

SERVICE SPECIFICATIONS

SERVICE DATA

E90CS-03

Tune - up	<p>Battery specific gravity</p> <p>High-tension cord resistance - Limit</p> <p>Alternator drive belt tension</p> <p style="padding-left: 40px;">New belt</p> <p style="padding-left: 40px;">Used belt</p> <p>Valve clearance (Cold) - Intake</p> <p>Valve clearance (Cold) - Exhaust</p> <p>Ignition timing</p> <p>Idle speed</p>	<p>1.25 - 1.27</p> <p>(when fully charged at 20°C (68°F))</p> <p>25 kΩ per cord</p> <p>120 ± 20 lbf</p> <p>104 ± 20 lbf</p> <p>0.15 - 0.25 mm (0.006 - 0.010 in.)</p> <p>0.28 - 0.38 mm (0.011 - 0.015 in.)</p> <p>10° BTDC @ idle</p> <p>800 ± 50 rpm</p>
Intake manifold vacuum	at idle speed	60 kPa (450 mmHg, 17.7 in.Hg)
Compression pressure	<p>at 250 rpm - STD</p> <p>at 250 rpm - Limit</p> <p>Difference of pressure between each cylinder</p>	<p>1,128 kPa (11.5 kgf/cm², 164 psi) or more</p> <p>883 kPa (9.0 kgf/cm², 128 psi)</p> <p>98 kPa (1.0 kgf/cm², 14 psi) or less</p>
Timing belt tensioner	Protrusion	8.5 - 9.5 mm (0.335 - 0.374 in.)
Cylinder head	<p>Warpage - Cylinder block side (Limit)</p> <p>Warpage - Intake manifold side (Limit)</p> <p>Warpage - Exhaust manifold side (Limit)</p> <p>Valve seat - Refacing angle</p> <p>Valve seat - Contacting angle</p> <p>Valve seat - Contacting width</p>	<p>0.20 mm (0.0079 in.)</p> <p>0.20 mm (0.0079 in.)</p> <p>0.30 mm (0.0118 in.)</p> <p>30°, 45°, 75°</p> <p>45°</p> <p>1.0 - 1.4 mm (0.039 - 0.055 in.)</p>
Valve guide bushing	<p>Inside diameter</p> <p>Outside diameter (for replacement part) - STD</p> <p>Outside diameter (for replacement part) - O/S 0.05</p>	<p>6.000 - 6.018 mm (0.2362 - 0.2369 in.)</p> <p>10.988 - 11.006 mm (0.4326 - 0.4333 in.)</p> <p>11.038 - 11.056 mm (0.4346 - 0.4353 in.)</p>
Valve	<p>Valve overall length - STD (Intake)</p> <p>Valve overall length - STD (Exhaust)</p> <p>Valve overall length - Limit (Intake)</p> <p>Valve overall length - Limit (Exhaust)</p> <p>Valve face angle</p> <p>Stem diameter (Intake)</p> <p>Stem diameter (Exhaust)</p> <p>Stem oil clearance - STD (Intake)</p> <p>Stem oil clearance - STD (Exhaust)</p> <p>Stem oil clearance - Limit (Intake)</p> <p>Stem oil clearance - Limit (Exhaust)</p> <p>Margin thickness - STD</p> <p>Margin thickness - Limit</p>	<p>105.50 mm (4.1535 in.)</p> <p>99.55 mm (3.9193 in.)</p> <p>104.80 mm (4.1260 in.)</p> <p>98.85 mm (3.8917 in.)</p> <p>44.5°</p> <p>5.960 - 5.975 mm (0.2346 - 0.2352 in.)</p> <p>5.955 - 5.970 mm (0.2344 - 0.2350 in.)</p> <p>0.025 - 0.058 mm (0.0010 - 0.0023 in.)</p> <p>0.030 - 0.063 mm (0.0012 - 0.0025 in.)</p> <p>0.08 mm (0.0031 in.)</p> <p>0.10 mm (0.0039 in.)</p> <p>0.8 - 1.2 mm (0.031 - 0.047 in.)</p> <p>0.5 mm (0.020 in.)</p>
Valve spring	<p>Squareness - Limit</p> <p>Free length</p> <p>Installed tension at 34.4 mm (1.354 in.)</p>	<p>2.0 mm (0.079 in.)</p> <p>44.43 mm (1.7492 in.)</p> <p>201 - 236 N (20.5 - 24.1 kgf, 45.2 - 53.1 lbf)</p>

Valve lifter	Lifter diameter Lifter bore diameter Oil clearance - STD Oil clearance - 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	0.20 mm (0.0079 in.)
T-VIS valve	Warpage - Limit	0.20 mm (0.0079 in.)
VSV (for T-VIS)	Resistance (Cold)	33 - 39 Ω
Camshaft	Thrust clearance - STD Thrust clearance - Limit Journal oil clearance - STD Journal oil clearance - Limit Journal diameter Circle rounout - Limit Cam lobe height - STD Cam lobe height - Limit	0.120 - 0.240 mm (0.0047 - 0.0094 in.) 0.30 mm (0.0118 in.) 0.0025 - 0.062 mm (0.0010 - 0.0024 in.) 0.08 mm (0.0031 in.) 26.959 - 26.975 mm (1.0614 - 1.0620 in.) 0.06 mm (0.0024 in.) 41.010 - 41.110 mm (1.6146 - 1.6185 in.) 39.90 mm (1.5709 in.)
Cylinder block	Cylinder head surface warpage - Limit Cylinder bore diameter - STD (Mark 1) Cylinder bore diameter - STD (Mark 2) Cylinder bore diameter - STD (Mark 3) Cylinder bore diameter - Limit	0.05 mm (0.0020 in.) 86.000 - 86.010 mm (3.3858 - 3.3862 in.) 86.010 - 86.020 mm (3.3862 - 3.3866 in.) 86.020 - 86.030 mm (3.3866 - 3.3870 in.) 86.23 mm (3.3949 in.)
Piston and piston ring	Piston diameter - STD (Mark 1) Piston diameter - STD (Mark 2) Piston diameter - STD (Mark 3) Piston oil clearance - STD Piston oil clearance - Limit Piston ring groove clearance - No.1 Piston ring groove clearance - No.2 Piston ring end gap - STD (No.1) Piston ring end gap - STD (No.2) Piston ring end gap - STD (Oil) Piston ring end gap - Limit (No.1) Piston ring end gap - Limit (No.2) Piston ring end gap - Limit (Oil)	85.920 - 85.930 mm (3.3827 - 3.3831 in.) 85.930 - 85.940 mm (3.3831 - 3.3835 in.) 85.840 - 85.950 mm (3.3835 - 3.3839 in.) 0.070 - 0.090 mm (0.0028 - 0.0035 in.) 0.11 mm (0.0043 in.) 0.040 - 0.080 mm (0.0016 - 0.00031 in.) 0.030 - 0.070 mm (0.0012 - 0.0028 in.) 0.330 - 0.550 mm (0.0130 - 0.0217 in.) 0.450 - 0.670 mm (0.0177 - 0.0264 in.) 0.200 - 0.600 mm (0.0079 - 0.0236 in.) 0.85 mm (0.0335 in.) 0.97 mm (0.0382 in.) 0.90 mm (0.0354 in.)
Connecting rod	Thrust clearance - STD Thrust clearance - Limit Connecting rod bearing center wall thickness - STD (Mark 1) - STD (Mark 2) - STD (Mark 3) Connecting rod oil clearance - STD (STD) - STD (U/S 0.25) - Limit Rod bend - Limit per 100 mm (3.94 in.) Rod twist - Limit per 100 mm (3.94 in.)	0.160 - 0.312 mm (0.0063 - 0.0123 in.) 0.35 mm (0.0138 in.) 1.484 - 1.488 mm (0.0584 - 0.0586 in.) 1.488 - 1.492 mm (0.0586 - 0.0587 in.) 1.492 - 1.496 mm (0.0587 - 0.0589 in.) 0.024 - 0.055 mm (0.0009 - 0.0022 in.) 0.023 - 0.069 mm (0.0009 - 0.0027 in.) 0.08 mm (0.0031 in.) 0.05 mm (0.0020 in.) 0.15 mm (0.0059 in.)

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.)
	Piston pin oil clearance – Limit	0.05 mm (0.0020 in.)
Crankshaft	Thrust clearance – STD	0.020 – 0.220 mm (0.0008 – 0.0087 in.)
	Thrust clearance – 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.)
	– STD (No.3 – U/S 0.25)	0.021 – 0.061 mm (0.0008 – 0.0024 in.)
	– STD (Others – STD)	0.015 – 0.034 mm (0.0006 – 0.0013 in.)
	– STD (Others – 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.)
	Main journal diameter – 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.)
	– STD (No.3 – Mark 2)	1.995 – 1.998 mm (0.0785 – 0.0787 in.)
	– STD (No.3 – Mark 3)	1.998 – 2.001 mm (0.0787 – 0.0788 in.)
	– STD (No.3 – Mark 4)	2.001 – 2.004 mm (0.0788 – 0.0789 in.)
	– STD (No.3 – 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.)
	– STD (Others – Mark 2)	2.000 – 2.003 mm (0.0787 – 0.0789 in.)
	– STD (Others – Mark 3)	2.003 – 2.006 mm (0.0789 – 0.0790 in.)
– STD (Others – Mark 4)	2.006 – 2.009 mm (0.0790 – 0.0791 in.)	
– STD (Others – 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.)	
Crank pin diameter – 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.)	

80008-02

TORQUE SPECIFICATION

Part tightened	N-m	kgf-cm	ft-lbf
Cylinder head cover x Cylinder head	2.5	25	21 in.·lbf
Throttle body x Intake manifold	19	195	14
Intake air connector stay x Intake manifold	19	195	14
Intake air connector stay x Cylinder head	7.8	80	69 in.·lbf
Intake air connector x Intake air connector stay	19	195	14
Distributor x Cylinder head	39	400	29
Spark plug x Cylinder head	18	180	13
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 x Cylinder head	52	530	38
Crankshaft pulley x Crankshaft	108	1,100	80
Camshaft timing pulley x Camshaft	59	600	43
Camshaft timing pulley x Camshaft (For use with SST)	41	420	30
Timing belt tensioner x Cylinder head	21	210	15

Cylinder head x Cylinder block (1 st)	49	500	36
Cylinder head x Cylinder block (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
Delivery pipe x Cylinder head	19	195	14
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
Oil cooler x Oil cooler bracket (Relief valve)	78	800	58
Oil cooler x Cylinder block (Nut)	7.8	80	69 in.·lbf
Water outlet housing x Cylinder head	39	400	29
EGR valve x Intake manifold	19	195	14
EGR pipe x Cylinder head	25	260	19
RH front engine hanger x Cylinder head	39	400	29
RH front engine hanger x Mounting bracket	61	620	45
LH engine hanger x Cylinder head (12 mm head)	13	130	9
LH engine hanger x Cylinder head (14 mm head)	19	195	14
Exhaust manifold x Cylinder head	52	530	38
Cold start injector x Intake manifold	5.9	60	52 in.·lbf
Cold start injector pipe x Cold start injector	12	125	9
Cold start injector pipe x Delivery pipe	12	125	9
Main TWC x Turbine outlet elbow	29	300	22
TWC stay x Main TWC	59	600	43
TWC stay x Cylinder block	59	600	43
Oil nozzle x Cylinder block	9.1	93	81 in.·lbf
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	37	380	27
Oil cooler bracket x Cylinder block	7.8	80	69 in.·lbf
Water pump x Cylinder block (10 mm head)	7.8	80	69 in.·lbf
Water pump x Cylinder block (12 mm head)	27	275	20 in.·lbf
Alternator 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
Clutch cover x Flywheel	19	195	14
Transaxle x Cylinder block	64	650	47
Transaxle x Rear end plate	46	470	34
Heater water pipe x Cylinder block	46	470	34
No.2 rear end plate x Cylinder block	9.3	95	82 in.·lbf
No.2 rear end plate x Transaxle	19	195	14
Stiffener plate x Cylinder block	37	380	27
Stiffener plate x Transaxle	37	380	27
Starter x Rear end plate	39	400	29
Drive shaft bearing bracket x Cylinder block	64	650	47
Drive shaft bearing stay x Bearing stay	75	770	56
RH engine mounting bracket x Cylinder block	61	620	45
RH engine mounting Insulator x Mounting Bracket	52	530	38

RH engine mounting Insulator x Body	78	800	58
RH engine mounting stay x RH engine hanger	73	740	54
RH engine mounting stay x Mounting insulator	73	740	54
LH engine mounting bracket x Transaxle	52	530	38
LH engine mounting insulator x Transaxle	52	530	38
LH engine mounting insulator x Mounting bracket (upper side)	73	740	54
LH engine mounting insulator x Mounting bracket (lower side)	63	650	47
LH engine mounting insulator x Body	78	800	58
LH engine mounting stay x Mounting insulator	73	740	54
LH engine mounting stay x Transaxle	25	250	47
Front engine mounting bracket x Transaxle	77	790	57
Front engine mounting insulator x Body	73	740	54
Front engine mounting insulator x Mounting bracket	96	980	70
Rear engine mounting bracket x Transaxle (rear side)	77	790	57
Rear engine mounting bracket x Transaxle (RH side)	39	400	29
Rear engine mounting insulator x Body	64	650	47
Rear engine mounting insulator x Mounting bracket	87	890	64
Rear suspension lower crossmember x Body	113	1,150	83
Lateral control rod x Body	35	360	26
Lateral control rod x LH engine mounting insulator	37	380	27
A/C idler pulley bracket x Cylinder block (12 mm heady	25	250	18
A/C idler pulley bracket x Cylinder block 0 4 mm head)	27	275	20
A/C idler pulley bracket x RH engine hanger	37	375	27
A/C compressor x Cylinder block	25	250	18
Clutch release cylinder x Transaxle	12	120	9
Front exhaust pipe x Main TWC	62	630	46
Front exhaust pipe support bracket x Suspension crossmember	21	210	15
Suspension member damper x Suspension crossmember	21	210	15
Tailpipe x Body bracket	66	670	48
Tailpipe x Front exhaust pipe	43	440	32
Tailpipe bracket x Front exhaust pipe bracket	19	190	14
Tailpipe x Body bracket	66	670	48
Lower suspension brace x Body	73	740	54
Upper suspension brace x Body (Bolt)	73	740	54
Upper suspension brace x Body (Nut)	64	650	47