

MIXTURE CONTROL FOR ROTAX 912 UL AND 912 ULS ENGINES.

The in-flight mixture control works by changing the relative pressure within the carburetor between the Venturi and the float chamber. The float chamber normally operates with the air above the level of fuel at ambient pressure and the venturi operates at a lower pressure. The pressure differential causes fuel to flow from the float chamber, through the main jet, needle jet and into the diffuser within the Venturi where the fuel is mixed with the incoming air.

By connecting the Venturi to the float chamber through a variable valve, with a bleed jet to ambient pressure, the pressure differential can be varied and a simple but very effective in-flight adjustable mixture control is achieved.

On Bing CD carburetors, the area under the cap connects to the Venturi through a bleed hole in the slide, and is therefore at Venturi pressure. A nipple is screwed into a tapped hole in the cap on both carburetors (see photo), and the two nipples connected by a tube to one end of cockpit mounted valve.

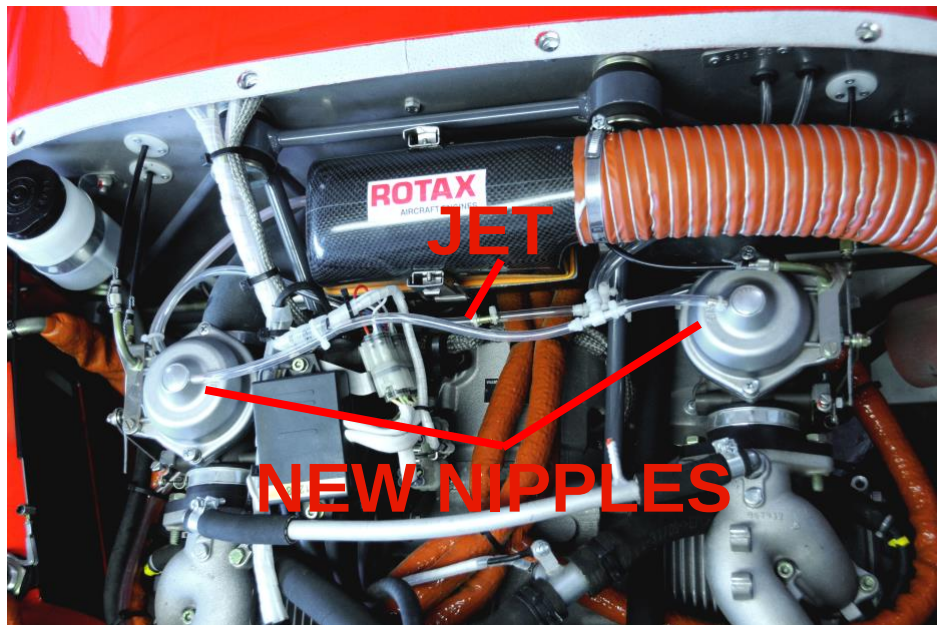
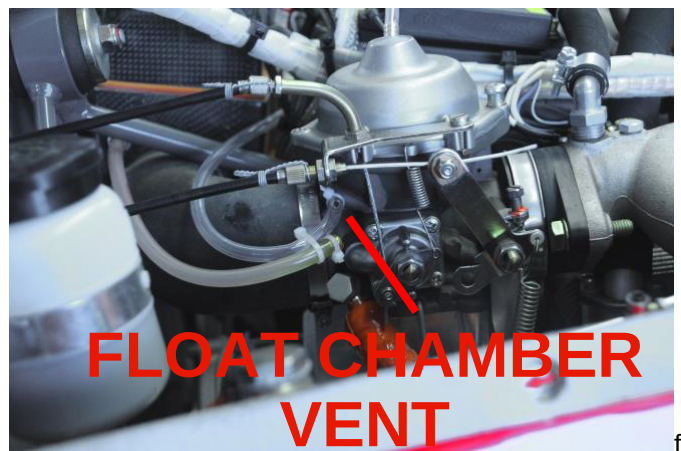


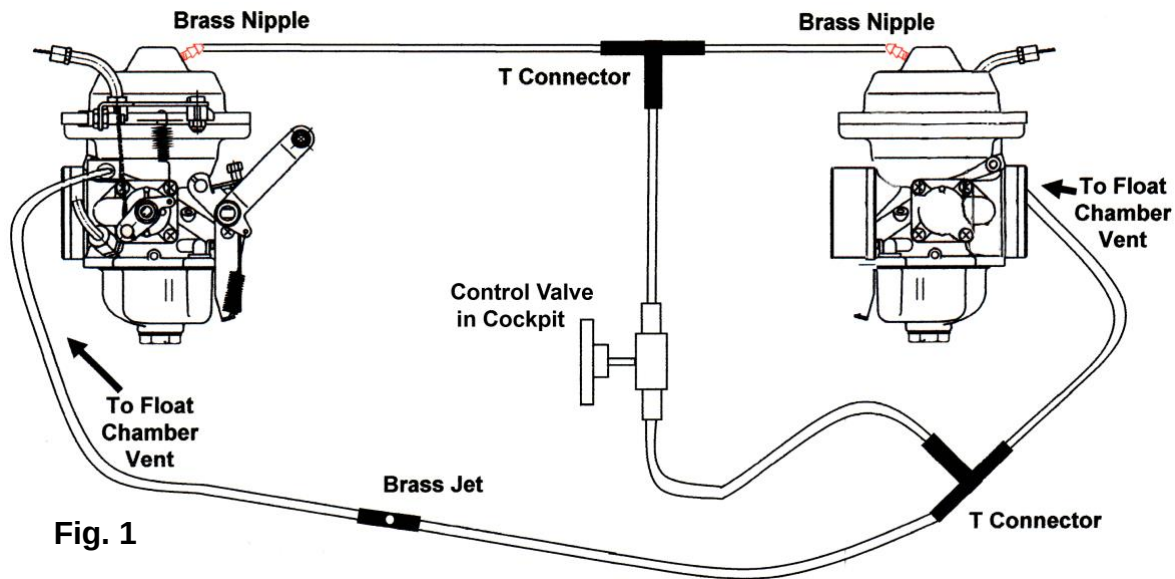
Photo. 1



The float chambers are already provided with nipples for vent tubes. These nipples are connected together with a T-piece and a jet tube in the line, the other end of the cockpit control valve goes to the T-piece. The control valve controls the pressure differential between the Venturi and the float chamber. The jet size has been selected to allow fully rich running by supplying ambient air pressure to the float chamber.

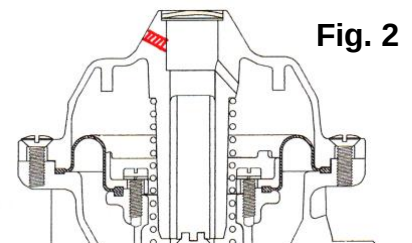
To operate, the valve is closed by turning clockwise to give a full rich condition. The mixture control should be kept fully rich unless operating at high density altitudes. Use conventional aircraft leaning techniques once the aircraft is at altitude and in stable cruise flight. The mixture control is turned counter-clockwise until an RPM drop is noticed and the EGT's have peaked, then richen a little by turning clockwise. The mixture should be at full rich before the throttle is opened to climb, unless at high altitude, say over 8000 ft density altitude, where leaning is required to obtain full power. At altitudes over about 9,000 ft, it is acceptable to lean past peak RPM and add throttle to regain required RPM, but do not lean to the point where the engine feels rough to the senses.

The following diagram (Fig 1) shows the connections between the carburetors and control valve.



The brass nipples need to be fitted to the carburetor tops (Rotax Parts List name "chamber top"), the top will need to be removed for the modification, full removal details can be found in the Rotax Heavy Maintenance Manual for the 912 UL, 912 ULS and 914 engines available on the Rotax web site. We can supply chamber tops with the nipples already installed on an exchange basis.

Drill and tap a 5mm threaded hole into the chamber top using a 4.2mm drill and M5 tap. The position for the threaded hole is shown in red in Fig. 2. Great care must be taken to drill the hole in the correct position as shown in the diagram, it must break into the small area in the centre and not into the chamber above the diaphragm. Orientate the nipple positions so that when the top is reinstalled onto the carburetors, they face each other as shown in Photo 1. Screw the brass nipples firmly into the threaded holes using Loctite 243 (blue thread lock/sealer). Reinstall the chamber tops onto the carburetors. Thoroughly clean all debris from the tops and reinstall them onto the carburetors following the Rotax Manual procedures



With the carburetor chamber tops in position, connect the two nipples with a suitable length of the supplied tube and with a T connector inserted. The position for the T connector does not really matter, so position it to give easy routing for the tube line to the control valve.

Remove the existing carburetor float bowl vent tubes and fit a new length of tube between the two vents, this time with a T connector and the brass jet inserted. Position the T connector to give easy routing for the tube line to the control valve. Ensure that the hole in the brass jet is fully exposed, see Fig. 3.



Run suitable lengths of the supplied tubing from the two T connectors at the carburetors, through the firewall into the cockpit to a suitable position to mount the control valve. The control valve must be within easy reach for the pilot(s), preferably near the throttle. Secure tubing on to all fittings with the spring clips provided.

If the aircraft is Light Sport in the US and not in experimental category, then a Letter of Authority to fit the mixture control is required from the aircraft manufacturer. On completion, the installation must be inspected by an LSRM or A&P before flight.

WARNING - Rotax have not approved the use of this mixture control on their engines. Only fit the mixture control kit to aircraft with at least 2 EGT readouts monitoring the hottest cylinders and carburetor heat control. It is the purchasers' responsibility to carry out testing of the system. With the mixture control in the fully rich position the carburetors operate exactly as the if the system was not fitted. When first testing the system, climb to height above the airfield and density altitude of over 5000 ft before operating the mixture control valve. With the kit as supplied and fitted to the aircraft already tested, leaning until the engine stops is not possible. However, while testing be prepared for the engine to stop and be in a position and height to be able to land should the engine stop. Use of the system is the owner's responsibility and Aircraft Service will not accept liability for any consequential loss or damage.