

SERVICE SPECIFICATIONS

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MAINTENANCE

Engine

Drive belt tension				
Alternator		New belt	120 ± 20 lb	
		Used belt	104 ± 20 lb	
A/C compressor		New belt	160 ± 25 lb	
		Used belt	100 ± 20 lb	
Engine coolant capacity (w/ Heater)		3S-GTE	13.6 liters	14.4 US qts
		5S-FE	13.0 liters	12.0 Imp. qts
Engine oil capacity (Drain and refill)				11.4 Imp. qts
	3S-GTE	w/ Oil filter change	3.9 liters	4.1 US qts
		w/o Oil filter change	3.6 liters	3.4 Imp. qts
	5S-FE	w/ Oil filter change	4.2 liters	3.8 US qts
		w/o Oil filter change	4.4 US qts	3.7 Imp. qts
			3.8 liters	4.0 US qts
				3.3 Imp. qts
Spark plug				
Type	3S-GTE	ND	PK20R8	
		NGK	BKR6EP8	
	5S-FE	ND	K16R-U11	
		NGK	BKR5EYA11	
Gap	3S-GTE		0.8 mm	0.031 in.
	5S-FE		1.1 mm	0.043 in.
Firing order			1 – 3 – 4 – 2	
Valve clearance	3S-GTE	Intake	0.15 – 0.25 mm	0.006 – 0.010 in.
		Exhaust	0.20 – 0.30 mm	0.008 – 0.012 in.
	5S-FE	Intake	0.19 – 0.29 mm	0.007 – 0.011 in.
		Exhaust	0.28 – 0.38 mm	0.011 – 0.015 in.

Chassis

Front and rear brakes					
Pad thickness		Limit	1.0 mm	0.039 in.	
Disc thickness	Limit	Front	24.0 mm	0.787 in.	
		Rear	15.0 mm	0.590 in.	
Disc runout	Limit	Front	0.07 mm	0.0028 in.	
		Rear	0.10 mm	0.0039 in.	
Front axle and suspension					
Ball joint vertical play		Limit	0 mm	0 in.	
Steering wheel play			30 mm	1.18 in.	
Torque specifications					
Front seat mount bolts			375 kg-cm	27 ft-lb	37 N-m
Strut bar bracket-to-body mount bolts			740 kg-cm	54 ft-lb	73 N-m
Rear suspension lower crossmember-to-body mount bolts			1,150 kg-cm	83 ft-lb	113 N-m

ENGINE MECHANICAL (3S-GTE)**Specifications**

Idle speed				800 ± 50 rpm	
Intake manifold vacuum		at Idle speed		450 mmHg 17.7 in.Hg 60 kPa	
Compression		at 250 rpm	STD Limit	11.5 kg/cm ² (164 psi, 1,128 kPa) or more 9.0 kg/cm ² 128 psi 883 kPa 1.0 kg/cm ² (14 psi, 98 kPa) or less	
		Difference of pressure between each cylinder			
Timing belt tensioner		Protrusion		8.5 – 9.5 mm 0.335 – 0.374 in.	
Cylinder head	Warpage	Cylinder block side	Limit	0.20 mm 0.0079 in.	
		Intake manifold side	Limit	0.20 mm 0.0079 in.	
		Exhaust manifold side	Limit	0.30 mm 0.0118 in.	
	Valve seat	Refacing angle		30°, 45°, 75°	
		Contacting angle		45°	
		Contacting width		1.0 – 1.4 mm 0.039 – 0.055 in.	
Valve guide bushing	Inside diameter			6.000 – 6.018 mm 0.2362 – 0.2369 in.	
	Outside diameter (for repair part)	STD O/S 0.05		11.030 – 11.041 mm 0.4343 – 0.4347 in. 11.080 – 11.091 mm 0.4362 – 0.4367 in.	
Valve	Valve overall length	STD	Intake Exhaust	105.50 mm 4.1535 in. 99.55 mm 3.9193 in.	
		Limit	Intake Exhaust	104.80 mm 4.1260 in. 98.85 mm 3.8917 in.	
	Valve face angle			44.5°	
	Stem diameter		Intake Exhaust	5.960 – 5.975 mm 0.2346 – 0.2352 in. 5.955 – 5.970 mm 0.2344 – 0.2350 in.	
	Stem oil clearance	STD	Intake Exhaust	0.025 – 0.058 mm 0.0010 – 0.0023 in. 0.030 – 0.063 mm 0.0012 – 0.0025 in.	
		Limit	Intake Exhaust	0.08 mm 0.0031 in. 0.10 mm 0.0039 in.	
	Margin thickness	STD Limit		0.8 – 1.2 mm 0.031 – 0.047 in. 0.5 mm 0.020 in.	
Valve spring	Squareness	Limit		2.0 mm 0.079 in.	
	Free length			44.43 mm 1.7492 in.	
	Installed tension at 34.4 mm (1.354 in.)			20.5 – 24.1 kg (45.2 – 53.1 lb, 201 – 236 N)	
Valve lifter	Lifter diameter			27.975 – 27.985 mm 1.1014 – 1.1018 in.	
	Lifter bore diameter			28.000 – 28.021 mm 1.1024 – 1.1032 in.	
	Oil clearance	STD Limit		0.015 – 0.046 mm 0.0006 – 0.0018 in. 0.07 mm 0.0028 in.	
Manifold	Warpage	Limit		0.20 mm 0.0079 in.	

Specifications (Cont'd)

Camshaft	Thrust clearance	STD	0.120 – 0.240 mm	0.0047 – 0.0094 in.	
		Limit	0.30 mm	0.0118 in.	
	Journal oil clearance	STD	0.025 – 0.062 mm	0.0010 – 0.0024 in.	
		Limit	0.08 mm	0.0031 in.	
	Journal diameter		26.959 – 26.975 mm	1.0614 – 1.0620 in.	
	Circle runout	Limit	0.06 mm	0.0024 in.	
	Cam lobe height	STD	41.010 – 41.110 mm	1.6146 – 1.6185 in.	
		Limit	39.90 mm	1.5709 in.	
T-VIS valve	Warpage	Limit	0.20 mm	0.0079 in.	
Cylinder block	Cylinder head surface warpage	Limit	0.05 mm	0.0020 in.	
	Cylinder bore diameter	STD	Mark 1	86.000 – 86.010 mm	3.3858 – 3.3862 in.
			Mark 2	86.010 – 86.020 mm	3.3862 – 3.3866 in.
			Mark 3	86.020 – 86.030 mm	3.3866 – 3.3870 in.
			Limit	86.23 mm	3.3949 in.
Piston and piston ring	Piston diameter	Mark 1	85.920 – 85.930 mm	3.3827 – 3.3831 in.	
		Mark 2	85.930 – 85.940 mm	3.3831 – 3.3835 in.	
		Mark 3	85.940 – 85.950 mm	3.3835 – 3.3839 in.	
	Piston oil clearance	STD	0.070 – 0.090 mm	0.0028 – 0.0035 in.	
		Limit	0.110 mm	0.0043 in.	
	Piston ring groove clearance	No.1	0.040 – 0.080 mm	0.0016 – 0.0031 in.	
		No.2	0.030 – 0.070 mm	0.0012 – 0.0028 in.	
	Piston ring end gap	STD	No.1	0.330 – 0.550 mm	0.0130 – 0.0217 in.
			No.2	0.450 – 0.670 mm	0.0177 – 0.0264 in.
			Oil	0.200 – 0.600 mm	0.0079 – 0.0236 in.
		Limit	No.1	0.85 mm	0.0335 in.
			No.2	0.97 mm	0.0382 in.
		Oil	0.90 mm	0.0354 in.	
Connecting rod	Thrust clearance	STD	0.160 – 0.312 mm	0.0063 – 0.0123 in.	
		Limit	0.35 mm	0.35 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.
	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.

Specifications (Cont'd)

Crankshaft	Thrust clearance		STD	0.020 – 0.220 mm	0.0008 – 0.0087 in.	
			Limit	0.30 mm	0.0118 in.	
	Thrust washer thickness		STD	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	0.021 – 0.061 mm	0.0008 – 0.0024 in.
			Others	STD	0.015 – 0.034 mm	0.0006 – 0.0013 in.
				U/S 0.25	0.029 – 0.069 mm	0.0011 – 0.0027 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 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.
		STD	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	47.985 – 48.000 mm	1.8892 – 1.8898 in.
				U/S 0.25	47.745 – 47.755 mm	1.8797 – 1.8801 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		kg-cm	ft-lb	N-m
Oil pump pulley x Oil pump drive shaft		355	26	35
No.2 idler pulley x Cylinder block		440	32	43
No.1 idler pulley bracket x Cylinder head		440	32	43
Crankshaft pulley x Crankshaft		1,100	80	108
Camshaft timing pulley x Camshaft		600	43	59
	For SST	420	30	41
Timing belt tensioner x Cylinder head		210	15	21
Cylinder head x Cylinder block	1st	500	36	49
	2nd	Turn 90°		
Camshaft bearing cap x Cylinder head		190	14	19
No.3 timing belt cover x Cylinder head		90	78 in.-lb	8.8
Cylinder head cover x Cylinder head		25	21 in.-lb	2.5
Intake manifold x Cylinder head		195	14	19
Intake manifold stay x Intake manifold		260	19	25
Intake manifold stay x Cylinder block		260	19	25
Water by-pass pipe x Water pump cover		80	69 in.-lb	7.8
Water outlet x Cylinder head		400	29	39

Torque Specifications (Cont'd)

Part tightened	kg-cm	ft-lb	N-m
EGR valve x Intake manifold	195	14	19
EGR valve x Cylinder head	260	19	25
EGR pipe x Cylinder head	195	14	19
LH engine hanger x Cylinder head	12 mm head bolt	9	13
	14 mm head bolt	14	19
Exhaust manifold x Cylinder head	530	38	52
Catalytic converter x Turbine outlet elbow	300	22	29
Catalytic converter stay x Catalytic converter	600	43	59
RH front engine hanger x Cylinder head	400	29	39
Main bearing cap x Cylinder block	600	43	59
Connecting rod cap x Connecting rod	680	49	67
Rear oil seal retainer x Cylinder block	95	82 in.-lb	9.3
Knock sensor x Cylinder head	450	33	44
RH engine mounting bracket x Cylinder block	620	45	61
Alternator bracket x Cylinder block	440	32	43
Rear end plate x Cylinder block	95	82 in.-lb	9.3
Flywheel x Crankshaft	1,100	80	108
LH engine mounting bracket x Transaxle	530	38	52
Rear engine mounting bracket x Transaxle	14 mm head bolt	38	52
	17 mm head bolt	57	77
LH engine mounting insulator x LH engine mounting bracket			
Front side	650	47	63
Rear side	740	54	73
LH engine mounting insulator x Body	800	58	78
RH engine mounting insulator x RH engine mounting bracket	530	38	52
RH engine mounting insulator x Body	800	58	78
RH engine mounting stay x RH engine mounting insulator	740	54	73
RH engine mounting stay x RH engine mounting bracket	740	54	73
Air cleaner case x Body	360	26	35
LH engine mounting stay x LH engine mounting insulator	740	54	73
LH engine mounting stay x Transaxle	250	18	25
Lateral control rod x LH engine mounting insulator	380	27	37
Front engine mounting bracket x Transaxle	790	57	77
Clutch release cylinder x Transaxle	120	9	12
Front engine mounting insulator x Body	740	54	73
Rear suspension lower crossmember x Body	1,150	83	113
Stabilizer link x Shock absorber	500	36	49
Rear engine mounting insulator x Body	650	47	64
Rear engine mounting insulator x Mounting bracket	800	58	79
Front engine mounting insulator x Mounting bracket	980	71	96
A/C compressor x Cylinder block	250	18	25
A/C idler pulley bracket x Cylinder block	275	20	27
A/C idler pulley bracket x RH front engine hanger	375	27	37
Suspension upper brace x Body	Bolt	54	73
	Nut	47	64

ENGINE MECHANICAL (5S-FE)**Specifications**

Idle speed	USA M/T A/T CANADA M/T A/T	750 ± 50 rpm 700 ± 50 rpm 850 ± 50 rpm 750 ± 50 rpm
Intake manifold vacuum	at Idle speed	450 mmHg 17.7 in.Hg 60 kPa
Compression pressure	at 250 rpm STD Limit Difference of pressure between each cylinder	12.5 kg/cm ² (178 psi, 1,226 kPa) or more 10.0 kg/cm ² 142 psi 981 kPa 1.0 kg/cm ² (14 psi, 98 kPa) or less
Idler pulley tension spring	Free length Installed load at 51.9 mm (2.043 in.)	46.0 mm 1.811 in. 4.75 – 5.25 kg (10.5 – 11.6 lb, 47 – 52 N)
Cylinder head	Warpage Cylinder block side Limit Manifold side Limit Valve seat Refacing angle Contacting angle Contacting width	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. 11.048 – 11.059 mm 0.4350 – 0.4354 in. 11.098 – 11.109 mm 0.4369 – 0.4374 in.
Valve	Valve overall length STD Intake Exhaust Limit Intake Exhaust Valve face angle Stem diameter Intake Exhaust Stem oil clearance STD Intake Exhaust Limit Intake Exhaust Margin thickness STD Limit	100.60 mm 3.9606 in. 100.45 mm 3.9547 in. 100.1 mm 3.941 in. 100.0 mm 3.937 in. 44.5° 5.970 – 5.985 mm 0.2350 – 0.2356 in. 5.965 – 5.980 mm 0.2356 – 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 Limit Free length Installed tension at 34.7 mm (1.366 in.)	2.0 mm 0.079 in. 45.0 mm 1.772 in. 16.7 – 19.3 kg (36.8 – 42.5 lb, 164 – 189 N)
Valve lifter	Lifter diameter Lifter bore diameter Oil clearance STD Limit	27.975 – 27.985 mm 1.1014 – 1.1018 in. 28.000 – 28.021 mm 1.1024 – 1.1032 in. 0.015 – 0.046 mm 0.0006 – 0.0018 in. 0.07 mm 0.0028 in.
Manifold	Warpage Limit	0.3 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.
		Limit	Intake	0.12 mm	0.0047 in.
			Exhaust	0.10 mm	0.0039 in.
	Journal oil clearance	STD		0.025 – 0.062 mm	0.0010 – 0.0024 in.
		Limit		0.10 mm	0.0039 in.
	Journal diameter			26.959 – 26.975 mm	1.0614 – 1.0620 in.
	Circle runout		Limit	0.04 mm	0.0016 in.
	Cam lobe height	STD	Intake	35.310 – 35.410 mm	1.3902 – 1.3941 in.
			Exhaust	35.560 – 35.660 mm	1.4000 – 1.4039 in.
		Limit	Intake	35.20 mm	1.3858 in.
			Exhaust	35.45 mm	1.3957 in.
Camshaft gear backlash	STD		0.020 – 0.200 mm	0.0008 – 0.0079 in.	
	Limit		0.30 mm	0.0188 in.	
Camshaft gear spring end free distance				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	86.911 – 86.921 mm
			Mark 2	86.921 – 86.931 mm	3.4221 – 3.4225 in.
			Mark 3	86.931 – 86.941 mm	3.4225 – 3.4229 in.
		O/S 0.50		87.411 – 87.441 mm	3.4414 – 3.4426 in.
		Piston oil clearance	STD		0.079 – 0.099 mm
Limit				0.119 mm	0.0047 in.
Piston ring groove clearance				0.030 – 0.070 mm	0.0012 – 0.0028 in.
Piston ring end gap		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.
		Limit	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.
			Oil	1.15 mm	0.0453 in.
Connecting rod	Thrust clearance	STD		0.160 – 0.312 mm	0.0063 – 0.0123 in.
		Limit		0.35 mm	0.35 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	0.023 – 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
	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.
	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.	

Specifications (Cont'd)

Crankshaft	Thrust clearance		STD	0.020 – 0.220 mm	0.0008 – 0.0087 in.
			Limit	0.30 mm	0.0118 in.
	Thrust washer thickness		STD	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.
	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 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.
	STD	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		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		kg-cm	ft-lb	N-m
Oil pump pulley x Oil pump drive shaft		290	21	28
No.2 idler pulley x Cylinder block		425	31	42
Crankshaft pulley x Crankshaft		1,100	80	108
Camshaft timing pulley x Camshaft		550	40	54
For SST		380	27	37
No.1 idler pulley x Cylinder Head		425	31	42
Cylinder head x Cylinder block		500	36	49
		1st		
		2nd		
Camshaft bearing cap x Cylinder head		190	14	19
Cylinder head cover x Cylinder head		180	13	18
RH front engine hanger x Cylinder head		250	18	25
LH front engine hanger x Cylinder head		250	18	25
No.3 timing belt cover x Cylinder head		80	69 in.-lb	7.8
Intake manifold x Cylinder head		195	14	19
Intake manifold stay x Intake manifold		195	14	19
Intake manifold stay x Cylinder block		425	31	42
EGR valve x Cylinder head		130	9	13

Torque Specifications (Cont'd)

Part tightened	kg-cm	ft-lb	N-m
EGR pipe x Cylinder head	600	43	59
Water by-pass pipe x Water pump cover	95	82 in.-lb	9.3
Water outlet x Cylinder head	150	11	15
Catalytic converter x Exhaust manifold	300	22	29
Exhaust manifold x Cylinder head	500	36	49
Catalytic converter stay x Catalytic converter	425	31	42
Catalytic converter stay x Cylinder block	425	31	42
Main bearing cap x Cylinder block	600	43	59
Connecting rod cap x Connecting rod	250	18	25
1st			
2nd	Turn 90°		
Rear oil seal retainer x Cylinder block	95	82 in.-lb	9.3
RH engine mounting bracket x Cylinder block	620	45	61
Alternator bracket x Cylinder block	440	32	43
Rear end plate x Cylinder block	95	82 in.-lb	9.3
Flywheel x Crankshaft (M/T)	900	65	88
Drive plate x Crankshaft (A/T)	850	61	83
LH engine mounting bracket x Transaxle	530	38	52
LH engine mounting insulator x LH engine mounting bracket			
Front side	650	47	63
Rear side	740	54	73
LH engine mounting insulator x			
Transaxle (with LH engine mounting bracket)	530	38	52
LH engine mounting insulator x Body	800	58	78
RH engine mounting insulator x RH engine mounting bracket	530	38	52
RH engine mounting insulator x Body	800	58	78
RH engine mounting stay x RH engine mounting insulator	740	54	73
RH engine mounting stay x RH front engine hanger	740	54	73
Air cleaner case x Body	360	26	35
LH engine mounting stay x LH engine mounting insulator	740	54	73
LH engine mounting stay x Transaxle	250	18	25
Lateral control rod x LH engine mounting insulator	380	27	37
Front engine mounting bracket x Transaxle	790	57	77
Clutch release cylinder x Transaxle	120	9	12
Rear engine mounting bracket x Transaxle	790	57	77
Front engine mounting insulator x Body	740	54	73
Rear engine mounting insulator x Body	650	47	64
Rear engine mounting insulator x Mounting bracket	800	58	79
Front engine mounting insulator x Mounting bracket	980	71	96
A/C compressor x Cylinder block	250	18	25
A/C idler pulley bracket x Cylinder block	275	20	27
A/C idler pulley bracket x RH front engine hanger	375	27	37
Suspension upper brace x Body	740	54	73
Bolt			
Nut	650	47	64

EXHAUST SYSTEM

Part tightened	kg-cm	ft-lb	N·m
Front exhaust pipe x Catalytic converter	630	46	62
Front exhaust pipe x Tailpipe	440	32	43
Front exhaust pipe bracket x Rear suspension crossmember	210	15	21
Front exhaust pipe stopper bracket x Tailpipe stopper bracket	210	15	21
Tail pipe x Tailpipe bracket	670	48	66

TURBOCHARGER SYSTEM**Specifications**

Turbocharger	Turbocharging pressure	0.50 – 0.83 kg/cm ² (7.1 – 11.8 psi, 49 – 81 kPa)
	Impeller wheel axial play	0.13 mm (0.0051 in.) or less
	Impeller wheel radial play	0.18 mm (0.0071 in.) or less

Torque Specifications

Part tightened		kg-cm	ft-lb	N·m
Turbine outlet elbow x Turbocharger		650	47	64
Side bearing housing plate x Turbocharger		120	9	11
Turbo water pipe x Turbocharger		120	9	11
Turbocharger x Exhaust manifold		650	47	64
Oil pipe x Turbocharger		175	13	17
Oil pipe x Cylinder block	Bolt	440	32	43
	Union bolt	525	38	51
Turbocharger stay x Turbocharger		705	51	69
Turbocharger stay x Cylinder block		600	43	59
Oxygen sensor x Turbine outlet elbow		450	33	44
No.4 air tube stay x Cylinder head		195	14	19
No.4 air tube stay x No.4 air tube		195	14	19
Air by-pass valve x No.4 air tube		195	14	19

EFI SYSTEM (3S-GTE)

Specifications

Fuel pressure regulator	Fuel pressure at no vacuum	2.3 – 2.7 kg/cm ² (33 – 38 psi, 226 – 265 kPa)	
Cold start injector	Resistance Fuel leakage	2 – 4 Ω One drop or less per minute	
Injector	Resistance Injection volume Difference between each cylinder Fuel leakage	2 – 4 Ω 95 – 120 cc (5.8 – 7.3 cu in.) per 15 sec. 5 cc (0.3 cu in.) or less One drop or less per minute	
Air flow meter	Resistance VS – E2 VC – E2 THA – E2 at –20°C (–4°F) at 0°C (32°F) at 20°C (68°F) at 40°C (104°F) at 60°C (140°F)	200 – 600 Ω (Measuring plate fully closed) 20 – 1,200 Ω (Measuring plate fully open) 200 – 400 Ω 10 – 20 kΩ 4 – 7 kΩ 2 – 3 kΩ 0.9 – 1.3 kΩ 0.4 – 0.7 kΩ	
Throttle body	Throttle body fully closed angle	6°	
Throttle position sensor	Clearance between stop screw and lever 0 mm 0 in. 0.50 mm 0.020 in. 0.70 mm 0.028 in. Throttle valve fully opened position —	Between terminals VTA – E2 IDL – E2 IDL – E2 VTA – E2 VC – E2	Resistance 0.2 – 0.8 kΩ Less than 2.3 kΩ Infinity 3.3 – 10.3 kΩ 3 – 8.3 kΩ
ISC valve	Resistance + B – RSC or RSO	17.7 – 23.9 Ω	
Cold start injector time switch	Resistance STA – STJ below 10°C (50°F) above 25°C (77°F) STA – Ground	30 – 50 Ω 70 – 90 Ω 30 – 90 Ω	
Solenoid resistor	Resistance + B – No.10, No.20, No.30 or No.40	5 – 7 Ω	
Fuel pump resistor	Resistance	Approx. 0.73 Ω	
T-VIS VSV	Resistance	33 – 39 Ω	
Turbocharging pressure VSV	Resistance	24 – 30 Ω	
EGR VSV	Resistance	33 – 39 Ω	

Specifications (Cont'd)

Water temp. sensor	Resistance	at -20°C (-4°F) at 0°C (32°F) at 20°C (68°F) at 40°C (104°F) at 60°C (140°F) at 80°C (176°F)	10 – 20 kΩ 4 – 7 kΩ 2 – 7 kΩ 0.9 – 1.3 kΩ 0.4 – 0.7 kΩ 0.2 – 0.4 kΩ
EGR gas temp. sensor	Resistance	at 50°C (112°F) at 100°C (212°F) at 150°C (302°F)	69.40 – 88.50 kΩ 11.89 – 14.37 kΩ 2.79 – 3.59 kΩ
Oxygen sensor	Heater coil resistance		5.1 – 6.3 Ω
ECU	HINT:		
	● Perform all voltage and resistance measurements with the ECU connected. ● Verify that the battery voltage is 11 V or above with the ignition switch is ON.		
	Voltage		
	Terminals	Condition	STD voltage (V)
	+B +B1 – E1	IG SW ON	10 – 14
	BATT – E1	—	10 – 14
	IDL – E2	Throttle valve open	4 – 6
	VTA – E2	Throttle valve fully closed	0.1 – 1.0
	IG SW ON	Throttle valve fully open	3.2 – 4.2
		—	4 – 6
		Measuring plate fully closed	3.7 – 4.3
		Measuring plate fully open	0.2 – 0.5
	VS – E2	Idling	2.6 – 3.6
		3,000 rpm	1.0 – 2.0
	No.1 No.2 – E01 No.3 – E02 No.4	IG SW ON	10 – 14
	THA1 – E2	IG SW ON Intake air temp. 20°C (68°F)	1 – 3
	THW – E2	IG SW ON Coolant temp. 80°C (176°F)	0.1 – 1.1
	STA – E1	Cranking	6 – 14
	IGT – E1	Cranking or idling	0.8 – 1.2

Specifications (Cont'd)

ECU (cont'd)		Voltage (cont'd)		
		Terminals	Condition	STD voltage (V)
w/ Regular unleaded gasoline	RSC – E1 RSO – E1	IG SW ON	Engine ECU connector disconnected	8 – 14
	W – E1	No trouble ("CHECK" engine warning light off) and engine running		10 – 14
	PIM – E2	IG SW ON		2.5 – 4.5
	AC1 – E1	IG SW ON	Air conditioning ON	8 – 14
	ACT – E1		Air conditioning ON	4 – 6
	TVIS – E1		Throttle valve fully closed	2.0 or less
			Throttle valve open	10 – 14
w/o Premium unleaded gasoline	TVIS – E1	Idling	2.0 or less	
		4,200 rpm or more	10 – 14	
	T – E1	IG SW ON	Check connector TE1 – E1 not connected	10 – 14
			Check connector TE1 – E1 connected	0.5 or less
	Resistance			
	Terminals	Condition		STD resistance (Ω)
	IDL – E2	Throttle valve open		Infinity
		Throttle valve fully closed		2,300 or less
	VTA – E2	Throttle valve fully open		3,500 – 10,000
		Throttle valve fully closed		200 – 800
	VC – E2	—		200 – 400
	VS – E2	Measuring plate fully closed		200 – 600
		Measuring plate fully open		20 – 1,200
	THA1 – E2	Intake air temp. 20°C (68°F)		2,000 – 3,000
	THW – E2	Coolant temp. 80°C (176°F)		200 – 400
	G1 – G⊖ G2 – G⊖	—		140 – 180
	NE – G⊖	—		180 – 220
	RSC + B RSO – + B1	—		17.7 – 23.9
Fuel cut rpm	w/ Vehicle speed 0 km/h and coolant and coolant temp. 80°C (176°F)			
	Fuel cut rpm		2,000 rpm	
	Fuel return rpm		1,600 rpm	

Torque Specifications

Part tightened		kg-cm	ft-lb	N-m
Fuel line	Union bolt type	300	22	29
	Flare nut type	310	22	30
Fuel pump x Fuel tank		35	30 in.-lb	3.4
Fuel sender gauge x Fuel tank		15	13 in.-lb	1.5
Fuel evaporation bent tube x Fuel tank		15	13 in.-lb	1.5
Fuel tank filler pipe x Fuel tank		35	30 in.-lb	3.4
Fuel tank band x Body		300	22	29
No.2 center crossmember x Body		300	22	29
Cold start injector x Intake manifold		60	52 in.-lb	5.9
Cold start injector pipe x Cold start injector		180	13	18
Cold start injector pipe x Delivery pipe		180	13	18
Fuel pressure regulator x Delivery pipe		300	22	29
Injector cover x Delivery pipe		80	69 in.-lb	7.8
Fuel inlet hose x Delivery pipe	Bolt	80	69 in.-lb	7.8
	Union bolt	300	22	29
Delivery pipe x Cylinder head		195	14	19
Fuel inlet hose x Fuel filter		300	22	29
Throttle body x Intake manifold		195	14	19
Intake air connector stay x Throttle body		195	14	19
Intake air connector stay x Cylinder head		80	69 in.-lb	7.8
Intake air connector x Throttle body		195	14	19

EFI SYSTEM (5S-FE)

Specifications

Fuel pressure regulator	Fuel pressure at no vacuum	2.7 – 3.1 kg/cm ² (38 – 44 psi, 265 – 304 kPa)		
Cold start injector	Resistance Fuel leakage	2 – 4 Ω One drop or less per minute		
Injector	Resistance Injection volume Difference between each injector Fuel leakage	Approx. 13.8 kΩ 45 – 55 cc (2.7 – 3.4 cu in.)/15 sec. 5 cc (0.31 cu in.) or less One drop or less per minute		
Throttle body	Throttle body fully closed angle	6°		
Throttle position sensor (M/T)	Throttle opening angle (from Vertical)	Clearance between stop screw and lever	IDL – E1	PSW – E1
	—	0.50 mm 0.020 in.	Continuity	No continuity
	—	0.90 mm 0.035 in.	No continuity	No continuity
	Throttle valve fully opened	—	No continuity	Continuity
	71°	—	No continuity	No continuity
	81°	—	No continuity	Continuity
Throttle position sensor (A/T)	7.5° or less	—	Continuity	No continuity
	Clearance between stop screw and lever		Between terminals	Resistance
	0 mm 0 in.		VTA – E2	0.2 – 0.8 kΩ
	0.50 mm 0.020 in.		IDL – E2	2.3 kΩ or less
	0.70 mm 0.028 in.		IDL – E2	Infinity
	Throttle valve fully opened position		VTA – E2	3.3 – 10 kΩ
	—		VC – E2	3 – 7 kΩ

Specifications (Cont'd)

ISC valve	Resistance	+ B – ISCC or ISCO	19.3 – 22.3 Ω
Cold start injector time switch	Resistance	STA – STJ below 30°C (68°F) above 40°C (104°F) STA – Ground	20 – 40 Ω 40 – 60 Ω 20 – 80 Ω
Fuel pressure VSV	Resistance		33 – 39 Ω
EGR VSV	Resistance		33 – 39 Ω
Water temp. sensor	Resistance	at -20°C (-4°F) at 0°C (32°F) at 20°C (68°F) at 40°C (104°F) at 60°C (140°F) at 80°C (176°F)	10 – 20 k Ω 4 – 7 k Ω 2 – 3 k Ω 0.9 – 1.3 k Ω 0.4 – 0.7 k Ω 0.2 – 0.4 k Ω
Intake air temp. sensor	Resistance	at -20°C (-4°F) at 0°C (32°F) at 20°C (68°F) at 40°C (104°F) at 60°C (140°F) at 80°C (176°F)	10 – 20 k Ω 4 – 7 k Ω 2 – 3 k Ω 0.9 – 1.3 k Ω 0.4 – 0.7 k Ω 0.2 – 0.4 k Ω
EGR gas temp. sensor (CALIF. only)	Resistance	at 50°C (112°F) at 100°C (212°F) at 150°C (302°F)	69.40 – 88.50 k Ω 11.89 – 14.37 k Ω 2.79 – 3.59 k Ω
ECU	HINT:		
	● Perform all voltage and resistance measurements with the computer connected. ● Verify that the battery voltage is 11 V or above with the ignition switch is ON.		
	Voltage		
	Terminals	Condition	STD voltage (V)
	+ B + B1 – E1	IG SW ON	10 – 14
	BATT – E1	—	10 – 14
	M/T	IDL – E1	Throttle valve open
		PSW – E1	Throttle valve fully closed (Throttle opener must be cancelled first)
	A/T	IDL – E2	Throttle valve open
		VTA – E2	Throttle valve fully closed (Throttle opener must be cancelled first)
			Throttle valve fully open
		PIM – E2	3.3 – 3.9
		VC – E2	4.5 – 5.5
		No.10 – E01 No.20 – E02	10 – 14

Specifications (Cont'd)

ECU (cont'd)		Voltage (cont'd)		
		Terminals	Condition	STD voltage (V)
A/T	THA – E2	IG SW ON	Intake air temp. 20°C (68°F)	1.7 – 3.1
	THW – E2		Coolant temp. 80°C (176°F)	0.3 – 0.8
	STA – E1	Cracking		6 – 14
	IGT – E1	Cranking or idling		0.8 – 1.2
	ISCC – E1 ISCO	IG SW ON		8 – 14
	W – E1	No trouble ("CHECK" engine warning light off) and engine running		8 – 14
	A/C – E1	IG SW ON	Air conditioning ON	8 – 14
	ACT – E1		Air conditioning ON	4.5 – 5.5
	T – E1		Check connector TE1 – E1 not connected	10 – 14
			Check connector T – E1 connected	1 or less
	NSW – E1		Neutral start switch P or N range	0 – 2
			Ex. neutral start switch P or N range	6 – 14
	B/K – E1	Stop light SW ON (Brake pedal depressed)		10 – 14
Resistance				
		Terminals	Condition	Resistance (Ω)
M/T	IDL – E1	Throttle valve fully open		Infinity
		Throttle valve fully closed (Throttle opener must be cancelled first)		0
	PSW – E1	Throttle valve fully open		0
		Throttle valve fully closed (Throttle opener must be cancelled first)		Infinity
A/T	IDL – E2	Throttle valve fully open		Infinity
		Throttle valve fully closed (Throttle opener must be cancelled first)		2,300 or less
	VTA – E2	Throttle valve fully open		3,300 – 10,000
		Throttle valve fully closed (Throttle opener must be cancelled first)		200 – 800
	VC – E2	—		3,000 – 7,000

Specifications (Cont'd)

ECU (cont'd)	Resistance (cont'd)		
	Terminals	Condition	Resistance (Ω)
	THA – E2	Intake air temp. 20° (68°F)	2,000 – 3,000
	THW – E2	Coolant temp. 80° (176°F)	200 – 400
	G NE – G ⊖	—	140 – 180
	ISCC – +B ISCO – +B1	—	19.3 – 22.3
Fuel cut rpm	w/ Vehicle speed 0 km/h and coolant and coolant temp. 80°C (176°F)		
		Fuel cut rpm	1,600 rpm
		Fuel return rpm	1,500 rpm

Torque Specifications

Part tightened		kg-cm	ft-lb	N·m
Fuel line	Union bolt type	300	22	29
	Flare nut type	310	22	30
Fuel pump x Fuel tank		35	30 in.-lb	3.4
Fuel sender gauge x Fuel tank		15	13 in.-lb	1.5
Fuel evaporation bent tube x Fuel tank		15	13 in.-lb	1.5
Fuel tank filler pipe x Fuel tank		35	30 in.-lb	3.4
Fuel tank band x Body		300	22	29
No.2 center crossmember x Body		300	22	29
Cold start injector x Intake manifold		95	82 in.-lb	9.3
Cold start injector pipe x Cold start injector		180	13	18
Cold start injector pipe x Delivery pipe		180	13	18
Fuel pressure regulator x Delivery pipe		55	48 in.-lb	5.4
Fuel return pipe x Fuel pressure regulator		180	13	18
Fuel pulsation damper x Delivery pipe		350	25	34
Delivery pipe x Cylinder head		130	9	13
Throttle body x Intake manifold		195	14	19

COOLING SYSTEM

Specifications

Engine coolant capacity		See page A-2
Radiator cap	Relief valve opening pressure STD	0.75 – 1.05 kg/cm ² (10.7 – 14.9 psi, 74 – 103 kPa)
	Limit	0.6 kg/cm ² 8.5 psi 59 kPa
Thermostat	Valve opening temperature	80 – 84°C 176 – 183°F
	Valve lift at 95°C (203°F)	8 mm (0.31 in.) or more

Torque Specifications

Part tightened		kg-cm	ft-lb	N-m
Engine block x Drain plug	3S-GTE	250	18	25
	5S-FE	130	9	13
Radiator pipe x Drain plug		170	12	17
Water pump x Water pump cover		95	82 in.-lb	9.3
Water pump x Cylinder block	3S-GTE	80	69 in.-lb	7.8
	5S-FE	95	82 in.-lb	9.3
Water by-pass pipe x Water pump	3S-GTE	120	9	12
	5S-FE	95	82 in.-lb	9.3
Water inlet x Water pump	3S-GTE	80	69 in.-lb	7.8
	5S-FE	90	78 in.-lb	8.8

LUBRICATION SYSTEM

Specifications

Engine oil capacity			See page A-21	
Oil pressure		at idling	0.3 kg/cm ² (4.3 psi, 29 kPa) or more	
		at 3000 rpm	2.5 – 5.0 kg/cm ² (36 – 71 psi, 245 – 490 kPa)	
Oil pump	Body clearance	STD	0.100 – 0.160 mm	0.0039 – 0.0063 in.
		Limit	0.20 mm	0.0079 in.
	Tip clearance	STD	0.040 – 0.160 mm	0.0016 – 0.0063 in.
		Limit	0.20 mm	0.0079 in.

Torque specifications

Part tightened		kg-cm	ft-lb	N-m
Engine pan x Drain plug	3S-GTE	200	14	20
	5S-FE	400	29	39
Oil pump body cover x Oil pump body		90	78 in.-lb	8.8
Oil pump x Cylinder block	3S-GTE	80	69 in.-lb	7.8
	5S-FE	95	82 in.-lb	9.3
Oil strainer x Cylinder block		55	48 in.-lb	5.4
Oil strainer x Oil pump		55	48 in.-lb	5.4
Oil pan x Cylinder block		55	48 in.-lb	5.4
Oil pan x Oil pump		55	48 in.-lb	5.4
Stiffener plate x Cylinder block		380	27	37
Stiffener plate x Transaxle case		380	27	37
Oil cooler bracket x Cylinder block (3S-GTE)		80	69 in.-lb	7.8
Oil cooler x Oil cooler bracket (3S-GTE)		800	58	78
Water by-pass pipe x Oil cooler (3S-GTE)		120	9	12
Water by-pass pipe x Oil cooler bracket (3S-GTE)		180	13	18
Oil cooler x Cylinder block (5S-FE)	Relief valve	450	33	44
	Nut	80	69 in.-lb	7.8
Oil nozzle x Cylinder block		93	81 in.-lb	9.1

IGNITION SYSTEM

Ignition timing		10° BTDC @ idle (w/ Terminals TE1 and E1 connected)
Firing order		1 – 3 – 4 – 2
Spark plug		See page A-2
High-tension cord	Resistance	25 kΩ per cord
Ignition coil	Primary coil resistance	0.40 – 0.50 Ω
	Secondary coil resistance	10.0 – 14.0 kΩ
Distributor	Air gap	0.2 – 0.4 mm 0.008 – 0.016 in.
	Signal generator (pickup coil) resistance	
	3S-GTE G1 – G ⊖	140 – 180 Ω
	G2 – G ⊖	140 – 180 Ω
	NE – G ⊖	180 – 220 Ω
	5S-FE	170 – 210 Ω

STARTING SYSTEM

Starter	Rated voltage and output power		12 V 1.0 kW		12 V 1.4 kW, 12 V 1.6 kW	
	No-load characteristic	Current rpm	90 A or less at 11.5 V 3,000 rpm or more		← 3,000 rpm or more (1.4 kW compact type) 3,500 rpm or more (Others)	
Brush length	STD		13.5 mm	0.531 in.		
	Limit		8.5 mm	0.335 in.		
Commutator	Outer diameter	STD	30 mm	1.18 in.		
		Limit	29 mm	1.14 in.		
Undercut depth	STD		0.6 mm	0.024 in.		
	Limit		0.2 mm	0.008 in.		
Circle runout	Limit		0.05 mm	0.0020 in.		
Spring installed load			1.79 – 2.41 kg (3.9 – 5.3 lb, 18 – 24 N)			

CHARGING SYSTEM

Drive belt tension		See page A-2
Battery specific gravity when fully charge at 20°C (68°F)		1.25 – 1.27
Alternator	Rated output	12 V – 70 A, 12 V – 80 A, 12 V – 100 A
	Rotor coil resistance	2.8 – 3.0 Ω
	Slip ring diameter	STD 14.2 – 14.4 mm 0.559 – 0.567 in.
		Limit 12.8 mm 0.504 in.
	Brush exposed length	STD 10.5 mm 0.413 in.
		Limit 1.5 mm 0.059 in.
Alternator regulator	Regulating voltage	at 25°C (77°F) 13.9 – 15.1 V
		at 115°C (239°F) 13.5 – 14.3 V

LUBRICANT

Item	Capacity			Classification
	Liters	US qts	Imp. qts	
Engine oil				API grade SG, multigrade fuel-efficient and recommended viscosity oil
3S-GTE				
Dry fill	4.3	4.5	3.8	
Drain and refill				
w/ Oil filter change	3.9	4.1	3.4	
w/o Oil filter change	3.6	3.8	3.2	
5S-FE				
Dry fill	4.4	4.7	3.9	
Drain and refill				
w/ Oil filter change	4.0	4.2	3.5	
w/o Oil filter change	3.8	4.0	3.3	