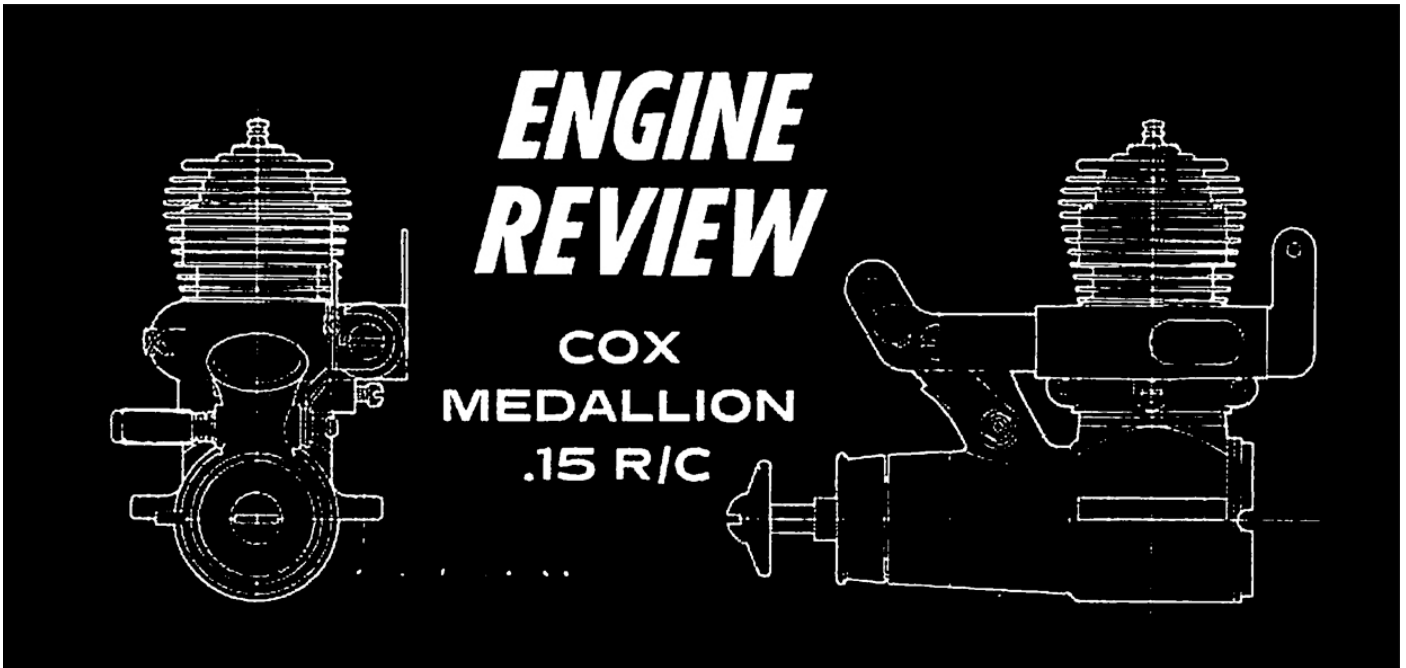


## Cox Medallion 15 R/C



NOW, WE HAVE THE ANSWERS FOR ALL THE R/C FOLKS WHO WANT TO KNOW PERFORMANCE DATA FOR THE COX MEDALLION .15 WITH ITS COX THROTTLE CONTROL SYSTEM.

by P. G. F. CHINN

► The 15 size engine is a popular choice for single channel radio-controlled models, not only in the U.S. but in many foreign countries as well. However, although about fifty different, .15's are made in various parts of the world, of which nearly a third are available in throttle equipped versions, only three U.S. manufacturers currently list R/C type 15's. Two of these have been dealt with in past Engine Reviews and the third, the Cox Medallion 15 as fitted with the appropriate Cox Throttle Control unit, is the subject of our present report.

Currently, the L.M. Cox company do not offer complete throttle equipped engines.

The Cox Throttle Control is available only as a conversion set and in three sizes for the three Medallion type engines. One can, of course, obtain the appropriate Throttle Control when purchasing the engine or buy it separately for tilting to a Medallion already owned.

The conversion is a very simple matter and can be carried out in five minutes with the aid of a screwdriver.

The complete throttle assembly adds about 5/8 oz to the weight of the Medallion 15 and, according to tests on our samples reduces peak power output by 30-40 percent when using standard Cox Glow Fuel as recommended for the Medallion 15.

Except during very hot weather, the manufacturer suggests that Cox Racing Fuel be used instead.

On our tests, this raised bph by a useful 10 percent.

It is, of course, quite usual to find that the addition of a throttle device, to an existing model engine design, will cut power output quite noticeably.

It is common practice to reduce choke area with throttle type carburetors and this will, by restricting the engine's "breathing" reduce the brake mean effective pressure developed in the cylinder, especially at high rpm with the result that power is reduced over the whole rpm range while the peak bhp is achieved at substantially lower rpm.

With the Cox throttle system, however, the carburetor choke area remains substantially the same and it is clear that the restriction on power is imposed not by the carburetor but by the exhaust system.

**Model Airplane News Magazine December 1964 by Hlsat**

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**Cox Throttle Control assembly, sold on extra, can be fitted to the Medallion .15 in a matter of minutes and with no modifications to engine.**

On the Medallion 15, as with other Cox engines, the exhaust outlet consists of two diametrically opposed ports in the cylinder wall, there being no exhaust stack to which a coupled exhaust restrictor could be fitted. The Throttle Control conversion has, therefore, necessitated the fitting of a special collector housing around the cylinder. into which spent gas is exhausted and its escape then controlled by a sliding bar type restrictor. Inevitably, this must cause some back pressure even with the restrictor in the full open-throttle position, but, more significant, it also means that, as the standard Medallion features sub-piston supplementary' air induction, gas remaining in the exhaust collector during the 46 degrees of shaft rotation for which the piston skirt is clear of the bottom edge of the exhaust port, is liable to be drawn into the crankcase thereby diluting the fresh charge.

This is a problem facing all manufacturers of engines using sub-piston supplementary air induction when such engines are converted to R/C use. Doing away with the coupled exhaust valve is not the answer, since an intake throttle, on its own, is very much less effective when, with the throttle closed, an engine can still leak air into its crankcase via the exhaust port. One solution is to use a longer piston skirt which will prevent the primary compression chamber being exposed to atmospheric pressure.



**Parts of Medallion .15 and throttle control. Cox precision mfg. evident.**

This, obviously, is only practical where a special R/C model is produced.

Having made the point that converting an engine of this type to throttle-control is not so easy as with an orthodox loop- scavenged, single-stack engine without sub- piston induction, we must now remark that, within the limitations imposed, we feel that Cox have done a good job on the Medallion 15.

First, one must remember that, although a drop of 30 to 40 percent in power sounds rather a lol, the Medallion 15 starts off with quite a good power output for a sport type engine four test on the standard Medallion 15 indicated a maximum bhp of .255 at 16.000 rpm on Cox glow fuel). Secondly, the drop in power is mostly due to reduced top end power (the bhp peaking speed being reduced by more than 4000 rpm) so that the actual loss of output on the props likely to be used for R/C models is not quite so noticeable. Thirdly, with an R/C engine, a drop in power is preferable, in most cases, to inadequate throttling. On the 15, the throttle works well with idling speeds ranging between 3.400 and 4.000 rpm on various props between 9x4 and 8x4.

Since the standard Medallion 15 was dealt with in our Engine Review for January 1963, we shall not repeat its full description here but confine our remarks mainly to the throttle assembly. The Medallion 15 is, of course, a front rotary valve,

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plain bearing, beam mount engine and follows the basic layout of the highly successful and very powerful Cox Special 15, the main differences between the two engines being found in the Special's more refined carburetion, larger rotary-valve port, twin bypass passages and higher compression ratio.

The throttle assembly features a semi rotary "flattened spray-bar" type intake throttle linked to the sliding bar exhaust restrictor previously mentioned. Coupling to the throttle servo or escapement is via the rear of the sliding bar and movement is in a straight fore and aft direction, the maximum travel between the fully open and fully closed positions being approximately 9/16 in.

The main component of the Cox Throttle Control assembly, around which the other parts are assembled, is the exhaust collector housing. This is made in two die-cast aluminum halves, accurately machined to house the restrictor bar and to fit around the cylinder between the base flange and the bottom cooling fin. The two sections are held together by 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 5/16 in., reducing to 1/10 in., at the center. The bar is drilled and tapped .010 in. at each end. At the rear end is attached an actuator arm which can be positioned vertically upwards or downwards, sideways, or in any other position to best suit the servo escapement location.

At the front end of the bar is attached the carburetor throttle linkage, this latter being permanently fixed to the spray-bar. The standard spray-bar is removed and the throttle spray-bar is slipped through the venturi in its place. Instead of being waisted at the center, the throttle spray-bar has two flats and can thereby vary the carburetor throat area by slight rotational movement in the manner of a butterfly valve. The standard needle-valve and spring are re-installed in this special spray-bar.

As is usual with Cox engines, starting the throttle-equipped Medallion 15 was easy. Since the collector housing makes it difficult to prime the cylinder accurately, we tried priming through the

intake when the engine was cold. This worked well. One or two preliminary flips of the prop with the intake choked was adequate for restarting the engine when warm. Compared with the Medallion 15 in standard form, the throttle equipped engine seemed to develop slightly more vibration, but rpm and torque readings were steady.

Compared with the throttle equipped Medallion 09, the 15 achieved substantially better idling especially on standard Cox glow fuel. As we have already remarked, idling speeds of under 4.000 rpm are obtainable. Minimum rpm obtained on a 9x4 Tornado nylon prop was 3.600 rpm when adjusted for a high speed of 9.300 rpm. On an 8x5 Top Flite wood, normally holding static rpm to 10.600 (i.e., roughly matched, in flight, to the peak rpm) safe idling speed was 3.750.

Idling adjustment is provided for by the addition or removal of .010 in. washers between the end of the actuating arm and the exhaust restrictor bar. Addition of washers allows the bar to go forward, simultaneously closing the intake throttle. The best idling was obtained on our test engine with three washers installed.

One thing to watch when adjusting the throttle for lowest idling speed and also when fitting the prop, is that the back of the prop blade does not foul the throttle link assembly. A prop which has the back of the boss worn, or compressed, from frequent use may easily do this, when the throttle is moved to the closed position. A simple solution is to insert a washer (preferably of fiber or nylon) between the prop and drive hub.

On test, the throttle equipped Medallion showed its highest torque at the lowest speed tested. 6.000 rpm. The torque curve declined in almost a straight line to 12.000 rpm and at a rate such as to result in a rather flat power curve. Thus, on standard Cox fuel (approximately 15 percent nitromethane) a peak of a little under 0.17 bhp at 11.500 rpm was recorded, but 95 percent of the maximum was obtainable at a little over 9.000 rpm, and 90 percent at 8.000 rpm. In other words, the engine is not critical to prop size and will deliver close to its maximum on a wide variety of props, e.g. 10 x 3 1/2, 9 x 5, 9 x 4, 8 x 5, 8 x 4

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which ever is found to be best for the model in question.

## Summary of Data

**Type:** Two-port, two-cycle with opposed exhaust ports and single bypass. Shaft type rotary-valve intake.

**Weight:** 4.8 oz. (with throttle assembly).

**Displacement:** 0.1525 cu. in. or 2.499 c.c.

**Bore:** 0.591 in. Stroke: 0.556 in.

**Stroke/Bore Ratio:** 0,941 : 1

**Specific Output (as tested):**

1.10 bhp/cu. in. on Cox Glow Fuel

1.21 bhp/cu. in. on Cox Racing Fuel

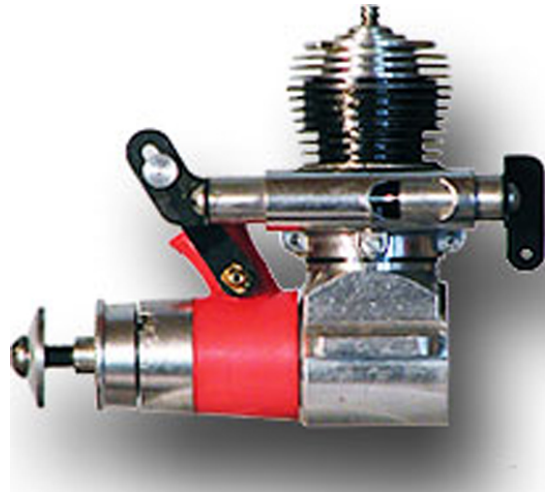
**Power/Weight Ratio (as tested):**

0.56 bhp/lb on Cox Glow Fuel

0.62 bhp/lb on Cox Racing Fuel

**Price:** \$11.98 plus \$4.98 for Throttle Control

**Manufacturer:** L. M. Cox Manufacturing Company Inc., Cox Center, Santa Ana, California.



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