SERVICE SPECIFICATIONS

SERVICE DATA

Compression pressure	at 250 rpm STD	3B, 14B	2,942 kPa (30.0 kgf/cm², 427 psi) or more
		15B—F	3,334 kPa (34.0 kgf/cm², 484 psi) or more
		15B—FT	3,138 kPa (32.0 kgf/cm², 455 psi) or more
		Minimum	1,961 kPa (20.0 kgf/cm², 284 psi)
	Difference of pressure between each cylinder		196 kPa (2.0 kgf/cm², 28 psi) or less
Valve clearance	at hot	Intake	0.20 mm (0.008 in.)
		Exhaust	0.36 mm (0.014 in.)
Injection timing	Plunger stroke	3B	1.23 — 1.29 mm (0.0484 — 0.0508 in.)
		14B	1.31 — 1.37 mm (0.0516 — 0.0539 in.)
		15B—F	0.67 — 0.73 mm (0.0264 — 0.0287 in.)
		15B—FT	0.87 — 0.93 mm (0.0342 — 0.0366 in.)
Idle speed	13B, 14B (Except Hong Kong)		600 — 700 rpm
	14B (Hong Kong)		750 — 850 rpm
	15B—F, 15B—FT		700 — 750 rpm
Maximum speed	3B		4,050 — 4,200 rpm
	14B		4,050 — 4,250 rpm
	15B—F, 15B—FT		3,900 — 4,100 rpm
PS idle—up speed	3B, 14B (Except Hong Kong) for BB		600 — 700 rpm
	14B (Hong Kong) for BB		650 — 750 rpm
	15B—F for BU		720 — 770 rpm
	15B—FT for BU		700 — 750 rpm
A/C idle—up speed	3B for BB		700 — 750 rpm
	14B for BB		775 — 825 rpm
	3B, 14B, 15B—F, 15B—FT for BU		900 — 1,000 rpm
Cylinder head (3B, 14B)	Warpage	Maximum	0.20 mm (0.0079 in.)
	Valve seat		
	Refacing angle		30°, 45°, 65°
	Contacting angle		45°
	Contacting width		1.9 — 2.3 mm (0.075 — 0.091 in.)
	Cylinder head bolt thread inside diameter	STD	11.800 — 12.000 mm (0.4646 — 0.4724 in.)
		Minimum	10.60 mm (0.4567 in.)
	Cylinder head gasket thickness (14B)	Mark 1.5	1.47 —1.53 mm (0.0579 — 0.0602 in.)
		Mark 1.6	1.57 —1.63 mm (0.0618 — 0.0642 in.)
		Mark 1.7	1.67 —1.73 mm (0.0657 — 0.0681 in.)
Cylinder head (15B—F, 15B—FT)	Warpage	Maximum	0.20 mm (0.0079 in.)
	Valve seat		
	Refacing angle	Intake	45°, 63°
		Exhaust	30°, 45°, 80°
	Contacting angle		45°
	Contacting width	Intake	1.3 — 1.9 mm (0.051 — 0.075 in.)
		Exhaust	1.6 — 2.4 mm (0.063 — 0.094 in.)
	Cylinder head bolt thread inside diameter	STD	11.800 — 12.000 mm (0.4646 — 0.4724 in.)
		Minimum	11.60 mm (0.4567 in.)
	Cylinder head gasket thickness	Mark 1.2	1.17 —1.23 mm (0.0461 — 0.0484 in.)
		Mark 1.3	1.27 —1.33 mm (0.0500 — 0.0524 in.)
		Mark 1.4	1.37 —1.43 mm (0.0539 — 0.0563 in.)

Valve guide bushing (3B, 14B)	Inside diameter		9.010 — 9.030 mm (0.3547 — 0.3555 in.)
	Outside diameter for repair part		14.023 — 14.041 mm (0.5521 — 0.5528 in.)
Valve guide bushing (15B—F, 15B—FT)	Inside diameter		7.010 — 7.030 mm (0.2760 — 0.2768 in.)
	Outside diameter for repair part		11.540 — 11.551 mm (0.4543 — 0.4548 in.)
Valve (3B, 14B)	Valve overall length		
	3B	STD Intake	126.35 — 126.75 mm (4.9744 — 4.9902 in.)
		Exhaust	126.35 — 126.75 mm (4.9744 — 4.9902 in.)
		Minimum Intake	126.05 mm (4.9626 in.)
		Exhaust	126.05 mm (4.9626 in.)
	14B	STD Intake	126.35 — 126.75 mm (4.9744 — 4.9902 in.)
		Exhaust	126.22 — 126.62 mm (4.9693 — 4.9850 in.)
		Minimum Intake	126.05 mm (4.9626 in.)
		Exhaust	125.92 mm (4.9575 in.)
	Valve face angle		44.5°
	Stem diameter	Intake	8.968 — 8.984 mm (0.3531 — 0.3537 in.)
		Exhaust	8.954 — 8.970 mm (0.3525 — 0.3531 in.)
	Stem oil clearance	STD Intake	0.026 — 0.062 mm (0.0010 — 0.0024 in.)
		Exhaust	0.040 — 0.076 mm (0.0016 — 0.0030 in.)
		Maximum Intake	0.10 mm (0.0039 in.)
		Exhaust	0.12 mm (0.0047 in.)
	Margin thickness		
	3B	STD Intake	1.4 mm (0.055 in.)
		Exhaust	1.8 mm (0.071 in.)
		Minimum Intake	0.9 mm (0.035 in.)
		Exhaust	1.3 mm (0.051 in.)
	14B	STD Intake	1.4 mm (0.055 in.)
		Exhaust	1.7 mm (0.067 in.)
		Minimum Intake	0.9 mm (0.035 in.)
		Exhaust	1.2 mm (0.047 in.)
Valve (15B—F, 15B—FT)	Valve overall length	STD Intake	126.30 — 126.70 mm (4.9724 — 4.9882 in.)
		Exhaust	126.25 — 126.65 mm (4.9705 — 4.9862 in.)
		Minimum Intake	126.00 mm (4.9606 in.)
		Exhaust	125.95 mm (4.9587 in.)
	Valve face angle		44.5°
	Stem diameter	Intake	6.970 — 6.985 mm (0.2744 — 0.2750 in.)
		Exhaust	6.955 — 6.970 mm (0.2738 — 0.2744 in.)
	Stem oil clearance	STD Intake	0.025 — 0.060 mm (0.0010 — 0.0024 in.)
		Exhaust	0.040 — 0.075 mm (0.0016 — 0.0030 in.)
		Maximum Intake	0.08 mm (0.0031 in.)
		Exhaust	0.10 mm (0.0039 in.)
	Margin thickness	STD Intake	1.26 mm (0.0496 in.)
		Exhaust	0.97 mm (0.0382 in.)
		Minimum Intake	0.76 mm (0.0299 in.)
		Exhaust	0.47 mm (0.0185 in.)

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Valve spring (13B, 14B)	Deviation	Maximum	2.0 mm (0.079 in.)
	Free length	Inner	43.21 — 45.28 mm (1.7012 — 1.7827 in.)
		Outer	48.70 — 50.73 mm (1.9173 — 1.9972 in.)
	Installed tension at 38.19 mm (1.5035 in.)	Inner	96 — 135 N (9.8 — 13.8 kgf, 21.6 — 30.4 lbf)
	Installed tension at 41.69 mm (1.6413 in.)	Outer	215 — 277 N (21.9 — 28.3 kgf, 48.3 — 62.4 lbf)
Valve spring (15B—F, 15B—FT)	Deviation	Maximum	2.0 mm (0.079 in.)
	Free length		51.83 — 54.16 mm (2.0406 — 2.1323 in.)
	Installed tension at 41.3 mm (1.626 in.)		245 — 315 N (25.0 — 32.1 kgf, 55.1 — 70.8 lbf)
Valve rocker arm and shaft	Valve rocker arm inside diameter		18.512 — 18.533 mm (0.7288 — 0.7296 in.)
	Valve rocker shaft diameter		18.472 — 18.493 mm (0.7272 — 0.7281 in.)
	Oil clearance	STD	0.019 — 0.061 mm (0.0007 — 0.0024 in.)
		Maximum	0.10 mm (0.0039 in.)
Push rod	Circle runout	Maximum	0.50 mm (0.0197 in.)
Timing gear	Idler gear thrust clearance	STD	0.060 — 0.170 mm (0.0024 — 0.0067 in.)
		Maximum	0.30 mm (0.0118 in.)
	Idler gear inside diameter		44.974 — 45.000 mm (1.7706 — 1.7717 in.)
	Idler gear shaft diameter		44.935 — 44.955 mm (1.7691 — 1.7699 in.)
	Idler gear oil clearance	STD	0.019 — 0.065 mm (0.0007 — 0.0026 in.)
		Maximum	0.18 mm (0.0071 in.)
	Gear backlash	STD	0.058 — 0.162 mm (0.0023 — 0.0064 in.)
		Maximum	0.30 mm (0.0118 in.)
Camshaft	Circle runout	Maximum	0.06 mm (0.0024 in.)
	Cam lobe height		
	3B	STD Intake	45.288 — 45.378 mm (1.7830 — 1.7865 in.)
		Exhaust	45.261 — 45.351 mm (1.7819 — 1.7855 in.)
		Minimum Intake	44.85 mm (1.7657 in.)
		Exhaust	44.83 mm (1.7650 in.)
	14B	STD Intake	44.879 — 44.969 mm (1.7669 — 1.7704 in.)
		Exhaust	45.050 — 45.140 mm (1.7736 — 1.7772 in.)
		Minimum Intake	44.44 mm (1.7496 in.)
		Exhaust	44.62 mm (1.7567 in.)
	15B—F, 15B—FT	STD Intake	43.774 — 43.864 mm (1.7234 — 1.7269 in.)
		Exhaust	44.905 — 44.995 mm (1.7679 — 1.7715 in.)
		Minimum Intake	43.34 mm (1.7063 in.)
		Exhaust	44.47 mm (1.7508 in.)
	Journal diameter	No.1	53.459 — 53.475 mm (2.1047 — 2.1053 in.)
		No.2	53.209 — 53.225 mm (2.0948 — 2.0955 in.)
		No.3	52.959 — 52.975 mm (2.0850 — 2.0856 in.)
		No.4	52.709 — 52.725 mm (2.0752 — 2.0758 in.)
		No.5	52.459 — 52.475 mm (2.0653 — 2.0659 in.)
	Camshaft bearing inside diameter	No.1	53.500 — 53.525 mm (2.1063 — 2.1073 in.)
		No.2	53.250 — 53.275 mm (2.0965 — 2.0974 in.)
		No.3	53.000 — 53.025 mm (2.0866 — 2.0876 in.)
		No.4	52.750 — 52.775 mm (2.0768 — 2.0778 in.)
		No.5	52.500 — 52.525 mm (2.0669 — 2.0679 in.)
	Journal oil clearance	STD	0.025 — 0.066 mm (0.0010 — 0.0026 in.)
		Maximum	0.10 mm (0.0039 in.)
	Thrust clearance	STD	0.060 — 0.130 mm (0.0024 — 0.0051 in.)
		Maximum	0.30 mm (0.0118 in.)

Connecting rod	Thrust clearance		STD	0.200 — 0.320 mm (0.0079 — 0.0126 in.)
			Maximum	0.40 mm (0.0157 in.)
	Connecting rod oil clearance	STD	STD	0.030 — 0.070 mm (0.0012 — 0.0028 in.)
			U/S 0.25, 0.50, 1.00	0.030 — 0.072 mm (0.0012 — 0.0028 in.)
			Maximum	0.10 mm (0.0039 in.)
	Connecting rod bearing center wall thickness			
	(Reference)		STD Yellow	1.480 — 1.485 mm (0.0583 — 0.0585 in.)
			Green	1.485 — 1.490 mm (0.0585 — 0.0587 in.)
	Rod out—of—alignment			
		Maximum per 100 mm (3.94 in.)		0.05 mm (0.0020 in.)
	Rod twist	Maximum per 100 mm (3.94 in.)		0.15 mm (0.0059 in.)
	Bushing inside diameter			
	3B, 14B			31.999 — 32.009 mm (1.2598 — 1.2602 in.)
	15B—F, 15B—FT			33.999 — 34.009 mm (1.3385 — 1.3389 in.)
	Piston pin diameter			
	3B, 14B			32.000 — 32.010 mm (1.2598 — 1.2602 in.)
	15B—F, 15B—FT			34.000 — 34.010 mm (1.3386 — 1.3390 in.)
	Bushing oil clearance			
	3B, 14B		STD	0.004 — 0.014 mm (0.0002 — 0.0006 in)
			Maximum	0.05 mm (0.0020 in.)
	15B—F, 15B—FT		STD	0.005 — 0.015 mm (0.0002 — 0.0006 in)
			Maximum	0.05 mm (0.0020 in.)
	Connecting rod bolt tension portion diameter		STD	9.900 — 10.100 mm (0.3898 — 0.3976 in.)
			Minimum	9.70 mm (0.3819 in.)
Cylinder block	Cylinder head surface warpage		Maximum	0.20 mm (0.0079 in.)
	Cylinder bore diameter			
	3B, 14B	STD	STD Mark 1	102.000 — 102.010 mm (4.0157 — 4.0165 in.)
			Mark 2	102.010 — 102.020 mm (4.0161 — 4.0165 in.)
			Mark 3	102.020 — 102.030 mm (4.0165 — 4.0169 in.)
			O/S 0.50	102.500 — 102.530 mm (4.0354 — 4.0366 in.)
			O/S 0.75	102.750 — 102.780 mm (4.0453 — 4.0464 in.)
			O/S 1.00	103.000 — 103.030 mm (4.0551 — 4.0563 in.)
			Maximum STD	102.23 mm (4.0248 in.)
			O/S 0.50	102.73 mm (4.0445 in.)
			O/S 0.75	102.98 mm (4.0543 in.)
			O/S 1.00	103.23 mm (4.0642 in.)
	15B—F, 15B—FT	STD	STD Mark 1	108.000 — 108.010 mm (4.2520 — 4.2524 in.)
			Mark 2	108.010 — 108.020 mm (4.2524 — 4.2528 in.)
			Mark 3	108.020 — 108.030 mm (4.2528 — 4.2531 in.)
			O/S 0.50	108.500 — 108.530 mm
			O/S 0.75	108.750 — 108.780 mm
			O/S 1.00	109.000 — 109.030 mm
			Maximum STD	108.23 mm
			O/S 0.50	108.73 mm
			O/S 0.75	108.98 mm
			O/S 1.00	109.23 mm

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Piston and piston ring	Piston diameter		
	3B	STD Mark 1	101.800 — 101.810 mm (4.0079 — 4.0083 in.)
		Mark 2	101.810 — 101.820 mm (4.0083 — 4.0087 in.)
		Mark 3	101.820 — 101.830 mm (4.0087 — 4.0090 in.)
		O/S 0.50	102.300 — 102.330 mm (4.0276 — 4.0287 in.)
		O/S 0.75	102.550 — 102.580 mm (4.0374 — 4.0386 in.)
		O/S 1.00	102.800 — 102.830 mm (4.0472 — 4.0484 in.)
	14B	STD Mark 1	101.760 — 101.770 mm (4.0063 — 4.0067 in.)
		Mark 2	101.770 — 101.780 mm (4.0067 — 4.0071 in.)
		Mark 3	101.780 — 101.790 mm (4.0071 — 4.0075 in.)
		O/S 0.50	102.260 — 102.290 mm (4.0260 — 4.0272 in.)
		O/S 0.75	102.510 — 102.540 mm (4.0358 — 4.0370 in.)
		O/S 1.00	102.760 — 102.790 mm (4.0457 — 4.0468 in.)
	15B—F	STD Mark 1	107.830 — 107.840 mm (4.2453 — 4.2457 in.)
		Mark 2	107.840 — 107.850 mm (4.2457 — 4.2461 in.)
		Mark 3	107.850 — 107.860 mm (4.2461 — 4.2465 in.)
		O/S 0.50	108.330 — 108.360 mm (4.2650 — 4.2661 in.)
		O/S 0.75	108.580 — 108.610 mm (4.2748 — 4.2760 in.)
		O/S 1.00	108.830 — 108.860 mm (4.2846 — 4.2858 in.)
	15B—FT	STD Mark 1	107.820 — 107.830 mm (4.2449 — 4.2453 in.)
		Mark 2	107.830 — 107.840 mm (4.2453 — 4.2457 in.)
		Mark 3	107.840 — 107.850 mm (4.2457 — 4.2461 in.)
		O/S 0.50	108.320 — 108.350 mm (4.2646 — 4.2657 in.)
		O/S 0.75	108.570 — 108.600 mm (4.2744 — 4.2756 in.)
		O/S 1.00	108.820 — 108.850 mm (4.2843 — 4.2854 in.)
	Piston oil clearance		
	3B	STD	0.190 — 0.210 mm (0.0075 — 0.0083 in.)
		Maximum	0.26 mm (0.0102 in.)
	14B	STD	0.230 — 0.250 mm (0.0091 — 0.0098 in.)
		Maximum	0.30 mm (0.0118 in.)
	15B—F	STD	0.160 — 0.180 mm (0.0063 — 0.0071 in.)
		Maximum	0.23 mm (0.0091 in.)
	15B—FT	STD	0.170 — 0.190 mm (0.0067 — 0.0075 in.)
		Maximum	0.24 mm (0.0094 in.)
	Piston ring groove clearance	STD No.1	
	3B		0.061 — 0.091 mm (0.0024 — 0.0036 in.)
	14B		0.062 — 0.092 mm (0.0024 — 0.0036 in.)
	15B—F		0.067 — 0.108 mm (0.0026 — 0.0043 in.)
	15B—FT		0.065 — 0.107 mm (0.0026 — 0.0042 in.)
		No.2	0.060 — 0.100 mm (0.0024 — 0.0039 in.)
		Oil	0.030 — 0.070 mm (0.0012 — 0.0028 in.)
		Maximum	0.20 mm (0.0079 in.)

Piston and piston ring (Cont'd)	Piston ring end gap			
	3B	STD	No.1	0.350 — 0.620 mm (0.0138 — 0.0244 in.)
			No.2	0.450 — 0.720 mm (0.0177 — 0.0283 in.)
			Oil	0.200 — 0.520 mm (0.0079 — 0.0205 in.)
		Maximum	No.1	1.46 mm (0.0575 in.)
			No.2	1.61 mm (0.0634 in.)
			Oil	1.61 mm (0.0634 in.)
	14B	STD	No.1	0.350 — 0.570 mm (0.0138 — 0.0244 in.)
			No.2	0.400 — 0.650 mm (0.0157 — 0.0256 in.)
			Oil	0.200 — 0.520 mm (0.0079 — 0.0205 in.)
		Maximum	No.1	1.46 mm (0.0575 in.)
			No.2	1.61 mm (0.0634 in.)
			Oil	1.61 mm (0.0634 in.)
	15B—F, 15B—FT	STD	No.1	0.350 — 0.570 mm (0.0138 — 0.0224 in.)
			No.2	0.470 — 0.720 mm (0.0185 — 0.0236 in.)
			Oil	0.200 — 0.520 mm (0.0079 — 0.0205 in.)
		Maximum	No.1	1.41 mm (0.0575 in.)
			No.2	1.61 mm (0.0634 in.)
			Oil	1.61 mm (0.0634 in.)
	Piston protrusion from cylinder block			
	14B			0.535 — 0.985 mm (0.0211 — 0.0388 in.)
	15B—F, 15B—FT			0.255 — 0.705 mm (0.0100 — 0.0278 in.)
Crankshaft	Thrust clearance		STD	0.040 — 0.250 mm (0.0016 — 0.0098 in.)
			Maximum	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	STD	No.3	0.060 — 0.104 mm (0.0024 — 0.0041 in.)
			Others	0.030 — 0.074 mm (0.0012 — 0.0029 in.)
		U/S 0.25, 0.50, 1.00		
			No.3	0.060 — 0.106 mm (0.0024 — 0.0042 in.)
			Others	0.030 — 0.076 mm (0.0012 — 0.0030 in.)
	Maximum		No.3	0.15 mm (0.0059 in.)
			Others	0.10 mm (0.0039 in.)
	Main journal diameter	STD	No.3	69.950 — 69.970 mm (2.7539 — 2.7547 in.)
			Others	69.980 — 70.000 mm (2.7551 — 2.7559 in.)
		U/S 0.25	No.3	69.710 — 69.720 mm (2.7445 — 2.7449 in.)
			Others	69.740 — 69.750 mm (2.7457 — 2.7461 in.)
		U/S 0.50	No.3	69.460 — 69.470 mm (2.7346 — 2.7350 in.)
			Others	69.490 — 69.500 mm (2.7358 — 2.7362 in.)
		U/S 1.00	No.3	68.960 — 68.970 mm (2.7150 — 2.7153 in.)
			Others	68.990 — 69.000 mm (2.7161 — 2.7165 in.)

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Crankshaft (Cont'd)	Main bearing center wall thickness (Reference)		
		STD Yellow	2.480 — 2.485 mm (0.0976 — 0.0978 in.)
		Green	2.486 — 2.490 mm (0.0979 — 0.0980 in.)
	Crank pin diameter	STD	60.980 — 61.000 mm (2.4008 — 2.4016 in.)
		U/S 0.25	60.740 — 60.750 mm (2.3913 — 2.3917 in.)
		U/S 0.50	60.490 — 60.500 mm (2.3815 — 2.3819 in.)
		U/S 1.00	59.990 — 60.000 mm (2.3618 — 2.3622 in.)
	Circle runout	Maximum	0.08 mm (0.0031 in.)
	Main journal taper and out—of—round	Maximum	0.02 mm (0.0008 in.)
	Crank pin taper and out—of—round	Maximum	0.02 mm (0.0008 in.)
Valve lifter	Cylinder block lifter bore diameter		27.010 — 27.030 mm (1.0634 — 1.0642 in.)
	Lifter diameter		26.955 — 26.975 mm (1.0612 — 1.0620 in.)
	Oil clearance	STD	0.035 — 0.075 mm (0.0014 — 0.0030 in.)
		Maximum	0.10 mm (0.0039 in.)

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TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Valve clearance adjusting screw x Valve rocker arm		18.5	189	14
Valve rocker support x Valve rocker shaft		7.5	76	66 in.·lbf
Cylinder head x Cylinder block	1st	49	500	36
	2nd	Turn 90°	Turn 90°	Turn 90°
	3rd	Turn 90°	Turn 90°	Turn 90°
Valve rocker support x Cylinder head		25	255	18
Cylinder head cover x Cylinder head		10.5	107	8
Exhaust manifold (except 15B—FT) x Cylinder head		47.5	484	35
Exhaust manifold heat insulator x Exhaust manifold		18.5	189	14
Drive belt adjusting bar x Cylinder head		44	449	32
Drive belt adjusting bar x Alternator		18.5	189	14
Alternator x Alternator bracket		37.5	382	28
Engine hanger x Cylinder head		37	380	27
Water outlet housing x Cylinder head		18.5	189	14
Intake manifold x Cylinder head		18.5	189	14
Intake shutter (14B) x Intake manifold		21	214	15
Glow plug x Cylinder head		12.5	127	9
Camshaft timing gear x Camshaft		37.5	382	28
Camshaft thrust plate x Cylinder block		18.5	189	14
Idler gear thrust plate x Cylinder block		47.5	484	35
Idler gear shaft (Oil pipe) x Cylinder block		11	112	8
Timing gear cover x Timing gear case		21	214	15
Timing gear cover x Cylinder block	12 mm head	21	214	15
	14 mm head	44	449	32
Crankshaft pulley x Crankshaft		294	3,000	217
Valve lifter set bolt x Cylinder block	10 mm head	7.5	76	66 in.·lbf
	12 mm head	37.5	382	28
Main bearing cap x Cylinder block		200	2,039	148
Connecting rod cap x Connecting rod	1st	68.6	700	51
	2nd	Turn 90°	Turn 90°	Turn 90°
Engine mounting bracket x Cylinder block		44	449	32
Oil nozzle for timing gears x Cylinder block		13	133	10
Alternator bracket x Cylinder block		98	1,000	72
Water drain union x Cylinder block		70	714	52
Rear oil seal retainer x Cylinder block		18.5	189	14
Rear end plate x Cylinder block		18.5	189	14
Flywheel x Crankshaft		160	1,630	118