

# INSTRUCTIONS FOR

## O.S. MAX-21FSR-C ABC & 21FSR-M ABC ENGINE



MAX-21FSR-C ABC



MAX-21FSR-M ABC

Flywheel and Universal joint are the optional parts.

The MAX-21FSR-C ABC & 21FSR-M ABC engine are the high performance power units designed for radio controlled model racing cars & boats and conforms to the internationally recognised 3.5cc displacement limit. For increased power output and longer life and to meet the special requirements of car racing, the engine incorporates Schnuerle scavenging ABC type piston & cylinder construction, twin ball bearings, squish type combustion chamber of high efficiency, a reinforced conrod and the O.S. 2C series carburettor. The latter has an automatic mixture control developed to give rapid pick-up for maximum acceleration.

Like all O.S. motors, the MAX-21FSR engine is manufactured to standards of skilled craftsmanship that have been developed through more than 40 years of O.S. engine production history, a history that is not only the longest in the model engine manufacturing world but includes such successes as the world's first and only production model rotary engine and the world's first quantity produced model four-stroke cycle engine.

### SPECIFICATIONS

Displacement	3.463 c.c. (0.211 cu. in.)
Bore	16.60 m.m. (0.654 in.)
Stroke	16.00 m.m. (0.630 in.)
Weight	21FSR-C ABC 268g (9.45 oz.)
	21FSR-M ABC 228g (8.04 oz.)
Practical R.P.M.	2,500~26,000 r.p.m.
Shaft Thread Size	¼ - 28 UNF

### RUNNING-IN ('Breaking-in')

For long life and high-performance, every engine needs to be properly "run-in", or "broken-in". However, it has been observed that some modellers consider the running-in of an engine to be complete after simply running it on a bench mount for a time. This is incorrect. For the best performance, any engine should also be run-in under the same conditions as when it is put to full use. Therefore, the final stage in running-in your 21FSR should be carried out after installing it in your model.

The recommended running-in stages are as follows:

As the 21FSR is a racing engine, its practical r.p.m. are high. Therefore, the engine may be run-in at around the speed range of 20,000 r.p.m. Install the engine in your model with reference to the installation notes.

Begin running the model with a fuel containing approximately 20% nitromethane, setting the needle-valve as much on the rich side as possible without badly affecting the running of the model. Then with each successive run, gradually and progressively re-set the needle-valve for increased r.p.m. Set the needle-valve on the rich side for at least the first 5 to 10 runs.

More nitromethane may now be tried but always take the precaution of restarting with a rich needle setting for a further trial run.

**Warning:** When the engine is installed in the model, avoid running it at high r.p.m. without load just after the engine is started, either by closing the throttle or by opening the needle-valve to reduce speed. Although the 21FSR is designed to run at high r.p.m., even when new, such components as the cylinder, piston, connecting-rod, etc. will be seriously damaged if they are allowed to become overheated. When the needle-valve is readjusted for high r.p.m. without load, keep periods of high speed running as short as possible by operating the throttle valve.

### FUEL

The most powerful model engine fuels currently available are those containing a high proportion of nitromethane and, to obtain the highest speeds, fuels containing 50% or more of nitromethane are now being used with some racing engines. However, it should be appreciated that with any engine, the use of high-nitro fuels inevitably shortens engine life and certain precautions should be observed. For example, castor-oil will not blend properly with fuels containing more than 40-50% nitromethane. It then becomes necessary to substitute part, or all, of the castor-oil content with a suitable synthetic lubricant. Generally speaking, synthetic lubricants give less protection to an engine in the event of the needle-valve being set too lean. There are many types of synthetic oil. Those which provide a cleaner exhaust (i.e. do not stain the model) are usually among the least suitable since they tend to burn with the fuel and their lubrication and cooling properties are severely reduced. Therefore, choose an oil that provides adequate lubrication at high temperatures and pressures and make doubly sure that you do not run your engine with a lean needle-valve setting.

## GLOW PLUGS

The type of glow plug used may greatly affect the performance of the engine under different atmospheric conditions and on different fuels. Select the best one by practical tests. Recommended O.S. plug is No.8.

## INSTALLATION NOTES

1. Make sure that the engine-bed mounting beams in the model are parallel, with their top surfaces in the same plane. Poor installation may not only cause vibration, erratic running and loss of performance, but may also damage the engine itself by deforming the crankcase, bearings etc.
2. If the holes in the mounting beams and the engine's mounting lugs do not align perfectly, enlarge them slightly with a needle file so that the fixing screws go in perfectly. Avoid forcing the screws in.
3. Clean the model's "engine room" before installing the engine, in order to eliminate the risk of foreign matter such as sandpaper residue, glass wool, dust, etc., being drawn through the carburettor.

## PROPELLERS (MAX-21FSR-M ABC only)

Suggested propellers are 38 mm to 42 mm diameter with pitch/dia. ratios of 0.8–1.2 for Deep Vees, or 40 mm.dia. and P/D ratios of 1.4–2.0 for Hydroplanes. Use well balanced propellers only. Generally, when a model is running at maximum speed, the revolutions of the engine increase by about 2,000 r.p.m. from the engine's measured r.p.m. at full throttle when the model is stationary. Therefore, select the propeller which reduces the static r.p.m. by 2,000 in order to get the highest model speed.

## CARBURETTOR

For the best result on the most racing events with the good balance of the power and fuel consumption, the O.S. Type 2CA and 2CB carburettors are equipped on the MAX-21FSR-C ABC and 21FSR-M ABC engines respectively. If higher output is required, the O.S. Type 2D carburettor with larger bore throat, which is available as an optional spare part, may be used.

For the adjustment, refer to the attached O.S. Type 2CA & 2CB Carburettor Throttle Handling Instructions.

## PARTS LIST

Code No.	Description	Code No.	Description
22401014	Crankcase	22413009	Screw Set (21FSR-C)
22402002	Crankshaft	22447005	Screw Set (21FSR-M)
22602601	Crankshaft Spacer	22414006	Gasket Set
22403028	Cylinder & Piston Assembly	22631019	Ball Bearing (Front)
22404308	Cylinder Head	22630002	Ball Bearing (Rear)
22441001	Water Cooled Head	22481026	Carburettor Complete (2CA) for Car
22404401	Cylinder Head for Buggy	22481035	Carburettor Complete (2CB) for Boat
22405013	Connecting Rod	*22481044	Carburettor Complete (2D)
22406001	Piston Pin	*22625019	OS-762 Silencer
22607006	Cover Plate	*22625037	OS-762-C Silencer
22608003	Drive Washer	*22426207	Exhaust Adapter for Car
22620003	Thrust Washer	*22625103	762 Extension Adapter
23009006	Propeller Washer	*71802005	Flywheel (2B)
23210007	Propeller Nut	*22442009	Universal joint (4 mmφ)

\* Optional Parts      The specification is subject to alteration for improvement without notice.

## OPTIONAL PARTS

<p>22426207 Exhaust Adapter for Car</p> 	<p>22481044 Type 2D Carburettor</p> 	<p>22404401 Cylinder Head for Buggy</p> 
<p>22442009 Universal joint (4 mmφ)</p> 	<p>71802005 Flywheel (2B)</p> 	<p>22625019 OS-762 Silencer</p> 

**O.S. ENGINES MFG.CO.,LTD.**

6-15 3-chome Imagawa Higashiumiyoshi-ku  
Osaka 546, Japan. TEL. Osaka (06) 702-0225