


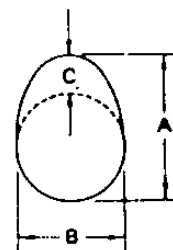


## B. Engine

<p>1. DESCRIPTION</p> <p>1) Engine type</p> <p>2) Engine model</p> <p>3) Displacement</p> <p>4) Bore x stroke</p> <p>5) Compression ratio</p> <p>6) Starting system</p> <p>7) Ignition system</p> <p>8) Lubrication system</p>	<p>Air cooled, 4-stroke, SOHC twin, parallel forward incline</p> <p>2F0</p> <p>653 cc (39.85 cu.in)</p> <p>75 x 74 mm (2.953 x 2.913 in)</p> <p>8.5 : 1</p> <p>Kick and electric starter</p> <p>Battery ignition</p> <p>Wet sump</p>																	
<p>2. CYLINDER HEAD</p> <p>1) Combustion chamber volume (with N-7Y)</p> <p>2) Combustion chamber type</p> <p>3) Head gasket thickness</p>	<p>43.6 cc (2.660 cu.in)</p> <p>Dome + Squish</p> <p>1.2 mm (0.047 in)</p>																	
<p>3. CYLINDER</p> <p>1) Material</p> <p>2) Bore size</p> <p>3) Taper limit</p> <p>4) Out of round limit</p>	<p>Aluminum alloy with cast iron sleeve</p> <p>75.00 <math>^{+0.02}_0</math> mm (2.9528 <math>^{+0.0008}_0</math> in)</p> <p>0.05 mm (0.002 in)</p> <p>0.01 mm (0.0004 in)</p>																	
<p>4. PISTON</p> <p>1) Piston skirt clearance</p> <p>2) Piston oversize</p> <p>3) Piston pin outside diameter x length</p>	<p>0.050 ~ 0.055 mm (0.0020 ~ 0.0022 in)</p> <table border="1" data-bbox="676 828 1217 904"> <tr> <td>75.25 mm (2.963 in)</td> <td>75.50 mm (2.972 in)</td> <td>75.75 mm (2.982 in)</td> <td>76.00 mm (2.992 in)</td> </tr> </table> <p>20.0 <math>^0_{-0.005}</math> mm x 61.0 <math>^0_{-0.3}</math> mm</p> <p>(0.79 <math>^0_{-0.0002}</math> in x 2.40 <math>^0_{-0.0116}</math> in)</p>	75.25 mm (2.963 in)	75.50 mm (2.972 in)	75.75 mm (2.982 in)	76.00 mm (2.992 in)													
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<p>5. PISTON RING</p> <p>1) Piston ring design</p> <p>2) Ring end gap (Installed, top) (Installed, 2nd) (Installed, oil)</p> <p>3) Ring groove side clearance (Top) (2nd)</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Top</p> </div> <div style="text-align: center;">  <p>2nd</p> </div> <div style="text-align: center;">  <p>Oil ring</p> </div> </div> <p>1.2 mm (0.047 in)    1.5 mm (0.059 in)    2.8 mm (0.110 in)</p> <p>0.2 ~ 0.4 mm (0.008 ~ 0.016 in)</p> <p>0.2 ~ 0.4 mm (0.008 ~ 0.016 in)</p> <p>0.3 ~ 0.9 mm (0.012 ~ 0.035 in)</p> <p>0.04 ~ 0.08 mm (0.0016 ~ 0.0031 in)</p> <p>0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)</p>																	
<p>6. BIG END BEARING</p> <p>1) Type</p> <p>2) Bearing size</p> <p>3) Needle size</p>	<p>Needle bearing</p> <p>φ 26 x φ 34 x 19.8</p> <p>φ 4 x φ 15.8 x 13</p>																	
<p>7. CAMSHAFT</p> <p>1) Cam drive type</p> <p>2) Number and type of bearing</p> <p>3) Bearing type</p> <p>4) Cam dimensions</p>	<p>Chain (Center side)</p> <p>4 bearings, Ball bearings (6005)</p> <p>φ 25-φ 47-8</p>																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;"></th> <th style="width: 20%;">Cam height "A"</th> <th style="width: 10%;">Limit</th> <th style="width: 20%;">Base circle "B"</th> <th style="width: 10%;">Limit</th> <th style="width: 10%;">Lift "C"</th> </tr> </thead> <tbody> <tr> <td>IN</td> <td>39.99 ± 0.05 mm (1.574 ± 0.002 in)</td> <td>39.84 mm (1.569 in)</td> <td>32.24 ± 0.05 mm (1.269 ± 0.002 in)</td> <td>32.09 mm (1.263 in)</td> <td>7.991 mm (0.315 in)</td> </tr> <tr> <td>EX</td> <td>40.03 ± 0.05 mm (1.576 ± 0.002 in)</td> <td>39.88 mm (1.570 in)</td> <td>32.30 ± 0.05 mm (1.272 ± 0.002 in)</td> <td>32.15 mm (1.266 in)</td> <td>8.030 mm (0.316 in)</td> </tr> </tbody> </table>		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)
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### 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

TSUBAKIMOTO 8F05M

Type

106L

Number of links

36/18 (2.000)

Sprocket ratio

### 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: 0.05 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)

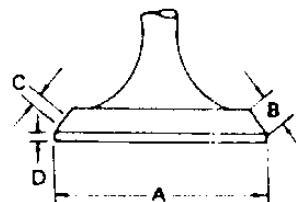
EX: 8.0  $^{+0.019}_{+0.010}$  mm (0.315  $^{+0.0007}_{+0.0004}$  in)

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)

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):  $10 \pm 0.7$  kg (22.0  $\pm$  1.5 lb)

OUTER (IN/EX):  $17.7 \pm 1.25$  kg (39.0  $\pm$  2.8 lb)

5) Compressed length (Valve open)

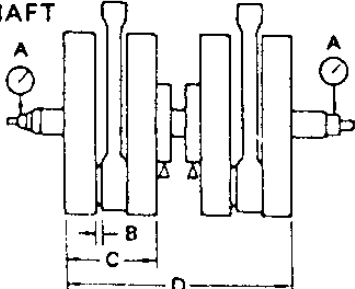
INNER (IN/EX): 25.5 mm (1.004 in)

OUTER (IN/EX): 27.5 mm (1.083 in)

6) Compressed pressure (Valve open)

INNER (IN/EX):  $27.2 \pm 1.9$  kg (60.0  $\pm$  4.2 lb)

OUTER (IN/EX):  $57.4 \pm 4.0$  kg (126.5  $\pm$  8.8 lb)

<p>7) Wire diameter</p> <p>8) Winding O.D.</p> <p>9) Number of windings</p>	<p>INNER (IN/EX): 2.9 mm (0.114 in)</p> <p>OUTER (IN/EX): 4.2 mm (0.165 in)</p> <p>INNER (IN/EX): 19.4 mm (0.764 in)</p> <p>OUTER (IN/EX): 32.6 mm (1.283 in)</p> <p>INNER (IN/EX): 6.0 turns</p> <p>OUTER (IN/EX): 4.25 turns</p>
<p>11. CRANKSHAFT</p>  <p>1) Crankshaft deflection limit (A)</p> <p>2) Con-rod large end clearance (B)</p> <p>3) Width of crankshaft (C)</p> <p>4) Crank pin I.D.</p> <p>5) Crank pin O.D. x length</p>	<p>0.05 mm (0.002 in)</p> <p>0.15 ~ 0.4 mm (0.0059 ~ 0.0157 in)</p> <p>66 <math>\begin{smallmatrix} -0.05 \\ -0.10 \end{smallmatrix}</math> mm (2.598 <math>\begin{smallmatrix} -0.002 \\ -0.004 \end{smallmatrix}</math> in)</p> <p>186 <math>\begin{smallmatrix} 0 \\ -0.3 \end{smallmatrix}</math> mm (7.323 <math>\begin{smallmatrix} 0 \\ -0.012 \end{smallmatrix}</math> in)</p> <p>26 <math>\begin{smallmatrix} -0.077 \\ -0.095 \end{smallmatrix}</math> mm (1.024 <math>\begin{smallmatrix} -0.003 \\ -0.004 \end{smallmatrix}</math> in)</p> <p>26 <math>\begin{smallmatrix} 0 \\ -0.006 \end{smallmatrix}</math> x 65 <math>\begin{smallmatrix} +0.1 \\ -0.2 \end{smallmatrix}</math> mm</p> <p>(1.024 <math>\begin{smallmatrix} 0 \\ -0.0002 \end{smallmatrix}</math> x 2.559 <math>\begin{smallmatrix} +0.004 \\ -0.008 \end{smallmatrix}</math> in)</p>
<p>12. CONNECTING ROD</p> <p>1) Big end I.D.</p> <p>2) Small end I.D.</p>	<p>34 <math>\begin{smallmatrix} +0.016 \\ 0 \end{smallmatrix}</math> mm (1.339 <math>\begin{smallmatrix} +0.0006 \\ 0 \end{smallmatrix}</math> in)</p> <p>20 <math>\begin{smallmatrix} +0.028 \\ +0.015 \end{smallmatrix}</math> mm (0.787 <math>\begin{smallmatrix} +0.0011 \\ +0.0006 \end{smallmatrix}</math> in)</p>
<p>13. CRANK BEARING</p> <p>1) Type Right end Others</p> <p>2) Oil seal type</p>	<p>φ 70-φ 78-19 (Ball bearing)</p> <p>φ 32-φ 68-17 (Roller bearing)</p> <p>SD-25-40-9</p>
<p>14. CLUTCH</p> <p>1) Clutch type</p> <p>2) Clutch operating mechanism</p> <p>3) Primary reduction ratio and method</p> <p>4) Primary reduction gear back lash (4 teeth)</p> <p>5) Friction plate Thickness/Quantity Wear limit</p> <p>6) Clutch plate Thickness/Quantity Warp limit</p> <p>7) Clutch spring Free length/Quantity</p> <p>8) Clutch housing radial play</p> <p>9) Push rod bending limit</p>	<p>Wet, multiple type</p> <p>Inner push type, screw push system</p> <p>72/27 (2.666), spur gear</p> <p>21.45 <math>\begin{smallmatrix} 0 \\ -0.025 \end{smallmatrix}</math> mm (0.8445 <math>\begin{smallmatrix} 0 \\ -0.00010 \end{smallmatrix}</math> in)</p> <p>3 mm (0.118 in)/7 pcs.</p> <p>2.7 mm (0.106 in)</p> <p>1.4 mm (0.055 in)/6 pcs.</p> <p>0.05 mm (0.002 in)</p> <p>34.6 mm (1.362 in)/6 pcs.</p> <p>0.027 ~ 0.081 mm (0.0011 ~ 0.0032 in)</p> <p>0.2 mm (0.008 in)</p>
<p>15. TRANSMISSION</p> <p>1) Type</p> <p>2) Gear ratio: 1st 2nd 3rd 4th 5th</p>	<p>Constant mesh, 5-speed forward</p> <p>32/13 (2.461)</p> <p>27/17 (1.588)</p> <p>26/20 (1.300)</p> <p>23/21 (1.095)</p> <p>22/23 (0.956)</p>

<p>3) Bearing type: Main axle (Left) (Right) Drive axle (Left) (Right)</p> <p>4) Oil seal type Drive axle (Left)</p> <p>5) Secondary reduction ratio and method</p>	<p>Needle bearing (<math>\phi 20-\phi 30-20</math>) Ball bearing (<math>\phi 25-\phi 52-20.6</math>) Ball bearing (<math>\phi 30-\phi 62-23.8</math>) Needle bearing (<math>\phi 20-\phi 30-16</math>) SDD-40-62-9 34/17 (2.000)/Chain</p>
<p>16. SHIFTING MECHANISM</p> <p>1) Type</p> <p>2) Oil seal type (Change lever)</p>	<p>Cam drum, return type SDO-14-24-6</p>
<p>17. KICK STARTER</p> <p>1) Type</p> <p>2) Oil seal type (Kick axle)</p> <p>3) Kick clip friction tension</p>	<p>Bendix type SD-25-35-7 1.2 ~ 1.7 kg (2.6 ~ 3.7 lb)</p>
<p>18. INTAKE</p> <p>1) Air cleaner: Type/Quantity</p> <p>2) Cleaner cleaning interval</p>	<p>Dry, foam rubber/2 pcs. Every 8,000 km (5,000 mile)</p>
<p>19. CARBURETOR</p> <p>1) Type and manufacturer/Quantity</p> <p>2) I.D. mark</p> <p>3) Main jet (MJ)</p> <p>4) Air jet (AJ)</p> <p>5) Jet needle (JN)</p> <p>6) Needle jet (NJ)</p> <p>7) Throttle valve (Th.V)</p> <p>8) Pilot jet (PJ)</p> <p>9) Pilot screw (Turns out) (PS)</p> <p>10) Starter jet (GS)</p> <p>11) Fuel level (FL)</p> <p>12) Idling engine speed</p>	<p>BS38 MIKUNI/2 pcs. 2F0-00 # 135 # 140 502-3 Z-2 # 120 # 27.5 Preset GS<sub>1</sub>: #80, GS<sub>2</sub>: 0.5 24 ± 1 mm (0.94 ± 0.04 in) 1,200 r/min</p>
<p>20. LUBRICATION</p> <p>1) Engine sump oil quantity</p> <p>2) Oil type and grade</p> <p>3) Oil pump type</p> <p>4) Trochoid pump specifications</p> <p>Top clearance</p> <p>Tip clearance</p> <p>Side clearance</p> <p>Oil pump volume</p> <p>5) Bypass valve setting pressure</p>	<p>Oil exchange: 2.0 lit (2.1 US qt) Overhaul: 2.5 lit (2.6 US qt) Yamalube 4-cycle oil or SAE 20W/40 type "SE" motor oil Trochoid pump 0.10 ~ 0.18 mm (0.0039 ~ 0.0071 in) 0.03 ~ 0.09 mm (0.0012 ~ 0.0035 in) 0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in) 1.3 lit/min (1.37 qt/min) at 1,000 r/min 1.0 kg/cm<sup>2</sup> (14 psi)</p>

b) Lubrication chart

