SERVICE SPECIFICATIONS

SERVICE DATA

EG0VT–02

Tune –up	Engine oil API grade	SG or SH, Energy–Conserving II or ILSAC multigrade
	Battery specific gravity–105D31 L battery	1.27 – 1.29
	Battery specific gravity–75D31 battery	1.25 – 1.27
		(when fully charged at 20°C (68°F))
	High–tension cord resistance – Limit	25 kΩ per cord
	Spark plug (Recommended spark plug) – ND	K16R–U
	Spark plug (Recommended spark plug) – NGK	BKR5EYA
	Spark plug (Correct electrode gap)	0.8 mm (0.031 in.)
	Generator drive belt tension	
	New belt	125 ± 25 lbf
	Used belt	80± 20 lbf
	Valve clearance (Cold) – Intake	0.15–0.25mm(0.006–0.010in.)
	Valve clearance (Cold) – Exhaust	0.25 – 0.35 mm (0.010 – 0.014 in.)
	Ignition timing	3° BTDC @ idle
	Idle speed	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/cm^2, 171 psi) or more 882 kPa (9.0 kg f/cm^2, 128 psi) 98 kPa (1.0 kgf/cm^2, 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) – 0/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 – 1 00° C (176 – 212° F)

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	98.4 mm (3.874 in.) 97.9 mm (3.854 in.) 97.9 mm (3.854 in.) 97.4 mm (3.835 in.) 44.5° 6.970 – 6.985 mm (0.2744 – 0.2750 in.) 6.965 – 6.980 mm (0.2742 – 0.2748 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.) 1.2 mm (0.047 in.) 1.0 mm (0.039 in.)
Valve spring	Squareness – Limit Free length Installed tension at 36.5 mm (1.437 in.)	2.0 mm (0.079 in.) 43.94 – 45.06 mm (1.7299 – 1.7740 in.) 214 – 238 N (21.8 – 24.2 kgf, 48.1 – 53.4 lbf)
Valve lifter	Lifter diameter Lifter bore diameter Oil clearance – STD Oil clearance – Limit	33.966 – 33.976 mm (1.3372 – 1.3376 in.) 34.000 – 34.021 mm (1.3386 – 1.3394 in.) 0.024 – 0.055 mm (0.0009 – 0.0022 in.) 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 Thrust clearance – Limit Journal oil clearance – STD Journal oil clearance – Limit Journal diameter Circle rounout – Limit Cam lobe height – STD Cam lobe height – Limit Camshaft gear backlash – STD Camshaft gear backlash – Limit Camshaft gear spring end free distance	0.030 – 0.080 mm (0.0012 – 0.0031 in.) 0.10 mm (0.0039 in.) 0.025 – 0.062 mm (0.0010 – 0.0024 in.) 0.10 mm (0.0039 in.) 26.959 – 26.975 mm (1.0614 – 1.0620 in.) 0.06 mm (0.0024 in.) 50.61 – 50.71 mm (1.9925 – 1.9965 in.) 50.51 mm (1.9886 in.) 0.020 – 0.200 mm (0.0008 – 0.0079 in.) 0.30 mm (0.0188 in.) 18.2 – 18.8 mm (0.717 – 0.740 in.)
Spark plug tube	Protrusion	45.5 mm 0.791 in.)
Oil pump drive shaft gear	Thrust clearance – STD Thrust clearance – Limit	0.040 – 0.160 mm (0.0016 – 0.0063 in.) 0.30 mm (0.011**8** in.)
Chain and timing gear	Chain length at 16 links – Limit Crankshaft timing gear wear (w/ chain) – Limit Camshaft timing gear wear (w/ chain) – Limit	146.6 mm (5.772 in.) 126.0 mm (4.961 in.) 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	0.05 mm (0.0020 in.)
	Cylinder bore diameter – STD (Mark 1)	100.000 – 100.010 mm (3.9370 – 3.9374 in.)
	Cylinder bore diameter – STD (Mark 2)	100.010 – 100.020 mm (3.9374 – 3.9378 in.)
	Cylinder bore diameter – STD (Mark 3)	100.020 – 100.030 mm (3.9378 – 3.9382 in.)
	Cylinder bore diameter – Limit (STD)	100.23 mm (3.9461 in.)
	Cylinder bore diameter – Limit (0/S 0.50)	100.73 mm (3.9658 in.)
	Main bearing bolt outside diameter – STD	10.85 – 11.00 mm (0.4271 – 0.4331 in.)
	Main bearing bolt outside diameter – Limit	10.6mm(0.417in.)
Piston and piston ring	Piston diameter – STD (Mark 1)	99.950 – 99.960 mm (3.9350 – 3.9354 in.)
	Piston diameter – STD (Mark 2)	99.960 – 99.970 mm (3.9354 – 3.9358 in.)
	Piston diameter – STD (Mark 3)	99.970 – 99.980 mm (3.9358 – 3.9362 in.)
	Piston diameter – O/S 0.50	100.450 – 100.480 mm (3.9547 – 3.9559 in.)
	Piston diameter – O/S 1.00	100.950 – 100.980 mm (3.9744 – 3.9756 in.)
	Piston oil clearance – STD	0.040 – 0.060 mm (0.0016 – 0.0024 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)	0.300 – 0.520 mm (0.0118 – 0.0205 in.)
	Piston ring end gap – STD (No.2)	0.450 – 0.670 mm (0.0177 – 0.0264 in.)
	Piston ring end gap – STD (Oil)	0.150 – 0.520 mm (0.0059 – 0.0205 in.)
	Piston ring end gap – Limit (No.1)	1.12 mm (0.0441 in.)
	Piston ring end gap – Limit (No.2)	1.17 mm (0.0461 in.)
	Piston ring end gap – Limit (Oil)	1.12 mm (0.0441 in.)
	Piston pin installing temperature	80 – 90° C (176 – 194° F)
Connecting rod	Thrust clearance – STD	0.160 – 0.262 mm (0.0063 – 0.0103 in.)
	Thrust clearance – Limit	0.362 mm (0.0143 in.)
	Connecting rod 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.)
	Connecting rod oil clearance	
	– STD (STD)	0.032 – 0.050 mm (0.0013 – 0.0020 in.)
	– STD (U/S 0.25)	0.033 – 0.073 mm (0.0013 – 0.0029 in.)
	– Limit	0.10 mm (0.0039 in.)
	Rod out–of–alignment	
	– 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.)
	Bushing inside diameter	26.008 – 26.020 mm (1.0239 – 1.0244 in.)
	Piston pin diameter	26.000 – 26.012 mm (1.0236 – 1.0241 in.)
	Piston pin oil clearance – STD	0.004 – 0.012 mm (0.0002 – 0.0005 in.)
	Piston pin oil clearance – Limit	0.05 mm (0.0020 in.)
	Connecting rod bolt outside diameter – STD	8.40 – 8.60 mm (0.3307 – 0.3386 in.)
	Connecting rod bolt outside diameter – Limit	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 (0/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.)

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TORQUE SPECIFICATIONS

Part tightened	N–rn	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 (1 sty	39	400	29
Cylinder head x Cylinder block (2nd)	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 bypass 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	for– 14 mm head bolt	**43**	440	**32**
No. 1 oil pan x Cylinder block	for 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	for bolt	7.8	**80**	69 in.–lbf
No.2 oil pan x No.1 oil pan	for 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 (1 st)		**74**	750	**54**
Main bearing cap x Cylinder block (2nd)		Turn 90°	Turn 90°	Turn 90°
Connecting rod cap x Connecting rod (i st)		**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	53
Transmission x No. 1 oil pan	72	730	53
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