

O.S Max-60FSR-R/C

PETER CHINN *tests the* **O.S. Max 60F-SR**

“ . . . very powerful and
easy to handle . . . ”



The O.S. Company have now been making model engines for 38 years (considerably longer than any other manufacturer, anywhere) and the 10c.c. Max-60FSR, built in their automated and air conditioned modern factory in Osaka Japan, is the most powerful O.S. engine produced to date.

The Max-60FSR is an entirely new design, featuring Schnuerle scavenging. It is not a development of the well-known crossflow-scavenged Max-H60F series. The latter continues to be available in the form of the current H60FGR (“Black Head”) model, for the benefit of those who require a high quality engine of good performance, more compact dimensions and lighter weight at a substantially lower price.

The 60FSR belongs to the new generation of very high performance 10 c.c. R C engines selling in the £45-£60 bracket. The O.S. costs £54 odd, but this includes a silencer, and, considering the engine’s extremely high standards of construction and performance, is not overpriced by today’s levels.

Design and construction summary.

Main casting. This comprises the crankcase barrel and full length cylinder casing in pressure die-cast aluminum alloy, with cast-in transfer channels, a short exhaust duct on the right side and long beam mounting lugs.

Cylinder liner. Hard-chromed steel cylinder liner with 1.5mm. wall thickness, closely fitted to main casting and located by the usual top flange.

Centrally bridged exhaust port on the right side, timed to open and close at 71 deg. each side of BDC. Two main transfer ports flanking exhaust, angled to direct gas to left side of cylinder and timed to open and close at 60 deg. each side of BDC. Rectangular third port diametrically opposite exhaust port, chamfered to sweep gas upward and timed to open and close 55 deg. each side of BDC.

Crankshaft and front end assembly.

Counterbalanced, hardened steel crankshaft with 15 mm. o.d. main journal, 8 mm o.d. front journal and integral 6.5 mm. o.d. tubular crankpin. Rectangular valve port, 15 mm. long, timed to open at 28 deg. ABDC and close at 55 deg. ATDC and admitting gas to 11 mm. i.d. gas passage. Shaft supported in one 15 x 28 mm. 11 ball steel caged ball journal bearing at rear and one 8 x 22 mm. 7 ball steel caged shielded ball-journal bearing at front. Bearings contained in substantial pressure die-cast aluminum alloy front housing closely fitted to crankcase and secured with four Allen type 4 mm. hardened steel cap screws. Machined aluminum alloy prop driver, recessed to protect front bearing and located on shaft by aluminum alloy split taper collet. ¼ in. UNF thread for prop nut.

Piston and connecting rod assembly.

Piston machined from gravity casting in high-grade piston alloy, with flat crown and skirt cutaways fore and aft. Single compression-ring, pinned to prevent rotation. Machined aluminum alloy connecting-rod, 40 mm. between centres,

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phosphor bronze bushed at both ends, with lubrication slit at the top and two oil holes at lower end. 6 mm. o.d. tubular gudgeon-pin retained by wire circlips in piston bosses.

Cylinder head. Machined from aluminum alloy bar, finned, with bowl-shaped combustion chamber surrounded by sloped 4.2 mm. wide squish band. Centrally located glow- plug. Recessed 0.4 mm. soft aluminum gasket. Head secured with six Allen, type 3.5 mm. hardened steel cap screws.

Back plate. Deeply recessed pressure die-cast aluminum alloy back plate secured by crankcase with four Allen type 3.5 mm. hardened steel cap screws.

Carburettor. O.S. Type 74 automatic fuel metering type. Pressure die-cast aluminum alloy carburettor body with grey, anodised finish. Ground steel throttle barrel. Brass mixture control valve installed in throttle barrel with three O ring seals and equipped with screwdriver slot enabling low-speed mixture to be adjusted while engine is idling. Idle-stop screw mounted in separate screw-in body with gland nut. Main needle valve mounted in left hand side of carburettor body in screw-in needle carrier with ratchet drive.

Separate spray bar and valve seat pressed into carb body. Separate screw-in fuel inlet fitted at rear left-hand side of body. Adjustable throttle-arm on right-hand side.

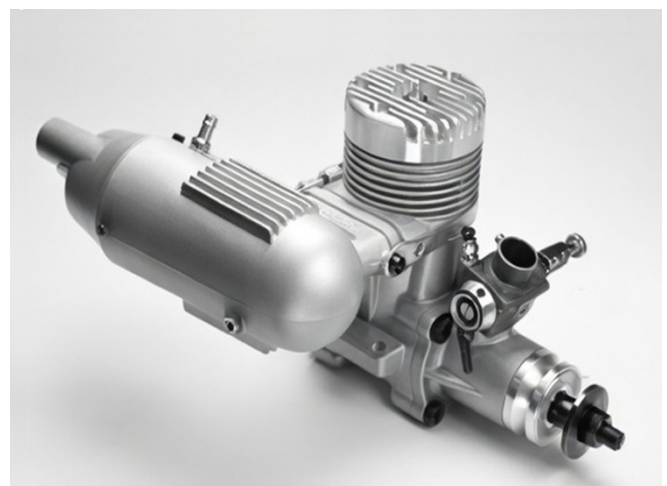
The Type 74 carburettor has a choke bore of 8.8 mm. and an effective choke area of approximately



Components of the O.S. type 74 automatic fuel-metering carburettor.

38 sq.mm, for maximum top end power using a silencer pressurised fuel system. For improved fuel draw on unassisted suction feed, a brass choke sleeve is included with the Type 74 carburettor. Instructions on how to fit it are included with the engine.

Silencer. Like all other O.S. motors (with the exception of the Max 40SR racing engine) the Max 60FSR comes complete with an O.S. silencer. The type supplied is the OS-704 expansion chamber but includes an adaptor plate which attaches to the 60FSR's exhaust duct. This silencer has an outlet i.d. of only 7.5 mm. which restricts outlet area to 44 sq.mm. It is equipped with a brass priming nozzle and an optional pressure nipple.



Shown here with the OS-704 silencer fitted.

Test performance.

The 60FSR was run-in on straight methanol castor-oil fuel and all tests were carried out on our

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standard R/C test fuel containing 5 percent nitromethane and 20 percent castor-oil. The glow plug used was the O.S. N0.7 as supplied with the engine. Also tried was the O.S. N0.9. Both plugs survived all running and testing. Atmospheric temperature at the time of testing was 18 deg.C (64 deg.F) and barometric pressure was 1026 mb (30.30 in.Hg.).

Starting and running. Proving, once again, that even the most powerful engines do not have to be difficult to handle, the Max 60FSR was outstandingly easy to start. We always have an electric starter at the ready during tests but, for prop rpm tests of the 60FSR, hand starting was used on every size from 14 inch diameters down to 9 x6s (finger stall recommended for this however!) one of which was turned at over 18.000 rpm.

Running qualities were also very good but a little less so at certain speeds when the OS-704 silencer was fitted. This made the otherwise non-critical needle-valve rather sensitive when the engine was running at very high speed (i.e. under loads light enough for it to reach its bhp peak at 16.000 rpm plus) and it also appeared to amplify the engine's normally moderate level of vibration when running at speeds in the region of 11.000-11.500 rpm. Having experienced similar symptoms with other high performance engines when these have been fitted with restrictive silencers, and in view of the fact that most other



to c.c. R/C engines use silencers of between 1.5 and 5 times the outlet area of the OS-704, one feels that 60F-SR owners would, in these circumstances, be justified in reaming out the existing 7.5 mm. i.d. silencer outlet to, say, 9 or 10 mm. i.d., thereby increasing the exit area from 44 to between 64 and 78 sq.mm.

Power less silencer. A gross power output of almost 1.5 bhp at just over 16.000 rpm was determined on the standard test fuel. This is marginally the highest figure recorded to date in the RADIO MODELLER test series. Equally impressive was the engine's excellent low speed torque, as a result of which the 60FSR still had a lot of power even when loaded down to much lower speeds, e.g. 1.2 bhp at 10.000rpm.

Typical static prop rpm included 9.550 on a 14x6 Top Flite maple, 11.300 on a 13x5½ Top Flite standard, 12.000 on a 12x6 Top Flite maple, 12.000 on an 11x7 ¾ Power Prop maple, 13.500 on an 11x8 Robbe glass fiber nylon, 14.000 on an 11x6 Top Flite maple, 14.500 on an 11x6 Power Prop maple, 15.900 on a 10 x 6 Top Flite maple and 16.400 on a 10 x 6 Taipan glass fiber nylon.

The ability to pull the larger diameter props at impressively high rpm should be particularly useful where one is faced with lifting heavily loaded FAI scale models.

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Power with silencer. The OS-705 silencer does a good job of lowering noise levels, but at the expense, in stock unmodified condition, of about 20 percent in power output at the peak and almost as much at lower speeds. As a result of a fairly constant loss of torque over the normal rpm range, the speed at which maximum power is realised, with the silencer fitted, was not significantly altered.

Throttling. Throttle response was exceptionally good. Even when propped for full throttle speeds in the region of 16.000 rpm (i.e. the peak of the power curve) the 60FSR idled down quite happily to 2200 rpm. On the 11 inch props commonly used for aerobatics, safe idling at 2.000 rpm was obtained, decreasing to 1.800 rpm on 12-14 inch diameters.

Recovery to full or part throttle operation after lengthy periods of idling was instantaneous and the 60FSR refused to be provoked into stopping when the throttle was abruptly slammed open or slammed shut.

Comment

Very powerful and easy to handle. Carburettor simple to adjust. Excellent throttle response. Overall weight reasonable. Fairly expensive but excellently made and finished.

GENERAL INFORMATION

Manufacturer: Ogawa Model Manufacturing Co. Ltd., Osaka 546, Japan.

U.K. Distribution: E. Keil & Co. Ltd., Wickford, Essex.

Type: Schnuerle scavenged, shaft rotary valve, throttle equipped glow plug engine with twin ball-bearings and ringed aluminum piston.

Bore and Stroke: 24 x 22 mm. (0.9449 x 0.8661 in.).

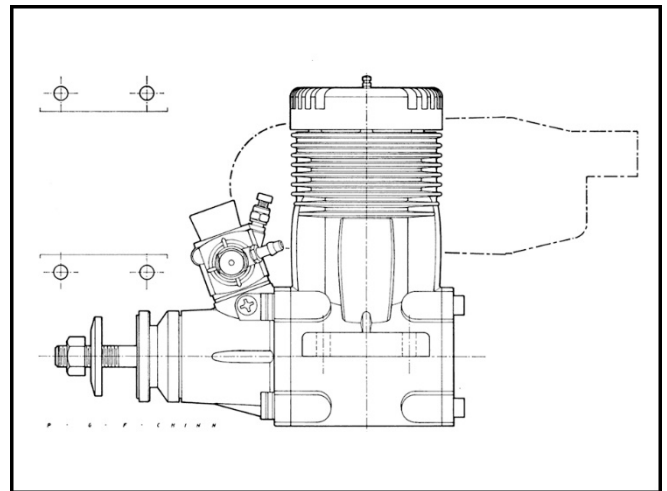
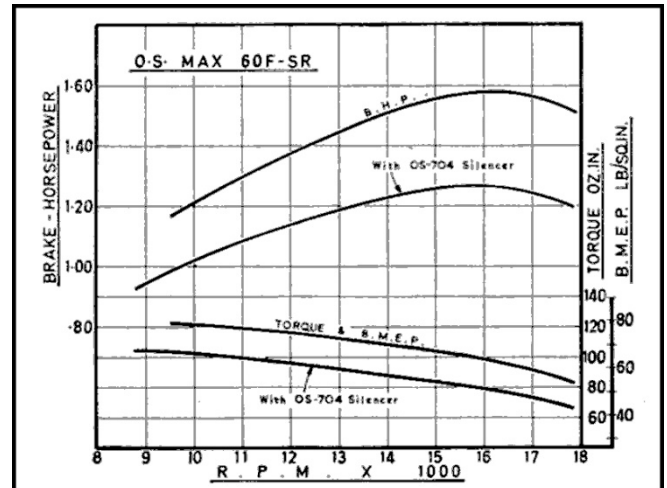
Stroke/Bore Ratio: 0.917:1.

Measured Nominal Compression Ratio: 11.8:1.

Displacement: 9.953 c.c.-0.6073 cu. in.

Checked Weights:

- (i) 470 grammes 16.6 oz. (less silencer)
- (ii) 560 grammes 19.7 oz. (with OS-704 silencer).



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