

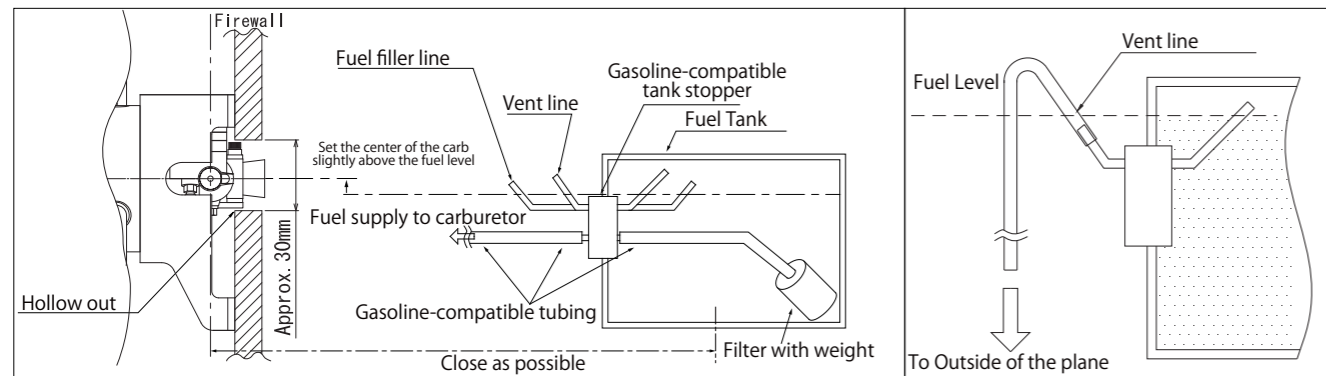
Specifications

Bore	Ø27.0mm	Stroke	19.2mm	Disp.	32.98cc	Applications	2st Gas-engine 20~30cc class
Weight (Approx.)	Body: 1,440g / Mufflers: 90g / Ignition system: 200g		RPM Range	Approx. 1,700-9,500rpm		Max on ground	Approx. 8,500-9,500rpm
Propeller	D16" x P8" ~D17" x P6"	Plug	1/4-32 spark plug SP-1 or SP-2	Battery for ignition system	Voltage: 6-12V, greater than 1,500mA ※		
Standard accessories	<ul style="list-style-type: none"> Limit gauge (0.1t) for tappet adjustment Wrench for tappet adjusting lock nut Spark plug [SP-2](Attached to the engine) Ignition system (w/ sensor) 		<ul style="list-style-type: none"> 1pc 1pc 3pcs 1set 	<ul style="list-style-type: none"> Plug wrench Hexagonal wrench 1.5mm Muffler set 		<ul style="list-style-type: none"> 1pc 1pc 1set 	
Optional parts	<ul style="list-style-type: none"> Filter with weight [G36-154] Rubber tube for gasoline(1m) [G36-155] Aluminum spinner nut [120S-30] Tappet adjusting kit [30-161] Digital tachometer [G17-167] 						

※If you use a Li-Po, we recommend the spec less than 2,500mA capacity and less than 30C discharge rate

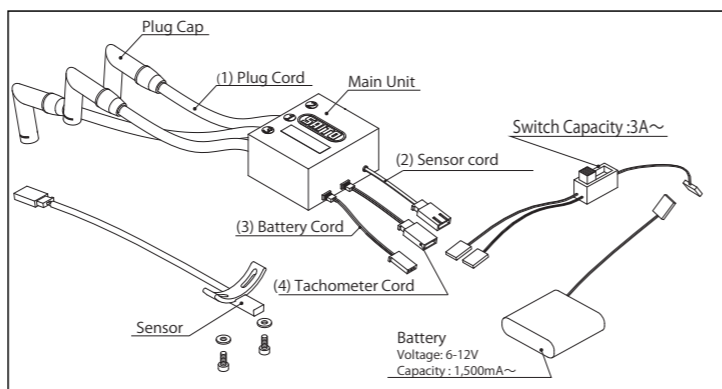
1. Fuel

- The fuel is a mixture of regular gasoline or high-octane gasoline and high-quality 2-stroke engine oil.
 - [Example of oil recommendation]
 - Klotz KL-200 Original Techniplate
 - Deluxe Materials PowerModel 2T-S
 - ENEOS RACING SPEC PRO-2T (SAITO STANDARD) 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

- Place the main unit as far from other electrical devices as possible.
 - Place the two switches of the ignition and the RC receiver as far from each other as possible.
- Plug cord(meshed high tension cord)
 - Insert the plug cap of (1) Plug cord deeply onto the plug of #1 cylinder to make sure it will not come off. The other caps and plugs should be installed by the same way. (Refer to cylinder # on the reverse side)
 - Sensor cord
 - Connect with the cord from the sensor attached to the engine.
 - Battery cord (black / red cord)
 - Use a fully charged battery that has adequate spec. (6-12V, more than 1,500mA is recommended). Between the battery and main unit, make sure to install a heavy duty switch whose capacity is higher than 3A.
 - Tachometer cord (optional)
 - Connect the digital tachometer (Option). Otherwise the connector is normally vacant.

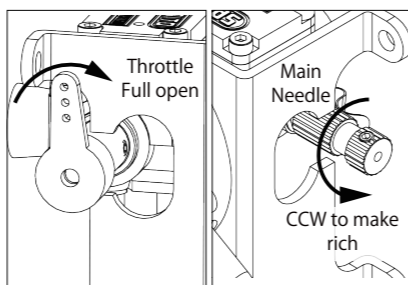


3. Propeller

- Recommended propeller is APC17x6.
- Use a reliable prop which brings maximum 8,500~9,500rpm in conformity to your plane.
- Use a well-balanced prop. Never use a prop that has been scratched or damaged even if slightly.
- Never use excessively light or heavy loaded prop. They may cause engine failure, big accident, or even injury.
- As the propeller is compressed slightly, tighten the propeller nut every hour of operation.

4. Break-in MOST IMPORTANT!!

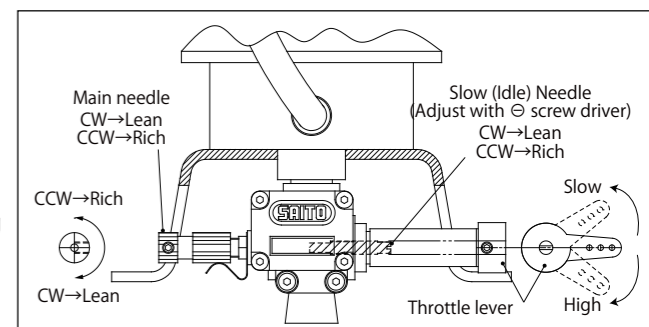
- Before starting the engine, inject a suitable amount (approx. 20~30cc) of engine oil into the lubrication nipple on the crankcase using a syringe or pump while turning the propeller by hand. After that, plug this nipple. As excess is discharged from the breather nipple, attach a tube to the breather nipple.
- Prop-recommendation : APC-17x6.
- 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.
- Before starting the engine, open the main needle Approx. 1+1/2 turns from fully closed.
- Start the engine (using a starter is recommended for safety).



- Run for 15~20 seconds at low speed to warm up.
- Open throttle gradually up to full. In the meantime turn the main needle CCW. Continue to turn the main needle CCW until just before engine stops **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.

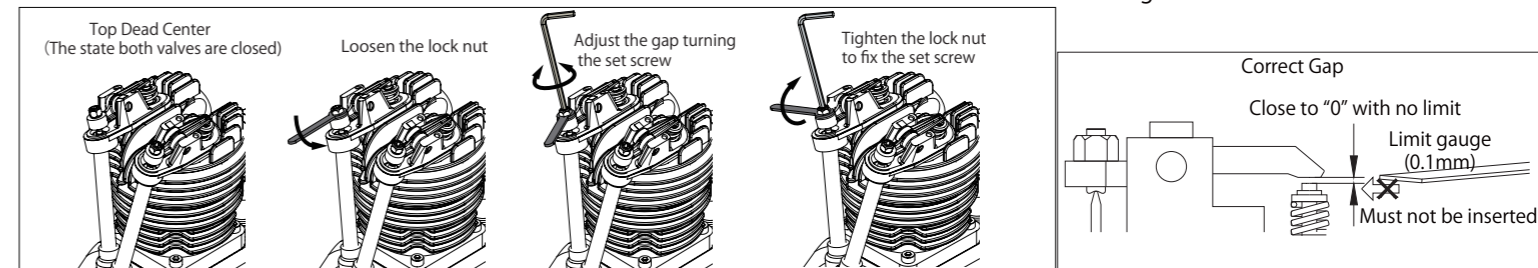
- Needle reference position (Set after initial break-in)**
 - Start the engine after adjusting the needle to the following reference value.
 - Main needle : Approx. 1+1/4~1+1/2 turns CCW from fully closed
 - Slow needle : Approx. 8 turns CCW from fully closed (Then throttle valve should be fully closed)
 - 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.
 - If the engine hesitates for a moment or stalls before the engine reaches max RPM, it's because the mixture is too lean. Then turn the slow needle CCW slightly.
 - If the engine is slow to reach peak RPM (full throttle set), it's because the mixture is too rich. Then turn the slow needle CW slightly.
 - 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.
 - Open the throttle fully and turn the main needle CCW approx. 60~90 degrees 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 time after two hours while the engine is cold. Before adjusting tappet gaps, tighten the screws around cylinders etc.

- Remove the spark plug and rocker arm covers of #1 cylinder. Then turn the prop CCW by hand to place the piston at TDC of compression stroke.
- Loosen the lock nut and adjust the gap by hexagonal wrench until you get the correct gap (below pic) for both of intake & exhaust.
- Once the gap is set, tighten the lock nut and attach the plug and covers. Do the same adjustment for the #3-#2 cylinders in order.
- 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 will lose compression. Then adjust again.



Note:

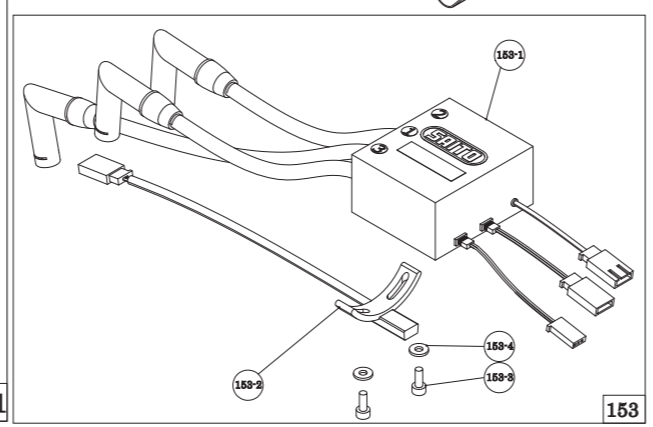
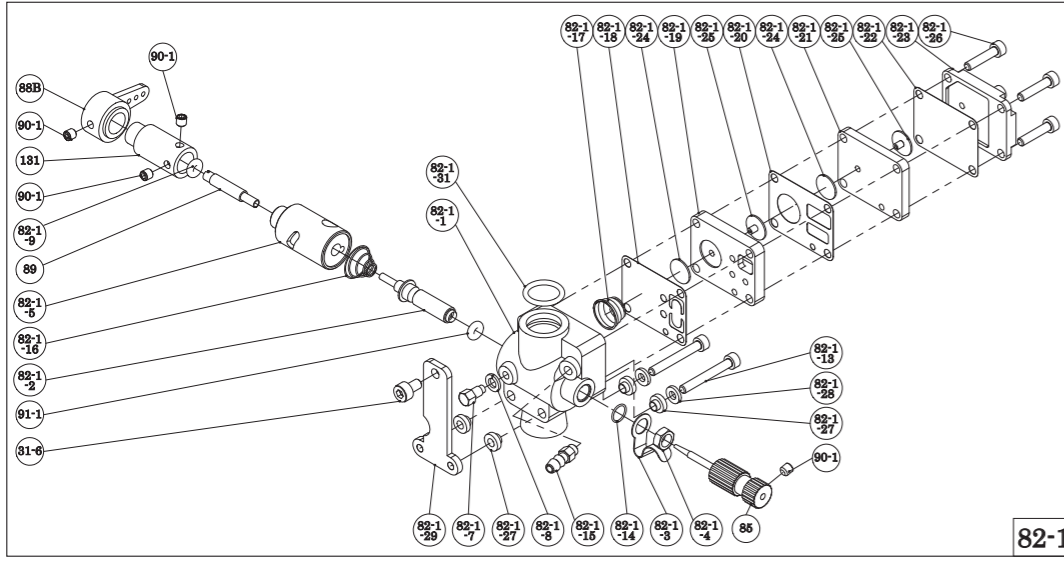
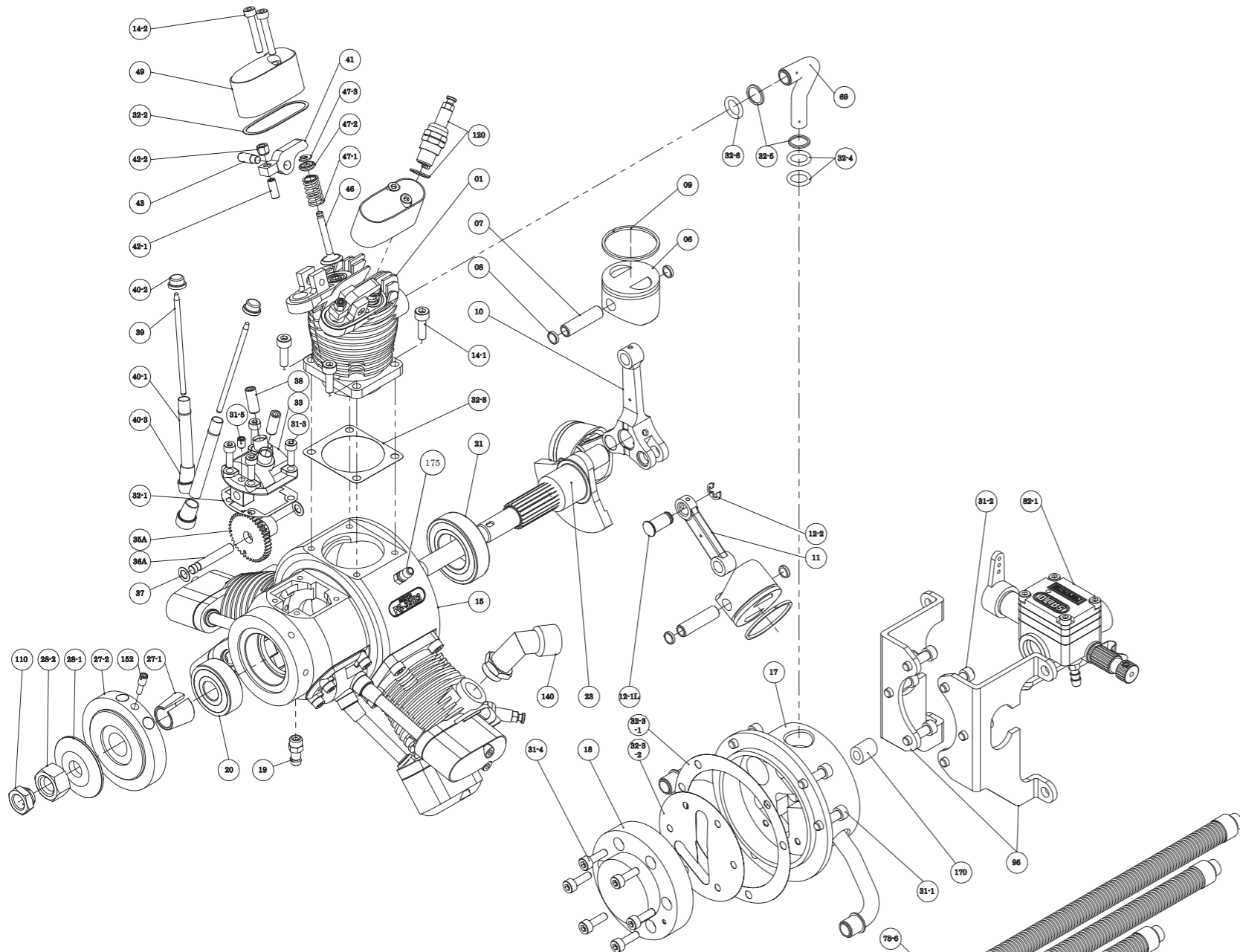
- As it uses oil-mixed fuel, the plane may sometimes get dirty from the exhaust.
- Use a reliable and well-balanced prop. Otherwise it may cause an abnormal vibration and could result in a serious accident.
- During operation, all engine screws can loosen due to metal heat expansion. Check and tighten 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 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.
- 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.

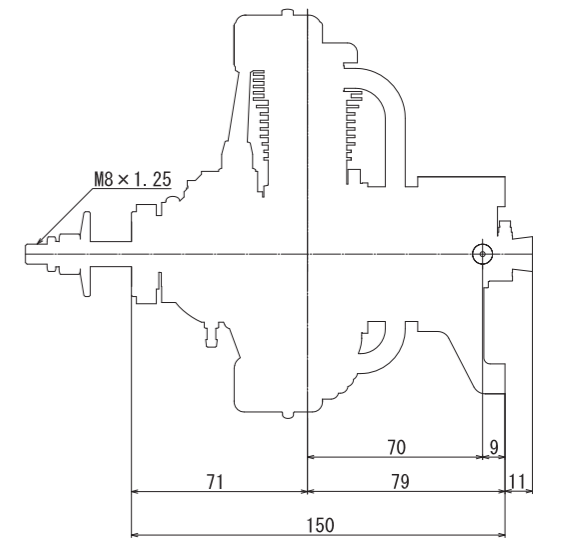
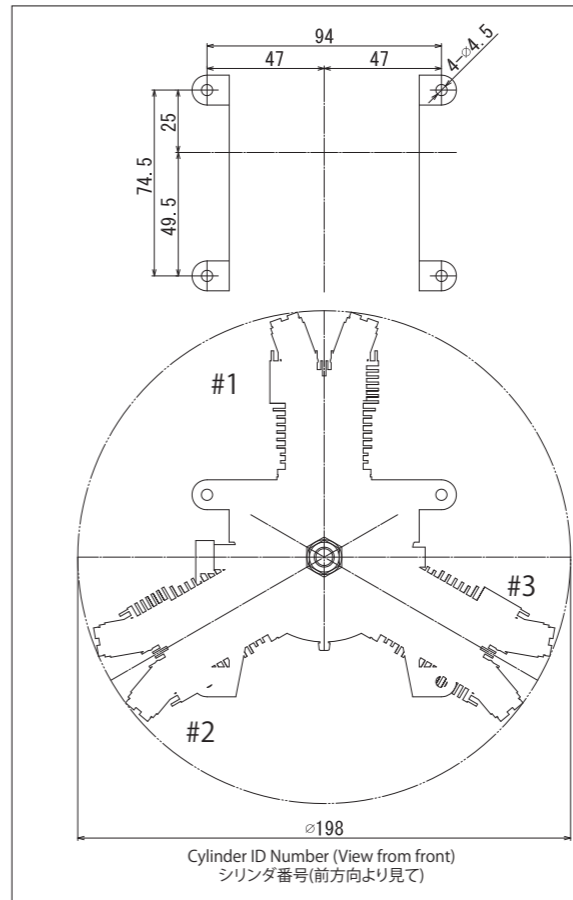
All specifications and models are subject to change without notice.

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No.	Item	Qty
01	Cylinder	3
06	Piston	3
07	Piston pin	3
08	Piston pin retainer	6
09	Piston ring	6
10	Master rod	1
11	Linked conrod	2
12	Conrod linkpin & E-ring 12-1L, 2	1set
14	Cylinder screw set 14-1, 2	3set
15	Crankcase	1
17	Rear cover A (Intake manifold)	1
18	Rear cover B	1
19	Breather nipple	1
20	Front ball bearing	1
21	Main ball bearing	1
23	Crankshaft	1
27	Taper collet & Drive flange 27-1, 2	1ea.
28	Prop washer & Nut 28-1, 2	1ea.
31	Crankcase screw set 31-1, 2, 3, 4, 5, 6	1set
32	Engine gasket set 32-1, 2, 3-1, 3-2, 4, 5, 6, 8	1set
33	Cam gear housing	3
35	Cam gear	3
36	Cam gear shaft	3
37	Steel washer set	3set
38	Tappet	6
39	Pushrod	6
40	Pushrod cover & Rubber seal 40-1, 2, 3	6ea.

No.	Item	Qty
41	Rocker arm	6
42	Rocker arm screw & Nut 42-1, 2	6ea.
43	Rocker arm pin	6
46	Valve	6
47	Valve spring & Keeper & Retainer 47-1, 2, 3	6ea.
49	Rocker arm cover	6
69	Intake pipe	3
78	Muffler complete 78-1, 2, 3, 5, 6	1set
82-1	Carburetor complete 82-1-1, -1-2, -1-3, -1-4, -1-5, -1-7, -1-8, -1-9, -1-13, -1-14, -1-15, -1-16, -1-17, -1-18, -1-19, -1-20, -1-21, -1-22, -1-23, -1-24, -1-25, -1-26, -1-27, -1-28, -1-29, -1-31, 31-6, 85, 88B, 89, 90-1, 91-1, 131	1set
85	Main needle 85, 90-1	1
88B	Throttle lever 88B, 90-1	1
89	Slow needle	1
95	Engine mount set	1
110	Anti loosening nut	1
120	Spark plug	3
131	Throttle valve extension adapter / set screw	1
140	Muffler right angle adopter / nut	3
152	Screw-pin	1
153	Electronic ignition system 153-1, 2, 3, 4	1set
160	Pump assembly 82-1-17, -1-18, -1-19, -1-20, -1-21, -1-22, -1-23, -1-24, -1-25, -1-26	1set
170	Insulator joint for carburetor	1
175	Initial lube nipple	1



82-1

153