ENGINE MECHANICAL

SERVICE DATA

0316N–01

Camshaft		
Circle runout	Maximum	0.06 mm (0.0024 in.)
Cam lobe height		45.31 – 45.41 mm (1.7839 – 1.7878 in.)
Journal diameter		26.959 – 26.975 mm (1.0614 – 1.0620 in.)
Backlash	Standard	0.020 – 0.200 mm (0.0008 – 0.0079 in.)
	Maximum	0.30 mm (0.0188 in.)
Thrust clearance	Standard	0.040 – 0.095 mm (0.0016 – 0.0037 in.)
	Maximum	0.12 mm (0.0047 in.)
Oil clearance	Standard	0.025 – 0.062 mm (0.0010 – 0.0024 in.)
	Maximum	0.08 mm (0.0031 in.)
No. 2 camshaft		
Circle runout	Maximum	0.06 mm (0.0024 in.)
Cam lobe height		45.06 – 45.16 mm (1.7740 – 1.7779 in.)
Journal diameter		26.959 – 26.975 mm (1.0614 – 1.0620 in.)
Thrust clearance	Standard	0.040 – 0.095 mm (0.0016 – 0.0037 in.)
	Maximum	0.12 mm (0.0047 in.)
Oil clearance	Standard	0.025 – 0.062 mm (0.0010 – 0.0024 in.)
	Maximum	0.08 mm (0.0031 in.)
Camshaft timing gear bolt washer		
Free distance		22.5 – 22.9 mm (0.886 – 0902 in.)
Cylinder head set bolt		
Out side diameter	Standard	10.76 – 10.97 mm (0.4236 – 0.4319 in.)
	Minimum	10.40 mm (0.4094 in.)
Chain sub–assy		
Length at 16 links	Maximum	147.5 mm (5.807 in.)
Gear diameter	Minimum Crankshaft timing gear	59.4 mm (2.339 in.)
	Camshaft timing gear	113.8 mm (4.480 in.)
No. 2 Chain sub–assy		
Length at 16 links	Maximum	123.6 mm (4.866 in.)
Gear diameter	Minimum Balance shaft drive gear	75.9 mm (2.988 in.)
	Crankshaft timing gear sprocket	96.7 mm (3.807 in.)
Chain tensioner slipper		
Wear	Maximum	1.0 mm (0.039 in.)
Chain vibration damper No. 1		
Wear	Maximum	1.0 mm (0.039 in.)
Chain vibration damper No. 2		
Wear	Maximum	1.0 mm (0.039 in.)
Chain vibration damper No. 3		
Wear	Maximum	1.0 mm (0.039 in.)
Chain vibration damper No. 4		
Wear	Maximum	1.0 mm (0.039 in.)
Valve clearance (Cold)		
Intake		0.15 – 0.25 mm (0.006 – 0.010 in.)
Exhaust		0.25 – 0.35 mm (0.010 – 0.014 in.)
Spark plug tube gasket		
Depth		0.5 – 2.5 mm (0.020 – 0.098 in.)
Cylinder head sub–assy		
Warpage	Maximum Cylinder block side	0.05 mm (0.0020 in.)
	Intake manifold side	0.10 mm (0.0039 in.)
	Exhaust manifold side	0.10 mm (0.0039 in.)

Intake valve		
Valve face angle		44.5°
Overall length	Standard Leaded gasoline	103.95 mm (4.0925 in.)
	Unleaded gasoline	103.45 mm (4.0728 in.)
	Minimum Leaded gasoline	103.65 mm (4.0807 in.)
	Unleaded gasoline	103.15 mm (4.0610 in.)
Valve stem diameter		5.970 – 5.985 mm (0.2350 – 0.2356 in.)
Margin thickness	Leaded gasoline	1.55 – 1.95 mm (0.0610 – 0.0768 in.)
	Unleaded gasoline	1.05 – 1.45 mm (0.0413 – 0.0571 in.)
Exhaust valve		
Valve face angle		44.5°
Overall length	Standard Leaded gasoline	103.90 mm (4.0906 in.)
	Unleaded gasoline	103.60 mm (4.0787 in.)
	Minimum Leaded gasoline	103.60 mm (4.0789 in.)
	Unleaded gasoline	103.30 mm (4.0669 in.)
Valve stem diameter		5.970 – 5.985 (0.2350 – 0.2356 in.)
Margin thickness	Leaded gasoline	1.50 – 1.90 mm (0.0591 – 0.0748 in.)
	Unleaded gasoline	1.20 – 1.60 mm (0.0472 – 0.0630 in.)
Inner compression spring		
Free length		47.7 mm (1.878 in.)
Deviation	Maximum	2.0 mm (0.079 in.)
Installed length	at 35.7 mm (1.406 in.)	162 – 190 N (16.6 – 19.4 kgf, 36.6 – 42.8 lbf)
Intake valve guide bush		
Inside diameter		6.01 – 6.03 mm (0.2366 – 0.2374 in.)
Oil clearance	Standard	0.025 – 0.060 mm (0.0010 – 0.0024 in.)
	Maximum	0.08 mm (0.0031 in.)
Bore diameter		10.985 – 11.006 mm (0.4325 – 0.4333 in.)
Protrusion height		8.2 – 8.6 mm (0.323 – 0.339 in.)
Exhaust valve guide bush		
Inside diameter		6.01 – 6.03 mm (0.2366 – 0.2374 in.)
Oil clearance	Standard	0.030 – 0.065 mm (0.0012 – 0.0026 in.)
	Maximum	0.10 mm (0.0039 in.)
Bore diameter		10.985 – 11.006 mm (0.4325 – 0.4333 in.)
Protrusion height		8.2 – 8.6 mm (0.323 – 0.339 in.)
Intake valve seat		
Width		1.0 – 1.4 mm (0.039 – 0.055 in.)
Exhaust valve seat		
Width		1.0 – 1.4 mm (0.039 – 0.055 in.)
Valve lifter		
Diameter		30.966 – 30.976 mm (1.1578 – 1.2195 in.)
Bore diameter		31.000 – 31.016 mm (1.2205 – 1.2211 in.)
Oil clearance	Standard	0.024 – 0.050 mm (0.0009 – 0.0020 in.)
	Maximum	0.07 mm (0.0028 in.)
Spark plug tube		
Protrusion height		47.0 mm (1.850 in.)
Tight plug		
Depth	Standard	1.3 – 2.3 mm (0.0512 – 0.0906 in.)
Ring pin		
Protrusion height	Standard	3.4 – 3.7 mm (0.134 – 0.146 in.)
Connecting rod sub–assy		
Thrust clearance	Standard	0.160 – 0.312 mm (0.0063 – 0.0123 in.)
	Maximum	0.350 mm (0.0138 in.)
Oil clearance	Standard STD	0.030 – 0.055 mm (0.0012 – 0.0022 in.)
	U/S 0.25	0.030 – 0.071 mm (0.0012 – 0.0026 in.)
	Maximum	0.10 mm (0.0039 in.)
Bush inside diameter		24.008 – 24.017 mm (0.9452 – 0.9455 in.)
Out–of–alignment	Maximum per 100 mm (3.94 in.)	0.05 mm (0.0020 in.)
Twist	Maximum per 100 mm (3.94 in.)	0.15 mm (0.0059 in.)

Connecting rod bearing		
Center wall thickness	STD ”4”	1.482 – 1.485 mm (0.0583 – 0.0585 in.)
	STD ”5”	1.485 – 1.488 mm (0.0585 – 0.0586 in.)
	STD ”6”	1.488 – 1.491 mm (0.0586 – 0.0587 in.)
	U/S 0.25	1.601 – 1.607 mm (0.0630 – 0.0633 in.)
Crankshaft		
Thrust clearance	Standard	0.020 – 0.220 mm (0.0008 – 0.0087 in.)
	Maximum	0.300 mm (0.0118 in.)
Oil clearance	Standard STD No. 3	0.030 – 0.055 mm (0.0012 – 0.0022 in.)
	Others	0.024 – 0.049 mm (0.0009 – 0.0019 in.)
	U/S 0.25 No. 3	0.030 – 0.070 mm (0.0012 – 0.0028 in.)
	Others	0.025 – 0.065 mm (0.0010 – 0.0026 in.)
	Maximum	0.10 mm (0.0039 in.)
Circle runout	Maximum	0.03 mm (0.0012 in.)
Main journal diameter	STD No. 3	59.981 – 59.994 mm (2.2615 – 2.3620 in.)
	Others	59.987 – 60.000 mm (2.3617 – 2.3622 in.)
	U/S 0.25 No. 3	59.740 – 59.750 mm (2.3520 – 2.3524 in.)
	Others	59.745 – 59.755 mm (2.3522 – 2.3526 in.)
Crank pin diameter	STD	52.987 – 53.000 mm (2.0861 – 2.0866 in.)
	U/S 0.25	52.745 – 52.755 mm (2.0766 – 2.0770 in.)
Taper and out–of–round	Maximum	0.005 mm (0.0002 in.)
Crankshaft thrust washer		
Thickness		2.440 – 2.490 mm (0.0961 – 0.0980 in.)
Crankshaft bearing		
Center wall thickness	STD ”1”	1.987 – 1.990 mm (0.0782 – 0.0783 in.)
	STD ”2”	1.991 – 1.993 mm (0.0784 – 0.0785 in.)
	STD ”3”	1.994 – 1.996 mm (0.0785 – 0.0786 in.)
	U/S 0.25	2.106 – 2.112 mm (0.0829 – 0.0831 in.)
No. 1 balanceshaft		
Thrust clearance	Standard	0.07 – 0.13 mm (0.0027 – 0.0051 in.)
	Maximum	0.20 mm (0.0079 in.)
Main journal diameter	A	37.969 – 37.985 mm (1.4948 – 1.4955 in.)
	B	37.449 – 37.465 mm (1.4744 – 1.4750 in.)
Bearing inside diameter	A	38.025 – 38.045 mm (1.4970 – 1.4978 in.)
	B	37.525 – 37.545 mm (1.4774 – 1.4781 in.)
Oil clearance	Standard A	0.040 – 0.076 mm (0.0016 – 0.0031 in.)
	B	0.060 – 0.096 mm (0.0024 – 0.0038 in.)
	Maximum	0.15 mm (0.0059 in.)
No. 2 balanceshaft		
Thrust clearance	Standard	0.07 – 0.13 mm (0.0027 – 0.0051 in.)
	Maximum	0.20 mm (0.0079 in.)
Main journal diameter	A	37.969 – 37.985 mm (1.4948 – 1.4955 in.)
	B	37.449 – 37.465 mm (1.4744 – 1.4750 in.)
Bearing inside diameter	A	38.025 – 38.045 mm (1.4970 – 1.4978 in.)
	B	37.525 – 37.545 mm (1.4774 – 1.4781 in.)
Oil clearance	Standard A	0.040 – 0.076 mm (0.0016 – 0.0031 in.)
	B	0.060 – 0.096 mm (0.0024 – 0.0038 in.)
	Maximum	0.15 mm (0.0059 in.)
Cylinder block sub–assy		
Warpage	Maximum	0.05 mm (0.0020 in.)
Bore diameter	Standard	94.990 – 95.003 mm (3.7400 – 3.7403 in.)
	Maximum	95.060 mm (3.7425 in.)
W/ Pin piston sub–assy		
Diameter (at 37.5 mm (1.470 in.) from piston head)	STD	94.933 – 94.943 mm (3.7375 – 3.7379 in.)
	O/S 0.50	95.433 – 95.443 mm (3.7572 – 3.7576 in.)
Oil clearance		0.047 – 0.070 mm (0.0019 – 0.0028 in.)
Piston pin diameter		24.000 – 24.009 mm (0.9449 – 0.9452 in.)
Pin oil clearance	Standard	0.005 – 0.011 mm (0.0002 – 0.0004 in.)
	Maximum	0.015 mm (0.0006 in.)

Piston ring set		
Ring groove clearance	No. 1	0.020 – 0.070 mm (0.0008 – 0.0028 in.)
	No. 2	0.030 – 0.070 mm (0.0012 – 0.0028 in.)
	Oil	0.055 – 0.135 mm (0.0022 – 0.0053 in.)
Ring end gap	Standard No. 1	0.300 – 0.400 mm (0.0118 – 0.0157 in.)
	No. 2	0.400 – 0.500 mm (0.0157 – 0.0197 in.)
	Oil	0.130 – 0.380 mm (0.005 – 0.015 in.)
	Maximum No. 1	1.00 mm (0.039 in.)
	No. 2	1.10 mm (0.043 in.)
	Oil	0.98 mm (0.039 in.)
Connecting rod bolt		
Outside diameter	Standard	7.80 – 7.90 mm (0.3071 – 0.3110 in.)
	Minimum	7.60 mm (0.2992 in.)
Crankshaft bearing cap set bolt		
Outside diameter	Standard	10.76 – 10.97 mm (0.4236 – 0.4319 in.)
	Minimum	10.40 mm (0.4094 in.)
Tight plug		
Depth	Standard	1 mm (0.039 in.)
Ring pin		
Protrusion height	A	4.5 – 5.5 mm (0.177 – 0.217 in.)
	B	3.5 – 4.5 mm (0.138 – 0.177 in.)
	C	4 – 6 mm (0.157 – 0.236 in.)
Straight pin		
Protrusion height	A	13 mm (0.512 in.) or less
	B	5.5 mm (0.217 in.) or less