ENGINE MECHANICAL

030YD–04

SERVICE DATA

Cyliner head	Warpage	STD Longitudinal direction	0.05 mm (0.0020 in.) or less
		Lateral direction	0.05 mm (0.0020 in.) or less
		Maximum	0.10 mm (0.0039 in.)
Valve and valve seat	Valve seat angle	Intake	29° 00' – 30° 00'
		Exhaust	44° 00' – 45° 15'
	Valve face angle	Intake	29° 45' – 30° 15'
		Exhaust	44° 45' – 45° 15'
	Valve sink dimension	STD Intake	0.15 – 0.45 mm (0.0059 – 0.0177 in.)
		Exhaust	0.47 – 0.77 mm (0.0185 – 0.0303 in.)
		Maximum Intake	0.55 mm (0.0217 in.)
		Exhaust	0.87 mm (0.0342 in.)
	Valve stem diameter	STD Intake	8.95 – 8.97 mm (0.3524 – 0.3531 in.)
		Exhaust	8.93 – 8.95 mm (0.3516 – 0.3524 in.)
		Minimum Intake	8.90 mm (0.3504 in.)
		Exhaust	8.80 mm (0.3465 in.)
	Valve stem oil clearance	STD Intake	0.035 – 0.068 mm (0.0014 – 0.0027 in.)
		Exhaust	0.050 – 0.083 mm (0.0020 – 0.0033 in.)
		Maximum Intake Position A & B	0.10 mm (0.0039 in.)
		C	0.18 mm (0.0071 in.)
		Exhaust Position A & B	0.12 mm (0.0047 in.)
		C	0.20 mm (0.0079 in.)
Valve spring	Deviation	Maximum	2.0 mm (0.079 in.)
	Free length	Inner	60.2 mm (2.370 in.)
		Outer	60.1 mm (2.366 in.)
	Installed tension	Inner at 43.0 mm (1.693 in.)	86.0 N (8.8 kgf, 19.3 lb)
		Outer at 45.5 mm (1.791 in.)	269.0 N (27.4 kgf, 60.5 lb)
Nozzle holder and nozzle set	Nozzle protrusion	STD	2.25 – 3.05 mm (0.1004 – 0.1201 in.)
		Maximum	3.05 mm (0.1201 in.)
Valve rocker arm and shaft	Valve rocker arm bush inside diameter	STD	19.020 – 19.045 mm (0.7488 – 0.7498 in.)
		Maximum	19.06 mm (0.7504 in.)
	Valve rocker arm shaft diameter	STD	18.966 – 18.984 mm (0.7467 – 0.7474 in.)
		Minimum	18.95 mm (0.7461 in.)
	Oil clearance	STD	0.036 – 0.079 mm (0.0014 – 0.0031 in.)
		Maximum	0.10 mm (0.0039 in.)
Valve lifter	Valve lfter diameter	STD	26.95 – 26.97 mm (1.0610 – 1.0618 in.)
	Valve lifter bore inside diameter	STD	27.00 – 27.02 mm (1.0630 – 1.0638 in.)
	Oil clearance	STD	0.025 – 0.071 mm (0.0010 – 0.0028 in.)
		Maximum	0.10 mm (0.0039 in.)
Cylinder head bolt	Length	Maximum Bolt No. position 1 – 13	118 mm (4.65 in.)
		14 – 18	165 mm (6.50 in.)
Valve clearance		at cold Intake	0.35 mm (0.014 in.)
		Exhaust	0.55 mm (0.022 in.)
Flywheel	Deflection	Maximum	0.04 mm (0.0016 in.)
	Grind limit		1.00 mm (0.0394 in.)
	Runout	Maximum	0.15 mm (0.0059 in.)

Timing gear	Idle gear and shaft		
	Shaft diameter	STD	49.950 – 49.975 mm (1.9665 – 1.9675 in.)
	Gear bush inside diameter	STD	50.000 – 50.025 mm (1.9685 – 1.9695 in.)
	Oil clearance between bush and shaft	STD	0.025 – 0.075 mm (0.0010 – 0.0030 in.)
		Maximum	0.10 mm (0.0039 in.)
	Gear thrust clearance	STD	0.040 – 0.100 mm (0.0016 – 0.0039 in.)
		Maximum	0.15 mm (0.0059 in.)
	Backlash		
	Crankshaft timing gear x Idle gear	STD	0.068 – 0.194 mm (0.0027 – 0.0076 in.)
		Maximum	0.30 mm (0.0118 in.)
	Idle gear x Injection pump drive gear	STD	0.065 – 0.232 mm (0.0026 – 0.0091 in.)
		Maximum	0.30 mm (0.0118 in.)
	Idle gear x Oil pump drive gear	STD	0.065 – 0.182 mm (0.0026 – 0.0072 in.)
		Maximum	0.30 mm (0.0118 in.)
	Camshaft timing gear x Oil pump drive gear	STD	0.065 – 0.182 mm (0.0026 – 0.0072 in.)
		Maximum	0.30 mm (0.0118 in.)
Camshaft	Cam lobe height	STD Intake	49.435 mm (1.9463 in.)
		Exhaust	49.493 mm (1.9485 in.)
		Minimum Intake	48.90 mm (1.9252 in.)
		Exhaust	48.95 mm (1.9272 in.)
	Journal diameter	STD No. 1	56.95 – 56.97 mm (2.2421 – 2.2429 in.)
		No. 2	56.75 – 56.77 mm (2.2342 – 2.2350 in.)
		No. 3	56.55 – 56.57 mm (2.2264 – 2.2272 in.)
		Minimum No. 1	56.85 mm (2.2382 in.)
		No. 2	56.65 mm (2.2303 in.)
		No. 3	56.45 mm (2.2224 in.)
	Camshaft bearing inside diameter	STD No. 1	57.00 – 57.07 mm (2.2441 – 2.2468 in.)
		No. 2	56.80 – 56.87 mm (2.2362 – 2.2390 in.)
		No. 3	56.60 – 56.67 mm (2.2283 – 2.2311 in.)
	Oil clearance	STD	0.030 – 0.120 mm (0.0012 – 0.0047 in.)
		Maximum	0.15 mm (0.0059 in.)
	Bent	Maximum	0.05 mm (0.0020 in.)
	Thrust clearance	STD	0.10 – 0.18 mm (0.0039 – 0.0071 in.)
		Maximum	0.30 mm (0.0118 in.)
Connecting rod	Rod bent	Maximum per 200 mm (7.87 in.)	0.10 mm (0.0039 in.)
	Rod twist	Maximum per 200 mm (7.87 in.)	0.10 mm (0.0039 in.)
	Bush inside diameter	STD	37.035 – 37.045 mm (1.4581 – 1.4585 in.)
		Maximum	37.10 mm (1.4606 in.)
	Bush oil clearance	STD	0.035 – 0.056 mm (0.0014 – 0.0022 in.)
		Maximum	0.08 mm (0.0031 in.)
	Rod big end inside diameter (w/o Bearing)	STD	65.985 – 66.000 mm (2.5978 – 2.5984 in.)
		Maximum	66.06 mm (2.6008 in.)
	Rod big end inside diameter (w/ Bearing)	STD	61.985 – 62.000 mm (2.4403 – 2.4409 in.)
		Maximum	62.06 mm (2.4433 in.)
	Rod big end oil clearance	STD	0.031 – 0.082 mm (0.0012 – 0.0032 in.)
		Maximum	0.12 mm (0.0047 in.)
	Thrust clearance	STD	0.20 – 0.52 mm (0.0079 – 0.0205 in.)
		Maximum	0.60 mm (0.0236 in.)
Connecting rod bolt	Length	STD	59.00 mm (2.3228 in.)
		Maximum	60.00 mm (2.3622 in.)

Piston and piston ring	Piston pin diameter	STD	36.989 – 37.000 mm (1.4563 – 1.4567 in.)
		Minimum	36.96 mm (1.4551 in.)
	Piston diameter	STD	103.908 mm (4.0909 in.)
		Minimum	103.902 mm (4.0906 in.)
	Piston oil clearance	STD	0.0140 – 0.0172 mm (0.0056 – 0.0068 in.)
	Piston pin boss inside diameter	STD	36.987 – 37.003 mm (1.4562 – 1.4568 in.)
		Minimum	37.05 mm (1.4587 in.)
	Clearance between piston pin boss and piston pin	STD	0.013 (T) – 0.014 (L) mm (0.0051 (T) – 0.0055 (L) in.)
		Maximum	0.05 mm (0.0020 in.)
	Piston ring groove width	STD 1st	2.58 – 2.60 mm (0.1016 – 0.1024 in.)
		2nd	2.06 – 2.08 mm (0.0811 – 0.0819 in.)
		Oil	4.01 – 4.03 mm (0.1579 – 0.1587 in.)
		Maximum 1st	3.10 mm (0.1220 in.)
		2nd	2.20 mm (0.0866 in.)
		Oil	4.08 mm (0.1606 in.)
	Piston ring thickness	STD 1st	2.47 – 2.49 mm (0.0972 – 0.0980 in.)
		2nd	1.97 – 1.99 mm (0.0776 – 0.0783 in.)
		Oil	4.97 – 4.99 mm (0.1957 – 0.1965 in.)
		Maximum 1st	2.32 mm (0.0913 in.)
		2nd	1.82 mm (0.0717 in.)
		Oil	4.95 mm (0.1949 in.)
	Piston ring groove clearance	STD 1st	0.09 – 0.13 mm (0.0035 – 0.0051 in.)
		2nd	0.07 – 0.11 mm (0.0028 – 0.0043 in.)
		Oil	0.02 – 0.06 mm (0.0008 – 0.0024 in.)
		Maximum	0.30 mm (0.0118 in.)
	Piston ring end gap	STD	0.30 – 0.42 mm (0.0118 – 0.0165 in.)
		Maximum	1.20 mm (0.0472 in.)
Crankshaft	Crankshaft pin diameter	STD	61.940 – 61.960 mm (2.4386 – 2.4394 in.)
		Minimum	60.76 mm (2.3921 in.)
	Bent	Maximum	0.04 mm (0.0016 in.)
	Main journal diameter	STD	72.94 – 72.96 mm (2.8716 – 2.8724 in.)
		Minimum for repair	72.74 mm (2.8638 in.)
		for use	71.76 mm (2.8252 in.)
	Main journal oil clearance	STD	0.039 – 0.090 mm (0.0015 – 0.0035 in.)
		Maximum	0.13 mm (0.0051 in.)
	Thrust clearance	STD	0.05 – 0.22 mm (0.0020 – 0.0087 in.)
		Maximum	0.40 mm (0.0157 in.)
Cylinder block	Warpage	STD	0.05 mm (0.0020 in.) or less
		Maximum	0.10 mm (0.0039 in.)
	Main bearing bore diameter (w/o bearing)	STD	77.985 – 78.000 mm (3.0703 – 3.0709 in.)
		Maximum	78.20 mm (3.0787 in.)
	Main bearing bore diameter (w/ bearing)	STD	73.000 mm (2.8740 in.)
		Maximum	73.30 mm (2.8858 in.)
Main bearing cap bolt	Length	STD	94.00 mm (3.7008 in.)
		Maximum	95.20 mm (3.7480 in.)
Cylinder liner	Protrusion	STD	0.01 – 0.08 mm (0.0004 – 0.0031 in.)
		Maximum	0.08 mm (0.0031 in.)
	Inside diameter	STD	104.003 – 104.018 mm (4.0946 – 4.0952 in.)
		Maximum	104.15 mm (4.1004 in.)