum	146.8 mm (5.780 in.)
Idle gear shaft	Diameter		22.987 to 23.000 mm (0.9050 to 0.9055 in.)
	Internal diameter		23.02 to 23.03 mm (0.9063 to 0.9067 in.)
	Oil clearance	Standard	0.020 to 0.043 mm (0.0008 to 0.0017 in.)
		Maximum	0.093 mm (0.0037 in.)
Chain tensioner assembly No. 2	Wear	Maximum	1.0 mm (0.039 in.)
Chain tensioner assembly No. 3	Wear	Maximum	1.0 mm (0.039 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.)
Chain vibration damper No. 2	Wear	Maximum	1.0 mm (0.039 in.)
Cylinder head sub-assembly	Warpage	Maximum	0.10 mm (0.0039 in.)
Intake valve	Valve stem diameter		5.470 to 5.485 mm (0.2154 to 0.2159 in.)
	Valve face angle		45.5°
	Margin thickness	Standard	1.0 mm (0.039 in.)
		Minimum	0.5 mm (0.020 in.)
	Overall length	Standard	106.95 mm (4.2106 in.)
		Minimum	106.70 mm (4.2008 in.)

Exhaust valve	Valve stem diameter			5.465 to 5.480 mm (0.2152 to 0.2158 in.)
	Valve face angle			45.5°
	Margin thickness		Standard	1.0 mm (0.039 in.)
			Minimum	0.5 mm (0.020 in.)
	Overall length		Standard	105.80 mm (41654 in.)
			Minimum	105.55 mm (4.1555 in.)
Inner compression spring	Deviation		Maximum	2.0 mm (0.079 in.)
	Free length		Maximum	47.80 mm (1.8819 in.)
	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)
Intake valve guide bush	Inside diameter			5.51 to 5.53 mm (0.2169 to 0.2177 in.)
	Oil clearance		Standard	0.025 to 0.060 mm (0.0010 to 0.0024 in.)
			Maximum	0.08 mm (0.0031 in.)
	Bore diameter			10.295 to 10.315 mm (0.4053 to 0.4061 in.)
	Protrusion height			9.3 to 9.7 mm (0.366 to 0.382 in.)
Exhaust valve guide bush	Inside diameter			5.51 to 5.53 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.)
	Bore diameter			10.295 to 10.315 mm (0.4053 to 0.4061 in.)
	Protrusion height			9.3 to 9.7 mm (0.366 to 0.382 in.)
Valve lifter	Diameter			30.966 to 30.976 mm (1.2191 to 1.2195 in.)
	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.)
No. 1 camshaft	Journal diameter		No. 1 journal	35.971 to 35.985 mm (1.4162 to 1.4167 in.)
			Other journals	22.959 to 22.975 mm (0.9039 to 0.9045 in.)
	Circle runout		Maximum	0.06 mm (0.0024 in.)
	Cam lobe height		Standard	44.168 to 44.268 mm (1.7389 to 1.7428 in.)
			Minimum	44.018 mm (1.7330 in.)
	Oil clearance	No. 1 journal	Standard	0.008 to 0.038 mm (0.0003 to 0.0015 in.)
			Other journals	0.025 to 0.062 mm (0.0010 to 0.0024 in.)
		No. 1 journal	Maximum	0.07 mm (0.0028 in.)
			Other journals	0.10 mm (0.0039 in.)
	Thrust clearance		Standard	0.04 to 0.09 mm (0.016 to 0.035 in.)
			Maximum	0.11 mm (0.0043 in.)
No. 2 camshaft	Journal diameter		No. 1 journal	35.971 to 35.985 mm (1.4162 to 1.4167 in.)
			Other journals	22.959 to 22.975 mm (0.9039 to 0.9045 in.)
	Circle runout		Maximum	0.06 mm (0.0024 in.)
	Cam lobe height		Standard	44.580 to 44.680 mm (1.7551 to 1.7591 in.)
			Minimum	44.430 mm (1.7492 in.)
	Oil clearance	No. 1 journal	Standard	0.040 to 0.079 mm (0.0016 to 0.0031 in.)
			Other journals	0.025 to 0.062 mm (0.0010 to 0.0024 in.)
			Maximum	0.10 mm (0.0039 in.)
	Thrust clearance		Standard	0.04 to 0.09 mm (0.016 to 0.035 in.)
			Maximum	0.11 mm (0.0043 in.)

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No. 3 camshaft sub-assembly	Journal diameter		No. 1 journal	35.971 to 35.985 mm (1.4162 to 1.4167 in.)
			Other journals	22.959 to 22.975 mm (0.9039 to 0.9045 in.)
	Circle runout		Maximum	0.06 mm (0.0024 in.)
	Cam lobe height		Standard	44.168 to 44.268 mm (1.7389 to 1.7428 in.)
			Minimum	44.018 mm (1.7330 in.)
	Oil clearance	No. 1 journal	Standard	0.008 to 0.038 mm (0.0003 to 0.0015 in.)
			Other journals	0.025 to 0.062 mm (0.0010 to 0.0024 in.)
			Maximum	0.10 mm (0.0039 in.)
	Thrust clearance		Standard	0.04 to 0.09 mm (0.016 to 0.035 in.)
			Maximum	0.11 mm (0.0043 in.)
No. 4 camshaft sub-assembly	Journal diameter		No. 1 journal	35.971 to 35.985 mm (1.4162 to 1.4167 in.)
			Other journals	22.959 to 22.975 mm (0.9039 to 0.9045 in.)
	Circle runout		Maximum	0.06 mm (0.0024 in.)
	Cam lobe height		Standard	44.580 to 44.680 mm (1.7551 to 1.7591 in.)
			Minimum	44.430 mm (1.7492 in.)
	Oil clearance	No. 1 journal	Standard	0.040 to 0.079 mm (0.0016 to 0.0031 in.)
			Other journals	0.025 to 0.062 mm (0.0010 to 0.0024 in.)
			Maximum	0.10 mm (0.0039 in.)
	Thrust clearance		Standard	0.04 to 0.09 mm (0.016 to 0.035 in.)
			Maximum	0.11 mm (0.0043 in.)
Ring pin for cylinder head sub-assembly and cylinder head LH	Protrusion height			2.7 to 3.3 mm (0.106 to 0.130 in.)
Straight pin for cylinder head sub-assembly and cylinder head LH	Protrusion height		A	17.5 to 19.5 mm (0.689 to 0.768 in.)
			B	7.5 to 8.5 mm (0.295 to 0.335 in.)
			C	7.0 to 9.0 mm (0.276 to 0.354 in.)
Tight plug for cylinder head sub-assembly and cylinder head LH	Depth			1.5 mm (0.059 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.)
	Oil clearance		Standard	0.026 to 0.046 mm (0.0010 to 0.0018 in.)
			Maximum	0.066 mm (0.0025 in.)
Crankshaft thrust clearance			Standard	0.04 to 0.24 mm (0.0016 to 0.0094 in.)
			Maximum	0.30 mm (0.0118 in.)
Cylinder block 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	Diameter			93.910 to 93.940 mm (3.6972 to 3.6984 in.)
	Oil clearance		Standard	0.060 to 0.102 mm (0.0031 to 0.0040 in.)
			Maximum	0.13 mm (0.0051 in.)
Connecting rod out-of alignment			Maximum	0.05 mm (0.0020 in.) per 100 mm (3.94 in.)
Connecting rod twist			Maximum	0.15 mm (0.0059 in.) per 100 mm (3.94 in.)
Connecting rod bushing	Internal diameter			22.005 to 22.014 mm (0.8662 to 0.8665 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	0.050 mm (0.0020 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 pin	Internal diameter			22.001 to 22.010 mm (0.8662 to 0.8665 in.)
Piston ring	End gap	No. 1	Standard	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.)
		No. 1	Maximum	1.0 mm (0.039 in.)
		No. 2		1.1 mm (0.043 in.)
		Oil (Side rail)		1.0 mm (0.039 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.)
	Thrust clearance		Standard	0.15 to 0.30 mm (0.0059 to 0.0118 in.)
			Minimum	0.35 mm (0.0138 in.)
Crankshaft bearing cap set bolt	Diameter		Standard	10.0 to 10.2 mm (0.393 to 0.402 in.)
Crankshaft	Circle 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.)
Crankshaft	Oil clearance		Standard	0.018 to 0.030 mm (0.0007 to 0.0012 in.)
			Maximum	0.046 mm (0.0018 in.)
	Thrust clearance			0.04 to 0.24 mm (0.0016 to 0.0094 in.)
			Maximum	0.30 mm (0.0018 in.)
Straight pin	Protrusion	Pin A	Standard	22.5 to 23.5 mm (0.886 to 0.925 in.)
		Pin B		10.5 to 11.5 mm (0.413 to 0.453 in.)
		Pin C		8.5 to 9.5 mm (0.335 to 0.374 in.)
		Pin D		5.5 to 6.5 mm (0.217 to 0.256 in.)