

SERVICE SPECIFICATIONS

SERVICE DATA

500CS-04

Tune - up	Engine oil API grade Battery specific gravity High-tension cord resistance - Limit Alternator drive belt tension New belt Used belt Valve clearance (Cold) - Intake Valve clearance (Cold) - Exhaust Ignition timing Idle speed (for USA M/T) Idle speed (for USA A/T) Idle speed (for CANADA M/T)	SG Energy-Conserving II multigrade 1.25 - 1.27 (when fully charged at 20°C (68°F)) 25 kΩ per cord 120 ± 20 lbf 104 ± 20 lbf 0.19 - 0.29 mm (0.007 - 0.011 in.) 0.28 - 0.38 mm (0.011 - 0.015 in.) 10° BTDC @ idle 750 ± 50 rpm 700 ± 50 rpm 850 ± 50 rpm
Intake manifold vacuum	at idle speed	60 kPa (450 mmHg, 17.7 in.Hg)
Compression pressure	at 250 rpm - STD at 250 rpm - Limit Difference of pressure between each cylinder	1,226 kPa (12.5 kgf/cm², 178 psi) or more 981 kPa (10.0 kgf/cm², 142 psi) 98 kPa (1.0 kgf/cm², 14 psi) or less
Idler pulley tension spring	Free length Installed load at 50.5 mm (1.988 in.)	46.0 mm (1.811 in.) 32 - 37 N (3.25 - 3.75 kgf, 7.2 - 8.3 lbf)
Cylinder head	Warpage - Cylinder block side (Limit) Warpage - Manifold side (Limit) Valve seat - Refacing angle Valve seat - Contacting angle Valve seat - Contacting width	0.05 mm (0.020 in.) 0.08 mm (0.031 in.) 30°, 45°, 75° 45° 1.0 - 1.4 mm (0.039 - 0.055 in.)
Valve guide bushing	Inside diameter Outside diameter (for repair part) - STD Outside diameter (for repair part) - O/S 0.05	6.010 - 6.030 mm (0.2366 - 0.2374 in.) 11.000 - 11.027 mm (0.4331 - 0.4342 in.) 11.050 - 11.077 mm (0.4350 - 0.4361 in.)
Valve	Valve overall length - STD (Intake) Valve overall length - STD (Exhaust) Valve overall length - Limit (Intake) Valve overall length - Limit (Exhaust) Valve face angle Stem diameter (Intake) Stem diameter (Exhaust) Stem oil clearance - STD (Intake) Stem oil clearance - STD (Exhaust) Stem oil clearance - Limit (Intake) Stem oil clearance - Limit (Exhaust) Margin thickness - STD Margin thickness - Limit	97.60 mm (3.8425 in.) 98.45 mm (3.8760 in.) 97.1 mm (3.823 in.) 98.0 mm (3.853 in.) 44.5° 5.970 - 5.985 mm (0.2350 - 0.2356 in.) 5.965 - 5.980 mm (0.2348 - 0.2354 in.) 0.025 - 0.060 mm (0.0010 - 0.0024 in.) 0.030 - 0.065 mm (0.0012 - 0.0026 in.) 0.08 mm (0.0031 in.) 0.10 mm (0.0039 in.) 0.8 - 1.2 mm (0.031 - 0.047 in.) 0.5 mm (0.020 in.)
Valve spring	Squareness - Limit Free length Installed tension at 34.7 mm (1.366 in.)	2.0 mm (0.079 in.) 41.9 mm (1.650 in.) 164 - 189 N (16.7 - 19.3 kgf, 36.8 - 42.5 lbf)

Valve lifter	Lifter diameter	30.966 – 30.976 mm (1.2191 – 1.2195 in.)
	Lifter bore diameter	31.000 – 31.018 mm (1.2205 – 1.2213 in.)
	Oil clearance – STD	0.024 – 0.052 mm (0.0009 – 0.0020 in.)
	Oil clearance – Limit	0.07 mm (0.0028 in.)
Manifold	Warpage – Limit	0.30 mm (0.0118 in.)
Camshaft	Thrust clearance – STD (Intake)	0.045 – 0.100 mm (0.0018 – 0.0039 in.)
	Thrust clearance – STD (Exhaust)	0.030 – 0.085 mm (0.0012 – 0.0033 in.)
	Thrust clearance – Limit (Intake)	0.12 mm (0.0047 in.)
	Thrust clearance – Limit (Exhaust)	0.10 mm (0.0039 in.)
	Journal oil clearance – STD	0.025 – 0.062 mm (0.0010 – 0.0024 in.)
	Journal oil clearance – Limit	0.10 mm (0.0039 in.)
	Journal diameter	26.959 – 26.975 mm (1.0614 – 1.0620 in.)
	Circle rounout – Limit	0.04 mm (0.0016 in.)
	Cam lobe height – STD (Intake)	42.01 – 42.11 mm (1.6539 – 1.6579 in.)
	Cam lobe height – STD (Exhaust)	40.06 – 40.16 mm (1.5772 – 1.5811 in.)
	Cam lobe height – Limit (Intake)	41.90 mm (1.6496 in.)
	Cam lobe height – Limit (Exhaust)	39.95 mm (1.5728 in.)
	Camshaft gear backlash – STD	0.020 – 0.200 mm (0.0008 – 0.0079 in.)
	Camshaft gear backlash – 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.)
	Cylinder bore diameter – STD (Mark 2)	87.010 – 87.020 mm (3.4256 – 3.4260 in.)
	Cylinder bore diameter – STD (Mark 3)	87.020 – 87.030 mm (3.4260 – 3.4264 in.)
	Cylinder bore diameter – Limit (STD)	87.23 mm (3.4342 in.)
Cylinder bore diameter – Limit (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.)
	Piston diameter – STD (Mark 2)	86.860 – 86.870 mm (3.4197 – 3.4201 in.)
	Piston diameter – STD (Mark 3)	86.870 – 86.880 mm (3.4201 – 3.4205 in.)
	Piston diameter – O/S 0.50	87.350 – 87.380 mm (3.4390 – 3.4402 in.)
	Piston oil clearance – STD	0.14 – 0.016mm (0.0055 – 0.0063 in.)
	Piston oil clearance – Limit	0.18 mm (0.0071 in.)
	Piston ring groove clearance – No.1	0.040 – 0.080 mm (0.0016 – 0.0031 in.)
	Piston ring groove clearance – 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.)
	Piston ring end gap – STD (No.2)	0.350 – 0.600 mm (0.0138 – 0.0234 in.)
	Piston ring end gap – STD (Oil)	0.200 – 0.550 mm (0.0079 – 0.0217 in.)
	Piston ring end gap – Limit (No.1)	1.10 mm (0.0433 in.)
	Piston ring end gap – Limit (No.2)	1.20 mm (0.0472 in.)
Piston ring end gap – Limit (Oil)	1.15 mm (0.0453 in.)	

Connecting rod	<p>Thrust clearance - STD Thrust clearance - Limit</p> <p>Connecting rod bearing center wall thickness - STD (Mark 1) - STD (Mark 2) - STD (Mark 3)</p> <p>Connecting rod oil clearance - STD (STD) - STD (U/S 0.25) - Limit</p> <p>Rod bending - Limit per 100mm (3.94 in.) Rod twist - Limit per 100 mm (3.94 in.)</p> <p>Bushing inside diameter Piston pin diameter Piston pin oil clearance - STD Piston pin oil clearance - Limit Connecting rod bolt outside diameter - STD Connecting rod bolt outside diameter - Limit</p>	<p>0.160 - 0.312 mm (0.0063 - 0.0123 in.) 0.35 mm (0.0138 in.)</p> <p>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.)</p> <p>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.)</p> <p>0.05 mm (0.0020 in.) 0.15 mm (0.0059 in.)</p> <p>22.005 - 22.017 mm (0.8663 - 0.8668 in.) 21.997 - 22.009 mm (0.8660 - 0.8665 in.) 0.005 - 0.011 mm (0.0002 - 0.0004 in.) 0.05 mm (0.0020 in.) 7.860 - 8.000 mm (0.3094 - 0.3150 in.) 7.60 mm (0.2992 in.)</p>
Crankshaft	<p>Thrust clearance - STD Thrust clearance - Limit</p> <p>Thrust washer thickness</p> <p>Main journal oil clearance - STD (No.3 - STD) - STD (No.3 - U/S 0.25) - STD (Others - STD) - STD (Others - U/S 0.25) - Limit</p> <p>Main journal diameter - STD Main journal diameter - U/S 0.25</p> <p>Main bearing center wall thickness - STD (No.3 - Mark 1) - STD (No.3 - Mark 2) - STD (No.3 - Mark 3) - STD (No.3 - Mark 4) - STD (No.3 - Mark 5) - STD (Others - Mark 1) - STD (Others - Mark 2) - STD (Others - Mark 3) - STD (Others - Mark 4) - STD (Others - Mark 5)</p> <p>Crank pin diameter - STD Crank pin diameter - U/S 0.25 Circle runout - Limit Main journal taper and out-of-round Limit Crank pin taper and out-of-round Limit</p>	<p>0.020 - 0.220 mm (0.0008 - 0.0087 in.) 0.30 mm (0.0118 in.) 2.440 - 2.490 mm (0.0961 - 0.0980 in.)</p> <p>0.025 - 0.044 mm (0.0010 - 0.0017 in.) 0.027 - 0.067 mm (0.0011 - 0.0026 in.) 0.015 - 0.034 mm (0.0006 - 0.0013 in.) 0.019 - 0.059 mm (0.0007 - 0.0023 in.) 0.08 mm (0.0031 in.)</p> <p>54.988 - 55.003 mm (2.1653 - 2.1655 in.) 54.745 - 54.755 mm (2.1553 - 2.1557 in.)</p> <p>1.992 - 1.995 mm (0.0784 - 0.0785 in.) 1.995 - 1.998 mm (0.0785 - 0.0787 in.) 1.998 - 2.001 mm (0.0787 - 0.0788 in.) 2.001 - 2.004 mm (0.0788 - 0.0789 in.) 2.004 - 2.007 mm (0.0789 - 0.0790 in.) 1.997 - 2.000 mm (0.0786 - 0.0787 in.) 2.000 - 2.003 mm (0.0787 - 0.0789 in.) 2.003 - 2.006 mm (0.0789 - 0.0790 in.) 2.006 - 2.009 mm (0.0790 - 0.0791 in.) 2.009 - 2.012 mm (0.0791 - 0.0792 in.)</p> <p>51.985 - 52.000 mm (2.0466 - 2.0472 in.) 51.745 - 51.755 mm (2.0372 - 2.0376 in.) 0.06 mm (0.0024 in.) 0.02 mm (0.0008 in.) 0.02 mm (0.0008 in.)</p>

TORQUE SPECIFICATION

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
Camshaft timing pulley x Camshaft (for use with SST)	37	380	27
No.1 idler pulley x Cylinder head	42	425	31
Spark plug x Cylinder head	18	180	13
Cylinder head x Cylinder block (1st)	49	500	36
Cylinder head x Cylinder block (2nd)	Turn 90°		
Spark plug tube x Cylinder head	39	400	29
Camshaft bearing cap x Cylinder head	19	190	14
Cylinder head cover x Cylinder head	23	230	17
Engine hanger x Cylinder head	25	250	18
No.3 timing belt cover x Cylinder head	7.8	80	69 in.·lbf
Delivery pipe x Cylinder head	13	130	9
Fuel inlet pipe x Delivery pipe	34	350	25
Intake manifold x Cylinder head	19	195	14
Intake manifold stay x Intake manifold	22	220	16
Intake manifold stay x Cylinder block	42	425	31
Air intake chamber stay x Intake manifold	42	425	31
Air intake chamber stay x Cylinder head	42	425	31
EGR valve x intake manifold	13	130	9
EGR pipe x Cylinder head	59	600	43
Throttle body x Intake manifold	19	195	14
Water by-pass pipe x Water pump cover	8.8	90	78 in.·lbf
Water outlet housing x Cylinder head	15	150	11
TWC (main) x Exhaust manifold	29	300	22
Exhaust manifold x Cylinder head	49	500	36
TWC stay x TWC (main)	42	425	31
TWC 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
Connecting rod cap x Connecting rod (2nd)	Turn 90°		
Rear oil seal retainer x Cylinder block	9.3	95	82 in.·lbf
Knock sensor x Cylinder block	37	380	27
Oil cooler x Cylinder block (relief valve)	78	800	58
Oil cooler x Cylinder block (nut)	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 for w/o A/C)	27	275	20
Alternator bracket x Cylinder block	43	440	32
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
Clutch cover x Flywheel (M/T)	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 plate x Torque converter (A/T)	27	280	20
RN engine mounting bracket x Cylinder block	61	620	45
RH engine mounting insulator x Body	78	800	58
RH engine mounting insulator x Mounting bracket	52	530	38
RH engine mounting stay x Mounting insulator	73	740	54
RH engine mounting stay x Engine hanger	73	740	54
LH engine mounting bracket x Transaxle	52	530	38
LH engine mounting insulator x Mounting bracket (upper side)	73	740	54
LH engine mounting insulator x Transaxle (A/T)	52	530	38
LH engine mounting insulator x Body	78	800	58
LH engine mounting stay x Mounting insulator (M/T)	73	740	54
LH engine mounting stay x Transaxle (M/T)	25	250	18
Front engine mounting bracket x Transaxle	77	790	57
Front engine mounting insulator x Mounting bracket	96	980	70
Front engine mounting insulator x Body	73	740	54
Clutch release cylinder x Transaxle (M/T)	12	120	9
Rear engine mounting Bracket x Transaxle	77	790	57
Rear engine mounting insulator x Mounting bracket	87	890	64
Rear engine mounting insulator x Body	64	650	47
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 head)	27	275	20
A/C idler pulley bracket x Cylinder block (14 mm head)	37	375	27
A/C compressor x Cylinder block	25	250	18
Front exhaust pipe x TWC (main)	62	630	46
Front exhaust pipe x Tailpipe	43	440	32
Front exhaust pipe bracket x Tailpipe bracket	19	190	14
Lower suspension brace x Body	73	740	54
Suspension member damper x Rear suspension lower crossmember	21	210	15
Tailpipe x Body bracket	66	670	48