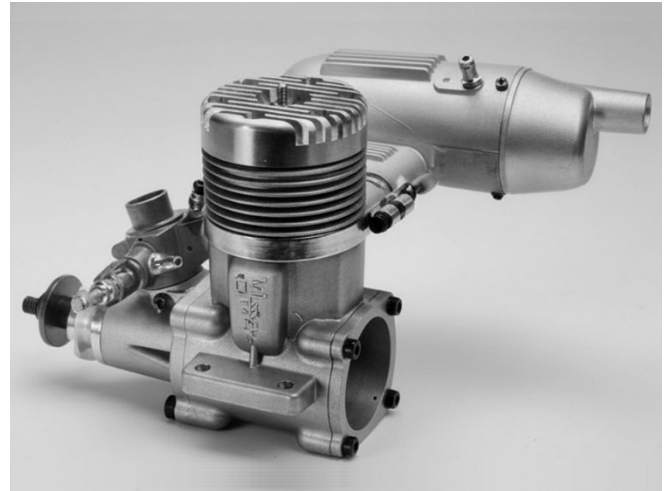


O.S Max-60FSR R/C

Peter Chinn's

RADIO MOTOR COMMENTARY



A couple of nasty accidents in the local club, involving badly lacerated hands and hospital treatment, prompts one to comment on something that has become all too common recently.

At some time, each of us has earned a painful whack from starting an engine, or skinned a knuckle when adjusting the needle valve, but what we ought to be worrying about are injuries that can result when a modeler often a newcomer to the hobby unthinkingly puts his hand straight through the whirling prop blades.

Once upon a time, a modeller's first power model was invariably free flight or control line and the most popular engines were small ones of around 1 c.c., so when our beginner unwittingly got his fingers in the way, he instantly acquired, at the expense of no more than a few cuts or bruises, a miraculous new intelligence which thereafter steered his hand around the prop rather than through it.

Nowadays, however, it is obvious that the beginner in R/C is at very much greater risk. Consider. No longer does he start with a light weight, low-powered single channel model. Instead, he is encouraged to buy a foam-and-block bomb, three or four channel radio and, as often as not, a .40 to haul it aloft. Add a 10 x 6 nylon prop and what have we got? A mobile, ultra high speed bacon slicer. Now put yourself in his shoes. You are a novice . . . The moment has come . . . You start the engine . . . Are you going to manage to control this howling beast or will you make a complete hash of it? Not to put too fine a point on it, you are distinctly nervous. Not a nervous type? inexperienced but confident?

Standard OS-704 silencer is included with Max 60FSR. It muffles effectively but at cost of 1000 r.p.m. and some deterioration in running qualities.

Over confident, probably. Either way you are ripe for an accident.

Clearly, it is up to all of us to try to prevent these and similar occurrences and a word of tactful advice from more experienced fellow club members is probably the best way of approaching the problem.

First and foremost, let us press home the point that a prop turning at ten or twelve thousand r.p.m. and absorbing upwards of half a horsepower is a pretty dangerous instrument and needs to be treated with the utmost caution. Nylon props are considerably worse than wooden ones in this respect and there is the added risk, with nylon, of blade-shedding if such props are used on more powerful engines a practice that is to be discouraged. Here, we make no excuse for repeating a warning we have voiced before, which is never to crouch over an engine running at full bore and to keep spectators, especially small children, well away from the front of the model. An 11 inch prop running at 12.000 r.p.m. on a .60 size engine, for example, has a tip speed of 576 feet per second or 393 m.p.h., which doesn't give much time to dodge out of the way if the prop throws a blade. You'd be more safely occupied as a knife thrower's assistant.

Secondly, it isn't sissy to use a finger protection for starting a model aeroplane engine.

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Production model O.S. Max 60FSR. Expensive, but equal in performance to the most powerful 10 c.c. R/C engines tested to date, including OPS Ursus and Austro Webra.

For about twenty years, E.D. have made an excellent finger-stall which we can thoroughly recommend. It is of moulded rubber with thick ribs on the back to protect the wearer from the thwack of the following blade if the engine fires prematurely.

Thirdly, it is not necessary to start an engine, as so many modellers do, on full throttle. Any R/C engine worth its salt should start perfectly satisfactorily with the throttle in the closed position and can then be left to idle, while the owner repositions himself rearward where he can make any final full throttle needle valve readjustment safely from behind, just before take-off.

None of this, of course, will actually prevent anyone from getting tangled with the prop in a thoughtless moment, but it will help to cultivate a wariness of the front end of the model that should reduce the risk of such a mishap.

O.S. Max 60FSR

The impending appearance of this motor was first mentioned in the September 1974 'Commentary', when a photograph of the sand-cast prototype 60SR was published, and an illustration of one of the pre-production test batch with black cylinder-head and now renamed 60FSR followed in the

February issue. Actual production models, however, have now been available in the U.K. for three or four months, so it is high time that this, the most powerful O.S. engine manufactured to date, was reported upon in more detail in this column.

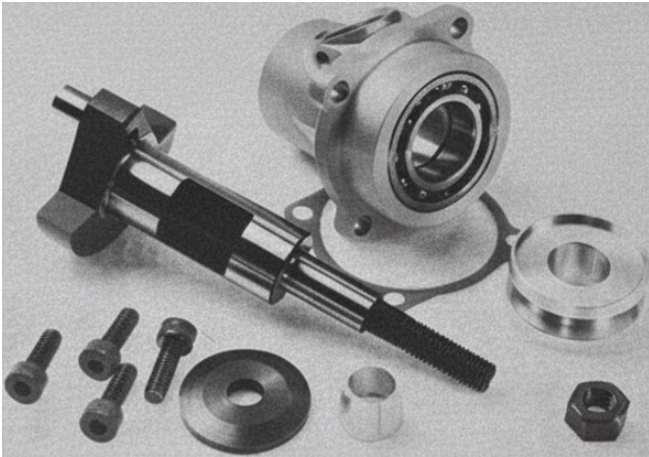
With this new motor, O.S. have joined the ever-growing movement towards Schnuerle scavenging for 10 c.c. class R/C motors. We have now reached the point where Schnuerle type engines (HP, OPS Ursus, Austro Webra, Ross RC-61, Fox Hawk, O.S. 60FSR. plus the new Kraft 61 and Enya 60XF) are just about as numerous as crossflow or open loop scavenged examples, such as the Merco, Super Tigre, HB, K&B Veco, Rossi, Berlin Webra, Meteor, etc.

In general design and appearance, the 60FSR closely follows the first O.S. Schnuerle port motor, the Max 40-SR racing unit except, of course, for its use of shaft valve induction in place of the 40-SR's rear rotary drum valve. Construction and finish are to high standards and, as one is entitled to expect of an engine costing nearly £55 including silencer, its overall quality and performance place it in the very top bracket of 10 c.c. R/C motors.

The engine is built around a nicely proportioned pressure die-cast one piece crankcase barrel/cylinder-casing incorporating the three transfer channels. The closely fitted cylinder-liner (with hard-chromed bore in the latest engine) has a centrally bridged exhaust port, timed to remain open for 142 degrees of crank angle and the usual Schnuerle arrangement of flanking angled main transfers and an upwardly inclined third port. The main transfers open at 60 deg. before bottom dead centre and the third port opens 5 deg. later.

The flat crown piston is fitted with a single, pinned compression-ring and has rectangular skirt cutaways fore and aft to avoid masking' the main transfer entries. The conrod is of machined bar-stock with bronze bushes at both ends, an oil slit at the small-end and two oil holes at the big-end. The hardened tubular 6mm o.d. gudgeon pin is retained by circlips.

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Some of the parts of the O.S. 60FSR. Cylinder porting follows 40-SR design. Ring is pinned and liner has chromed bore.

The crankshaft has the usual 15mm o.d. main journal, a 6.5mm o.d. integral crankpin and an 11 mm i.d. gas passage fed from a large rectangular valve port. This uncovers the intake port for approximately 207 degrees of crank angle, opening quite early at 28 deg. ABDC and closing at 55 deg. ATDC.

The shaft runs in a 15 x 28mm. NTN 11 ball steel caged ball journal bearing at the rear and an 8 x 22mm NTN 7 ball steel-caged ball journal bearing at the front. The latter is of the shielded type and further protection is provided by the turned aluminum prop-driver which is recessed to fit over the machined nose of the robustly proportioned front housing.

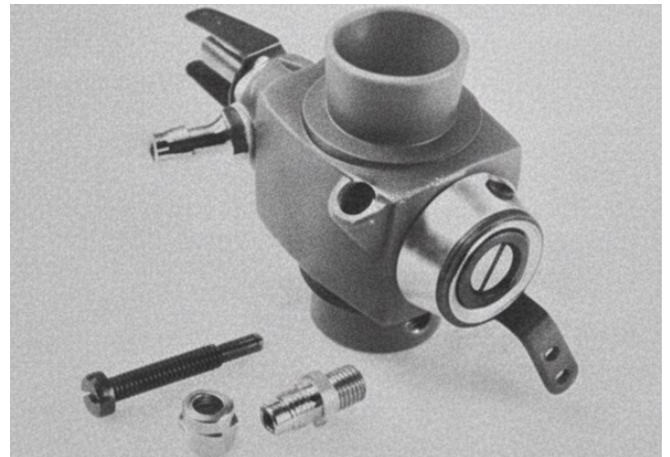
The machined bar stock, finned cylinder-head has a bowl-shaped combustion chamber surrounded by a 4.2mm wide squish band. A soft aluminum gasket, 0.4mm thick, is used to make the joint between the head and cylinder liner top flange and the measured combustion chamber volume with this in place checked out at 0.92ml, giving a nominal compression ratio of 11.8:1.

The carburettor fitted to the Max 60FSR is the OS Type 74 with adjustable automatic mixture control as fitted to the current Max- H 60FGR model. It has provision for easy adjustment of the idling mixture while the engine is running and has a generous 38 sq. mm effective choke area.



All assembly screws are hardened Allen cap head type. Three Allen keys are provided.

The Type 74 carb is intended for operation in conjunction with a silencer pressurised fuel system, but for those who may wish to use suction feed, an optional choke restrictor is supplied with the engine which reduces effective choke area to 29 sq. mm.



60FSR equipped with O.S. Type carb with automatic fuel metering adjustable while engine is idling by means of screw driver slot. Idle-stop (seen removed) is fitted with gland-nut.

To date, the manufacturers of the more powerful types of 10 c.c. R/C motors have been reluctant to supply them with effective silencers due to the fact that hard-won extra performance can quickly disappear again when anything other than a noisy low-loss silencer' is used.

Initially, the O.S. company intended to offer the 60S-FSR without a silencer and to leave it to their customers,

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Parts of the O.S. Type 74 carburettor showing mixture control valve in left foreground. Carb gave extremely good control on test and proved not at all critical to adjust.

in various parts of the world, to decide the level of power loss to be tolerated in their respective areas by choosing from the many proprietary silencers now obtainable.

However, with the recent and somewhat belated recognition of the fact that existing low-power-loss silencers fall lamentably short of acceptable standards of muffling. O.S. are, after all, supplying the 60FSR with a standard OS-704 expansion type silencer suitably adapted. This is basically the same as that supplied with all O.S.60 and 80 engines over the past four years, but has an adaptor to fit the 60FSR exhaust stub. It has a 7.5mm i.d. tailpipe giving a cross-sectional area of only 44 sq. mm (about one-fifth to one-quarter of the area of some of the vented front type mufflers) and does a tolerable job of suppressing the 60FSR's lusty voice, though not without knocking up to 1.200 r.p.m. off prop speeds.

We also found that this silencer resulted in a slight but definite deterioration in the engine's smooth and even running qualities. This is not unusual when a high performance free-breathing motor has its exhaust restricted by a silencer with a small outlet area. One feels that, in view of the 704's better than average muffling qualities, owners may be pardoned for opening up the tailpipe to restore a little of the 60FSR's power

and smoothness. There is sufficient material to allow the outlet to be reamed out to 10mm for a cross-sectional area of 78 sq. mm. This, by the way, is still well under half the outlet area (177 sq. mm) permitted by the FAI pylon-racer silencer rules.

Tests so far carried out on the Max 60FSR have shown it to be easy to handle and very powerful. After a short running-in period, the following prop r.p.m. figures were recorded (less silencer) on 5 per cent nitromethane fuel:

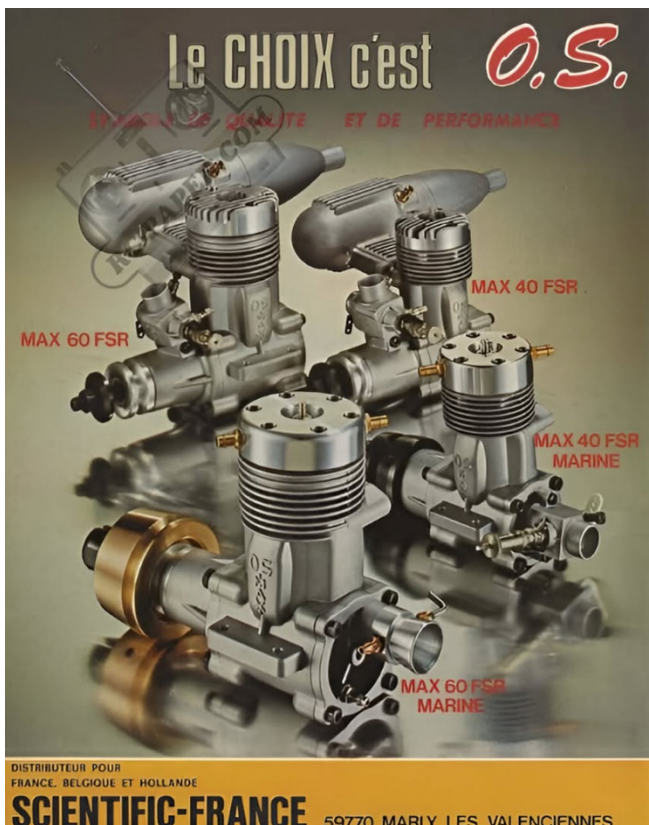
9.500	r.p.m. on a 14x6 Top Flite maple
11.700	r.p.m. on a 11x7 Bartels glass fiber-epoxy
12.000	r.p.m. on a 12x6 Top Flite maple
13.200	r.p.m. on a 11 x7 ½ Power Prop maple
13.500	r.p.m. on a 11x8 Robbe glass fiber-nylon
14.000	r.p.m. on a 11 x6 Top Flite maple
14.500	r.p.m. on a 11 x6 Power Prop maple
15.900	r.p.m. on a 10x6 Top Flite maple

Starting qualities were excellent and we were able to hand-start the engine without difficulty on all props - even a 9 x 6 (which was turned at 18.100 r.p.m.). Throttle response was faultless with safe idling on the bench down to only 2.000 r.p.m. on 11 inch props. Nor was the engine at all hard on plugs. A single O.S. No. 7 plug survived the running-in and all the tests.

Like the still current (and less expensive) Max H60FGR the 60FSR has a bore and stroke of 24 x 22mm (displacement 9.953 c.c. or 0.6073 cu. in.) but is more heftily proportioned externally and is 1.9 oz. heavier at 16.6 oz. bare, or 19.7 oz. with silencer.



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