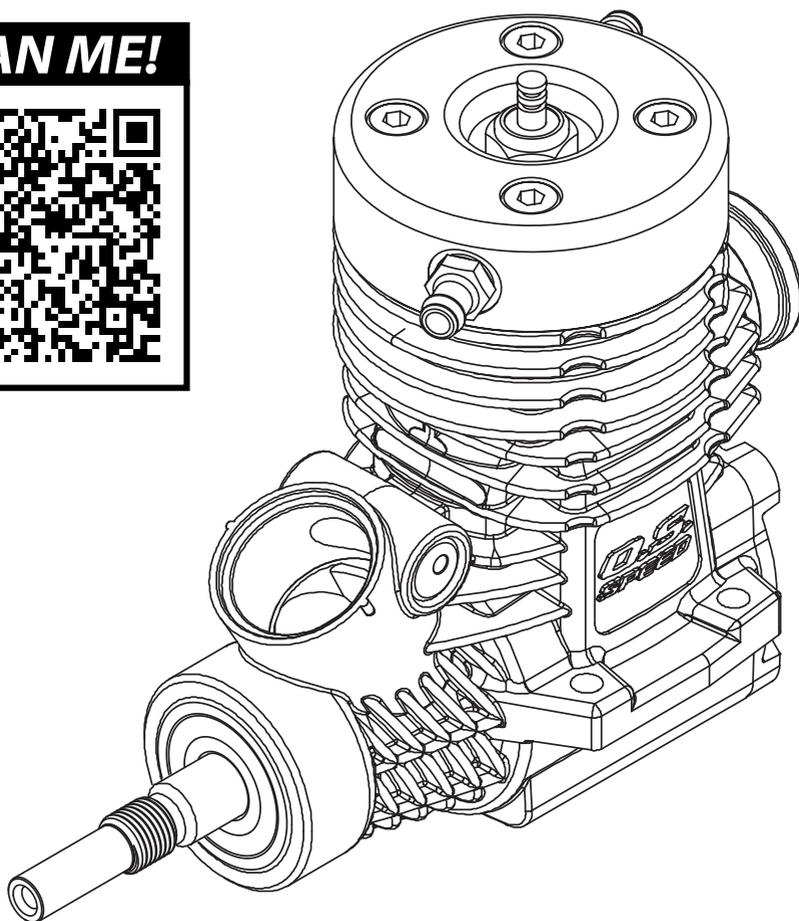


O.S. SPEED *Tuned*

minicars **R21M-05**

HYDRO | OFFSHORE | ENDURANCE

SCAN ME!



Manual

June 2023 v1.0

O.S.SPEED Minicars Marine R21M05 Nitro Racing Engine

This is a racing engine suitable for most 3.5cc RC boat racing applications such as Outrigger Hydroplane boats, Offshore boats & Endurance boats.

Included

- R21M05 racing engine without carburettor & flywheel
- O.S. RP7 Turbo glow plug
- O-ring for carburettor (15 mm)
- O.S.SPEED decal sheet
- Manual

Items needed

- Flywheel (application depended)
- Gear box (application depended)
- Carburettor (application depended)
- Fuel
- After-run oil
- Exhaust system

Fuel

This is what we recommend for different applications:

- **Endurance Boats:** 16-40% Nitro, 8% Klotz Benol Recin Oil, 8% Klotz Original Techniplat Synthetic Oil.
- **Offshore Boats:** 16-40% Nitro, 8% Klotz Benol Recin Oil, 8% Klotz Original Techniplat Synthetic Oil.
- **Outrigger Hydroplane Boats:** 25-60% Nitro, 8% Klotz Benol Recin Oil, 8% Klotz Original Techniplat Synthetic Oil.
- Don't use less oil in the fuel than the above recommendations!. You may add some more castor/recin oil (Klotz Benol) in extreme conditions and heavy loads.

Glow Plugs

There are two different types of turbo glow plugs from O.S.

The normal one is steel colored and the O.S.Speed versions are gold plated. The main difference between them is that the gold O.S.Speed versions last a little longer and can be beneficial if it's very warm temperatures. Regarding power there is basically no difference between them in a marine application.

- **RP6:** For outrigger hydroplane boats
- **RP7:** For offshore and endurance boats
- **RP8:** For endurance boats (rarely)

Head shims

This is the recommended shims to use with stock R21M05 combustion chamber.

- **Endurance boats:** 0.1mm
- **Offshore boats:** 0.1mm
- **Hydroplane boats:** Preferably no shims at all (or 0.1)

Combustion Chamber

For the racers that have the knowledge, the stock combustion chamber can be optimized by removing 0.2mm from the surface that touches the head gasket/liner (this gives you a zero clearance squish height, as in; the piston will just about touch the combustion chamber if you would install it without any shims at all).

Note! This modification must be done in a lathe by a very knowledgeable person. The modification gives you the possibility to use a lower squish height, resulting in more compression and more possible power. The desired squish height measured with the piston at top dead position and the squish band on the combustion chamber is this:

- **Endurance:** 0.35-0.45mm
- **Offshore:** 0.35-0.45mm
- **Hydroplane:** 0.20-0.25mm

Exhaust System

O.S. does't have exhaust adaptors or marine 3.5cc tuned exhaust pipes, so this is a guide for what will work for different applications (not available from Minicars):

• Endurance & Offshore Marine Pipe:

CMB #C30005/#C30006, old Novarossi #50050/#50054.

• Endurance & Offshore Marine Exhaust Adapter:

Old Novarossi #40043/#40045 or CMB C20007/#C20008 (check fit).

• Outrigger Hydroplane Marine Pipes:

Hipex MP1-21 parabolic pipe (#MA210103), Andy Brown Parabolic .21 pipe, old Novarossi #50050/#50054 pipe or CMB #C30005.

• Outrigger Hydroplane Marine Exhaust Adapters:

Hipex 180° exhaust manifold (#CL210108), old Novarossi 180° exhaust manifold or AA 180° deg wrap-around header.

Carburettor

O.S. used to have two carbs that are useable for Endurance and offshore applications that uses a gear reduction gearbox (booth of them have been discontinued in 2023 from O.S.):

- O.S. 21D - #0523882000
- O.S. 60LH - #0529083020

These two carbs are basically the same, the 61H has a solid 15mm neck (but shorter neck length) and a longer throttle arm shaft that might need to be cut down in a lathe vs the 21D carb that has a shorter throttle shaft and a *split* 15mm neck.

For most outrigger hydroplane boats those two carbs have too large diameter venturis and in many cases they are physically too large to fit under the cowl of the outrigger boat. So try to get hold of a Zoom 21 carb or similar specialized hydro carb (8.5-8.7mm venturi diameter). In outrigger boats the carb is mostly used together with an remote rc needle and base.

- O.S. Remote RC Needle - #0571703009

(The Remote RC needle from O.S. is discontinued but we're working on it to be available again)

“SG Pilot-Shaft” Crankshaft

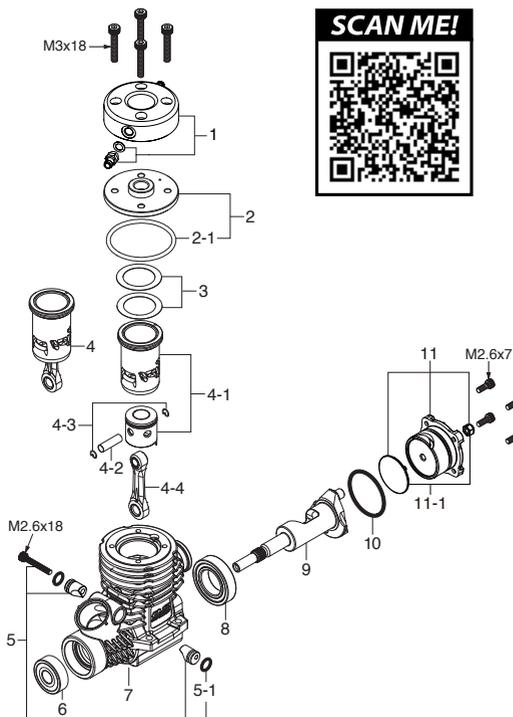
The crankshaft is an std car-spec shaft that has a non threaded 5mm part that the clutch is mounted on a RC car application.

If you plan to mount a short flywheel in a direct-drive application such as a outrigger hydroplane, then you need to cut the outermost part off with a powertool cut-off disc (Dremel). That should be done with outermost care and if you are in any doubt of your own ability to do so, ask a friend with more experience to help you out.

You need to disassemble the engine and remove the crankshaft before any cutting being done. Then you need to de-burr the cut-off part and clean the crank carefully before assembly!

Maintenance

- Blow air in the cooling tube so any excess water is pushed out.
- After each day of use, empty the fuel tank in the boat so there is just a little fuel left.
- Start the engine - let it get warm, run the engine on shore until it stops/runs out of fuel.
- Try to start it again.
- If possible, remove the engine from the boat and clean it and remove any water.
- Remove the glow plug and inspect it.
- Remove the rear cover (make sure the piston is not at the bottom stroke). Check if there is any signs of wear or corrosion.
- You may clean the inside of the engine with alcohol and add a few drops of a good quality after-run oil.
- Please do not use any spray lube (such as WD40) inside the engine as the silicone ramp in the crankshaft may come lose.



| No. | Part No. | Description |
|------|-------------|-----------------------------------------------|
| 1 | 050R21M05MH | Water Cooling Head (Plain Black) |
| 2 | 052C604100 | Inner Head / Combustion Chamber |
| 2-1 | 052DA04180 | O-Ring Inner Head (Black) |
| 3 | 052A004160 | Head Gasket Set (0.1/0.15mm) |
| 4 | 052D903010 | Cylinder Liner, Piston & Rod - Built-Up Set |
| 4-1 | 052D903000 | Cylinder Liner & Piston Set |
| 4-2 | 0522016000 | Piston Pin |
| 4-3 | 052AP17000 | Piston Pin Retainer 0.5.SPEED (6) |
| 4-4 | 052D981000 | Connecting Rod w/ piston pin retainers (3) |
| 5 | 0523981740 | Carburettor Retainer Assembly |
| 5-1 | 0524881824 | O-Ring (2) |
| 6 | 0523731000 | Ball Bearing Front - ID7 x OD19 x Tx mm |
| 7 | 052D901000 | Crank Case |
| 8 | 0523731000 | Ball Bearing Rear/Inner - ID14 x ODxx x Tx mm |
| 9 | 052D902000 | Crankshaft DLC Coated Tungsten Balanced |
| 10 | 0523107100 | Cover Plate O-Ring |
| 11 | 052DA07000 | Cover Plate |
| 11-1 | 052DA07010 | Thrust Plate with M3 nyloc nut |

| Part No. | Size | Description |
|------------|------------|-----------------------------------------------|
| 0571642060 | | Glow Plug Turbo RP6 |
| 0571642070 | | Glow Plug Turbo RP7 |
| 0571642080 | | Glow Plug Turbo RP8 |
| 0571642740 | | Glow Plug Turbo RP6 - 0.5.SPEED (Gold) |
| 0571642750 | | Glow Plug Turbo RP7 - 0.5.SPEED (Gold) |
| 0579871020 | M2.6x7 mm | Cover Plate Retainer Socket Head Screw (10) |
| 0579871055 | M2.6x18 mm | Carburettor Retainer Socket Head Screw (10) |
| 0579871180 | M3x18 mm | Cylinder Head Retainer Socket Head Screw (10) |

R21M05 Specifications:

| | |
|-----------------------|------------------------------------------------------------------------|
| Displacement: | 3.49 cc |
| Bore: | 16.08 mm |
| Stroke: | 17.20 mm |
| Exhaust Ports: | 1+2 |
| Inlet Ports: | 9 |
| Crank Dia: | 14 mm |
| Crankshaft: | DLC coated, balanced, silicone ramp, 4.5mm tungsten balance weights |
| Practical RPM Range: | 6000-43000 |
| Carburettor Neck Dia: | 15 mm |
| Weight (w/o Carb): | 265 g |

