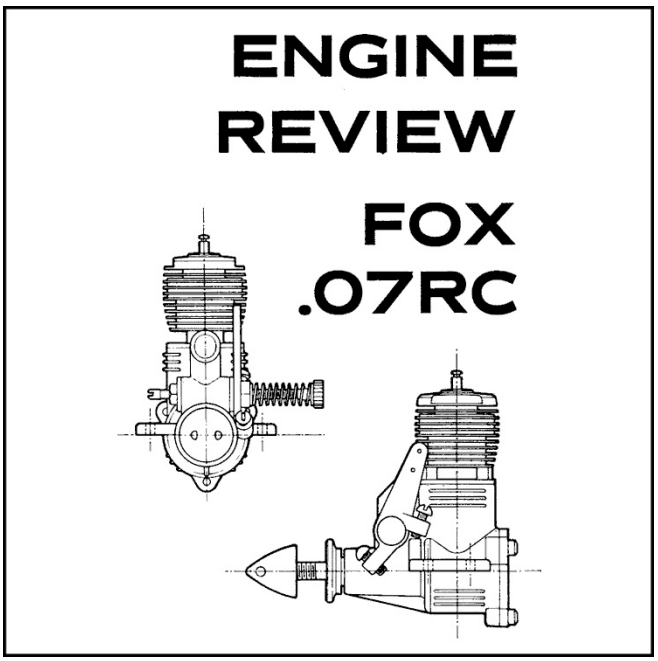
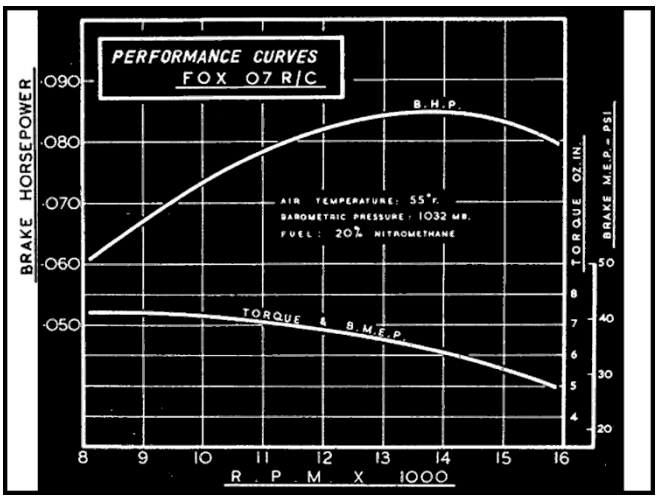
Fox .07 R/C





1/2A RC WITH GOOD HIGH AND LOW SPEED CHARACTERISTICS ARE OUTSTANDING FEA-TURES OF THIS LATEST IN FOX ENGINES. By P.G.F. CHINN

► The original Fox 07, introduced three years ago, was withdrawn at the end of 1963 and, since January this year, a new model has been in production, the 07RC, which, as its designation implies, is aimed at the radio-control field. The 07RC is one of the smallest and lightest throttle equipped engines yet to be offered.

Although outwardly similar to, and fitted with the same cylinder assembly as, the 07, the 07RC is virtually a new engine throughout. It has a new crankcase, back-plate, crankshaft and prop attachment assembly, plus, of course, the addition of throttle parts.

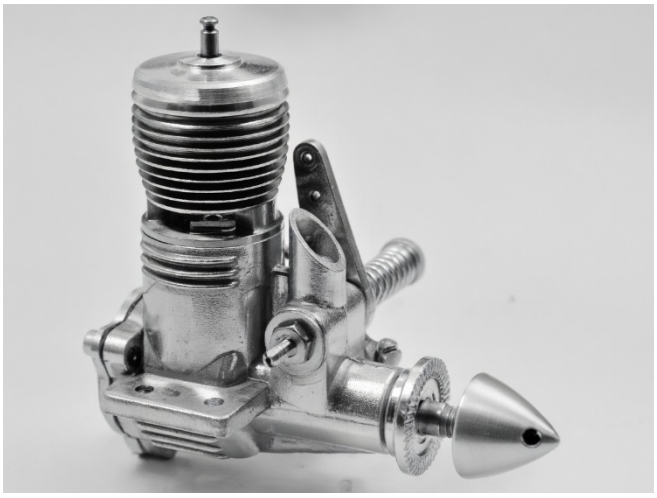
The engine has been designed expressly for small escapement operated single-channel airplanes. It is important, with miniature escapements, that loading should be at a minimum and, with this in mind, Duke Fox abandoned the idea of a coupled exhaust-intake system and concentrated on evolving a simple carburetor throttle that would be feather-light in operation, yet effective within the rpm range required for such models. This throttle is of the semi-rotary pattern, with butterfly action favored by Fox, but, unlike the simple throttles of some small engines, has the refinement of a two-jet fuel system. The operation of this will be described in a moment.

In general, the basic design and construction of the Fox 07RC is orthodox. Only its .07 cu.in. displacement is a little out of the ordinary. In overall dimensions, the engine is only a little bigger than the average 049 and it is scarcely any heavier perhaps ¼ oz more than the average. It has, in fact, been designed to fly models ordinarily powered with .049 motors. Where it scores over these (and this is where the 40 percent extra displacement comes in) is in its ability to turn useful “R/C size” props, such as 7x3 or 7x4.

Base component around which the 07RC is assembled is an aluminum pressure die-casting, comprising crankcase, lower cylinder housing and main bearing. Bearer spacing necessary to accommodate the crankcase, is the same as the original 07, but enlarged mounting lugs with wider bolt hole spacing, are used for better sup-port. As an alternative to normal beam mounting, firewall mounting via the back-plate attachment lugs is possible, by using longer 2-56 screws preferably with the addition of an aluminum backing plate. Here, it is worth noting too, that the 1964 model Fox 049 radial tank mount assembly (cost $1.75 including screws and gaskets) can be fitted to the 07RC. However, except in cases where the airplane has been built for a firewall mounted motor and cannot be converted to beam mounts without extensive modification, it is probably better to use beam mounting, which, if properly done, is more rigid and thereby reduces vibration losses.

Model Airplane News Magazine May 1964 by Hlsat

Fox .07 R/C



Fox's new .07RC, weight only 1.8 ounces, is first small motor to have throttle with independent high speed and low speed mixture controls.

Parts of the .07RC are nearly all new. Only the cylinder and piston assembly taken from the original .07. Note wide mounting lugs on case.

The hardened, counterbalanced crank-shaft has a 14-in. dia. journal and a 7/64 in. dia. crankpin. Its 11/64 in. dia. circular valve port leads into a 5/32 in. bore gas passage through the journal. Ahead of the ground journal, the shaft has three short lands, which engage keyways in the machined aluminum thrust washer, to provide a firm non-slip drive to the prop. Unlike the original 07, the 07RC has a full length threaded prop-shaft section integral with the shaft, and an aluminum spinner-nut, instead of a short crankshaft and prop retaining screw.

Normal Half-A practice, of a hardened piston, ball jointed to a steel conrod, and running in an unhardened one-piece cylinder, is used. The piston has a flat head and is permanently attached to the conrod. The cylinder screws into the crankcase and is vertically located by a flange below the exhaust port. Two diametrically opposed exhaust ports are used in conjunction with a single internal bypass flute. Screwing into the top of the cylinder, the aluminum head has an integral ignition filament which will operate satisfactorily on nickel-cadmium boosters. Don't use a lead-acid cell unless you use adequate dropping leads or have a suitable resistance in the circuit.

At the base of the air intake, that part of the casting comprising the carburetor throttle housing, is extended to the full width of the main bearing and is bored to accommodate the machined steel throttle valve. The throttle valve is 14-in. dia. and is drilled and threaded through its center, to take, from one side, a threaded steel needle-valve and. from the other side, an externally threaded brass needle-valve jet. By a simple but ingenious arrangement, this is made to provide an independently adjustable idling jet and an adjustable high speed jet that comes into use only when the throttle is in the high speed position.

To take the high speed jet first. The amount of fuel that this admits is metered, in the normal way, by the needle-valve. However, the actual jet releasing fuel into the airstream through the carburetor is a small hole in the underside of the throttle valve, offset to one side where it is only exposed to the airstream when the throttle is in the open position and the jet registers with a small notch in the supporting housing.

The low speed jet, on the other hand, is located in the center of the throttle valve where it feeds continuously into the airstream. It is, however, possible to meter the amount of fuel released to the low speed jet by screwing in, or out, the brass needle-valve jet. To do this, the fuel hose is removed to reveal a screwdriver slot and the brass needle-valve jet can then be turned, after slightly slackening the lock nut. Inside the throttle valve, the tip of the brass needle-valve jet is tapered and it is this taper which, itself acting like a needle-valve, meters the amount of

Fox .07 R/C

fuel which gets through to the idling jet.

Securely fitted to the other end of the throttle-valve is a die-cast aluminum actuating arm and this is fitted with two stop screws, the upper one for adjusting the low speed setting of the throttle valve and the lower one for adjusting the high speed setting.

Fox suggests that a low speed of 6000 rpm is a practical minimum for this engine and our tests confirmed this. It is a general rule that small R/C motors do not reliably throttle down as low as the big multi engines and an "idling" speed of half the high speed is a realistic figure for an engine of this small size and is one which the 07RC will achieve without any trouble. This, of course, is quite adequate for small single-channel model requirements, the low speed giving useful cruising power after the required height has been reached on full power. Our 07RC ran especially happily on a 7x3 Top Flite wood prop, turning up better than 12,000 rpm on Missile Mist fuel, with a reliable 6,000 rpm low speed.

Torque tests of the 07RC indicated maximum torque at between 8,000 and 9,000 rpm, with peak power occurring at around 14,000 rpm. Because of the resulting relative flatness of the power curve, the engine was not unduly critical to prop size and would deliver a useful level of power when propped for a static rpm of anywhere between say, 11,000 and 14,000 rpm. However, don't be misled into using a 6x3 or even a 6x4 prop merely because the 07RC looks so much like a Half-A. Such a prop will take it past its peak horsepower revolutions and throttling usually won't be as good. A 7x3 should be about right and will, in most cases, be better for the airplane. The engine will also turn up quite useful rpm on some 7x4's: ours bettered 11.000 on a Power Prop 7x4.

Apart from a tendency to start back-wards on small props (again, the use of a 7x3 will eliminate this) the 07RC was docile and simple to handle. Fox suggests that the proper high speed needle adjustment is a rich 2-cycle, occasionally giving a 4-cycle burp. This, in fact, is an adjustment which the 07RC seems to adopt quite willingly. We found the needle adjustment for a continuous lean two-cycle to be quite critical.

As we commented at the beginning, the Fox 07RC is one of the smallest and lightest throttle-equipped engines now available. It should be welcomed by those modelers who like to build small light weight R/C ships and who wish to add throttle control.

Summary of Data

Type: Two-port, two-cycle with opposed exhaust ports and single bypass. Shaft type rotary-valve intake.
Weight: 1.8 oz.
Displacement: 0.0698 cu. in. or 1.144 c.c.
Bore: 0.460 in.
Stroke: 0.420 in.
Stroke/Bore Ratio: 0.913 : 1
Specific Output (as tested): 1.22 bhp/cu. in.
Power/Weight Ratio (as tested): 0.75 bhp/lb.
Price: $10.95
Manufacturer: Fox Manufacturing Company, Station A. Fort Smith, Arkansas