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Now available direct from the manufacturer, the superbly made production version of the Fisher Redshift 60.

Production Redshift 60
Sixteen months ago, in this column, we expressed considerable enthusiasm for an entirely new British engine, the Redshift 60, a prototype of which we had been invited to examine by the designer and constructor, Dick Fisher of Sheffield. As was then stated, this motor was (and still is) one of the most technically interesting 10c.c. R/C engines to come our way for a very long time and, while it has taken a little longer than was anticipated to get the Redshift into production, the end result has, we believe, been well worth waiting for.

The current production model, as illustrated here, is beautifully made and is a credit to the British model industry. The engine's performance is something that we shall be reporting on in due course but, so far as overall standards of finish are concerned, the Redshift must rank with the two makes that one has come to regard as being at the very top of the tree. It was a delight to dismantle this motor and contemplate the finish of its component parts and the care that has been put into its construction.
Compared with the prototype, a number of changes have, of course, been made. First and foremost, the sand castings used for the crankcase, front housing, etc., of the prototypes, have been superseded by heat treated investment castings. These are extremely good examples of aluminium investment casting, crisply finished and with machined joint faces. The piston is a gravity casting in high silicon content aluminium alloy and a separate prop stud is now used, screwed into the hardened
nickel-chrome steel crankshaft.

What makes the Redshift so interesting from the design angle are its cylinder bore coating and, especially, its unconventional crankshaft main bearing set up. the cylinder liner is of brass and is used in conjunction with a ringless piston, as in an ABC type engine but, instead of being hard chrome plated, the cylinder bore has a Drayloy coating having a harder surface and, allegedly, a lower coefficient of friction.

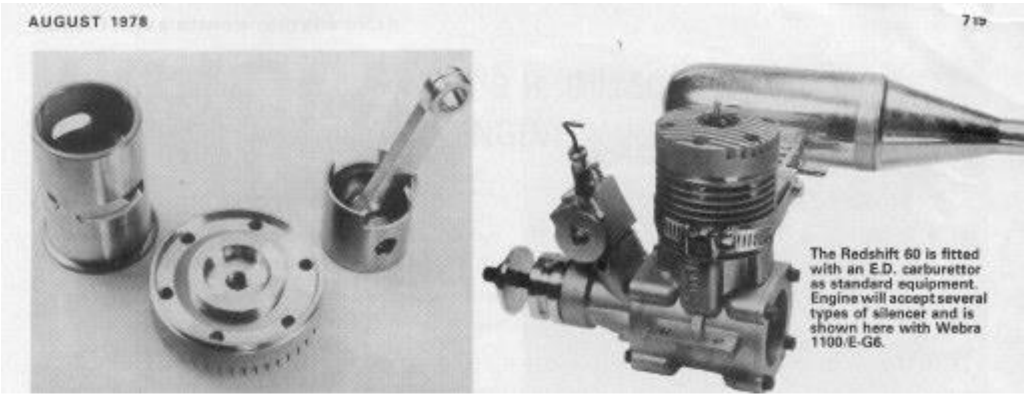
The crankshaft and front end assembly, as explained in detail in our earlier article, has the advantage of permitting a large valve port with an oversize induction passage, while avoiding excessive primary compression chamber volume or the need for non-standard ball baring sizes. The diameter of the shaft at the valve port IS 17mm (instead of the standard 15mm o.d. shared by most current 10 c.c. shaft valve motors) and this is increased to a 20mm journal diameter at the rear , enabling it to be carried in a standard 20x32mm ball baring. In the prototype, a 13mm i.d. gas passage was used but Dick Fisher later found that an equally good performance could be obtained with a slightly smaller bore and this is now reduced to 11.9mm, while the induction period is extended by having the rotary valve close later. The prototype's unique method of reducing effective crankcase volume, by having the counterbalanced crankweb running within a sleeve extension of the front housing, is continued in the production model but is further refined: the bore of this sleeve is now machined 0.06mm eccentric to allow for the downward loading on the crankshaft.

This close attention to detail is also evident in the fitting of the cylinder head to the latest production examples of the Redshift. Finned cylinder heads are inevitably stiffer parallel to the direction of the finning than across it, and the slight distortion that this can cause, when the head is pulled down, can result in a degree of ovality in the cylinder liner which, though extremely small, may nevertheless be undesirable in a ringless A\BC type engine. To overcome this problem, the latest production Redshlfts are fitted with a brass ring encircling the head screws between the head and main casting. The ring is machined to a thickness precisely matched to the thickness of the head flange and shim and to maintain a good gas tight joint between the head and cylinder flange these latest engines have this joint sealed with a liquid gasket compound.

At the time when the prototype Redshift was described in this column, various carburettors had been tried and a decision had then to be made as to which type would be supplied as standard equipment. The type eventually chosen was, appropriately enough for a British engine, the British made E.D. 'Multi Carb', but with a slightly enlarged choke. This now checks out at 0.297in. or 7.54mm bore and since, with the E.D. carb, a surface jet is used, the effective choke area works out at a generous .069 sq. in. or 44.7 sq. mm.

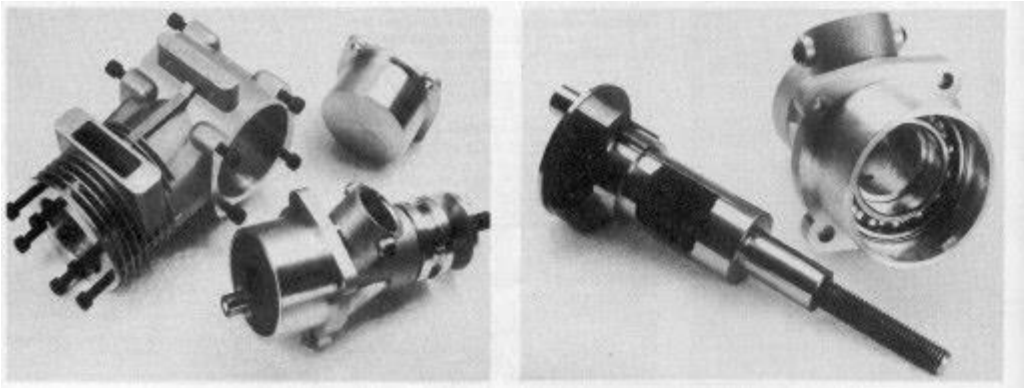
Complete with E.D. carb and a suitable glowplug, the production Redshift examined scaled 529 grams or just under 18.7oz. No silencer is supplied with the engine at the present time but a number of existing 60 size silencers will (or can be easl)y adapted to) fit the engine, Including Enya, HP, 0.S. and Webra. Drilling and tapping the ends of the exhaust duct for a bolt-on attachment is to be preferred, but if the strap-fitting HP or Webra is used, care should be taken not to risk distorting the cylinder by excessive tightening.

Because of the cost of manufacturing a motor of the Redshift's high quality, the engine is available only direct from the manufacturer at the present time, price £72.50, plus £2 post and packing. Orders should be sent to Fisher Engineering (Sales and Service), 9 Portland Avenue, Aston, Sheffield S31 0FN.



Above: Redshift's exclusive Drayloy coated brass liner, excellent piston and rod assembly and cylinder head with special 'anti-distortion' ring.

Below: Redshift's excellent investment castings. Note how front housing encloses crankdisc to reduce crankcase dead volume.
Below right: Redshift 60's unique front end assembly features a 17mm diameter shaft with 20 mm rear journal.



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Redshift 60 tested

The first news of this innovative British 10cc R/C engine was revealed in the April 1977 Radio Motor Commentary when an illustrated description of the prototype was published. This was followed, last August, by a description of the excellently made production model. As the design and construction of the engine has, therefore, been adequately covered previously, our present remarks are primarily concerned with the Redshift's performance.

The Redshift is supplied without a silencer, but several current .60 size silencers will fit (or can be adapted to fit) and, for our tests, we used both the standard HP expansion chamber (as sold for use with the current Hirtenberger HP61 Silver Star and Gold Cup series engines) and the Webra 1100/ E-G6 silencer as intended for the Webra Speed 61 series. Of these two, the HP (at the expense of slightly reduced noise suppression) causes less power loss and was therefore used for most of our tests.

The manufacturer's recommendations in regard to fuel are a 75/25 mixture of methanol and castor oil for the first hour of running time, after which the oil content can be reduced to 20 per cent. Also recommended is the addition of 3-5 per

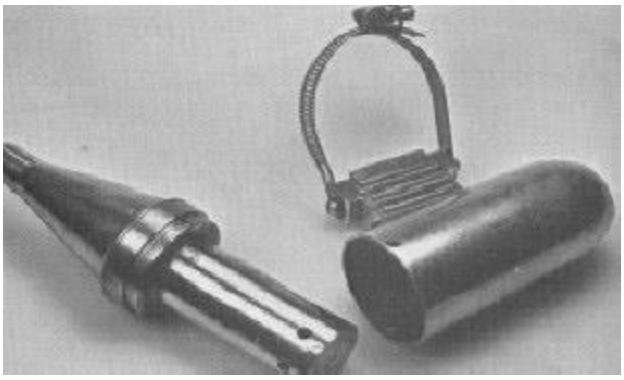
cent nitromethane for 'improved throttling characteristics.' We used our standard R/C test mixture of 75/20/5 methanol/castor-oil/nitromethane. This added 200-300 r.p.m. with the engine propped for full-throttle speeds of around 12,000-13,000 r.p.m. static and markedly improved the Redshift's tolerance to mixture strength variations, eliminating a tendency for the engine to abruptly cut out when the needle valve was leaned out too far.
Using the five per cent nitro fuel, HP silencer and a K&B bar-type long- reach plug, the following prop r.p.m. were recorded after running in: r.p.m.

16 x 4 Top Flite maple 8,000
14 x 6 Top Flite maple 8,900
14 x 4 Top Flite maple ,.10,500
12 x 6 Top Flite maple 11,400
12 x 73/4 Power Prop maple 11,600
11 x 7~ Zinger maple , 12,400
11 x 7~ McCann epoxy/glass fibre/carbon-fibre 12,900
11 x 6 Zinger maple ., 13,400
11 x 6 Top Flite maple 13,700

Even allowing for the moderate power absorption of the HP silencer, with its unrestricted 87sq.mm. outlet and 110cc volume, these are excellent prop r.p.m. figures and suggest that the Redshift is comparable with the most powerful imported engines currently available. In fact, subsequent open-exhaust dynamometer checks to establish its gross b.h.p. confirmed this to be so.
One thing that is essential, with the E.D. carburettor fitted to this engine, is a pressurised fuel supply because, despite Redshift designer Dick Fisher's efforts to maximise primary compression by an ingenious method of reducing effective crankcase volume, the carburettor will not pull fuel from the tank without assistance.
Of course, this is no problem, in the normal course of events, when one is using a silencer and can tap exhaust gas pressure to pressurise the fuel tank. Difficulties arise only when one removes the silencer in order to establish, for purely statistical reasons, the engine's gross output. For this, we resorted to a Robart, pump. (See Radio Motor Commentary, April1977 for details of the Robart). This, like the Perry Pump, is strictly a pump: it draws fuel from the tank and passes it on to the carburettor but, unlike the Perry, does not incorporate a regulator unit. It is very easy to
fit, since the only modification required to the engine is to drill and tap the crankcase back plate to take a 1/16in. i.d. pressure nipple.
An alternative to the Robart, of course, would be to pressurise the fuelank from the crankcase, using the rotary-valve to provide only positive pulses, and to control the high pressure fuel flow so created, through a 'TK' Pressure System hook-up. TK systems, in fact, were favoured (in place of ordinary silencer pressure) by a number of Redshift users last season.
One or two changes have been made to the E..D. carburettor since our previous description. Instead of having a standard 13mm spigot diameter with an adaptor to

fit the Redshift's 16mm intake boss, the latest engines have a new carb with a 16mm spigot. There is also an optional extra, in the shape of a modified needle-valve in which the spring ratchet is replaced by an O-ring and sleeve. Since, during the running-in of the engine, a month or two before testing, the original needle-valve had been found to leak, this latter modification was considered a worthwhile improvement and was therefore fitted to the engine.
Turning back to silencers for a moment: for the benefit of those readers who might have wondered what was inside the current type Webra silencer (earlier types were plain expansion chambers or vented front types), we are including a photo of the Webra 1100/E-G6 that was also tried on the Redshift. The two halves of this are 'glued' together, evidently with epoxy or polyester resin, which, in the presence of heat and vibration, may not be the best method of joining them. This was made abundantly clear when, with explosive suddenness, the Redshift shot up to 100 plus decibels as it spat the silencer's innards onto the workshop floor.
As can be seen from the photograph, the body of the silencer is divided from the tail section but the two parts are linked by a 25mm o.d. cylindrical baffle. Gases enter the cylinder through eight 4mm dia. holes (total area 100sq.mm.) and are then transferred through a similar series of holes into the tail cone of the silencer from which they escape via an 11mm i.d. (95sq.mm.) outlet nozzle. Incidentally, the two diametrically opposed holes in the rear part of the main body section and the corresponding screw holes in the tail section are non-standard. These were added later to enable the two halves to be joined more securely.

Below: the Redshift 60 with Robart fuel pump. This has a tubular diaphragm that is operated by positive and negative pulses tapped from the crankcase. A pumped or pressurised fuel supply is essential with the E.D. carburettor.



Right: the inside of the current Webra 1100/E-G6 silencer. See text for details. (Redshift 60 tested).