

# SERVICE SPECIFICATIONS

# MAINTENANCE

## Engine

Drive belt tension						
Alternator	4A- F E	New belt		<b>160 ± 20 lbf</b>		
		Used belt		<b>130 ± 20 lbf</b>		
	3S-GTE	w/ A/C	New belt		<b>165 ± 10 lbf</b>	
			Used belt		<b>84 ± 15 lbf</b>	
		w/o A/C	New belt		<b>150 ± 25 lbf</b>	
			Used belt		<b>130 ± 25 lbf</b>	
	5S-FE	w/ A/C	New belt		<b>165 ± 10 lbf</b>	
			Used belt		<b>110 ± 10 lbf</b>	
		w/o A/C	New belt		<b>125 ± 25 lbf</b>	
			Used belt		<b>95 ± 20 lbf</b>	
PS pump		New belt		<b>125 ± 25 lbf</b>		
		Used belt		<b>80 ± 20 lbf</b>		
A/C compressor (4A- FE)		New belt		<b>160 ± 25 lbf</b>		
		Used belt		<b>100 ± 20 lbf</b>		
Engine coolant capacity (w/ Heater)						
4A-FE		M /T		5.2 liters	5.5 US qts	4.6 Imp. qts
		A/T		5.6 liters	5.9 US qts	4.9 Imp. qts
3S-GTE				6.5 liters	6.9 US qts	5.7 Imp. qts
				6.2 liters	6.6 US qts	5.5 Imp. qts
5S-FE		M /T		6.1 liters	6.4 US qts	5.4 Imp. qts
		A/T				
Engine oil capacity (Drain and refill)						
4A- F E		w/ Oil filter change		3.2 liters	3.3 US qts	2.8 Imp. qts
		w/o Oil filter change		3.0 liters	3.1 US qts	3.4 Imp. qts
3S-GTE		w/ Oil filter change		3.9 liters	4.1 US qts	3.4 Imp. qts
		w/o Oil filter change		3.6 liters	3.8 US qts	3.2 Imp. qts
5S-FE	w/ Oil cooler	w/ Oil filter change		4.2 liters	4.4 US qts	3.7 Imp. qts
		w/o Oil filter change		3.8 liters	4.0 US qts	3.3 Imp. qts
	w/o Oil cooler	w/ Oil filter change		4.1 liters	4.3 US qts	3.6 Imp. qts
		w/o Oil filter change		3.7 liters	3.9 US qts	3.3 Imp. qts
Spark plug						
Type	4A-FE	ND		Q16R-U		
		NGK		BCPR5EY		
	3S-GTE	ND		PK20R8		
		NGK		BKR6EP8		
	5S-FE	ND		PK20R11		
		NGK		BKP6EP-11		
Gap	4A-FE and 3S-GTE			0.8 mm	0.031 in.	
	5S-FE			1.1 mm	0.043 in.	
Firing order				1 - 3 - 4 - 2		
Valve clearance	4A-FE	Intake		0.15 - 0.25 mm	0.006 - 0.010 in.	
		Exhaust		0.20 - 0.30 mm	0.008 - 0.012 in.	
	3S-GTE	Intake		0.15 - 0.25 mm	0.006 - 0.010 in.	
		Exhaust		0.28 - 0.38 mm	0.011 - 0.015 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.	
Idle speed (4A-FE)				800 rpm		

## Chassis

Brake pads and disc						
Pad thickness		Limit		1.0 mm	0.039 in.	
Disc thickness	Limit	Front		23.0 mm	0.906 in.	
		Rear		9.0 mm	0.354 in.	
Disc runout	Limit	Front		0.07 mm	0.0028 in.	
		Rear		0.15 mm	0.0059 in.	
Brake linings and drums						
Lining thickness		Limit		1.0 mm	0.039 in.	
Drum inside diameter	Limit	Drum brake		201.0 mm	7.913 in.	
		Disc brake		171.0 mm	6.732 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 mounting bolts				37 N·m	375 kgf·cm	27 ft·lbf
Engine mounting center member-to-body mounting bolts				73 N·m	740 kgf·cm	54 ft·lbf
Front suspension lower crossmember-to-body mounting bolts				152 N·m	1,550 kgf·cm	112 ft·lbf
Rear suspension lower crossmember-to-body mounting bolts				159 N·m	1,620 kgf·cm	117 ft·lbf

## ENGINE MECHANICAL (4A-FE)

### Specifications

Intake manifold vacuum	at idle speed			60 kPa	450 mmHg	17.7 in.Hg
Compression pressure	at 250 rpm		STD	1,320 kPa (13.5 kgf/cm <sup>2</sup> , 191 psi) or more		
			Limit	981 kPa	10.0 kgf/cm <sup>2</sup>	142 psi
Difference of pressure between each cylinder				98 kPa (1.0 kgf/cm <sup>2</sup> , 14 psi) or less		
Idler pulley tension spring	Free length			38.4 mm	1.512 in.	
	Installed load at 51.9 mm (2.043 in.)			35 – 39 N	3.6 – 4.0 kgf	7.9 – 8.8 lbf
Cylinder head	Warpage	Cylinder block side	Limit	0.05 mm	0.020 in.	
		Manifold side	Limit	0.10 mm	0.039 in.	
	Valve seat	Refacing angle		30°, 45°, 60°		
		Contacting angle		45°		
	Contacting width		1.2 – 1.6 mm	0.047 – 0.063 in.		
Valve guide bushing	Inside diameter			6.010 – 6.030 mm		0.2366 – 0.2374 in.
	Outside diameter (for repair part)	STD		11.048 – 11.059 mm		0.4350 – 0.4354 in.
		O/S 0.05		11.098 – 11.109 mm		0.4369 – 0.4374 in.

## Specifications (Cont'd)

Valve	Valve overall length	STD	Intake	91.45 mm	3.6004 in.
			Exhaust	91.90 mm	3.6181 in.
		Limit	Intake	90.95 mm	3.5807 in.
			Exhaust	91.40 mm	3.5984 in.
	Valve face angle			44.5°	
	Stem diameter		Intake	5.970 – 5.985 mm	0.2350 – 0.2356 in.
			Exhaust	5.965 – 5.980 mm	0.2348 – 0.2354 in.
	Stem oil clearance	STD	Intake	0.025 – 0.060 mm	0.0010 – 0.0024 in.
			Exhaust	0.030 – 0.065 mm	0.0012 – 0.0026 in.
		Limit	Intake	0.08 mm	0.0031 in.
Exhaust			0.10 mm	0.0039 in.	
Margin thickness	STD		0.8 – 1.2 mm	0.031 – 0.047 in.	
	Limit		0.5 mm	0.020 in.	
Valve spring	Squareness		Limit	2.0 mm	0.079 in.
	Free length			43.8 mm	1.774 in.
	Installed tension at 34.7 mm (1.366 in.)			143 – 155 N (14.6 – 15.8 kgf, 32.2 – 34.8 lbf)	
Valve lifter	Lifter diameter			27.975 – 27.985 mm	1.1014 – 1.1018 in.
	Lifter bore diameter			28.005 – 28.026 mm	1.1026 – 1.1034 in.
	Oil clearance		STD	0.020 – 0.051 mm	0.0008 – 0.0020 in.
		Limit	0.07 mm	0.0028 in.	
Manifold	Warpage	Limit	Intake	0.20 mm	0.0079 in.
			Exhaust	0.30 mm	0.0118 in.
Camshaft and gear	Thrust clearance	STD	Intake	0.030 – 0.085 mm	0.0012 – 0.0033 in.
			Exhaust	0.035 – 0.090 mm	0.0014 – 0.0035 in.
		Limit		0.11 mm	0.0043 in.
	Journal oil clearance	STD		0.035 – 0.072 mm	0.0014 – 0.0028 in.
		Limit		0.10 mm	0.0039 in.
	Journal diameter		Exhaust No.1	24.949 – 24.965 mm	0.9822 – 0.9829 in.
			Others	22.949 – 22.965 mm	0.9035 – 0.9041 in.
	Circle runout		Limit	0.04 mm	0.0016 in.
	Cam lobe height	STD	Intake	35.210 – 35.310 mm	1.3862 – 1.3902 in.
			Exhaust	34.910 – 35.010 mm	1.3744 – 1.3783 in.
	Limit	Intake		34.81 mm	1.3705 in.
		Exhaust		34.51 mm	1.3587 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			17.0 – 17.6 mm	0.669 – 0.693 in.	
Cylinder block	Cylinder head surface warpage		Limit	0.05 mm	0.0020 in.
	Cylinder bore diameter	STD	Mark 1	81.000 – 81.010 mm	3.1890 – 3.1894 in.
			Mark 2	81.010 – 81.020 mm	3.1894 – 3.1898 in.
			Mark 3	81.020 – 81.030 mm	3.1898 – 3.1902 in.
		Limit	STD	81.23 mm	3.1980 in.
		O/S 0.50	81.73 mm	3.2177 in.	

## Specifications (Cont'd)

Piston and piston ring	Piston diameter	STD	Mark 1	80.930 – 80.940 mm	3.1862 – 3.1866 in.
			Mark 2	80.940 – 80.950 mm	3.1866 – 3.1870 in.
			Mark 3	80.950 – 80.960 mm	3.1870 – 3.1874 in.
		O/S 0.50		81.430 – 81.460 mm	3.2059 – 3.2071 in.
	Piston oil clearance	STD		0.060 – 0.080 mm	0.0024 – 0.0031 in.
		Limit		0.10 mm	0.0039 in.
	Piston ring groove clearance	No.1		0.040 – 0.081 mm	0.0016 – 0.0032 in.
		No.2		0.030 – 0.070 mm	0.0012 – 0.0028 in.
	Piston ring end gap	STD	No.1	0.250 – 0.450 mm	0.0098 – 0.0177 in.
			No.2	0.150 – 0.400 mm	0.0059 – 0.0157 in.
		Limit	Oil	0.100 – 0.700 mm	0.0039 – 0.0276 in.
			No.1	1.05 mm	0.0413 in.
No.2			1.00 mm	0.0394 in.	
Oil			1.30 mm	0.0512 in.	
Connecting rod	Thrust clearance	STD		0.150 – 0.250 mm	0.0059 – 0.0098 in.
		Limit		0.30 mm	0.0118 in.
	Connecting rod bearing center wall thickness	STD	Mark 1	1.486 – 1.490 mm	0.0585 – 0.0587 in.
			Mark 2	1.490 – 1.494 mm	0.0587 – 0.0588 in.
			Mark 3	1.494 – 1.498 mm	0.0588 – 0.0590 in.
	Connecting rod oil clearance	STD	STD	0.020 – 0.051 mm	0.0008 – 0.0020 in.
			U/S 0.25	0.019 – 0.065 mm	0.0007 – 0.0026 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.)		0.05 mm	0.0020 in.
Crankshaft	Thrust clearance	STD		0.020 – 0.220 mm	0.0008 – 0.0087 in.
		Limit		0.30 mm	0.0118 in.
	Thrust washer thickness			2.440 – 2.490 mm	0.0961 – 0.0980 in.
	Main journal oil clearance	STD	STD	0.015 – 0.033 mm	0.0006 – 0.0013 in.
			U/S 0.25	0.018 – 0.056 mm	0.0007 – 0.0022 in.
		Limit		0.10 mm	0.0039 in.
	Main journal diameter	STD		47.982 – 48.000 mm	1.8891 – 1.8898 in.
			U/S 0.25	47.745 – 47.755 mm	1.8797 – 1.8881 in.
	Main bearing center wall thickness	STD	Mark 1	2.002 – 2.005 mm	0.0788 – 0.0789 in.
			Mark 2	2.005 – 2.008 mm	0.0789 – 0.0791 in.
			Mark 3	2.008 – 2.011 mm	0.0791 – 0.0792 in.
			Mark 4	2.011 – 2.014 mm	0.0792 – 0.0793 in.
			Mark 5	2.014 – 2.017 mm	0.0793 – 0.0794 in.
	Crank pin diameter	STD		39.985 – 40.000 mm	1.5742 – 1.5748 in.
			U/S 0.25	39.745 – 39.755 mm	1.5648 – 1.5652 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
Crankshaft pulley x Crankshaft	118	1,200	87
Camshaft timing pulley x Camshaft	59	600	43
Idler pulley x Cylinder block	37	375	27
Cylinder head x Cylinder block	60	610	44
Camshaft bearing cap x Cylinder head	13	130	9
PS drive belt adjusting strut x Cylinder head	39	400	29
Engine hanger x Cylinder head	27	280	20
Fan belt adjusting bar x Cylinder head	20	200	14
Cylinder head cover x Cylinder head	7.8	80	69 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	39	400	29
EGR valve x Intake manifold	13	130	9
ACV x Intake manifold	13	130	9
Water inlet housing x Cylinder head	20	200	14
Water outlet x Cylinder head	15	150	11
Exhaust manifold x Cylinder head	25	250	18
Exhaust manifold stay x Exhaust manifold	39	400	29
Exhaust manifold stay x Cylinder block	39	400	29
Main bearing cap x Cylinder block	60	610	44
Connecting rod cap x Connecting rod	49	500	36
Rear oil seal retainer x Cylinder block	9.3	95	82 in·lbf
PS pump bracket x Cylinder block	19	195	14
RH engine mounting bracket x Cylinder block	51	525	38
Alternator bracket x Cylinder block	39	400	29
Rear end plate x Cylinder block	9.3	95	82 in·lbf
Flywheel (M/T) x Crankshaft	78	800	58
Drive plate (A/T) x Crankshaft	64	650	47
LH engine mounting bracket x Transaxle	52	530	38
LH engine mounting insulator x LH mounting bracket	48	490	35
LH engine mounting insulator x Body	87	890	64
RH engine mounting insulator x RH mounting bracket	52	530	38
	64	650	47
R H engine mounting insulator x Body	87	890	64
RH engine mounting stay x RH mounting insulator	42	430	31
RH engine mounting stay x PS drive belt adjusting strut	42	430	31
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	64	650	47
Engine mounting center member x Rear mounting insulator	64	650	47
Front engine mounting bracket x Front mounting insulator	87	890	64
Rear engine mounting bracket x Rear mounting insulator	87	890	64

## Torque Specifications (Cont'd)

Part tightened	N·m	kgf·cm	ft·lbf
PS pump x Bracket	39	400	29
A/C compressor x Bracket	25	250	18
Suspension lower crossmember x Body	152	1,550	112

## ENGINE MECHANICAL (3S-GTE) Specifications

Idle speed				800 ± 50 rpm
Intake manifold vacuum	at idle speed			60 kPa      450 mmHg      17.7 in.Hg
Compression	at 250 rpm	STD		1,128 kPa (11.5 kgf/cm <sup>2</sup> , 164 psi) or more
		Limit		883 kPa      9.0 kgf/cm <sup>2</sup> 128 psi
	Difference of pressure between each cylinder			98 kPa (1.0 kgf/cm <sup>2</sup> , 14 psi) or less
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		11.030 – 11.041 mm      0.4343 – 0.4347 in.
		Q/S 0.05		11.080 – 11.091 mm      0.4362 – 0.4367 in.
Valve	Valve overall length	STD	Intake	100.50 mm      3.9567 in.
			Exhaust	99.55 mm      3.9193 in.
		Limit	Intake	99.80 mm      3.9291 in.
			Exhaust	98.85 mm      3.8917 in.
		Valve face angle		44.5°
		Stem diameter	Intake	5.960 – 5.975 mm      0.2346 – 0.2352 in.
	Exhaust		5.955 – 5.970 mm      0.2344 – 0.2350 in.	
	Stem oil clearance	STD	Intake	0.025 – 0.058 mm      0.0010 – 0.0023 in.
			Exhaust	0.030 – 0.063 mm      0.0012 – 0.0025 in.
		Limit	Intake	0.08 mm      0.0031 in.
			Exhaust	0.10 mm      0.0039 in.
		Margin thickness	STD	0.8 – 1.2 mm      0.031 – 0.047 in.
			Limit	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.)		201 – 236 N	
			(20.5 – 24.1 kgf, 45.2 – 53.1 lbf)	

## Specifications (Cont'd)

Valve lifter	Lifter diameter		30.975 – 30.985 mm	1.2195 – 1.2199 in.	
	Lifter bore diameter		31.000 – 31.021 mm	1.2205 – 1.2213 in.	
	Oil clearance	STD	0.015 – 0.046 mm	0.0006 – 0.0018 in.	
		Limit	0.07 mm	0.0028 in.	
Manifold	Warpage	Limit	0.20 mm	0.0079 in.	
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	Intake	41.010 – 41.110 mm	1.6146 – 1.6185 in.
			Exhaust	41.090 – 41.190 mm	1.6177 – 1.6217 in.
	Limit	Intake	39.90 mm	1.5709 in.	
		Exhaust	39.98 mm	1.5740 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	No.1	0.200 – 0.600 mm	0.0079 – 0.0236 in.
			No.2	0.85 mm	0.0335 in.
		Limit	No.1	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	0.0138 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.	

## Specifications (Cont'd)

Connecting rod (cont'd)	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.	
Crankshaft	Thrust clearance			STD	0.020 - 0.220 mm	0.0008 - 0.0087 in.
			Limit		0.30 mm	0.0118 in.
	Thrust washer thickness				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.
			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		N·m	kgf·cm	ft·lbf
Oil pump pulley x Oil pump drive shaft		35	355	26
No.2 idler pulley x Cylinder block		43	440	32
No.1 idler pulley bracket x Cylinder head		52	530	38
Crankshaft pulley x Crankshaft		108	1,100	80
Camshaft timing pulley x Camshaft		59	600	43
	For SST	41	420	30
Timing belt tensioner x Cylinder head		21	210	15
Cylinder head x Cylinder block	1st	49	500	36
	2nd	Turn 90°		
Camshaft bearing cap x Cylinder head		19	190	14
No.3 timing belt cover x Cylinder head		8.8	90	78 in·lbf

## Torque Specifications (Cont'd)

Part tightened	N·m	kgf·cm	ft·lbf
Cylinder head cover x Cylinder head	2.5	25	21 in·lbf
Intake manifold x Cylinder head	19	195	14
Intake manifold stay x Intake manifold	25	260	19
Intake manifold stay x Cylinder block	25	260	19
Water by-pass pipe x Water pump cover	7.8	80	69 in·lbf
Water outlet x Cylinder head	39	400	29
EG R valve x Intake manifold	19	195	14
EGR pipe x Cylinder head	25	260	19
LH engine hanger x Cylinder head	19	195	14
	12 mm head bolt		
	14 mm head bolt		
Exhaust manifold x Cylinder head	52	530	38
Catalytic converter x Turbine outlet elbow	29	300	22
Catalytic converter stay x Catalytic converter	59	600	43
No.1 alternator bracket x Cylinder head	39	400	29
Main bearing cap x Cylinder block	59	600	43
Connecting rod cap x Connecting rod	67	680	49
Rear oil seal retainer x Cylinder block	9.3	95	82 in·lbf
Knock sensor x Cylinder block	44	450	33
R H engine mounting bracket x Cylinder block	52	530	38
PS pump bracket x Cylinder block	43	440	32
Rear end plate x Cylinder block	9.3	95	82 in·lbf
Flywheel x Crankshaft	108	1,100	80
LH engine mounting bracket x Transaxle	52	530	38
LH engine mounting insulator x LH mounting bracket	63	650	47
LH engine mounting insulator x Body	87	890	64
RH engine mounting insulator x RH mounting bracket	52	530	38
RH engine mounting insulator x Body	87	890	64
RH engine mounting stay x RH mounting insulator	73	740	54
RH engine mounting stay x No.1 alternator bracket	73	740	54
LH engine mounting stay x LH mounting insulator	21	210	15
LH engine mounting stay x Transaxle	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 insulator x Front mounting insulator	87	890	64
Rear engine mounting insulator x Rear mounting insulator	87	890	64
PS pump x PS pump bracket	39	400	29
	Adjusting bolt		
	Others		
A/C compressor x Cylinder block	43	440	32
Suspension lower crossmember x Body	27	280	20
Transaxle oil cooler tube x Oil cooler hose	152	1,550	112
Suspension upper brace x Body	34	350	25
	Bolt		
	Nut		
	21	210	15
	64	650	47



## 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	42.010 - 42.110 mm	1.6539 - 1.6579 in.	
			Exhaust	40.060 - 40.160 mm	1.5772 - 1.5811 in.	
		Limit	Intake	41.90 mm	1.6496 in.	
Exhaust			39.95 mm	1.5728 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	86.850 - 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.	
			O/S 0.50	87.350 - 87.380 mm	3.4390 - 3.4402 in.	
	Piston oil clearance		STD	0.140 - 0.160 mm	0.0055 - 0.0063 in.	
			Limit	0.18 mm	0.0071 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	0.270 - 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.	
			Limit	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	0.0138 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 - 0.0087 in.	
		Limit		0.30 mm	0.0118 in.	
	Thrust washer thickness			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.	
		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		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	1 st	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	69 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
EG R 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	1 st	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
RH 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
RH engine mounting stay x RH mounting insulator		73	740	54
R H 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 a		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

## EXHAUST SYSTEM

Part tightened	N·m	kgf·cm	ft·lbf
Front exhaust pipe x Exhaust manifold (4A-FE)	62	630	46
Front exhaust pipe x Catalytic converter (4A-FE)	43	440	32
Front exhaust pipe x Catalytic converter (3S-GTE and 5S-FE)	62	630	46
Center exhaust pipe x Catalytic converter (4A-FE)	43	440	32
Front exhaust pipe x Center exhaust pipe (3S-GTE and 5S-FE)	43	440	32
Center exhaust pipe x Tailpipe (4A-FE and 3S-GTE)	43	440	32
Center exhaust pipe x Tailpipe (5S-FE)	21	210	15

## TURBOCHARGER SYSTEM

### Specifications

Turbocharger	Turbocharging pressure	49 – 81 kPa (0.50 – 0.83 kgf/cm <sup>2</sup> , 7.1 – 11.8 psi)
	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		N·m	kgf·cm	ft·lbf
Turbine outlet elbow x Turbocharger		64	650	47
Side bearing housing plate x Turbocharger		11	120	9
Turbo water pipe x Turbocharger		11	120	9
Turbocharger x Exhaust manifold		64	650	47
Turbo oil pipe x Turbocharger		17	175	13
Turbo oil pipe x Cylinder block	Bolt	43	440	32
	Union bolt	51	525	38
Turbocharger stay x Turbocharger		69	705	51
Turbocharger stay x Cylinder block		59	600	43
Oxygen sensor x Turbine outlet elbow		44	450	33

## EFI SYSTEM (4A-FE)

### Specifications

Fuel pressure regulator	Fuel pressure at no vacuum	265 – 304 kPa (2.7 – 3.1 kgf/cm <sup>2</sup> , 38 – 44 psi)
Injector	Resistance	Approx. 13.8 kΩ
	Injection volume	40 – 50 cm <sup>3</sup> (2.4 – 3.1 cu in.)/15 sec.
	Difference between each injector	5 cm <sup>3</sup> (0.31 cu in.) or less
	Fuel leakage	One drop or less per minute
Throttle body	Throttle body fully closed angle	6°

## Specifications (Cont'd)

Throttle position sensor	Throttle opening angle (from vertical)	Clearance between stop screw and lever	IDL - E2	PSW - E2
	Throttle valve fully open 63° 69° 7.5° or less	0.60 mm 0.024 in. 0.80 mm 0.032 in.	Continuity No continuity No continuity No continuity Continuity	No continuity No continuity Continuity No continuity Continuity
		—	—	—
		—	—	—
		—	—	—
Dash pot	Setting speed	M/T Arr	1,800 rpm 2,200 rpm	
ACV valve	Resistance		27 - 33 Ω	
EGR VSV	Resistance		33 - 39 Ω	
Water temp. sensor	Resistance	at -20°C (-4°F)	10 - 20 kΩ	
		at 0°C (32°F)	4 - 7 kΩ	
		at 20°C (68°F)	2 - 3 kΩ	
		at 40°C (104°F)	0.9 - 1.3 kΩ	
		at 60°C (140°F)	0.4 - 0.7 kΩ	
		at 80°C (176°F)	0.2 - 0.4 kΩ	
Intake air temp. sensor	Resistance	at -20°C (-4°F)	10 - 20 kΩ	
		at 0°C (32°F)	4 - 7 kΩ	
		at 20°C (68°F)	2 - 3 kΩ	
		at 40°C (104°F)	0.9 - 1.3 kΩ	
		at 60°C (140°F)	0.4 - 0.7 kΩ	
		at 80°C (176°F)	0.2 - 0.4 kΩ	
EGR gas temp. sensor (CALIF. only)	Resistance	at 50°C (112°F)	69 - 89 kΩ	
		at 100°C (212°F)	11 - 15 kΩ	
		at 150°C (302°F)	2 - 4 kΩ	
Oxygen sensor heater (Ex. CALIF.)	Resistance		5.1 - 6.3 Ω	
ECU	<b>HINT:</b>			
	<ul style="list-style-type: none"> <li>Perform all voltage and resistance measurements with the ECU connected.</li> <li>Verify that the battery voltage is 11 V or above with the ignition switch ON.</li> </ul>			
	Voltage			
	Terminals	Condition		STD voltage (V)
	+B +B1 - E1	IG SW ON		10 - 14
	BATT - E1			10 - 14
	IDL - E2	iG SW ON	Throttle valve open	10 - 14
	PSW - E2		Throttle valve fully closed	10 - 14
	PIM - E2	IG SW ON		3.3 - 3.9
	VCC - E2			4.5 - 5.5

## Specifications (Cont'd)

ECU (cont'd)	Voltage (cont'd)		
	Terminals	Condition	STD voltage (V)
No.10 - E01 No.20 - E02	IG SW ON		10 - 14
THA - E2	IG SW ON	Intake air temp. 20°C (68°F)	1 - 3
THW - E2		Coolant temp. 80°C (176°F)	0.1 - 1.0
STA - E1	Cranking		6 - 14
IGT - E1	Cranking or idling		0.7 - 1.0
W - E1	No trouble ("CHECK" engine warning light off) and engine running		10 - 14
A/C - E1	IG SW ON	Air- conditioning ON	8 - 14
ACT - E1		Air conditioning ON	4 - 6
T - E1		Check connector TE1 - E1 not connected	10 - 14
		Check connector TE1 - E1 connected .	0.5 or less
NSW - E1		Neutral start switch P or- N range	0 - 2
		Ex. neutral start switch P or N range	6 - 14
V-ISC - E1	Cranking for ten seconds after starting		10 - 14
<b>Resistance</b>			
	Terminals	Condition	STD resistance (Ω)
IDL - E2	Throttle valve fully open		Infinity
	Throttle valve fully closed		0
PSW - E2	Throttle valve fully open		0
	Throttle valve fully closed		Infinity
THA - E2	Intake air- temp. 20°C (68°F)		2,000 - 3,000
THW - E2	Coolant temp. 80°C (176°F)		200 - 400
G1 NE - G ⊖	Cold		185 - 265
Fuel cut	w/ Vehicle speed 0 km/h and coolant and coolant temp. 80°C (176°F) Fuel cut rpm Fuel return rpm		2,300 rpm 1,700 rpm

## Torque Specifications

Part tightened		N·m	kgf·cm	ft·lbf
Fuel line	Union bolt type	29	300	22
	Flare nut type	30	310	22
Fuel pump bracket x Fuel tank		2.9	30	26 in·lbf
Fuel inlet pipe x Fuel tank		2.9	30	26 in·lbf
Fuel evaporation vent tube x Fuel tank		1.5	15	13 in·lbf
Fuel breather tube x Fuel tank		1.5	15	13 in·lbf
Fuel tank band x Body		39	400	29
Fuel pressure regulator x Delivery pipe		9.3	95	82 in·lbf
Delivery pipe x Cylinder head		15	150	11
Throttle body x Intake manifold		22	220	16

## EFI SYSTEM (3S-GTE) Specifications

Fuel pressure regulator	Fuel pressure at no vacuum	226 – 265 kPa (2.3 – 2.7 kgf/cm <sup>2</sup> , 33 – 38 psi)	
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	2 – 4 Ω 95 – 120 cm <sup>3</sup> (5.8 – 7.3 cu in.) per 15 sec. 5 cm <sup>3</sup> (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 position sensor	Clearance between stop screw and lever	Between terminals	Resistance
	0 mm 0 in.	VTA – E2	0.47 – 6.1 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 open —	VTA – E2 VC – E2	3.1 – 12.1 kΩ 3.9 – 9.0 kΩ
Throttle opener	Setting speed	900 – 1,900 rpm	
ISC valve	Resistance +B – RSC or RSO	19.3 – 22.3 Ω	

## Specifications (Cont'd)

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	4 - 6 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		
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 (CALIF. only)	Resistance at 50°C (112°F) at 100°C (212°F) at 150°C (302°F)	69 - 89 kΩ 11 - 15 kΩ 2 - 4 kΩ		
Oxygen sensor heater	Resistance	5.1 - 6.3 Ω		
ECU	<b>HINT:</b> <ul style="list-style-type: none"> <li>Perform all voltage and resistance measurements with the ECU connected.</li> <li>Verify that the battery voltage is 11 V or above with the ignition switch ON.</li> </ul>			
	Voltage			
	Terminals	Condition	STD voltage (V)	
	+B +B1 - E1	IG SW ON	10 - 14	
	BATT - E1		10 - 14	
	IDL - E2	IG SW ON	Throttle valve open	4.5 - 5.5
	VTA - E2		Throttle valve fully closed (Throttle opener must be cancelled first)	0.1 - 1.0
			Throttle valve fully open	3.2 - 4.2
	VC - E2			4.5 - 5.5
	VS - E2		Measuring plate fully closed	3.7 - 4.3
			Measuring plate fully open	0.2 - 0.5
		Idling	1.6 - 4.1	
	3,000 rpm	1.0 - 2.0		

## Specifications (Cont'd)

ECU (cont'd)	Voltage (cont'd)		
	Terminals	Condition	STD voltage (V)
	No.1 No.2 - E01 No.3 - E02 No.4	IG SW ON	10 - 14
	THA - E2	IG SW ON	Intake air temp. 20°C (68°F)
	THW - E2		Coolant temp. 80°C (176°F)
	STA - E1	Cranking	
	IGT - E1	Cranking or idling	
	RSC RSO - E1	IGSWON	Engine ECU connectors disconnected
	W - E1	No trouble ("CHECK" engine warning light off) and engine running	
	PIM - E2	IG SW ON	
	AC - E1	IG SW ON	Air conditioning ON
	ACT - E1		Air conditioning ON
	TVIS - E1		Throttle valve fully closed
			Throttle valve open
	w/ Premium unleaded gasoline	TVIS - E1	Idling
4,200 rpm or more			
TE1 - E1	IG SW ON	Check connector TE1 - E1 not connected	
		Check connector TO - E1 connected	
<b>Resistance</b>			
	Terminals	Condition	STD resistance (Ω)
IDL - E2		Throttle valve fully open	Infinity
		Throttle valve fully closed	2,300 or less
VTA - E2		Throttle valve fully open	3,100 - 12,100
		Throttle valve fully closed	470 - 6,100
VC - E2			390 - 9,000
VS - E2		Measuring plate fully closed	200 - 600
		Measuring plate fully open	20 - 1,200
THA - E2		Intake air temp. 20°C (68°F)	2,000 - 3,000
THW - E2		Coolant temp. 80°C (176°F)	200 - 400

## Specifications (Cont'd)

ECU (cont'd)	Resistance (cont'd)		
	Terminals	Condition	STD resistance ( $\Omega$ )
	<b>G1 G2 - G <math>\ominus</math></b>	Cold	<b>125 - 190</b>
	<b>NE - G <math>\ominus</math></b>	Cold	<b>155 - 240</b>
	<b>RSC - +B RSO - +B1</b>		<b>19.3 - 22.3</b>
Fuel cut	Fuel return rpm		<b>1,600 rpm</b>

## Torque Specifications

Part tightened		N-m	kgf-cm	ft-lbf
Fuel line	Union bolt type	<b>29</b>	<b>300</b>	<b>22</b>
	Flare nut type	<b>30</b>	<b>310</b>	<b>22</b>
Fuel pump x Fuel tank		<b>2.9</b>	<b>30</b>	<b>26 in.-lbf</b>
Fuel sender gauge x Fuel tank		<b>1.5</b>	<b>15</b>	<b>13 in.-lbf</b>
Fuel evaporator bent tube x Fuel tank		<b>1.5</b>	<b>15</b>	<b>13 in.-lbf</b>
Fuel inlet pipe x Fuel tank		<b>2.9</b>	<b>30</b>	<b>26 in.-lbf</b>
Fuel tank band x Body		<b>22</b>	<b>220</b>	<b>16</b>
Cold start injector x Intake manifold		<b>5.9</b>	<b>60</b>	<b>52 in.-lbf</b>
Cold start injector pipe x Cold start injector		<b>12</b>	<b>125</b>	<b>9</b>
Cold start injector pipe x Delivery pipe		<b>12</b>	<b>125</b>	<b>9</b>
Fuel pressure regulator x Delivery pipe		<b>29</b>	<b>300</b>	<b>22</b>
Injector cover x Delivery pipe		<b>7.8</b>	<b>80</b>	<b>69 in.-lbf</b>
Fuel inlet hose x Delivery pipe E	Bolt	<b>7.8</b>	<b>80</b>	<b>69 in.-lbf</b>
	Union bolt	<b>29</b>	<b>300</b>	<b>22</b>
Delivery pipe x Cylinder head		<b>19</b>	<b>195</b>	<b>14</b>
Fuel inlet hose x Fuel filter		<b>29</b>	<b>300</b>	<b>22</b>
Throttle body x Intake manifold		<b>19</b>	<b>195</b>	<b>14</b>
Intake air connector stay x Throttle body		<b>19</b>	<b>195</b>	<b>14</b>
Intake air connector stay x Cylinder head		<b>7.8</b>	<b>80</b>	<b>69 in.-lbf</b>
Intake air connector x Throttle body		<b>19</b>	<b>195</b>	<b>14</b>

## EFI SYSTEM (5S-FE)

### Specifications

Fuel pressure regulator	Fuel pressure at no vacuum	265 - 304 kPa (2.7 - 3.1 kgf/cm <sup>2</sup> , 38 - 44 psi)	
Injector	Resistance Injection volume Difference between each injector Fuel leakage	Approx. 13.8 kΩ 49 - 59 cm <sup>3</sup> (3.0 - 3.6 cu in.)/15 sec. 5 cm <sup>3</sup> (0.31 cu in.) or less One drop or less per minute	
Throttle position sensor	Clearance between stop screw and lever	Between terminals	Resistance
	0 mm                    0 in. 0.50 mm                0.020 in. 0.70 mm                0.028 in. Throttle valve fully open —	VTA - E2 IDL - E2 IDL - E2 VTA - E2 VC - E2	0.2 - 5.7 kΩ 2.3 kΩ or less Infinity 2.0 - 10.2 kΩ 2.5 - 5.9 kΩ
Throttle opener	Setting speed	1,300 - 1,500 rpm	
ISC valve	Resistance +B - ISCC or ISCO	19.3 - 22.3 Ω	
A/C idle-up VSV	Resistance	30 - 34 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 kΩ 4 - 7 kΩ 2 - 3 kΩ 0.9 - 1.3 kΩ 0.4 - 0.7 kΩ 0.2 - 0.4 kΩ
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 kΩ 4 - 7 kΩ 2 - 3 kΩ 0.9 - 1.3 kΩ 0.4 - 0.7 kΩ 0.2 - 0.4 kΩ
EGR gas temp. sensor (CALIF. only)	Resistance	at 50°C (112°F) at 100°C (212°F) at 150°C (302°F)	69 - 89 kΩ 11 - 15 kΩ 2 - 4 kΩ
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 ON.		
	Voltage		
	Terminals	Condition	STD voltage (V)
+B +B1 - E1	IG SW ON		10 - 14

## Specifications (Cont'd)

ECU (cont'd)	Voltage (cont'd)			
	Terminals	Condition	STD voltage (V)	
	<b>BATT - E1</b>		<b>10 - 14</b>	
	<b>IDL - E2</b>	Throttle valve open	<b>8 - 14</b>	
	<b>VTA - E2</b>	IG SW ON Throttle valve fully closed (Throttle opener must be cancelled first)	<b>0.8 - 1.2</b>	
		Throttle valve fully open	<b>3.2 - 4.2</b>	
	<b>PIM - E2</b>	IG SW ON	<b>3.3 - 3.9</b>	
	<b>VC - E2</b>		<b>4.5 - 5.5</b>	
	<b>No.10 - E01</b> <b>No.20 - E02</b>		<b>10 - 14</b>	
	<b>THA - E2</b>	IG SW ON Intake air temp. 20°C 168°F	<b>1.9 - 2.9</b>	
	<b>THW - E2</b>	Coolant temp. 80°C (176°F)	<b>0.1 - 1.1</b>	
	<b>STA - E1</b>	Cranking	<b>6 - 14</b>	
	<b>IGT - E1</b>	Cranking or idling	<b>0.8 - 1.2</b>	
	<b>ISCC</b> <b>ISCO - E1</b>	IG SW ON Engine (& ECT) ECU connectors disconnected	<b>8 - 14</b>	
	<b>W - E1</b>	No trouble ("CHECK" engine warning light off) and engine running	<b>10 - 14</b>	
	<b>A/C - E1</b>	IG SW ON	Air conditioning ON	<b>8 - 14</b>
	<b>ACT - E1</b>		Air conditioning ON	<b>4.5 - 5.5</b>
	<b>ACA - E1</b>		Air conditioning ON	<b>2 or less</b>
	<b>TE1 - E1</b>		Check connector TE1 - E1 not connected	<b>10 - 14</b>
	<b>NSW - E1</b>		Check connector TE1 - E1 connected	<b>1 or less</b>
			Neutral start switch P or N range	<b>0 - 2</b>
			Ex. neutral start switch P or N range	<b>6 - 14</b>
	<b>B/K - E1</b>	Stop light SW ON (Brake pedal depressed)	<b>10 - 14</b>	
	Resistance			
	Terminals	Condition	STD resistance (Ω)	
	<b>IDL - E2</b>	Throttle valve fully open	<b>Infinity</b>	
		Throttle valve fully closed (Throttle opener must be cancelled first)	<b>2,300 or less</b>	
	<b>VTA - E2</b>	Throttle valve fully open	<b>2,000 - 10,200</b>	
		Throttle valve fully closed (Throttle opener must be cancelled first)	<b>200 - 5,700</b>	

## Specifications (Cont'd)

ECU (cont'd)	Resistance (cont'd)		
	Terminals	Condition	STD resistance (Ω)
	VC - E2		2,500 - 5,900
	THA - E2	Intake air temp. 20°C (68°F)	2,000 - 3,000
	THW - E2	Coolant temp. 80°C (176°F)	200 - 400
	G + - G -	Cold	185 - 265
	NE + - NE -	Cold	370 - 530
	ISCC +B ISCO - +B1		19.3 - 22.3
Fuel cut	Fuel return rpm		1,500 rpm

## Torque Specifications

Part tightened		N·m	kgf·cm	ft·lbf
Fuel line	Union bolt type	29	300	22
	Flare nut type	30	310	22
Fuel pump bracket x Fuel tank		2.9	30	26 in.-lbf
Fuel inlet pipe x Fuel tank		2.9	30	26 in.-lbf
Fuel evaporation bent tube x Fuel tank		1.5	15	13 in.-lbf
Fuel sender gauge x Fuel tank		1.5	15	13 in.-lbf
Fuel breather gauge x Fuel tank		1.5	15	13 in.-lbf
Fuel tank band x Body		39	400	29
Cold start injector x Intake manifold		9.3	95	82 in.-lbf
Cold start injector pipe x Cold start injector		18	180	13
Cold start injector pipe x Delivery pipe		19	195	14
Fuel pressure regulator x Delivery pipe		5.4	55	48 in.-lbf
Fuel return pipe x Fuel pressure regulator		18	180	13
Delivery pipe x Cylinder head		13	130	9
Fuel pulsation damper x Delivery pipe		34	350	25
Throttle body x Intake manifold		19	195	14

## COOLING SYSTEM

### Specifications

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

### Torque Specifications (4A–FE)

Part tightened	N–m	kgf–cm	ft–lbf
Engine block x Drain plug	<b>34</b>	<b>350</b>	<b>25</b>
Water pump x Cylinder block	<b>15</b>	<b>150</b>	<b>11</b>
Water inlet pipe x Water pump	<b>20</b>	<b>200</b>	<b>14</b>
Water inlet pipe x Cylinder block	<b>13</b>	<b>130</b>	<b>9</b>
Water inlet x Water inlet housing	<b>9.3</b>	<b>95</b>	<b>82 in.·lbf</b>

### Torque Specifications (3S–GTE and 5S–FE)

Part tightened	N–m	kgf–cm	ft–lbf
Engine block x Drain plug	<b>25</b>	<b>250</b>	<b>18</b>
Water pump x Water pump cover	<b>9.3</b>	<b>95</b>	<b>82 in.·lbf</b>
	<b>8.8</b>	<b>90</b>	<b>78 in.·lbf</b>
Water pump x Cylinder block	<b>7.8</b>	<b>80</b>	<b>69 in.·lbf</b>
	<b>9.3</b>	<b>95</b>	<b>82 in.·lbf</b>
Water by-pass pipe x Water pump cover	<b>12</b>	<b>120</b>	<b>9</b>
	<b>9.3</b>	<b>95</b>	<b>82 in.·lbf</b>
Idler pulley bracket x Cylinder block (3S–GTE)	<b>19</b>	<b>195</b>	<b>14</b>
Idler pulley bracket x Alternator bracket (3S–GTE)	<b>19</b>	<b>195</b>	<b>14</b>
Water inlet x Water pump	<b>7.8</b>	<b>80</b>	<b>69 in.·lbf</b>
	<b>9.3</b>	<b>95</b>	<b>82 in.·lbf</b>

## LUBRICATION SYSTEM

### Specifications

Engine oil capacity		See page A-29	
Oil pressure	at idle at 3,000 rpm	29 kPa (0.3 kgf/cm <sup>2</sup> , 4.3 psi) or more 245 – 490 kPa (2.5 – 5.0 kgf/cm <sup>2</sup> , 36 – 71 psi)	
Oil pump (4A-FE)	Body clearance	STD	0.080 – 0.180 mm      0.0031 – 0.0071 in.
		Limit	0.20 mm                0.0079 in.
	Tip clearance	STD	0.025 – 0.085 mm      0.0010 – 0.0033 in.
		Limit	0.35 mm                0.0138 in.
	Side clearance	STD	0.025 – 0.085 mm      0.0010 – 0.0033 in.
		Limit	0.10 mm                0.0039 in.
Oil pump 3S-GTE and 5S-FE	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 (4A-FE)

Part tightened	N·m	kgf·cm	ft·lbf
Engine pan x Drain plug	34	350	25
Oil pump x Cylinder block	21	218	16
Oil strainer x Cylinder block	9.3	95	82 in.-lbf
Oil strainer x Oil pump	9.3	95	82 in.-lbf
Oil pan x Cylinder block	4.9	55	43 in.-lbf
Oil pan x Oil pump	4.9	55	43 in.-lbf
Oil pan x Rear oil seal retainer	4.9	50	43 in.-lbf
Oil dipstick guide x Water pump	9.3	95	82 in.-lbf

## Torque Specifications (3S-GTE and 5S-FE)

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

## 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 (Cold)	
	4A-FE	1.1 - 1.7 Ω
	3S-GTE and 5S-FE	0.3 - 0.6 Ω
	Secondary coil resistance (Cold)	9 - 15 kΩ
Distributor	Air gap	0.2 - 0.4 mm      0.008 - 0.016 in.
	Signal generator (pickup coil) resistance (Cold)	
	4A-FE	185 - 265 Ω
	3S-GTE G1 - G ⊖	125 - 190 Ω
	G2 - G ⊖	125 - 190 Ω
	NE - G ⊖	155 - 240 Ω
	5S-FE G ⊕ - G ⊖	185 - 265 Ω
NE ⊕ - NE ⊖	370 - 530 Ω	

**STARTING SYSTEM**

Starter	Rated voltage and output power		12 V 1.0 kW	12V 1.4 kW, 12 V 1.6 kW	
	No-load characteristic	Current	90 A or less at 11.5 V	←	
		rpm	3,000 rpm or more	3,500 rpm or more	
	Brush length	STD	13.5 mm 0.531 in.	15.5 mm 0.610 in.	
		Limit	8.5 mm 0.335 in.	10.0 mm 0.394 in.	
	Commutator	Outer diameter	STD	30.0 mm 1.181 in.	←
			Limit	29.0 mm 1.142 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		18 – 24 N (1.79 – 2.41 kgf, 3.9 – 5.3 lbf)	←		

**CHARGING SYSTEM**

Drive belt tension		See page A-2	
Battery specific gravity when fully charged at 20°C (68°F)		1.25 – 1.27	
Alternator	Rated output	12 V – 70 A, 12 V – 80 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	4A– FE	Dry fill	<b>3.7</b>	<b>3.9</b>	<b>3.3</b>	API grade SG, multigrade fuel-efficient and recommended viscosity oil
		Drain and refill				
		w/ Oil filter change	<b>3.2</b>	<b>3.3</b>	<b>2.8</b>	
		w/o Oil filter change	<b>3.0</b>	<b>3.1</b>	<b>2.6</b>	
	3S–GTE	Dry fill	<b>4.3</b>	<b>4.5</b>	<b>3.8</b>	
		Drain and refill				
		w/ Oil filter change	<b>3.9</b>	<b>4.1</b>	<b>3.4</b>	
		w/o Oil filter change	<b>3.6</b>	<b>3.8</b>	<b>3.2</b>	
	5S–FE (w/ Oil cooler)	Dry fill	<b>4.6</b>	<b>4.9</b>	<b>4.0</b>	
		Drain and refill				
		w/ Oil filter change	<b>4.2</b>	<b>4.4</b>	<b>3.7</b>	
		w/o Oil filter change	<b>3.8</b>	<b>4.0</b>	<b>3.3</b>	
	5S–FE (w/o Oil cooler)	Dry fill	<b>4.5</b>	<b>4.8</b>	<b>4.0</b>	
		Drain and refill				
		w/ Oil filter change	<b>4.1</b>	<b>4.3</b>	<b>3.6</b>	
		w/o Oil filter change	<b>3.7</b>	<b>3.9</b>	<b>3.3</b>	