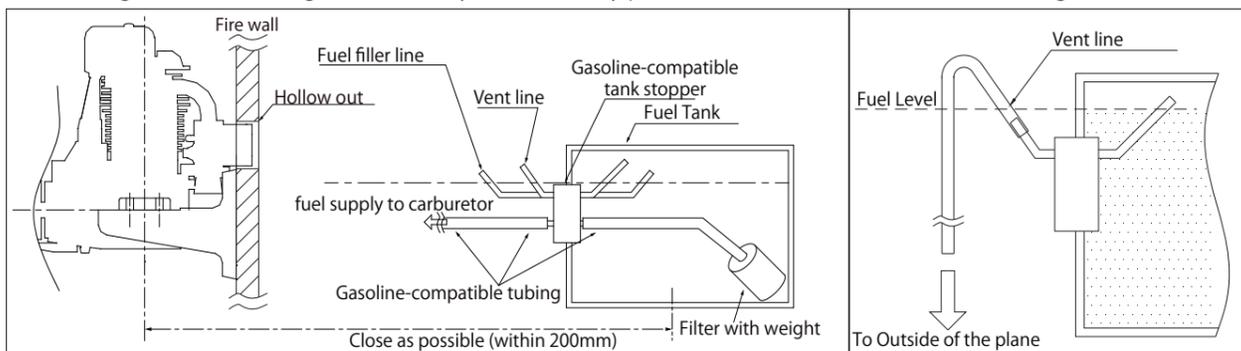


Specifications

Bore	Φ32.0mm	Stroke	26.0mm	Disp.	20.91cc	Weight (Approx.)	Body: 690g / Muffler: 83g / Ignition system: 100g / Engine mount: 155g
Applications	4-stroke glow 100-110 class		RPM Range	Approx. 2,000-9,500rpm	Max on ground	Approx. 9,000rpm	
Propeller	15"x8"~16"x6"	Plug	SP-1 or SP-2	Battery for ignition system	6-9V, greater than 1,000mA (2S Lipo 25C or less, 2S Life, 5S NiMH)		
Standard accessories	• Engine mount set • Hexagonal wrench • Ignition system(w/sensor)	1set 1set 1set	• Limit gauge (0.1t) for tappet adjustment • Spanner for tappet adjusting lock nut • Spark plug[SP-2](Attached to the engine)	1pc 1pc 1pc	• Plug wrench • Muffler set • Anti-loosening nut	1pc 1set 1pc	
Optional parts	• Filter with weight [G36-154] • Tappet adjusting kit [30-161]		• Durable tube for Gasoline (1m) [G36-155] • Digital tachometer [G17-167]	• Aluminum spinner nut [120S-30]			

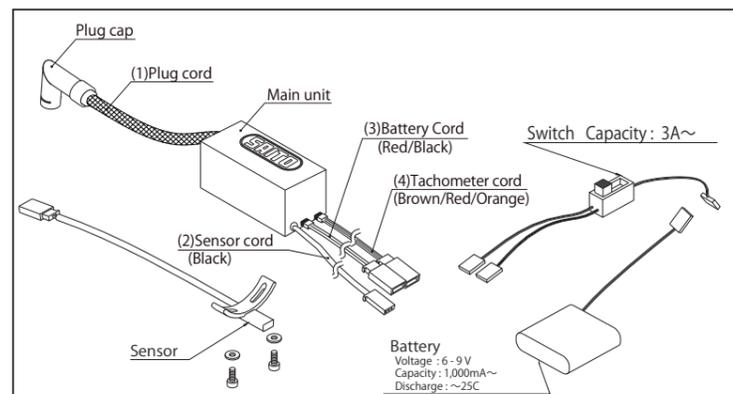
1. Fuel

- The fuel is mixture of regular gasoline or high-octane gasoline and high-quality 2-stroke engine oil.
- [Example of oil recommendation]
 - Castrol POWER1 RACING 2T • Deluxe Materials PowerModel 2T-S • Klotz KL-200 Original Techniplate etc.
- If such oils are not available in your country, then please ask the official SAITO distributor in your country for an alternative.
- **NEVER use "cheap oil" designed for utility engines for brush cutter, lawn mower, or chain saw etc.**
- Be sure to use the mixture "gasoline : oil = 15~20 : 1" by volume ratio. (Ex. 1000ml of gasoline should be mixed with more than 50ml of oil).
- During the break-in process, use 15:1 mixed fuel to ensure the best lubrication for initial running.
- Any damage caused by the fuel used, in which the oil ratio is lower than 20:1 will not be covered by warranty.
- Do not use gasoline containing ethanol. It may cause not only power loss but also corrosion inside the engine.



2. Ignition

- Ignition arrangement- Place the main unit as far from other electrical devices as possible.
- (1) Plug cord (meshed high tension cord)
Insert the plug cap of the plug cord deeply into the plug attached to the cylinder to make sure it will not come off.
- (2) Sensor cord
Connect with the cord from the sensor attached to the engine.
- (3) Battery cord (black / red cord)
Use a fully charged battery that has adequate spec. (6-9V, greater than 1000mA, 25C or less). Between the battery and main unit, make sure to set a heavy duty switch whose capacity is higher than 3A.
- (4) Tachometer cord
Connect the digital tachometer (Option). Otherwise the connector is normally vacant.

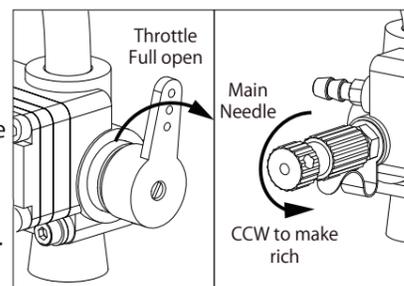


3. Propeller

- Recommended propeller is APC15x8~16x6 which brings approx. 9,000rpm. Larger size or greater pitch can cause engine broken due to overload.
- Use a well-balanced one. Never use the propeller that has been scratched or damaged even if slightly.
- As the propeller is compressed slightly, tighten the propeller nut every hour of operation.

4. Break-in MOST IMPORTANT!!

- Prop-recommendation : APC16x6.
- Use 15:1 fuel:oil ratio for break-in.
- **Never make the fuel mixture lean** during break-in. It could cause seizure even during idling or low-speed running.
- Check that the slow needle is set to the reference position. (Depth approx. 1.5mm from the surface of the throttle lever.)
- Before starting the engine, open the main needle Approx. 2 turns from fully closed.
- Start the engine (using a starter is recommended for safety).
- Soon after starting, Open throttle gradually up to full. In the meantime turn the main needle CCW. Continue to turn the main needle CCW until the RPM declines (to approx 4,500-5,000rpm) **keeping the throttle opened fully.**
- Run in this very rich condition for 1 liter of fuel.
- Now "initial" break-in is done.



5. Adjustment of carburetor after initial break-in.

◇ Needle reference position (Set after initial break-in)

- Start the engine after adjusting the needle to the following reference value.

● Main needle: Approx. 2 turns CCW from fully closed

● Slow needle: Approx. 3 turns CW from the surface of the throttle lever (1mm).

- Actually, the best position of the needles vary depending on the prop, temperature, humidity and so on. Please adjust as necessary after observing the engine performance during flight.

◇ Peak adjustment

- After starting the engine, warm up for approx. 30 seconds at low speed.
- Achieve the peak at full throttle.

→ Turn the main needle CW gradually to the position where the RPM is greatest (the peak). Continuing to turn the needle CW past the peak could lead to seizure so turn it slowly and carefully. If the RPM suddenly decreases after passing the peak, **instantly turn the main needle CCW** to again increase the RPM. Otherwise it could damage the engine seriously.

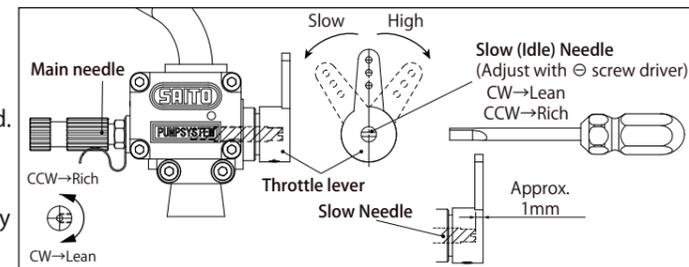
- Once achieving peak RPM, return the throttle to low speed. Make a note of the position of main needle at the peak at that time. (How many turns you did CW based on the reference value.)

◇ Slow needle Adjustment

- After achieving peak RPM, next is slow needle adjustment. Open the throttle from low RPM to full throttle quickly.
- Turn the slow needle CCW slightly if the engine hesitates for a moment or stalls before the engine reaches max RPM because the mixture is too lean.
- Turn the slow needle CW slightly if the engine is slow to reach peak RPM (full throttle set) because the mixture is too rich.
- Adjust the slow needle as above until the RPM follows the throttle movement smoothly. The important point is to adjust the slow needle **AFTER** the main needle has been adjusted to its peak.
- Now break-in at ground level is done. Adjust tappets by the method described later.

◇ Pre-flight / Flight adjustment

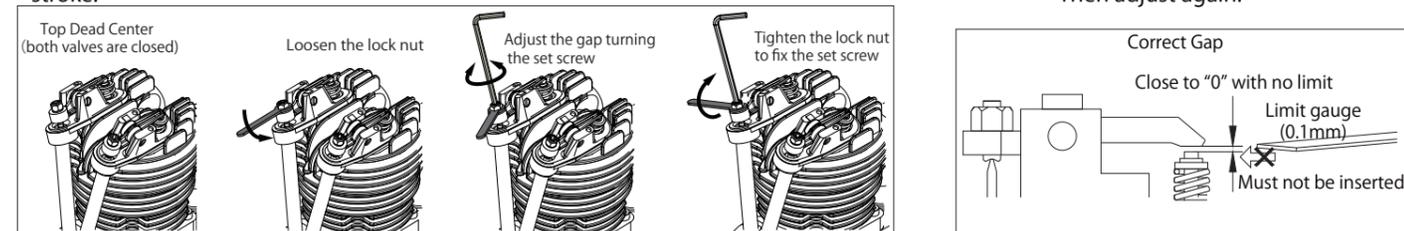
- When the slow needle adjustment is done, check the response by revving up from low speed to full throttle quickly several times.
- **Turn the main needle CCW approx. 4~6 clicks from the peak position.** This is to make the fuel mixture richer in the air where the RPM get higher than on the ground.
- After all adjustments are made, fly your aircraft and fine tune the engine according to the situation. Basically tuning should be done with the main needle. Readjustment of the slow needle is rarely needed if the first adjustment of the slow needle has been done successfully.



6. Tappet adjustment

The valve clearance should be checked and adjusted after Break-in and every after 2 hours while the engine is cold. Before adjusting tappet gaps, tighten the screws around cylinder etc.

1. Remove the spark plug and rocker arm covers from the cylinder. Then turn the prop CCW by hand to place the piston at TDC of compression
2. Loosen the lock nut and adjust the gap by hexagonal wrench until you get the correct gap (below pic) for both of intake & exhaust.
3. Once the gap is set, tighten the lock nut and attach the plug and covers.
4. Turn the prop by hand to check if the compression is enough. If the gap is less than 0, the valve is always opened slightly and lose compression. Then adjust again.



Note:

- As it uses oil-mixed fuel, the plane may sometimes get dirty from the exhaust.
- Use a reliable and well-balanced prop. Otherwise it may cause an abnormal vibration and could result in a serious accident.
- During operation, all engine screws can loosen due to metal heat expansion. Check and tighten occasionally.
- When the exhaust valve gets dull by carbon or sludge especially in cold atmosphere, remove the rocker cover and apply some anti-rust spray to the exhaust valve to help the valve to move smoothly.
- Pay attention to the surroundings so as not to disturb others by noise and exhaust.
- Always keep spectators stand behind the engine when operating the engine.
- As exhaust smoke is harmful, be careful not to breathe in or otherwise expose yourself to its harmful effects.
- Pay attention not to touch the rotating propeller when starting engine, and move to rear side of the aircraft once the engine is started.
- Do not use our products for passenger vehicle.
- All responsibilities for the use of the engine, and other obligations and responsibilities based on laws, regulations, etc. are borne by the purchaser and the user, and SAITO SEISAKUSHO CO., LTD. is exempt from any responsibilities.

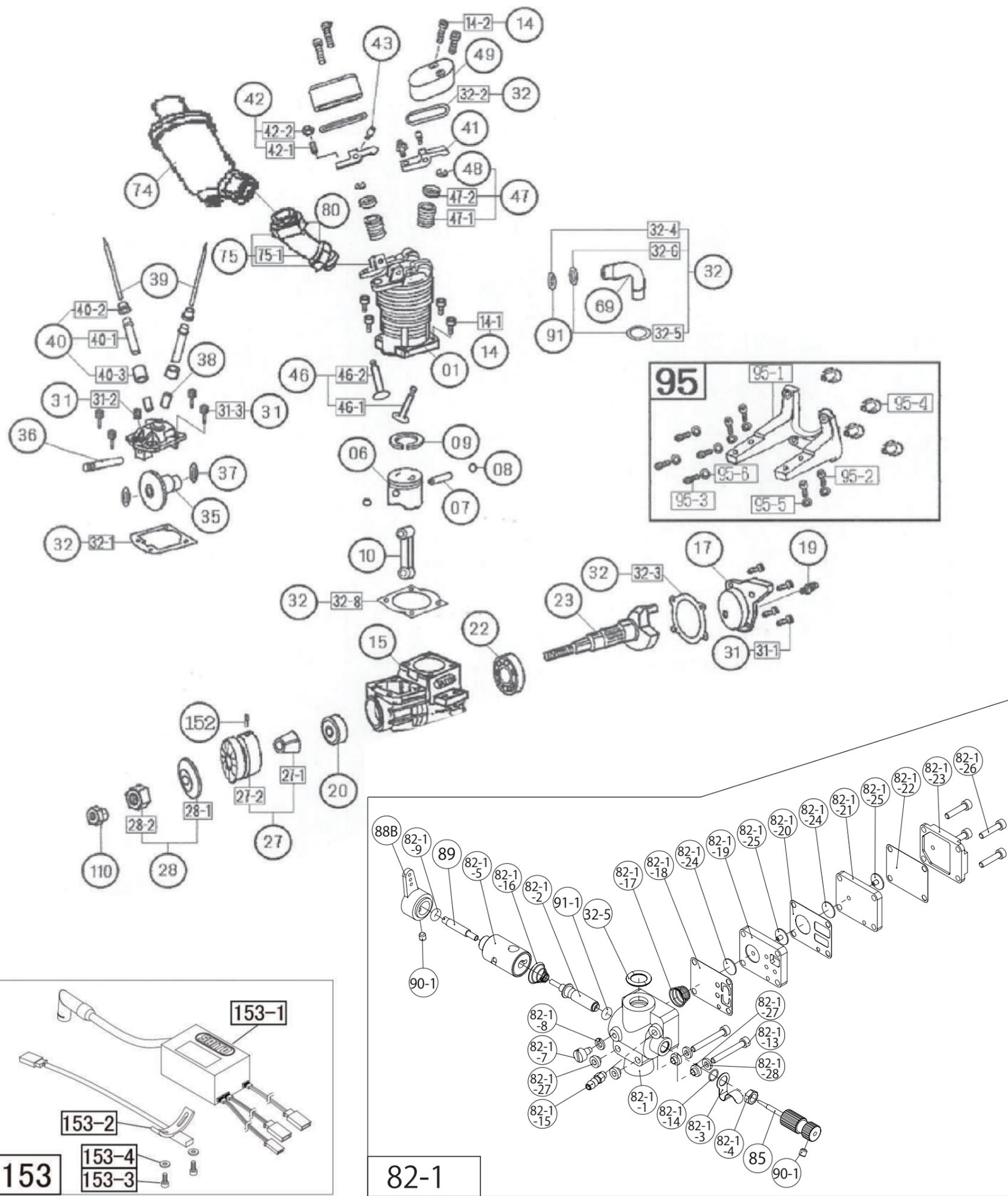
Warranty:

- If there is any deficiency from the factory concerning manufacture, please consult with the shop or distributor you bought from. Our company will be responsible for repair. However, any failure or trouble caused by unnecessary disassembly, modification, or other uses than those provided in the instruction manual is not subject to warranty.
- Ignition system is subject to the warranty only for initial failure. Once the system has been activated successfully, it will no longer be subject to warranty.

All specifications and models are subject to change without notice.

SAITO FG-21 Parts List

No.	Description	Q'ty	No.	Description	Q'ty
01	Cylinder	1	46	Valve set (In & Ex)	1set
06	Piston	1	46-1,-2		
07	Piston pin	1	47	Valve spring & Keeper & Retainer	2ea.
08	Piston pin retainer	2	47-1,-2,48		
09	Piston ring	1	48	Valve retainer	2
10	Connecting rod	1	49	Rocker arm cover	2
14	Cylinder screw set	1set	69	Intake pipe	1
	14-1,-2		74	Muffler	1
15	Crankcase	1	75	Muffler manifold set	1set
17	Rear cover (Back plate)	1	75-1,80		
19	Breather nipple	1	80	Muffler nut	2
20	Front ball bearing	1	82-1	Carburetor compete	1set
22	Rear ball bearing	1	82-1-1,-1-2,-1-3,-1-4,-1-5,-1-7,-1-8,-1-9,		
23	Crankshaft	1	-1-13,-1-14,-1-15,-1-16,-1-17,-1-18,-1-19,		
27	Tpaer collet& Drive flange	1ea.	-1-20,-1-21,-1-22,-1-23,-1-24,-1-25,-1-26,		
	27-1,-2		-1-27,-1-28,32-5,85,88B,89,90-1,91-1		
28	Prop washer & Nut	1ea.	85	Full throttle needle	1
	28-1,-2		87	Throttle barrel assembly	1set
31	Crankcase screw set	1set	82-1-5,-1-9,88B,89		
	31-1,-2,-3		88B	Throttle lever	1
32	Engine gasket set	1set	88B,90-1		
	32-1,-2,-3,-4,-5,-6,-8		89	Idle needle	1
33	Cam gear housing	1	90	Carburetor screw & spring set	1set
35	Cam gear	1	82-1-7,-1-8,-1-13,-1-16,-1-26,-1-28,90-1		
36A	Cam gear shaft	1	91	Carburetor gasket set	1set
37	Steel washer set	1set	32-4,-5,-6,82-1-9,-1-14,-1-18,-1-20,-1-22,-91-1		
38	Tappet	2	95	Engine mount set	1set
39	Pushrod	2	95-1,-2,-3,-4,-5,-6		
40	Pushrod cover & Rubber seal	2ea.	110	Anti loosening nut	1
	40-1,-2,-3		152	Screw-pin (to fix drive flange)	1
41	Rocker arm	2	153	Electronic ignition system	1set
42	Rocker arm screw & Nut	2ea.	153-1,-2,-3,-4,-5		
43	Rocker arm pin	2	160	Pump assembly	1set
			82-1-17,-1-18,-1-19,-1-20,-1-21,-1-22,-1-23		
			-1-24,-1-25,-1-26		



FG-21
Dimensional drawing

