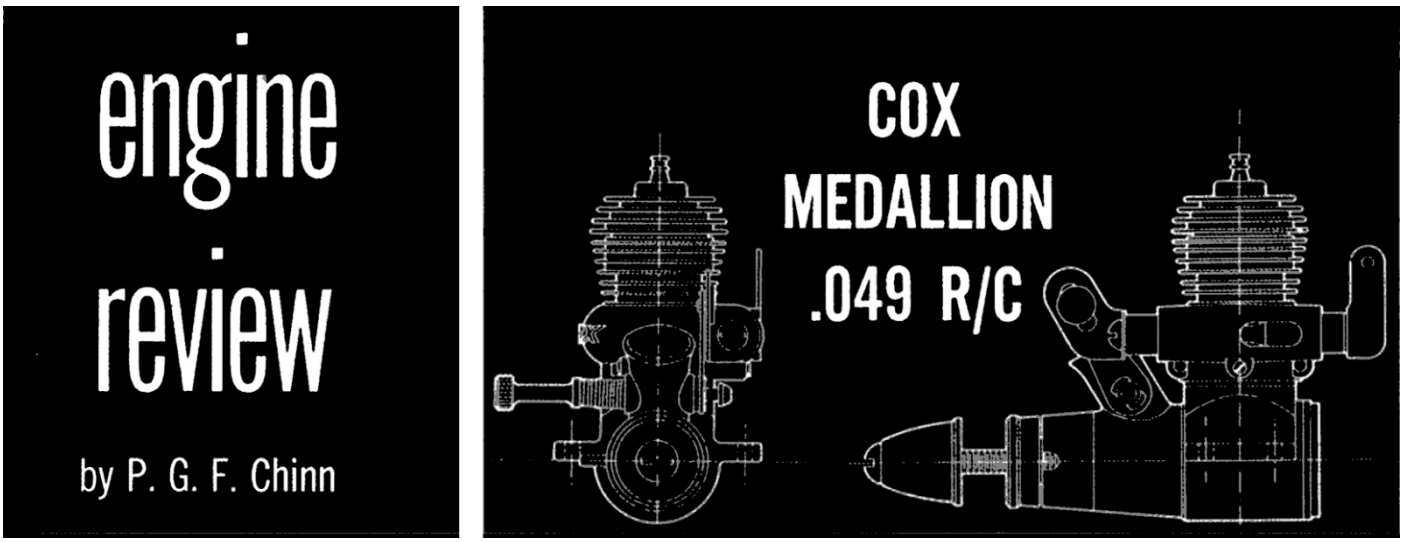
Cox Medallion .049 R/C



WITH THE COX THROTTLE CONTROL ADDED, MEDALLION 049 IS THE SMALLEST RADIO CONTROL ENGINE CURRENTLY AVAILABLE.

► Fitted with Cox's Throttle Control unit, the Medallion 049 is the smallest "R/C" type engine, domestic or foreign, at present on the market.

The Throttle Control unit comes as a separate set of parts, catalog number 2450, priced at $3.98. It is very easily installed in a matter of a few minutes, without special tools, and involves no modifications to the engine. The Medallion 049 can, therefore, he quickly converted back to stock condition if required. Since the total cost of the engine plus throttle control, at nearly $12, is a little above average for a small R/C engine, having the motor readily convertible from R/C back to standard is a worthwhile bonus where the user might want to switch the engine between two planes R/C and free flight, for example. As with most R/C engines, there is some loss of power with the throttle unit installed and being able to remove it completely, rather than merely fixing it in the full open position, is an obvious advantage.

The Medallion engines, which are made in three dis-placements, .049, .09 and .15 cu.in., comprise Cox's line of "sport" motors: more powerful than the reed valve motors used in the Cox ready built, less expensive than the Tee Dee range of contest models. Like the Tee Dees, they are shaft valve engines and have the same type of crankcase, main bearings and shaft setup but with de-tuned porting.

The design and construction of the Medallion and Tee Dee engines have been discussed previously in these columns but, for the benefit of new' readers, we will briefly recount the main points as they apply to the Medallion .049.

In common with other current Cox engines, the crankcase is not a casting, but is machined from the solid. At the front, the crankcase is extended to form a sleeve in which the crankshaft runs directly. The sleeve has a rectangular valve aperture at the top and is enclosed within a molded Delrin housing that also includes the carburetor intake. This housing is retained by an aluminum ring screwed onto the end of the sleeve. The crankshaft is of hardened steel, has a crescent counterbalance, a 9/32 in. dia. journal and a generous 3/16 in. bore gas passage. The valve-port, rectangular on the Tee Dee models, is circular on the Medallion and gives a 165 degree intake period, timed to open at 55 deg. ABDC.

At the front, the shaft has a reduced diameter knurled section onto which a machined aluminum prop driver is pressed. The prop is retained by a machined spinner nut and a long screw, into the shaft end.

Model Airplane News Magazine June 1966 by Hlsat

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Typical Cox quality is seen on dismantling complete motor and throttle. Throttle is extremely effective even though rpm's are a bit higher.

In addition to providing variable speeds, Cox throttle lowers engine's peaking speed, brings performance more into line with R/C requirements.

The cylinder is typically Cox, being machined in one piece with integral fins and screwed into the top of the crankcase. Dual opposed exhaust ports and a single internal bypass flute are used. The cylinder is topped by a machined aluminum screw- in glow head, seating on a soft copper gasket. The Medallion head is of hemispherical pattern. The piston and rod are a non-detachable ball-jointed assembly and, again are typically Cox with hardened conrod and hardened piston skirt.

The throttle system comprises a semi-rotary "flattened spray-bar" type intake throttle, linked to a sliding bar type exhaust restrictor. This latter is enclosed within a special exhaust collector housing, die-cast and machined in two halves and clamped around the cylinder between the base flange and bottom cooling fin. The two halves are held together with two screws and. to prevent movement of the housing on the cylinder, a small set screw is used. The restrictor bar has a diameter of 7/32 in., reducing to 3/32 in. at the center. The bar is drilled and tapped at each end. At the rear end is attached an actuator arm which can be positioned upwards, downwards, left or right, to suit servo or escapement location. At the front end of the bar is attached the carburetor throttle linkage, this latter being permanently fixed to the special spray-bar which replaces the standard spray-bar when the Throttle Control unit is fitted. Instead of being wasted at the center the throttle spray-bar is "flattened" and can thereby vary the carburetor throat area by slight rotational movement, in the manner of a butterfly valve.

Since the Medallion features sub-piston supplementary air induction (i.e. the piston skirt clears the bottom edge of the exhaust port as TDC is approached and thereby opens the crankcase to atmospheric pressure) there is a rather bigger drop in maximum power output in the throttle- equipped version than would normally be the case. This is because when the collector housing is fitted, residual exhaust gas, rather than fresh air finds its way into the crankcase. One would expect this to be particularly noticeable at high speeds and. in fact, this was exactly borne out by our tests on all the Medallion models when comparisons were made with and without the Throttle Control fitted.

However, whereas the manufacturer's normal recommendation for the Medallion series is the medium nitromethane content Cox standard glow fuel, the use of Cox Racing Fuel is suggested after fitting the throttle control (except during very hot weather). This has the effect of raising torque at low speeds and thereby partially compensating for the restricted breathing at high rpm. Because the torque curve drops off very much more rapidly as rpm are raised, effective prop sizes are apt to be larger.

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Our tests of the Medallion .049 with throttle, indicated that the prop size, that would enable maximum power to be developed in the air, would not be smaller than 6x4. A 7x3 Top Flite, with between 1/8 and 1/4 in. off each blade, might be even better. The same engine without the throttle unit, however, would get nearest to its peak power (in the air) when turning a 6x3 or 51/2x3 prop. The difference is accounted for by the fact that, although the non-throttle equipped engine on standard fuel was more powerful than the throttle-equipped engine on racing fuel, the throttle system cut bhp peaking speed by over 5000 rpm i.e. from nearly 18.000 to 12.500.

In the case of the .049, this drastic change in the shape of the performance curves is, in fact, quite acceptable. Compared with a Half-A free flight, a Half-A R/C ship is usually heavier and has higher drag and a tiny prop spinning at high rpm is not the best way to move such a model through the air. Thus, although the Medallion .049 without throttle even on less powerful fuel had a 25 percent higher power output and, for example, turned a 5x3 prop 3.000 rpm faster than the same engine with throttle unit fitted, the actual performance on suitable R/C model props was not so very different.

Throttle effectiveness was not quite so good as on the Medallion 15 R/C tested earlier, but compared quite well with the .09 R/C model. Reliable maximum minimum speeds on the bench included 10.800/ 5500 with a 7x3 Top Flite wood and 11.700 / 6000 on a 6x4 Tornado nylon. Idling speeds with very small engines are, of course, usually rather high by comparison with the big multi type engines. Our particular example worked best with all the adjustment washers removed from the restrictor bar. The throttle was most effective over the last part of its travel, half-speed being achieved with the throttle 75 percent closed.

Since priming through the exhaust port for a cold start is not practical with the exhaust collector in place, one has the choice of priming into the intake or (not a bad idea when the engine is being first started up after conversion) of removing the glow-head and squirting a few drops of fuel onto the piston head. Warm re-starts are easily, merely requiring the usual choked preliminary flip or two of the prop.

Running qualities of our test Medallion .049 with the Cox Throttle Control unit were best at between 10.000 and 14.000 rpm. At the upper end of the speed range the Medallion gradually picked up speed during the first 20 seconds of starting from cold. At higher speeds, however, the engine became increasingly critical to needle valve adjustment and at the maximum speed tested (15.400 rpm) the gap between "rich" and “lean" setting was extremely narrow. Fortunately, this is not too significant since it occurs beyond the speed at which the R/C version will normally be operated. This effect was not experienced with the same engine when not fitted with the throttle control.

We totalled about 2 hours running time on our Medallion .049 with the throttle control. The original glow head survived all these tests.

Summary of Data

Type: Two-part two-cycle with opposed exhaust ports and single bypass. Shaft type rotary-valve intake.
Weight: 1.8 oz (including Throttle Control).
Displacement: 0.0499 cu.in. 0.817 c.c.
Bore: 0.406 in.
Stroke: 0.386 in.
Stroke/Bore Ratio: 0.951: 1
Specific Output (as tested): 1.28 bhp/cu. in.
Power/Weight Ratio (as tested): 0.57 bhp/lb.
Price: $7.98 plus $3.98 for Throttle Control.
Manufactures: L.M. Cox Manufacturing Co. Inc., Cox Center, Santa Ana, California 92702.

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