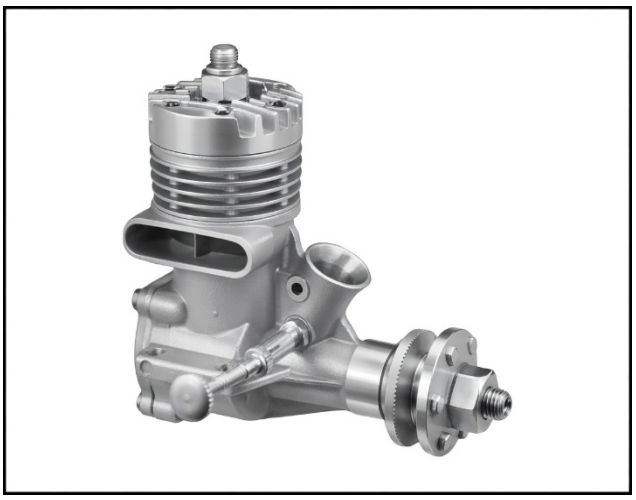
O.S Max I - .15



Engine

Analysis No. 26

World Championship winning

OS MAX-1 15

reviewed by R. H. Warring

THE MAX-I 15 is a small engine for a 2.5, and weighs a fraction less than 3 ½ ounces. Like most glow motors it does not develop a great deal of power low down (although it makes a lot of noise it is not really working very hard), but once it gets past about 11,000 r.p.m. the power curve just goes on climbing. The plotted power peak from test data was established as 14,650 r.p.m. at which speed the brake horse power was only a little under .24 or nearly .07 B.H.P. per ounce, which is double that of most diesels. Hence it must have a special appeal for lightweight free flight duration work or any combination where high power and light weight can be put to advantage.

Fuel specified by the makers is methanol, nitro-methane and castor oil, with no specific proportions, but particularly recommending the addition of detergents to avoid gumming up the engine. For general running test purposes we used a conventional methanol-castor mixture with 10% nitro methane on the basis that this was essentially a racing engine and could be tested fairly on doped fuel.

For starting purposes and as is typical with most glow motors the MAX-I has a “soggy” feel. It does start fairly readily although not as easily as some glow plug jobs. It does not like being flooded, but it starts readily with the needle valve in the running position providing it is primed or finger choked. It should be pointed out that this engine is normally supplied with restrictors for the air intake, the smallest restrictor giving the highest fuel suction. A standard K.L.G. glow plug was needed in place of the Japanese plug and proved quite satisfactory.

Design of the MAX-I follows the accepted standard of optimum glow motor performance with 180 degree annular exhaust and diametrically opposed transfer.

The cylinder follows typical American practice in being machined from steel with integral cooling fins with a detachable light alloy head. The cylinder is a beautiful “plug” fit in the crankcase unit and is held down with two long screws extending through the head. Four additional short screws hold the head down on to the cylinder, wide gaskets being used between both mating surfaces.

Specification

Bore: .399 in.
Stroke: .549 in.
Displacement: 2.53cc (.154 cu. in.)
Bore/Stroke: 1.03
Bare Weight: 3 & 7/16 ounces.
Max. B.H.P.: .2365 at 14.650 r.p.m.
Max. Torgue: 18.5 ounces-inches at 10.500 r.p.m.
Power Rating: .093 B.H.P. per c.c
Power/Weight Ratio: .07 B.H.P. per ounce.

Manufactores:
Ogawa Model Mfg. Co.
518 Kumatacho
Higashi Sumiyoshi
Osaka, Japan

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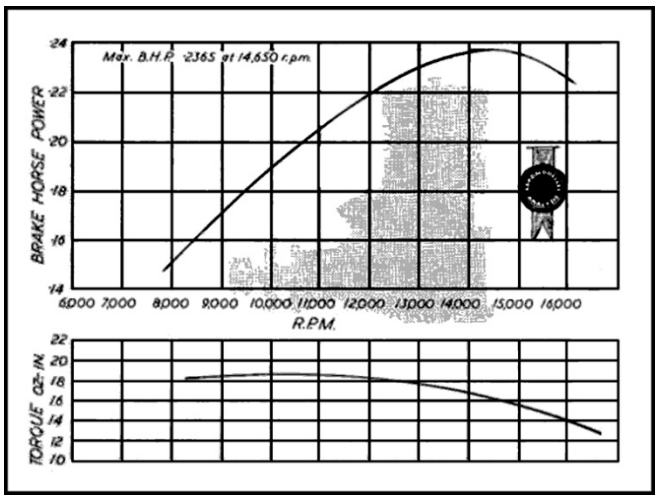
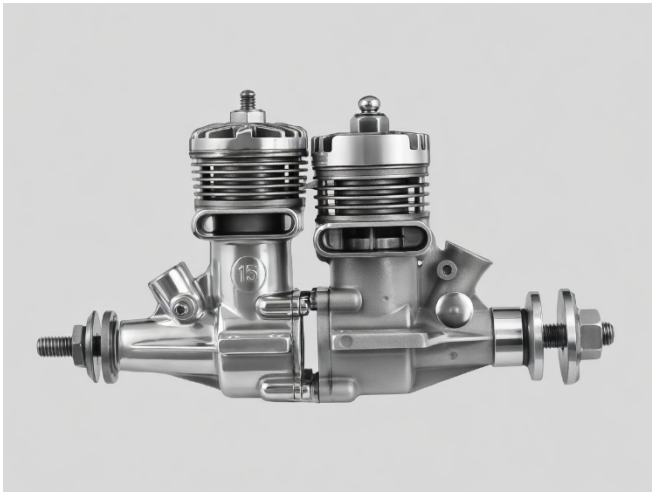




Inevitable comparison is that of MAX-15 and the Torpedo .15 Though structurally similar, the MAX is different in many respects, not the least being its small exhaust port at top of large stack in crankcase.

PROPELLER — R.P.M. FIGURES

Propeller dia. pitch	r.p.m.
8 x 6 (Stant)	10,200
8 x 5 (Stant)	12,000
7 x 6 (Stant)	13,600
7 x 4 (Stant)	16,000
6 x 5 (Stant)	16,800
Fuel: Methanol-castor plus 10% nitromethane	
9 x 3 (Tiger)	11,800
8 x 4 (Tiger)	13,100
8 x 3½ (Tiger)	13,800
Fuel: Methanol-castor plus 40% nitromethane	

A commendable feature is the piston which appears to be of steel and is exceptionally light, being turned away to very thin walls. It is flat-top- ped with a straight baffle and appears to have been ground between centers an accurate, if laborious method of finishing. The connecting rod is a light alloy forging bushed at the big end with a driven-in bronze bushing. The 5/32 in. diameter crankshaft appears to be nickel steel, hardened, and the web is turned away to provide a counter weight opposite the crank pin, it runs in a brass or bronze hushing pressed into the crankcase.

A surprising degree of corrosive attack produced within the engine during some two hours running time was quite remarkable. A rust-like powder appeared almost everywhere with a definite etching attack on the metal itself where there was no actual rubbing contact, e.g., the inside of the crankcase, the con-rod, around the crank disc, outside the cylinder where fuel had dribbled down, etc.

None of the rubbing surfaces themselves, however, showed the slightest signs of scoring or undue wear. It would appear that internal cleaning of the engine and flushing out would be essential to preserve its life, operated on doped fuels.

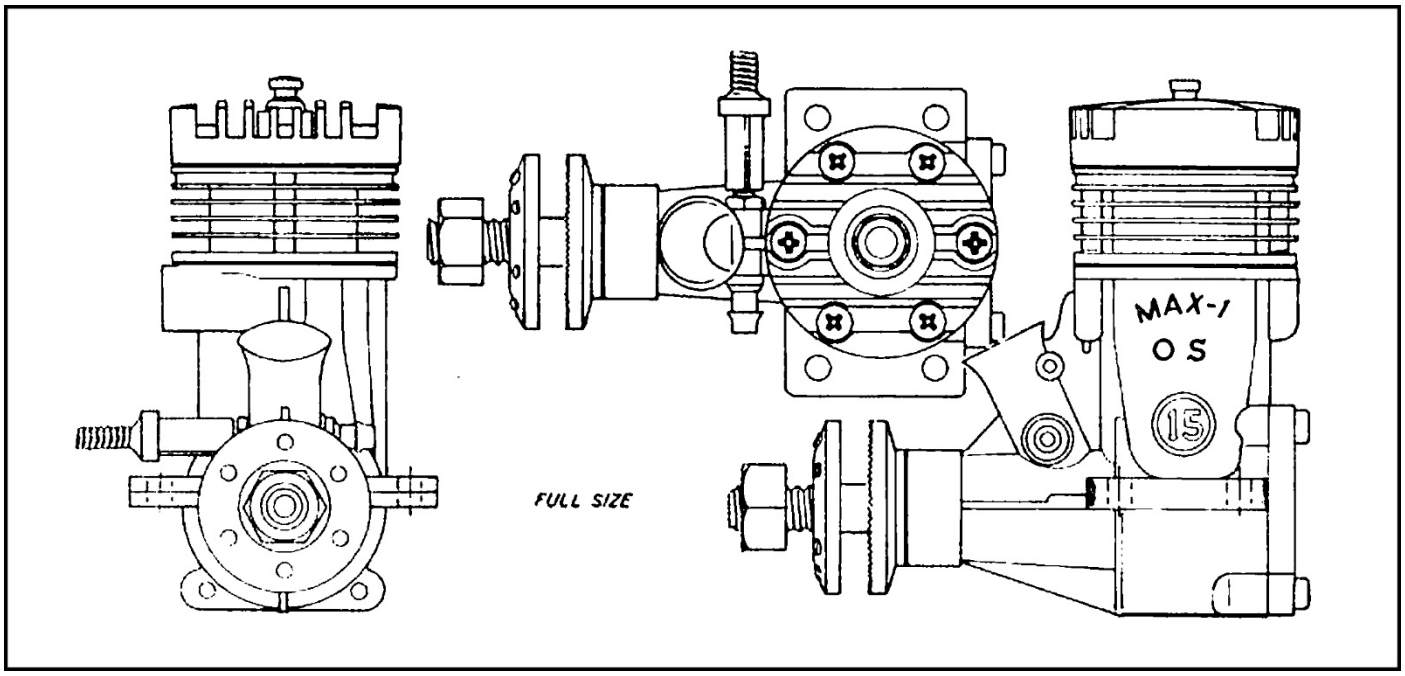
Internal clearances throughout are held to a practical minimum and the standard of workman-ship is excellent throughout.

Summarising: A well designed engine with an eye on minimum dimensions without “skimping” in any direction, one which appears to have been built with meticulous accuracy and involved considerably more man hours than standard on Western production and with a performance rating of the highest order. Although the example tested was over-capacity for the International class, the manufacturers assure us that all O.S. MAX-I .15 units produced since March, 1956, have a maximum bore of .597 in. and stroke .540 in., offering a capacity of 2.49 c.c. They are also attending to the question of corrosion by investigating material.

The pair of engines used by Ron Draper at the World Championship Meeting were purchased since the above changes were made to the bore and stroke and therefore comply with the F.A.I. requirements. Ron chose a MAX-1 for his model as it seemed to offer a

O.S Max I - .15

more steady output than other engines of similar capacity, and this was borne out by his performance at Cranfield. He used a high nitro-methane content in his fuel and had a specially made radial mount for inter-changeability with other engines on the same model.



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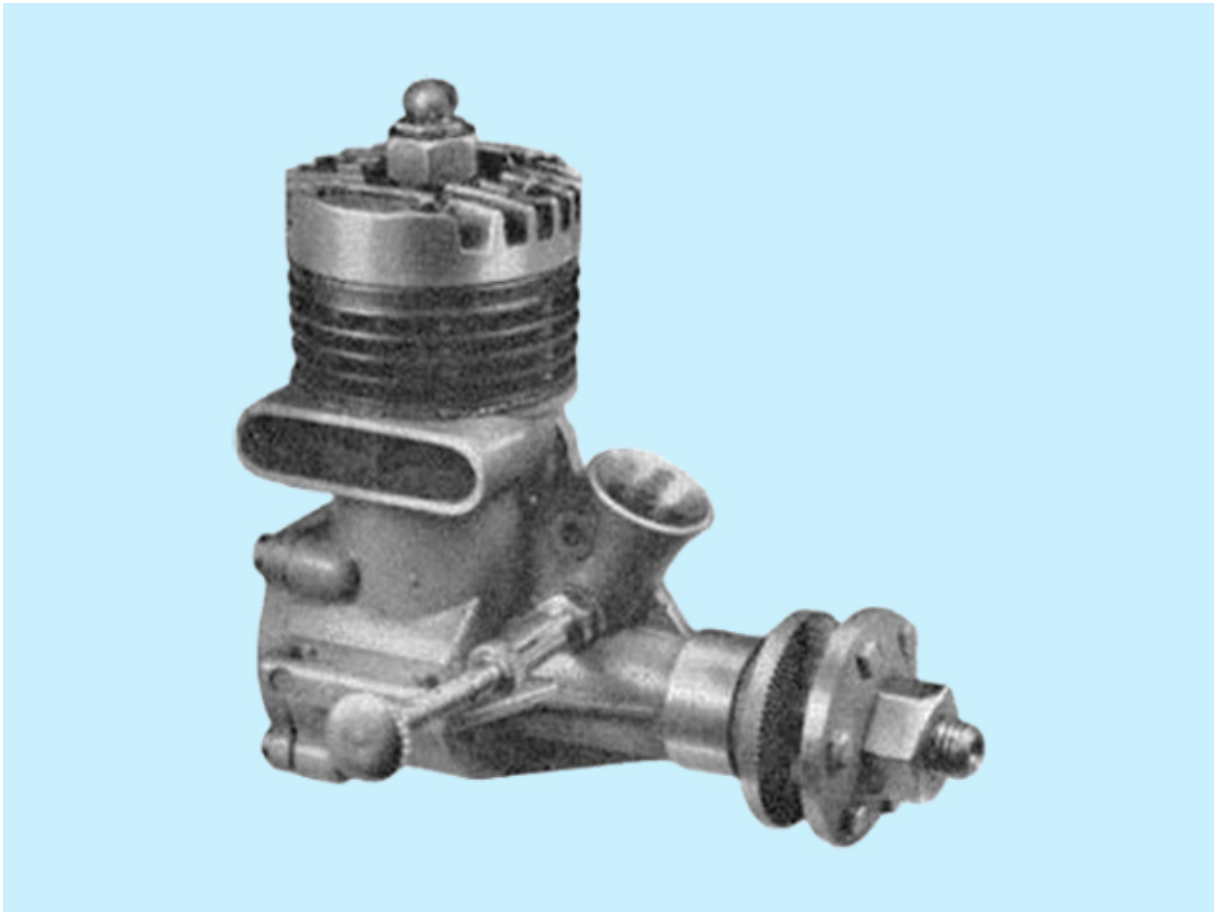

AeroModeller Magazine October 1956 by Hlsat