

Frequently asked questions on mixture control and Bing carburetors

<i>Green Sky Adventures, Inc.</i> of North Central Florida				
Ph 352 475-5625 Cell 352 318-5625 or Email mail@greenskyadventures.com				
Engines	Instruments	Propellers	Micro Mong	Zippy Sport
Mixture Control Info ▼				

HACman questions

Manual In-cockpit Mixture Control Kit for HKS, Jabiru, and ALL Rotax UL series engines.

Why a manual system if the automatic HAC works so well?

The simple answer is the supply well has gone dry. There is a good demand for mixture control we've come to know as HAC (High Altitude Compensation) Once upon a time, the automatic HAC chambers were used in the snow industry then later in Ultralights, but that's going back almost 15 years. Demand on the snow side has dwindled in favor of more modern technologies. The HAC chamber, as marketed to the UL industry never really caught on as packaged and priced through Rotax. Over the last three years, it has gained in popularity because of promotional effort by Olenik Aviation, and Green Sky Adventures, Inc. and the fact that the kit was reconfigured to exclude expensive, unnecessary components.

A production run of certain HAC chamber parts requires quantity commitments that are quite high. This has been an ongoing issue for the last couple of years. Remember, the UL industry, compared to motorcycles, watercraft, and snowmobiles, is extremely tiny. So, while UL demand has been increasing, the lack of demand elsewhere makes it economically unattractive for producers of components. During this period, the decision was made to produce a similar manual system. We call it HACman

Will HACman work with my existing Bing 54 Carburetor?

It will work on Bing 54 x 36mm carburetors as delivered with Rotax UL series engines since around the late nineties. These were cast, drilled, and tapped to accept the nipple fitting which exposes the mixing chamber (manual or automatic) to venturi pressure. This vintage carburetor was, and is shipped with a tapped hole that is plugged with a slotted screw. It is visible just to the right of the fuel inlet tube on the right hand side of the carburetor. Click [HERE](#) to view. For about five years prior to this change, the castings were produced to accept the fitting, but without machining to accept the plug screw or nipple. The raised boss area is easily identifiable. Click [HERE](#) to view. Carburetors with housing not cast to accept this nipple cannot be used with HACman.

Do both carburetors require the HAC nipple?

No. The differential in pressure is extremely small. It is sufficient to pick up venturi pressure from only one carburetor on a dual carburetor system. That is why HACman uses such a high quality precision controller, to effectively utilize this minute differential.

Can the HACman be used on other Bing equipped 2 stroke engines?

The principal is the same regardless of engine brand. In fact, the technology goes back to the

twenties or thirties on certain carbs used on aircraft. There are two sizes of Bing model 54 carburetor, 36 and 38 mm. The 38 was supplied with Hirth engines. These were never machined to accept the HAC nipple, but their later castings can accept the modification.

I understand that ambient, float bowl, and venturi pressures are mixed to alter air/fuel ratio with the automatic HAC, but with that, the automatic controlling chamber is located right next to the carburetor(s). **Does line length distance between HACman controller and the engine make a difference?**

To date, (June 2004) we have only tested 4 ft (Kitfox) and 12 ft (Challenger II) installations. Operational differences between the two are not distinguishable.

With HACman installed, will I ever have to change jets?

That is the goal, but it is difficult to take every possibility into consideration. We supply the same main jets with HACman that we do with the automatic system. Theoretically, our manual system could be useful with 100% stock jetting, except adjustment could only be made in one direction. ...Lean. The normal operating range for Rotax 582 is 930 F to 1150 F. The aircooled Rotaxes run from 860 F to 1080 F. That is an operating range of 230 degrees, but the engines run best at the top of that range. Cruise EGT, by design is higher than Wide Open Throttle EGT. The rich mixture at WOT provides extra cooling and is efficiently atomized by the high airflow through the venturi. When throttled back in cruise, mixture is leaned as the jet needle / needle jet interface creates a crosssectional area smaller than the main jet. On faster airplanes, as speed increases, increased rpm relative to throttle position also has a leaning effect. Therefore, much of that 230 degree operating range is utilized. Typically, extreme atmospheric conditions like hot to cold or high to low, which essentially effect density altitude can vary the EGT about 100 degrees. In those extremes, without mixture control, jetting change is required. The HACman, and auto HAC have the ability to control approximately 80 degrees of EGT and quite effectively maintain mixture in the normal operating range

Am I able to send my carbs to you to modify for the HAC accessories?

If your carb castings are prior to about 1990, there is some question whether the casting is such that it can be modified. Check just right of the fuel inlet. There should be a raised boss. Click [HERE](#) for an image. We modified some carb bodies recently as a time study in making such a decision. Both Carbs should be serviced or inspected to some standard. If you as an owner, or your local technician can do the inspection, you can send your stripped and cleaned carb body to us for modification. This is only in conjunction with the sale of the HACman through Green Sky Adventures, Inc. or one of our distributors. Price is \$50. plus shipping. We'll do the mods weekly, so turn around should never be more than 8 days.

Though the modification is relatively simple, we have avoided offering that service because of possible variables in used carburetor condition and our discounted New Carburetor price could be more economically attractive. Only one carb needs to be modified for the venturi connection. However, if we service just one carb up to some standard, by inspection, cleaning, and replacement of potential wear items, that could result in a mismatch with the unserviced carburetor. (If one elects to go for one new carburetor the same possibility exists) When performing the modification to older carbs, our standard recommended procedure is to service

both. If we perform the carb service, the following parts will be replaced: All gaskets and o-rings, floats, float needle, bracket, hinge, sieve sleeve, and rubber grommet. Current price for the service, including mod, is \$97.88 per carburetor. Other required parts or extreme cleaning is extra. So, one would have about \$200 expense plus shipping, but both carbs would be up to speed. If your existing carbs are already 100 % and you only need the nipple installed, the most economical course is to modify one carb yourself or we can do it for you for \$50, as stated above. One might also consider simply purchasing one new carb along with the HAC or HACman (current carb price **with the package** is \$346.41 as of Summer 2009)

Do the Bing Constant Velocity Carburetors used on HKS, Jabiru, and Rotax 912 have to be modified?

There is no internal modification required to run HACman on the Bing CV carburetors. Externally, the vent line will be changed. Your carburetor(s) must already be jetted rich enough for the lowest Density Altitude they will ever encounter, prior to installing the HACman. HACman is a leaning device, and does not technically increase fueling in Full Rich position. ...Only to the extent that the carburetor jetting will allow.

******* I typically must get to 13,000 to 14,000' to get over the mountains. Do you see an advantage to the manual sys. over the Auto. HAC ?**

Both systems will function at that altitude, and also allow correct richening if you happen to fly down some low valley on a cold day. The manual system allows the pilot to have control. Keeping the EGT up at high density altitude is essential for smooth economical operation. Both systems do that, but at high altitude, peak power occurs at cooler than peak EGT. this is most noticeable when climb rate dwindles down to almost nothing at high altitude. In such an instance you can lean to peak power with the HACman. With autoHAC that option does not exist. **Lean spots in midrange.** It is quite common to experience certain midrange throttle position / rpm combinations where EGT spikes dangerously high. With the auto HAC system, or even without any system, the mid range jets and clip positions may require tweaking to check this. That tweaking tends to make mixture unnecessarily rich at other parts of the midrange. The HACman gives the pilot control over this. With HACman or autoHAC, we jet the carbs much richer than stock. Those who have made high density altitude departures with conventional aircraft are already familiar with leaning for take off. AutoHAC does that for you. HACman must be leaned manually for such departures. The EGT range variation is not enormous from full rich to full lean with either system. It's about 80 degrees F, but a very important 80 degrees.

As I am new to Homebuilt and Experimental power plants, any advise would be greatly appreciated. All of my experience is with Cert. engines and the typical Manual mixture controls. But I am not opposed to carbs that can perform this task. Will you be at Oshkosh ?

Yes, I have assisted in manning the Hpower booth (HKS 700E 4 stroke) for the past couple of years. Most likely that will continue this year.

When will units be available?

Now.

Shipments began the third week of July 04. An initial production run of fifty units was sold over several months, allowing a customer feedback period. Units are serialized for tracking. There have been no complaints or returns as of May, 05

What is the cost?

Pricing as of June 29, 2004 is \$159.95 plus shipping for standard length tractor installation like Pulsar, Kitfox, Ranns, Avid, etc. \$189.95 for longer length like Challenger and Kolb. A price increase of \$15 per unit is planned for June 1, 2005

Do you see and advantage to the manual over the auto HAC?

Manual or automatic is still a matter of personal preference. Availability and supply of automatic HAC chambers has been extremely unreliable and there is presently some question whether it will be available in the future. Availability of the HACman will not be an issue.

What is Triplex Line?

HACman controls mixture by combining and metering three pressures: Static; Float Chamber; and Venturi There are three lines between the controller and corresponding connections at the carburetors. With HACman, these three individual lines are bundled as one, with spiral wrap. This protects the lines from heat and abrasion, provides an easy means for securing, and results in an installation that is more sanitary in appearance.

Do the lines have to be the same length? Can I cut the lines?

Yes, you can cut the line to facilitate routing and connections. The lines do not have to be equal length. Equal length is a requirement on a stock non HAC system. More specifically, on a non stock system, the static lines must terminate in an area where atmospheric pressure is similar or identical to that of the air filters vicinity. ON HACman, the static pressure is sourced from within the filter. That pressure is routed to a remote chamber (HACman) within reach of the pilot, then to the float chambers. That's two lines. The third port on the HACman is separated from the "static/chamber pressure" side by a precision needle valve. When the valve is opened, static pressure is decreased by bleeding it back to the the venturi of one carburetor thus leaning the mixture.