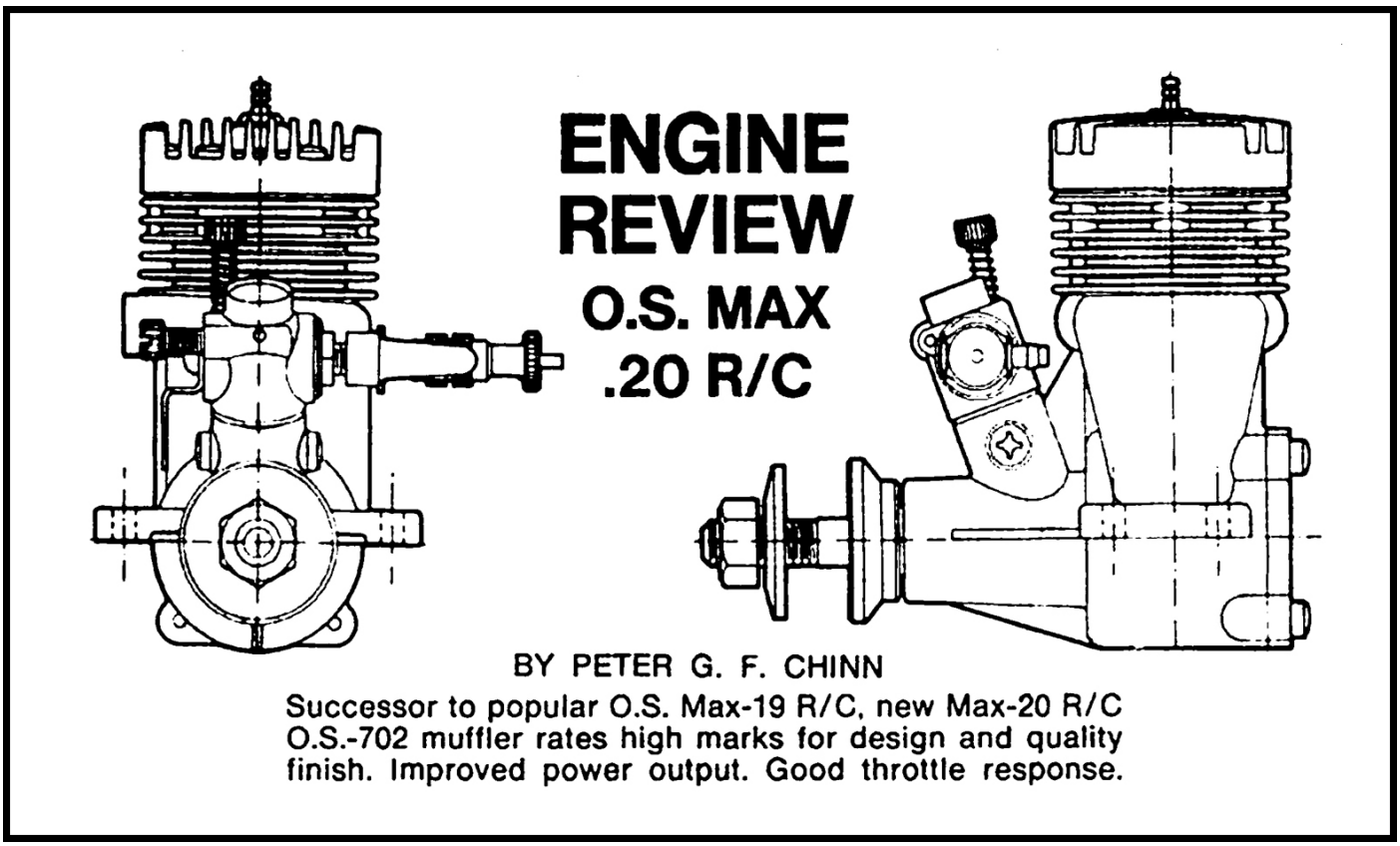
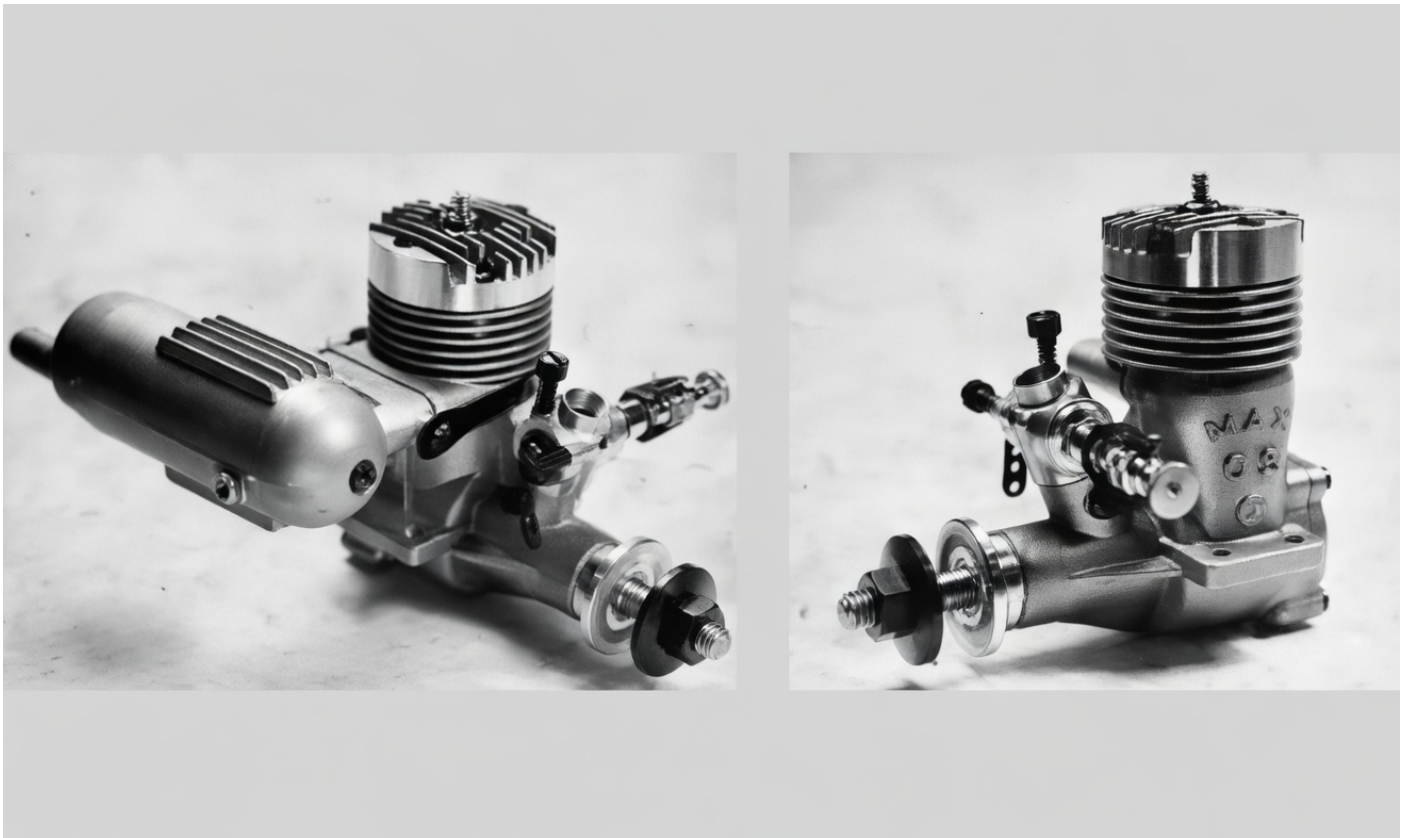
O.S Max .20 R/C



• Despite its name, the new O.S Max 20 still qualifies as a “19." That is to say, its diplacement remains within the .20 cu. in. limit. Swept volume is 0.1974 cu in. This compares with 0.1928 cu. in. for the Max 19 model.



New O.S 702 is neat, light and quite effective. Strap fitting more secure. One piece case design brings Max 20 intro line with other O.S motors.

Model Airplane News Magazine June 1972 by Hlsat

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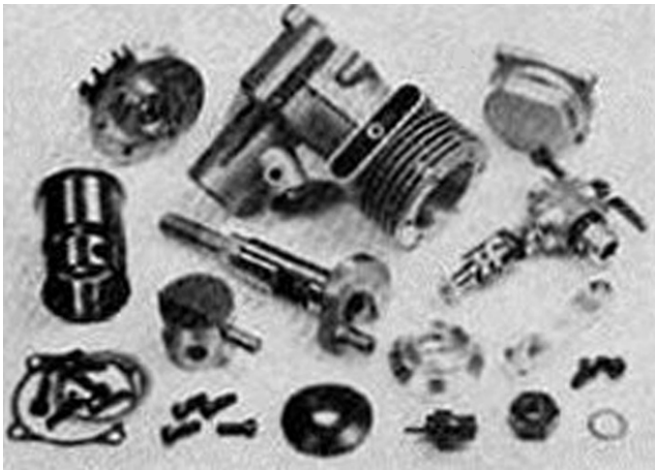
Actually, the Max 20 has been in the pipeline for a very long lime. The original intention was to put it into production in 1967 as a replacement for the Max 19, then already five years old. However, at that time, the O.S company became heavily involved with several more urgent projects, including the development of the O.S Graupner Wankel motor and, since there was still a very healthy demand for the existing 19 model, the obvious solution was to postpone introduction of the 20 for a while. Naturally, preproduction development did not stand still during this period, so that the 20 that has now appeared is probably a better product than would have been the ease had the original schedule been adhered to.

As already mentioned, the 20 replaces the Max 19 which has at last been with-drawn from production after nearly ten years. The 19 was one of the most popular engine of its size ever made, so the 20 obviously has to live up to quite a reputation as its successor.

Initial impressions on examining the 20 are entirely, favorable. It is an extremely neat-looking little motor exhibiting very high quality diecasting and machining. The engine's external dimensions including the cylinder diameter and crankcase width, are slightly greater than those of the 19 but it fits the same bolt hole spacing and the frontal overhang is the same. Anyone who wishes to install a Max 20 in a model built for a Max 19 should encounter no serious problems. In most cases, slight chamfering of the inside edges of the motor bearers will be enough to allow the new engine to drop into place. Weight is increased by less than half an ounce.

Like the Max 19, the 20 is a front intake lapped-piston motor with orthodox open loop or crossflow scavenging. However, whereas the construction of the Max-19 closely resembled that of the original O.S. Max series engines (15, 29 and 35) in using a short crankcase casting and a separate steel cylinder with integral machined fins, the 20 follows current O.S. design trends in having a one piece body casting with drop-in cylinder sleeve. The body incorporates a cast-in phosphor bronze main bearing bush, has machined



joint faces and a malt grey shot-blasted external finish.

The hardened counterbalanced crankshaft has a 10.5 mm (0.413 in.) dia. journal (slightly longer than on the 19), a 7.5 mm. bore gas passage and a 5 mm. dia. tubular crankpin. The crank throw is the same as that of the 19, both engines having a stroke of 14.6 mm., but the connecting rod length is increased by 2 mm. to 27.5 mm. between centers, giving a rod-to stroke ratio of 1.88 : 1, which will be beneficial in reducing piston side-thrust.

The piston itself. 0.2 mm. larger diameter than that of the 19, is nevertheless faction- ally lighter at 6.2 grams, or 7.5 grams complete with wristpin. The piston is machined from high-grade innoculated cast iron, has a straight baffle and features two 5 mm. dia. skirt transfer pot Is which register with similar ports in the bypass side of the cylinder sleeve. The piston is relieved for a depth of 1.0 mm. immediately below the crown, 'lire relief is quite deep and reduces piston head diameter by 0.1 mm. The hardened tubular wristpin is full-floating, has a diameter of 4 mm. and is fitted with brass pads. The connecting-rod is of machined aluminum alloy with plain eyes and a lube hole at the lower end.

The cylinder sleeve is a close slip fit in the main casting where it is located by the usual top flange. The sleeve has thick walls (1.8 mm. or approx. .071 in.) and conventional rectangular bypass and exhaust ports. Measured bypass period on our test motor was 112 deg. of crank angle. The exhaust period was 134

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deg. The machine finished pressure diecast cylinder head has deep tapered cooling fins and a cast-in brass thread insert for the glow-plug, as is usual on O.S. engines having pressure-east heads. Combustion chamber shape is different from that of the Max 19. The 20 has a wide (3.2 mm.) squish-band surrounding a small bowl-shaped chamber. Six screws are employed to secure the head to the cylinder casting and a 0.4 mm. (16 thou.) soft aluminum gasket is used to make the joint between the head and sleeve flange.

The carburetor, unchanged from that of the 19, is the same barrel-throttle with adjustable air-bleed type (hat has proved so reliable for a number of years with the medium size O.S. engines. It has a pressure cast aluminum body, ground brass barrel, and an adjustable jet assembly by which means the effective choke area of the carb can be varied to emphasize either high power or maximum fuel suction. Choke bore is 4.6 mm. and. with the jet tube in the normal position, this gives an effective choke area of approximately 11 sq. mm. The carburetor plugs into a 9 mm. i.d. intake boss on the crankcase nose, sealed against air leaks with a rubber gasket and retained by two set screws. The intake aperture through the main bearing has parallel sides and registers with a 10 mm. long rectangular crankshaft valve port timed to open at 30 deg. after BDC and to close at 45 deg. after TDC.

Last year. O.S. introduced a new range of mufflers for all their engines, except the Max 10 (for which the O.S. Jetstream Type S muffler is retained) and the one for the 20 is the O.S. 702 type. This is a straightforward expansion chamber made in two parts from pressure cast aluminum. The main body of the muffler includes an integral entry duct that fits firmly over the engine's exhaust stack and is secured by a steel trap around the cylinder casing. It has cooling fins top and bottom and a screw-in brass nozzle that enables a fuel prime to be injected via the exhaust port for cold starting. The rear part of the muffler, containing an offset outlet pipe, is retained by a long screw and locknut and can be rotated according to where one wishes to position the tailpipe. The complete muffler with mounting strap weighs 1.3 oz. Normally, the Max 20 R/C is supplied without an exhaust baffle coupled to the throttle, as most O.S. customer throughout the world now accept the desirability of using a muffler instead, but for the U.S. market, a couple exhaust baffle is available.

Our motors were supplied with mufflers only and were therefore tested with these and in straight open-exhaust form.

Two Max 20 R/C motors were received for test slightly in advance of general overseas release. The English instruction leaflet was not available at that time but the engine responded well enough to standard procedures and no difficulties were encountered.

We gave each engine an initial break-in totalling 30 minutes intermittent running using a 9x4 prop and our standard five per cent pure nitromethane test fuel. Neither engine showed any tendency to overheat or tighten up at any time and. at the end of this period, both held leaned out full-throttle speeds steadily and indefinitely on 8x5 props. At this point, one engine was about 200 rpm faster than the other and this motor was therefore set aside for performance testing.

At 26 oz. in., the maximum torque recorded by the Max 20 R/C on five percent nitro fuel was not significantly better than that of the Max 19 R/C on the same mixture and in consequence, the performance on the larger prop sizes was much the same for both engines. The 20, however, recorded its maximum torque at higher rpm and had a flatter torque curve. As a result, it showed a useful top end improvement, the gain in bhp being of the order of 15-20 percent at the peak of the power curve.

Average prop rpm figures obtained included 9400 rpm on a 9x6 Top Flite Super-M. 10.500 on a 10x3 ½ Top Flite wood, 10.600 on a 9x5 Top Elite wood. 12.500 on an 8x6 Power-Prop wood and 13.500 on an 8x5 Power-Prop wood.

Fitting the muffler knocked about 200 rpm off the engine's full throttle speed when it was propped for speeds of under10.000. rising to losses of 900-1000 rpm when propped for speeds around the peak. This

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is much as one would expect as the muffler has a tailpipe i.d. of only 5 mm.

With such a relatively modest outlet area (19.6 sq. mm.) the muffler subdues the exhaust note quite effectively, and if the user feels that a slightly higher noise level can be tolerated in the interests of reduced power loss, it is quite feasible to ream the existing outlet to a maximum of 6 mm. i.d. - i.e., an increase in outlet area of up to 44 percent.

The throttle worked very well. We had the 20 idling as low as 2.100 rpm on a big prop (10x6) and the practical safe idling speed on a more suitable prop (e.g.. 9x4) would seem to be around 2,600 rpm. Incidentally, for most of our tests, we used the new O.S. No. 9 glow-plug which, despite the fact that it does not have an idle ar. seemed to suit the engine just as well as the regular No. 7 shielded type. The engine would idle steadily for long periods and pick up unfailingly when the throttle was snapped open.

Compared with (he bigger O.S. engines, all of which we have found to be extremely quick and reliable starters, the 20 was less impressive. Cold starts were usually good but the engine seemed to have somewhat marginal compression and was sometimes reluctant to restart quickly when warm. This applied to both test engines. On the other hand. Max 20 owners to whom we have since spoken have had no complaints about starting.

Running qualities were good at all times. The 20 held steady full throttle readings under a wide variety of loads and was very smooth running, vibration levels being rather less than average in the 19 class.

All in all, the new Max 20 R/C will, we believe, move to be a worthy successor to the popular Max 19 R/C.

Summary of Data

Type: Single cylinder two-stroke cycle with crankshaft rotary-valve and bronze bushed main bearing. Throttle type carburetor. Muffler or coupled exhaust restrictor optional.
Checked Weights: 5.95 oz. less muffler 7.25 oz. with muffler.

Displacement: 3.26 c.c. — 0.1975 cu. in.
Bore: 16.8 mm. (0.6614 in.)
Stroke: 14.6 mm. (0.5748 in.)
Stroke/Bore Ratio: 0.870:1

Specific Outputs (as tested):
1.64 bhp/cu. in. (less muffler)
1.34 bhp/cu. in. (with muffler)

Power/Weight Ratio (as tested):
0.87 bhp/lb. (less muffler)
0.58 bhp/lb. (with muffler)

Manufacturer: Ogawa Model Manufacturing Co. Ltd.. Higashisumiyoshi. Osaka. Japan.

U.S. Distributor: World Engines. Inc., 8960 Rossash Avenue. Cincinnati, Ohio 45236 U.S.A.