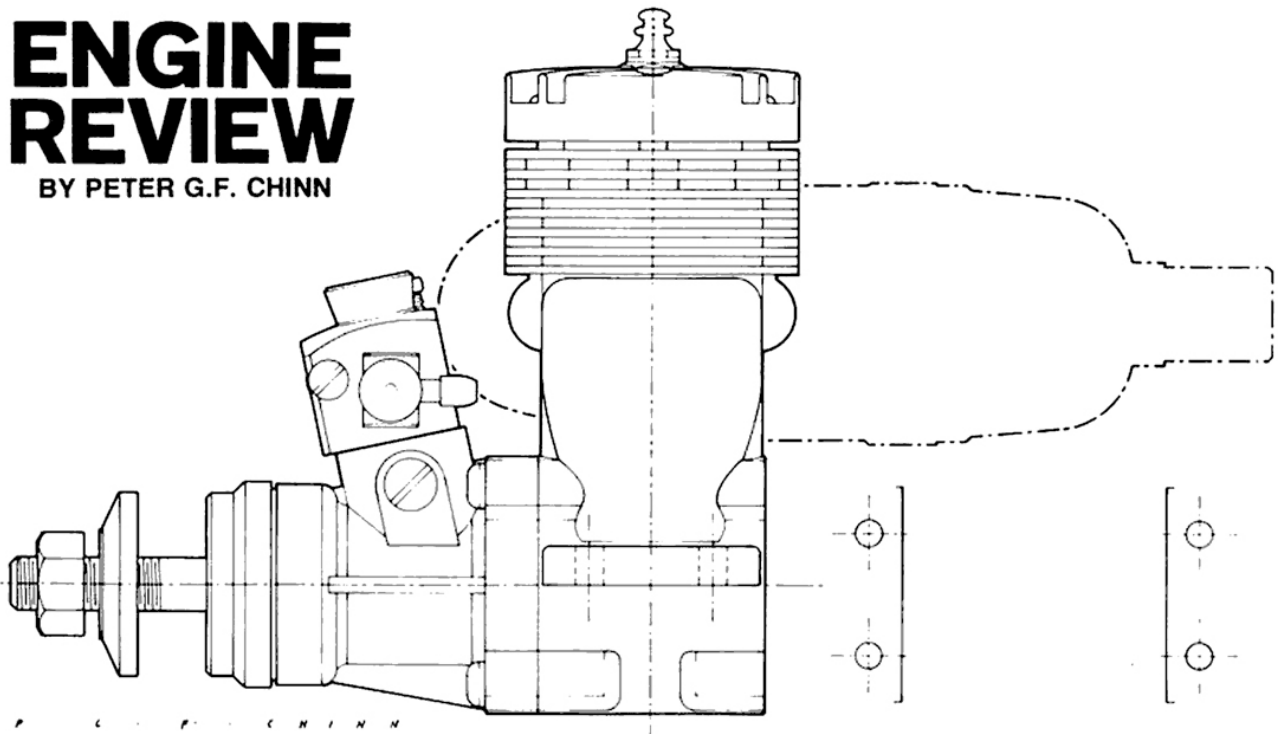


MRC Enya 40 TV Model 6002

ENGINE REVIEW

BY PETER G.F. CHINN



MRC ENYA 40-TV

MRC-Enya at last plugs a gaping hole in their extensive engine range with this fine .40 R/C pattern motor. Latest in the line follows the traditional Enya characteristics.

• Fox, HP, K&B, McCoy, OPS, O.S., Super Tigre, Webra, all have at least one thing in common. They all make .40 size R/C engines and most of them have been doing so for some years. Until now, Enya, almost alone among the major model engine manufacturers, has held back, despite having an engine to fit into practically every other displacement group from .049 to .60 cu.in. But with the new Enya Model 6002, the Enya brothers have at last made their long expected bid for a slice of this popular section of the market.

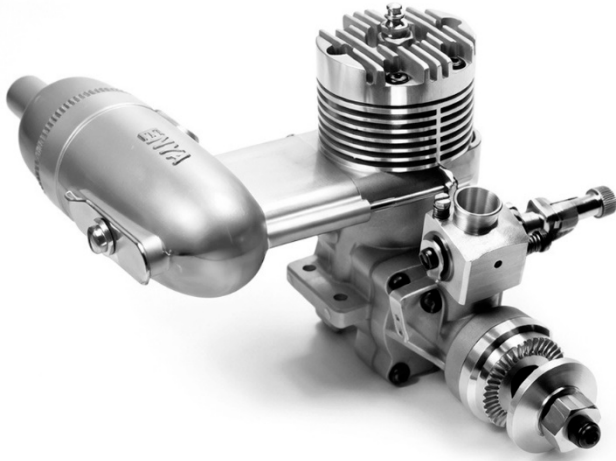
As we have had cause to remark on previous occasions, all the Enya engines imported into the U.S. by MRC (the exceptions are the 049, 06, 08, and 10 models seldom seen outside Japan) possess an unmistakable family likeness. They are all front intake, crossflow-scavenged motors with one piece cylinder/crankcase castings and detachable front housings, and they all have the same distinctive styling with grey matte finished castings relieved by bright matched fin edges and prop drivers. The Model 6002 (it is to be offered in a new 45 version as well as a 40) continues this tradition and is therefore of quite conventional basic design, although it does differ from previous Enya engines in certain respects. It also has one feature that sets it apart from all other current .40 cu.in. motors.

DESIGN AND CONSTRUCTION

CRANKSHAFT AND BEARINGS. It is in the size of the crankshaft main journal and the gas passage through it, that the Enya 40 is so different from its competitors. The majority of current shaft valve 40's have 12 mm. 12.7 mm. (1/2") or 13 mm. o.d. shafts. They include the HP, Super Tigre and Webra (all 12 mm.), K&B (12.7 mm.) and O.S. (13 mm.). These five high performance engines have, respectively, 8.1 mm., 9 mm., 8.5 mm., 8.9 mm. and 9.8 mm. i.d. gas passages. In contrast, the Enya 40 has a 15 mm. shaft o.d. (the same size as most modern front valve .60 engines) and an enormous 11.5 mm. i.d. gas passage (bigger than most 60's, the majority of which, in the interests of shaft strength, do not go above 11 mm.).

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Expansion type muffler is bigger than earlier type and has a larger outlet. Uses simple clamp fitting.

The object of using a large diameter journal in a shaft-valve engine is primarily to enable a large bore gas passage to be employed which, theoretically, should improve the engine's ability to breathe freely. In the case of the Enya, the gas passage is nearly 70% larger in cross-sectional area than the average of the other engines mentioned. There is a point beyond which nothing is to be gained by enlarging intake passages without corresponding improvements in other areas, but it would seem that, by opening up the crankshaft passage, Enya has managed to lift the 40-TV into the upper performance bracket without resorting to Schnuerle scavenging or a very large carburetor choke area requiring pressure feed.

Entry to the shaft passage is via a rectangular shaft port, 13 mm. long which, according to our measurement of the test engine, is timed to open at 36° after bottom dead center and to close at 50° ATDC. The crankshaft itself is machined in one piece with a solid 6 mm. crankpin and a 7.5 mm. thick crankweb. Counterbalancing is by means of web cutaways each side of the crankpin and, except on its working diameters, the shaft has a blued anti-corrosive finish. It runs in a 3/8 x 7/8" NSK 7 ball, steel caged, shielded bearing at the front and a 15 x 22 mm. NSK 10 ball, steel caged, shielded bearing at the rear. Bearings are mounted in a sturdy, pressure cast front housing that attaches to the crankcase with four 3.5 mm. Phillips head screws.



Detachable front end, an Enya trademark, is sturdy, as is main casting. Bowl and squish type head.

MAIN CASTING. This comprises the crankcase barrel with integral back plate and full length finned cylinder casing. It has a wide bypass passage that is further widened by internal milling so that it extends almost 180° around the case interior, allowing free movement of the incoming gas to the outer bypass ports.

CYLINDER SLEEVE AND HEAD. The drop-in cylinder sleeve has an o.d. of 23.2 mm., a nominal wall thickness of 1.15 mm. and is located, in the usual manner, by a flange at the top. It has five exhaust ports, timed to open for 138° of crank angle and four bypass ports timed for 118° of crank angle. The cylinder head is conventional with bowl shaped combustion chamber surrounded by a 3.5 mm. wide squish band and is interrupted by a rather wide slot to clear the piston baffle on the bypass side. The head is of pressure cast aluminum with the usual Enya cast-in brass thread insert for the glow plug and is secured with six 3.5 mm. Phillips screws. No gasket is used: the head makes a metal-to-metal joint with a narrow raised rim on the liner flange.

PISTON AND CONNECTING ROD ASSEMBLY. Tire first Enya engine to do so, the 40 uses a Dykes type piston-ring. The piston is machined from aluminum bar stock and, complete with ring, weighs 6.1 gr. It has a straight baffle and two 6 mm. dia. skirt ports on the bypass side which register with two 6.5 mm. ports in the cylinder

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Massive 15 mm. shaft is biggest yet seen on a 40. Engine is first in Enya line to use Dykes ring.

sleeve at the bottom of the stroke. A full floating 5.5 mm o.d. tubular wristpin is used. It has brass pads and weighs 2.6 grams. Tire connecting rod is of forged aluminum alloy, is 34.5 mm. between centers and weighs 5.3 gr. It is bronze bushed at both ends without oil holes or slits.

CARBURETOR. The carburetor fitted to the 40-TV follows the design of those used by other current Enya R/C engines, with the exception of the 60-IIIB which has a non-adjustable automatic fuel metering carb. In other words, the 40 carb is of the air bleed type with a screw adjustment for admitting extra air at low speeds to avoid an over rich idling mixture. The throttle barrel is of steel with aground o.d. and a 6.7 mm. i.d. choke.

The machined aluminum carburetor body has the needle-valve and jet assembly mounted in its left side. The jet tube has a 5 mm. thread and projects approximately half way into the choke. As installed in the test motor, this resulted in an effective choke area of approximately 21 sq. mm., although by slackening its locknut and rotating the jet assembly through a range of two turns in, to two turns out, it is actually possible to vary the choke area from about 15 sq.mm, to nearly 30 sq.mm. Although the instruction leaflet issued with the motor docs not mention the fact, it would be possible to make use of this means of varying choke area under certain conditions. For example, the smaller area could be useful in a scale installation where, perhaps, the combination

of an awkward tank location and. maybe, a large diameter prop, culled for improved fuel suction at speeds well below peak rpm. Alternatively, where absolute maximum high-speed power is more important than aerobatic capability or optimum throttle performance, one might profitably opt for a larger choke area and a pressurized fuel supply. In 95% of cases, however, the jet position as set at the factory is likely to prove the best all-round compromise and it is not our intention to encourage owners to alter it unless they have a very good reason for doing so.

MUFFLER. The muffler supplied by the manufacturer for our tests on the 40 was the Enya M-200 type which is also available for use with the current Enya 29. 35 and 45 engines. This, like all previous Enya mufflers, is an orthodox non-baffled expansion box of two-piece die-cast aluminum construction but is bigger (with a larger outlet i.d.) than the earlier 29-45 size. The outlet bore is now 8.5 mm. giving an area of just under 57 sq.mm.

The muffler is not equipped with a pressure fitting but has a cast-in boss suitable for drilling and tapping for a fuel tank pressurization system should the owner wish to use this. As on previous Enya mufflers, there is a pivoted plate on the side which can be rotated to enable the engine to be port primed for cold starting.

PERFORMANCE.

Our test model Enya 40-TV came directly from the manufacturer but had not been broken in. We ran it a total of 60 minutes on a straight fuel of 75% methanol and 25% castor oil, following our standard break- in procedure of a series of short (approximately 2 minute) runs, with cooling-off periods between each, beginning with very rich runs and then towards the end of the series, leaning out to full power. A 10x6 Top Flite maple prop was used for breaking-in.

Although the Enya ran quite satisfactorily on a straight alcohol/castor mix, we switched to our standard test fuel containing 5% pure nitromethane and 20% castor oil, since this is the stock blend always used for performance testing

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R/C engines unless the motor concerned has been specifically set up for a totally different fuel. Compared with the straight blend, the 5% nitro mix added approximately 200 rpm to the speed recorded on the 10x6 prop.

Starting and handling qualities were good. Piston seal provided sufficient compression for quick cold starting when the engine was new and improved as the engine was broken-in to give equally reliable hot restarting.

On test, the Enya 40-TV showed itself capable of producing the sort of performance that one has come to expect of the better front-intake 40 R/C engines, combining useful medium speed torque with a high peak power output. Tested first without its muffler in order to determine gross torque and bhp levels, the 40-TV recorded a maximum torque of 68 oz.in. at 9.000 rpm. As load was reduced and rpm raised, torque declined steadily, and the power curve plotted from the figures obtained indicates a maximum output of 0.87 bhp at just below 16.000 rpm. This is one of the big heat figures we have recorded to date for a pattern type 40 R/C and may be regarded as confirming the manufacturer's nominal rating of .9 hp.

The muffler was then fitted and the tests repeated. The muffler made only a slight difference to torque levels when the engine was loaded for speeds below 11.000 rpm but, as expected, caused the torque curve to fall off more rapidly as load was reduced. Under these conditions, a peak power of 0.74 Nip at approximately 13.600 rpm was determined.

Without the muffler, rpm checks on various appropriately sized props yielded 13.400 rpm on a 10 x 6 Taipan nylon fiberglass. 12.800 rpm on a 10 x 6 Top Flite maple. 11.600 on an 11 x 6 Power Prop maple and 10.800 on an 11 x 6 Top Flite maple. Moving to finer pitches, such as might be desirable for a heavier and slower scale model, we obtained 13.200 on an 11 x 4 Top Flite standard. 12.500 on an 11 x 5 Power Prop standard and 10.500 on a 12 x 4 Power Prop standard. Replacing the muffler reduced static prop speeds by between 200 and 600 rpm, and,

keeping in mind that power loss is considerably more when one compares the bhp peaks, there would be a rather more noticeable power loss on the smaller (e.g., 10 x 6) sizes in the air. With its 57 sq.mm, outlet area, the muffler is not exactly quiet but is considerably more effective than the low-loss open front extractor types.

Despite its relatively unsophisticated design, the carburetor worked well, throttling down to around 2.500 rpm on a 10 x 6 and to around 2.200 on a 12 x 4 with reliable recovery and good intermediate control.

Running qualities at all times were good. Our impression was that the Enya produced just a wee bit more vibration than the very smoothest running of the rival .40 engines tested to date. In this respect, one might regard the Enya 40 as average. In practically all other respects we found it above average and on a specific output basis, it is certainly a worthy companion to its very successful bigger brother, the Enya 60-IIIB.

Examined at the conclusion of our tests, which included extended periods of full throttle operation at speeds of up to 17.500 rpm, the 40-TV was found to be in excellent shape. The piston and cylinder were practically unmarked and there was no slop whatsoever in the wristpin or crankpin fit.

SUMMARY OF DATA.

Type: Single-cylinder, crossflow scavenged two-stroke cycle with crankshaft rotary-valve and twin ball bearings. Throttle type carburetor. Enya muffler optional.

Checked Weights: 10.7 oz. (less muffler)
12.9 oz. (with muffler)

Displacement: 6.518 c.c. = 0.3978 cu.in.

Bore: 20.9 mm. (0.8228")

Stroke: 19.0 mm. (0.7480")

Stroke/Bore Ratio: 0.909 : 1

Measured Nominal Compression Ratio: 9.4 : 1

Specific Output (as tested):

2.18 bhp/cu.in. (less muffler)

1.86 bhp/cu.in. (with Enya M-200 muffler)

Power/Weight Ratio (as tested):

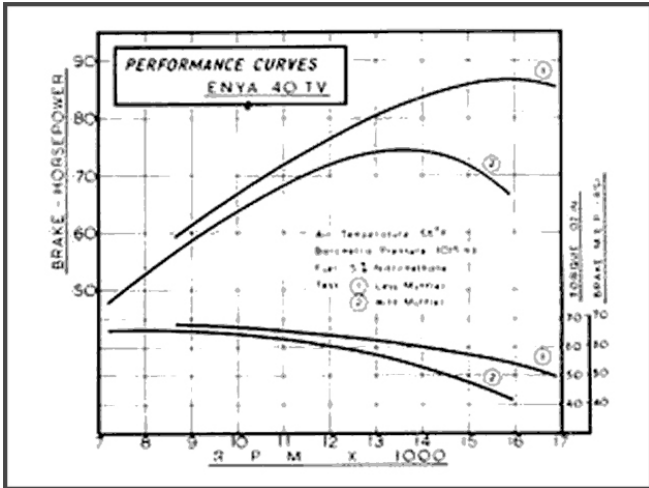
1.30 bhp/lb. (less muffler)

0.92 bhp/lb. (with Enya M-200 muffler)

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Manufacturer: Enya Metal Products Co. Ltd., 5-11-13 Toyotama-K ita, Nerimaku, Tokyo, Japan.

U.S. Distributor: Model Rectifier Corporation, 2500 Woodbridge Ave., Edison. NJ 08817. ■



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