

ENGINE MECHANICAL (5S-FE)

Specifications

Idle speed		USA CANADA	700 ± 50 rpm 750 ± 50 rpm	
Intake manifold vacuum	at idle speed		60 kPa 450 mmHg 17.7 in.Hg	
Compression pressure	at 250 rpm Difference of pressure between each cylinder	STD Limit	1,226 kPa (12.5 kgf/cm ² , 178 psi) or more 981 kPa 10.0 kgf/cm ² 142 psi 98 kPa (1.0 kgf/cm ² , 14 psi) or less	
Idler pulley tension spring	Free length at 51.9 mm (2.043 in.) Installed load		46.0 mm 1.811 in. 32-37 N 3.25-3.75 kgf 7.2-8.3 l bf	
Cylinder head	Warpage Cylinder block side Manifold side Valve seat Refacing angle Contacting angle Contacting width	Limit Limit	0.05 mm 0.020 in. 0.08 mm 0.031 in. 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. 11.033 - 11.044 mm 0.4344 - 0.4348 in. 11.083 - 11.094 mm 0.4363 - 0.4368 in.	
Valve	Valve overall length Valve face angle Stem diameter Stem oil clearance Margin thickness	STD Limit STD Limit	Intake Exhaust Intake Exhaust Intake Exhaust Intake Exhaust Intake Exhaust STD Limit	97.60 m m 3.8425 in. 98.45 m m 3.8760 in. 97.1 mm 3.823 i n . 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.
Valve spring	Squareness Free length Installed tension at 34.7 mm (1.366 in.)	Limit	2.0 mm 0.079 ii 0.079 in. 41.96 - 41.99 mm 1.6520 1.6520 - 1.6531 in. 164 - 189 N 0 6.7 - 19.3 kgf, 36.8 - 42.5 l bf)	
Valve lifter	Lifter diameter Lifter bore diameter Oil clearance	STD Limit	30.966 - 30.976 mm 1.2191 - 1.2195 in. 31.000 - 31.018 mm 1.2205 - 1.2213 in. 0.024 - 0.052 mm 0.0009 - 0.0020 in. 0.07 mm 0.0028 in.	
Manifold	Warpage	Limit	0.30 mm 0.0118 in.	

Specifications (Cont'd)

Camshaft	Thrust clearance	STD	Intake	0.045 – 0.100 mm 0.0018 – 0.0039 in.
			Exhaust	0.030 – 0.085 mm 0.0012 – 0.0033 in.
	Journal oil clearance	Limit	Intake	0.12 mm
			Exhaust	0.0047 in.
	Journal diameter	STD		0.10 mm 0.0039 in.
		Limit		0.025 – 0.062 mm 0.0010 – 0.0024 in.
	Circle runout Limit			0.10 mm 0.0039 in.
				26.959 – 26.975 mm 1.0614 – 1.0620 in.
	Cam lobe height STD Intake			0.04 mm 0.0016 in.
				42.010 – 42.110 mm 1.6539 – 1.6579 in.
	Exhaust			40.060 – 40.160 mm 1.5772 – 1.5811 in.
				41.90 mm 1.6496 in.
	Limit Intake			39.95 mm 1.5728 in.
			0.020 – 0.200 mm 0.0008 – 0.0079 in.	
Exhaust			0.30 mm 0.0188 in.	
			22.5 – 22.9 mm 0.886 – 0.902 in.	
Cylinder block	Cylinder head surface warpage	Limit		0.05 mm 0.0020 in.
	Cylinder bore diameter STD	Mark 1		87.000 – 87.010 mm 3.4252 – 3.4256 in.
		Mark 2		87.010 – 87.020 mm 3.4256 – 3.4260 in.
		Mark 3		87.020 – 87.030 mm 3.4260 – 3.4264 in.
	Limit	STD		87.23 mm 3.4342 in.
O/S 0.50			87.73 mm 3.4350 in.	
Piston and piston ring	Piston diameter	STD	Mark 1	86.850 – 86.860 mm 3.4193 – 3.4197 in.
			Mark 2	86.860 – 86.870 mm 3.4197 – 3.4201 in.
			Mark 3	86.870 – 86.880 mm 3.4201 – 3.4205 in.
	Piston oil clearance	O/S 0.50		87.350 – 87.380 mm 3.4390 – 3.4402 in.
	Piston ring groove clearance	STD		0.140 – 0.160 mm 0.0055 – 0.0063 in.
		Limit		0.18 mm 0.0071 in.
	Piston ring end gap	No.1		0.040 – 0.080 mm 0.0016 – 0.0031 in.
		No.2		0.030 – 0.070 mm 0.0012 – 0.0028 in.
	Limit	STD	No.1	0.270–0.500 mm 0.0106–0.0197 in.
			No.2	0.350 – 0.600 mm 0.0138 – 0.0234 in.
			Oil	0.200 – 0.550 mm 0.0079 – 0.0217 in.
			No.1	1.10 mm 0.0433 in.
		No.2	1.20 mm 0.0472 in.	
Connecting rod	Thrust clearance STD			0.160 – 0.312 mm 0.0063 – 0.0123 in.
		Limit		0.35 mm 0.0138 in.
	Connecting rod bearing center wall thickness	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.
		Limit		0.08 mm 0.0031 in.
	Rod bending Limit per 100 mm (3.94 in.)			0.05 mm 0.0020 in.
	Rod twist Limit 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.	

Specifications (Cont'd)

Connecting rod (cont'd)	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.	
	Limit			0.05 mm	0.0020 in.	
	Connecting rod bolt outside diameter	STD		7.860 – 8.000 mm	0.3094 – 0.3150 in.	
		Limit		7.60 mm	0.2992 in.	
Crankshaft	Thrust clearance	STD		0.020 – 0.220 mm	0.0008 –	
		Limit		0.30 mm	0.0087 in.	
	Thrust washer thickness			2.440 – 2.490 mm	0.0118 in.	
	Main journal oil clearance				0.0961 – 0.0980 in.	
		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.
				Limit	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					
		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 m m	0.0787 – 0.0788 in.
				Mark 4	2.001 – 2.004 m m	0.0788 – 0.0789 in.
				Mark 5	2.004 – 2.007 m m	0.0789 – 0.0790 in.
			Others	Mark 1	1.997 – 2.000 mm	0.0786 – 0.0787 in.
				Mark 2	2.000 – 2.003 m m	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			Limit	0.06 mm	0.0024 in.	
Main journal taper and out-of-round			Limit	0.02 mm	0.0008 in.	
Crank pin taper and out-of-round			Limit	0.02 mm	0.0008 in.	

Torque Specifications

Part tightened		N·m	kgf-cm	ft-lbf
Oil pump pulley x Oil pump drive shaft		28	290	21
No.2 idler pulley x Cylinder block		42	425	31
Crankshaft pulley x Crankshaft		108	1,100	80
Camshaft timing pulley x Camshaft		54	550	40
	For SST	37	380	27
No.1 idler pulley x Cylinder head		42	425	31
Cylinder head x Cylinder block	1st	49	500	36
	2nd	Turn 90°		
Spark plug tube x Cylinder head		39	400	29
Camshaft bearing cap x Cylinder head		19	190	14

Torque Specifications (Cont'd)

Part tightened		N·m	kgf-cm	ft-lbf
Cylinder head cover x Cylinder head		23	230	17
Alternator bracket x Cylinder head		42	425	31
Engine hanger x Cylinder head		25	250	18
No.3 timing belt cover x Cylinder head		7.8	80	fig in.-lbf
Intake manifold x Cylinder head		19	195	14
Intake manifold stay x Intake manifold		19	195	14
Intake manifold stay x Cylinder block		42	425	31
EGR valve x Intake manifold		13	130	9
EGR pipe x Cylinder head		59	600	43
Water by-pass pipe x Water pump cover		9.3	95	82 in.-lbf
Water outlet x Cylinder head		15	150	11
Catalytic converter x Exhaust manifold		29	300	22
Exhaust manifold x Cylinder head		49	500	36
Catalytic converter stay x Catalytic converter		42	425	31
Catalytic converter stay x Cylinder block		42	425	31
Main bearing cap x Cylinder block		59	600	43
Connecting rod cap x Connecting rod	1st	25	250	18
	2nd	Turn 90°		
Rear oil seal retainer x Cylinder block		9.3	95	82 in.-lbf
Knock sensor x Cylinder block		37	380	27
Rear end plate x Cylinder block		9.3	95	82 in.-lbf
Flywheel x Crankshaft (M/T)		88	900	65
Drive plate x Crankshaft (A/T)		83	850	61
R H engine mounting bracket x Cylinder block		52	530	38
PS pump bracket x Cylinder head		43	440	32
LH engine mounting bracket x Transaxle		52	530	38
LH engine mounting insulator x Body		87	890	64
LH engine mounting insulator x LH mounting bracket		63	650	47
RH engine mounting insulator x Body		87	890	64
RH engine mounting insulator x RH mounting bracket		52	530	38
R H engine mounting stay x R H mounting insulator		73	740	54
RH engine mounting stay x Alternator bracket		73	740	54
LH engine mounting stay x Transaxle		21	210	15
LH engine mounting stay x LH mounting insulator		21	210	15
Front engine mounting bracket x Transaxle		77	790	57
Rear engine mounting bracket x Transaxle		77	790	57
Engine mounting center member x Body		52	530	38
Engine mounting center member x Front mounting insulator		73	740	54
Engine mounting center member x Rear mounting insulator		73	740	54
Front engine mounting bracket x Front mounting bracket		87	890	64
Rear engine mounting bracket x Rear mounting insulator		87	890	64
PS pump x PS pump bracket	Adjusting bolt	39	400	29
	Others	43	440	32
A/C compressor x Cylinder block		27	280	20
Suspension lower crossmember x Body		152	1,550	112
Suspension upper brace x Body	Bolt	21	210	15
	Nut	64	650	47