

ENGINE SAFETY INSTRUCTIONS

Read and follow these safety instructions and warnings before attempting to operate your engine!

The model engine you have purchased will give you dependable performance and can be a source of satisfaction and pleasure if you will strictly follow these instructions and warnings as to its proper and safe use. Remember, this engine is not a “toy”, but a precision built machine whose power is capable of harming you and others if abused, misused, or if you fail to observe these safety precautions. Don't let pleasure turn into harm or even tragedy! You alone are responsible for the safe operation of your engine. Act sensibly at all times.

AT ALL TIMES

Keep small children and anyone who might be hurt while running your engine away from you and the engine! Keep all spectators at least 20 feet away.

Mount the engine securely in a solid stand (available from your model shop) or in the model, using lock washers. DO NOT clamp the engine in a vice. When you mount the engine in a model, use a good quality engine mount as recommended by the plane's manufacturer, or by your model shop and make certain the engine is very secure in that mount.

Use the correct size and pitch of propeller for your engine. See your instruction book, consult your model's plans or get the recommendation of the propeller manufacturer from your model shop. If your engine is over a 40 size, we recommend only wood, fibreglass or high quality propellers like APC. All non-wood propellers require special care and handling. Follow the instructions of the propeller manufacturer.

Install the propeller with the curved side facing you. Securely tighten the propeller nut against the washer and the propeller using the correct size box spanner. Propeller spanners are available from your model shop.

Keep your face and body away from the path of the propeller as you start or run the engine. DO NOT lean over the engine to adjust it while it is running.

Keep your hands away from the propeller as much as possible! Use a “Chicken stick” or electric starter for cranking the engine. Both are available from your model shop. Follow the directions supplied with these devices. DISREGARD any instruction in any manual that speaks of using fingers!

Make all engine and carburettor adjustments from BEHIND the rotating propeller.

To stop the engine, cut off the fuel supply by pinching the fuel line or disconnecting the fuel line from the carburettor. Alternatively, adjust the throttle linkage to completely close the barrel and cut off the air supply. Never use your hands, fingers, or any other part of your body to stop the propeller. DO NOT THROW ANYTHING INTO A RUNNING ENGINE TO STOP IT!

Discard any propellers with nicks, scratches, splits, cracks or any sign of wear or damage. NEVER ALTER, REPAIR, BEND OR SHAVE A PROPELLER! Normal engine vibration can loosen the propeller, so inspect it frequently and tighten or replace if necessary.

If you carry your model with the engine running, be especially cautious. Keep your eye on the propeller, and keep it away from yourself and others.

Under no circumstances should you fly a control line model under or near high tension electric power lines.

WE RECOMMEND

Use safety glasses or a safety shield when starting or running your engine.

Do not run the engine in an area containing loose gravel or sand. The propeller can throw such materials into your face and eyes.

Do not allow loose clothing (such as shirt sleeves, ties, or scarves) to come near the propeller. Keep loose objects (pencils, rules, screwdrivers) out of shirt pockets to prevent them from falling into the propeller.

Make certain the glow plug clip and its lead are well out of the way of the propeller.

If you use a spinner of any kind, be certain its edges do not touch the propeller blades. This causes propeller fatigue and propeller and spinner failure.

Keep all engine fuels in a safe place. Keep fuels away from excessive heat or anything that could ignite the fuel. Remember, model fuel is highly inflammable and must be handled with extreme caution. Do not smoke while working with or running the engine or let anyone smoke near the engine or its fuel supply.

CAUTION

Model engines develop considerable heat as they run. Do not touch any part of your engine until it has cooled.

Never run your engine in an enclosed place (garage etc.). Model engines, like car engines, exhaust deadly carbon monoxide. Run your engine only in a safe, well ventilated area.

Operating any model takes skill and constant safety precautions. A flying model, a power boat, a racing car, can all develop a great deal of inertia and can cause serious personal injuries and do considerable property damage.

KNOW WHAT YOU ARE DOING! Obtain training from an experienced modeller before you operate your model!

Castor Oil Fuel in Saito Engines

Based on our experience obtained over many years, MacGregor Industries Ltd. strongly recommend that Saito four stroke engines are operated using a **Castor based fuel with 20% oil content**. This is because most users in the UK upgrade from two stroke engines or have only seen two stroke engines in operation and are not familiar with the different sounds and characteristics of four strokes. As a consequence, they run with a lean mixture. The lean mixture leads to detonation and can cause overheating, marginal lubrication and subsequent engine damage.

With a two stroke and a rich mixture, the engine "four strokes" - fires every other revolution. As the mixture is weakened, the engine revs increase slowly at first and when the mixture is almost right, the revs suddenly increase and the engine zings into the two stroke mode. Small movements of the main needle peak the revs which can be clearly heard to increase and decrease as the needle is moved. The correct final setting is slightly on the rich side of the peak.

With a four stroke engine, things are quite different. As the mixture is weakened, the revs increase - but only slightly. It is very difficult to hear the maximum and usually the engine will suddenly fade as the mixture becomes too lean to sustain combustion. On the rich side, the engine just stutters slightly without the revs changing much.

Without the sudden increase in revs, it is very difficult to judge the maximum and our experience is that most modellers, attempting to get the absolute maximum revs, err on the weak mixture side. Of course, the correct needle setting for a four stroke is to maximum and then rich until the engine just starts to stutter. For those with a tachometer, Saito recommend that the mixture is set rich to drop the revs by 300 rpm from maximum.

Due to the lubrication being provided by leakage of combustion gasses past the bottom of the piston, a lean mixture can cause a seized and ruined engine due to excessive temperatures and inadequate lubrication. Our experience is that under severe load, marginal lubrication and high temperature conditions, castor oil provides the best lubrication and so helps to prevent engine damage.

The downside is that the castor goo gets all over the inside of the engine and tends to produce varnishing on the piston. Having said that, varnishing has never been a problem with Saito engines used or serviced by MacGregor Industries Ltd.

Of course, with the correct mixture, a high quality synthetic oil is fine. It just has to be remembered that there is no margin for error. The recommendations made by Saito, in their leaflet, assume that the engine will only be operated with the correct mixture **and 23% oil**.

ENGINE SETUP

Please note that the carburettor on GMS and Saito engines are factory set and only minor adjustments should be necessary.

To Reset GMS Carburettors:

Connect a piece of fuel tubing to the inlet nipple of the carburettor.
Close the main needle valve (clockwise all the way in) - throttle barrel fully open.
Blow through tubing, no air should escape through the jet.
Open the main needle valve 3 to 4 full turns (anti-clockwise) and blow through the tubing - air should flow freely through the jet.
Close the throttle barrel to the idling position (approx. 1/16 to 1/8 opening). Turn the idle needle valve all the way in (clockwise - closed position) and blow through tubing - no air should escape from the jet.
Keep blowing and slowly open the idle needle (anti-clockwise) until air just starts to escape from the jet.
Note: Keep the throttle barrel in the idling position.
Start the engine and go to full throttle. Adjust the full throttle needle to give max. rpm. Note: Never run the engine lean, always slightly rich.
Close the throttle to the idle position (approx. 2,500 rpm).
Open the throttle to gain max. rpm. If the engine cuts with no fuel spitting back from the carburettor intake (too lean) open the idle needle valve 1/8 turn at a time (anti-clockwise) until smooth acceleration is obtained. If fuel spits from the carburettor intake (too rich) turn the idle needle in (clockwise) 1/8 turn at a time until smooth acceleration is obtained.

Use ZAP31 After Run engine cleaner and corrosion inhibitor in all 2 and 4 stroke engines. This will neutralize the corrosive acids in your engine and prevent bearings becoming corroded or pitted.

The larger GMS engines are timed for performance and require muffler back-pressure to the fuel tank for top end performance. Some after market mufflers will fit the GMS engine but were never designed for GMS resulting in the engine running hot and possibly lean, which in turn will damage the con-rod and bearings. For best results we suggest testing the engine using the stock muffler first and then the after market parts and test run to see if the same performance is obtained. Also, forget the Nitro. Methanol and 20% castor oil will provide all the power you need!

GUARANTEE

Should this engine require attention under warranty, please return to MacGregor Industries Ltd. Please do not return to our Service Agent.

Recommended Service Agent FOR NON-WARRANTY REPAIRS:

Fox Manufacturing,
The Haven, Rixey Park, Chudleigh, Newton Abbott,
Devon, TQ13 0AN.
Tel: (01626) 852330

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