

Revflow: Innovations and improvements

By Joe Horvath

Twenty five years ago Revmaster engines used a throttle-body carb called the POSA, manufactured by Jim Birmingham. By most reports it was a dreadful, leaky thing that lacked an effective idle cut-off and a functional mixture control. Many operators indicated that this carb had difficulties in the "ram air" mode and the number of owners who indicate that keeping the POSA in tune a "hit or miss" adventure are legion. When Joe Horvath got tired of having to shoulder the complaints about the inadequacies of this fuel metering unit, he decided that while he knew the concept was sound, the manufacturer's execution had been lacking. He was certain that he could improve the design and create a superior device. A fluid systems engineer was brought into the company to investigate the shortcomings of the Posa. Joe and his associates came up with solutions and a new design was created by the engineer which met these new higher criteria. The following article is from "Technical Study: RevFlow Injector Carburetor" and reprinted with the permission of the author. ~JPM

TECHNICAL STUDY: REVFLOW INJECTOR CARBURETOR

Revmaster has been manufacturing the RevFlow-series injector carburetor since 1981. The major components of the RevFlow are precision die-cast, not machined from-bar stock. The die casting process allows for many intricate features to be cast in, thus reducing manufacturing costs. The injector unit incorporates a once-patented variable-jet for fuel metering and a guillotine-slide which controls the air flow. The two parts work in unison, thus providing the engine with the proper fuel/air mixture.

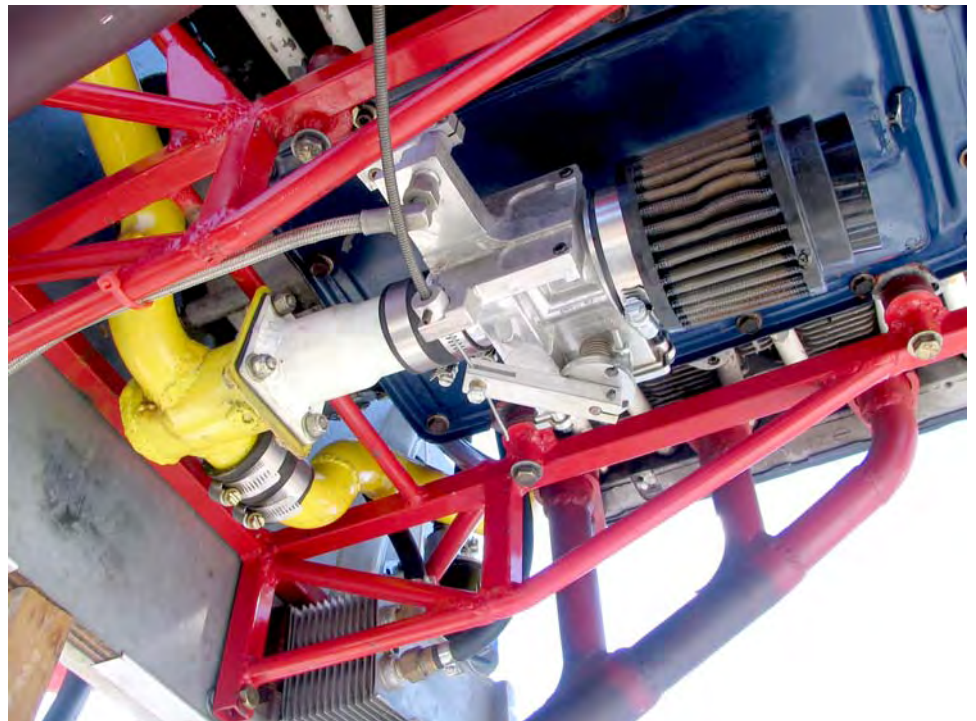
The fuel-metering-needle is ground with a flat tapered side which gives it an asymmetrical shape. The needle is attached to the slide and is allowed to float so it is self-aligning when inserted into the fuel nozzle. The head of the needle is configured so it cannot rotate while in service and is spring-loaded so the fuel mixture can be fine-tuned during the initial installation via a slotted adjust-

ing screw. Several throat sizes and needle configurations are available.

The guillotine-slide is actuated by a wheel and leaf-spring that opens and closes to the throat-opening when the wheel is rotated via the control-arm. The slide has four flutes that guide it very precisely on several surfaces so the transition from idle to full power is without hesitation.

When the slide is in the wide-open position, there are no other obstructions in the way of the air flow except for the needle, thus allowing for much greater air flow than with throttle-bodies which typically have butterfly valves. The flat side of the needle is oriented towards the engine and produces a low-pressure on the back side which in turn causes fuel to flow in relation to the air flow. This characteristic has altitude compensation benefits due to the variance in air density at higher altitudes. In order to manually control the mixture, the injector unit is equipped with a manual mixture control and idle cutoff. Besides controlling the mixture, this system will allow the fuel to be cut off at the nozzle, thus eliminating fuel leakage from the fuel line. Then, on restart, the fuel is at the nozzle for priming and starting.

The unit is equipped with two control arms; one for throttle and one for mixture cutoff. They require vernier-type controls with at least 3.5" travel with solid wire ends. Cable-housings are connected to the injector body via cable housing attach-points. This eliminates any movement in the cable housing which can cause erratic control prob-

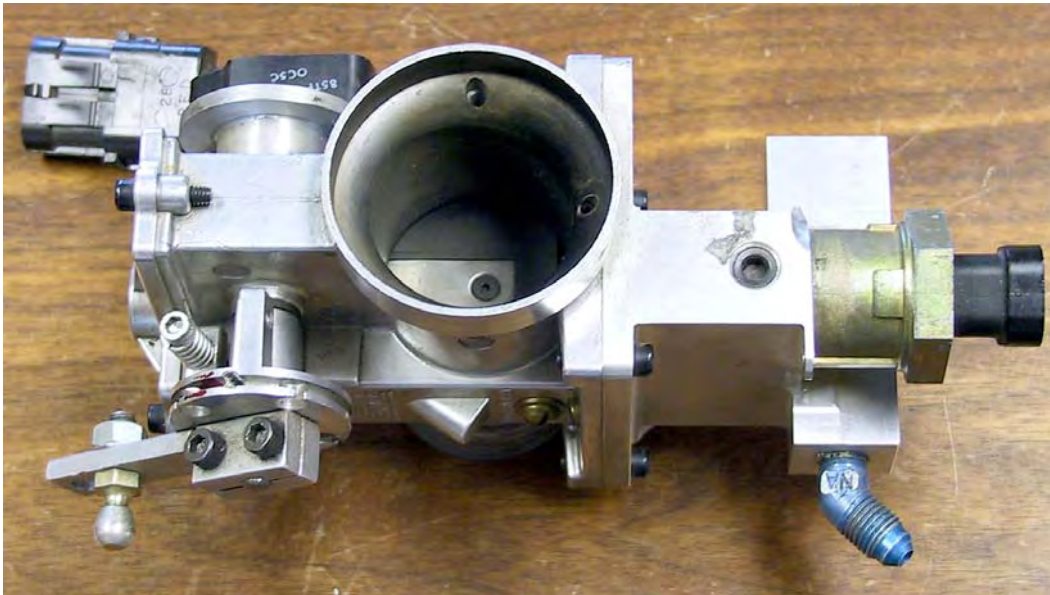


We currently have a Revflow mounted under a Corvair engine attached to our test stand, exceeding our expectations. We've had two other carburetors on the rig in the past and the Revflow out-performs them all.

lems. The wire ends of the controls are secured at the control arms with barrel clamps. The unit is mounted to the intake system by a 1-1/2" hose and two clamps. Flanged adapters can be provided on request. *(The one in the Corvair engine installation photo on the previous page shows an adapter I made to adapt the hose-clamp spigot of the Revflow to the AeroCarb flange that is welded to the intake manifold. ~Pat)*



Revmaster has a hoard of Revflow carbs in stock. This batch of bodies is only a small part of the stock we saw at the factory. 28mm up to 42mm throat diameters are available. It seems entirely plausible that this selection would be good for 1/2 VW all the way up to 180 hp, irrespective of the engine manufacturer. Since the carb can be mounted in just about any orientation, it seems well suited for experimental aviation.



The above photo is of an experimental version of the Revflow we found on Joe's desk, the day we conducted our interview. This unit has been fitted with an electronic fuel injection nozzle and a throttle position sensor. When mated with an oxygen sensor in the exhaust system and an ECU, optimal mixture can be established automatically. The real beauty of this system is that in the event of a computer malfunction or other electrical issues, if the carb is plumbed to gravity feed (in addition to the high-pressure needed by the injector) opening the fuel feed line to the carb will get the engine running again. This carb can also be fitted to most any multi-port fuel injection system, functioning as the throttle-body. If connected to gravity feed as described above, it too can act as a back-up for the MP-EFI system in the event of a failure.

In the event multiple units are required, such as for in-line engine applications, up to 4 units can be ganged on a single throttle shaft.

RevFlow-injector sizes range from 28mm through, 30, 32, 34, 36, 38, 40, 42, to 44mm. An alternate-air-source assembly is recommended for most single unit installations. This assembly consists of an air filter, open on both ends, mounted onto the air-horn of the injector and held on with a clamp. The ram-air tube is clamped onto the opposite end. *(The ram-air tube was omitted for our Corvair application pictured to the left~ Pat)* The tube incorporates a valve that controls the ram air. When in the closed position the ram air is cut off and the engine is digesting warm filtered cowled air.

The RevFlow injector is a 1-to-2 psi low-pressure injector. It will function well on gravity feed, although some applications require a fuel pump. When a fuel pump is installed, the fuel pressure should be maintained at a nominal 1.5 psi. This is best accomplished with a fuel-return-line to the source. The return line can be restricted to achieve the 1.5 psi.

For VW engine applications, Revmaster manufactures a special oil pump/fuel pump/oil filter assembly. This allows for an engine-driven fuel pump to be incorporated into certain applications.

The RevFlow injector unit is floatless, therefore, it lends itself to any mounting position; horizontal, vertical, etc. The RevFlow injectors have been installed in various types of experimental aircraft over the years, with excellent service history. The unit is not type certificated (STC'd) and no such claims have been made, intentionally or otherwise.

The original POSA carbs are still occasionally encountered; most are being used as doorstops or paperweights, it seems. I have never encountered another piece of aircraft hardware which is held in such vitriolic disrepute. There have been several other similar devices which have made it to the marketplace, including the RevFlow and the Aero Carb, which have fared far better in the court of public opinion.
~JPM



