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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**NOTES ON OPERATION**

**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.

**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**

More and more drivers are getting into 1/8 scale GT touring, and the ROAR-legal O.S. SPEED 21XZ-GT was designed specifically to give those drivers a competitive edge. Based on the SPEED 21XZ-R racing engine, the GT features a new cylinder liner with 5 scavenger ports and 3 exhaust ports, for improved power in the mid- to high range. The crankshaft is also new, designed solely for GT touring, and is silicon-coated and DLC coated with tungsten weights pressed in. The dual adjustable carb also conforms to ROAR regulations, and comes with a 7mm restrictor. The outer head has a lower CG, along with shiny fins.

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**TOOLS, ACCESSORIES, etc.**

The following items are necessary for operating the engine:

- 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 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.

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**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**

The connection between the fuel tank and the engine. 2.5mm ID

**O.S. SPEED DRIVER TOOLS**

- O.S. SPEED FLYWHEEL KEY
- O.S. SPEED CLUTCH WRENCH & ADJUST
- O.S. SPEED FLYWHEEL PULLER
- O.S. SPEED PLUG WRENCH
**BASIC ENGINE PARTS**

- Outer Head
- Carburetor Type Z1J3(B)R7
- Exhaust
- Cover Plate
- Crankshaft
- Mounting Lugs
- Crankcase
- Crankshaft Bearing (Front)

**CARBURETOR CONTROLS - STANDARD POSITIONS (POSITIONS WHEN THE ENGINE LEAVES THE FACTORY)**

Four adjustable controls are provided on this carburetor.

- Needle Valve
- Carburetor Reducer
- Ball Link
- Throttle Stop Screw
- Throttle Insulator
- Metering Needle
- Dust Cover
- Retaining Screw

**The Needle Valve:**

For adjusting air-fuel ratio (air-fuel mixture) at maximum rpm (fully opened throttle).

- Close (Clockwise)
- Open (Counter-clockwise)

**[Standard Position]**

3 turns opened from the fully closed position.

**[Fully closed position]**

Turn the needle-valve clockwise until it stops. This is the fully closed position.

Do not force it to turn further.

**The Mixture Control Valve:**

For adjusting acceleration feeling. (Adjusting range should be within ±1 turn.)

**[Standard Position]**

Flush with the carburetor body.

**The Metering Needle:**

For adjusting idle and acceleration feeling.

**[Standard Position]**

Flush with the ball link body.

**The Throttle Stop Screw:**

For setting the minimum idle speed.

**[Standard Position]**

Approx 0.5mm

**NOTE:** Sketch shows the carburetor reducer removed.

**INSTALLATION OF THE CARBURETOR**

As delivered, the engine has its carburetor lightly 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.

**Do not allow bottom of crankcase to touch chassis.**

Chamfer inside edges of bearings.

**NOTE:**

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 use a optional 28XZ Hyper Flywheel 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 gelied and the piston/liner becoming stuck together.

**PRESSURIZED FUEL SYSTEM**

It is recommended that a pressure-pressurized fuel feed system be used so that the fuel may be steadily 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 (counter-clockwise 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 stops 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. This 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 over-heat 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/cylinderliner assembly) being replaced or the fuel being changed, especially to high nitro fuel, the complete running-in should be repeated.
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. When the engine running, close the throttle and allow it idle for about five seconds, then reopen the throttle fully.

If, at this point, the engine pulls 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.

4. OPTIMUM MIXTURE CONTROL POSITION

With 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 towards a leaner needle setting may be required to maintain maximum performance.

Note: Please regard 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.

5. CARE AND MAINTENANCE

1. The minute particles of foreign matter, that are present in any fuel, may, by accumulating and partially obstructing the fuelflow, 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 pickup tube inside your refueling container, will prevent the entry of foreign material into the fuel tank. It is also recommended that a gas mileage filter be installed between the tank and carburetor.

2. Do not forget to clean the filters regularly to remove dirt and lint that accumulate on the filter screens. Also, clean the carburetor itself occasionally.

3. At the end of each operating session, drain out any fuel that may remain in the fuel tank, Afterwards, energize the glow-plug and to restart the engine, to burn off any fuel that may remain inside the engine. Repeat this procedure until the engine fails to fire. Do this while the engine is still warm.

4. Then, inject some after-run oil into the engine, and rotate the engine with an electric starter for 4 to 5 seconds to distribute the oil to all the working parts.

Note: Do not inject after-run oil into the carburetor as this may cause the O-rings inside the carburetor to deteriorate. These procedures will reduce the risks of starting difficulties or corrosion after a period of storage.

5. Finally, when cleaning the exterior of the engine, use methanol or a household cleaning agent. Do not use gasoline, kerosene, or any petroleum based chemical which can damage silicone fuel tubing.

■ REMOVING DIRT/STAIN

Dirt and stain stuck on the engine and silencer/manifold cause lowering heat dissipation effect. When dirt and stain are detected, remove the engine from the chassis and clean it with alcohol.

■ INSTALLING DUST CAPS

When storing the engine, install the cap on the exhaust port, carburetor, etc. to prevent dust from entering the engine.

■ CHECKING THE ENGINE

If the engine will not develop normal performance after long time running due to wearing of parts. It is suggested to replace necessary parts when the following symptoms are detected.

- Engine sound changes and easily overheats.
- Power has dropped extremely.
- Idle is unstable and/or engine tends to stop at idle.

In most cases, ball bearings, cylinder & piston assembly, connecting rod, or crankcase have become worn. Check the parts carefully and replace them if necessary.

■ O.S. GENUINE PARTS & ACCESSORIES

O.S. GLOW PLUG

- P4 (71641400) + P4 (71641400) + PS (71641500)

CARBURETOR REDUCER

- Ø 8 (71533240) + Ø 8.5 (71533205)
- Ø 9 (71533200)

M2002SC EXHAUST HEADER PIPE ASSEMBLY

(72106480) (80mm)
- Header Pipe Spring (2pcs.) (72101272)
- Exhaust Seal Ring (2pcs.) (22826140)

M2003SC EXHAUST HEADER PIPE ASSEMBLY

(72106480) (70mm)
- Header Pipe Spring (2pcs.) (72101272)
- Exhaust Seal Ring (2pcs.) (22826140)

T-2060SC W TUNED SILENCER COMPLETE SET

(72106135)
- T-2060SC W TUNED SILENCER Assembly

(72106130)
- Exhaust Seal Ring (2pcs.) (22826140)
- Joint Spring (3pcs.) (72106042)

M20005C Exhaust Header Pipe Assembly

(72106440) (75mm)
- Header Pipe Spring (2pcs.) (72101272)
- Exhaust Seal Ring (2pcs.) (22826140)

T-2090SC TUNED SILENCER COMPLETE SET

(72106192)
- T-2090SC Tuned SILENCER Assembly

(72106190)
- Exhaust Seal Ring (2pcs.) (22826140)
- Joint Spring (3pcs.) (72106042)

M20000C Exhaust Header Pipe Assembly

(72106440) (75mm)
- Header Pipe Spring (2pcs.) (72101272)
- Exhaust Seal Ring (2pcs.) (22826140)

28X2 HYPER FLYWHEEL SET

- (For MUGEN) (71812000)
- 28X2 Hyper Flywheel MUGEN (71812100)
- Collet (71801100)
- (For KYOSHO) (71813000)
- 28X2 Hyper Flywheel KYOSHO (71813100)
- Collet (71801100)

SUPER AIR CLEANER 203

(72413000)
- 203 Filter Element (4pcs.) (72413920)

SUPER AIR CLEANER 204

(72415000)
- 204 Filter Element (4pcs.) (72415200)

PRESSURE CHAMBER SET

(71500000)

O.S. SPEED CARBURETOR REPAIR KIT 21

(71490000)

O.S. SPEED Carburetor Repair Parts 21

(71491000)

O.S. SPEED CARBURETOR REPAIR PARTS 21

(71491000)

O.S. SPEED CLUTCH BEARING (1050ZZ 2pcs.)

(71550001)

O.S. SPEED CLUTCH BEARING (1050Z 10pcs.)

(71550002)

O.S. SPEED CICLONE TUBE

(72561200) 2.5mm x 1000mm

O.S. SPEED EXHAUST SEAL RING 21 (2pcs.)

(22826140)

DUST CAP SET 3mm (5pcs.)

(73300305)

DUST CAP SET 16mm (3pcs.)

(73301612)

DUST CAP SET 18mm (3pcs.)

(73301812)

O.S. SPEED CLUTCH WRENCH & ADJUSTER

(71415300)

O.S. SPEED FLYWHEEL KEY

(71415200)

O.S. SPEED FLYWHEEL PULLER

(71415100)

O.S. SPEED PLUG WRENCH

(71420100)

O.S. SPEED PHILLIPS SCREW DRIVER No.1

(71417100)

O.S. SPEED PHILLIPS SCREW DRIVER No.2

(71417200)

O.S. SPEED SPRING REMOVER

(71415500)

O.S. SPEED BODY REAMER

(71415400)

O.S. SPEED DRIVER TOOLS

Code No. Description

71401050 O.S. SPEED WRENCH DRIVER 1.5

71402000 O.S. SPEED WRENCH DRIVER 2.0

71401250 O.S. SPEED WRENCH DRIVER 2.5

71401300 O.S. SPEED WRENCH DRIVER 3.0

71411200 O.S. SPEED WRENCH DRIVER 2.0

71411250 O.S. SPEED WRENCH DRIVER 2.5

71412300 O.S. SPEED FLAT HEAD SCREWDRIVER 3.0

71413500 O.S. SPEED NUT DRIVER 5.5

71413600 O.S. SPEED NUT DRIVER 6.0

71413700 O.S. SPEED NUT DRIVER 7.0