

FA-120 has a choke valve which is very useful device for scale airplanes, etc.

Instructions for SAITO FA-120 AAC 4 Stroke Cycle Engine

Let us express our sincere thanks for your favouring Saito Seisakusho, Ltd., particularly for your purchase of the "Saito FA-120 Engine". This is your engine you bought. please read our instructions carefully and treat your engine with loving care. If you have a manufacturing defect, we are in a position to repair it without any cost.

USE RC Large Stunt Airplane (60-class) } Fix your standard
 RC Large Scale Airplane (60-class) } Wing area 60-100 (dm²)
 RC Helicopter } Maximum weight 8 kg.

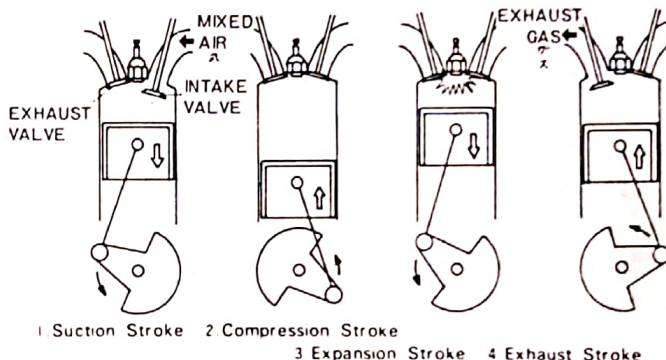


This engine is designed and manufactured based on high efficiency and durability of the first AAC method in the world.

FA-120 Features (Saito's unique designs)

- Cylinder..... Direct hard chrome plated for better cool running and light weight.
 A cylinder and a head are united into one.
 Minimized distortion of the cylinder.
 Large heat-sink fins.
- Piston..... High Silicon Aluminum Piston
- Crank Shaft 2 Ball Bearings
- Cylinder Head has a hemispheric shape combustion chamber for better combustion efficiency.
- Cam Gear is positioned forward and light weight.
- Breather nipple (Pat. Pend.) drains waste oil efficiently (In case of long nipple tube, waste oil goes back and forth in the tube, and is scarcely drained. This unique design solved the problem as above)
- Piston ring..... Increase of durability
- New mechanical carburetor: Developed to stabilize from low speed running to maximum revolutions. Operation is smooth throughout the power range.
- Prevention of loosening a prop. Safety design.
 The propeller nut hardly unlooses.

Explanation of AAC 4 Stroke Cycle Engine



4 Stroke Cycle engine consists of 4 strokes as illustrated above. Stroke means that piston is moved from the upper dead point to the lower dead point. In case of 4 Stroke cycle engine, gas condition in cylinder, variation, valve motion, etc., are 4 strokes (2 both ways) of piston. After all, 1 cycle is finished every 2 revolutions of crankshaft and returns to the original condition.

FA-120 (20cc) Specifications.

Bore 32mm Stroke 24.8mm

Practical Rev.

About 1,600 r.p.m.-approx. 10,000 r.p.m.-

Weight. Approx. 920 grams

Accessories

- | | |
|--|--------|
| 1. Spanner for tappet adjusting screw | 1 |
| 2. Screwdriver for tappet adjustment | 1 |
| 3. Tappet adjusting screw gap gauge(0.1T) | 1 |
| 4. Hexagonal spanner (wrench) (3, 2.5, 1.5) | 1 each |
| 5. Spanner for propeller nut | 1 |
| 6. Spanner for exhaust pipe nut | 1 |
| 7. Opening & closing bar for choke valve | 1 |
| 8. Needle valve extension bar | 1 |
| 9. P-2 plug | 1 |

A. Fuel.

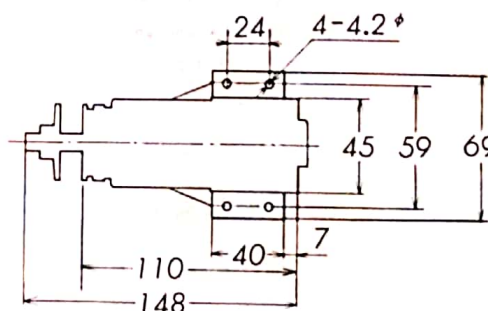
Use castor oil system with nitromethane approx. 10~20% for glow engine use. Do not use 100% synthetic system fuel. If you use it, add 30% of castor sysem oil. When using Nitro 15-20%, the engine can display its best efficiency. There is fuel caused of gathering rust, so that use fuel of good quality. The "Saito fuel filter" will supremely promote the engine efficiency. Fit always the fuel filter in.

B. Plug. The Saito P-2 plug is recommended. Due to the operation of 4 stroke engines(1 explosion for 2 revolutions), plug selection is critical for efficient operation. (It will be influenced more or less by a change in the wether)

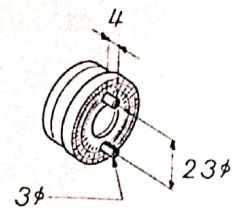
An unsuitable plug for the engine will be cause of over-heat, and the engine will not run smoothly.

The optional parts

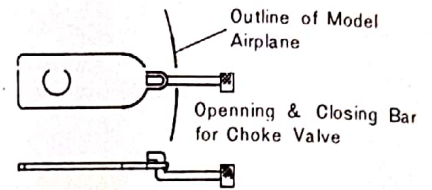
1. Radial mount
2. Exhaust extention



C. How to Fit Propeller. Standard is 15"×6" while some differences are occurred to various model airplane types. Do not operate it more than 10,000 r.p.m. with a small propeller due to our engine mechanism. Two neck pins which stick out from a drive flange prevent loosening a propeller during its revolution. Refer to the right illustration for how to tighten. Propeller washer and nut are safely designed not to loosen the nut. Thinking of a case that the engine starts to run by manual, the direction of prop should be vertical at the point where compression has built up.



Choke Valve Setting. Refer to the right illustration.



D. Engine Fitting Position

Any directions are available. However, we recommend to use it as a vertical position, because inverted position will damage cylinder head, etc., at landing. If you use it at the inverted position and operate it after a time, take out the plug and turn the propeller several times for removal of oil. (If you turn it by a starter without these ways, the engine will be sometimes broken.)

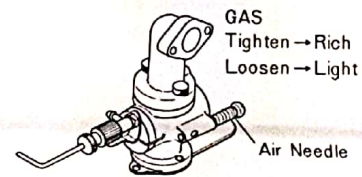
Engine bed should be used a strong material as much as possible. Weak material causes vibrations. The optional "SAITO engine bed" is the best one.

E. Fuel Tank. Depend upon a propeller, fuel and flight time. However, a tank with a capacity of over 400 cc is preferable.

F. Engine Start. Use always muffler pressure.

a) Engine Start by a Starter. let's carry out the following procedure.

- * Open the throttle valve to its full width.
- * Open a needle valve by four rotation turns.
- * Close a choke valve.
- * Rotate forcibly a crank shaft toward counter-clockwise direction about three turns to absorb fuel.
- * Open the choke valve (Choke at the spot where the throttle is fully opened. It cannot be done halfway)
- * In the event of flooding, there may be some possibility of the rod broken by fuel compression. Confirm by manual turn that fuel compression has not built up.
- * Open the throttle valve a little bit more than low speed (Caution. Do not open the throttle too much not to fly out)
- * Confirm the starter's revolution direction (Counter-clockwise)
- * Connect a plug with and heat.
- * Start the engine
- * Open the throttle valve gradually up to the maximum (Max. 10,000 r.p.m.)
- * Increase the engine revolutions up to max. revs. by adjusting the needle valve.
- * Close the throttle valve gradually and adjust the needle body to gain a little rich mixture for decreasing the engine revolution down to approx. 1,600 r.p.m. for idling.

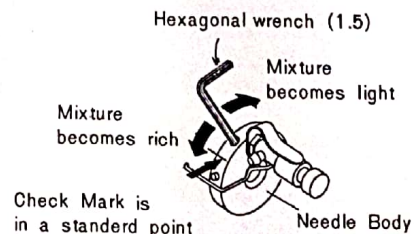


b) Manual Start.

Once experience gained in engine starting, you could start the engine easy without missing.

Fit propeller vertically at the propeller position where it catches compression.

Suck up fuel into carburetor as the same way as (a). Stop the propeller at compression position under vertical position and crank it to clockwise direction as soon as possible after plug in.



c) How to Operate and Adjust the Carburetor.

Adjustment of engine response by the throttle valve.

When opening the throttle valve quickly to its full width from engine idling speed:

- a. Quick response is normal.
- b. c. d. and e's troubles and counterplans to.

	Conditions	Causes	Counterplans
b	When throttle response from low speed running to high speed is no good. Darker gas from an exhaust pipe.	Caused by rich mixture	There is a hole on a needle body, put a hexagonal wrench 1.5 mm into the hole and turn it clockwise direction gradually, so that mixture gas becomes lighter. Throttle response will be good little by little.
c	When increasing speed from low to high, if the engine stalled.	Mixture gas is too light.	Turn gradually the needle body counter-clockwise, and mixture gas becomes rich. It prevents engine stalling.
d	If the idling does not continue.	Neither plug nor fuel fits the engine.	In normal way, it will be almost stabled by the needle body adjustment. If it cannot be stable, adjust it by the airneedle.
e	When idle adjusting, no response is gained, however the needle body is turned toward the right or the left.	There must be a gap between the surface of the throttle valve and the surface of the needle body.	Confirm whether there are dirt and blemish between the surface of the throttle valve and the surface of the needle body, or dirt between the carburetor body.
		A spring of the throttle valve loses its elasticity, and is not in connection with.	Take off the spring and make its elasticity strong.

*** How to Operate the Carburetor (After finish break-in running)**

Rotate the main needle three turns to open it.

Close up the air needle.

Fit the check marks on the needle body.

Start the engine, and put the throttle lever at the middle speed running position.

Move the needle body back and forth as shown in the illustration to gain light and rich mixture and set it at the best spot.

Move the throttle lever gradually toward high speed running and adjust mixture by the needle.

Move the throttle lever slowly toward the low speed running, and keep the engine running at idling about 1,600r.p.m.

A fine adjustment should be done by the airneedle.

*** Caution**

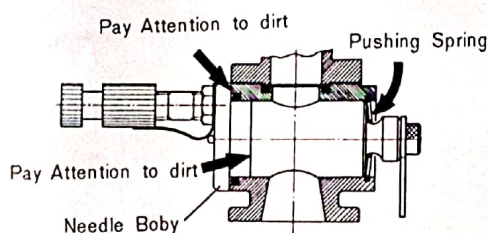
When assembling a carburetor after disassembling, if dirt comes into, or the inside is blemished, it will be the cause of bad condition. Please do not dismantle unless it is necessary.

Fuel. When idling, a little rich mixture is better.

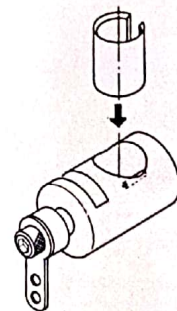
*** Application of Insert Ring.**

When using a large diameter propeller 17" x 6" - 18" x 6" and revolving max. about 7,000r.p.m. the engine revolutions will be stable.

When using it by max. revs. about 9,000 - 10,000r.p.m. with 16" x 6" etc., the insert ring is not required.



When inserting the insert ring into the throttle valve, take off the pushing spring first, and insert it. When assembling, pay your special attention to dirt and blemish. The throttle valve must be attached tightly to the needle body by the pushing spring.



G. Break-In

The break-in procedures for all engines should be followed carefully as a proper break-in will achieve the best, long lasting performance. After a start of engine running according to the procedure (F), adjust the needle valve to gain rich mixture and keep the engine running at max. 4,000 - 5,000 r.p.m. for the first 30 minutes. (For mainly break-in of a connecting rod and a cam gear) Next is to lean out the mixture to achieve the highest RPM for about 30 seconds, then richen it up again to about 6,000 RPM. Repeat this procedure every three minutes or so. For about the first 10 flights, you should not fly at peak RPM as the engine is still wearing in. After about an hour of running, check the valve for proper clearance. The engine should now be broken in and function smoothly at all settings. Sometimes, fasten tightly (11) Propeller Nut, nut of (60) Exhaust Pipe etc. When starting engine, keep spectators away and out of path of rotating prop. Make all engine adjustments from behind rotating prop. Secure all persons against danger.

H. General Running & Maintenance Procedures

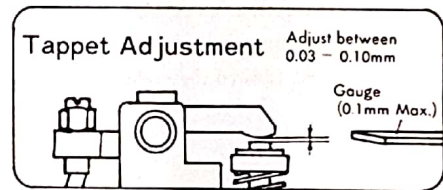
1. Too lean of a needle valve setting will cause the engine to run hotter than normal. (It will cause the engine stalling and has a bad influence on the connecting rod and the cam gear.)

2. Tappet clearance will have to be adjusted periodically due to wear in of the moving parts. If the supplied gauge will fit, the tappets need to be adjusted for proper spaces. After adjustment make sure to tighten up the lock nut. This will keep wear to a minimum. (See diagram)

* Lubrication of the engine inside: Oil contained in fuel from between a piston and a cylinder comes into the inside will lubricate piston, bearing, cam and gear etc.

* Breather nipple (Pat. Pend.): Drain out waste oil through a silicon tube outside a model airplane.

3. Rocker arm and valve should be lubricated as occasion demands on inspection.



I. Dismantling

Please do not dismantle the engine. However, pay your attention to the following points in case of dismantling.

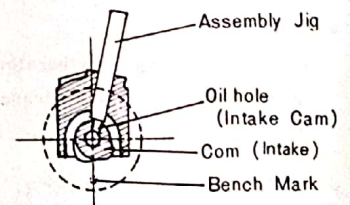
(a) When assembling, apply engine oil to the tops of screws and fasten them accordingly (If you fasten screws under dry conditions, screws will be damaged so that they need oil)

(b) Assemble cam gear to meet necessary marks as per drawing. (Refer Detail.) First, crank shaft should be positioned at the upper dead point. Then the coincidence of (16) Cam Gear should be positioned below. Use our an optional assembly jig for your convenience.

(c) Position piston rod, rocker arms, pins, push rod, tappet, etc., in the original positions, because they are accustomed to their respective positions even if they are common parts. This is a knack to assemble them in the original conditions. When you assemble it, apply engine oil to each part for assembly.

(1) Clearness (2) Apply engine oil to each section (3) Fasten screws averagely. Do not fasten too tight. These are important steps to assemble your engine.

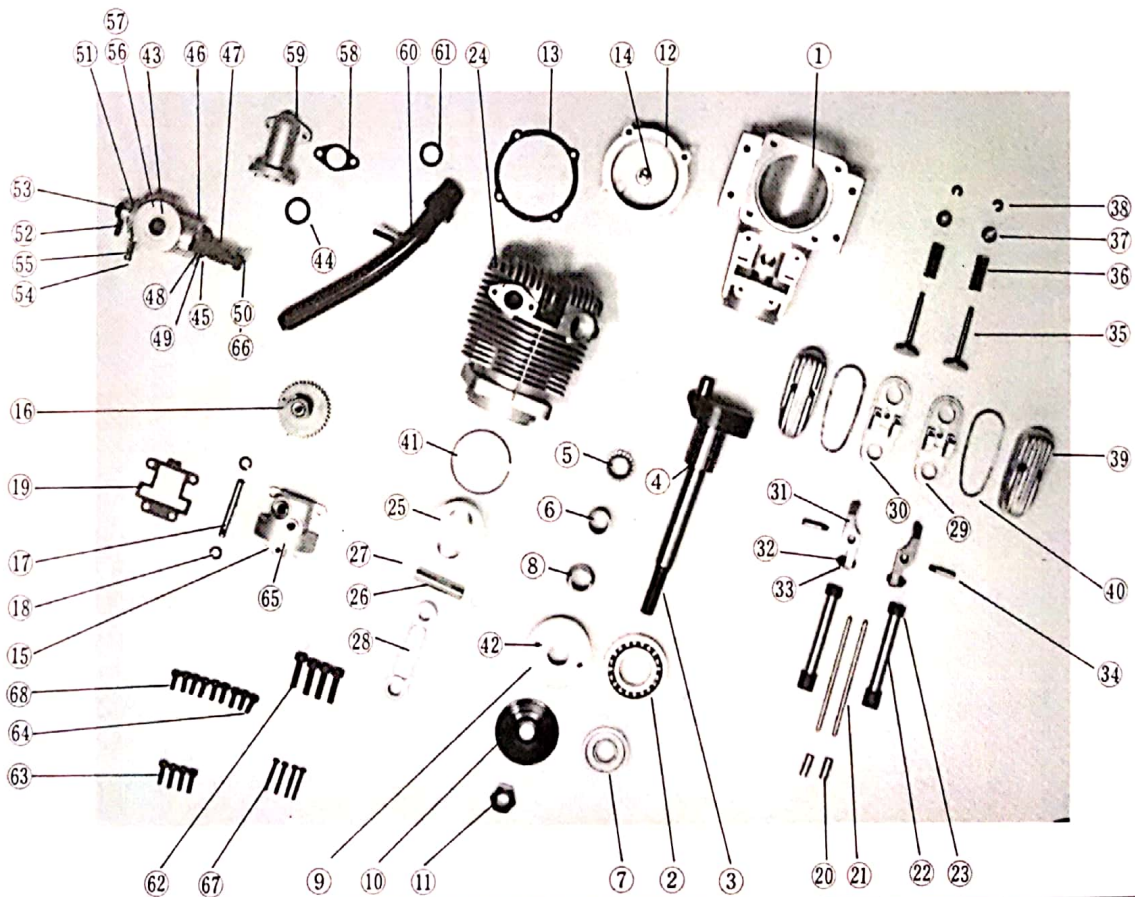
(d) If you do not use your engine for a time, take out plug, crank case rear cover so as to wash them completely with petroleum. After cleaning, blow away petroleum with air and apply engine oil to them for assembly. Then, pack it in a vinyl bag for storage.



Warning After starting of the engine, operate it behind the propeller. It is dangerous if the propeller will fly. Moreover, tighten the screws occasionally. Use a starter or a pair of gloves for starting. Always, set an interval of the tappet within 0.1 as shown. Please pay your attention to safety and other troubles. All specifications and models subject to change without notice.

Saito FA-120 Parts List

Part No.	Name	Q'ty	Part No.	Name	Q'ty
1	Crankcase	1	35	Valve	2
2	Rear Bearing	1	36	Valve Spring	2
3	Crankshaft	1	37	Valve Spring Keeper	2
4	Pinion Gear Pin	1	38	"E" Ring	2
5	Pinion Gear	1	39	Rocker Arm Cover	2
6	Pinion Collar	1	40	Rocker Arm Cover Gasket	2
7	Front Bearing	1	41	Piston Ring	1
8	Taper Collet	1	42	Drive Flange Nock Pin	2
9	Drive Flange	1	43	Carburetor Body	1
10	Propeller Washer	1	44	"O" Ring S-10	1
11	Propeller Nut	1	45	Nipple	1
12	Rear Cover	1	46	Needle Body	1
13	Rear Cover Gasket	1	47	Spray Bar	1
14	Breather Nipple	1	48	Needle Stopper	1
15	Cam Gear Housing	1	49	Lock Nut, Spray Bar	1
16	Cam Gear	1	50	Needle Valve	1
17	Cam Gear Shaft	1	51	Throttle Valve	1
18	Teflon Washar	2	52	Throttle Lever	1
19	Gasket, Cam Housing	1	53	Throttle Lever Nut	1
20	Tappet	2	54	Adjustment Screw, Throttle	1
21	Push Rod	2	55	Spring, Throttle Adjust Screw	1
22	Push Rod Cover	2	56	Air Needle	1
23	Push Rod Cover Grommet	4	57	Air Needle Spring	1
24 A	Cylinder	1	58	Manifold Gasket	1
25 A	Piston	1	59 A	Manifold	1
26	Piston Pin	1	60 A	Exhaust Pipe	1
27A	Piston Pin Retainer	2	61	Exhaust Pipe Gasket	1
28	Connecting Rod	1	62	Cap Screw M4 x 15	4
29	Bracket (Right)	1	63	Cap Screw M3 x 10	4
30	Bracket (Left)	1	64	Cap Screw M3 x 8	8
31	Rocker Arm	2	65	Set Screw M3 x 4	1
32	Rocker Arm Adjust Screw	2	66	Set Screw M3 x 3	1
33	Lock Nut	2	67	Valve Cover Screw M2.6 x 16	4
34	Locker Arm Pin	2	68	Cap Screw M3 x 6	3



SUPPLEMENT TO FA-120

When using such a large size prop as 18" X 6" etc., set the needle body at the richest position (Refer to illustration), and the throttle at high position.

Adjust the main needle to make mixture for high speed running, and set the throttle at middle speed running, if it is too dark, adjust the needle body to make proper mixture.

Caution

When using the large size prop (18" X 6" etc.) If the needle body is set for light mixture, and only the main needle is adjusted, there will be a possibility of knocking.