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.

**NOTES**

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

**WARNINGS**

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

### 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.

![Diagram of engine parts]

- **Near TDC**
  - Cylinder Liner
  - Piston
  - Crankshaft
  - Slight taper

When the engine is cold. When the engine is hot.

### 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.

### FUEL FILTER

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

### O.S. SPEED SILICONE FUEL LINE

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

### ABOUT THE ENGINE

The O.S. SPEED 12XZ Spec III is a high performance engine meeting IFMAR specification produced by O.S.’s SPEED TEAM technicians. Major parts such as cylinder & piston assembly, crankshaft and crankcase have been refined to have a powerful potential equal to more expensive specially tuned or modified engines. Also, it employs an outer head that has many drilled holes for lighter weight and better cooling, and a ceramic rear ball bearing for lower friction loss.

### NOTES ON OPERATION

**NOTES**

- This engine is intended for model cars. Do not attempt to use it for any other purpose.
- Mount the engine in your model securely, following the manufacturers’ recommendations, using appropriate screws and locknuts.

**NOTES WHEN APPLYING AN ELECTRIC STARTER**

Do not over-prime. This could cause a hydraulic lock and damage the engine on application of the electric starter. If over-primed, remove glowplug, close needle-valve and apply starter to pump out surplus fuel. Cover the head with a rag to prevent any pumped out fuel from getting into your eyes.

**NOTES**

- 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 where loud noises can disturb others, such as hospitals and residential areas.

**Abbreviations**

- T-type head (Turbo head)
- Glow Plug RP6
- T-type head (Turbo head)
- Exhaust Seal Ring
- Dust Cap Set
- 3mm 1 piece
- 16mm 2 pcs.

**Standard accessories**

- Install an effective silencer (muffler). Frequent close exposure to a noisy exhaust (especially in the case of the more powerful high-speed engines) may eventually impair your hearing and such noise is also likely to cause annoyance to others over a wide area.

**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.

**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**

Commercially available.

**TOOLS**

- O.S. SPEED FLYWHEEL KEY
- O.S. SPEED CLUTCH WRENCH & ADJUSTER
- O.S. SPEED FLYWHEEL PULLER
- O.S. SPEED PLUG WRENCH
Screw supplied.

Install the exhaust seal ring cross-threaded before tightening firmly.

Heatsink-head carefully, making sure that it is not damaged.

Type (12F2-B)

Carburetor

Four adjustable controls are provided on this carburetor.

BASIC ENGINE PARTS

Crankshaft Bearing (Front)

Crankcase

Mounting Lugs

Exhaust

Crankshaft

Carburetor Reducer

Dust Cover

Ball Link

Metering Needle

Thermo Insulator

Carburetor Body

Carburetor Body (12F2-B)

Metering Needle Slide Valve

Carburetor Body

Install the exhaust seal ring supplied.

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 retaining screw gently until it stops, then tighten a further 120-180°, and no more. Do not overtighten the screw as this will damage the thermo insulator.

3. 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.

4. 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.

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

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.

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 pistons/liner becoming stuck together.

PRESSURIZED FUEL SYSTEM

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 seen 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.

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.

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 being 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.

Note:

In the event of any major working parts (e.g. piston/cylinder liner 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 15°.

2. METERING NEEDLE ADJUSTMENT

After setting the Needle-valve at optimum position, run the vehicle a few times at the straightaway, and stop the vehicle. With the engine still running, close the throttle and allow it idle for about five seconds, then reopen the throttle fully.

If, at this point, the engine puffs out an excessive amount of smoke and the vehicle does not accelerate smoothly or rapidly or even stops, it is probable that the idle mixture is too rich. In this case, turn the Metering needle clockwise 15°. If, on the other hand, the engine tends to speed up momentarily with little smoke 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°.

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

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 toward 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.

CARE AND MAINTENANCE

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.

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 try 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 other petroleum-based chemical which can damage silicone fuel tubing.

Note:
Crankshaft of this engine is filled with silicone. Do not use light oil nor kerosene, etc. for washing, or the silicone will swell. Use alcohol or fuel for washing and dry it completely.

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**FINAL ADJUSTMENT**

Final adjustment should be carried out only after the running-in has been completed.

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**PRESSURE CHAMBER SET**

(7150000)

**INDUCTION SILENCER**

(72414400)

- Induction Silencer Filter (3pcs.)
  (72414100)

**ON-ROAD FILTER OIL (20ml)**

(72414200)

**O.S. SPEED CLUTCH BEARING (1050Z2 4pcs.)**

(71500001)

**O.S. SPEED CLUTCH BEARING (1050Z2 10pcs.)**

(71500002)

**O.S. SPEED SILENCER TUBE**

(72506100) ID 2.5mm x Length 1000mm

**O.S. SPEED EXHAUST SEAL RING 12 (10pcs.)**

(21427210)

**O.S. SPEED PISTON PIN RETAINER 4mm (6pcs.)**

(21817010)

**O.S. SPEED FLYWHEEL COLETTE (2pcs.)**

(71800110)

**O.S. SPEED DUST CAP SET FOR 12-30 CLASS**

3mm(2pcs.) 16mm(2pcs.) 1/16in(1pcs.)

(22884254)

**DUST CAP SET 3mm (5pcs.)**

(73300305)

**DUST CAP SET 16mm (3pcs.)**

(73301612)

**O.S. SPEED CLUTCH WRENCH & ADJUSTER**

(71415300)

**O.S. SPEED FLYWHEEL KEY**

(71415200)

**O.S. SPEED FLYWHEEL PULLER**

(71415100)

**O.S. SPEED PLUG WRENCH**

(71520100)

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**O.S. SPEED DRIVER TOOLS**

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<td>O.S. SPEED HEX BALL WRENCH DRIVER 2.0</td>
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<td>O.S. SPEED FLAT HEAD SCREWDRIVER 3.0</td>
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<td>O.S. SPEED NUT DRIVER 5.5</td>
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<td>71413600</td>
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<tr>
<td>71413700</td>
<td>O.S. SPEED NUT DRIVER 7.0</td>
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**O.S. GENUINE PARTS & ACCESSORIES**

- O.S. GLOW PLUG
  - RP6 (71642060)
  - RP7 (71642070)

- T-1070SC L52 TUNED SILENCER COMPLETE SET (72107600)

- T-1070SC L52 Tuned Silencer Assembly (72107610)
  - Joint Spring (3pcs.)
    (72106042)
  - Exhaust Seal Ring (2pcs.)
    (22851400)

- M1006SC Exhaust Header Pipe Assembly (72107620)
  - Header Pipe Spring (2pcs.)
    (72106172)
  - Exhaust Seal Ring (2pcs.)
    (21427200)

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**SUPER AIR CLEANER 202 ASSEMBLY**

On-road Type (72412000)

- 202 Cleaner Body (72412100)
- 202 Filter Element (4pcs.)
  (72412200)

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**ON-ROAD FILTER OIL (20ml)**

(72414200)

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The specifications are subject to alteration for improvement without notice.
**ENGINE EXPLODED VIEW**

- Dimensions (mm)
  - Displacement: 2.10 cc (0.128 cu.in.)
  - Bore: 13.8 mm (0.543 in.)
  - Stroke: 14.0 mm (0.551 in.)
  - Practical R.P.M.: 5,000-44,000 r.p.m.
  - Output: 1.75 ps / 1.73 hp / 35,000 r.p.m.
  - Weight: 225g (7.94 oz.)

**CAP SCREW SETS**

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**ENGINE PARTS LIST**

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<td>Needle</td>
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<tr>
<td>2-3</td>
<td>21682940</td>
<td>Needle Holder</td>
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<tr>
<td>3</td>
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<td>No.14 Universal Nipple Assembly</td>
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<td>&quot;O&quot; Ring (1pc.)</td>
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<tr>
<td>4</td>
<td>21986260</td>
<td>Throttle Stop Screw</td>
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<td>&quot;O&quot; Ring (S) (2pcs.)</td>
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<td>5</td>
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<td>Thermo Insulator</td>
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**CARBURETOR EXPLODED VIEW**

- Type of screw
  - C: Cap Screw
  - S: Set Screw

**THREE VIEW DRAWING**

- Specifications
  - Displacement: 2.10 cc (0.128 cu.in.)
  - Bore: 13.8 mm (0.543 in.)
  - Stroke: 14.0 mm (0.551 in.)
  - Practical R.P.M.: 5,000-44,000 r.p.m.
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