It is of vital importance, before attempting to operate your engine, to read the general "SAFETY INSTRUCTIONS AND WARNINGS" in the following section and to strictly adhere to the advice contained therein.

Also, please study the entire contents of this instruction manual, so as to familiarize yourself with the controls and other features of the engine.

SAFETY INSTRUCTIONS AND WARNINGS ABOUT YOUR O.S. ENGINE

Remember that your engine is not a "toy", but a highly efficient internal-combustion machine whose power is capable of harming you, or others, if it is misused or abused. As owner, you, alone, are responsible for the safe operation of your engine, so act with discretion and care at all times. If at some future date, your O.S. engine is acquired by another person, we would respectfully request that these instructions are also passed on to its new owner.

The advice which follows is grouped under two headings according to the degree of damage or danger which might arise through misuse or neglect.

**WARNINGS**

These cover events which might involve serious (in extreme circumstances, even fatal) injury.

**NOTES**

These cover the many other possibilities, generally less obvious sources of danger, but which, under certain circumstances, may also cause damage or injury.

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### ENGINE CONSTRUCTION

With this engine, the piston will feel tight at the top of its stroke (TDC) when the engine is cold. This is normal. The cylinder bore has a slight taper. The piston and cylinder are designed to achieve a perfect running clearance when they reach operating temperature.

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### ABOUT THE WARRANTY

Since this is a special SPEED version, individual special parts are available only for limited period (one year after finishing the production). Also, the engine is free of warranty due to damage and/or wear occurred during running.

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### NOTES ON OPERATION

**While Operating**
- Please do not run on a public street, this could cause serious accidents, personal injuries and/or property damage.
- Please do not run near pedestrians or small children.
- Please do not run in small or confined areas.
- Please do not run loud noises can disturb others, such as hospitals and residential areas.

**NOTE**

As delivered, the engine has the carburetor lightly fit into its intake. Secure it changing its angle according to the car chassis.

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### ABOUT THE ENGINE

The O.S. SPEED 21XZ-B Spec III is the evolution of the Spec II, which has enjoyed much success at races all over the world. Low- to middle-range torque has been enhanced even more, providing a great advantage on tracks that require lots of power. You’ll easily hear the difference in the engine’s roar when warming it up on a starter box, and once you’ve raced with the Spec III you’ll want to stay with it. To improve drivability, the drop-in type outer head is lighter, with a lower CG than the Spec II. Some components could not be improved upon, such as the silicon-potted, DLC coated crankshaft with pressed-in tungsten weights. The carburetor is also the same easy-to-tune 21x with 6.5mm restrictor.

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### TOOLS, ACCESSORIES, etc.

- Items necessary for starting
- FUEL
  Generally, it is suggested that the user selects a fuel that is commercially available for model two-stroke engines. When the brand of fuel is changed, or the nitro content increased, it is advisable to repeat the running-in procedure referred to in the RUNNING-IN paragraphs. Please note that with high-nitro fuels, although power may be increased for competition purposes, glowplug elements do not last as long and engine life will be shortened.

- FUEL FILTER
  To be installed in the fuel line between fuel tank and carburetor to prevent foreign matter from entering the carburetor.

- GLOWPLUG IGNITER
  Commercially available handy glowplug heater in which the glowplug battery and battery leads are integrated.

- STARTER BOX
  For starting the engine.

- FUEL PUMP
  For filling the fuel tank, a simple, polyethylene "squeeze" bottle, with a suitable spout, is required.

- O.S. SPEED SILICONE FUEL LINE (optional extra)
  The connection between the fuel tank and the engine. 2.5mm ID

- TOOLS
  O.S. SPEED DRIVER TOOLS
  O.S. SPEED FLYWHEEL KEY
  O.S. SPEED CLUTCH WRENCH & ADJUSTER
  O.S. SPEED FLYWHEEL PULLER
  O.S. SPEED PLUG WRENCH
NOTE: While the Mixture Control Valve and the Metering Valve are set at the standard position when the engine leaves the factory, readjustment may be necessary, occasionally, to allow for changes in fuel formula and climatic conditions. Readjust the controls only when satisfactory results cannot be obtained with the standard positions following the instructions mentioned in the “CARBURETOR ADJUSTMENT” section.

**INSTALLATION OF THE CARBURETOR**

As delivered, the engine has its carburetor tightly installed in the intake boss. Secure it as follows.

1. Loosen the retainer screw, rotate the carburetor to its correct position and make sure that it is pressed well down into the intake boss, compressing the rubber gasket, before retightening screw.

2. Rotate the retainer screw gently until it stops, then tighten a further 120-180°. Do not overtighten the screw as this will damage the thermo insulator.

**NOTE**

Be careful not to damage the O rings when removing the carburetor retainer from the engine. First, remove the retainer Retaining screw, then pull out each part. Do not push the part in or damage the O rings.

**ENGINE INSTALLATION**

Make sure that the vehicle’s engine mounting surfaces are level and in the same plane. Poor installation may cause distortion of the crankcase, bearings, etc., resulting in erratic running and loss of performance. The recommended screws for securing the engine are 3mm or 4-40 steel Allen hexagon socket type. If existing holes in the engine mount do not align perfectly with engine mounting lugs, enlarge them slightly with a needle-file so that screws are in alignment with the mounting holes.

**NOTE**

Do not allow bottom of crankcase to touch chassis. Chamfer inside edges of bearers.

The engine bottom may interfere with chassis of some models. In this case, file off the chassis so that the engine may not interfere with the chassis when it is installed.

**NOTE**

Be sure to use a collet supplied when using a optional 28XZ Hyper Piwyhead Set.

**STARTING THE ENGINE & RUNNING-IN (Breaking-in)**

Running-in is a procedure for an engine to come close to actual running conditions (fuel, r.p.m., engine temperature, etc.). Excessively rich running and prolonged low speed running should be avoided. Prolonged low speed running and low temperature running may result in the oil in the fuel becoming gelled and the piston/liner becoming stuck together.

**PRESSURIZED FUEL SYSTEM**

- It is recommended that a muffler pressurized fuel feed system be used so that the fuel may be stably fed to the carburetor.
- The following procedure is suitable when a fuel containing 30% nitro-methane is used.
  1. Set the carburetor controls at the standard positions (positions when the engine leaves the factory).
  2. Switch the transmitter and make sure that each linkage moves correctly.
  3. Make sure rotating direction of the starter box is correct (counterclockwise when viewed from the front edge of the crankshaft), and turn the engine with the starter box to draw fuel into the engine.
  4. Connect glowplug battery lead to heat the plug and start the engine with the starter box. When the engine does not start or stalls right after being started, try the followings:
     - Close the needle-valve approx. 90° from the standard position.
     - Set the throttle opening a little wider (approx. 1mm) than the standard setting by adjusting the Throttle Stop Screw.
  5. When the engine starts, warm it up by repeatedly increasing the rpm to medium speed and back again to a fast idle with the mixture set very rich, glowplug connected, and the driving wheels clear of the ground. The rich mixture will provide adequate lubrication and cooling, indicated by profuse exhaust smoke.

**Attention:**

It is vitally important to set the throttle at the correct position before starting the engine. If the engine is allowed to run with the throttle too far open under “no load” conditions (i.e. with the driving wheels not in contact with the ground) it will rapidly overheat and may be seriously damaged.

6. When the engine is warmed up, disconnect the glowplug battery and try running the car on the track. If the engine stops soon after running at around mid speed, the mixture is too rich. Close the needle-valve 15-30°. If the engine still stalls, close the metering needle 15-30°. Run the car on the track until one tank of fuel has been consumed, then close the needle-valve very little (within 10°).

7. Repeat this procedure (close needle-valve very little after one tank of fuel has been consumed) until approx. 2 liters of fuel have been consumed, extending gradually the full throttle running time at the straight. Carefully observe the exhaust smoke. Be sure to run the engine with visible white smoke at all times. If the smoke is not visible, the needle-valve is closed too far.

Now the RUNNING-IN (breaking-in) is completed.

**Note:**

In the event of any major working parts (e.g. piston/cylinder liner assembly) being replaced or the fuel supply changed, especially to high nitro fuel, the complete running-in should be repeated.
How to stop the engine
To stop the engine, close the throttle to idle speed and shut it off completely with the trim lever on the transmitter then cut off the fuel supply by pinching the fuel delivery tube to the carburetor.

**Warning:**
Do not touch rotating parts, engine and silencer when stopping the engine as they become very hot, and contact with them may result in a serious burn.

**CARBURETOR ADJUSTMENT**
Carburetor adjustment should be carried out only after the running-in has been completed.

1. NEEDLE VALVE ADJUSTMENT
Run the vehicle (with throttle fully open) over the longest available straight course a few times to observe the model's speed. Return the vehicle to the starting point and close the Needle-valve 15° and repeat the run, taking note of the improvement in performance. Continue with further runs, gradually reduce the Needle-valve setting aiming to achieve the highest straight line speed (optimum position). Remember, however, if the Needle-valve is closed too far, the engine will overheat, accompanied by visibly diminished exhaust smoke and the model will lose speed. At this point, throttle down immediately, stop the vehicle and reopen the Needle-valve 30°-45°.

2. METERING NEEDLE ADJUSTMENT
After setting the Needle-valve at optimum position, run the vehicle a few times at the straight line. With the engine running, close the throttle and allow it idle for about five seconds, then reopen the throttle fully.
If, at any point, the engine puts out an excessive amount of smoke and the vehicle does not accelerate smoothly and rapidly or even stops, it is probable that the idle mixture is too rich. In this case, turn the Metering needle clockwise 15°-30°.
If, on the other hand, the engine tends to speed up momentarily and then cut out abruptly when the throttle is opened, the idle mixture is too lean. In this case, turn the Metering needle counter-clockwise 15°-30°.

3. THROTTLE STOP SCREW ADJUSTMENT
If the engine runs too fast with the throttle closed, the throttle stop screw should be turned counter-clockwise to allow the throttle opening to be reduced.

**OPTIMUM MIXTURE CONTROL POSITION**
The optimum mixture control position, light smoke is visible during high speed running and the engine rpm increase smoothly during acceleration. Carry out adjustment 1–3 patiently until the engine responds quickly and positively to the throttle control. Remember that, if the engine is operated with the fuel-air mixture slightly too lean, it will overheat and run unevenly. As with all engines, it is advisable to set both the needle-valve and metering needle slightly on the rich side of the best rpm setting, as a safety measure. Finally, beyond the normal break-in period, a slight readjustment toward a leaner needle setting may be required to maintain maximum performance.

**Note:**
Please disregard the standard positions in the instruction manual as just a guide. Positions will vary due to the fuel and silencer used. In general, if a fuel containing less nitromethane is used, the needle-valve will need to be closed further. Remember, closing the needle valve too far can cause rusting and damage to the engine.

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1. The minute particles of foreign matter, that are present in any fuel may, by accumulating and partially obstructing fuel flow, cause engine performance to become erratic and unreliable. O.S. Super-Filters (large and small) are available, as optional extras, to deal with this problem. One of these filters installed to the fuel pickup tube inside your refueling container, will prevent the entry of foreign material into the fuel tank. It is also recommended that a good fuel filter be installed between the tank and carburetor.