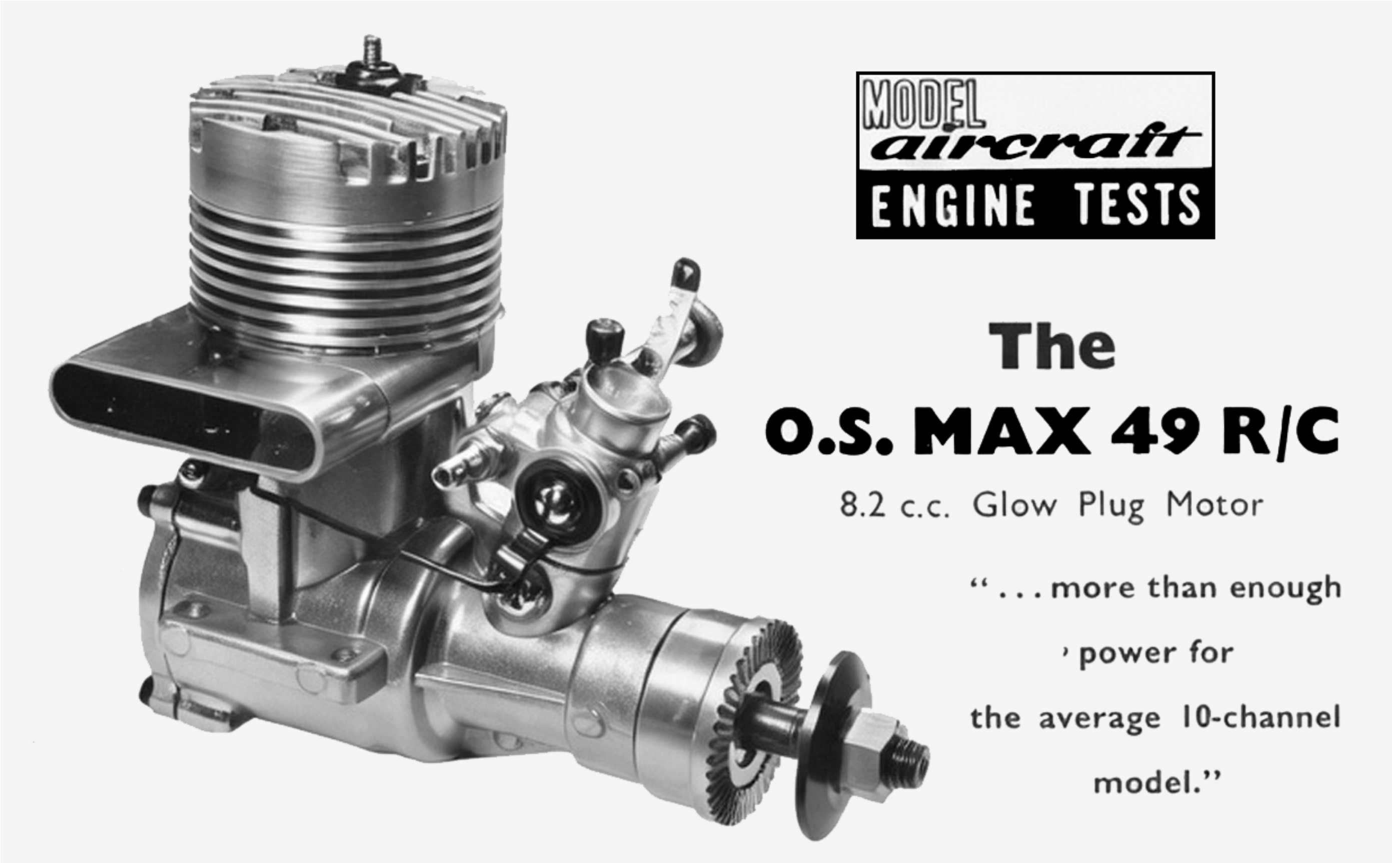
O.S Max 49 R/C



Among multi-channel R/C enthusiasts it is now generally agreed that an engine rather more powerful and/or with better throttling characteristics than the earlier, converted .35 class engines, is now essential.

Until recently, most of the larger R/C engines were .35's which, having originally started life as C/L stunt motors, were equipped with various types of elementary throttles in order to give them a measure of speed control. .Among the earliest throttle systems were simple barrel and butterfly valve intake throttles and exhaust throttles either of a semi rotary or blanking plate pattern. In neither ease, however, could a reduction in speed of more than 50 per cent. IM: reliably accomplished with most of these early designs. Among the first to try to improve this situation was the O.S. Company, who coupled a semi rotary exhaust restrictor to an intake butterfly on the Max-II .35, in 1957-58. Not until 1959, however, when, with the Max-Ill Multispeed .35, a more advanced type of carburettor was adopted having a low speed air bleed adjustment, was a significant improvement obtained. Although effective throttling has been achieved on some engines (the K. & B. 45 being by far the most notable example) without the complication of an independent low speed air adjustment, it is interesting to note that in addition to the O.S., both the Merco Multispeed .35 and Taplin Twin use an air bleed and with excellent results.

Effective, wide range speed control usually brings with it some reduction in power developed, although, since this is mostly in the form of an earlier falling off in torque as load is reduced, it is not so noticeable on the relatively large diameter props usually required for acrobatic R/C models. What is required is greater power in the 8-10.000 r.p.m. range and the obvious way to accomplish this is in increase in cylinder swept volume. Hence the present trend towards .45's and .49's.

The O.S. 49 is the first engine, to be tested in this series, which combines an increase in power on the "right" props with what is, in our experience, the best throttle range of any R/C engine marketed so far. Almost irrespective of the prop used, it can, for example, be throttled down to a safe 2.200 r.p.m.

O.S Max 49 R/C

Below: the stripped down throttle assembly.
Right: complete set of parts of the O.S. Max .49 R/C.

From a peak 11.000 r.p.m., this, an r.p.m. drop of 80 per cent., represents an idling output less than 1 per cent, of maximum power, which must come near to the ideal for engine on landings, etc.

'Flic O.S. 49 is an entirely new motor and while it bears some resemblance to the 35 and 29 O.S. models, it has several structural differences and refinements which set it apart from its smaller brothers. A description of the construction of the engine, with photographs of individual parts, was included in last month's issue and will not, therefore, be repeated in detail here.

Specification

Type: Single cylinder, air cooled, loop scavenged two stroke cycle, glow plug ignition. Crankshaft type rotary valve induction. Baffle piston and offset ignition plug. Coupled exhaust restrictor and carburettor throttle.
Bore: 22.8 mm. (0.8976 in.).
Stroke: 20 mm. (0.7874 in.).
Swept Volume: 8.158 c.c. or 0.4978 cu in.
Stroke/Bore Ratio: 0.885: 1.
Compression Ratio: 9.5: 1.
Weight: 11 oz.

General Structural Data

Pressure die-cast aluminum alloy crankcase and main bearing housing. Counterbalanced nickel chromium steel crankshaft with ½ in. dia. main journal and 17/64 in. dia. tubular crankpin and running in one precision ball bearing and one outer bronze bush.

Hardened steel cylinder liner with machined 17S duralumin finned cooling jacket and pressure die-cast aluminum alloy finned cylinder head. Recessed "blow out proof" soft aluminum head gasket. Six Phillips head screws, three extra-long to secure complete cylinder assembly to crankcase. Lightweight Meehanite piston with straight filleted baffle and two skirt transfer ports. Fully floating hardened 7/32 in. dia. tubular gudgeon pin with aluminum end pads.
Fully machined 24ST alloy connecting rod with lubrication hole at lower end. Pressure die cast alloy counterbalanced prop driver, keyed to flat on crankshaft. Pressure valve control extension. Throttle arm on left hand side for direct push-pull coupling to servo. Pressure die cast aluminum alloy back cover secured to crank ease with four Phillips screws. Beam mounting lugs. Separate carburettor unit, plugged into intake boss seating on recessed gastight rubber seal and secured with two Phillips screws. Barrel type throttle valve with separate screw adjustments for setting idling speed and low speed mixture strength. Needle-valve mounted at rear of carburettor and metering fuel to screw in fixed jet. Flexible needle die cast exhaust extension with enclosed butterfly type baffle linked to carburettor throttle.

Test Conditions

Running time prior to test: 2 hours.
Fuels used:
(i) 70 per cent, methanol and 30 per cent. Duckham's Racing Castor oil (running in and initial tests).

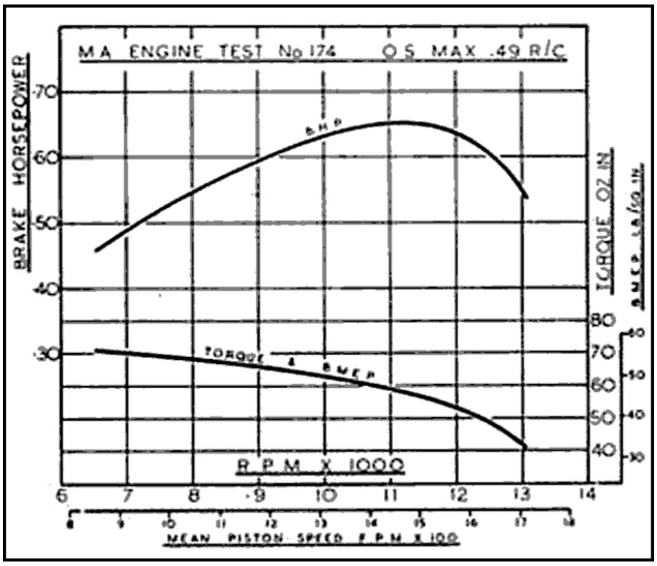
(ii) 70 per cent, methanol, 25 per cent. Duckham's Racing Castor oil, 5 per cent, nitromethane (dynamometer test).
Ignition plug used: O.S. No. 6 bar type.
Fuel system: standard suction feed.
Air temperature: 50 deg. F.
Barometer: 29.5 in. Hg.

Performance

The O.S. 49 will be available through Keil Kraft stockists from early February. Our test sample was submitted direct by the manufacturers prior to general release and before the appropriate instruction leaflet had been issued. We were, therefore, without benefit of any specific recommendations as to fuel, running-in, or starting but no difficulties were, in fact, encountered

So far as can be judged from this single example, running-in time would appear to be less than with the 35 model. Examination revealed that our test sample had received very little running, but less than an hour of bench running was required before sustained full throttle running could be safely field. On large props (13 and 14 in. dia.) some loss of power on warming up did occur, even after two hours but this tendency disappeared on props allowing speeds above 9.000 r.p.m.

Our first tests were to check the effectiveness of the throttle on various props. On a 13 X 5 ½ Top Flite, the O.S. ran up to a very respectable 8.500 r.p.m. and a similar speed was obtained on a 12 X 8. On closing the throttle, speed dropped to 2.100 r.p.m. We then tried successive readjustments to the throttle stop and air bleed and managed to gel the engine down to a steady 1.600 r.p.rn. The 49 ticked over quite happily at this speed but, if after protracted idling, the throttle was suddenly slammed wide open, it could be provoked into cutting out abruptly, so we then began advancing the low speed adjustments until a " safe " setting was obtained. This was reached at 2.200 r.p.rn. At this point, the throttle could be "jazzed" indiscriminately from maximum to minimum or anywhere between, it could lie left



closed for long periods and then suddenly opened up for full power or vice versa.

We then tried several other props. On a 14 X 6 Top Flite, the O.S. pulled well, running up to 7.400 r.p.rn., but with some power loss after protracted full throttle running. Aimed at getting full throttle speed up to around the b.h.p. peaking speed in the air, we then tried 12 X 6 and 12 X 5 Power Props and found the idling speed to be equally as good as on the larger props, giving an even better power range.

Much, of course, depends on the type of glow plug used. We used the makers' own plug, the O.S. No. 6 shielded type. This has a "flat" shield made up of three thin bars side by side. Certain other bar type plugs, such as the Ohlsson Full Range, have a much heavier, single bar which may foul the piston baffle at TDC. An extra plug washer will cure this, but may then mean that the filament is too deeply pocketed in the head for best performance and throttle range and it is conceivable that filing down the bar depth of such plugs may be better. Actually, we found that the 49 would operate quite well on ordinary type plugs. On standard Herkimer OK plugs, for example, starting and performance was comparable with the No. 6 plug and with only a slight loss of reliability at low speeds.

To obtain a start from dead cold, an exhaust prime is essential and this may also be desirable with the engine slightly warm. Hot restarts can

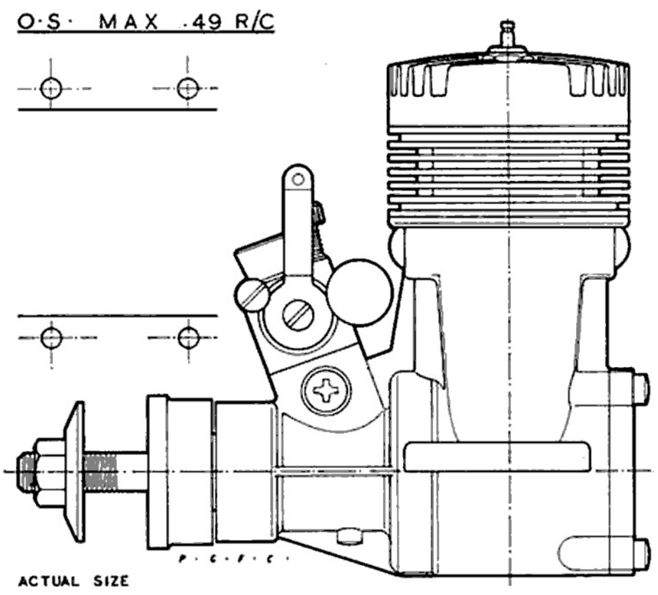
O.S Max 49 R/C

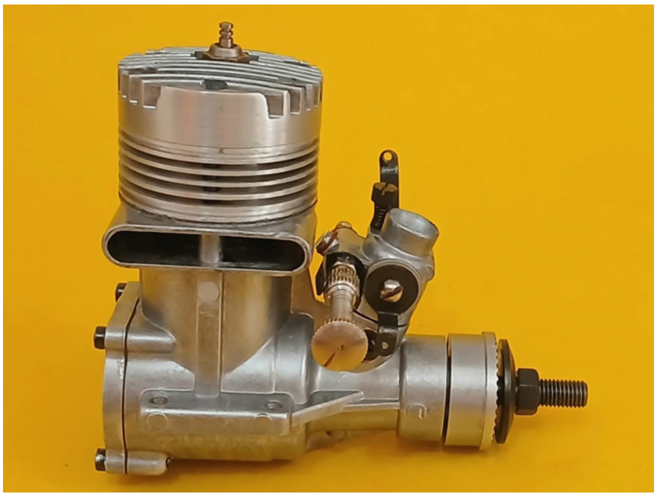
generally be obtained by simply choking the intake for a couple of preliminary turns of the prop. With practice, it is possible to restart the engine, when hot, with the throttle closed. If it is required to choke the intake in order to re fill the fuel line, however, one must remember, if the throttle is closet!, to cover also, the air bleed hole in the front of the carburettor.

Due to the restricted air intake imposed by the throttle, the 49 develops its maximum torque at relatively low r.p.rn. Our 49 was tested over a 7.000 r.p.rn. power range from 6.000 upwards. Torque declined steadily over this entire range dropping from 70 oz. in. at 7.000 r.p.rn. to 42 oz. in. at 13.000 r.p.rn. and resulting in a peak power of just over 0.65 b.h.p. at 11,300 r.p.rn. Such an output should be more than enough for the average to channel model, but if more power should be required, we would estimate that 15 per cent, nitro would raise this to 0.75-0.70 b.h.p. with a well run in engine.

Power/Weight Ratio (as tested): 0.945 b.h.p./lb.

Specify Output (as tested): 74.5 b.h.p./litre.





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