

SERVICE SPECIFICATIONS

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ENGINE MECHANICAL**Specifications**

Engine coolant capacity					
	w/ Front heater		17.5 liters	18.5 US qts	15.4 Imp. qts
	w/ Front and rear heaters		19.5 liters	20.6 US qts	17.2 Imp. qts
Engine oil capacity					
Drain and refill	w/o Oil filter change		7.0 liters	7.4 US qts	6.2 Imp. qts
	w/ Oil filter change		7.8 liters	8.2 US qts	6.9 Imp. qts
Dry fill			8.0 liters	8.5 US qts	7.0 Imp. qts
Battery gravity when fully charged at 20°C (68°F)			1.25 – 1.27		
High-tension cord	Resistance	Limit	25 kΩ per cord		
Spark plug					
Type		ND	W16EXR-U		
		NGK	BPR5EY		
Correct electrode gap			0.8 mm	0.031 in.	
Firing order			1 – 5 – 3 – 6 – 2 – 4		
Drive belt deflection with 10 kg (22.0 lb, 98 N)					
Alternator – Water pump	New belt		7.0 – 9.0 mm	0.278 – 0.354 in.	
	Used belt		9.0 – 12.0 mm	0.354 – 0.472 in.	
PS pump – Crankshaft	New belt		7.0 – 9.5 mm	0.278 – 0.374 in.	
	Used belt		8.0 – 10.0 mm	0.315 – 0.393 in.	
Valve clearance at hot	IN		0.20 mm	0.008 in.	
	EX		0.35 mm	0.014 in.	
Ignition timing			7° BTDC @ Idle		
Dash pot setting speed			1,200 rpm		
Intake manifold vacuum	at idle speed		420 mmHg (16.54 in.Hg, 56.0 kPa) or more		
Compression pressure	at 200 rpm	STD	10.5 kg/cm ² (149 psi, 1,030 kPa) or more		
		Limit	8.0 kg/cm ² (114 psi, 785 kPa)		
Pressure difference between each cylinder			0.5 kg/cm ² (7 psi, 49kPa) or less		

Specifications (Cont'd)

Cylinder head	Cylinder block surface warpage	Limit	0.15 mm	0.0059 in.
	Manifold surface warpage	Limit	0.10 mm	0.0039 in.
	Valve seat Refacing angle	Intake	25°, 45°, 70°	
		Exhaust	45°, 65°	

Specifications (Cont'd)

Camshaft and bearing	Circle runout	Limit		0.30 mm	0.0118 in.
	Cam lobe height	STD	IN	38.36 – 38.46 mm	1.5102 – 1.5142 in.
			EX	38.25 – 38.35 mm	1.5059 – 1.5098 in.
	Journal diameter	Limit	IN	38.0 mm	1.496 in.
			EX	37.9 mm	1.492 in.
		STD	No. 1	47.955 – 47.975 mm	1.8880 – 1.8888 in.
			No. 2	46.455 – 46.475 mm	1.8289 – 1.8297 in.
			No. 3	44.955 – 44.975 mm	1.7699 – 1.7707 in.
			No. 4	43.455 – 43.475 mm	1.7108 – 1.7116 in.
		U/S 0.25	No. 1	47.715 – 47.725 mm	1.8785 – 1.8789 in.
			No. 2	46.215 – 46.225 mm	1.8195 – 1.8199 in.
			No. 3	44.715 – 44.725 mm	1.7604 – 1.7608 in.
			No. 4	43.215 – 43.225 mm	1.7014 – 1.7018 in.
		U/S 0.50	No. 1	47.465 – 47.475 mm	1.8687 – 1.8691 in.
			No. 2	45.965 – 45.975 mm	1.8096 – 1.8888 in.
			No. 3	44.465 – 44.475 mm	1.7506 – 1.7510 in.
			No. 4	42.965 – 42.975 mm	1.6915 – 1.6919 in.
	Bearing inside diameter	STD	No. 1	48.000 – 48.030 mm	1.8898 – 1.8909 in.
			No. 2	46.500 – 46.530 mm	1.8307 – 1.8319 in.
			No. 3	45.000 – 45.030 mm	1.7717 – 1.7728 in.
			No. 4	43.500 – 43.530 mm	1.7126 – 1.7138 in.
		U/S 0.25	No. 1	47.750 – 47.825 mm	1.8799 – 1.8829 in.
			No. 2	46.250 – 46.325 mm	1.8209 – 1.8238 in.
			No. 3	44.750 – 44.820 mm	1.7618 – 1.7646 in.
			No. 4	43.250 – 43.320 mm	1.7028 – 1.7055 in.
		U/S 0.50	No. 1	47.500 – 47.575 mm	1.8701 – 1.8730 in.
			No. 2	46.000 – 46.075 mm	1.8110 – 1.8140 in.
			No. 3	44.500 – 44.570 mm	1.7520 – 1.7547 in.
			No. 4	43.000 – 43.070 mm	1.6929 – 1.6957 in.
	Journal oil clearance	STD	STD	0.025 – 0.075 mm	0.0010 – 0.0030 in.
			U/S 0.25 and 0.50		
			No. 1 and No. 2	0.025 – 0.110 mm	0.0010 – 0.0043 in.
		Limit	No. 3 and No. 4	0.025 – 0.105 mm	0.0010 – 0.0041 in.
			STD	0.10 mm	0.0039 in.
			U/S 0.25 and 0.50	0.15 mm	0.0059 in.
	Thrust clearance	STD		0.200 – 0.290 mm	0.0079 – 0.0114 in.
		Limit		0.33 mm	0.0130 in.
Valve lifter	Lifter diameter	STD		21.387 – 21.404 mm	0.8420 – 0.8427 in.
		O/S 0.05		21.437 – 21.454 mm	0.8440 – 0.8446 in.
	Cylinder block lifter bore diameter			21.417 – 21.443 mm	0.8432 – 0.8442 in.
	Lifter oil clearance	STD		0.013 – 0.056 mm	0.0005 – 0.0022 in.
		Limit		0.10 mm	0.0039 in.

Specifications (Cont'd)

Cylinder block	Warpage Cylinder bore diameter	STD	Limit	0.15 mm	0.0059 in.
			Mark "1"	94.000 – 94.010 mm	3.7008 – 3.7012 in.
			Mark "2"	94.010 – 94.020 mm	3.7012 – 3.7016 in.
			Mark "3"	94.020 – 94.030 mm	3.7016 – 3.7020 in.
			Limit	94.23 mm	3.7098 in.
			O/S 0.50	94.73 mm	3.7295 in.
Piston and piston ring	Piston diameter	STD	Limit	95.23 mm	3.7492 in.
			O/S 1.00	95.73 mm	3.7689 in.
			O/S 1.50		
			Limit		
			Mark "1"	93.963 – 93.973 mm	3.6993 – 3.6997 in.
			Mark "2"	93.973 – 93.983 mm	3.6997 – 3.7001 in.
	Piston oil clearance	O/S 0.50	Mark "3"	93.983 – 93.993 mm	3.7001 – 3.7005 in.
				94.463 – 94.493 mm	3.7190 – 3.7202 in.
				94.963 – 94.993 mm	3.7387 – 3.7399 in.
				95.463 – 95.493 mm	3.7584 – 3.7596 in.
				0.027 – 0.047 mm	0.0011 – 0.0019 in.
	Piston ring groove clearance	No. 1		0.030 – 0.070 mm	0.0012 – 0.0028 in.
				0.050 – 0.090 mm	0.0020 – 0.0035 in.
				0.200 – 0.420 mm	0.0079 – 0.0165 in.
				0.500 – 0.720 mm	0.0197 – 0.0283 in.
				0.200 – 0.820 mm	0.0079 – 0.0323 in.
				1.02 mm	0.0402 in.
	Piston ring end gap	STD	No. 1	1.32 mm	0.0520 in.
			No. 2	1.42 mm	0.0559 in.
			Oil		
			Limit		
			No. 1		
			No. 2		
Connecting rod and piston pin	Thrust clearance	STD		0.160 – 0.300 mm	0.0063 – 0.0118 in.
			Limit	0.40 mm	0.0156 in.
	Connecting rod bearing center wall thickness	STD	Mark A	1.484 – 1.488 mm	0.0584 – 0.0586 in.
			Mark B	1.488 – 1.492 mm	0.0586 – 0.0587 in.
			Mark C	1.492 – 1.496 mm	0.0587 – 0.0589 in.
	Connecting rod oil clearance	STD		0.020 – 0.050 mm	0.0008 – 0.0020 in.
			U/S 0.25 and 0.50	0.019 – 0.063 mm	0.0007 – 0.0025 in.
			Limit	0.10 mm	0.0039 in.
	Bend per 100 mm (3.94 in.)	Limit		0.05 mm	0.0020 in.
	Twist per 100 mm (3.94 in.)	Limit		0.15 mm	0.0059 in.
				22.012 – 22.027 mm	0.8666 – 0.8672 in.
				22.004 – 22.019 mm	0.8663 – 0.8669 in.
	Bushing inside diameter	STD		0.005 – 0.011 mm	0.0002 – 0.0004 in.
				0.03 mm	0.0012 in.
Crankshaft and bearing	Thrust clearance	STD		0.015 – 0.204 mm	0.0006 – 0.0080 in.
			Limit	0.30 mm	0.0118 in.
	Thrust washer thickness	STD		2.430 – 2.480 mm	0.0957 – 0.0976 in.
			O/S 0.125	2.493 – 2.543 mm	0.0981 – 0.1001 in.
			O/S 0.250	2.555 – 2.605 mm	0.1006 – 0.1026 in.
	Main journal oil clearance	STD		0.020 – 0.044 mm	0.0008 – 0.0017 in.
			U/S 0.25 and 0.50	0.021 – 0.067 mm	0.0008 – 0.0026 in.
			Limit	0.10 mm	0.0039 in.

Specifications (Cont'd)

Crankshaft and bearing (cont'd)	Main journal diameter	STD	No. 1	66.972 – 66.996 mm	2.6367 – 2.6376 in.
			No. 2	68.472 – 68.496 mm	2.6957 – 2.6967 in.
			No. 3	69.972 – 69.996 mm	2.7548 – 2.7557 in.
			No. 4	71.472 – 71.496 mm	2.8139 – 2.8148 in.
	U/S 0.25		No. 1	66.745 – 66.755 mm	2.6278 – 2.6281 in.
			No. 2	68.245 – 68.255 mm	2.6868 – 2.6872 in.
			No. 3	69.745 – 69.755 mm	2.7459 – 2.7463 in.
			No. 4	71.245 – 71.255 mm	2.8049 – 2.8053 in.
	U/S 0.50		No. 1	66.495 – 66.505 mm	2.6179 – 2.6183 in.
			No. 2	67.995 – 68.005 mm	2.6770 – 2.6774 in.
			No. 3	69.495 – 69.505 mm	2.7360 – 2.7364 in.
			No. 4	70.995 – 71.005 mm	2.7951 – 2.7955 in.
	Main bearing center wall thickness	STD	Mark T1	2.493 – 2.497 mm	0.0981 – 0.0983 in.
			Mark T2	2.497 – 2.501 mm	0.0983 – 0.0985 in.
			Mark T3	2.501 – 2.505 mm	0.0985 – 0.0986 in.
			Mark T4	2.505 – 2.509 mm	0.0986 – 0.0988 in.
			Mark T5	2.509 – 2.513 mm	0.0988 – 0.0989 in.
	Crank pin diameter	STD		52.988 – 53.000 mm	2.0861 – 2.0866 in.
			U/S 0.25	52.701 – 52.711 mm	2.0748 – 2.0752 in.
			U/S 0.50	52.451 – 52.461 mm	2.0650 – 2.0654 in.
	Circle runout	Limit		0.12 mm	0.0048 in.
	Taper and out-of-round				
	Main journal and crank pin	Limit		0.02 mm	0.0008 in.

Torque Specifications

Part tightened	kg-cm	ft-lb	N-m
Cylinder head x Cylinder block	1,250	90	123
Valve rocker support x Cylinder head			
12 mm bolt head	240	17	24
14 mm bolt head and nut	340	25	33
Manifold x Cylinder head			
14 mm bolt head	510	37	50
17 mm bolt head	700	51	69
Nut	570	41	56
Cylinder head cover x Cylinder head	90	78 in.-lb	8.8
Intake manifold x Intake manifold stay	300	22	29
Cylinder block x Intake manifold stay	300	22	29
Air injection manifold x Cylinder head	210	15	21
Exhaust manifold x Exhaust pipe	630	46	62
Water outlet housing x Cylinder head	250	18	25
Camshaft thrust washer x Cylinder block	120	9	12
Timing gear cover x Front end plate or cylinder block			
10 mm bolt head	50	43 in.-lb	4.9
14 mm bolt head	250	18	25
Crankshaft pulley x Crankshaft	3,500	253	343

Torque Specifications (Cont'd)

Part tightened	kg-cm	ft-lb	N-m
PS pulley x Crankshaft pulley	185	13	18
Push rod cover x Cylinder block	40	35 in.-lb	3.9
Main bearing cap x Cylinder block			
19 mm bolt head	1,375	99	135
17 mm bolt head	1,175	85	115
Connecting rod cap x Connecting rod	600	43	59
Front end plate x Cylinder block			
Screw	250	18	25
Bolt	310	22	30
Drive plate x Crankshaft	890	64	87

EFI SYSTEM**Specifications**

Fuel pressure regulator	Fuel pressure	at No vacuum	2.6 – 3.2 kg/cm ² (37 – 46 psi, 255 – 314 kPa)
Cold start injector	Resistance		2 – 4 Ω
	Fuel leakage		One drop or less per minute
Injector	Resistance		Approx. 13.8 Ω
	Injection volume		47 – 59 cc (2.9 – 3.6 cu in.) per 15 sec.
	Difference between each injector		5 cc (0.31 cu in.) or less
	Fuel leakage		One drop or less per minute
Throttle position sensor	Clearance between stop screw and lever		Resistance
	0 mm	0 in.	VTA – E2
	0.77 mm	0.0303 in.	IDL – E2
	1.09 mm	0.0429 in.	IDL – E2
	Throttle valve fully opened position		VTA – E2
	—		VC – E2
ISC valve	Resistance	B1 – S1 or S3	10 – 30 Ω
		B2 – S2 or S4	10 – 30 Ω
Cold start injector time switch	Resistance	STA – E1	below 15°C (59°F)
		STA – Ground	above 30°C (86°F)
Air flow meter	Resistance	E2 – VS	200 – 600 Ω (Measuring plate fully closed)
			20 – 1,200 Ω (Measuring plate fully open)
		E2 – VC	200 – 400 Ω
		E1 – FC	Infinity
			(Measuring plate fully closed)
			Zero (Other than closed position)

Specifications (Cont'd)

Air flow meter (cont'd)	Resistance (cont'd)	E2 – THA 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)	10 – 20 kΩ 4 – 7 kΩ 2 – 3 kΩ 0.9 – 1.3 kΩ 0.4 – 0.7 kΩ	
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	
Oxygen sensor	Heater resistance		5.1 – 6.3 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 kΩ 11.89 – 14.37 kΩ 2.79 – 3.59 kΩ	
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)	
	BATT – E1	—	10 – 14	
	IG SW – E1	Ignition switch ON	10 – 14	
	M-REL – E1	Ignition switch ON	10 – 14	
	+ B (+ B1) – E1	Ignition switch ON	10 – 14	
	IDL – E2	Ignition switch ON	Throttle valve open	4 – 6
	VC – E2		—	4 – 6
	VTA – E2		Throttle valve fully closed	0.1 – 1.0
			Throttle valve fully open	4 – 5
	VC – E22	Ignition switch ON	—	4 – 6
	VS– E22		Measuring plate fully closed	4 – 5
			Measuring plate fully open	0.02 – 0.08
			Idling	2 – 4
		3,000 rpm	0.3 – 1.0	
	THA – E2	Ignition switch ON	Intake air temperature 20°C (68°F)	1 – 3
	THW – E2	Ignition switch ON	Coolant temperature 80°C (176°F)	0.1 – 1.0
	No. 10 E01 No. 20 E02	Ignition switch ON		10 – 14
	STA – E1	Cranking		6 – 14
	ISC1 ISC2 – E1 ISC4	Ignition switch ON		10 – 14
	IGT – E1	Idling		0.7 – 1.0
	W – E1	No trouble ("CHECK" engine warning light off) and engine running		10 – 14

Specifications (Cont'd)

ECU (cont'd)	Terminals	Condition	STD voltage (V)
	T – E1	Ignition switch ON	Check connector TE1 – E1 not connect
			Check connector TE1 – E1 connect
	NSW – E1	Ignition switch ON	Shift position P or N range
			Ex. P or N range
	4WD – E1	Ignition switch ON	4WD switch ON
			4WD switch OFF
	STP – E1	Ignition switch ON	Stop light switch ON
			Stop light switch OFF
	Resistance		
	Terminals	Condition	Resistance (Ω)
	IDL – E2	Throttle valve fully open	Infinity
		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 – E2	—	4,250 – 8,250
	VC – E22	—	200 – 400
	VS – E22	Measuring plate fully closed	200 – 600
		Measuring plate fully open	20 – 1,200
	THA – E2	Intake air temperature 20°C (68°F)	2,000 – 3,000
	THW – E2	Coolant temperature 80°C (176°F)	200 – 400
	GI – G ⊖	—	185 – 265
	NE – G ⊖	—	185 – 265
	ISC1, ISC2 ISC3, ISC4 – +B	—	10 – 30
Fuel cut rpm	Fuel cut rpm	1,300 rpm	
	Fuel return rpm	1,000 rpm	

Torque Specifications

Part tightened	kg-cm	ft-lb	N-m
Cold start injector pipe x Cold start injector	180	13	18
Cold start injector pipe x Delivery pipe	180	13	18
Cold start injector clamp bolt	120	9	12
Fuel pump bracket x Fuel tank	35	30 in.-lb	3.4
Pressure regulator x Delivery pipe	50	43 in.-lb	4.9
Fuel return pipe x Pressure regulator	180	13	18
Delivery pipe x Intake manifold	120	9	12
Pulsation damper x Delivery pipe	300	22	29
Air intake chamber x Intake manifold	250	18	25
Intake chamber stay mount bolt	120	9	12
EGR pipe union nut	800	58	78
Throttle body x Air intake chamber	120	9	12
ISC valve x Air intake chamber	120	9	12

IGNITION SYSTEM

Ignition timing		7° BTDC @ idle (Check connector TE1 and E1 connected)
Firing order		1 – 5 – 3 – 6 – 2 – 4
High-tension cord	Resistance Limit	25 k Ω per cord
Spark plug	Type	ND NGK
	Correct electrode gap	W16EXR-U BPR5EY 0.8 mm 0.031 in.
Ignition coil	Primary coil resistance at cold	0.52 – 0.64 Ω
	Secondary coil resistance at cold	11.5 – 15.5 k Ω
Distributor	Air gap G and NE pickups	0.2 mm (0.008 in.) or more
	Pickup coil resistance G and NE pickups	185 – 265 Ω

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 80A
	Rotor coil resistance	2.8 – 3.0 Ω
	Slip ring diameter	STD 32.3 – 32.5 mm 1.272 – 1.280 in.
		Limit 32.1 mm 1.264 in.
	Brush exposed length	STD 20.0 mm 0.789 in.
		Limit 5.5 mm 0.217 in.
Alternator regulator	Regulating voltage at 25°C (77°F)	13.8 – 14.4 V

