



Part #52

Rebuilding the Bing Carb

By Mike Stratman

One of the most overlooked and misunderstood parts of the powerplant is the Bing Model 54 Carb. While a lot of guys follow the Scheduled Maintenance plan religiously and need to be commended for it, many do not really understand what to do every 50 hours when the plan calls for "Clean Carburetors and check for wear". The same round slide Carb is used on all two stroke engines from the 277 to the 618, the only difference being the jetting found in the recommending jetting chart. This month we'll discuss the things to look for when maintaining your Carbs, the parts you need to have on hand before you get started, and why using oil injection instead of premix actually will considerably extend Carb life.



Figure #1 – Bing Carb Rebuild kit #13503 contains most everything you need to do the job for less than \$30.



Figure #2 – The float level should be $\frac{1}{2}$ " or about 13mm from the top of the bowl with the floats removed.

Getting Started: General overhaul should be done at the same time as the engine or at the recommended 300 hours. Have on hand a Bing Carb Rebuild kit shown in Figure #1. Available for less than \$30, it includes all the normal parts you replace including the 261-705 Valve w/ viton tip that sells for more than the entire kit when purchased separately by part number. Be sure to order one per Carb.

Remove Carb(s) from engine and flip bail to remove float bowl. Inspect the float arm, floats, and the pins the float ride on for wear. Also check to see if both float rides at the same level in the fuel. Unequal floatation would mean the float is saturated and needs to be replaced.

Checking Float Level: If you suspect fuel delivery problems inside the Carb first check the float level. With the engine running normally kill the engine and turn off the fuel valve at the same time. Flip the bail and drop the float bowl carefully. Remove the floats and measure the fuel level. The correct level is $\frac{1}{2}$ " from the top of float bowl. Don't start bending the float arms to change the level. Rather inspect the parts carefully for wear or float saturation. Check the float arm #861-190 for wear or flat spots at the contact point with the float. To check the alignment measure from the surface of the float bowl gasket to the float arm at the contact point. Should be right at 10.5 mm or 0.412". Only after verifying that all parts are working properly, adjust the tab at the contact point of the valve to achieve proper float level.



Figure #3 – With the float arm removed you can now inspect the passages including the inlet seat and jet passages.

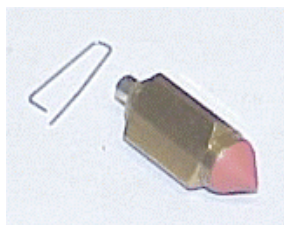


Figure #4 – The Viton Tipped Valve controls the fuel entry and float level. Inspect under a magnifying glass all these parts for wear. Buying the #261-705 valve by itself is actually more expensive than the entire rebuild kit. See figure #1.

Needle & Seat: Next remove the pivot pin holding the float arm. One end is knurled the other is not. Use an ice pick to drive the pin out from the opposite end of the knurl. Remove the 261-705 three-sided needle valve paying close attention not to lose the tiny clip that holds the valve to the float arm. This part is literally microscopic if not completely invisible to you older guys. Find a nice quiet place for it so you can find it again in a few minutes. See figure #4.

With a magnifying glass study the rubber tip of the valve and the internal seat for wear. This piece controls the fuel entry and the float level in the Carb. If not seating or closing properly the fuel will continue to flow causing the fuel to exit the overflow or vent tubes on either side of the Carb. A messy if not dangerous situation. The seat or internal brass cylinder is considered part of the main Carb body and non-replaceable. I understand that Bing does make a replacement kit for this item but the procedure is extremely difficult and not recommended for a novice or the faint of heart. Remove idler jet and inspect for blockage. Note the number stamped on the side. (40, 45, 50, etc.) Check the recommended chart found in the CPS catalog to see if this is the right number. Rarely should this part vary from the recommendation. Use a blast of compressed air in both directions to clear jet passages.



Figure #5 – The Bing Quick Change Wrench has both 8mm and 10mm hexes for both the main jet and the needle jet. The newer version has handy threaded ports for the storage of additional mains for seasonal jetting changes.



Figure #6 – The top end parts are accessed by removing the two screws on the Carb top plate.

Remove Needle Jet: Next remove the needle jet and main jet using a 8mm and 10mm open end wrenches or use the #6926 Bing Quick Change Wrench shown the figure #5. One end is 8mm for the main jet and the other end is 10mm for the needle jet. The unit shown here also has storage for additional main jets. Drop the needle jet out of the passage. Use a magnifying glass to inspect both jets for wear or blockage. Use a blast of compressed air in both directions to clear jet passages. Replace at the first sign of wear. Note the tuning number on the needle jet. (2.70, 2.72, 2.74, etc.) Check to see if it matches the recommendation in the jetting chart. This part along with the needle riding in from the top of the Carb controls mid-range throttle response. It is generally recommended to change the needle

jet as apposed to the pin for mid-range corrections, because it is fairly predictable (smaller number are leaner, larger numbers are richer). See part #11 of the Proper Care & Feeding of the Rotax Motor "Tuning the Bing Carburetor - Understanding the Mid-Range" for more on tuning using these two parts. It is a good idea to take a minute here to record all your jetting numbers in your logbook for future reference.

Inspect main jet for blockage. It is considered rare but if the #261-625 Sleeve Screen (red and white plastic screen that surrounds main jet tube) is installed improperly, chips from the plastic can block the main jet passage causing a lean-overheat condition. If you experience such an event, immediately check the main jet for blockage being sure to disturb the crime scene as you conduct your investigation. At no time should you run without this screen, as it is necessary to stabilize the fuel as it enters the main jet area. Use a blast of compressed air in both directions to clear jet passages. If you are a savvy operator you already are familiar with the importance of the proper main jet and probable have a selection of sizes on hand to compensate for changes of seasons and flying conditions. See Part #10 of the Proper Care & Feeding of the Rotax Motor "Tuning the Bing Carburetor" for more on the selection of the right main jet.

Top End Inspection: Move to the other end of the Carb and remove the top cover plate screws. Remove the entire slide assembly with cable attached. Compress the spring and push the cable wire out and over to release it from the round slide. Remove spring and white plastic spring cup paying special attention the position of the e-clip (above or below the spring cup) and the position on the jet needle or tuning pin. Note the slot number (1 being the end slot and four being the slot closest to the center of the pin). Record this in your logbook along with the tuning number stamped on the pin. You must be able to return this clip to the same position. Inspect the tuning pin carefully for wear paying particular attention to the wear point between the #963-500 E-clip and the tuning pin. **The parts must not rotate freely.** Vibration has been known to cause the e-clip to cut the tuning pin like a lathe. If left unattended the tuning pin will fail and drop causing an engine failure. The addition of a small o-ring just above the e-clip as recommended by Bing seems to provide enough interference to keep the rotation from starting. Rotax came out with a Service Bulletin with a parts change on the slide and spring cup allowing for an o-ring above and below the clip. This rather expensive solution never rally caught on because the addition of just a single o-ring seemed to do the trick. Order part #963-505 O-Ring for \$0.69 if you don't find this part in your Carb. Replace both the tuning pin and the e-clip at the first sign of wear. See figure #7. Inspect slide to be sure that no galling or unusual wear is present. Replace if wear is present. Remember that a sticky throttle is not only annoying, it can be very dangerous. Take no chances with worn slide parts.



Figure #7 – Pay particular attention to the relationship between the tuning pin and the e-clip. These two parts will rotate and wear from vibration. The small o-ring shown here provides enough interference to stop this wear.

After a thorough inspection, reassemble the top of the Carb paying close attention that the e-clip is below the spring cup. Yes, it fits nicely inside the spring cup but this will cause an over rich mid-range. Years ago I had a guy call me from Ireland complaining that his buddies had worked on his carburetors and now his fuel consumption was nearly doubled. After listening to his heavy Irish accent for a while, I suggested he inspect his carburetors to see if the e-clip was on top the spring cup. A few days later he phoned to say everything was back to normal and that his buddies weren't going to get near his plane anymore.

Inspect Throttle Lines: Now is a good time to inspect throttle lines for wear and to lubricate them. Many accidents can be attributed to poor or sticky throttle operation. Take a few moments to check for clean operation of throttle system. Adjust the Carb top fitting so that the throttle responses smoothly and especially that it opens the slide completely and allows it to return to the fully closed position. The large screw and spring on the side of the Carb should control the final closed position and not the cable travel. If you are running two Carbs be sure that slide travel is synchronized both top and bottom.

You can lube the lines in place with the use of a "Cable Luber Kit" made by Champions Choice, Inc. A special block can be clamped over the end of any choke or throttle line and attached to the aerosol can with a snorkel tube. This can be done without removing the line from the installation. All you need is a little slack to fit the block on the cable end. When properly installed the Luber will force fluid through the entire cable with a minimum of mess. See Figure #8.



Figure #9 – Special attention needs to be given to the Carb top entry. The use of a short length of ¼" i.d. fuel line makes and excellent strain reliever.



Figure #8 – The use of the Cable Luber Kit shown here allows lube to be forced into choke and throttle cables while they are still in place. Special clamping block and snorkel kit sells for less than \$20.

Carb Top Entry: How the cable enters the top of the Carb is extremely important and often times overlooked. The standard #260-370 Rubber Grommet (center of Figure #9) is fine for keeping out dirt but does little to keep the cable from riding up onto the collar of the adjustor nut especially if slack is present in the line. This can cause the throttle to stick open and create a dangerous situation. A piece of #7011 ¼" i.d. fuel line and a couple of clamps works well to supply strain relief and flexibility yet security when applied to throttle lines as shown in figure #9.

Oil Injection versus Pre-mix: The debate still rages on over the pros and cons of both systems, but consider this. With oil injection the oil component never reaches most of the inner workings of the carburetor. Thus the residue left behind when a Carb dries out between operations is not a factor in oil injection as it is in pre-mix. Carbs will last longer and be less likely to "varnish" especially if you're the kind of guy who flies infrequently.

Conclusions: Schedule your Carbs to be inspected and rebuilt just as you do with the rest of the engine at the recommended 300-hour TBO. For less than \$30 a Carb you can replace most of the common wear parts and can do it in about ½ hour per Carb. Cheap insurance that your free time will spent flying rather than thrashing.

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