

SERVICE SPECIFICATIONS

SERVICE DATA

EGOVT-02

Tune-up	Engine oil API grade Battery specific gravity High-tension cord resistance - Limit Spark plug (Recommended spark plug) - ND Spark plug (Recommended spark plug) - NGK Spark plug (Correct electrode gap) Generator drive belt tension New belt Used belt Valve clearance (Cold) - Intake Valve clearance (Cold) - Exhaust Ignition timing Idle speed	SG Energy-Conserving II multigrade 1.25 - 1.27 (when fully charged at 20°C (68°F)) 25 kΩ per cord K16R-U BKR5EYA 0.8 mm (0.031 in.) 125 ± 25 lbf 80 ± 20 lbf 0.15 - 0.25 mm (0.006 - 0.010 in.) 0.25 - 0.35 mm (0.010 - 0.014 in.) 3° BTDC @ idle 650 ± 50 rpm
Compression pressure	at 250 rpm - STD at 250 rpm - Limit Difference of pressure between each cylinder	1,176 kPa (12.0 kgf/cm², 171 psi) or more 882 kPa (9.0 kgf/cm², 128 psi) 98 kPa (1.0 kgf/cm², 14 psi) or less
Intake manifold vacuum	at idle speed	63 kPa (473 mmHg, 18.6 in.Hg)
Cylinder head	Warpage - Cylinder block side (Limit) Warpage - Manifold side (Limit) Valve seat - Refacing angle (Intake) Valve seat - Refacing angle (Exhaust) Valve seat - Contacting angle Valve seat - Contacting width (Intake) Valve seat - Contacting width (Exhaust) Cylinder head bolt outside diameter - STD Cylinder head bolt outside diameter - Limit	0.15 mm (0.0059 in.) 0.10 mm (0.0039 in.) 30°, 45°, 75° 45°, 75° 45° 1.2 - 1.6 mm (0.047 - 0.063 in.) 1.0 - 1.4 mm (0.039 - 0.055 in.) 10.85 - 11.00 mm (0.4272 - 0.4331 in.) 10.6 mm (0.417 in.)
Valve guide bushing	Inside diameter Outside diameter (for repair part) - STD Outside diameter (for repair part) - O/S 0.05 Protrusion height Replacing temperature (Cylinder head side)	7.010 - 7.030 mm (0.2760 - 0.2768 in.) 11.492 - 11.513 mm (0.4524 - 0.4533 in.) 11.542 - 11.563 mm (0.4544 - 0.4552 in.) 8.2 - 8.6 mm (0.323 - 0.339 in.) 80 - 100°C (176 - 212°F)

Valve	Valve overall length – STD (Intake)	98.4 mm (3.874 in.)
	Valve overall length – STD (Exhaust)	97.9 mm (3.854 in.)
	Valve overall length – Limit (Intake)	97.9 mm (3.854 in.)
	Valve overall length – Limit (Exhaust)	97.4 mm (3.835 in.)
	Valve face angl	44.5°
	Stem diameter (Intake)	6.970 – 6.985 mm (0.2744 – 0.2750 in.)
	Stem diameter (Exhaust)	6.965 – 6.980 mm (0.2742 – 0.2748 in.)
	Stem oil clearance – STD (Intake)	0.025 – 0.060 mm (0.0010 – 0.0024 in.)
	Stem oil clearance – STD (Exhaust)	0.030 – 0.065 mm (0.0012 – 0.0026 in.)
	Stem oil clearance – Limit (Intake)	0.08 mm (0.0031 in.)
	Stem oil clearance – Limit (Exhaust)	0.10 mm (0.0039 in.)
	Margin thickness – STD	1.2 mm (0.047 in.)
	Margin thickness – Limit	1.0 mm (0.039 in.)
Valve spring	Squareness – Limit	2.0 mm (0.079 in.)
	Free length	43.94 – 45.06 mm (1.7299 – 1.7740 in.)
	Installed tension at 36.5 mm (1.437 in.)	214 – 238 N (21.8 – 24.2 kgf, 48.1 – 53.4 lbf)
Valve lifter	Lifter diameter	33.966 – 33.976 mm (1.3372 – 1.3376 in.)
	Lifter bore diameter	34.000 – 34.021 mm (1.3386 – 1.3394 in.)
	Oil clearance – STD	0.024 – 0.055 mm (0.0009 – 0.0022 in.)
	Oil clearance – Limit	0.07 mm (0.0028 in.)
Manifold	Warpage – Limit	0.30 mm (0.0118 in.)
Air intake chamber	Warpage – Limit	0.30 mm (0.0118 in.)
Camshaft	Thrust clearance – STD	0.030 – 0.080 mm (0.0012 – 0.0031 in.)
	Thrust clearance – Limit	0.10 mm (0.0039 in.)
	Journal oil clearance – STD	0.0025 – 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	0.06 mm (0.0024 in.)
	Cam lobe height – STD	50.61 – 50.71 mm (1.9925 – 1.9965 in.)
	Cam lobe height – Limit	50.51 mm (1.9886 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.)
Spark plug tube	Protrusion	45.5 mm (1.791 in.)
Oil pump drive shaft gear	Thrust clearance – STD	0.050 – 0.150 mm (0.0020 – 0.0059 in.)
	Thrust clearance – Limit	0.30 mm (0.0118 in.)
Chain and timing gear	Chain elongation at 16 links – Limit	146.6 mm (5.772 in.)
	Crankshaft timing gear wear (w/ chain) – Limit	126.0 mm (4.961 in.)
	Camshaft timing gear wear (w/ chain) – Limit	65.4 mm (2.575 in.)
Chain tensioner slipper and vibration damper	Wear – Limit	1.0 mm (0.039 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 (STD) Cylinder bore diameter – Limit (O/S 0.50) Main bearing bolt outside diameter – STD Main bearing bolt outside diameter – Limit	0.05 mm (0.0020 in.) 100.000 – 100.010 mm (3.9370 – 3.9374 in.) 100.010 – 100.020 mm (3.9374 – 3.9378 in.) 100.020 – 100.030 mm (3.9378 – 3.9382 in.) 100.23 mm (3.9461 in.) 100.73 mm (3.9658 in.) 10.85 – 11.00 mm (0.4271 – 0.4331 in.) 10.6 mm (0.417 in.)
Piston and piston ring	Piston diameter – STD (Mark 1) Piston diameter – STD (Mark 2) Piston diameter – STD (Mark 3) Piston diameter – O/S 0.50 Piston diameter – O/S 1.00 Piston oil clearance – STD 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) Piston pin installing temperature	99.950 – 99.960 mm (3.9350 – 3.9354 in.) 99.960 – 99.970 mm (3.9354 – 3.9358 in.) 99.970 – 99.980 mm (3.9358 – 3.9362 in.) 100.450 – 100.480 mm (3.9547 – 3.9559 in.) 100.950 – 100.980 mm (3.9744 – 3.9756 in.) 0.040 – 0.060 mm (0.0016 – 0.0024 in.) 0.040 – 0.080 mm (0.0016 – 0.0031 in.) 0.030 – 0.070 mm (0.0012 – 0.0028 in.) 0.300 – 0.520 mm (0.0118 – 0.0205 in.) 0.450 – 0.670 mm (0.0177 – 0.0264 in.) 0.150 – 0.520 mm (0.0059 – 0.0205 in.) 1.12 mm (0.0441 in.) 1.17 mm (0.0461 in.) 1.12 mm (0.0441 in.) 80 – 90°C (176 – 194°F)
Connecting rod	Thrust clearance – STD Thrust cleace – Limit Connecting rod bearing center wall thickness – STD (Mark 2) – STD (Mark 3) – STD (Mark 4) – STD (Mark 5) – STD (Mark 6) Connecting rod oil clearance – STD (STD) – STD (U/S 0.25) – Limit Rod bending – Limit per 100 mm (3.94 in.) Rod twist – Limit per 100 mm (3.94 in.) 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	0.160 – 0.262 mm (0.0063 – 0.0103 in.) 0.362 mm (0.0143 in.) 2.489 – 2.492 mm (0.0980 – 0.0981 in.) 2.492 – 2.495 mm (0.0981 – 0.0982 in.) 2.495 – 2.498 mm (0.0982 – 0.0983 in.) 2.498 – 2.501 mm (0.0983 – 0.0985 in.) 2.501 – 2.504 mm (0.0985 – 0.0986 in.) 0.032 – 0.050 mm (0.0013 – 0.0020 in.) 0.033 – 0.073 mm (0.0013 – 0.0029 in.) 0.10 mm (0.0039 in.) 0.05 mm (0.0020 in.) 0.15 mm (0.0059 in.) 26.008 – 26.020 mm (1.0239 – 1.0244 in.) 26.000 – 26.012 mm (1.0236 – 1.0241 in.) 0.004 – 0.012 mm (0.0002 – 0.0005 in.) 0.05 mm (0.0020 in.) 8.40 – 8.60 mm (0.3307 – 0.3386 in.) 8.0 mm (0.315 in.)

Crankshaft	Thrust clearance – STD	0.020 – 0.0220 mm (0.0008 – 0.0087 in.)
	Thrust clearance – Limit	0.30 mm (0.0118 in.)
	Thrust washer thickness (STD)	2.440 – 2.490 mm (0.0961 – 0.0980 in.)
	Thrust washer thickness (O/S 0.125)	2.503 – 2.553 mm (0.0985 – 0.1005 in.)
	Thrust washer thickness (O/S 0.250)	2.565 – 2.615 mm (0.1010 – 0.1030 in.)
	Main journal oil clearance – STD (STD)	0.042 – 0.060 mm (0.0017 – 0.0024 in.)
	Main journal oil clearance – STD (U/S 0.25)	0.041 – 0.081 mm (0.0016 – 0.0032 in.)
	Main journal oil clearance – Limit	0.10 mm (0.0039 in.)
	Main journal diameter – STD	68.982 – 69.000 mm (2.7158 – 2.7165 in.)
	Main journal diameter – U/S 0.25	68.745 – 68.755 mm (2.7065 – 2.7069 in.)
	Main bearing center wall thickness	
	– STD (Mark 2)	2.489 – 2.492 mm (0.0980 – 0.0981 in.)
	– STD (Mark 3)	2.492 – 2.495 mm (0.0981 – 0.0982 in.)
	– STD (Mark 4)	2.495 – 2.498 mm (0.0982 – 0.0983 in.)
	– STD (Mark 5)	2.498 – 2.501 mm (0.0983 – 0.0985 in.)
	– STD (Mark 6)	2.501 – 2.504 mm (0.0985 – 0.0986 in.)
	Crank pin diameter – STD	56.982 – 57.000 mm (2.2434 – 2.2441 in.)
	Crank pin diameter – U/S 0.25	56.745 – 56.755 mm (2.2341 – 2.2344 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.)

E00VU-02

TORQUE SPECIFICATIONS

Part tightened	N·m	kgf·cm	ft·lbf
Throttle body x Air intake chamber	21	210	15
Spark plug x Cylinder head	20	200	14
Fuel filter x Intake manifold	21	210	15
Intake manifold x Cylinder head	21	210	15
Heater inlet pipe x Intake manifold	21	210	15
EGR pipe x Cylinder head	21	210	15
Cylinder head x Cylinder block (1st)	39	400	29
Cylinder head x Cylinder block (2st)	Turn 90°	Turn 90°	Turn 90°
Cylinder head x Cylinder block (3rd)	Turn 90°	Turn 90°	Turn 90°
Cylinder head x Timing chain cover	21	210	15
Camshaft bearing cap x Cylinder head	16	160	12
Camshaft timing gear x Camshaft	74	750	54
Chain tensioner x Cylinder head	21	210	15
Water by-pass outlet x Cylinder head	21	210	15
Engine hanger x Cylinder head	41	420	30
Exhaust manifold x Cylinder head	39	400	29
Heat insulator x Exhaust manifold	19	195	14
PAIR reed valve x Cylinder head	20	200	14
Air pipe x PAIR reed valve	21	210	15
Air pipe x Exhaust manifold	21	210	15
Air pipe x Cylinder head	20	200	14
Heater pipe x Timing chain cover	21	210	15
Heater pipe x Cylinder head	20	200	14
Front exhaust pipe x Exhaust manifold	62	630	46
Intake manifold x Cylinder head	21	210	15

No.1 support bracket x Transmission	39	400	29
No.1 support bracket clamp bolt	19	195	14
Front exhaust pipe x No.3 front exhaust pipe	39	400	29
Fuel inlet hose x Fuel filter	29	300	22
Delivery pipe x Intake manifold	21	210	15
No.1 fuel pipe x Delivery pipe (Union bolt)	29	300	22
No.1 fuel pipe x Delivery pipe (Bolt)	20	200	14
No.1 fuel pipe x Fuel filter	29	300	22
Fuel return pipe x Intake manifold	20	200	14
Emission control valve set assembly x Intake manifold	20	200	14
Air intake chamber x Intake manifold	21	210	15
Oil dipstick guide x Intake manifold	20	200	14
Oil dipstick guide x No.1 oil pan	20	200	14
Heater inlet pipe x Air intake chamber	20	200	14
EGR pipe x EGR valve	64	650	47
No.2 water by-pass pipe x Cylinder head	20	200	14
No.2 water by-pass pipe x Engine hanger	20	200	14
Water outlet x Cylinder head	21	210	15
Generator bracket x Cylinder head	43	440	32
Distributor x Cylinder head	21	210	15
PS reservoir tank x Cylinder head	20	200	14
Oil jet x Cylinder block	20	200	14
Chain tensioner slipper x Cylinder block	69	700	51
Vibration damper x Cylinder block	20	200	14
Timing chain cover x Cylinder block	21	210	15
Drive belt idler pulley x Timing chain cover	43	440	32
Crankshaft pulley x Crankshaft	412	4,200	304
No.1 oil pan x Cylinder block (14 mm head bolt)	43	440	32
No.1 oil pan x Cylinder block (12 mm head bolt)	20	200	14
No.1 oil pan x Timing chain cover	20	200	14
No.2 oil pan x No.1 oil pan (Bolt)	7.8	80	69 in.·lbf
No.2 oil pan x No.1 oil pan (Nut)	8.8	90	78 in.·lbf
Transmission housing x No.1 oil pan	72	730	53
Oil level sensor x No.1 oil pan	5.4	55	48 in.·lbf
Radiator pipe x No.1 oil pan	21	210	15
A/C compressor bracket x No.1 oil pan	37	375	27
A/C compressor bracket x Cylinder block	37	375	27
A/C compressor x A/C compressor bracket	25	250	18
Water pump x Timing chain cover	21	210	15
Main bearing cap x Cylinder block (1st)	74	750	54
Main bearing cap x Cylinder block (2nd)	Turn 90°	Turn 90°	Turn 90°
Connecting rod cap x Connecting rod (1st)	48	490	35
Connecting rod cap x Connecting rod (2nd)	Turn 90°	Turn 90°	Turn 90°
Oil nozzle x Cylinder bracket	25	250	18
Rear oil seal retainer x Cylinder block	20	200	14
Oil cooler cover x Cylinder block	21	210	15
LH engine mounting bracket x Cylinder block	69	700	51
LH insulator x LH engine mounting bracket	72	730	43
RH engine mounting bracket x Cylinder block	69	700	51

RH insulator x RH engine mounting bracket	72	730	43
PS pump x Cylinder block	36	370	27
Knock sensor x Cylinder block	44	450	33
Oil filter union x Cylinder block	44	450	33
Drive plate x Crankshaft	100	1,000	74
Transmission x Cylinder block	72	730	43
Transmission x No.1 oil pan	72	730	43
Torque converter clutch x Drive plate	55	550	41
A/T oil cooler pipe x Union (Transmission)	34	350	25
Starter x Transmission	39	400	29
Frame crossmember x Frame	61	620	45
Frame crossmember x Engine rear mounting insulator	74	750	54
Engine front mounting insulator x Frame	74	750	54
Transfer under cover x Frame crossmember	28	290	21
Transfer shift lever x Transmission	18	185	13
Transmission shift lever assembly x Body	5.4	55	48 in.-lbf
Transmission control rod x Control shaft lever	13	130	9
Front propeller shaft x Front differential	74	750	54
Front propeller shaft x Transfer	74	750	54
Rear propeller shaft x Rear differential	88	900	65
Rear propeller shaft x Transfer	88	900	65
Stabilizer bar bracket mounting bolt	18	185	13
Stabilizer bar x Axle carrier	25	260	19