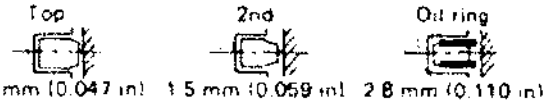
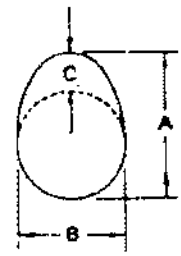
B. Engine

1. DESCRIPTION	
1) Engine type	Air cooled, 4-stroke, SOHC twin, parallel forward incline
2) Engine model	2F0
3) Displacement	653 cc (39.85 cu.in)
4) Bore x stroke	75 x 74 mm (2.953 x 2.913 in)
5) Compression ratio	8.5 : 1
6) Starting system	Kick and electric starter
7) Ignition system	Battery ignition
8) Lubrication system	Wet sump
2. CYLINDER HEAD	
1) Combustion chamber volume (with N-7Y)	43.6 cc (2.660 cu.in)
2) Combustion chamber type	Dome + Squish
3) Head gasket thickness	1.2 mm (0.047 in)
3. CYLINDER	
1) Material	Aluminum alloy with cast iron sleeve
2) Bore size	75.00 $^{+0.02}_{0}$ mm (2.9528 $^{+0.0008}_{0}$ in)
3) Taper limit	0.05 mm (0.002 in)
4) Out of round limit	0.01 mm (0.0004 in)
4. PISTON	
1) Piston skirt clearance	0.050 ~ 0.055 mm (0.0020 ~ 0.0022 in)
2) Piston oversize	75.25 mm (2.963 in) / 75.50 mm (2.972 in) / 75.75 mm (2.982 in) / 76.00 mm (2.992 in)
3) Piston pin outside diameter x length	20.0 $^{0}_{-0.005}$ mm x 61.0 $^{0}_{-0.3}$ mm (0.79 $^{0}_{-0.0002}$ in x 2.40 $^{0}_{-0.0116}$ in)
5. PISTON RING	
1) Piston ring design	
2) Ring end gap (Installed, top)	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)
(Installed, 2nd)	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)
(Installed, oil)	0.3 ~ 0.9 mm (0.012 ~ 0.035 in)
3) Ring groove side clearance (Top)	0.04 ~ 0.08 mm (0.0016 ~ 0.0031 in)
(2nd)	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)
6. BIG END BEARING	
1) Type	Needle bearing
2) Bearing size	φ26 x φ34 x 19.8
3) Needle size	φ4 x φ15.8 x 13
7. CAMSHAFT	
1) Cam drive type	Chain (Center side)
2) Number and type of bearing	4 bearings, Ball bearings (6005)
3) Bearing type	φ25-φ47-8
4) Cam dimensions	

	Cam height "A"	Limit	Base circle "B"	Limit	Lift "C"
IN	39.99 ± 0.05 mm (1.574 ± 0.002 in)	39.84 mm (1.569 in)	32.24 ± 0.05 mm (1.269 ± 0.002 in)	32.09 mm (1.263 in)	7.991 mm (0.315 in)
EX	40.03 ± 0.05 mm (1.576 ± 0.002 in)	39.88 mm (1.570 in)	32.30 ± 0.05 mm (1.272 ± 0.002 in)	32.15 mm (1.266 in)	8.030 mm (0.316 in)

5) Valve timing

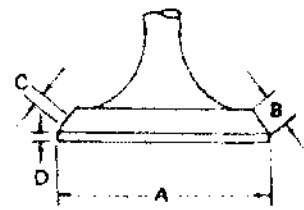
	OPEN	CLOSE	DURATION	OVERLAP
IN	BTDC36°	ABDC68°	284°	72°
EX	BBDC68°	ATDC36°	284°	



6) Camshaft deflection limit: 0.03 mm (0.0012 in)
7) Cam chain
Type: TSUBAKIMOTO 8F05M
Number of links: 106L
Sprocket ratio: 36/18 (2.000)

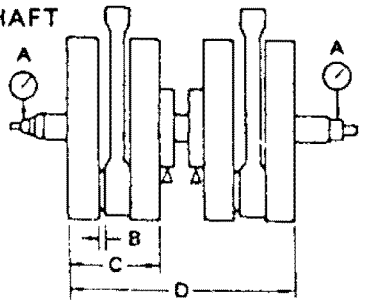
8. ROCKER ARM AND ROCKER SHAFT
1) Rocker arm inner diameter: $15.0\ ^{+0.018}_{0}$ mm ($0.591\ ^{+0.0007}_{0}$ in)
2) Rocker arm shaft diameter: $15.0\ ^{-0.009}_{-0.015}$ mm ($0.591\ ^{-0.00035}_{-0.00059}$ in)
3) Clearance: 0.009 ~ 0.033 mm (0.00035 ~ 0.00130 in)
4) Lift ratio: X : Y = 40 : 48.41 mm (1.575 : 1.906 in)

9. VALVE, VALVE SEAT AND VALVE GUIDE
1) Valve per cylinder: 2 pcs.
2) Valve clearance (In cold engine): IN: 0.06 mm (0.0024 in)
EX: 0.15 mm (0.0059 in)
3) Dimensions
Valve head diameter "A": IN: 41 mm (1.614 in)
EX: 35 mm (1.378 in)



Valve face width "B": IN: 2.1 mm (0.083 in)
EX: 2.1 mm (0.083 in)
Valve seat width "C": IN: 1.3 mm (0.051 in)
EX: 1.3 mm (0.051 in)
Valve margin thickness "D": IN: 1.3 mm (0.051 in)
EX: 1.3 mm (0.051 in)
Valve stem diameter: IN: $8.0\ ^{-0.010}_{-0.025}$ mm ($0.315\ ^{-0.0004}_{-0.0010}$ in)
Valve stem diameter: EX: $8.0\ ^{-0.025}_{-0.040}$ mm ($0.315\ ^{-0.0010}_{-0.0016}$ in)
Valve guide diameter: IN: $8.0\ ^{+0.019}_{+0.010}$ mm ($0.315\ ^{+0.0007}_{+0.0004}$ in)
EX: $8.0\ ^{+0.019}_{+0.010}$ mm ($0.315\ ^{+0.0007}_{+0.0004}$ in)
Valve stem to guide clearance: IN: 0.020 ~ 0.044 mm (0.00079 ~ 0.00173 in)
EX: 0.035 ~ 0.059 mm (0.00138 ~ 0.00232 in)
4) Valve face runout limit: IN & EX: 0.03 mm (0.0012 in) or less

10. VALVE SPRING
1) Free length: INNER (IN/EX): 42 mm (1.654 in)
OUTER (IN/EX): 42.55 mm (1.675 in)
2) Spring rate: INNER (IN/EX): k_1 = 1.43 kg/mm (80.1 lb/in)
k_2 = 1.81 kg/mm (101.4 lb/in)
OUTER (IN/EX): k_1 = 3.2 kg/mm (179.2 lb/in)
k_2 = 4.18 kg/mm (234.1 lb/in)
3) Installed length (Valve closed): INNER (IN/EX): 35 mm (1.378 in)
OUTER (IN/EX): 37 mm (1.457 in)
4) Installed pressure (Valve closed): INNER (IN/EX): 10 ± 0.7 kg (22.0 ± 1.5 lb)
OUTER (IN/EX): 17.7 ± 1.25 kg (39.0 ± 2.8 lb)
5) Compressed length (Valve open): INNER (IN/EX): 25.5 mm (1.004 in)
OUTER (IN/EX): 27.5 mm (1.083 in)
6) Compressed pressure (Valve open): INNER (IN/EX): 27.2 ± 1.9 kg (60.0 ± 4.2 lb)
OUTER (IN/EX): 57.4 ± 4.0 kg (126.5 ± 8.8 lb)

7) Wire diameter	INNER (IN/EX): 2.9 mm (0.114 in) OUTER (IN/EX): 4.2 mm (0.165 in)
8) Winding O.D.	INNER (IN/EX): 19.4 mm (0.764 in) OUTER (IN/EX): 32.6 mm (1.283 in)
9) Number of windings	INNER (IN/EX): 6.0 turns OUTER (IN/EX): 4.25 turns
11. CRANKSHAFT 	
1) Crankshaft deflection limit (A)	0.05 mm (0.002 in)
2) Con-rod large end clearance (B)	0.15 ~ 0.4 mm (0.0059 ~ 0.0157 in)
3) Width of crankshaft (C)	$66\ ^{-0.05}_{-0.10}$ mm ($2.598\ ^{-0.002}_{-0.004}$ in)
(D)	$186\ ^{0}_{-0.3}$ mm ($7.323\ ^{0}_{-0.012}$ in)
4) Crank pin I.D.	$26\ ^{-0.077}_{-0.095}$ mm ($1.024\ ^{-0.003}_{-0.004}$ in)
5) Crank pin O.D. x length	$26\ ^{0}_{-0.006} \times 65\ ^{+0.1}_{-0.2}$ mm ($1.024\ ^{0}_{-0.0002} \times 2.559\ ^{+0.004}_{-0.008}$ in)
12. CONNECTING ROD	
1) Big end I.D.	$34\ ^{+0.016}_{0}$ mm ($1.339\ ^{+0.0006}_{0}$ in)
2) Small end I.D.	$20\ ^{+0.028}_{+0.015}$ mm ($0.787\ ^{+0.0011}_{+0.0006}$ in)
13. CRANK BEARING	
1) Type Right end	φ30-φ78-19 (Ball bearing)
Others	φ32-φ68-17 (Rollar bearing)
2) Oil seal type	SD-25-40-9
14. CLUTCH	
1) Clutch type	Wet, multiple type
2) Clutch operating mechanism	Inner push type, screw push system
3) Primary reduction ratio and method	72/27 (2.666), spar gear
4) Primary reduction gear back lash (4 teeth)	$21.45\ ^{0}_{-0.025}$ mm ($0.8445\ ^{0}_{-0.00010}$ in)
5) Friction plate	
Thickness/Quantity	3 mm (0.118 in)/7 pcs.
Wear limit	2.7 mm (0.106 in)
6) Clutch plate	
Thickness/Quantity	1.4 mm (0.055 in)/6 pcs.
Warp limit	0.05 mm (0.002 in)
7) Clutch spring	
Free length/Quantity	34.6 mm (1.362 in)/6 pcs.
8) Clutch housing radial play	0.027 ~ 0.081 mm (0.0011 ~ 0.0032 in)
9) Push rod bending limit	0.2 mm (0.008 in)
15. TRANSMISSION	
1) Type	Constant mesh, 5-speed forward
2) Gear ratio: 1st	32/13 (2.461)
2nd	27/17 (1.588)
3rd	26/20 (1.300)
4th	23/21 (1.095)
5th	22/23 (0.956)

3) Bearing type: Main axle (Left)	Needle bearing (φ20-φ30-20)
(Right)	Ball bearing (φ25-φ52-20.6)
Drive axle (Left)	Ball bearing (φ30-φ62-23.8)
(Right)	Needle bearing (φ20-φ30-16)
4) Oil seal type Drive axle (Left)	SDD-40-62-9
5) Secondary reduction ratio and method	34/17 (2.000)/Chain
16. SHIFTING MECHANISM	
1) Type	Cam drum, return type
2) Oil seal type (Change lever)	SDO-14-24-6
17. KICK STARTER	
1) Type	Bendix type
2) Oil seal type (Kick axle)	SD-25-35-7
3) Kick clip friction tension	1.2 ~ 1.7 kg (2.6 ~ 3.7 lb)
18. INTAKE	
1) Air cleaner: Type/Quantity	Dry, foam rubber/2 pcs.
2) Cleaner cleaning interval	Every 8,000 km (5,000 mile)
19. CARBURETOR	
1) Type and manufacturer/Quantity	BS38 MIKUNI/2 pcs.
2) I.D. mark	2F0-00
3) Main jet (MJ)	#135
4) Air jet (AJ)	#140
5) Jet needle (JN)	502-3
6) Needle jet (NJ)	Z-2
7) Throttle valve (Th.V)	#120
8) Pilot jet (PJ)	#27.5
9) Pilot screw (Turns out) (PS)	Preset
10) Starter jet (GS)	GS_1 : #80, GS_2 : 0.5
11) Fuel level (FL)	24 ± 1 mm (0.94 ±0.04 in)
12) Idling engine speed	1,200 r/min
20. LUBRICATION	
1) Engine sump oil quantity	Oil exchange: 2.0 lit (2.1 US qt) Overhaul: 2.5 lit (2.6 US qt)
2) Oil type and grade	Yamalube 4-cycle oil or SAE 20W/40 type "SE" motor oil
3) Oil pump type	Trochoid pump
4) Trochoid pump specifications	
Top clearance	0.10 ~ 0.18 mm (0.0039 ~ 0.0071 in)
Tip clearance	0.03 ~ 0.09 mm (0.0012 ~ 0.0035 in)
Side clearance	0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)
Oil pump volume	1.3 lit/min (1.37 qt/min) at 1,000 r/min
5) Bypass valve setting pressure	1.0 kg/cm^2 (14 psi)

b) Lubrication chart

