

O.S Max-61RF RING-ABC R/C

Engine Review Round Up

By PETER CHINN

O.S. Max-61RF ABC

The MAX-61 RF ABC is one of a new and extensive range of O.S. FAI 10cc (0.61 cu in.) class two- stroke-cycle engines which, it is expected, will eventually replace the 61FSR and 61VF range. The latter engines have been very successful over the years, but they have their origins in the Max-60FSR designed in 1974, whereas the new models have been developed to meet the changing requirements of modern high-performance international class contest models.

For example, the demands of the revised FAI aerobatics schedule and the need to reduce overall noise levels (prop as well as engine noise) have seen a swing toward the use of much coarser pitched propellers and substantially lower operating rpm. High performance two-strokes have long had an abundance of top end power that is impossible to use, simply because, to reach these high bhp peaking speeds would require inefficiently small props.

Unfortunately, in an internal combustion engine, the pursuit of the ultimate maximum power output inevitably brings with it higher operating speeds. So far as model applications are concerned, this can be an advantage for racing models, for ducted fan use and for racing boats, but, for most R/C aircraft, only the use of a reduction gear between engine and prop will enable full aerodynamic use to be made of the engine's available power.

To date, attempts to interest pattern fliers in geared engines have not been too successful. Gear boxes are ideal in that they allow virtually any sized prop to be used (given a suitable gear ratio) but they add about 50 percent to power unit weight and also increase both noise and fuel consumption.

There is a need, therefore, for engines that will produce more torque at lower rpm, even at the



All new Max-61RF has lengthened stroke and modified porting for higher torque at reduced operating rpm, as now required by pattern fliers. Also good for scale.

expense of some top end power. So far as the new O.S. RF Series (rear exhaust) and their companion SF Series (side exhaust) engines are concerned, there is very little change in the peak bhp rating, compared with the FSR and VF models, but quite a sharp improvement in the power available at lower rpm has been achieved.

For example, in factory tests on the Max-61 FSR.ABC versus the Max-61SF ABC, the new engine produced 1.85 bhp at 16.000 rpm compared with just over 1.80 at 17.000 for the 61 FSR. Above 17.000 rpm, the power of the new model fell off quicker than that of the older engine, but at lower speeds it was markedly better. Extrapolating torque values from these factory power curves, there appears to be something like 14 percent greater torque available at 10.000 rpm, nearly 11 percent at 11.000 rpm and about 9 percent at 12.000 rpm. The current trend in FAI world championship class aerobatics is to use props that hold rpm down to less than 11.000 rpm static, so the new engine's substantially better performance at these levels should be really useful.

The news is equally good for FAI scale buffs who wish for more torque, low down, to turn the larger diameter props and achieve the higher takeoff thrust desirable for a 13 pound scale model.

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Max-61RF has a rear exhaust. Also available is side-exhaust Max-61SF.

Roth engines obtainable in helicopter versions and/or with diaphragm fuel pump.

Although the 61SF and 61RF engines bear a family likeness to the 61FSR and 61VF, they are completely new models. First, it will be seen that, unlike all other 10cc size O.S. engines of the past twenty years, they no longer have a detachable front end. Instead, a one-piece body casting incorporating the crankcase, cylinder block, front housing and, of course, intake boss, mounting lugs, etc., is used to achieve greater rigidity and improved support for the working parts. Although this means that damage to the case, or to just the front end, would involve replacement of the complete casting, the body, as a whole, is stronger and should be less susceptible to accidental damage.

Second, whereas, in common with most other .60 size engines, the previous O.S. motors in this category used an "over-square" bore and stroke combination of 24x22 mm, the new engine has "under square" dimensions of 23x24 mm, to achieve the longer stroke configuration traditionally associated with increased torque at reduced rpm. To provide the necessary clearance between the piston skirt and crankshaft counterweight at the bottom of the stroke, the connecting rod is lengthened from 40 mm to 42 mm and this also keeps rod angularity and piston side thrust within bounds at a rod length to piston stroke ratio of 1.75:1.



Robust one piece case and Type 7C easy to adjust automatic mixture control carburetor are both new.

As fitted to the Max-61RF ABC illustrated, a ringless aluminum piston is used in conjunction with a convergent bore brass cylinder liner having the now well-known O.S. electroless ultra hard composite plating on all surfaces.

Porting is a conventional, but more conservatively timed, Schnuerle plus third port system.

A centrally bridged exhaust port, at the rear, opens for a measured 144 degrees of crank angle and is flanked, on each side, by transfer ports (open for 114 degrees) that are inclined slightly upward, as well as being angled away from the exhaust port and toward the third port located at the front of the cylinder. The third port is inclined sharply upward and is open for only 104 degrees of crank angle. The liner has a very thick (2.5 mm) wall which is an aid to inducing an angled gas flow through the ports. It also leaves open the opportunity for the manufacturer to introduce a larger displacement version of the engine, at a future date, if required. The pressure cast cylinder head has a bowl and squish band combustion chamber and provides a nominal (full stroke) compression ratio of 11.8:1 (our measurement).

The crankshaft has a big 17 mm diameter main journal and an 11.7 mm gas passage that is gas-flowed where it meets the 17 mm long rectangular rotary valve port. The valve opens at 35 degrees ABDC and closes at 50 degrees ATDC. The shaft runs in a 17x30 mm 11 ball steel caged bearing at the rear and a 3/8 x 7/8 7 ball steel caged

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Hefty crankshaft has 17 mm diameter main journal. Cylinder liner has extra thick wall and revised ports. Conrod is longer.

shielded bearing at the front.

The standard carburetor fitted to the Max-61RF ABC is a new O.S. model, the Type 7L. This is an adjustable automatic mixture control type similar to the 7M fitted to the most recent versions of the 61FSR, 61VF and 61VR. Like the 7M, it has provision for manually setting the automatic mixture control valve that meters fuel admission through the entire throttle range. However, it lacks the separate mid-range overriding manual adjustment that is a feature of the Type 7M and Type 7H (helicopter) carbs. Why this refinement has been omitted from these latest engines is not known. We would hazard a guess that the reason is the same as has been evident, many times in the past, when manufacturers have provided an extra control to facilitate additional tuning of the carburetor to cover all possible contingencies. Past experience has indicated that, for every customer who appreciates such a feature, another one fails to understand how to use it and succeeds only in upsetting another wise acceptable adjustment. In such cases, it may be better for the manufacturer to omit the extra control and settle for a foolproof design as standard equipment, possibly giving the purchaser the option of the more complex carburetor should he wish to have it.

In addition to the Max-61RF ABC and 61SF ABC, the new O.S. long stroke range includes helicopter versions of both models, plus four more powerful versions equipped with diaphragm pump pressurized fuel systems and enlarged choke carburetors. More about these in a future Round-Up.

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