

ENGINE MECHANICAL

SERVICE DATA

SS06N-03

Compression pressure	at 250 rpm STD Minimum Difference of pressure between each cylinder	3,138 kPa (32.0 kgf/cm ² , 455 psi) or more 1,961 kPa (20.0 kgf/cm ² , 284 psi) 490 kPa (5.0 kgf/cm ² , 71 psi) or less
Valve clearance	at cold Intake Exhaust Adjusting shim thickness (for repair part) No.01 No.42 No.06 No.43 No.11 No.44 No.16 No.45 No.21 No.46 No.26 No.47 No.31 No.48 No.36 No.49 No.41	0.20 – 0.30 mm (0.008 – 0.012 in.) 0.40 – 0.50 mm (0.016 – 0.020 in.) 2.50 mm (0.0984 in.) 2.55 mm (0.1004 in.) 2.60 mm (0.1024 in.) 2.65 mm (0.1043 in.) 2.70 mm (0.1063 in.) 2.75 mm (0.1083 in.) 2.80 mm (0.1102 in.) 2.85 mm (0.1122 in.) 2.90 mm (0.1142 in.) 2.95 mm (0.1161 in.) 3.00 mm (0.1181 in.) 3.05 mm (0.1201 in.) 3.10 mm (0.1220 in.) 3.15 mm (0.1240 in.) 3.20 mm (0.1260 in.) 3.25 mm (0.1280 in.) 3.30 mm (0.1299 in.)
Injection timing	Plunger stroke 2L w/ ACSD w/o ACSD 3L w/ ACSD w/o ACSD 5L w/ ACSD w/o ACSD	0.44 – 0.56 mm (0.0173 – 0.0220 in.) 0.84 – 0.96 mm (0.0331 – 0.0378 in.) 0.54 – 0.66 mm (0.0213 – 0.0260 in.) 0.84 – 0.96 mm (0.0331 – 0.0378 in.) 0.44 – 0.56 mm (0.0173 – 0.0220 in.) 0.64 – 0.76 mm (0.0252 – 0.0299 in.)
Idle speed	2L, 3L	650 – 750 rpm
Maximum speed	2L Turkey Malaysia Others 3L Singapore Others 5L	5,020 – 5,280 rpm 4,570 – 4,830 rpm 4,770 – 5,030 rpm 4,270 – 4,530 rpm 4,470 – 4,730 rpm 4,770 – 5,030 rpm
A/C idle-up speed	–	900 – 1,000 rpm
Idler pulley tension spring	Free length Installed load at 52.1 mm (2.051 in.)	44.4 – 45.4 mm (1.748 – 1.787 in.) 53 – 59 N (5.42 – 5.98 kgf, 11.9 – 13.2 lbf)

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Valve	Valve overall length	STD Intake 2L, 3L	103.29 – 103.69 mm (4.0665 – 4.0823 in.)
		5L	104.10 – 104.50 mm (4.0984 – 4.1142 in.)
		Exhaust 2L, 3L	103.14 – 103.54 mm (4.0606 – 4.0764 in.)
		5L	103.95 – 104.35 mm (4.0925 – 4.1083 in.)
		Minimum Intake 2L, 3L	102.79 mm (4.0468 in.)
		5L	103.60 mm (4.0787 in.)
		Exhaust 2L, 3L	102.64 mm (4.0409 in.)
		5L	103.45 mm (4.0728 in.)
		Valve face angle	44.5°
		Stem diameter	
	Intake	7.975 – 7.990 mm (0.3140 – 0.3146 in.)	
	Exhaust	7.960 – 7.975 mm (0.3134 – 0.3140 in.)	
	Stem oil clearance	STD Intake	0.020 – 0.055 mm (0.0008 – 0.0022 in.)
		Exhaust	0.035 – 0.070 mm (0.0014 – 0.0028 in.)
Margin thickness	Maximum Intake	0.08 mm (0.0031 in.)	
	Exhaust	0.10 mm (0.0039 in.)	
	STD Intake	1.6 mm (0.063 in.)	
	Exhaust	1.7 mm (0.067 in.)	
	Minimum Intake	1.1 mm (0.043 in.)	
	Exhaust	1.2 mm (0.047 in.)	
Valve spring	Deviation	Maximum	2.0 mm (0.079 in.)
	Free length	Type A	46.20 mm (1.8189 in.)
		Type B	48.54 mm (1.9110 in.)
	Installed tension at 37.0 mm (1.457 in.)		
Valve lifter	Valve lifter inside diameter		40.892 – 40.902 mm (1.6099 – 1.6103 in.)
	Cylinder head lifter bore diameter		40.960 – 40.980 mm (1.6126 – 1.6134 in.)
	Oil clearance	STD	0.058 – 0.088 mm (0.0023 – 0.0035 in.)
		Maximum	0.10 mm (0.0039 in.)
Manifold	Warpage	Maximum	0.40 mm (0.0157 in.)
Camshaft	Circle runout	Maximum	0.10 mm (0.0039 in.)
	Cam lobe height	STD Intake 2L	53.850 – 53.870 mm (2.1201 – 2.1209 in.)
		3L, 5L	54.290 – 54.310 mm (2.1374 – 2.1382 in.)
		Exhaust	54.990 – 55.010 mm (2.1650 – 2.1657 in.)
		Minimum Intake 2L	53.35 mm (2.1004 in.)
		3L, 5L	53.79 mm (2.1177 in.)
		Exhaust	54.49 mm (2.1453 in.)
	Journal diameter	STD No.1	34.969 – 34.985 mm (1.3767 – 1.3774 in.)
		Others	27.969 – 27.985 mm (1.1011 – 1.1018 in.)
		U/S 0.125 No.1	34.844 – 34.860 mm (1.3718 – 1.3724 in.)
		Others	27.844 – 27.860 mm (1.0962 – 1.0968 in.)
		U/S 0.250 No.1	34.719 – 34.735 mm (1.3669 – 1.3675 in.)
		Others	27.719 – 27.735 mm (1.0913 – 1.0919 in.)
	Journal oil clearance	STD	0.022 – 0.074 mm (0.0009 – 0.0029 in.)
		Maximum	0.10 mm (0.0039 in.)
	Thrust clearance	STD	0.080 – 0.280 mm (0.0031 – 0.0110 in.)
		Maximum	0.35 mm (0.0138 in.)
	Combustion chamber	Protrusion	
Shim thickness		0.03 mm (0.0012 in.)	

Connecting rod	Thrust clearance	STD	0.080 – 0.300 mm (0.0031 – 0.0118 in.)
		Maximum	0.35 mm (0.0138 in.)
	Connecting rod oil clearance	STD	0.036 – 0.064 mm (0.0014 – 0.0025 in.)
		U/S 0.25, U/S 0.50, 2L	0.023 – 0.073 mm (0.0009 – 0.0029 in.)
		3L, 5L	0.033 – 0.079 mm (0.0013 – 0.0031 in.)
		Maximum	0.10 mm (0.0039 in.)
	Connecting rod bearing center wall thickness		
	Reference	STD Mark 1	1.478 – 1.482 mm (0.0582 – 0.0583 in.)
		Mark 2	1.482 – 1.486 mm (0.0583 – 0.0585 in.)
		Mark 3	1.486 – 1.490 mm (0.0585 – 0.0587 in.)
	Rod 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.)
	Bushing inside diameter	2L	27.008 – 27.020 mm (1.0633 – 1.0638 in.)
		3L, 5L	29.008 – 29.020 mm (1.1420 – 1.1425 in.)
	Piston pin diameter	2L	27.000 – 27.012 mm (1.0630 – 1.0635 in.)
Cylinder block		3L, 5L	29.000 – 29.012 mm (1.1417 – 1.1422 in.)
	Bushing oil clearance	STD	0.004 – 0.012 mm (0.0002 – 0.0005 in.)
		Maximum	0.05 mm (0.0020 in.)
	Connecting rod bolt tension portion diameter	STD	8.400 – 8.600 mm (0.3307 – 0.3386 in.)
		Minimum	8.20 mm (0.3228 in.)
	Cylinder head surface warpage	Maximum	0.20 mm (0.0079 in.)
	Cylinder bore diameter	STD 2L STD Mark 1	92.000 – 92.010 mm (3.6220 – 3.6224 in.)
		Mark 2	92.010 – 92.020 mm (3.6224 – 3.6228 in.)
		Mark 3	92.020 – 92.030 mm (3.6228 – 3.6232 in.)
		3L STD Mark 1	96.000 – 96.010 mm (3.7795 – 3.7799 in.)
		Mark 2	96.010 – 96.020 mm (3.7799 – 3.7803 in.)
		Mark 3	96.020 – 96.030 mm (3.7803 – 3.7807 in.)
		5L STD Mark 1	99.500 – 99.010 mm (3.9173 – 3.9177 in.)
		Mark 2	99.510 – 99.020 mm (3.9177 – 3.9181 in.)
		Mark 3	99.520 – 99.030 mm (3.9181 – 3.9185 in.)
Piston and piston ring		Maximum 2L, STD	92.23 mm (3.6311 in.)
		O/S 0.50	92.73 mm (3.6508 in.)
		O/S 0.75	92.98 mm (3.6606 in.)
		O/S 1.00	93.23 mm (3.6705 in.)
		3L STD	96.23 mm (3.7886 in.)
		O/S 0.50	96.73 mm (3.8083 in.)
		5L STD	99.73 mm (3.9264 in.)
		O/S 0.50	100.23 mm (3.9461 in.)
	Piston diameter	2L STD Mark 1	91.940 – 91.950 mm (3.6197 – 3.6201 in.)
		Mark 2	91.950 – 91.960 mm (3.6201 – 3.6205 in.)
		Mark 3	91.960 – 91.970 mm (3.6205 – 3.6209 in.)
		O/S 0.50	92.440 – 92.470 mm (3.6394 – 3.6405 in.)
		O/S 0.75	92.690 – 92.720 mm (3.6492 – 3.6504 in.)
		O/S 1.00	92.940 – 92.970 mm (3.6590 – 3.6602 in.)
		3L STD Mark 1	95.940 – 95.950 mm (3.7772 – 3.7776 in.)
		Mark 2	95.950 – 95.960 mm (3.7776 – 3.7779 in.)
		Mark 3	95.960 – 95.970 mm (3.7779 – 3.7783 in.)
		O/S 0.50	96.440 – 96.470 mm (3.7968 – 3.7980 in.)
		5L STD Mark 1	99.450 – 99.460 mm (3.9153 – 3.9157 in.)
		Mark 2	99.460 – 99.470 mm (3.9157 – 3.9161 in.)
		Mark 3	99.470 – 99.480 mm (3.9161 – 3.9165 in.)
		O/S 0.50	99.950 – 99.980 mm (3.9350 – 3.9362 in.)

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Piston and piston ring (cont'd)	Piston oil clearance	STD 2L, 3L	0.050 – 0.070 mm (0.0020 – 0.0028 in.)
		5L	0.040 – 0.060 mm (0.0016 – 0.0024 in.)
		Maximum 2L, 3L	0.14 mm (0.0055 in.)
		5L	0.13 mm (0.0051 in.)
	Piston ring groove clearance	STD No.1 2L	0.031 – 0.079 mm (0.0012 – 0.0031 in.)
		3L	0.031 – 0.075 mm (0.0012 – 0.0030 in.)
		5L	0.057 – 0.101 mm (0.0022 – 0.0040 in.)
		No.2 2L, 3L	0.060 – 0.105 mm (0.0024 – 0.0041 in.)
		5L	0.060 – 0.100 mm (0.0024 – 0.0039 in.)
		Oil	0.030 – 0.070 mm (0.0012 – 0.0028 in.)
		Maximum	0.20 mm (0.0079 in.)
		STD No.1	0.350 – 0.590 mm (0.0138 – 0.0232 in.)
	Piston ring end gap	No.2 2L	0.450 – 0.720 mm (0.0177 – 0.0283 in.)
		3L	0.400 – 0.670 mm (0.0157 – 0.0264 in.)
		5L	0.470 – 0.720 mm (0.0185 – 0.0283 in.)
		Oil	0.200 – 0.520 mm (0.0079 – 0.0205 in.)
		Maximum No.1	1.29 mm (0.0508 in.)
		No.2 2L, 5L	1.42 mm (0.0559 in.)
		3L	1.37 mm (0.0539 in.)
		Oil	1.22 mm (0.0480 in.)
	Piston protrusion from cylinder block		0.68 – 0.97 mm (0.0268 – 0.0382 in.)
Crankshaft	Thrust clearance	STD	0.040 – 0.250 mm (0.0016 – 0.0098 in.)
		Maximum	0.30 mm (0.0118 in.)
	Thrust washer thickness	STD	2.430 – 2.480 mm (0.0957 – 0.0976 in.)
		O/S 0.125	2.493 – 2.543 mm (0.0981 – 0.1001 in.)
		O/S 0.250	2.555 – 2.605 mm (0.1006 – 0.1026 in.)
	Main journal oil clearance	STD STD	0.034 – 0.065 mm (0.0013 – 0.0026 in.)
		U/S 0.25, 0.50	0.033 – 0.079 mm (0.0013 – 0.0031 in.)
		Maximum	0.10 mm (0.0039 in.)
	Main journal diameter	STD	61.985 – 62.000 mm (2.4403 – 2.4409 in.)
		U/S 0.25	61.745 – 61.755 mm (2.4309 – 2.4413 in.)
		U/S 0.50	61.495 – 61.505 mm (2.4211 – 2.4215 in.)
	Main bearing center wall thickness Reference	STD Mark 1	1.979 – 1.983 mm (0.0779 – 0.0781 in.)
		Mark 2	1.983 – 1.987 mm (0.0781 – 0.0782 in.)
		Mark 3	1.987 – 1.991 mm (0.0782 – 0.0784 in.)
	Crank pin diameter	2L STD	52.988 – 53.000 mm (2.0861 – 2.0866 in.)
		U/S 0.25	52.745 – 52.755 mm (2.0766 – 2.0770 in.)
		U/S 0.50	52.495 – 52.505 mm (2.0667 – 2.0671 in.)
		3L, 5L STD	54.988 – 55.000 mm (2.1649 – 2.1654 in.)
		U/S 0.25	54.745 – 54.755 mm (2.1553 – 2.1557 in.)
		U/S 0.50	54.495 – 54.505 mm (2.1455 – 2.1459 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.)