

ENGINE MECHANICAL

Specifications

Idle speed			700 rpm		
Intake manifold vacuum			400 mmHg (15.75 in.Hg, 53.3 kPa) or more		
Compression pressure	at 250 rpm	STD	12.0 kg/cm ²	171 psi	1,177 kPa
		Limit	9.0 kg/cm ²	128 psi	883 kPa
Differential of pressure between each cylinder			1.0 kg/cm ² (14 psi, 98 kPa) or less		
Cylinder head	Warpage	Cylinder block side	Limit	0.10 mm	0.0039 in.
		Intake manifold side	Limit	0.10 mm	0.0039 in.
		Exhaust manifold side	Limit	0.10 mm	0.0039 in.
	Valve guide bore		STD	11.000 – 11.027 mm	0.4331 – 0.4341 in.
			O/S 0.05	11.050 – 11.077 mm	0.4350 – 0.4361 in.
	Valve seat	Refacing angle		30°, 45°, 60°	
Contacting angle			45°		
Contacting width			1.0 – 1.4 mm	0.039 – 0.055 in.	
Valve guide bushing	Inside diameter		6.010 – 6.030 mm	0.2366 – 0.2374 in.	
	Outside diameter	STD	11.033 – 11.044 mm	0.4344 – 0.4348 in.	
		O/S 0.05	11.083 – 11.094 mm	0.4363 – 0.4368 in.	
	Replacing temperature (Cylinder head side)		90°C	194°F	
Valve	Valve overall length	STD	98.15 mm	3.8642 in.	
		Limit	97.75 mm	3.8484 in.	
	Valve face angle		44.5°		
	Stem diameter		Intake	5.970 – 5.985 mm	0.2350 – 0.2356 in.
			Exhaust	5.965 – 5.980 mm	0.2348 – 0.2354 in.
	Stem oil clearance	STD	Intake	0.025 – 0.060 mm	0.0010 – 0.0024 in.
			Exhaust	0.030 – 0.065 mm	0.0012 – 0.0026 in.
		Limit	Intake	0.08 mm	0.0031 in.
			Exhaust	0.10 mm	0.0039 in.
	Valve margin thickness	STD	1.3 mm	0.051 in.	
Limit		0.5 mm	0.020 in.		
Valve spring	Free length		41.64 mm	1.6394 in.	
	Installed length		35.0 mm	1.378 in.	
	Installed load at 35 mm (1.378 in.)	STD	16.0 kg	35 lb 157 N	
	Squareness	Limit	1.5 mm	0.059 in.	
Valve lifter	Lifter diameter	STD	27.975 – 27.985 mm	1.1014 – 1.1018 in.	
	Oil clearance	STD	0.015 – 0.046 mm	0.0006 – 0.0018 in.	
		Limit	0.10 mm	0.0039 in.	

Specifications (Cont'd)

Intake, exhaust manifold and intake chamber	Manifold surface warpage				
	Intake	Limit	0.10 mm	0.0039 in.	
	Exhaust	Limit	0.75 mm	0.0295 in.	
	Intake chamber	Limit	0.10 mm	0.0039 in.	
Camshaft	Thrust clearance	STD	0.08 – 0.19 mm	0.0031 – 0.0075 in.	
		Limit	0.30 mm	0.0118 in.	
	Journal oil clearance				
	No. 1	STD	0.035 – 0.072 mm	0.0014 – 0.0028 in.	
		Limit	0.13 mm	0.0051 in.	
	No. 2 – No. 7	STD	0.025 – 0.093 mm	0.0010 – 0.0037 in.	
		Limit	0.13 mm	0.0051 in.	
	Journal diameter				
	No. 1	STD	26.949 – 26.965 mm	1.0610 – 1.0616 in.	
	No. 2 – No. 7	STD	26.888 – 26.975 mm	1.0586 – 1.0620 in.	
Circle runout	Limit	0.03 mm	0.0012 in.		
Cam lobe height					
	Intake	STD	38.16 mm	1.5024 in.	
		Limit	37.85 mm	1.4902 in.	
	Exhaust	STD	38.35 mm	1.5098 in.	
		Limit	38.00 mm	1.4961 in.	
Idler pulley tension spring	Free length		69 mm	2.72 in.	
Pump drive shaft	Thrust clearance	STD	0.06 – 0.13 mm	0.0024 – 0.0051 in.	
		Limit	0.30 mm	0.0118 in.	
	Oil clearance	STD	0.025 – 0.066 mm	0.0010 – 0.0026 in.	
		Limit	0.08 mm	0.0031 in.	
	Journal diameter				
		Front	40.959 – 40.975 mm	1.6126 – 1.6132 in.	
		Rear	32.959 – 32.975 mm	1.2976 – 1.2982 in.	
Cylinder block	Cylinder head surface warpage	Limit	0.05 mm	0.0020 in.	
	Cylinder bore	STD			
		Mark 0	82.990 – 83.000 mm	3.2673 – 3.2677 in.	
		Mark 1	83.001 – 83.010 mm	3.2677 – 3.2681 in.	
		Mark 2	83.011 – 83.020 mm	3.2681 – 3.2685 in.	
		Mark 3	83.021 – 83.030 mm	3.2685 – 3.2689 in.	
		Mark 4	83.031 – 83.040 mm	3.2689 – 3.2693 in.	
		Limit			
		STD	83.24 mm	3.2772 in.	
		O/S 0.50	83.74 mm	3.2968 in.	
	Cylinder block main journal bore				
	STD				
		Mark 1	64.024 – 64.030 mm	2.5206 – 2.5209 in.	
		Mark 2	64.031 – 64.036 mm	2.5209 – 2.5211 in.	
		Mark 3	64.037 – 64.042 mm	2.5211 – 2.5213 in.	
	U/S 0.25		64.022 – 64.046 mm	2.5205 – 2.5215 in.	
Piston and piston ring	Piston diameter	STD			
		Mark 0	82.900 – 82.910 mm	3.2638 – 3.2642 in.	
		Mark 1	82.911 – 82.920 mm	3.2642 – 3.2646 in.	
		Mark 2	82.921 – 82.930 mm	3.2646 – 3.2650 in.	
		Mark 3	82.931 – 82.940 mm	3.2650 – 3.2653 in.	
		Mark 4	82.941 – 82.950 mm	3.2654 – 3.2657 in.	
		O/S 0.50		83.40 – 83.45 mm	3.2835 – 3.2854 in.
	Piston oil clearance	STD	0.08 – 0.10 mm	0.0020 – 0.0028 in.	
	Limit	0.13 mm	0.0051 in.		

Specifications (Cont'd)

Piston and piston ring (cont'd)	Piston ring end gap	STD	No. 1	0.23 – 0.38 mm	0.0091 – 0.0150 in.
			No. 2	0.25 – 0.53 mm	0.0098 – 0.0209 in.
			Oil	0.10 – 0.40 mm	0.0039 – 0.0157 in.
	Limit	No. 1	0.68 mm	0.0268 in.	
		No. 2	1.13 mm	0.0455 in.	
		Oil	1.00 mm	0.0394 in.	
	Ring groove clearance		No. 1	0.03 – 0.07 mm	0.0012 – 0.0028 in.
		No. 2	0.02 – 0.06 mm	0.0008 – 0.0024 in.	
Piston pin installing temperature			60°C	140°F	
Connecting rod and bearing	Thrust clearance	STD		0.160 – 0.296 mm	0.0063 – 0.0117 in.
		Limit		0.30 mm	0.0118 in.
	Big end inner diameter	STD	Mark 1	55.015 – 55.025 mm	2.1659 – 2.1663 in.
			Mark 2	55.026 – 55.035 mm	2.1664 – 2.1667 in.
			Mark 3	55.036 – 55.045 mm	2.1668 – 2.1671 in.
			U/S 0.25	55.015 – 55.045 mm	2.1659 – 2.1671 in.
	Connecting rod bearing center wall thickness	STD	Mark 1	1.490 – 1.495 mm	0.0587 – 0.0589 in.
			Mark 2	1.496 – 1.500 mm	0.0589 – 0.0591 in.
			Mark 3	1.501 – 1.505 mm	0.0591 – 0.0593 in.
			Mark 4	1.506 – 1.510 mm	0.0593 – 0.0594 in.
			Mark 5	1.511 – 1.515 mm	0.0595 – 0.0596 in.
				U/S 0.25	1.622 – 1.632 mm
	Bearing oil clearance	STD		0.021 – 0.053 mm	0.0008 – 0.0021 in.
		Limit		0.08 mm	0.0031 in.
Pin oil clearance	STD		0.005 – 0.011 mm	0.0002 – 0.0004 in.	
	Limit		0.02 mm	0.0008 in.	
Piston pin diameter			21.996 – 22.009 mm	0.8860 – 0.8665 in.	
Rod bend	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.	
Crankshaft and bearing	Thrust clearance	STD		0.05 – 0.25 mm	0.0020 – 0.0098 in.
		Limit		0.30 mm	0.0118 in.
	Thrust washer thickness	STD		2.925 – 2.975 mm	0.1152 – 0.1171 in.
			O/S 0.125	2.988 – 3.038 mm	0.1176 – 0.1196 in.
	Main journal oil clearance	STD		0.030 – 0.048 mm	0.0012 – 0.0019 in.
			Limit	0.07 mm	0.0028 in.
	Main journal diameter	STD	Mark 0	60.007 – 60.012 mm	2.3625 – 2.3627 in.
Mark 1			60.001 – 60.006 mm	2.3622 – 2.3624 in.	
Mark 2			59.994 – 60.000 mm	2.3620 – 2.3622 in.	
U/S 0.25			59.730 – 59.740 mm	2.3516 – 2.3520 in.	

Specifications (Cont'd)

Crankshaft and bearing (cont'd)	Main bearing center wall thickness				
		STD	Mark 1	1.988 – 1.991 mm	0.0783 – 0.0784 in.
			Mark 2	1.992 – 1.994 mm	0.0784 – 0.0785 in.
			Mark 3	1.995 – 1.996 mm	0.0785 – 0.0786 in.
			Mark 4	1.998 – 2.000 mm	0.0787 – 0.0787 in.
			Mark 5	2.001 – 2.003 mm	0.0788 – 0.0789 in.
		U/S 0.25		2.123 – 2.133 mm	0.0836 – 0.0840 in.
	Crank pin diameter		Mark 0	51.993 – 52.000 mm	2.0470 – 2.0472 in.
			Mark 1	51.985 – 51.992 mm	2.0466 – 2.0469 in.
			Mark 2	51.976 – 51.984 mm	2.0463 – 2.0466 in.
		U/S 0.25		51.725 – 51.735 mm	2.0364 – 2.0368 in.
	Circle runout		Limit	0.06 mm	0.0024 in.
	Main journal taper and out-of-round		Limit	0.02 mm	0.0008 in.
Check pin journal taper and out-of-round		Limit	0.02 mm	0.0008 in.	
Flywheel	Runout	Limit	0.1 mm	0.004 in.	

Torque Specifications

Part tightened	kg-cm	ft-lb	N·m
Camshaft timing pulley x Camshaft	500	36	49
Oil pump drive pulley x Oil pump drive shaft	220	16	22
Crankshaft x Crank pulley	2,700	195	265
Crankshaft x Flywheel	750	54	74
Crankshaft x Drive plate	750	54	74
Air intake chamber x Intake manifold	180	13	18
Air intake chamber x Air intake connector	180	13	18
Throttle body x Air intake connector	130	9	13
Cylinder head x No.-1 and No.2 cylinder head covers	25	22 in.-lb	2.5
Cylinder head x No.3 cylinder head cover	180	13	18
Cylinder head x Cylinder block	800	58	78
Cylinder head x Spark plug	180	13	18
Cylinder head x No.2 engine hanger	400	29	39
Cylinder head x Heater union	600	43	59
Cylinder head x EGR cooler	140	10	14
Cylinder head x Camshaft bearing cap	200	14	20
Cylinder head x Intake manifold	180	13	18
Cylinder head x Exhaust manifold	400	29	39
Cylinder head x Distributor	140	10	14
Connecting rod cap x Connecting rod	650	47	64
Cylinder block x Main bearing cap	1,040	75	102
Cylinder block x Timing belt case x Idler pulley	500	36	49
Cylinder block x Oil pump drive shaft thrust plate	130	9	13