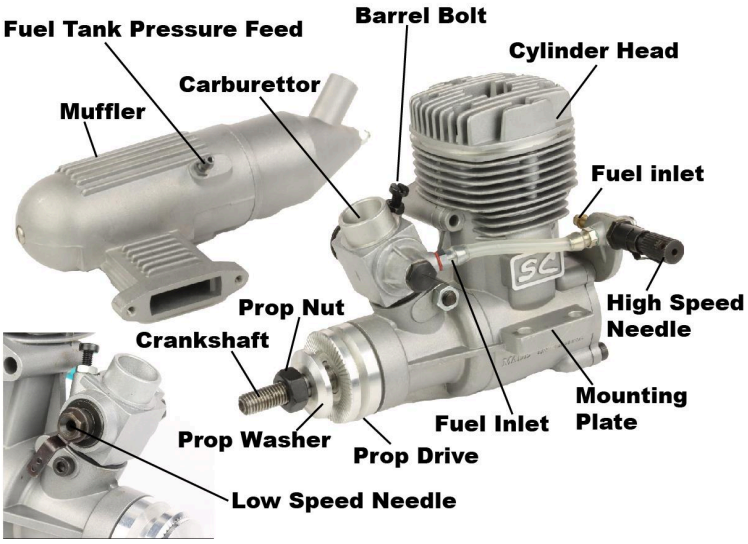
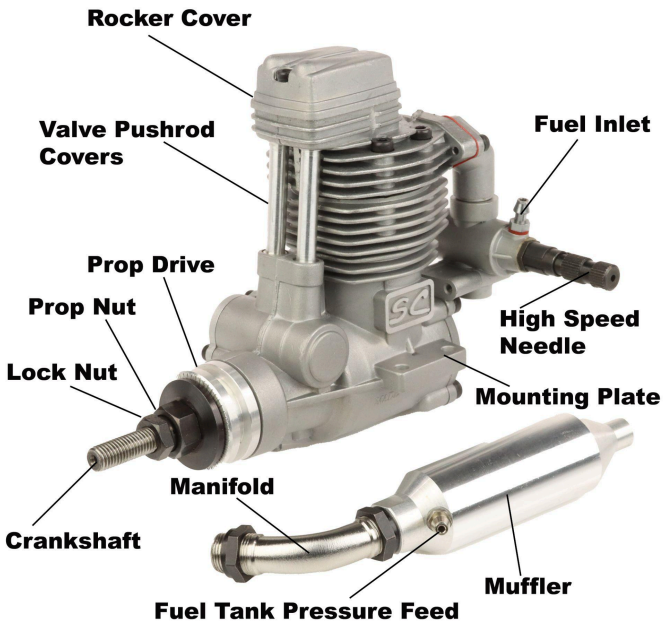
Thank you for purchasing this SC model engine. Please carefully read the following information on the safe operation of your engine. Do not be tempted to operate your engine until you are thoroughly familiar with the information contained in this manual. SC series engines will provide many years of dependable and trouble-free operation if the instructions and warnings detailed here are carefully adhered to.

Become Familiar with Your Engine





Safety is Paramount

Please remember that the safety of both the operator and bystanders is paramount at all times when operating a model engine.

Your model engine is not a toy but a precision engineered powerplant which, if abused – or if these safety precautions are ignored – is capable of injuring the operator and / or bystanders. In this respect please observe the following safety information:

1. Keep onlookers, especially children and animals, at a distance of at least 5 metres behind your engine when operating.
2. Before running, mount the engine securely in an engine test stand or into a model, making sure that the engine is secured firmly by means of four 3mm high tensile (or equivalent) bolts. WARNING: Failure to firmly secure your engine can lead to serious injury.
3. Use only good quality, balanced propellers of the correct size and pitch. See the specification table for this information.
4. Before installation, check your propeller for any cracks, chips or defects. Fit a new propeller if you detect any damage or have the slightest doubt.
5. Ensure that the propeller type matches the rotation of your engine and that the propeller is bolted securely to the engine. Always use a dedicated propeller wrench for this.
6. Keep your face and body well clear of the propeller when starting the engine. Use only a ‘chicken stick’ or an electric starter to crank the engine. NEVER use an unprotected finger to start a model engine!
7. Make all engine adjustments from behind the motor, keeping your body and clothing away from the rotating propeller. Never wear loose clothing or neckties when operating model engines.
8. To stop the engine, close the throttle or disconnect the fuel tubing from the carburettor. Never put your hand or anything else into a rotating propeller to stop it, or, indeed, for any other reason.
9. If you carry your model aeroplane with the engine running, ensure that the aircraft is held securely and that the engine and propeller face as far away from your body as is safely possible.
10. Do not run the engine in an area containing loose sand or gravel. Never run the engine in an enclosed space or indoors. Under no circumstances should models be flown in built-up areas, near children, or near high tension cabling or electric and telegraphic wiring.
11. Store fuel in a safe place and keep well away from heat sources, sparks, naked flames or cigarettes.
12. Model engines generate considerable heat as they run. Do not touch any non-adjustable part of your engine until it has cooled.
13. Model flying should only be carried out in places approved for such activities. This is usually a local, dedicated model flying field.

14. Newcomers to model engines must read all instructions and safety warnings before running an engine. If you have any doubt about how to operate your engine safely and properly, you must seek advice from your local model shop or from where the engine was purchased.
15. Never disassemble your model engine. Disassembly will void any existing warranty agreement. Servicing and repairs should be carried out only by an authorised and appointed service agent for SC engines.

Glow Plugs
The glow plugs used in model engines commonly require a source voltage of between 1.5 and 2 volts in order to achieve a steady orange glow from the plug element. Once started, the engine will continue to run with the voltage source disconnected. We recommend the Force glow plug series for the SC engine range.

Choice of Fuels
We recommend that the fuel used in your two-stroke and four-stroke SC engine should contain only fully synthetic oil with a minimum content of 18%. The nitromethane (nitro) content will depend on what performance you require but we suggest a minimum of 5% for SC two-stroke engines and 10% for SC four-stroke engines. The balance of the fuel's composition should consist of high quality methanol. Use of incorrect fuels and / or unsuitable oils can seriously damage or shorten the life of your SC engine. No warranty claims can be accepted where improper fuel or an improper fuel mix has been used.

Factory Needle Settings
As a guide the factory setting for the needles is as follows:

High speed needle – 2½ turns from closed.
Low speed needle – 2½ turns from closed.

Please note that the low speed needle setting should always be set when the carburetor is in the idle position.

Muffler Installation
All SC engines are supplied with a muffler.
Two-stroke mufflers are supplied with two bolts whilst four-stroke mufflers are supplied with a manifold, two locking nuts and the muffler assembly. NEVER run the engine without the muffler attached.

Fuel Supply
Ideally the centre of the fuel tank should be in line with the high speed needle assembly. That said, as a general rule the only problem you will encounter if it is above the recommended position is syphoning from the tank when the engine is not running.

Carburettor Attachment
This is attached to the crankcase via the pinch bolt assembly. Before starting the engine, please make sure the carburettor is secure.

Propeller Installation
All propellers must be balanced before use. Failure to do so can cause vibration, damage to the bearings and serious – potentially dangerous – damage to your model. Always make sure the centre hole is not over drilled in the propeller as this can cause imbalance. When securing the propeller, ensure the propeller nut is securely tightened. Never secure a propeller without a prop washer. With four-stroke engines it is imperative that you use both the prop nut and the locking nut.

Recommended Propeller Sizes
Please refer to the chart at the end of this manual.

Carburettor Adjustment
All SC engines suitable for radio control use are equipped with R/C carburettors providing easy operation, reliable adjustment, high sensitivity, and good idling performance.

High Speed Needle Valve – The high speed needle valve is used to metre the air / fuel mixture at full throttle. Turn the needle clockwise to lean the mixture or turn the needle counterclockwise to richen the mixture. When you start the engine for the very first time the valve should be turned out from the closed position by around 2 - 2½ turns, this should be the factory setting.

Low Speed Needle Valve – The low speed needle valve regulates the air / fuel mixture at idle and during transition from idle to full throttle. Turn the needle clockwise to lean the mixture or turn the needle counterclockwise to richen the mixture. The factory setting for this should also be 2½ turns.

Priming
Priming Before a Cold Start (two-strokes) – DISCONNECT the glow clip. Fully open the carburettor and cover the venturi with a finger. With the venturi covered, flip the propeller counter-clockwise several times in order to draw fuel into the carburettor. This can be seen on sight of fuel transitioning through the fuel pipe to the carburettor.

Priming Before a Cold Start (four strokes) – DISCONNECT the glow clip. Fully open the

carburettor and cover the muffler exhaust outlet with a finger. With the muffler outlet covered, crank the engine with an electric starter.

Starting
In both cases check that the throttle is set to idle and, with the model securely restrained, crank the engine over with an electric starter and the glow start attached.

Break in Procedure
Prior to prolonged use it is essential to run in your engine in order to bed in the components. Failure to do so can cause damage to the piston, liner and more. Running in should be carried out with the engine securely fitted into a model and should be done outdoors.

It is vital for proper performance that the engine should not become overheated at any stage. When running in an ABC engine, the throttle should be opened carefully to a high setting ensuring that the full speed needle is opened sufficiently to allow the motor to run with a rich (four-stroking) rather than with a lean (two-stroking) mixture. To obtain the correct settings, adjustment of the needles should be made carefully and in small increments of 1-2 clicks. Carefully screw in the high speed needle in order to lean the motor until the engine starts to break from an uneven four-stroke burble into an even / smooth two-stroke sound. Hold this high speed setting for a few seconds and then reduce the engine to idle speed and allow it to cool. Open the throttle and repeat this procedure as many times as required until reliable high speed operation, without overheating, is obtained.

Running in time will vary from engine to engine but you should always aim for the process to use a minimum of two tanks of fuel. If in doubt about any of the above priming, starting or running in procedures, contact the SC Engines agent.

If any information presented in this manual is unclear then it is the responsibility of the operator to seek advice from his dealer.

Optimising the Carburettor Settings
With your engine run in you can set the high speed needle valve to optimise performance.

WARNING: Be careful not to lean out the engine too much. Remember that the lubricants for your engine are suspended in the fuel. If you lean out the fuel mixture too much you will also be lowering the amount of lubrication entering the engine. Less lubricant means more chance of your engine overheating and possible engine failure.

Setting the High Speed Needle Valve
Start the engine and allow it to warm up. Increase the throttle to 100% and lean the high speed needle until the engine reaches max RPM, this can be confirmed by listening to the engine but we recommend using a tachometer. Once you have reached max RPM, richen the high speed needle until you hear the revs drop a little, around 200-300 RPM. Now position the aeroplane so that the nose is angled upwards by 45 degrees and run the engine at 100%. This should give you the optimum max RPM although it may be necessary to adjust by a very small amount to ensure it's correct.

NOTE: The RPM will increase about 10% in the air
This is due to the forward motion of the aircraft in flight. When airborne more air will be entering the carburetor, at a higher force, which causes the mixture to lean out. Additionally, as the fuel level in the fuel tank decreases, fuel draw becomes more difficult for the engine, especially during aerobatics, which causes the mixture to go lean. It is imperative that you set the mixture slightly rich on the ground to compensate for the leaning tendencies that will happen in the air. In this respect, always watch the exhaust emissions during flight. If there is no smoke trail, the engine is running too lean. You should land immediately and reset (richen) the mixture.

Setting the Low Speed Needle Valve
Start the engine and rev to 100% momentarily and return to a reliable idle. Allow the engine to idle for about 30 seconds. Quickly advance the throttle to 100%. If the engine just stops running as soon as the throttle is advanced the idle mixture is too lean. With the engine stopped, richen the idle mixture by about ⅛ of a turn. Repeat the above procedure until you are happy with the pick-up and throttle response.
If you quickly advance the throttle from idle to 100% and the engine is slow to respond and seems very rich during transition (lots of smoke coming from the muffler) the mixture is too rich. With the engine stopped, lean the low end needle mixture ⅛ of a turn.

Care of Your Engine
At the end of a day's flying, ensure that the fuel supply is shut off whilst the engine is operating at a relatively low throttle setting so the engine burns off all fuel inside before stopping. Inject a good quality after-run oil into the engine for protection and turn the engine over half a dozen times in order to distribute the oil to the internal components.

Type	Size cc	Bore mm	Stroke mm	Propeller	Break in prop	Practical rpm range	Weight grams
SC32A ABC	5.32	19	18.4	9x6-8 / 10x5-6 / 11x4-5	9x5	2,000-11,700	330
SC36A ABC	5.9	20.2	18.4	9x6-8 / 10x5-6 / 11x4-6	9x5	2,000-12,200	331
SC40A ABC	6.64	20.6	19.2	10x6-8 / 11x5-7 / 12x5-6	10x5	2,000-12,500	423
SC46A ABC	7.46	22.5	19.28	10x7-9 / 11x6-8 / 12x5-7	10x6	2,000-12,800	418
SC52A ABC	8.46	23.7	19.28	10x8-10 / 11x7-9 / 12x6-8	10x7	2,000-13,200	420
SC61A ABC	9.95	24	22	12x8-10 / 13x6-7 / 14x5-6	12x7	2,000-12,800	609
SC91A ABC	14.97	27.3	25.5	13x10-11 / 14x6-8 / 15x6-8	13x8	2,000-11,500	728
SC108A ABC	17.3	28. 5	25.5	13x10-11 / 14x6-8 / 15x6-9	13x8	2,000-9,500	733
SC180A Ring	29.83	35	31	17x8-10 / 18x8-10 / 20x6-8	17x6	1,800-10,000	1530
SC30FS Ring	5	19.7	16.4	10x5-7 / 11x4-5	10x4	2,500-11,500	275
SC52FS Ring	8.56	23	20.6	11x7-8 / 12x6-7 / 13x5-6	11x6	2,500-11,500	455
SC70FS Ring	11.5	25.8	22	12x7-9 / 13x6-7	12x6	2,000-10,500	606
SC91FS Ring	14.95	27.7	24.8	13x8-11 / 14x7-9 / 15x5-7	13x7	2,500-11,500	640
SC120FS Ring	19.96	30.4	27.5	14x7-8 / 15x6-10 / 16x6-8	14x6	2,500-11,500	888
SC180FS Ring	29.52	36	29	16x10-12 / 17x8-10 / 18x8	16x8	2,000-9,500	1050
SC160FS Ring	12.8×2	26.5	23.2	16x8 / 18x6-8 / 20x6	16x6	2,000-9,000	1265
SC400FS Radial Ring	12.8×5	26.5	23.2	18x10-14 / 20x8-10 / 22x8	18x8	1,800-8,000	2800

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