WARNINGS

Model engine fuel is poisonous. Do not allow it to come in contact with the eyes or mouth. Always store it in a clearly marked container and out of the reach of children.

Model engine fuel is also highly flammable. Keep it away from open flame, excessive heat, sources of sparks, or anything else which might ignite it. Do not smoke or allow anyone else to smoke, near to it.

Model engines generate considerable heat. Do not touch any part of your engine until it has cooled. Contact with the muffler, silencer, cylinder head or exhaust header pipe, in particular, may result in a serious burn.

Never operate your engine in an enclosed space. Model engines, like automobile engines, exhaust deadly carbon-monoxide. Run your engine only in an open area.

NOTES

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

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.

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 perfect running clearance when the engine is cold. If over-prime, 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 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-prime, 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.

ABOUT THE ENGINE

MAX-21XR-B is a 1/8 off-road engine with smooth acceleration and easy handling. The newly developed carburetor has polished up-easiness of adjustment, that is distinctive characteristic of O.S. engine.

TOOLS, ACCESSORIES, etc.

The following items are necessary for operating the engine.

<table>
<thead>
<tr>
<th>Items necessary for starting</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUEL</td>
</tr>
<tr>
<td>Generally, it is suggested that the user selects a fuel that is commercially available for model two-stroke engines and contains 10-30% nitromethane. As a starting point, we recommend a fuel containing 20% nitromethane, changing to a fuel containing more nitro if necessary. 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.</td>
</tr>
</tbody>
</table>

FUEL FILTER

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

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

The wearing of safety glasses is also strongly recommended.

Take care that the glowplug clip or battery leads do not come into contact with rotating parts. Also check that the linkage to the throttle arm is secure.

For their safety, keep all onlookers (especially small children) well back (at least 20 feet or 6 meters) when preparing your model for running.

Before starting the engine, always check the tightness of all the screws and nuts especially those of joint and movable parts such as throttle arm. Missing tightening the loose screws and nuts often causes the parts breakage that is capable of harming you.

To stop the engine, fully retract the throttle stick and trim lever on the trans-mitter, or, in an emergency, cut off the fuel supply by pinching the fuel delivery line from the tank.

Warning! Immediately after a glowplug-ignition engine has been run and is still warm, conditions sometimes exist whereby it is just possible for the engine to abruptly restart if it is rotated over compression WITHOUT the glowplug battery being reconnected.

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

For starting the engine.

For firing the fuel tank, a simple, polyethylene “squeeze” bottle, with a suitable spout, is required.

Heatproof silicone tubing of approx. 5mm o.d. and 2mm i.d. is required for the connection between the fuel tank and engine.

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

BASIC ENGINE PARTS

Exhaust

Carburetor

Mounting Lugs

Crankshaft

Crankcase Bearing (Front)

Crankshaft

Cover Plate

Distributor Type 22B

Crankcase Bearing (Front)
STARTING THE ENGINE & RUNNING-IN ('Breaking-In')

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 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.

- Fill the tank completely with fuel.
- The carburetor is set as shown below at the factory. Start the engine as it is.

- The needle-valve is set approx. 3 and 1/4 turns opened from the fully closed position.

- Turn the needle-valve clockwise until it stops. This is the fully closed position. Do not force it to turn further.

- Throttle is set approx. 0.5mm open.

- Rotate the retainer screw gently until it stops, then tighten a further 60-90°.
- Do not overtighten the screw as this will damage the carburetor spacer.

REALIGNMENT OF METERING NEEDLE

In the course of making carburetor adjustments, it is just possible that the Metering Needle may be inadvertently screwed in or out too far and thereby moved beyond its effective adjustment range. The basic positions can be found by rotating the Metering Needle until its slotted head is flush with the ball link body.

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.

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.

Do not allow bottom of crankcase to touch chassis.

Chamfer inside edges of bearers.

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, the glowplug connected, and the driving wheels clear of the ground. The rich mixture will provide adequate lubrication and cooling indicated by profuse exhaust smoke.

When the engine starts, 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.

- Disconnect the glowplug battery and try running the car on the track. If the engine stalls, open the throttle fractionally, but try to keep the engine running as rich as possible: if it stops because of being excessively rich, close the Needle-Valve 30° and try again.

- Run the car on the track until one tank of fuel has been consumed, then close the Needle-Valve 30° and run the car for another full tank of fuel. Repeat this procedure until approx. 2 liters of fuel have been consumed, during which time the throttle may be opened for brief bursts of increased power. If the engine stops at medium speeds, close the Metering Needle 30°.

The position of the needle-valve when starting the engine.

Switch on the transmitter and make sure that each linkage moves correctly.

- Turn the engine with starter box to draw fuel into the engine.

- Deliver fuel into the carburetor.

- Now connect glowplug battery to lead to heat the plug filament and start the engine.

When the engines does not start or stops right after being started, try the followings:

- Set the needle-valve approx. 3 turns open from the fully closed position. Do not force the needle valve to turn beyond a slightly closed position.
- Set the throttle opening a little wider than the factory setting by adjusting the Throttle Stop Screw.
FINAL ADJUSTMENT

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

- Run the vehicle (with throttle fully open) over the longest available straight course, in order to observe the model's speed. Next return the car to the starting point, close the Needle-Valve 15° and repeat the run, taking note of the improvement in performance.
- Continue with further runs, gradually reducing the Needle-Valve setting and aiming to achieve the highest straight-line speed. Remember, however, that, if the Needle-Valve is shut down 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 45-50°.
- With the engine running, close the throttle and allow it to 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, 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. Correct this by turning the Metering Needle counter-clockwise 15-30°.

NOTE:
Metering Needle adjustment should be made in steps of not more than 15-30°, carefully checking the effect on throttle response, of each small adjustment.

- Carry out adjustments patiently, under actual running conditions, until the engine responds quickly and positively to the throttle control.

WARNING!
Mixture adjustments (whether via the Metering Needle, or the Needle-Valve) cannot be made accurately under "no-load" conditions, which, in any case, are not advised, since such operation carries the risk of seriously damaging the engine through over-revving and overheating.

- With the optimum mixture control position, light smoke is visible during high-speed running, and the engine rpm increases smoothly during acceleration. 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.
- 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.
- Finally, beyond the nominal break-in period, a slight readjustment toward a leaner needle setting may be required to maintain maximum performance.

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. 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 fueling container, will prevent the entry of foreign material into the fuel tank. It is also recommended that a good in-line 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 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 petroleum-based chemical which can damage silicone fuel tubing.

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 and/or crankcase have become worn. Check the parts carefully and replace them if necessary.

O.S. GENUINE PARTS & ACCESSORIES

- O.S. GLOW PLUG
  - P3 (71641300) • P4 (71641400) • P5 (71641500)

- T-2060SC WN TUNED SILENCER COMPLETE SET (72106135)
  - T-2060SC WN Tuned Silencer Assembly (72106130)
    - Exhaust Seal Ring (2pcs.) (22826140)
    - Joint Spring (3pcs.) (72106042)
  - M2000SC Exhaust Header Pipe Assembly (72106440)
    - Header Pipe Spring (2pcs.) (72101272)
    - Exhaust Seal Ring (2pcs.) (22826140)
  - T-2090SC TUNED SILENCER COMPLETE SET (72106192)
    - T-2090SC Tuned Silencer Assembly (72106100)
      - Exhaust Seal Ring (2pcs.) (22826140)
      - Joint Spring (3pcs.) (72106042)
    - M2000SC Exhaust Header Pipe Assembly (72106440)
      - Header Pipe Spring (2pcs.) (72101272)
      - Exhaust Seal Ring (2pcs.) (22826140)
  - M2002SC Exhaust Header Pipe Assembly (72106480)
    - Header Pipe Spring (2pcs.) (72101272)
    - Exhaust Seal Ring (2pcs.) (22826140)

- 28XZ HYPER FLYWHEEL SET
  - (For MUGEN) (71812000)
    - 28XZ Hyper Flywheel MUGEN (71812100)
    - Collet (71801100)
  - (For KYOSHO) (71813000)
    - 28XZ Hyper Flywheel KYOSHO (71813100)
    - Collet (71801100)

- SUPER AIR CLEANER 203
  - 203 Filter Element (4pcs.) (72413000)

- SUPER AIR CLEANER 204
  - 204 Filter Element (4pcs.) (72415000)

- 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)

- O.S. SPEED DRIVER TOOLS

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>71410150</td>
<td>O.S. SPEED HEX WRENCH DRIVER 1.5</td>
</tr>
<tr>
<td>71410200</td>
<td>O.S. SPEED HEX WRENCH DRIVER 2.0</td>
</tr>
<tr>
<td>71410250</td>
<td>O.S. SPEED HEX WRENCH DRIVER 2.5</td>
</tr>
<tr>
<td>71410300</td>
<td>O.S. SPEED HEX WRENCH DRIVER 3.0</td>
</tr>
<tr>
<td>71411200</td>
<td>O.S. SPEED HEX BALL WRENCH DRIVER 2.0</td>
</tr>
<tr>
<td>71411250</td>
<td>O.S. SPEED HEX BALL WRENCH DRIVER 2.5</td>
</tr>
<tr>
<td>71412300</td>
<td>O.S. SPEED FLAT HEAD SCREWDRIVER 3.0</td>
</tr>
<tr>
<td>71413550</td>
<td>O.S. SPEED NUT DRIVER 5.5</td>
</tr>
<tr>
<td>71413600</td>
<td>O.S. SPEED NUT DRIVER 6.0</td>
</tr>
<tr>
<td>71413700</td>
<td>O.S. SPEED NUT DRIVER 7.0</td>
</tr>
</tbody>
</table>

The specifications are subject to alteration for improvement without notice.