

SERVICE SPECIFICATIONS

	Page
ENGINE MECHANICAL	A-2
TURBOCHARGER SYSTEM	A-7
EFI SYSTEM	A-7
COOLING SYSTEM	A-11
LUBRICATION SYSTEM	A-11
IGNITION SYSTEM	A-12
STARTING SYSTEM	A-13
CHARGING SYSTEM	A-13

A

ENGINE MECHANICAL

Specifications

Drive belt deflection or tension		w/ 10 kg (22.1 lb, 98 N)		w/ SST (Reference)
Water Pump — Alternator	New belt	10 — 12 mm	0.39 — 0.47 in.	70 — 80 kg
	Used belt	15 — 17 mm	0.59 — 0.67 in.	30 — 45 kg
Crankshaft — PS pump	New belt	7 — 8 mm	0.28 — 0.31 in.	55 — 65 kg
	Used belt	9 — 11 mm	0.35 — 0.43 in.	25 — 40 kg
Crankshaft — A/C compressor	New belt	MA	7 — 9.5 mm	0.28 — 0.374 in.
		MS	7.5 — 9.5 mm	0.295 — 0.374 in.
	Used belt	MA	10.5 — 12 mm	0.413 — 0.47 in.
		MS	10 — 13 mm	0.39 — 0.51 in.
Engine coolant capacity				
MA				
w/ Heater or air con.	M/T	8.1 liters	8.5 US qts	7.1 Imp. qts
	A/T	8.0 liters	8.5 US qts	7.0 Imp. qts
w/o Heater or air con.	M/T	7.5 liters	7.9 US qts	6.6 Imp. qts
	A/T	7.4 liters	7.8 US qts	6.5 Imp. qts
MS (GCC Countries*)				
w/ Heater or air con.		8.5 liters	9.0 US qts	7.5 Imp. qts
w/o Heater or air con.		7.8 liters	8.2 US qts	6.9 Imp. qts
MS (Others)				
w/ Heater or air con.		7.8 liters	8.2 US qts	6.9 Imp. qts
w/o Heater or air con.		7.1 liters	7.5 US qts	6.2 Imp. qts
Engine oil capacity				
Dry fill				
7M-GE MA (GCC Countries*)		5.0 liters	5.3 US qts	4.4 Imp. qts
7M-GE MA (Others)		4.9 liters	5.2 US qts	4.3 Imp. qts
7M-GE MS		5.3 liters	5.6 US qts	4.7 Imp. qts
7M-GTE (M/T)		5.1 liters	5.4 US qts	4.5 Imp. qts
7M-GTE (A/T)		5.0 liters	5.3 US qts	4.4 Imp. qts
Drain and refill				
w/o Oil filter change				
MA		3.9 liters	4.1 US qts	3.4 Imp. qts
MS		4.1 liters	4.3 US qts	3.6 Imp. qts
w/ Oil filter change				
MA		4.2 liters	4.4 US qts	3.7 Imp. qts
MS		4.4 liters	4.7 US qts	3.9 Imp. qts
Battery specific gravity		1.25 — 1.27 when fully charged at 20°C (68°F)		
High-tension cord resistance		Limit	25 kΩ per cord	
Spark plug				
Conventional tipped type				
Type	ND	Q20R-U		
	NGK	BCPR6EY		
Air gap		0.8 mm	0.031 in.	
Platinum tipped type				
Type	7M-GE	ND	PQ16R	
		NGK	BCPR5EP11	
	7M-GTE	ND	PQ20R-P8	
		NGK	BCPR6EP-N8	
Air gap	7M-GE	1.1 mm	0.043 in.	
	7M-GTE	0.8 mm	0.031 in.	

* GCC Countries: Saudi Arabia, Sultanate of Oman, Bahrain, United Arab Emirates, Qatar, Kuwait.

Specifications (Cont'd)

Ignition timing	T/M in N range		10°BTDC @ idle [w/ Terminals T (TE1) and E1 short-circuited]				
Firing order			1 - 5 - 3 - 6 - 2 - 4				
Valve clearance (cold)		Intake	0.15 - 0.25 mm	0.0059 - 0.0098 in.			
		Exhaust	0.20 - 0.30 mm	0.0079 - 0.0188 in.			
Idle speed	7M-GE	w/o TWC	800 rpm				
		w/ TWC	700 rpm				
Idle CO concentration	7M-GTE	w/o TWC	800 rpm				
		w/ TWC	1.0 ± 0.5 %				
Dash pot setting speed			2,000 rpm				
Intake manifold vacuum at idle speed			440 mmHg (17.32 in.Hg, 130 kPa) or more				
Compression pressure at 250 rpm	7M-GE	STD	11.0 kg/cm ²	156 psi	1,079 kPa		
		Limit	9.0 kg/cm ²	128 psi	883 kPa		
	7M-GTE	STD	10.0 kg/cm ²	142 psi	981 kPa		
		Limit	9.0 kg/cm ²	128 psi	883 kPa		
Differential of pressure between each cylinder			1.0 kg/cm ² (14 psi, 98 kPa) or less				
Cylinder head	Warpage	Cylinder block side	Limit	0.10 mm	0.0039 in.		
		Intake manifold side	Limit	0.10 mm	0.0039 in.		
		Exhaust manifold side	Limit	0.10 mm	0.0039 in.		
	Valve guide bore		STD	11.000 - 11.027 mm	0.4331 - 0.4341 in.		
			O/S 0.05	11.050 - 11.077 mm	0.4350 - 0.4361 in.		
	Valve seat	Refacing angle	Contacting angle	30°, 45°, 60°			
Contacting width				45°			
				1.0 - 1.4 mm	0.039 - 0.055 in.		
Valve guide bushing	Inside diameter	Outside diameter	STD	6.010 - 6.030 mm	0.2366 - 0.2374 in.		
			O/S 0.05	11.033 - 11.044 mm	0.4344 - 0.4348 in.		
			90°C	11.083 - 11.094 mm	0.4363 - 0.4368 in.		
Valve	Valve overall length		STD	98.15 mm	3.8642 in.		
			Limit	97.75 mm	3.8484 in.		
	Valve face angle			44.5°			
				Stem diameter		Intake	5.970 - 5.985 mm
	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.
	Valve margin thickness		STD	1.3 mm			
Limit				0.5 mm			
Valve spring	Free length		41.64 mm				
			Installed height	35 mm			
	Installed load at 35 mm (1.378 in.)		STD	16 kg	35 lb	157 N	
				Limit	1.5 mm		
Squareness		Limit	0.059 in.				
			Valve lifter	Lifter diameter	STD	27.975 - 27.985 mm	
Oil clearance	STD	0.015 - 0.046 mm					
				Limit	0.10 mm		
						1.1014 - 1.1018 in.	
						0.0006 - 0.0018 in.	
						0.0039 in.	

Specifications (Cont'd)

Intake, exhaust manifold and intake chamber	Warpage					
	Intake		Limit	0.10 mm	0.0039 in.	
	Exhaust	7M-GE	Limit	0.75 mm	0.0295 in.	
		7M-GTE	Limit	0.50 mm	0.0197 in.	
	Intake chamber		Limit	0.10 mm	0.0039 in.	
Camshaft	Thrust clearance		STD	0.08 – 0.19 mm	0.0031 – 0.0075 in.	
			Limit	0.30 mm	0.0118 in.	
	Journal oil clearance					
		No. 1	STD	0.035 – 0.072 mm	0.0014 – 0.0028 in.	
			Limit	0.13 mm	0.0051 in.	
		No. 2 – No. 7	STD	0.025 – 0.093 mm	0.0010 – 0.0037 in.	
			Limit	0.13 mm	0.0051 in.	
	Journal diameter					
		No. 1	STD	26.949 – 26.965 mm	1.0610 – 1.0616 in.	
		No. 2 – No. 7	STD	26.888 – 26.975 mm	1.0586 – 1.0620 in.	
	Circle runout			Limit	0.03 mm	0.0012 in.
	Cam lobe height					
		Intake	7M-GE (MA)	STD	38.36 mm	1.5102 in.
				Limit	38.00 mm	1.4961 in.
			7M-GE (MS)	STD	38.16 mm	1.5024 in.
				Limit	37.85 mm	1.4901 in.
		7M-GTE	STD	38.35 mm	1.5098 in.	
			Limit	38.00 mm	1.4961 in.	
	Exhaust	7M-GE (MA)	STD	38.36 mm	1.5102 in.	
			Limit	38.00 mm	1.4961 in.	
		Others	STD	38.35 mm	1.5098 in.	
			Limit	38.00 mm	1.4961 in.	
Idler pulley tension spring	Free length			69 mm	2.72 in.	
Cylinder block	Cylinder head surface warp		Limit	0.05 mm	0.0020 in.	
	Cylinder bore	STD	STD	82.99 – 83.04 mm	3.2673 – 3.2693 in.	
			Limit	83.24 mm	3.2772 in.	
		O/S 0.50	Limit	83.74 mm	3.2968 in.	
	Cylinder block main journal bore					
		STD	Mark 1	64.024 – 64.030 mm	2.5206 – 2.5209 in.	
		Mark 2	64.031 – 64.036 mm	2.5209 – 2.5211 in.		
		Mark 3	64.037 – 64.042 mm	2.5211 – 2.5213 in.		
		U/S 0.25	64.022 – 64.046 mm	2.5205 – 2.5215 in.		
Piston and piston ring	Piston diameter					
	7M-GE	STD	82.90 – 82.95 mm	3.2638 – 3.2658 in.		
		O/S 0.50	83.40 – 83.45 mm	3.2835 – 3.2854 in.		
	7M-GTE	STD	82.91 – 82.96 mm	3.2642 – 3.2661 in.		
		O/S 0.50	83.41 – 83.46 mm	3.2839 – 3.2858 in.		
	Piston oil clearance					
	7M-GE	STD	0.08 – 0.10 mm	0.0031 – 0.0039 in.		
		Limit	0.13 mm	0.0051 in.		
	7M-GTE	STD	0.07 – 0.09 mm	0.0028 – 0.0035 in.		
		Limit	0.13 mm	0.0051 in.		
Piston ring end gap						
7M-GE (w/o TWC) and 7M-GTE						
	No. 1	STD	0.29 – 0.44 mm	0.0114 – 0.0173 in.		
		Limit	0.74 mm	0.0291 in.		
	No. 2	STD	0.25 – 0.53 mm	0.0098 – 0.0209 in.		
		Limit	1.13 mm	0.0445 in.		
	Oil	STD	0.10 – 0.44 mm	0.0039 – 0.0173 in.		
		Limit	1.04 mm	0.0409 in.		

Specifications (Cont'd)

Piston and piston ring (Cont'd)	7M-GE (w/ TWC)				
	No. 1	STD	0.23 – 0.38 mm	0.0091 – 0.0150 in.	
		Limit	0.68 mm	0.0268 in.	
	No. 2	STD	0.25 – 0.53 mm	0.0098 – 0.0209 in.	
		Limit	1.13 mm	0.0051 in.	
	Oil	STD	0.10 – 0.40 mm	0.0039 – 0.0157 in.	
		Limit	1.00 mm	0.0394 in.	
	Piston ring groove clearance				
	No. 1	Limit	0.03 – 0.07 mm	0.0012 – 0.0028 in.	
		No. 2	Limit	0.02 – 0.06 mm	0.0008 – 0.0024 in.
Connecting rod and bearing	Thrust clearance		STD	0.160 – 0.296 mm	0.0063 – 0.0117 in.
			Limit	0.3 mm	0.012 in.
	Big end inner diameter				
	STD	Mark 1	55.015 – 55.025 mm	2.1659 – 2.1663 in.	
		Mark 2	55.026 – 55.035 mm	2.1664 – 2.1667 in.	
		Mark 3	55.036 – 55.045 mm	2.1668 – 2.1671 in.	
	U/S 0.25			55.015 – 55.045 mm	2.1659 – 2.1671 in.
	Connecting rod bearing center wall thickness				
	STD	Mark 1	1.490 – 1.495 mm	0.0587 – 0.0589 in.	
		Mark 2	1.496 – 1.500 mm	0.0589 – 0.0591 in.	
		Mark 3	1.501 – 1.505 mm	0.0591 – 0.0593 in.	
		Mark 4	1.506 – 1.510 mm	0.0593 – 0.0594 in.	
		Mark 5	1.511 – 1.515 mm	0.0595 – 0.0596 in.	
	U/S 0.25			1.622 – 1.632 mm	0.0639 – 0.0643 in.
	Bearing oil clearance		STD	0.021 – 0.053 mm	0.0008 – 0.0021 in.
			Limit	0.07 mm	0.0028 in.
	Busing inside diameter			22.005 – 22.017 mm	0.8663 – 0.8668 in.
	Piston pin oil clearance		STD	0.005 – 0.011 mm	0.0002 – 0.0004 in.
			Limit	0.02 mm	0.0008 in.
	Piston pin diameter			21.996 – 22.009 mm	0.8660 – 0.8665 in.
Rod bend	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.	
Crankshaft and bearing	Thrust clearance		STD	0.05 – 0.25 mm	0.0020 – 0.0098 in.
			Limit	0.30 mm	0.0118 in.
	Thrust washer thickness		STD	2.925 – 2.975 mm	0.1152 – 0.1171 in.
			O/S 0.125	2.988 – 3.038 mm	0.1176 – 0.1196 in.
	Main journal oil clearance		STD	0.030 – 0.048 mm	0.0012 – 0.0019 in.
			Limit	0.07 mm	0.0028 in.
	Main journal diameter				
	STD	Mark 0	60.007 – 60.012 mm	2.3625 – 2.3627 in.	
		Mark 1	60.001 – 60.006 mm	2.3622 – 2.3624 in.	
		Mark 2	59.994 – 60.000 mm	2.3620 – 2.3622 in.	
	U/S 0.25			59.730 – 59.740 mm	2.3516 – 2.3520 in.
	Main bearing center wall thickness				
STD	Mark 1	1.988 – 1.991 mm	0.0783 – 0.0784 in.		
	Mark 2	1.992 – 1.994 mm	0.0784 – 0.0785 in.		
	Mark 3	1.995 – 1.997 mm	0.0785 – 0.0786 in.		
	Mark 4	1.998 – 2.000 mm	0.0787 – 0.0787 in.		
	Mark 5	2.001 – 2.003 mm	0.0788 – 0.0789 in.		
U/S 0.25			2.123 – 2.133 mm	0.0836 – 0.0840 in.	

Specifications (Cont'd)

Crankshaft and bearing (Cont'd)	Crank pin diameter	STD	Mark 0	51.993 – 52.000 mm	2.0470 – 2.0472 in.
			Mark 1	51.985 – 51.992 mm	2.0466 – 2.0469 in.
			Mark 2	51.976 – 51.984 mm	2.0463 – 2.0466 in.
		U/S 0.25		51.725 – 51.735 mm	2.0364 – 2.0368 in.
	Circle runout		Limit	0.06 mm	0.0024 in.
	Main journal taper and out-of-round		Limit	0.02 mm	0.0008 in.
Check pin journal taper and out-of-round			Limit	0.02 mm	0.0008 in.
Pump drive shaft	Thrust clearance	STD		0.06 – 0.13 mm	0.0024 – 0.0051 in.
		Limit		0.30 mm	0.0118 in.
	Oil clearance	STD		0.025 – 0.066 mm	0.0010 – 0.0026 in.
		Limit		0.08 mm	0.0031 in.
	Journal diameter	Front		40.959 – 40.975 mm	1.6126 – 1.6132 in.
		Rear		32.959 – 32.975 mm	1.2976 – 1.2982 in.

Torque Specifications

Part tightened	kg-cm	ft-lb	N-m
Camshaft timing pulley x Camshaft	500	36	49
Oil pump drive pulley x Oil pump drive shaft	220	16	22
Crankshaft x Crank pulley	2,700	195	265
Crankshaft x Flywheel	750	54	74
Crankshaft x Drive plate	750	54	74
Air intake chamber x Intake manifold	180	13	18
Air intake chamber x Air intake connector (7M-GE)	180	13	18
Throttle body x Air intake connector	130	9	13
Cylinder head x No. 1 and No. 2 cylinder head cover	25	22 in.-lb	2.5
Cylinder head x No. 3 cylinder head cover	180	13	18
Cylinder head x Cylinder block	800	58	78
Cylinder head x Spark plug	180	13	18
Cylinder head x No. 2 engine hanger	400	29	39
Cylinder head x Heat union	600	43	59
Cylinder head x EGR cooler	140	10	14
Cylinder head x Camshaft bearing cap	200	14	20
Cylinder head x Intake manifold	180	13	18
Cylinder head x Delivery pipe	180	13	18
Cylinder head x Exhaust manifold	400	29	39
Cylinder head x Distributor (7M-GE)	140	10	14
Cylinder head x Cam position sensor (7M-GTE)	140	10	14
Connecting rod cap x Connecting rod	650	47	64
Cylinder block x Main bearing cap	1,040	75	102
Cylinder block x Oil nozzle	250	18	25
Cylinder block x Timing belt case x Idler pulley	500	36	49
Cylinder block x Oil pump drive shaft thrust plate	145	11	14

TURBOCHARGER SYSTEM

Specifications

Turbocharger	Turbocharging pressure	M/T	STD	0.39 – 0.53 kg/cm ² (5.5 – 7.5 psi, 38 – 52 kPa)
		A/T	STD	0.34 – 0.42 kg/cm ² (4.8 – 6.0 psi, 33 – 41 kPa)
	Bearing shaft axial play			STD

Torque specifications

Part tightened	kg-cm	ft-lb	N·m
Turbocharger x Turbin outlet elbow	440	32	43
Oil pipe x Turbocharger	130	9	13
Water pipe x Turbocharger	75	65 in.-lb	7.4
Oil pipe x Cylinder block (Bolt)	350	25	34
Oil pipe x Cylinder block (Nut)	130	9	13
Turbocharger stay x Turbocharger	810	59	79
Turbocharger stay x Engine mounting bracket	590	43	58
Turbocharger x Exhaust manifold	450	33	44
Front exhaust pipe x Turbocharger	630	46	62

EFI SYSTEM

Specifications

Fuel pressure regulator	Fuel pressure	at No vacuum	2.3 – 2.8 kg/cm ² (33 – 40 psi, 275 kPa)	
Cold start injector	Resistance		2 – 4 Ω	
	Fuel leakage		One drop or less per minute	
Injector	Resistance	7M-GE	1.8 – 3.4 Ω	
		7M-GTE	2.0 – 3.8 Ω	
	Injection volume	7M-GE	65 – 80 cc (4.0 – 4.9 cu in.) per 15 sec.	
		7M-GTE	101 – 114 cc (6.2 – 7.0 cu in.) per 15 sec.	
	Difference between each injector		9 cc (0.5 cu in.) or less	
	Fuel leakage		One drop or less per minute	
Throttle position sensor	Clearance between stop screw and lever		Between terminals	Resistance
	7M-GE	7M-GTE		
	0 mm (0 in.)		VTA – E2	0.3 – 6.3 kΩ
	0.40 mm (0.0157 in.)	0.5 mm (0.0197 in.)	IDL – E2	Less than 2.3 kΩ
	0.75 mm (0.0295 in.)	0.9 mm (0.0354 in.)	IDL – E2	∞
	Throttle valve fully opened position		VTA – E2	3.5 – 10.3 kΩ
		VC – E2	4.25 – 8.25 kΩ	
ISC valve	Resistance	B1 – S1 or S3	10 – 30 Ω	
		B2 – S2 or S4	10 – 30 Ω	
Solenoid resistor	Resistance	No. 10 +B – } No. 30	3 Ω each	

Specifications (Cont'd)

Cold start injector time switch	Resistance w/ TWC	STA - STJ	25 - 50 Ω	below 15°C (59°F)	
			60 - 85 Ω	above 30°C (86°F)	
	Resistance w/o TWC	STA - Ground	25 - 85 Ω	-	
		STA - STJ	20 - 40 Ω	below 30°C (86°F)	
			40 - 60 Ω	above 40°C (104°F)	
		STA - Ground	20 - 80 Ω	-	
Fuel pump Resistor	Resistance		Approx. 0.7 Ω		
VSV (FPU)	Resistance		30 - 50 Ω		
Air flow meter	Resistance	7M-GE	E2 - VS	20 - 600 Ω	(Measuring plate fully closed)
					20 - 1,200 Ω
			E2 - VC	200 - 400 Ω	
			E1 - FC	Infinity	(Measuring plate fully closed)
				Zero	(Other than closed position)
		7M-GTE	E2 - THA	10 - 20 kΩ	at -20°C (-4°F)
				4 - 7 kΩ	at 0°C (32°F)
				2 - 3 kΩ	at 20°C (68°F)
				0.9 - 1.3 kΩ	at 40°C (104°F)
				0.4 - 0.7 kΩ	at 60°C (140°F)
		KS → E1	∞		
		E1 → KS	5 - 10 kΩ		
		VC → E1	10 - 15 kΩ		
		E1 → VC	5 - 10 kΩ		
		E2 - THA	10 - 20 kΩ	at -20°C (-4°F)	
Water temp. sensor	Resistance		10 - 20 kΩ	at -20°C (-4°F)	
			4 - 7 kΩ	at 0°C (32°F)	
			2 - 3 kΩ	at 20°C (68°F)	
			0.9 - 1.3 kΩ	at 40°C (104°F)	
			0.4 - 0.7 kΩ	at 60°C (140°F)	
			0.2 - 0.4 kΩ	at 80°C (176°F)	
ECU	NOTE:				
	● 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)	
	BATT - E1	-		10 - 14	
IG S/W - E1	Ignition S/W ON				
M-REL - E1					
+B (+B1) - E1 B (B1)					

Specifications (Cont'd)

ECU (Cont'd)	Terminals	Condition	STD voltage (V)	
	IDL - E2	Ignition S/W ON	Throttle valve open	10 - 14
	VC (VCC) - E2			4 - 6
	VTA - E2	Ignition S/W ON	Throttle valve fully closed	0.1 - 1.0
			Throttle valve fully open	4 - 5
*1VS - E2		Ignition S/W ON	Measuring plate fully closed	4 - 5
			Measuring plate fully open	0.02 - 0.08
		Idling	2 - 4	
*2KS - E2		3,000 rpm	0.3 - 1.0	
		Ignition S/W ON	4 - 6	
		Cranking or running	2 - 4	
		Ignition S/W ON	4 - 6	
VC - E2		Ignition S/W ON	4 - 6	
THA - E2	Ignition S/W ON	Intake air temperature 20°C (68°F)	1 - 3	
THW - E2	Ignition S/W ON	Coolant temperature 80°C (176°F)	0.1 - 1.0	
No. 10 - E01 No. 20 - E02 No. 30 - E02		Ignition S/W ON	9 - 14	
STA - E1		Cranking	6 - 14	
ISC1 } - E1 ISC4		Ignition S/W ON	9 - 14	
IGF, IGT - E1		Idling	0.7 - 1.0	
*2IGdA, IGdB - E1		Idling	1 - 3	
*2HAC - E2	Ignition S/W ON	540 mmHg (21.26 in.Hg, 72.0 kPa)	Approx. 2.8	
		750 mmHg (129.53 in.Hg, 100.0 kPa)	Approx. 3.6	
W - E1		No trouble ("CHECK ENGINE" warning light off) and engine running	9 - 4	
*3A/C - E1		Air conditioning ON	10 - 14	
T - E1	Ignition S/W ON	Check connector T (TE1) - E1 not short	4 - 6	
		Check connector T (TE1) - E1 short	0	
*3NSW (A/T) - E1	Ignition S/W ON	Shift position P or N range	0	
		Ex. P or N range	10 - 14	
*3N/C (M/T) - E1	Ignition S/W ON	Clutch pedal not depressed	0	
		Clutch pedal depressed	10 - 14	
*3DFG - E1	Ignition S/W ON	Defogger S/W OFF	10 - 14	
		Defogger S/W ON	0	
*3LP - E1		Headlight S/W OFF	10 - 14	
		Headlight S/W ON	0	

*1 7M-GE only

Specifications (Cont'd)

ECU (Cont'd)	Resistance		
	Terminals	Condition	Resistance (Ω)
IDLE - E2		Throttle valve open	∞
		Throttle valve fully closed	Less than 2,300
VTA - E2		Throttle valve fully open	3,500 - 10,300
		Throttle valve fully closed	300 - 6,300
VC (VCC) - E2		-	200 - 400
* ¹ VS - E2		Measuring plate fully closed	20 - 600
		Measuring plate fully open	20 - 1,200
* ² KS → E1		-	∞
* ² E1 → KS		-	5,000 - 10,000
* ² VC → E1		-	10,000 - 15,000
* ² E1 → VC		-	5,000 - 10,000
THA - E2		Intake air temperature 20°C (68°F)	2,000 - 3,000
THW - E2		Coolant temperature 80°C (176°F)	200 - 400
G1, G2 - G -		-	140 - 180
NE - G -		-	
ISC1, ISC2 - +B ISC3, ISC4		-	10 - 30
* ² HAC - E2		-	2,900 - 4,200
Fuel cut rpm	Fuel cut rpm		1,800 rpm
	Fuel return rpm		1,200 rpm

*¹ 7M-GE only*² 7M-GTE only

Torque Specifications

Part tightened	kg-cm	ft-lb	N-m
Fuel pump x Fuel tank	35	30 in.-lb	3.4
Cold start injector x Intake chamber	55	48 in.-lb	5.4
Pressure regulator x Delivery pipe	250	18	25
No. 2 fuel pipe x Pressure regulator	250	18	25
Pulsation damper x Delivery pipe	400	29	39

Torque Specifications (Cont'd)

Part tightened	kg-cm	ft-lb	N-m
Cold start injector tube x Delivery pipe	300	22	29
Cold start injector tube x Cold start injector	180	13	18
No. 1 fuel pipe x Fuel pipe support	300	22	29
ISC valve x Intake chamber	130	9	13
Air intake connector x Intake chamber	180	13	18
Throttle body x Air intake connector	130	9	13

COOLING SYSTEM

Specifications

Engine coolant capacity		See page A-2	
Thermostat	Valve opening temperature	86 – 90°C	187 – 194°F
	Valve lift at 100°C (212°F)	8 mm (0.31 in.) or more	
Radiator	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

Torque Specifications

Part tightened	kg-cm	ft-lb	N-m
Drain plug	300	22	29
Water outlet x Water outlet housing	65	56 in.-lb	6.4
Water pump x Cylinder block	180	13	18

LUBRICATION SYSTEM

Specifications

Engine oil capacity		See page A-2	
Oil pressure	at Idle speed	0.3 kg/cm ² (4.3 psi, 29 kPa) or more	
	at 3,000 rpm	2.5 – 5.0 kg/cm ² 36 – 71 psi 245 – 490 kPa	
Oil pump	Body clearance	STD	0.105 – 0.175 mm 0.0041 – 0.0069 in.
		Limit	0.2 mm 0.008 in.
	Side clearance	STD	0.03 – 0.09 mm 0.0012 – 0.0035 in.
		Limit	0.15 mm 0.0059 in.
	Gear backlash	STD	0.5 – 0.6 mm 0.020 – 0.024 in.
		Limit	0.9 mm 0.035 in.

Torque Specifications

Part tightened	kg-cm	ft-lb	N·m
Engine oil drain plug	350	25	34
Oil pump cover x Oil pump body	75	65 in.-lb	7.4
Relief valve x Oil pump cover	375	27	37
Oil pump strainer x Oil pump body (MA only)	130	9	13
Oil pump x Cylinder block	220	16	22
Oil pump strainer x Cylinder block (MA only)	60	52 in.-lb	5.9
Oil pump outlet pipe x Oil pump	350	25	34
Oil pump outlet pipe x Union	350	25	34
Oil pan x Cylinder block	130	9	13
Oil pressure regulator x Cylinder block (7M-GE only)	145	10	14
Oil pressure regulator plug	375	27	37
Oil filter bracket x Cylinder block	500	36	49

IGNITION SYSTEM

Ignition timing			10° BTDC @ idle [w/ Terminals T (TE1) and E1 short-circuit]		
Firing order			1 - 5 - 3 - 6 - 2 - 4		
High-tension cord	Resistance	Limit	25 k Ω per cord		
Spark plug	Conventional tipped type				
	Type	ND	Q20R-U		
		NGK	BCPR6EY		
	Air gap		0.8 mm	0.031 in.	
	Platinum tipped type				
	Type	7M-GE	ND	PQ16R	
			NGK	BCPR5EP11	
		7M-GTE	ND	PQ20R-P8	
Air gap	7M-GE	STD	1.1 mm	0.043 in.	
		Limit	1.3 mm	0.051 in.	
	7M-GTE	STD	0.8 mm	0.031 in.	
		Limit	1.0 mm	0.039 in.	
Ignition coil	Primary coil resistance		at cold		
	7M-GE	MA	0.24 - 0.30 Ω		
		MS	0.41 - 0.50 Ω		
	7M-GTE		0.3 - 0.5 Ω		
	Secondary coil resistance				
7M-GE	MA	9.2 - 12.4 k Ω			
	MS	10.2 - 13.8 k Ω			
Distributor (7M-GE) or can position sensor (7M-GTE)	Air gap	NE, G1 and G2	Pickups	0.2 - 0.4 mm	0.008 - 0.016 in.
	Pickup coil resistance	NE, G1 and G2	Pickups	140 - 180 Ω	

STARTING SYSTEM

Starter	Rated voltage and output power		12 V 1.0 kW		12 V 1.4 kW	
	No-load characteristic	Ampere	90 A or less at 11.5 V			
	rpm	3,000 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.
Spring installed load	STD	1,785 – 2,415 g (3.9 – 5.3 lb, 17 – 24 N)				←
	Limit	1.2 kg 2.6 lb 12 N				←
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.			←
Circuit runout	Limit	0.05 mm	0.0020 in.			←

CHARGING SYSTEM

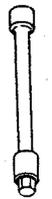
Drive belt tension		See page A-2	
Battery specific gravity when fully charged at 20°C (68°F)		1.25 – 1.27	
Alternator	Rated output	12 V 70 A	
	Rotor coil resistance	2.8 – 3.0 Ω	
	Slip ring diameter	STD	14.2 – 14.4 mm 0.559 – 0.567 in.
		Limit	12.8 mm 0.504 in.
	Brush exposed length	STD	10.5 mm 0.413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

SST AND SSM

	Page
SST (SPECIAL SERVICE TOOLS)	C-2
SSM (SPECIAL SERVICE MATERIALS)	C-5

SST (SPECIAL SERVICE TOOLS)

NOTE: Classification
 A = SST required for vehicle inspections and minor repairs and
 multipurpose SST.
 B = SST required for major repairs involving disassembly of com-
 ponents.
 C = SST required for rather special, less frequent work not of
 classification as either A or B.

Section	Classification	Part Name	Part No.	Illustration	EM	TC	FI	CO	LU	IG	ST	CH	Note	
			09032-00100										A	(Oil Pan Seal) Cutter
			09043-38100										A	(Hexagon 10 mm) Wrench
			09155-18100										A	(Spark Plug Wrench)
			09201-41020										B	(Valve Stem Oil Seal Replacer)
			09201-70010										B	(Valve Guide Bushing) Remover & Replacer
			09202-70010										A	(Valve Spring Compressor)
			09213-31021										A	(Crankshaft Pulley) Puller
			09213-54014										A	(Crankshaft Pulley) Puller
			09213-60017										A	(Crankshaft Pulley & Gear Pulley Set)
			09213-70010										A	(Crankshaft Pulley) Holding Tool
			09214-41010										B	(Crankshaft Damper & Gear Replacer)
														Oil pump oil seal

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section	Classification	Part Name	Part No.	Illustration	EM	TC	FI	CO	LU	IG	ST	CH	Note	
			09214-60010										B	(Crankshaft Pulley & Gear Replacer)
			09215-00100										C	(Cameshaft Bearing Remover & Replacer) Set
			09215-00120											(Gate "A")
			09215-00130											(Bolt)
			09215-00140											(Nut)
			09215-00160											(Pin)
			09215-00210											(Remover & Replacer)
			09215-00220											(Remover & Replacer)
			09216-00020											(Belt Tension Gauge)
			09216-00030											(Belt Tension Cable)
			09222-30010											(Connecting Rod Bushing Remover & Replacer)
			09223-41020											(Crankshaft Rear Oil Seal Replacer)
			09223-60010											(Crankshaft Front Oil Seal Replacer)
			09228-07500											(Oil Filter Wrench)
														Cameshaft oil seal

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section	Classification	Part Name	Part No.	Illustration	EM	TC	FI	CO	LU	IG	ST	CH	Note
		(Rectifier Service Tool Set)	09230-00010		B		●						
		(Idle Adjusting Screw Wrench)	09243-00020		A	●							
		(Valve Clearance Adjusting Tool Set)	09248-85010		A	●							
		(Injection Measuring Tool Set)	09268-41045		B		●						
		(EFI Fuel Pressure Gauge)	09268-45012		A		●						
		(Drive Shaft Holding Tool)	09278-54012		A	●							Camshaft timing pulley
		(Injection Pump Camshaft Bearing Cone Replacer)	09285-76010		C						●	●	*1 Starter front bearing for 1.0 kW only *2 Rotor rear bearing
		(Injection Pump Spline Shaft Puller)	09285-46011		C						●	●	*1 Starter bearing *2 Rectifier and frame
		(Oil Seal Puller)	09308-55010		A	●							
		(Companion Flange Holding Tool)	09330-00021		A	●							
		(Differential Drive Pinion Rear Bearing Replacer)	09508-35010		B	●							Crankshaft front oil seal
		(Front Hub & Drive Pinion Bearing Tool Set)	09608-20012		B							●	
		(Replacer)	(09608-00030)									●	Rotor front bearing
		(Power Steering Hose Nut 14 x 17 Wrench Set)	09831-22020		A							●	Fuel line flare nut

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section	Classification	Part Name	Part No.	Illustration	EM	TC	FI	CO	LU	IG	ST	CH	Note
		(Outer Rear View Mirror Wrench)	09814-20010		C		●						Cold start injector time switch
		(Alternator Rear Bearing Puller)	09820-09021		B							●	
		(Alternator Pulley Set Nut Wrench Set)	09820-83010		B							●	
		(Wiring "A" EFI Inspection)	09842-30050		B		●						
		(Wiring "E" EFI Inspection)	09842-30066		B		●						
		(Hexagon Wrench)	09823-00010		B	●							
		(Universal Puller)	09860-20017		B	●							
		(Turbocharger Pressure Gauge)	09892-40241		C		●						7M-GTE

SSM (SPECIAL SERVICE MATERIALS)

Part Name	Part No.	Sec.	Use etc.
Seal packing or equivalent	08826-00080	EM	Over the space between the timing belt case and cylinder block Cylinder head x No. 1 and No. 2 Cylinder head cover Cylinder head x No. 1 camshaft bearing cap
Adhesive 1324, Three bond 1324 or equivalent	08833-00070	LU	Engine oil pan
		EM	Timing belt case mounting bolt (10 mm)