

# SERVICE SPECIFICATIONS

## SERVICE DATA

Compression pressure	STD	1,177 kPa	12.0 kgf/cm <sup>2</sup>	171 psi
	Limit	981 kPa	10.0 kgf/cm <sup>2</sup>	142 psi
	Difference between each cylinder	980 kPa (1.0 kgf/cm <sup>2</sup> , 14 psi) or less		
Cylinder head	Head surface warpage	Limit	0.15 mm	0.0059 in.
	Manifold surface warpage	Limit	0.20 mm	0.0079 in.
	Valve seat Refacing angle	Intake	30°, 45°, 60°	
		Exhaust	30°, 45°, 65°	
	Contacting angle		45°	
Contacting width		1.2–1.6 mm	0.047–0.063 in.	
Valve guide bushing	Inner diameter	Intake	8.01–8.03 mm	
	Exhaust		8.01–8.03 mm	
	Outer diameter	STD	13.040–13.051 mm	
		O/S 0.05	13.090–13.101 mm	
	Replacing temperature (cylinder head side)		Approx. 90°C (194°F)	
Valve	Valve overall length	STD Intake	113.5 mm	
		Exhaust	112.4 mm	
	Valve face angle		44.5°	
	Stem diameter	STD Intake	7.970–7.985 mm	
		Exhaust	7.965–7.980 mm	
	Stem end refacing	Limit	0.5 mm	
	Stem oil clearance	STD Intake	0.025–0.06 mm	
		Exhaust	0.03–0.065 mm	
		Limit Intake	0.08 mm	
		Exhaust	0.10 mm	
	Valve head edge thickness	STD	1.0 mm	
Limit		0.6 mm		
Valve spring	Free length		48.5 mm	
	Installed load at 40.5 mm (1.594 in.)	STD	294 N	30.0 kgf
		Limit	279 N	28.5 kgf
	Squareness	Limit	1.6 mm	
Rocker arm and shaft	Rocker arm inside diameter		16.000–16.018 mm	
	Rocker shaft diameter		15.97–15.99 mm	
	Shaft to arm oil clearance	STD	0.01–0.05 mm	
		Limit	0.08 mm	
Intake exhaust manifolds and air intake chamber	Manifold surface warpage		0.2 mm	
	Limit Intake		0.7 mm	
		Exhaust	0.2 mm	
	Air intake chamber		0.008 in.	
Chain and sprocket	Crankshaft sprocket wear	Limit	59.4 mm	
	Camshaft sprocket wear	Limit	113.8 mm	

Tension and Damper	Tensioner head thickness	Limit		11.0 mm	0.433 in.	
	No. 1 damper wear	Limit		0.5 mm	0.020 in.	
	No. 2 damper wear	Limit		0.5 mm	0.020 in.	
Camshaft	Thrust clearance	STD		0.08-0.18 mm	0.0031-0.0071	
		Limit		0.25 mm	0.0098 in.	
	Journal oil clearance	STD		0.01-0.05 mm	0.0004-0.0020	
		Limit		0.1 mm	0.004 in.	
	Journal diameter	STD		32.98-33.00 mm	1.2984-1.2992 in.	
	Circle runout	Limit		0.2 mm	0.008 in.	
	Cam height	STD	Intake		42.63-42.72 mm	1.6783-1.6891
			Exhaust		42.69-42.78 mm	1.6807-1.6842
Limit		Intake		42.25 mm	1.6634 in.	
		Exhaust		42.30 mm	1.6654 in.	
Cylinder block	Cylinder head surface warpage	Limit		0.05 mm	0.0020 in.	
	Cylinder bore	STD	No. 1	92.00-92.01 mm	3.6220-3.6224 in.	
			No. 2	92.01-92.02 mm	3.6224-3.6228 in.	
			No. 3	92.02-92.03 mm	3.6228-3.6232 in.	
	Cylinder bore wear	Limit		0.02 mm	0.008 in.	
	Cylinder block main journal bore	STD	No. 3	64.004-64.010 mm	2.5198-2.5201 in.	
			No. 4	64.010-64.016 mm	2.5201-2.5203 in.	
			No. 5	64.016-64.022 mm	2.5203-2.5205 in.	
U/S 0.25			64.004-64.022 mm	2.5198-2.5205 in.		
Piston and piston ring	Piston diameter	STD	No. 1	91.975-91.985 mm	3.6211-3.6214 in.	
			No. 2	91.985-91.995 mm	3.6214-3.6218 in.	
			No. 3	91.995-92.005 mm	3.6218-3.6222 in.	
			O/S 0.50	92.475-92.505 mm	3.6407-3.6419 in.	
			O/S 1.00	92.975-93.005 mm	3.6604-3.6616 in.	
	Piston to cylinder clearance	STD			0.015-0.035 mm	0.0006-0.0014 in.
	Ring to ring groove clearance	STD			0.03-0.07 mm	0.0012-0.0028 in.
		Limit			0.2 mm	0.008 in.
	Piston ring end gap	STD	No. 1		0.25-0.47 mm	0.0098-0.0185 in.
			No. 2		0.60-0.82 mm	0.0236-0.0323 in.
			Oil		0.20-0.57 mm	0.0079-0.0224 in.
Limit			No. 1		1.07 mm	0.0421 in.
			No. 2		1.42 mm	0.0559 in.
	Oil		1.17 mm	0.0461 in.		
				Piston pin installing temperature	80°C / 176°F	
Connecting rod and bearing	Thrust clearance	STD		0.16-0.26 mm	0.0063-0.0102 in.	
		Limit		0.3 mm	0.012 in.	
	Bearing oil clearance	STD		0.025-0.055 mm	0.0010-0.0022 in.	
		Limit		0.10 mm	0.0039 in.	

Connecting rod and bearing (cont'd)	Big end inner diameter	STD A	56.000–56.006 mm	2.2047–2.2050 in.	
		B	56.006–56.012 mm	2.2050–2.2052 in.	
		C	56.012–56.018 mm	2.2052–2.2054 in.	
		U/S 0.25	56.000–56.018 mm	2.2047–2.2054 in.	
	Connecting rod bearing center wall thickness	STD A	1.484–1.488 mm	0.0584–0.0586 in.	
		B	1.488–1.492 mm	0.0586–0.0587 in.	
		C	1.492–1.496 mm	0.0587–0.0589 in.	
		U/S 0.25	1.626–1.636 mm	0.0640–0.0644 in.	
	Pin to bushing oil clearance	STD	0.005–0.011 mm	0.0002–0.0004 in.	
		Limit	0.015 mm	0.0006 in.	
	Rod out-of-alignment per 100 mm (3.94 in.)	Limit	0.05 mm	0.0020 in.	
		Limit	0.15 mm	0.0059 in.	
	Crankshaft	Thrust clearance	STD	0.02–0.22 mm	0.0008–0.0087 in.
			Limit	0.3 mm	0.012 in.
Thrust washer thickness		STD	2.690–2.740 mm	0.1059–0.1079 in.	
		O/S 1.25	2.753–2.803 mm	0.1084–0.1104 in.	
		O/S 2.50	2.815–2.865 mm	0.1108–0.1128 in.	
Main journal oil clearance		STD	0.025–0.055 mm	0.0010–0.0022 in.	
		Limit	0.08 mm	0.0031 in.	
Main journal diameter		STD	59.984–60.000 mm	2.3616–2.3622 in.	
		U/S 0.25	59.701–59.711 mm	2.3504–2.3508 in.	
Main bearing center wall thickness		STD	No. 3	1.988–1.992 mm	0.0783–0.0784 in.
			No. 4	1.992–1.996 mm	0.0784–0.0786 in.
			No. 5	1.996–2.000 mm	0.0786–0.0787 in.
		U/S 0.25	2.216–2.136 mm	0.0837–0.0841 in.	
Crank pin diameter		STD	52.988–53.000 mm	2.0861–2.0866 in.	
		U/S 0.25	52.701–52.711 mm	2.0748–2.0752 in.	
Crank pin finished diameter		Limit	0.1 mm	0.004 in.	
		Limit	0.01 mm	0.0004 in.	
Main journal taper and out-of-round		Limit	0.01 mm	0.0004 in.	
		Limit	0.01 mm	0.0004 in.	

## TORQUE SPECIFICATIONS

Part tightened	N·m	kgf·cm	ft·lbf
Cylinder head X Cylinder head cover	5.9	60	52 in·lbf
Cylinder head X Camshaft bearing cap	20	200	14
Cylinder head X Spark plug	18	180	13
Cylinder head X Intake manifold	19	195	14
Cylinder head X No. 1 secondary air injection manifold	13	130	9
Cylinder head X EGR valve	13	130	9
Cylinder head X Exhaust manifold	44	450	33
Cylinder head X Cylinder head rear cover	13	130	9
Cylinder block X Cylinder head	78	800	58
Cylinder block X Chain damper	22	220	16
Cylinder block X Chain tensioner	19	195	14
Cylinder block X Engine mounting	39	400	29
Cylinder block X Rear oil seal retainer	18	180	13
Cylinder block X Fuel filter bracket	19	195	14
Oil cooler relief valve X Cylinder block	69	700	51
Cylinder block X Crankshaft bearing cap	103	1,050	76
Cylinder block X Oil strainer	13	130	9
Cylinder block X Oil pan	13	130	9
Cylinder block X Engine mounting bracket	44	400	33
Valve clearance adjusting screw	25	250	18
Camshaft X Distributor drive gear	78	800	58
Crankshaft pulley X No. 2 crankshaft pulley	19	195	14
Air intake chamber X EGR pipe	13	130	9
Air intake chamber X Intake manifold	19	195	14
Air intake chamber X Accelerator control cable bracket	13	130	9
Intake manifold X Water outlet	19	195	14
Intake manifold X PAIR valve	13	130	9
No. 1 secondary air injection manifold X PAIR valve	13	130	9
No. 1 secondary air injection manifold X No. 2 secondary air injection manifold	13	130	9
Exhaust manifold X No. 2 exhaust manifold heat insulator	19	195	14
Exhaust manifold X No. 2 secondary air injection manifold			
10 mm bolt	44	450	33
8 mm bolt	22	220	16
Connecting rod X Connecting rod cap	69	700	51
Crankshaft X Crankshaft pulley	157	1,600	116
Crankshaft X Flywheel	108	1,100	80
Crankshaft X Drive plate	83	850	61
Oil pan X Drain plug	25	250	18