

## SAITO FA-80T AAC 4 Stroke Engine

Thank you for your purchase of the Saito FA-80T engine. We feel that you have made a wise purchase and one that will last for an extended period of time through hard usage. Please read and become familiar with these instructions prior to operation of the engine. Follow closely the break-in procedures and maintenance instructions while we will repair this engine without any cost, if you have a manufacturing defect.



The FA-80T engine utilizes a single throw crank shaft, like all full sized radial engines. Because of this design, the engine is simple in construction, light in weight, and highly efficient. To maintain a positive crankcase pressure, and eliminate harmful blowby gasses, and to ensure complete and smooth lubrication throughout the engine, and protect from inside rust, a vane type air pump is employed (Patent applied for).

Cylinder	: Direct hard chrome plated for better cooling and light weight
Piston	: High silicon content aluminum
Crankshaft	: Twin ball bearing supported
Cylinder Head	: Hemispherical for increased power
Cam Gear	: Forward placed twin cams for light weight
Valves	: Large diameter for power and efficiency
Carburetor	: Automix for smooth transition from low to high speed

### FA-80T (13cc) Specifications

Bore	: 21mm $\times$ 2
Stroke	: 19mm $\times$ 2
Maximum RPM	: 10,000
Useful RPM Range	: 2,500 - 9,000
Fuel Flow	: Full throttle/1 minute, Approx. 14cc fuel, 10% Nitro
Weight	: 770 grams approx.

### Supplied standard accessories

1. Spanner for tappet adjustment 1
2. (-) Screwdriver for tappet adjustment 1
3. Gap gauge for valve clearance (0.1T) 1
4. Hex wrenches (3, 2.5, 2 & 1.5mm) 1 each
5. Box wrench for glow plug 1
6. Open end wrench for prop & manifold nuts 1
7. Engine mount bolts 4  $\times$  25mm (+) and washers 4 each
8. Blind nuts for mounting bolts 4mm 4
9. Needle valve extension 1
10. Glow plug connectors & ground 1 set

**A Fuel:** Any glow engine fuel with a nitro content from 5 - 15%. Castor oil based fuels are recommended for the best lubrication.

**B Plugs:** The Saito P-1 plug is recommended. Due to the operation of 4 stroke engines (1 explosion for 2 revolutions), plug selection is critical for efficient operation.

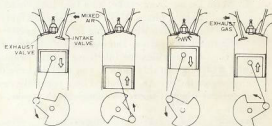
**C Propeller:** Standard for this engine is the TOP FLIGHT 14  $\times$  6" wooden prop. You can expect an RPM of approximately 8,500 with this prop.

**D Engine Mounting:** Use at least 10mm or greater thickness of plywood for mounting the radial engine mount as a fireproof wall and strengthen with triangle wood stock. Use attached parts for fixing. (See diagram)

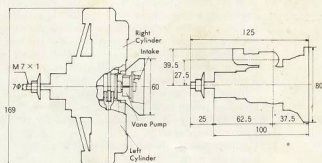
**E Fuel Tank:** Use a 350 ~ 400cc fuel tank or larger if possible for extended running. (For example, approx. 14cc/1 minute with a Top Flight 14  $\times$  6", Nitro 10% and Saito P-1 plug)

**F Carburetor Adjustment:** When using exhaust pressure, open nee-

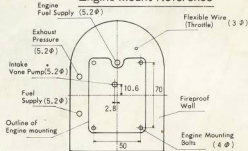
### Explanation of AAC 4 Stroke Cycle Engine



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 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 over 2 revolutions of crankshaft and returns to the original condition.



### Engine Mount Reference



die valve approximately  $3\frac{3}{4}$  turns. When not using pressure, open up  $5\frac{1}{2}$  turns. The slow or idle valve is screwed in for a leaner mixture. After about 4 turns the engine at idle will begin to die out. Make all needle valve adjustments very gradually to give the engine time to respond to the adjustments. All adjustments are not that critical however.

**Each Needle Adjustments:** For engine start, open the throttle  $1/3$  to  $1/2$ . After start open to full throttle and adjust needle valve (High Speed) for a rich mixture. Close throttle and adjust low speed valve for the best idle. (About 2,500 RPM idle will be achieved only after complete break-in). When the low speed needle is too rich, a thick over rich smoke will exhaust when the throttle is opened full. Lean out by screwing the low speed valve clockwise, until the engine runs steadily. Keep the engine rich during break-in though, but smoothly running.

Ⓔ **Engine Starting:** A point of starting is that you have to choke rather overly. In case of 2 cycle engine, the mixed gas, charged in the crankcase, will be supplied continuously. 4 cycle engine is concerned, the mixed gas will be sucked into the cylinder inside directly from the carburetor so that it is short supplied at low revolutions of starting. Moreover, use an electric wire (0.5 VSF low resistance wire) or bigger ones. Unless you use it, electric current is short and a battery is wasted for start troubles. Make sure to start the both cylinders together while one side start is strictly prohibited.

**Using Electric Starter:** Open throttle about  $1/3$ . Crank over 2 or 3 revolutions by hand while choking the carburetor with your finger.

Note: Do not over choke, as a fuel lock could develop whereby you could damage the con rods. Apply plug heat to both plugs. Make sure that the starter is rotating in the proper direction. Engine rotates counter clockwise when facing it. Start engine.

**Engine Lubrication:** During engine running, oil is swept into the crank case by the piston movement. This oil provides the lubricant for the crankshaft, con rods, bearings, valve train, rocker arms, etc.

**Hand Starting:** In this engine, you will observe during hand cranking, a compression stroke, followed by another compression stroke, followed by a complete revolution without compression. Adjust the propeller so that it is vertical when at the first compression stroke, and for the best results always start at the first compression stroke.

Ⓕ **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 30 minutes of running, you will have the needle valve set at the slightly rich setting (About 6,000 RPM at full throttle). 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, tighten up the exhaust and intake manifold nuts, check the valves for proper clearance, etc. The engine should now be broken in and function smoothly at all settings.

Ⓖ **General Running & Maintenance Procedures:**

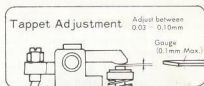
1. Too lean of a needle valve setting will cause the engine to run hotter than normal.

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. When you have the valve cover off of the engine, it is good practice to give each of the bearing points a drop of high quality silicon content motor oil (Same as the 40 weight used in automobiles). This will keep wear to a minimum. (See diagram)

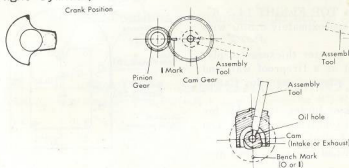
3. Vane type compressor which is a very important part of your engine. It is necessary to keep the air inlet (Nipple at the back of the crankcase) open at all times for a fresh supply of clean air. Attach a piece of silicon fuel tubing to this inlet and run into the fuselage of the model. Keep this tubing unblocked at all times.

Ⓖ **Engine Disassembly:** Avoid as much as possible the complete disassembly of this engine. If necessary, follow these instructions exactly.

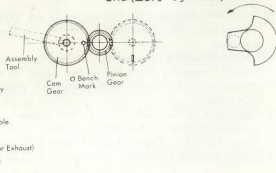
1. Cylinder Heads. Do not unscrew all of the head bolts at the same time. Alternate removal of the screws to avoid any warp.
2. Assemble in reverse order, and use a drop of engine oil on the threads prior to screwing in.
3. Cam Gears Replacement. When facing engine, time the right cam gear first as follows:



1st(Right Cylinder)



2nd (Left Cylinder) Revolution



### 1st (Right Cylinder)

Crank throw at right cylinder top dead center. Insert cam shaft assembly tool into the exhaust pushrod bushing, and rotate camshaft until tool falls into oil hole in camshaft. With camshaft in position and crank at TDC, the gears will mesh at the proper timing point. Bench marks are located on the gears for reference.

### 2nd (Left Cylinder)

Rotate crankshaft 180 degrees to the arrow mark. Insert timing tool into the intake side of the pushrod opening. Rotate cam gear until the tool enters the oil hole of the camshaft. Gears are now lined up with the bench marks. Study diagrams carefully.

When reassembling your engine, it is very important that the same pistons, rods, valves, etc., all go into their original positions. Clean all parts well, and then oil with clean engine oil. Alternate the tightening of screws and do not overtighten.

**ⓀOverall Precautions:** When stopping the engine, run at high RPM for about 10 seconds, then cut off fuel supply. This will rid the engine of unburnt fuel which could cause rusting if stored for long periods.

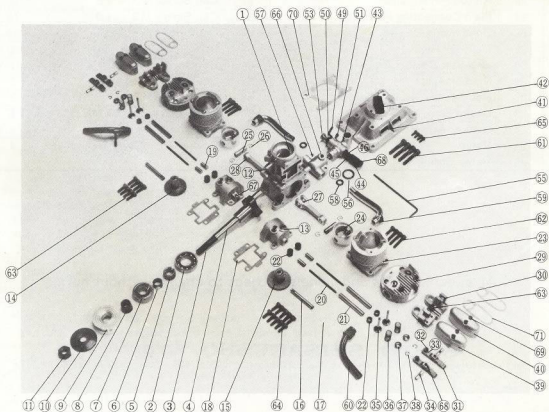
- When engine is to be stored, remove rear crankcase, plugs and valve covers.
- Wash well in kerosene, and then blow out remaining kerosene with a compressor and lubricate well with engine oil, and store in a sealed vinyl bag.
- To protect the engine during periods between flying, cover the engine with a cloth.
- After engine start, make all adjustments from behind the propeller for safety.
- Make sure that propeller nut and other screws (Mounting Bolts, etc.) are tight.
- Use an electric starter, or gloves when hand starting. Make safety in your flying first and foremost.
- Make sure that your propeller is properly balanced prior to installation.

### Engine Usage

Useable for all .60 sized 2 stroke aircrafts.

Type	Wing Area	Weight(kgs.)	Flying	Airfoil
Scale	50 dm <sup>2</sup>	4	Simple aerobatic	Symmetrical
Sport	47 dm <sup>2</sup>	3.7	Stunt	Symmetrical
Large, light scale, etc.	80 dm <sup>2</sup>	4-4.5	Prototypical flight maneuvers	Clark Y and semi-symmetrical

### FA-80T Parts Diagram



(See next page for Parts List)

## Saito FA-80T Parts List

Part No.	Name	Q'ty	Part No.	Name	Q'ty
1	Crankcase	1	37	Valve Spring Keeper	4
2	Rear Bearing	1	38	"E" Ring	4
3	Crankshaft	1	39	Rocker Cover (R)	2
4	Pinion Gear Pin	1	40	Rocker Cover (L)	2
5	Pinion Gear	1	41	Rear Cover Mount	1
6	Pinion Collar	1	42	Vane Pump Assembly	1
7	Front Bearing	1	43	Carburetor Body	1
8	Taper Collet	1	44	Needle Valve	1
9	Drive Flange	1	45	Needle Valve Body	1
10	Propeller Washer	1	46	Lock Nut, Needle Valve Body	1
11	Propeller Nut	1	47	Needle Stopper	1
12	Breather	1	48	Throttle Valve	1
13	Cam Gear Housing	2	49	Throttle Lever	1
14	Right Cylinder Cam Gear	1	50	Throttle Lever Nut	1
15	Left Cylinder Cam Gear	1	51	Adjustment Screw, Throttle	1
16	Cam Shaft	2	52	Coil Spring	1
17	Teflon Washer	4	53	Slow Needle	1
18	Gasket, Cam Housing	2	54	Slow Needle Spring	1
19	Tappet	4	55	Needle Extension	1
20	Push Rod	4	56	"O" Ring P-10	1
21	Push Rod Cover	4	57	Intake Manifold	1
22	Push Rod Cover Grommet	8	58	"O" Ring P-6	2
23	Cylinder	2	59	Intake Manifold Pipe	2
24	Piston	2	60	Exhaust Pipe	2
25	Piston Pin	2	61	Cap Screw M4 × 22	4
26	Piston Pin Retainer	4	62	Cap Screw M3 × 16	8
27	Main Connecting Rod (L)	1	63	Cap Screw M3 × 10	10
28	Connecting Rod (R)	1	64	Cap Screw M3 × 8	10
29	Cylinder Head	2	65	Cap Screw M2.6 × 6	4
30	Bracket, Rocker Arm	2	66	Set Screw M4 × 5	1
31	Rocker Arm	4	67	Set Screw M3 × 4	3
32	Rocker Arm Adjust Screw	4	68	Set Screw M3 × 3	5
33	Lock Nut	4	69	Valve Cover Screw M2.6 × 16	8
34	Rocker Arm Pin	4	70	Crankcase Gasket	1
35	Valve	4	71	Rocker Arm Cover Gasket	4
36	Valve Spring	4			

All specifications and models subject to change without notice.

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99