

# SERPENT

# SE1

INSTRUCTION  
MANUAL



## INTRODUCTION

Thank you very much for choosing a Serpent engine. Read this manual with great attention before racing the engine, for your own safety as well as for others, and to ensure you can enjoy your engine for a long time.

The engine is manufactured from precision parts. Always treat the engine and parts very carefully and avoid dirt and damage at all times. The carburetor of the engine is pre-set in such a way that easy starting is possible.

In case you want to change any setting then follow the manual as per below. Read very carefully before making changes. It's always possible to restore default settings if needed.

## RUNNING-IN

The engine is brand new and requires a run-in session. This run-in session will allow oil to lubricate the inner parts of the engine, the piston and sleeve will get the best possible match and some coal will develop and create a perfect seal inside the engine.

Follow the section Engine run-in carefully. It will protect your engine and increase performance and lifetime.



# SERPENT S21 ENGINE SPECS OVERVIEW



## AIRFILTER:

Makes sure the air that enters the carburetor is clean, so the engine will live longer. The filter must be oiled well, with a good quality foam airfilter oil. Clean and re-oil or replace after each 5 tanks of fuel.

## COOLING HEAD

This helps to keep the engine on the right temperature. During running the head will become very hot, so never touch with bare hands, and keep away from your bodyparts.

## GLOWPLUG

The Glowplug ignites the compressed fuel-air gas-mixture inside the engine. The glowplug is ignited with a glowplugstarter. When the engine runs the glowplugstarter can be removed. The glowplug is a normal one (not turbo) and requires a brass shim to seal.

## THROTTLE-LEVER

This lever controls the throttle opening.

## PULL STARTER

The recoilstarter or pullstarter is used to start the engine, its has a spring inside which will wind back the rope. Dont pull it too far out.

## CARBURETTOR

The carburetor mixes air and fuel into gas and controls the gas-flow going into the engine.

High speed needle: adjusts the overall amount of fuel flowing into the carburetor

Low speed needle: adjusts the amount of fuel flowing into the carburetor

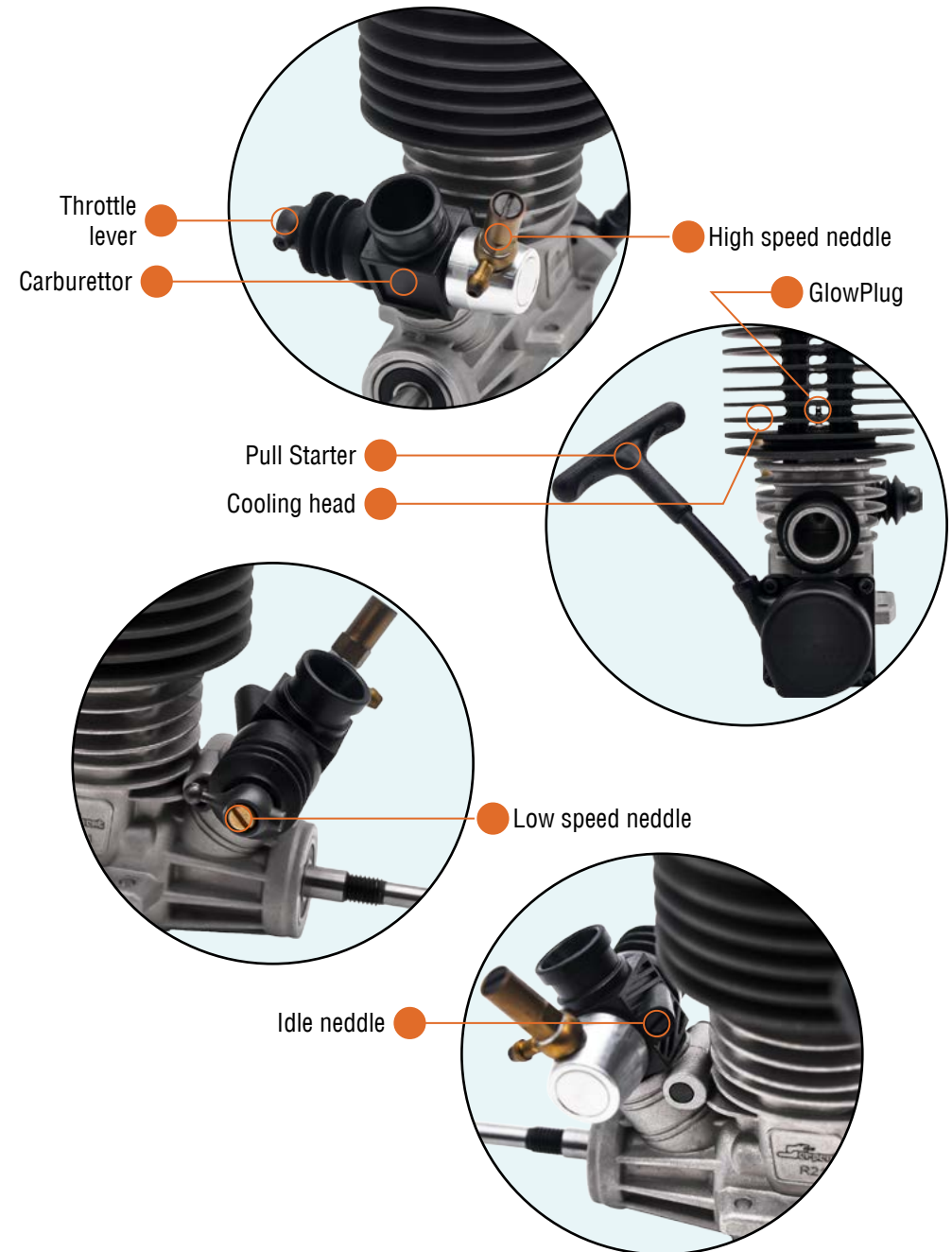
at idel and low revs Idle speed needle: adjusts the carburettor opening when at idling

## INITIAL SETTING:

The carburettor of the engine has been pre-set, so the starting will go as easy as possible. The standard settings are as following: always start from needle fully in, and screw full turns out as below:

- High speed needle: adjusts the overall amount of fuel flowing into the carburetor
- Low speed needle: adjusts the amount of fuel flowing into the carburetor at idle and low revs.
- Idle speed needle: adjusts the carburetor opening when idling.

**The default settings must be both fully closed and then 3.5 turns open. Idle 1mm open if you look into the carburetor.**



## Notes before to start:

- Before you start the engine, first switch on the receiver and then the radio and perform all checks as above.
- When pulling the pullstarter, make sure not to pull out more than 20cm. If you pull out more the device inside may damage and the rope will not return into the case.

## Run-in the engine

Follow the cold start section as below.

Idling with throttle on radio in neutral position:

- Engine idle is well; this is the case if the car does not roll forward with the engine running and the throttle in neutral > leave it as it is.
- Engine stops when in neutral > Adjust the idle screw with Y4 of a turn in (clockwise) at the time, and start again; repeat as needed
- Engine idles too high; in this case the car moves forward with throttle in neutral > Adjust the idle screw with V4 of a turn out (counter clockwise) at the time until the car does not move forward anymore and engine idles well.

- Run the car one tank of fuel with this setting. When you run the car apply max 70% of total power and do not run at 70% or more for longer than a few seconds.

- After 1 tank of fuel, screw in the high speed needle 1/16 turn and run it for 1 tank again.

- Repeat this 5 times in total. Do not lean out the engine too much, as this will cause overheating and breakage. 1/16 turn out (anti-clockwise) is the minimum necessary.

- Run the engine with same setting for another 5 tanks and apply max 90% throttle .

- After the 10 tanks in total the engine is run-in and can be run at full power.

## Cold-start

- Make sure the fuel tank is filled to 90% with a high quality commercially available re car fuel with 25% nitro.

- Perform 5 pulls with the pullstarter without using the Glowstarter and closing the outlet-pipe of the exhaust with your finger, this will allow gas-mixture to enter the engine.

- Apply the glowplug starter and pull the pullstarter with short fast pulls. As soon as the engine runs, then lift the car up and apply short strokes with the throttle lever of your radio to warm up the engine. Remove the glowplugstarter.

- Mount body-shell and start running the car.

- When the engine is new it needs a session of run-in, before the engine can be run at high speeds, follow the instructions as per below.
- If the engine does not start after 10 pulls, then stop and follow procedure as per below with title: Engine does not start.

- Try to avoid the fuel tank from going empty during the run. A tank of fuel will last between 10 and 15 minutes, so refuel before it's empty, so you continue driving without restarts.

- To stop the engine, press a proper engine stopper with rubber top against the flywheel from the bottom of the chassis. NEVER use your fingers!

## Hot re-start

- Apply the glowplug starter, apply a little bit of throttle on the transmitter, pull the pullstarter few times until it restarts.

- If after few pulls the engine does not start then let it cool down for 5 minutes and try again.

- In case it still does not start than follow the instructions in section: Engine does not start.

## Setting the carburetor for best performance

Follow the section: start the engine (cold or hot re-start)

### 1. High speed needle setting:

- Adjust the setting with max 1/16 turn in or out per time.

- After changing the setting apply throttle few times with car off the ground, to allow the engine to adapt to the new setting

- Run the car again and check carefully the result.

- By turning-in the needle (clockwise) the engine will run leaner (will get less fuel) and the speed will increase, if you lean the engine too much, the engine will run too hot and damage if continued too long. If the engine runs too rich (too much fuel) the speed will go down and the engine may shut down, as the plug cannot ignite the gasses anymore.

- You can also check the correct running with an optional infrared temperature gauge; optimal temperature is around 100°C.

## 2. Low speed needle setting

- Adjust the setting with max 1/16 turn in or out per time.
- After changing the setting apply throttle few times with car of the ground, to allow the engine to adapt to the new setting.
- Run the car again and check carefully the result.
- Watch closely for the smoke coming from the pipe:
  - Small amounts of smoke, regular engine sound and fast reaction on throttle > setting is fine, no adjustment needed.
  - A lot of smoke and '4-stroking' sound > mixture is too rich, turn in (clockwise) the low speed needle with 1/16 turn.
  - Engine stops, very little smoke, rpm/revs go up and down mixture is too lean, turn out (anti clockwise) low speed needle with 1/16 turn per time and try again.

## After Running the engine

- Remove fuel from fuel tank
- Restart the engine to burn any fuel still left in the engine.
- Remove the airfilter to clean/wash out and re-oil or replace the foam fully.
- Insert a few cc of normal engine oil or after run oil in the carburetor and pull the pullstarter 5 times, so the oil can move inside the engine and lubricate and protect the engine against corrosion; apply a rubber cover over the carburetor intake (in case you do not remount the airfilter yet) to prevent any debris to enter the carburetor during car cleaning or maintenance.
- Wipe of oil and dirt carefully
- Disconnect the receiver battery /switch off.

## Engine maintenance

Its best to leave the maintenance of the engine to a service center/rc dealer or experienced user if you lack experience by yourself. You can learn by following the guidelines of the expert user, or check out the online video's on re car engine maintenance.

## Problem solving: Issue and >Solution

### Engine doesn't start.

- Too much fuel in the engine. >Remove the glowplug, then pull the pullstarter, so the fuel will be pushed out. Be carefull far fuelspray and use protective gloves and eye protection.

- No fuel in the engine. >Pull the throttle 5 times quickly and start again. >Check if the pipe-outlet is not hot anymore, then apply your finger to close the outlet pipe and pull the pullstart 5 times, check if fuel moves in through the tubing to the engine. Check the silicone tubing and connections to the carburetor, tank and pipe.

- Carburetor is not open for more than 0.3mm. >Re-adjust the idle screw to allow 0.3mm or more opening = turn in.

- Glowplug does not glow red when applying the glowbooster. Try another plug.

- Check if the glowbooster battery is charged. Replace or recharge as needed.

### Low outside temperature.

Warm up the engine:

- by leaving the car in a warm room for an hour.
- by using a hairdrier.

**Engine is overheating.** Wait until engine cooled down, turn-out the high speed needle with 1/8 turn and retry.

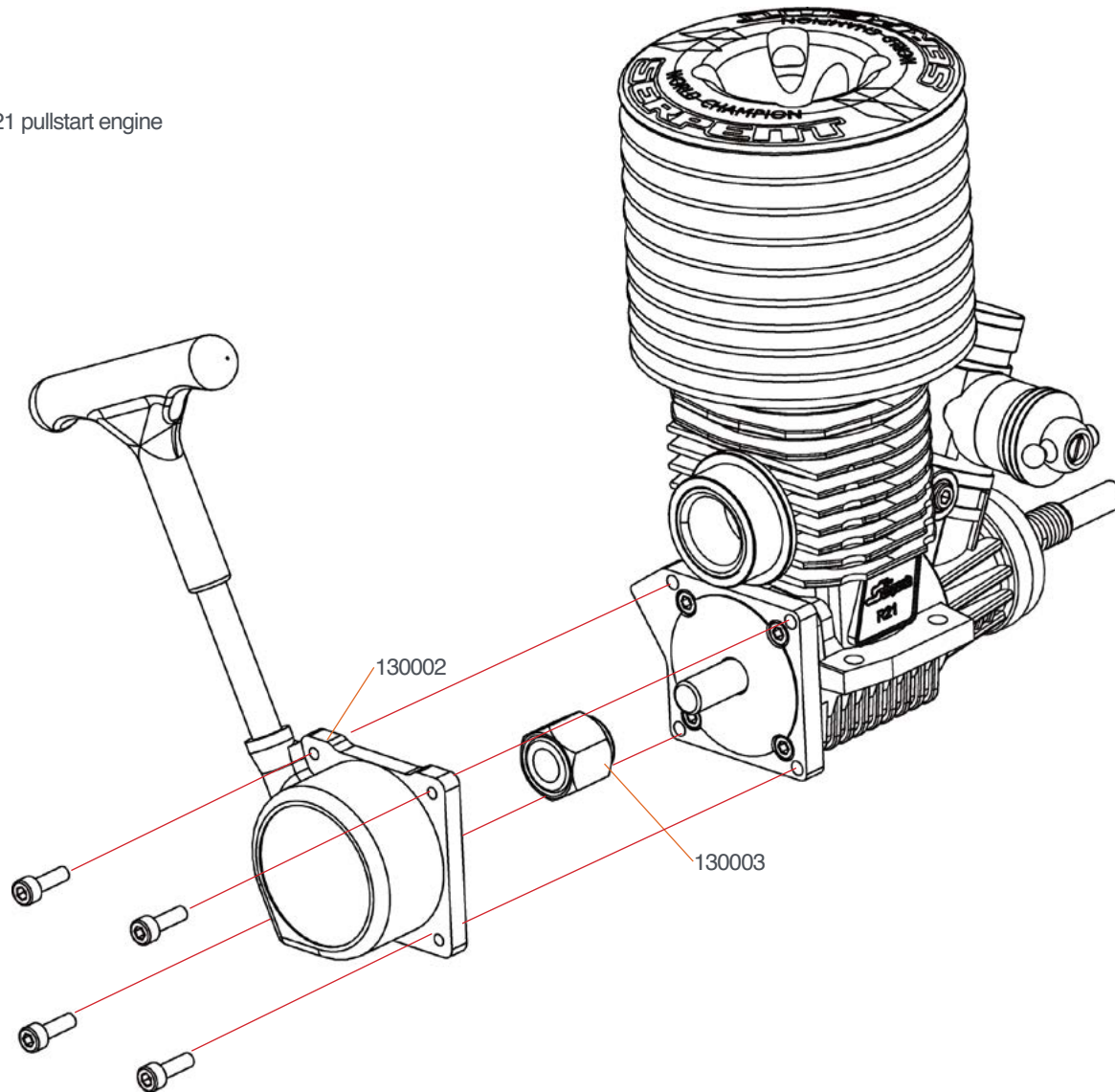
**The carburetor is blocked or dirty** > Clean with cleaner spray. Dis-assemble and clean overall.

**Air filter is blocked.** Remove airfilter and check far dirt; clean or replace faam element as needed, and make sure to oil before use.

**Engine adjustment is not correct.**>Go back to the standard settings section and re-read the engine tuning section as above .

**For more information on engines and maintenance look in the Serpent website section downloads and tech-tips: [www.serpent.com](http://www.serpent.com)**

130001 Serpent S21 pullstart engine



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**NOTES:**

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# SERPENT

# S21



Serpent S21 pullstart engine manual # 13004-1