

FA-50 · FA50GK has a choke valve which is very useful device for scale airplanes, etc.

Instructions for FA-50 · FA-50 GOLDEN KNIGHT ABC 4 Stroke Engine

Let us express our sincere thanks for your favouring Saito Seisakusho, Ltd., particularly for your purchase of the "Saito FA-50 · FA-50GK 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.

When placing your order for parts, please specify a notation of production version (Alphabet), part number, name of part and quantity you need.

USE RC Stunt Airplane	RC Sports Airplane	UC Stunt Airplane
RC Scale Airplane	RC Helicopter	

This engine is designed and manufactured based on high efficiency and durability of the first ABC method (Aluminum Piston, Brass Cylinder, Hard Chrome Plated) in the world.

(Features)

- Cylinder..... Hard-chromed bore brass cylinder sleeve increases durability of the engine. The cylinder with nondetachable head results nondistortion of the cylinder bore, and increases heat dissipation.
- Piston..... High silicone aluminum piston with a compression ring increases efficiency of the engine.
- Crank shaft..... Shaft made of chrome molybdenum forged steel is supported by two ball bearings.
- Cam gear..... Front mounted cam gear design results in the compact engine.
- Valves..... Large diameter intake valve and exhaust valve increase combustion efficiency.
- Carburetor..... It has a high efficient automatic choking device, and is easy to be operated and helps the engine to run at a uniform rate in low speed.
When low speed running, adjust mixture to get rich slightly by *Slow needle*, (Screw it toward the closed position, and mixture gets right. Screw it toward the opened position, and mixture gets rich)

Choke valve..... This is very useful for scale aircraft.

FA-50 · FA-50GK (8.2cc) Specifications

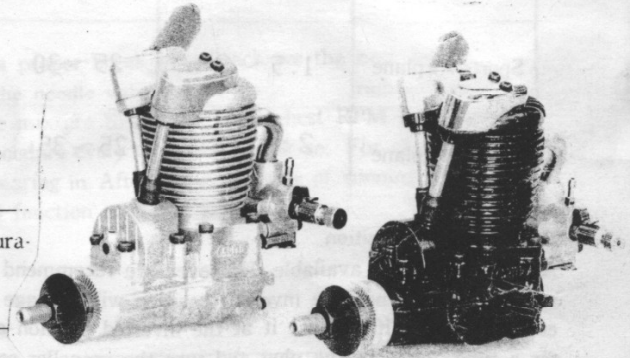
- Bore..... 23.4mm
- Stroke..... 19.0mm
- Practical rpm..... About 2,000rpm ~ 12,000rpm
- Fuel consumption..... 5 minutes/Approx. 90 cc
(Prop 10.5" x 7.5", Full throttle.
Nitro 10%)
- Weight..... Approx. 435 grs.

A. Fuel

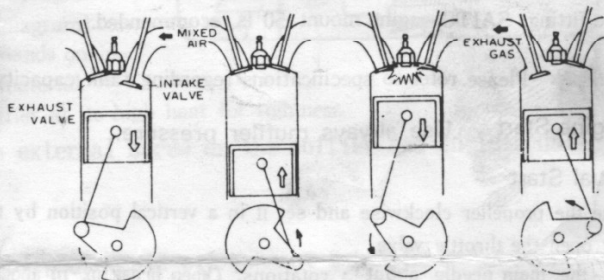
Recommend good quality fuel (oil 20%) for glow engine use on the market, containing synthetic oil type with nitro content of approx. 5% to 15%. Since the four-stroke engine has high exhaust temperature and carbon is apt to accumulate when castor oil type lubricants are used, avoid using fuel containing them.

B. Plug SAITO glow plug P-2 & P-3 are recommended. Due to the operation of 4 stroke engines (1 explosion for 2 revolutions), plug selection is critical for efficient operation.

Choke valve setting Being manually operate, you can choke easily by one hand, holding an airframe by the other hand.



FA-50 FA-50GK
Explanation of ABC 4 Stroke Cycle Engine

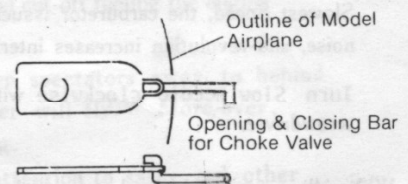


1. Suction Stroke
2. Compression Stroke
3. Expansion Stroke
4. Exhaust Stroke

4 Stroke Cycle engine consists of 4 strokes as illustrated above. Stroke means that piston is moved from 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.

(Accessories)

- | | |
|---|--------|
| 1. Screwdriver for slowneedle adjustment | 1 |
| 2. Spanner for tappet adjusting screw | 1 |
| 3. Hexagonal spanner(wrench) (2.5, 2, 1.5) | 1 each |
| 4. Tappet adjusting screw gap gauge (0.1 T) | 1 |
| 5. Needle valve extension bar | 1 |
| 6. Opening and closing bar for choke valve | 1 |
| 7. Knob for bar | 1 |
| 8. Muffler | 1 |
| 9. Spanner for prop.nut, muffler nut | 1 |
| 10. Glow plug fitted in the engine | 1 |



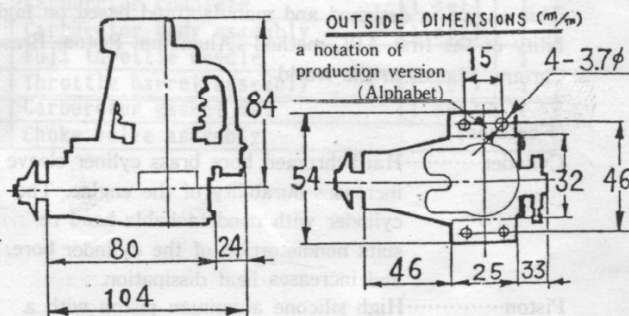
C. Propeller It depends upon an airframe. Choose a suitable prop from the following table. Avoid operating the engine on a small size prop over 12,000 rpm.

Type	Weight(kgs.)	Wing Area (dm ²)	Propeller
Stunt Airplane	1.6~2.3	26~35	10x8 , 10.5x7, 10.5x7.5
Sports Airplane	1.5~2	25~30	10x7 , 10.5x7, 11x6
Scale Airplane	2~2.8	25~35	11x6 , 11x7 , 12x6

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 turns for removal of oil. (If you turn it by a starter without these ways, engine will be sometimes broken).

Engine mount should be used a strong material as much as possible. Weak material causes vibrations. Use nylon nuts to fit and cap screw for engine fitting. SAITO engine mount 50 is recommended.



E. Fuel Tank Please refer to specifications regarding tank capacity.

F. Engine Start Use always muffler pressure.

a) Manual Start

- Rotate the propeller clockwise and set it in a vertical position by tightening nuts when it gets compressed.
- Fully open the throttle valve.
- Open the main needle about 3 rotations. (When breaking-in about 5 rotations)
- Close the choke valve.
- Rotate the propeller counter-clockwise about three turns to take fuel in.
- Open the choke valve. (It closes when the throttle is full open)
- Confirm the fuel is not compressed. (When fuel is taken in too much, it may be compressed and may damage rod, etc.)
- Slightly open the throttle valve from the Low speed. (If the throttle is opened too much, the aircraft may make a dashing start)
- Rotate the propeller clockwise 180 degrees back from the position where it is compressed. (Upper side)
- Switch on the electric source, and crank the propeller clockwise and the engine will start running rightly.

b) Start by starter

- Set the throttle valve at the Slowest position.
- Confirm that the starter is rotating counter-clockwise and run the engine idle for five to seven seconds. It then chokes.
- Switch on the electric source and open the throttle valve from the Slowest Speed to about one-fourth for starting.

c) How to Operate and Adjust the Carburetor.

The slow needle that is installed on your Saito engine is pre-adjusted (about 4 turns), at the factory, for best performance. Re-adjustment may be necessary according to the propeller used, the installation of the engine, type of fuel or atmospheric conditions.

- Rotate the main needle about three turns to open.
- Start the engine by opening the throttle valve about one-fourth.
- Full open the throttle and adjust the main needle for best high speed rotation.
- Close the throttle slowly and adjust idling.

a) The mixture is too rich.

When the throttle is fully opened too quickly from the Slowest Speed, the carburetor issues white smoke and dull noise, and revolution increases intermittently.

Turn Slow needle clockwise with the small screwdriver.

b) The mixture is too lean.

The engine stops when the throttle is set at Slowest Speed. Or, the engine stops when the throttle is fully opened too quickly or it issues dry noise and revolution increases belatedly.

Turn Slow needle counter-clockwise.

- When idling run is obtained, set the desired slow revolution with Adjusting screw for throttle.
- Do the above-mentioned adjustment until the engine revolution promptly responds to operation of the throttle valve.

© How to Adjust finely the Needle valve

Too much closure may lead to overheating and cause corrosion of the inner surface. It may also cause knocking. Continual knocking leads to damage to the engine.

First set the needle valve at a position in excess of the normal peak position. Fly the plane for about ten minutes. After landing, run the engine at the maximum rpm to obtain the ideal peak position of the needle valve.

Caution:

- A. Don't adjust the needle valve when the tank is full.
- B. Adjust it when the fuel is low in the tank after a flight.

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. For the first 20 minutes of running, you will have the needle valve set at the rich setting (About 4,000 r.p.m.) Next is to lean out the mixture to achieve the highest RPM for about 30 seconds, then enrich 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.

H. General Running & Maintenance Procedures

1. Too lean of a needle valve setting will cause the engine to run hotter than normal. (Be careful of overchoke, since overchoke causes over-heat, and shortens a life of the engine.)
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)
3. Rocker arm and valve should be lubricated as occasion demands on inspection. Usually it is unnecessary because of oil contained material.

Sometimes, check all screws and nuts for propeller and muffler at its high heat for tightness.

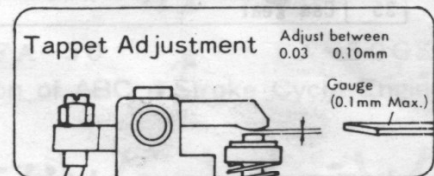
- * When screwing a muffler in a cylinder, oil both an external screw on the muffler and an internal one on the cylinder side.

* Beather nipple

Use silicon tube, etc., for as an outlet to outside of plane. (Old oil exhaust mouth)

* Engine Inside Lubrication

Piston, Bearing, Cam, Gear, etc., are lubricated by fuel oil which enters inside through an aperture of piston.



I. Dismantling

Do not take the engine apart unless necessary. However, pay your attention to the following points in case of dismantling.

(a) Cylinder screws should be loosened dividing in 3 times under a diagonal line. (If you loosen them straight, it results in a distortion of the cylinder.)

(b) Assemble it with the counter method of (a) At this time, 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)

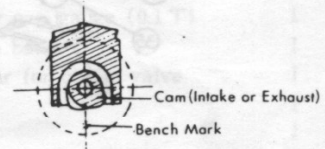
(c) Assemble can gear to meet necessary marks as per drawing. (Refer Detail.) First, crank shaft should be positioned at the Upper Dead Point. Then the coincidence of (35) Cam Gear should be positioned below.

(d) 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.

(e) 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.

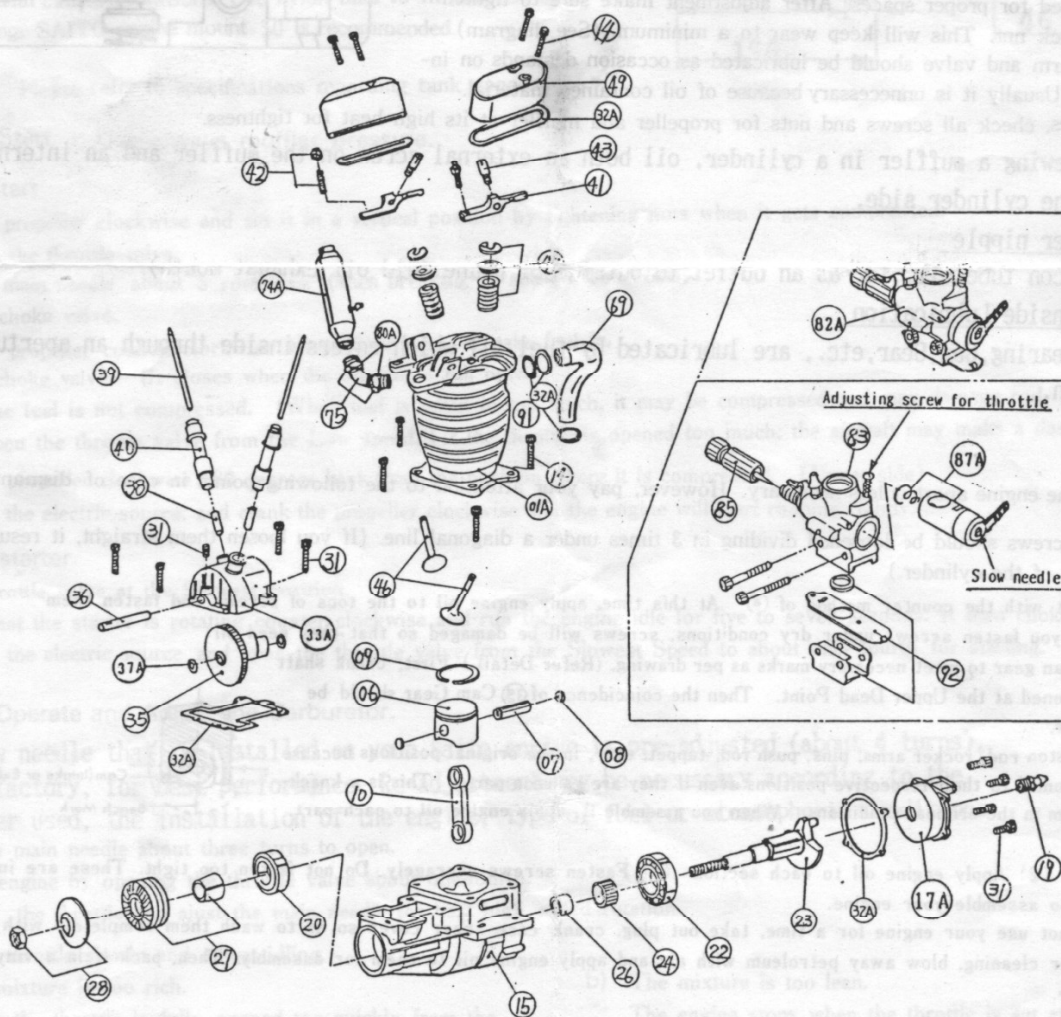
* When finishing flight, run the engine at full throttle open position for about one minute, and cut off fueling the engine to avoid rusting ballbearing et cetera.



Warning After starting of the engine, operate it behind the propeller. (Keep spectators away to behind the engine. Secure all persons against danger.) It is dangerous if the propeller will fly. More-over, 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.

NO.	DESCRIPTION (q'ty per pack)	Q'TY	NO.	DESCRIPTION (q'ty per pack)	Q'TY
01A	Cylinder	1	36	Cam gear shaft	1
06	Piston	1	37A	Teflon washer set (1 set)	1
07	Piston pin	1	38	Tappet	2
08	Piston pin retainer	2	39	Pushrod	2
09	Piston ring	1	40	Pushrod cover & rubber seal (2 each)	1
10	Connecting rod	1	41	Rocker arm	2
14	Cylinder screw set (1 set)	1	42	Rocker arm screw & nut (2 each)	1
15	Crankcase	1	43	Rocker arm pin	2
17A	Rear cover	1	46	Valve (in & out pair)	2
19	Breather nipple	1	47	Valve spring, keeper, retainer (2 sets)	1
20	Front bearing	1	49	Rocker arm cover	2
22	Rear bearing	1	69	Intake manifold	1
23	Crankshaft	1	74A	Muffler	1
24	Pinion (crankshaft)	1	75	Muffler manifold (standard) w/nut	1
26	Collar (crankshaft)	1	80A	Muffler nut	2
27	Taper collet & drive flange (1 each)	1	82A	Carburetor complete (1 set)	1
28	Prop washer & nut (1 each)	1	83	Carburetor body assembly (1 set)	1
31	Crankcase screw set (1 set)	1	85	Full throttle needle	1
32A	Engine gasket set (1 set)	1	87A	Throttle barrel assembly (1 set)	1
33A	Cam gear housing	1	91	Carburetor gasket set (1 set)	1
35	Cam gear	1	92	Choke valve assembly	1



All specifications and models subject to change without notice.

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