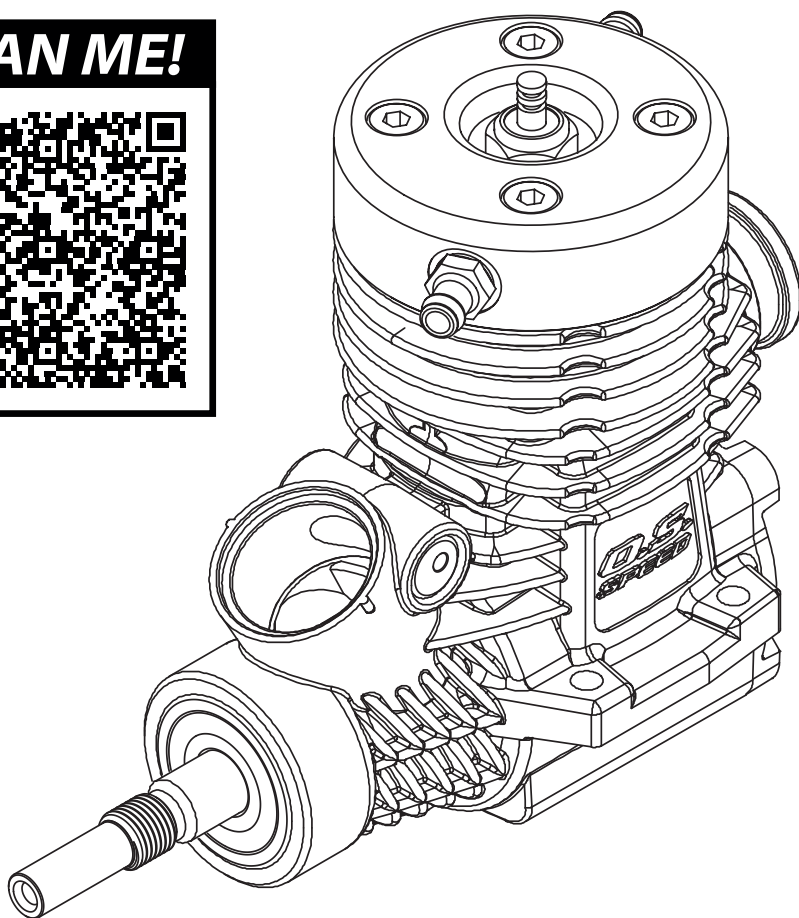


# **O.S. SPEED** *Tuned*

**minicars** **R21M-05**

**HYDRO | OFFSHORE | ENDURANCE**

**SCAN ME!**



## **Manual 2024 Edition**

March 2024 v1.0

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# O.S.SPEED Minicars Marine R21M05 '24 Nitro Racing Engine

This is a racing engine suitable for 3.5cc RC boat racing applications such as Outrigger Hydroplane-, Offshore- & Endurance-boats. The R21M05-2024 Edition engine is equipped with a new combustion chamber with smaller volume optimized for running on lower levels of nitro. It also has an updated piston that makes the run-in period shorter/easier.

## Included

- R21M05-2024 racing engine without carburettor & flywheel
- O.S. RP7 Turbo glow plug
- O-ring for carburettor (15 mm)
- O.S.SPEED flywheel cone
- 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:** 12% Nitro, 8% Klotz Benol Recin Oil, 8% Klotz Original Techniplate Synthetic Oil (or 16% Elkalub ME0200).
- **Offshore Boats:** 12% Nitro, 8% Klotz Benol Recin Oil, 8% Klotz Original Techniplate Synthetic Oil (or 16% Elkalub ME0200).
- **Outrigger Hydroplane Boats:** 12% Nitro, 8% Klotz Benol Recin Oil, 8% Klotz Original Techniplate Synthetic Oil (or 16% Elkalub ME0200).

• Don't use less oil in the fuel than the recommendations! You may add some more castor/recin oil (Klotz Benol) in extreme conditions and heavy loads (or use Elkalub ME0150 instead - it has 70% recin & 30% synthetic oil).

## 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 hot 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 thickness of shims to use with stock R21M05-2024 16% EU combustion chamber:

- **Endurance boats:** 0.20-0.25mm
- **Offshore boats:** 0.20-0.25mm
- **Hydroplane boats:** 0.1mm

## Combustion Chamber EU 16%

The new 2024 combustion chamber has a smaller volume that is optimized for using lower levels of nitro (16% by weight or 12% by volume).

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. doesn't have exhaust manifolds 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 or 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 can be used 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 - #OS23882000
- O.S. 60LH - #OS29083020

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 (8-8.5mm venturi diameter). In outrigger boats the carb is mostly used together with an remote rc needle and base.

### • #OS1703009 - O.S. Remote R/C Needle

## “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 power tool 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!

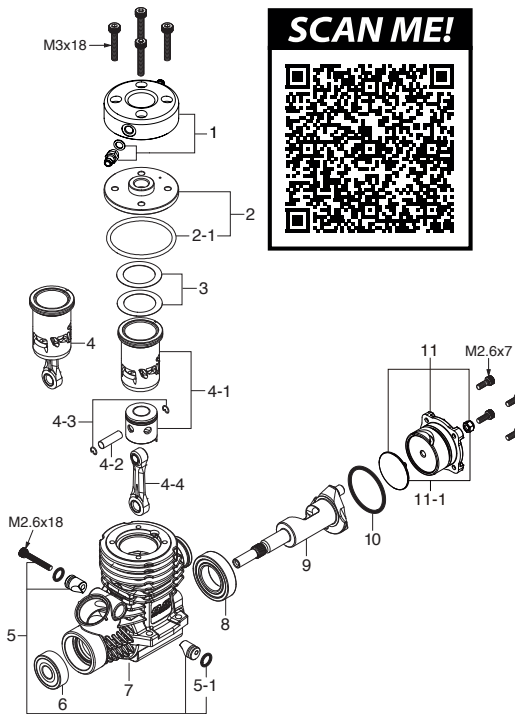
## Marine Direct-Drive Flywheel

From early summer of 2024 we will have a purpose designed flywheel for direct-drive (no gearbox). It will fit the R21M05 engines and most other 3.5cc car engines with a “SG-style” crankshaft. You need to cut-off the protruding 5mm part of the crank though yourself. It uses the std O.S. Speed flywheel cone.

### • #OS0MM-DDFW - Short Marine Direct Drive Flywheel

## 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 residue.
- 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 0.19ml - Option
2	052C604120	Inner Head / Combustion Chamber 16% EU - Low Nitro
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 T? mm
7	052D901000	Crank Case
8	0523731000	Ball Bearing Rear/Inner - ID14 x OD? x T? 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
	050MM-DDFW	Flywheel Short Direct-Drive Minicars Marine (with cone)

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

