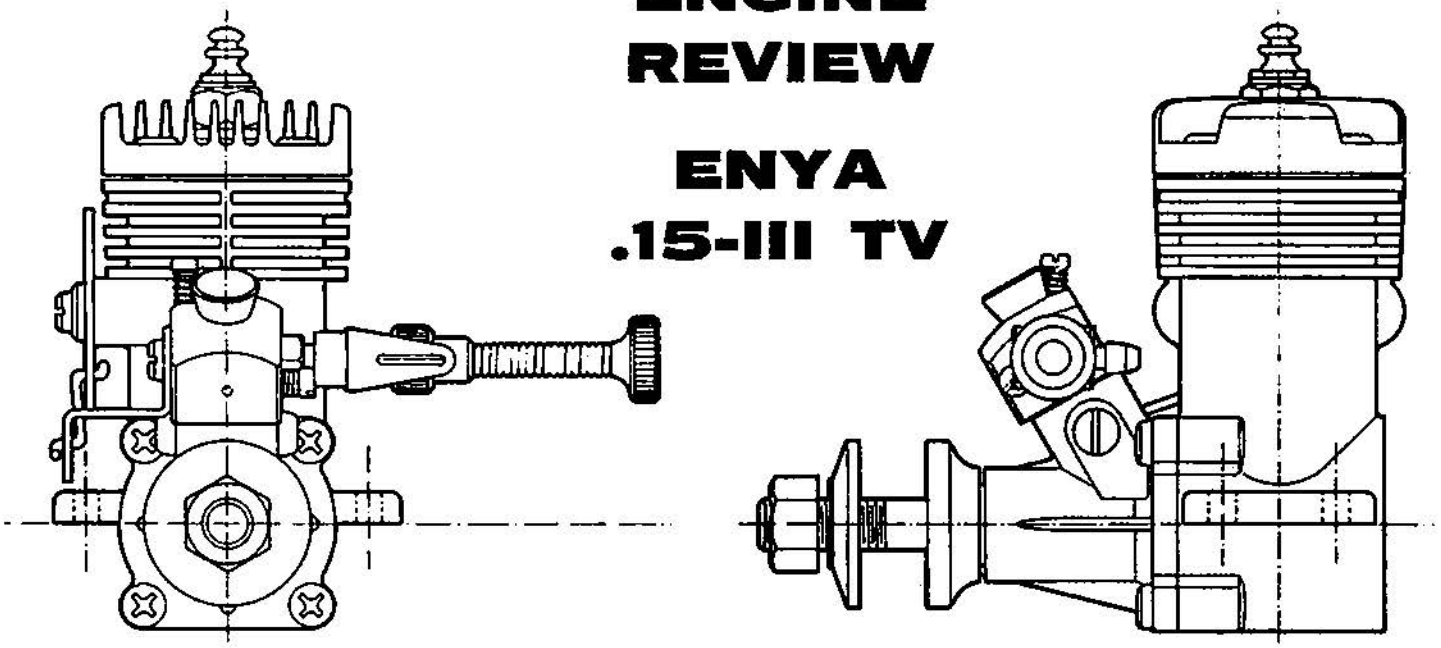
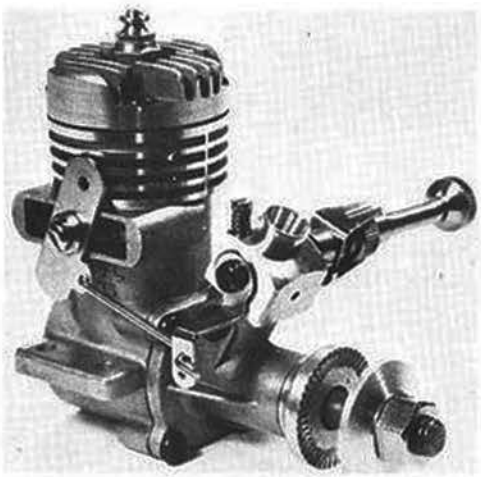
ENGINE REVIEW

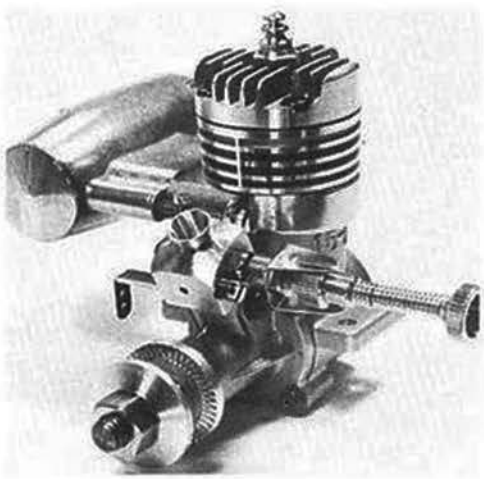
ENYA .15-III TV



By PETER G. F. CHINN . . . Latest in the extensive line of good Enya engines is its new .15-III TV radio control. Finely built and easy to handle, it has very impressive throttle performance.



A dozen years development in 15 class is background story of the Enya 15-III TV.

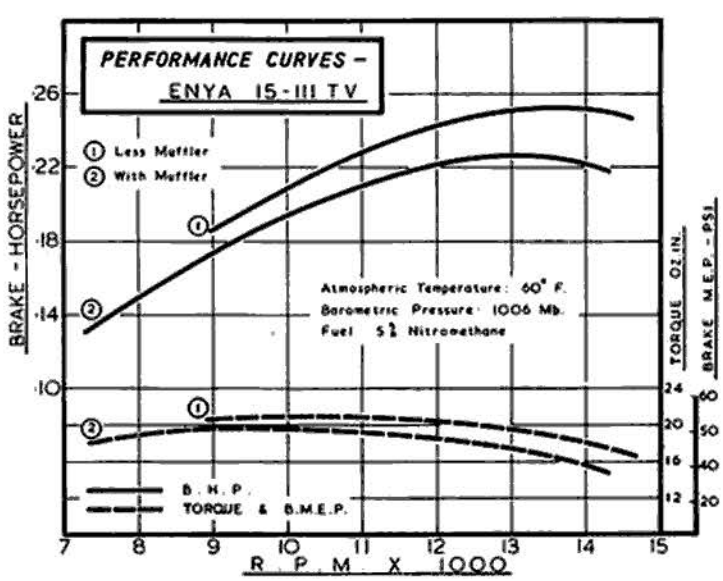


As an alternative to coupled exhaust restrictor, the Enya muffler may be used.

► The first .15 cu. in. Enya glowplug motor was put into production early in 1955. The Enya name was not, at that time, so well known in the United States as it is today and the original 15 did not become commonly known outside its native Japan. It was, nevertheless, a very pleasing little motor; nicely made, easy to start and of good performance. During 1956, the manufacturer made certain modifications to the Enya 15 to improve its performance and this revised model, first called the 15-IS, but later the 15-IB, was put into production in January 1957.

The 15-IB remained in production for over three years until superseded by the 15-II. This was a completely redesigned motor, with a new type of cylinder sleeve having twin internal bypass flutes instead of the usual port with the bypass passage formed between the liner and casing. It appeared *(Continued on page* **43***)*

Parts are well made. Note the thick cylinder sleeve with flute type bypass.



also in an R/C version, the 15-II TV, having a barrel throttle type carburetor. At first, this latter was without airbleed or idling adjustment screw, but later an improved carburetor, with these features, was substituted.

The current 15-III is, therefore, the fourth .15 cu.in. Enya glow motor (Enya also make a diesel 15 but this is of entirely different design) and, as one would expect, it profits from the long experience gained by the manufacturer in the design and production of medium-priced motors of this size. The engine is a logical development of the previous model but is, nevertheless, an entirely new motor inasmuch as none of the major parts is exactly the same as the 15-II equivalent. Even where a relatively minor design change has necessitated a completely new part, the manufacturer has not hesitated to make the change. Past experience of Enya products indicates that this is all part of company policy. Nothing is skimped. The factory obviously tries to maintain a high standard of quality and there has certainly not been any falling off, in this respect, with the 15-III as compared with the previous models.

Basically, the 15-III TV, which is the subject of our report this month, is a shaft intake, loop-scavenged, plain bearing motor with barrel throttle carburetor and optional coupled exhaust restrictor. In general design, it follows typical Enya glow motor practice. The front housing is separate from the crankcase, this latter being, instead, integral with the cylinder block. A very thick walled (2.75 mm. or nearly 7/64 in.) cylinder sleeve is used. This enables transfer flutes of adequate cross section to be used. Cylinder port timing is quite conservative, the exhaust opening at 63 degrees before bottom dead center and remaining open for 126 degrees of crank angle, while the bypass port opens 8 degrees later for a bypass period of 110 degrees. The sleeve drops into the block and is arrested at its base by an annular seating.

The hardened crankshaft has a larger diameter journal than the 15-II. This is now 9.5 mm. (0.374 in.) instead of 9.0 mm. and has permitted a larger bore gas passage (6.8 mm.-0.268 in.) through the shaft. The shaft also now has a full disc web with counterbalancing via a machined-in crescent counterweight. The crankpin is solid and has a diameter of 3.5 mm. (0.177 in.). A large rectangular valve port with radiussed corners is featured. This registers with an oval port in the bronze bushed main bearing to give an intake period timed to open at approximately 43 degrees ABDC and close at 48 degrees ATDC.

The 15-III also has a smaller diameter crankcase than the 15-II. This gives a smaller volume primary compression chamber for improved induction and charge transfer and, of course, also enables the engine to be fitted between narrower bearers. The stroke of the 15-III is the same (14 mm.) as that of previous Enya 15's and to maintain the necessary clearance between the lower end of the connecting-rod and the crankcase wall, a new conrod is employed which has a smaller big end o.d. The big end is still bronze bushed and the bearing area is the same.

The piston is conventional and is of lapped cast-iron. This has a straight fence baffle on a flat head and is coupled to the conrod by a fully floating 4 mm. (0.157 in.) diameter tubular wrist-pin with brass pads. The cylinder-head is deeply finned and has a hemispherical pattern combustion chamber with slot for piston baffle clearance. The glowplug is placed centrally in the head.

A very nicely made throttle type carburetor is fitted to the 15-III TV. This has a machined aluminum body with a ground steel throttle barrel retained, in the usual way, by the idling adjustment screw. The throttle barrel, with actuating arm, is inserted into the body from the right hand side and the needle valve assembly is mounted on the opposite side. This has a tee-fitting fuel inlet on the same side and is screwed into the carburetor and locked by a hexagon nut. Normally it is screwed in sufficiently to bring the jet almost to the center of the choke, reducing its area by about a third. The choke area can, however, be varied to give more suction and less power, or vice-versa, by simply screwing the needle-valve assembly further in or further out. The carburetor also includes an airbleed hole in the front of the body with the usual screw for adjusting the mixture strength at idling speed. This airbleed only comes into effect when the throttle barrel is more than half closed.

On test, we found this throttle to be one of the best we have yet encountered in an engine of this size. It permitted an uncommonly low idle, reliable intermediate speed running and unfailing recovery from idling speed to full throttle at all times. More of this in a moment.

An optional coupled exhaust restrictor is included with the 15-III TV. This comes as a separately packaged item to be fitted by the purchaser if he so desires. Alternatively, the standard Enya small size expansion-chamber type muffler can be substituted.

Our tests were carried out both with and without the muffler. We used an Enya No. 3 glowplug, which is a platinum filament plug of medium-hot rating, with mild R/C type fuel containing 5 percent pure nitromethane and 25 percent castor-oil. Thirty minutes break-in were obviously quite adequate, but a further half-hour of running time was accumulated before performance tests were undertaken.

Starting was very easy and was in no way complicated by the muffler, when fitted. The 15-III TV also started readily with the throttle in the idling position. The needle-valve was fairly sensitive and needed careful adjustment for optimum power, but this did not unduly influence idling qualities which, as we have said, were exceptional.

The best airbleed setting on our engine under the test conditions noted (and using the muffler—which slightly improves idling) was with the screw backed off to open the airbleed hole about one-third. Using a 9x4 Top-Flite nylon prop, we obtained a consistent idle of 2,200 rpm which is unusually good for a small R/C engine. Such a speed may well be a trifle too low for reliable operation in the air, but is, nevertheless, a good indication of the potentialities of the 15-III TV. On a 10x4 Tornado, the engine would idle at a steady 2000 and on an 8x4 Tornado or Top-Flite, idling in the 2500—2700 rpm bracket was easily obtained. We let the 15-III TV idle for three or four minutes at a stretch like this and then tried to make it die by slamming the throttle wide open, but the engine always picked up again. The only way we could provoke the Enya into cutting out was to search out the precise throttle position at which the mixture was "wrong" (most R/C engines have this) and then, after letting it run for a few moments, to abruptly shut the throttle. So good was the Enya's throttling, however, that we would not be at all surprised to learn that further experiment with the throttle controls could even eliminate this "failing."

As regards power, the 15-III TV did not put out the highest horsepower of any .15 R/C engine we have tested to date, but it was one of the best nevertheless. With the muffler fitted, maximum power was developed at just over 12,000 rpm where an output of nearly 0.23 bhp was indicated. When the muffler was removed, power went up to over 0.25 bhp at approximately 12,700 rpm. Typical prop speeds, without muffler fitted, included 8500 on a 10x4 Tornado nylon, 10,000 on a 9x4 Top-Flite nylon, 11,500 on an 8x6 Power-Prop, 12,600 on an 8x4 Top-Flite nylon and 14,100 rpm on an 8x3½ Top-Flite wood. Fitting the muffler reduced these figures by 100-500 rpm but, as we have previously remarked, slightly helped idling.

The Enya 15-III TV is a well made motor, nicely finished. Castings have an attractive satin finish relieved by polished edges to the cooling fins, etc. It looks worth the $12.50 asking price and, in our opinion, its performance confirms this.

Summary of Data

Type: Loop scavenged two-stroke cycle with shaft type rotary-valve induction and bronze bushed main bearing. Throttle type carburetor and optional coupled exhaust restirictor.
Weight: 5.3 oz. (6.6 oz. with muffler)
Displacement: 2.474 c.c. = 0.1510 cu.in.
Bore: 15 mm. (0.5905 in.) Stroke: 14 mm. (0.5512 in.)
Stroke/Bore Ratio: 0.933 : 1
Specific Output: (as tested, less muffler) 1.67 bhp/cu.in. (as tested, with muffler) 1.50 bhp/cu.in.
Power/Weight Ratio: (as tested, less muffler) 0.76 bhp/lb. (as tested, with muffler) 0.55 bhp/lb.
Price: $12.50 (muffler $2.95 extra).
Manufacturer: Enya Metal Products Company Ltd., Tokyo, Japan.
U.S. Distributor: MRC-Enya Company Inc., 5300 21st Avenue, Brooklyn, N.Y. 11204.