HOW TO .. Remove, Clean, Rebuild and Reinstall Keihin PD46A carbs

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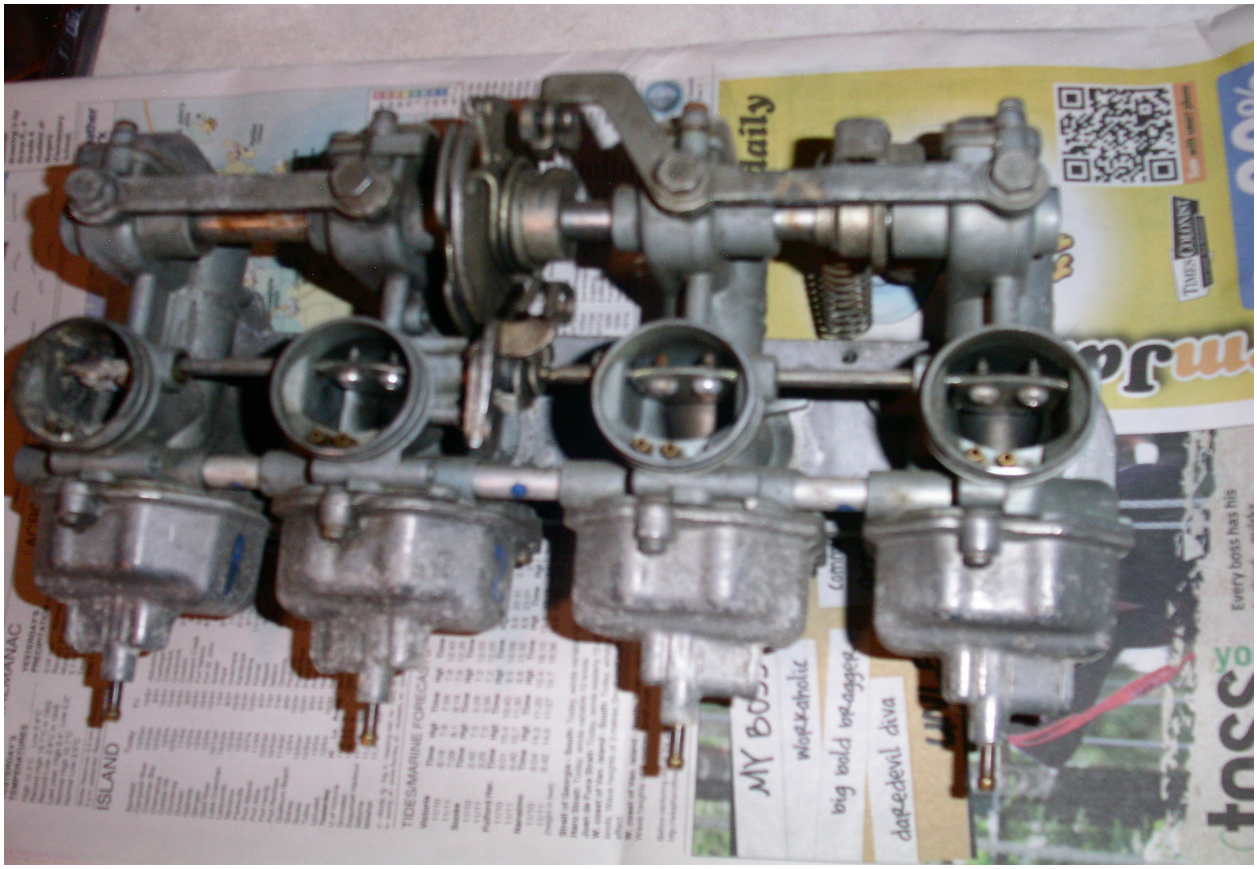
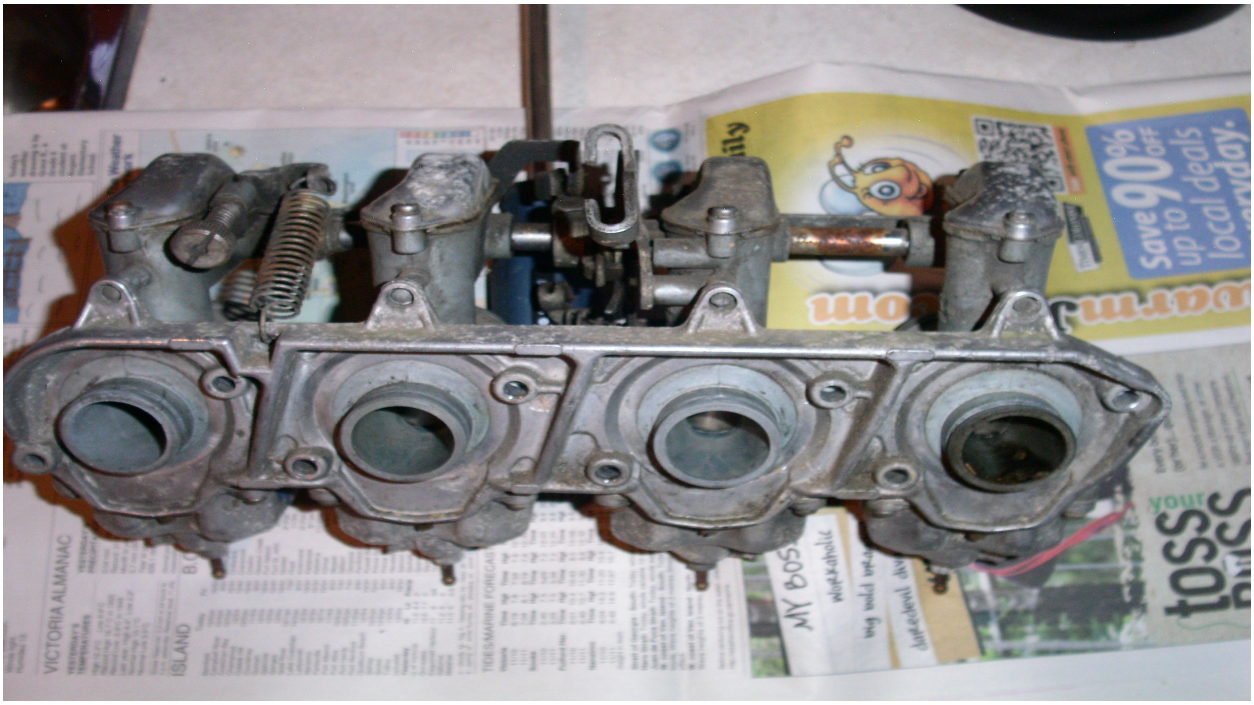




Though this guide is specifically for PD46A carbs on 1977 Honda 550K motorcycles, the basics for removal, cleaning, rebuilding and installation are similar to many other Keihin carbs as used on similar models.

Please read through this document a few times so you are very familiar with each step before actually attempting the work and also review the above note pages of the FSM. PD46A carbs should look exactly as shown on those pages 174-178 and the pictures here. Also note, on the right side of the bike is Carb 4. Clean it off just above the float bowl for about an inch. You should see the raised letters PD on the carb body and below that you should see a stamping beginning with 46A. If not, do not take anything apart until you resolve the issue.

I have three 1977 550K bikes (according to the VIN) but one came with carbs from a 550F (Carb Model 069A) that are similar but also have substantial differences. One of my 550 carb sets has self tapping screws on the choke rod. They work but that sure took me by surprise! You never know what has happened to an old bike over the years so be prepared to question and confirm what you are dealing with.

If you are confused by any step in these instructions, now is the time to ask questions before you start taking things apart. Do not be intimidated. Anyone with the basic tools required and average skill can do this work. You can email the author or consult with members of one of many Internet forums.

This document is long because I do not want to skip a step or assume the reader knows certain things. As a buddy of mine used to say “Imagine you had to write a guide on how to change a car tire, making no assumptions that the reader knows where the jack, tools or spare are stored, nor how they work. Suddenly your brief document is like a book.”

Factory Service Manual (FSM) references:

Page 174 – Removal
Page 175 – Disassembly
Page 176 – Assembly
Page 177 – Adjustment
Page 178 – Carb Sync.

Specifications:

Main jet	90
Air jet	130
Slow jet	38
Slow air jet	150
Jet needle Default setting	E2349F 3rd Groove
Float height	14.5 mm.

To avoid any misunderstanding, the terminology I use is:

'front' of the carbs is the side facing the motor,
'back' is the choke side,
Carb 1 is on the rider's left, 4 on the right.
The carbs have a number on the top left side of the body.

The only parts you normally require will be O rings for the pilot jet (aka fuel/air mixture) screw, fuel rail tubes and the float bowl drain screw. Rarely will you need metal parts like new slides, slide needles, main jets, floats or float needles.

O-rings (Viton or Nitrile) approximate sizes:

Fuel rail 3/8 diameter 1/16 thick
Pilot jet 5/32 diameter 1/16 thick
Drain screw 7mm diameter by 1mm thick.

In fact on these carbs it does not appear that the slow speed jet or the brass seat for the float needle can even be removed. Do a careful job of disassembly & cleaning parts - inspect them first so you don't go buying things you do not need.

Remove carbs from bike. On the 550K, it is best to remove the tank, seat, battery, air cleaner box and battery box – in that order. This gives you greater access to move the airbox while removing the carbs.

Loosen the clamps holding the airbox tubes to the carbs and the clamps holding the carbs to the 'insulator' tubes which connect to the manifold stubs. The clamps in front of the carbs are set into a recess in the mounting plate to which all carbs are attached. If you cannot loosen these clamps, you can loosen the clamps at the forward end of the insulator tubes. In doing so, you commit to removing the tubes with the carbs. This is not a big deal.

Remove the vent tube from the bottom of the airbox. The other end connects to the cylinder head. Pull it out, and tape off the engine port. Unfortunately you cannot remove the airbox before removing the carbs but having it loose will help a lot. Pull the airbox back so the tubes are disconnected from the carbs. Gently try to position lower and to one side of it's normal position so when you pull the carbs back, they do no accidentally reconnect to the airbox tubes. Some folks remove the tubes from the airbox to make more room but it is not really necessary. Remember, anything you remove now will have to get properly back in place again later. It's up to you! Neither way is wrong.
Leave the choke and throttle cables attached for now, but remove any zap straps or tape that may have been applied to keep the cables tied against the frame. You need to have free movement so that you can pull the carbs back off the manifolds, slide them to the left and clear of the motor. Then we will remove the cables. I have read some bizarre stories of how people have sweated bullets to remove their carbs. It simply is not that difficult.

First, never use any type of metal pry bar. Get a couple of pieces of cedar, pine or other similar soft wood about two feet long and at least one inch square or slightly larger with no knots. I usually start on the right side of the bike.

Slide one of those pieces of wood in behind the cylinders, further than half way across and hold it almost level up in front of the the carb float bowls. Gently hold the tip of the wood against the engine and bring midsection of the wood against the outside carb float bowl. Now using the wood as a lever, pull back. The inboard end of the wood will contact the back of the cylinders. As you pull back on the wood, the carbs will tend to tip up a bit, not a problem. Now go and do the same from the other side. Try this a couple of times to get everything wiggling around. You will probably see that the carbs move a bit more freely after moving them around a bit.

If the carbs do not release from their insulators, hold light tension on the lever. Insert another piece of wood down between the cylinder head and the metal bracket that holds the carb bank together. Using these two levers together was all I needed to do to remove 550 carbs. On numerous other Honda fours, I only needed the bar between carbs and the back of the motor. Just take your time and work slowly and deliberately. If you have an extra pair of hands, great. But never use anymore force than is absolutely needed. I have never damaged engine fins, because the soft wood distributes the force unlike a metal pry bar.

Once the carbs are free from the insulators, or the carbs and insulators are free from the manifolds, hold the carbs carefully and work them out the left side of the bike. Make sure the carb drain tubes are free to pull out with the carbs. Removing the carbs from here just takes a bit of patience and work to get them moved sideways while avoiding hangups with the insulator tubes and airbox tubes and clamps. With the carbs out of the bike, lay them gently on the frame and remove the throttle and choke cables. Place clean shop rags or paper towel in the insulator tubes so no creatures can crawl in and make a nest in your motor. Finally, remove the float bowl drain tubes. Be careful of the little brass tips on the bottom of each float bowl. You do not want to break them off.

Prepare to clean & rebuild the carbs:
You need a parts organizer to itemize all the parts from each carb and store the general mounting and control parts.

Eye protection like wrap around safety glasses or a face shield is an absolute must. You will be using very nasty chemistry, blasting areas with compressed air and there's plenty of opportunity to get stuff in your eyes.

You need a table or bench area at least about three feet square. The surface should be fuel and solvent resistant or just something you don't care about. Ventilation is important. Carb cleaner is very nasty stuff and you should not inhale the fumes. Consider taking a part outside to spray with cleaner and have a bucket to tote parts around. Try to organize your area. Imagine what would happen if you drop a tiny flat washer. Perhaps you could drape a tarp or piece of poly around your work area so it is easy to look for a small part. Preparation may save yourself a lot of grief. Good lighting is a must.

You will need a spray can of carb cleaner, WD40 or similar spray lube, a small tube of Blue Loctite and some fine wire brushes similar in size to a toothbrush. An old high E guitar string (approximately 0.010 inches in diameter) is very helpful and a few heavier grades as well. Welder's wire files as normally used for cleaning welding torch tips are also very handy but use them gently so you do not accidentally ream holes oversize. You simply want to clean away gunk. Get a few paperclips in various sizes and straighten them out. Take one of these and bend a small hook in one end that is about one eighth of an inch wide. You will see in a moment that this is a very handy item. Compressed air is very helpful, along with some shop rags. Instead of soaking the carbs in carburetor cleaner which is very nasty stuff, I have an old camp cooler about half full of Pine Sol diluted about 2 parts Pine Sol to one part water. Pine Sol can still be pretty nasty but far less so than traditional carb cleaner. Never soak plastic floats, O rings or any non-metal items in Pine Sol.

You will need a few small metric wrenches, usually 8 and 10 mm. A small crescent wrench in good condition is also handy. Needle nosed pliers, a scratch awl or just a finishing nail with the sharp end blunted with a file or grinder and a magnifying glass are all handy.

Phillips screws (star drive) were used for original screws in most circumstances but occasionally I have found Robertson (square drive) have be used as replacements to original and there are some flat blade screws. Each screwdriver type comes in various sizes. Check the fit of your driver before attempting to undo any screws. Removing screws with damaged heads is not fun.

The original screws used in Keihin carbs for choke plates (and throttle plates in Constant Velocity or CV type carbs) are expanded at the threaded end after they are installed. The screws go through the hole in the plate and thread into the choke or throttle rod. It is the very small threaded end that sticks out of the rod that is expanded. This is done to prevent the screws from accidentally backing out on their own. Undoing these screws is difficult. A good fit of screwdriver to screw head is essential. This is a terrible situation to have a screw head damaged so badly that you cannot turn it. Make sure you have the carb supported well so it is not moving around. Apply steady pressure and work slowly to avoid rounding over the head of the screw, bending the choke shaft or driving your screwdriver down the throat of the carb. After removing these screws, consider replacing them with stainless steel button head Robertson (square drive) screws. I have even seen Robertson self tapping screws used, a bit ugly but very secure if done right.

If you must reuse the old screws, look at them carefully and you will see the very end of the threaded portion is a bit fatter than the rest. File and bevel the end so the screw threads in without jamming. Test the screws in the rods before assembling the carbs and never force any poor fit. This way there should be no surprises when you are doing final assembly. Do NOT force a poor fit or you may strip a hole in the choke rod.

If you do have stripped holes, the best thing to do is get the rods out, try to retap original size enough to hold a screw fairly well without over tightening. If this works, assemble loose and when we get to the point of final tightening, use a dab of Blue Loctite and tighten very carefully. If need be, you can either go oversize of tapping (make sure you can get screws of the right length and thread first) and remember you will have to drill out the choke plates too. Or you could go to self tapping screws. This again may require the rod and choke plates to be drilled oversize. Unless you are a glutton for punishment, just repair the bad holes, don't do them all.

Never use a spring-loaded impact on any stuck screw in a carb because you will almost certainly damage the carb. Carb bodies are frail! Do NOT hammer, pry or otherwise use extreme force!

Caution: It is often necessary to use products like Pine Sol or carb cleaner to loosen up congealed gas and other crud that accumulates in old carbs. Sometimes it is necessary to use a quick squirt of carb cleaner while you probe the tiny passages of a carb after you have done the primary soak. But remember that stuff is really bad on O rings, floats and even with prolonged contact on metal. If you are rebuilding a set of carbs that will sit in storage while you do other work, or perhaps this is a spare set of carbs, it is a good idea to get the carb cleaner out of there. Once I get passages cleared, I spray them all with compressed air and then WD40 and again with compressed air. I do this to ensure that the carbs can sit in a drawer for months and not suffer any damage. Unless I have a seemingly impenetrable blockage, I use WD40 to clear and check holes. It will not cause any issues with O rings or plastic and it dries without leaving any residue.

Disassemble the Carb Bank:

OK, let's get to work. Remove throttle shaft spring which attaches to the mounting plate and place the spring in your organizer. Place the carbs on their backs (choke end) & unscrew mounting plate & remove gently. Flip them over on their fronts & remove the four 10mm bolts holding two steady arms (one between 1& 2 and one between 3&4. The arm for 3&4 has the mount for the choke cable. Make it a habit to put all fasteners and small parts in the organizer as you go, even if they will need cleaning later.

Remove the top of each carb. There is a gasket under the top cover that should not be glued in place but it snugly fits over a couple of pegs. Remove the cover carefully to avoid damaging the gasket. If you do need a new one, make one out of heavy paper using a sharp knife. Put the cover, gasket & screws in your parts organizer.

The heavy shaft going through the tops of each carb is the throttle shaft. Inside the top of each carb is a linkage so when the shaft is rotated, the carb slides are raised or lowered. The smaller shaft at the back which actuates the chokes. There are actually two choke shafts which connect to each other between carbs 2 & 3. At that junction are a heavy spring and a lighter spring and the actuator that connects to the choke cable.

It is important to note how the choke shafts interconnect and how the light spring is positioned and hooked at either end. By all means make notes, take pictures or whatever else you feel necessary so you can reconnect the morass later.

Note how the choke shaft springs are placed, the heavier spring closest to carb 2 and the lighter one on the other side of the choke cable connector. The fork on the right side choke shaft interlocks with a tab under the linkage with the cable connector. Also the lighter of the two choke shaft springs attaches with it's vertical end to a notch in the fork of the right side shaft and it's horizontal end hooks into the actuator linkage. Basically the springs pull the chokes shut and the cable pulls them open against the spring pressure. When you are ready, use your paperclip hook to disconnect the light spring from the fork.

Caution:
On this model carb, the throttle shaft passes through each carb. On each side of the carb body where the shaft goes through are small seals or bushings. I do not know of any replacement parts. It is fine to clean these areas but rinse the areas well immediately. Do NOT remove any of these parts.

Under the top cover of each carb is the linkage for the throttle slide. On Carb 1, remove the Phillips screw, and put it in your organizer. This screw holds the slide linkage onto the throttle shaft. The rest of the linkage does not need to be taken apart right now, even if it is corroded.

Very carefully remove the choke plate screws, remembering the warning I stated earlier about those screws. Place the screws and choke plate in the organizer. Now you can gently slide Carb 1 away from the carb bank. The fuel rail tube will either stay with Carb 1 or 2, not a problem. Pull it out of whichever carb it holds on to and store it in your organizer.

Try to pull the slide linkage out of the top of the carb. If it's not all gunked up, the entire linkage and slide will simply pull out. Do NOT force it! If it is all messed up, spray carb cleaner from front, back and top down and let the carb sit a while. Once we have all carbs separated from the bank, you can come back to the problem issues. I will deal with specific problem issues below. Perhaps because Carb 1 is on the low side of the bike when the bike is on it's side stand, it is most common for Carb 1 to be the one most likely jammed up and corroded. Don't worry, problems can be solved.

Remove the carb tops, choke plates and Phillips screws holding the slide linkages to the throttle shaft from the each of the other carbs, storing the parts for each carb carefully in your organizer.

Remove Carb 4 from the bank as you did with Carb 1. Remove & store the fuel tube and throttle slide assembly.

Gently slide Carb 3 along the throttle shaft a bit so you can remove & store the fuel tube. Rotate Carb 3 on the throttle shaft so it is clear of Carb 2, then remove & store the choke shaft with it's pickle fork end.

Gently slide carb 2 off the throttle shaft being sure that the choke linkage and springs do not foul up with the throttle shaft actuator. The throttle shaft actuator will remain on the throttle shaft along with Carb 3 for now. Be very careful not to stretch or kink the light spring.

Carefully store the left side choke shaft and light spring from Carb 2. Remove & store the slide assembly also. The remaining parts of the choke actuator & heavy spring can be left attached to Carb 2 along with the throttle cable steady arm above.

There is a 10mm nut on the throttle actuator assembly which sits on the throttle shaft between Carbs 2 & 3. Carb 3 cannot be removed from the throttle shaft without either removing this actuator, or the fitting on the other side of Carb 3 on the same shaft for the high idle thumb screw. However, if the slide assembly in Carb 3 is not stuck in the carb, you can get by without removing the throttle shaft.

The only risk is that the needle setting on this carb is different than all other carbs which is quite unlikely. Be realistic about your options. Make it easy on yourself.

The high idle thumb screw (on Carb 4) works against a stop fitting fixed to the shaft with an expansion roll pin. Those pins are a royal pain to remove and reinstall. If you are going to remove the throttle shaft, your best option is to remove the throttle actuator.

To remove the throttle shaft actuator, remove and store the nut. That nut was sitting on a threaded part that looks like the end of a bolt, but it is actually a set screw requiring a 3mm hex key. By the way, be careful not to lose the nylon washer on the actuator, on the side opposite the set screw side.

If the set screw is very tight, you may need to gently heat the actuator to get the set screw out. But wait, at this time we don't need fires and there may be gas in the carb so wait on heating anything. If the slide is functioning well and it is not jammed in place by corrosion or goo, it is possible to continue without removing a reluctant set screw. Let's get all the float bowls off the carbs first. Again, I will deal with stuck set screws in the trouble shooting area below.

Carb features using Carb 3, right side.
The front or engine end is on the left, choke end on the right. The hole at top right is the throttle shaft hole with it's bushing visible. Not visible here, a number 3 is stamped just to the left of the throttle shaft position. The hole directly below the shaft hole is the fuel rail tube socket. Immediately to the left, in the center of the carb is a shoulder with the tiny float bowl vent hole.

From the left:
Pilot jet (aka fuel air mixture screw) with spring, then flat washer and O ring. It threads into the carb body directly above.

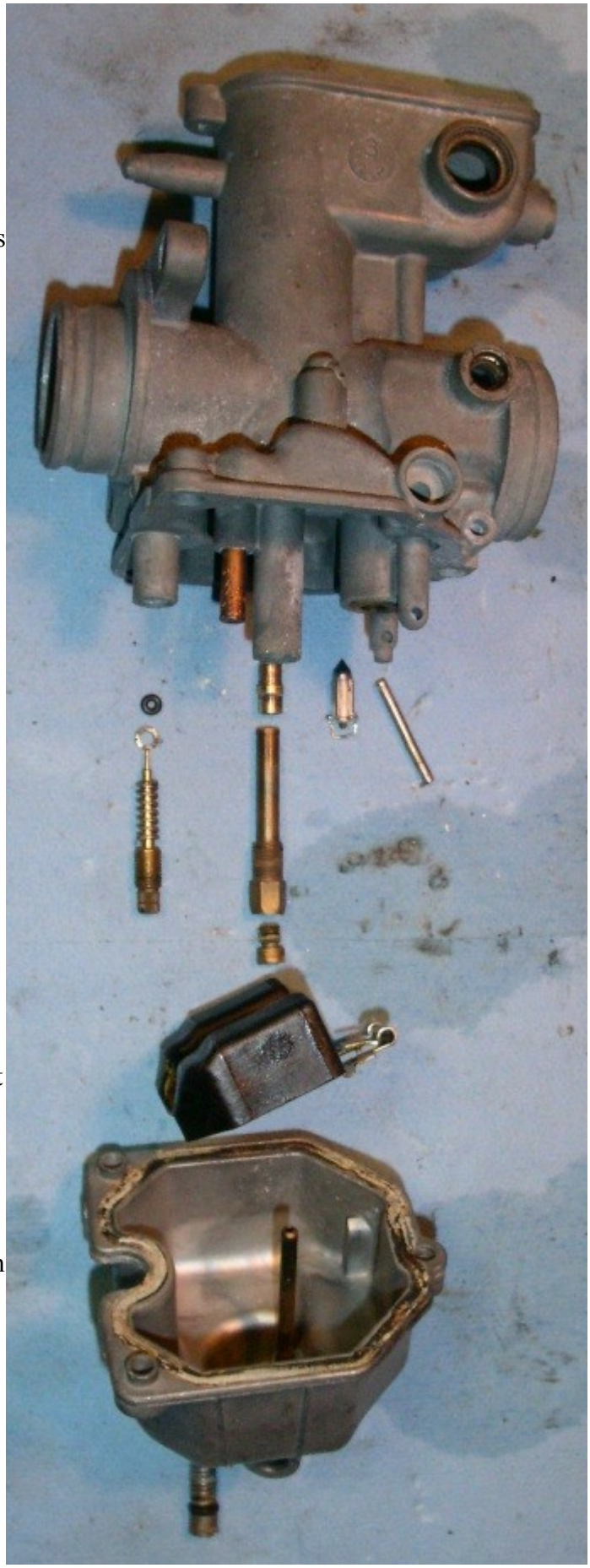
To the right of the pilot jet's location on the carb is a small round brass projection. This is the secondary jet.

Next on the right is the socket which accepts the brass items arranged directly below. They are in order, the small brass throttle slide needle jet, then the emulsion tube and finally the main jet. We will deal with the black float item later.

To the right of the brass parts we just reviewed is the small float needle. It fits into a brass socket directly above it. The wire bail on the needle loosely fits over the adjustment tab in the metal frame of the float assembly.

To the right of the needle is the pivot pin that mounts the float onto the carb. Above, on the carb are two gray metal projections with holes. These stands hold either end of the pin. Note that the flat side of the floats faces the bottom of the float bowl. It is possible to mount the floats upside down. If this is done, the carbs will dribble fuel out of the overflow drains.

To the right of the guide is the emulsion tube with main jet attached. Slightly above on carb body is a small brass projection, the slow speed jet. Last, is the float bowl partially covering the drain screw with O ring below - that screws into the hole just visible to the right on the bowl. Note the overflow tube inside the bowl, notch in bowl for pilot screw & gasket area that needs cleaning!



Dismantle each carb:
Place any carb top down on a bench so you are looking at the float bowl. Note there are three Phillips screws attaching the float bowl. There is a brass pilot screw (flat blade) fastened into the carb in the same direction as the float bowl screws. It is located in a notch in the float bowl. Also there is a brass float bowl drain screw (flat blade) in the center bottom of the bowl.

Remove & store the drain screw & pilot screw but do NOT move the carb because we have to fish some parts out of the pilot screw hole. We don't want to lose them. Use your paperclip hook and carefully fish out a spring, flat washer and small rubber O ring. They should all be in there and you must get them out because you cannot put the carbs back together with any old parts in there. People have a habit of abusing the pilot screws and occasionally they get broken off. If you have one that is broken, continue with the tear-down. We'll deal with the problem in the clean-up section.

The O ring is the most difficult to hook out. Check the flat washer carefully when you remove it because sometimes the O ring will be glued thoroughly to the flat washer. You don't want to be digging for days for an O ring that is already out! If you do not get all the pieces, use a strong light and magnifying glass to ensure nothing is left inside. Once in a while someone will be missing a washer and they install the pilot jet with just the spring and O ring.

Remove & store the float bowl fastening screws. Very carefully remove the float bowl. Remember the brass tube on the bottom of the bowl? Well note how it sticks up on the inside. This is the overflow tube. If it breaks off you have to replace the bowl. If you want to polish the bowls later (I'll tell you when), do so with absolute care. Do not pile them in a box with other parts. Protect that overflow tube or you WILL be sorry.

Use a scratch awl or a blunt nail to **gently** push the float pivot pin through the stands. Note this assembly is very lightly built. Use minimal force. If the pin is stuck, spray it with carb cleaner (do NOT get cleaner on the plastic floats!) and let it sit for a while, then try again. If still no progress, we will deal with it below in the trouble shooting section. Just keep going for now with the other carbs.

If you got the pin out OK, store it and carefully lift out the floats. Note that the float needle valve is attached to the metal base of the floats. If the carbs have been sitting, the needle may be stuck in it's brass socket called the needle seat. Carefully grip the needle with needle nose pliers and gently rotate it slightly to loosen it. Don't just pull up on the floats or you will damage the light wire clip that holds the needle to the floats. Remove & store the floats and needle.

Refer to the picture to see the jets, slide needle jet, pilot screw with spring, flat washer & O ring and float bowl drain screw. In the center of the area covered by the float bowl is a brass fitting that looks like a screw with flat blade slot and hole in the middle, sitting on top of a hexagonal brass fitting. This is the main jet and emulsion tube. Place a thick flat blade screwdriver tip in the main jet. Make sure the fit is good. Place a wrench on the hexagonal body of the emulsion tube. Just loosen the top screw part but do not unscrew it entirely. Now use the wrench and remove the tube with jet still attached. Store it away.

Beside the location of the main jet & emulsion tube is a round brass projection with a hole in it's end. This is the slow speed jet. You do not need to remove it but remember what it is.

Look down into the hole in the carb body from where you removed the main jet and emulsion tube. There is a small brass tube with one end hollowed out, way down inside. If you look down into the

carb from above, you will see that the slide needle passes into this brass slide needle jet. Normally it is pressed into the carb body quite firmly but occasionally it is loose. It is held in place by the emulsion tube. Be careful that the jet does not get lost when you remove the emulsion tube. It is not necessary to remove it for cleaning, it is just important not to lose it! Note the way it is installed, with the hollowed end facing up to receive the slide needle.

There is a flat blade screw plug on the left side of each carb near the front. This is the vacuum plug for attaching adapters to when doing carb synchronization. Leave it where it is for now. We will clean the port later.

Done! If you had problems with removing floats or other items, do not worry. Put that carb aside for now. Now repeat the steps above for all the other carbs. When they have all been dismantled as best as you can, refer to the trouble shooting steps to resolve the problem issues.

Now, just before we fix any problem issues, please note for future reference, the carbs are numbered on the left side of the body near the top. This is handy information when doing assembly

Trouble shooting:

Removing a reluctant throttle actuator set screw:
Remember you only have to pull the throttle shaft out of carb 3 if the slide jammed or you want to confirm or change the needle setting. If the only issue is a stuck slide, you can try various iterations of the Pine Sol soak with the rest of the stuff, douse it with hot water, spray it with carb cleaner and hope that it frees up. The only real downside of leaving Carb 3's slide assembly intact is that you will not be able to determine for sure which groove is used for the slide needle setting.

Make sure your carb is stripped down with no float bowl attached and the float pivot pin, floats & needle valve have been removed (and if you have trouble with that, there's a solution below!). Even a small quantity of old gas can cause trouble.

You only need a small tipped flame like a mini butane torch or even hold the actuator over a candle. The black soot will clean up, no problem. Warm the actuator that the set screw is screwed into. Avoid heating the set screw. Try to turn the set screw while the actuator is hot. An old oven mit is handy for this.

Removing a stuck throttle slide:
You must have the throttle shaft removed from the carb to pull the slide out, but if you have Carb 3 with throttle shaft in place and a reluctant throttle shaft actuator, this may be your salvation. If you can get the slide working, you could go ahead without removing the actuator.

Otherwise, place the carb body upright in a bucket. Slowly pore hot water into the top until the carb is fully under water. Let it sit for an hour or so, then try to pull the slide out with your fingers pulling on the linkage. If it does not move, try washing it down again with water right out of the kettle and let it sit in the hot water. If the thing still will not come apart, soak it over night in Pine Sol full strength, or CLR plumbing cleaner. Trust me, eventually it will free up. One of mine took two days before it finally loosened up.

Never try to pry on the slide with a screw driver through the carb throat or on the linkage at the top. You will most likely do damage. I recently bought a bike in pieces with the carbs in a box. One carb had a chunk broken out of the top. I couldn't understand how this could happen until I was cleaning up another set. One carb had a slide that was thoroughly stuck. It took me two days to get it freed up. At one point, I was thinking I might be able to hook the slide linkage with a screwdriver and lever it against the top of the carb to pull up on the slide. Then I realized how that other carb got damaged. The carb body is a very light casting.

Removing stuck float pivot pins:
If you cannot get the pin unstuck by soaking it with carb cleaner, boil some water in a kettle. Hold the carb firmly so that you can dribble hot water on the float pin area. Try not to get a lot of hot water on everything else. For example, I am not sure now well the floats would appreciate being immersed in boiling water. In fact, if not for the floats, I would suggest just dunking that end of the carb in a bowl of boiling water. Be very careful pressing on the pin. The little metal stands which support either end of the pin are quite frail. All of your pressure is transferred to those stands if the pin is jammed.

Repeated attempts with carb cleaner and hot water will eventually cause the corrosion or congealed gas to release the pin. Persevere with carb cleaner, hot water and gently pressing on one end of the pin. Sometimes all it takes is to push on the other end of the pin. You will eventually get it.

End of trouble shooting for tear down.

By now you should have the carbs separated from the bank and disassembled. You may have the throttle shaft in Carb 3 but it's slide should be free. You need to clean the carbs, make a lot of careful checks and then reassemble with a few new O rings.

Inventory your parts.
Hopefully you have carefully placed the parts in your organizer as you went along. You should have:

Right side choke shaft with forked end
Left side choke shaft with light spring
Throttle shaft with high idle throttle stop fitting and throttle shaft actuator
3 aluminum fuel tubes

For each carb you should have:
- Carb top, each with 2 screws and a gasket.
- Carb body, each with slide assembly & Phillips screw, choke plate with 2 screws
  - Note Carb 2 slide linkage is not adjustable as are all others
  - Carb 2 has a heavy choke spring, actuator and cable mount still attached
  - Carb 4 has the high idle thumb screw
- One pilot screw with spring, flat washer – if you didn't chuck the O ring, do so.
- Float bowl with gasket & three screws
- Float pivot pin, float & needle valve
- Main jet on emulsion tube

Chemically Clean the Metal Parts:
Place the carb bodies (even ones with stuck slides) and float bowls in Pine Sol to soak. Do NOT put floats or any rubber parts in Pine Sol. You can put the brass parts in the soak if they are very gunked up but usually even on older carbs I find this unnecessary. Similarly, I only soak slide assemblies if the

slide or it's linkage is bad. Soak for 12 to 24 hours. To rinse, fill a 5 gallon bucket or similar container with lukewarm water and rinse each part thoroughly and dry with compressed air.

Some people say that a ultrasonic cleaning tool works well. If you have one, great, follow the directions. I have enough tools and the procedures I use give good results so I am not inclined to get anything more.

Physically Clean the Metal Parts:
If necessary, you can do all of this work by hand, using small hand held wire brushes, wet/dry sandpaper & WD 40 and Q Tips. Work slowly to avoid damage.

I have a homemade 'sandblast' box, that I use with baking soda. The gun is a cheap 'siphon feed' unit available from most discount tool supply places for about thirty dollars. This works really well to clean up carbs inside and out. It makes the outsides look like new and cleans the internal areas that are hard to reach by hand. Baking soda does not cut into metal substantially so do not fear that you will damage any fine tolerance parts. You must be sure that all parts are dry before blasting. If you have any soft goop in float bowls or the like, you have to get it out manually because the soda will just cake into it.

I blast the float bowls inside and out. Be very careful that you do not bend or break the brass overflow tube that sticks up inside the float bowl. Any light rust on the throttle linkage or a slide assembly is easily cleaned up with the blaster. It is safe to give the slides a shot but only do this if you have obvious crud to remove. Remove all traces of congealed gunk on internal areas of carb where the float bowl attaches.

I also clean all of the small brass parts with the blaster too. It is quicker and safer to clean up things like the tiny pilot jet tip with the blaster than to do it by hand. But again, if you don't have access to soda blasting, very carefully polish these items with very fine wire brushes or wet/dry sandpaper and a bit of WD40.

I use the blaster to polish out the brass needle seat where the float needle sits. It is important to get that very clean. If you do this by hand, use Q tips and Brasso (avoid the fumes). The main reason for carbs overflowing is if the needle seat is not clean.

Be sure the sockets for the fuel rail tubes are clean, whether you use a soda blaster or small brushes or a scrap of fine sandpaper and a small dowel. One way or another you need a clean surface for the O rings on the tube to connect with. If you don't get this right, you won't know until you have the carbs assembled and otherwise ready to install. When we wet test it, it will leak like a sieve and you will have to strip the banks down again to do the step you skipped.

This is a good time to remove the old O rings from the fuel rail tubes as well. I use a very sharp knife to cut diagonally across the ring then strip it off. Be very careful not to score the aluminum or the O ring may not seal. Clean any burrs on the O ring grooves and ends as well as the inside of the tubes.

It is important to wash all parts that have been soda blasted. Rinse thoroughly in warm water and blow dry with compressed air. Blow through all open orifices but do not worry too much if some remain blocked. They may have congealed gas and corrosion. We will do more detailed checks in a moment.

If there is any corrosion in the area where the slide operates, very gently polish the area with 600 grit wet/dry sandpaper and a bit of WD40. Blow it out with compressed air when you are done. Do

likewise on any corroded areas in the throats of the carbs. The intention is to remove any remaining corrosion or rough spots. Do not use heavier grades of sand paper or start playing with your Dremel in there.

Eye Protection MUST Be Used for the next steps, manually cleaning and checking all the important passages in the carbs. Please heed this warning. You will be using pressurized stuff like carb cleaner and blasting stuff with compressed air. It is very easy to get stuff in your eyes and unfortunately easy to do permanent damage.

Checking Carb Passages – these checks are best done, one carb at a time:

Passages to check:
Note - Always probe holes with wire even if initial tests show fluid squirts through the hole. Running the wire through the holes a few times often cleans the hole much more.

Pilot screw passage:
At the front of the carb, the pilot screw (currently removed) screws in vertically from below and it's passage is a small hole you can see on the bottom of the carb throat. You can squirt a little WD40 up through the hole and you should see it squirt into the throat. Use fine wire, like high E guitar string, to ensure this hole is clean. You should be able to push the wire from below right up into the carb throat. Remember the shape of the pilot jet itself? When you are probing with wire, it takes a little fooling around to get the wire right down to the bottom of the hole and through to the carb throat.

If your pilot screw is broken off, you will need to use an EZ Out or similar tool to remove the old screw. Look at a good pilot screw and note the overall diameter (so you do not go too wide with your pilot hole) and the relatively short depth of the threaded part (so you do not drill too deep). If you cannot get the hole cleared so a new pilot jet will screw in, you must replace the carb. Remember, if your damaged carb is #2, get yourself a replacement #2 because they are all different!

Vacuum plug passage:
Unscrew the vacuum plug off the front left side of the carb body and make sure the hole is clean right down to the throat. Reinstall the plug firmly. This is the easiest task of all.

Jet passages:
Please take note, at the choke end of the carb throat are two brass tubes, one at the very bottom of the throat and one just to the left of it. These connect to jets in the float bowl area of the carb body. The bottom one is connected to the main jet area where the emulsion tube resides, and the tube just to the left connects to the slow speed jet, the round brass thing with the little hole in it and the pilot jet further beyond the slow jet. We need to clean the jets themselves and theses passages. We have the main jet and emulsion tube out of the carb for cleaning now, the slow jet is fixed in place.

Main jet passages:
Squirt some WD40 into the tube at the bottom of the choke end and you should see fluid bubbling in the main jet area. Even if you do get flow, probe this passage with fine wire. If you only use wire that is just capable of entering the tube at the choke end, you will only go down about three quarters of an inch, but with fine wire you should go down two inches. You must have this passage clean.

Main Jet:
Go to your organizer and pull out the main jet and emulsion tube. Unscrew the main jet from the tube. Check that there is no debris in the tube and the main jet hole is clear. Thread the jet back onto the tube finger tight for now and put them back in the organizer.

Slow speed jet passages:
Back to the carb again. If you squirt WD40 in the tube for the slow jet at the choke end or into the jet itself, it will spray all over you even when it is clean. Instead slowly spray a bit of WD40 on the front of tube, then hold your air gun up to the tube and put a finger over the spot where the pilot jet will thread into place. When you hit the air you should see a squirt of fluid out the slow jet. If you do this again, without your finger on the pilot jet position, some or all of the spray will come out there. Probe

the passages with wire as above. Course wire entering from the choke end will only enter about three quarters of an inch. Fine wire will go in two and a half inches for this jet passage. Also, probe down into the brass jet. Fine wire will right through into the throat if you fish around a bit. It can be an ugly job to get this passage clear but you must. It is critical that this works.

Carb body vent for the float chamber:
Look carefully at the left side of the carb body and the corresponding area inside that forms the roof of the float chamber. You will find a tiny vent hole. On the inside, this passage enters into a depression. Squirt a bit of WD40 on the inside and place your air gun tip there. Watch the vent outside as you hit the air. You should see a fine spray. If not, turn the carb over again and lay a puddle of carb cleaner in the depression and let it sit for a while, then test it again to see if it clears. Again, this is a critical passage and must be kept clear. By now you should have a pretty good idea why eye protection is a must. Please be careful.

Brass seat for the float needle:
Previously when discussing the general clean-up with and without soda blasting, I mentioned that it was imperative to get the brass seat for the float needle very clean. Otherwise your carbs will tend to overflow. So check again that the seat is really clean and probe the passage with wire. You can go down into the seat and across from the passage where the fuel rail tubes attach to the carb. Finally squirt a little WD40 into the bottom of the seat and you should see spray out of the fuel rail area. You should be able to probe right through this fuel rail passage on Carbs 2 & 3. Carbs 1 & 4 are obviously blocked on one side.

Floats:
Check the floats to ensure the frame metal part is not twisted relative to the floats. Clean any gunk off the metal areas with Q Tips and a bit of cleaner. You can quickly wipe the plastic parts with Pine Sol but wash everything immediately with warm water. If the plastic goes a bit sticky, rinse well with warm water and allow it to dry for a day or two and the plastic should firm up.
Place the floats in a bowl of water and weight them down so they are fully submerged for about half an hour. Remove the floats and gently dry with paper towel. Carefully shake the float. If you can feel or hear water sloshing inside the float, it has a leak. The safest thing to do is to buy a replacement.

Float Needle Valve:
The float needle has a rubber tip at one end and spring loaded metal tip on the other end. The rubber tip should be consistent in shape, pliable but not mushy. The little spring loaded metal end should pop out quickly if you depress it and release. If not, clean it with carb cleaner and work it to get it going well, then wash in warm water. You can also try soaking it in a dish of hot water with a bit of dish detergent to free it up. Make sure that the outside is clean. Remember it may have been stuck with gunk when you first pulled it out of the carb. If the needle, or it's wire hoop, is damaged, you will have to replace it.

Float Bowl, Overflow Tube and Drain Screw:
The float bowl must be clean inside. You will find some corrosion is nearly impossible to remove except by scraping. Remove the drain screw and blow through it's hole, up through the outside drain tip and down through the overflow tube to ensure these passages are clear. If the overflow tube is plugged do NOT put anything inside the tube from the end that sits inside the carb. Instead, work from the other end of the tube where it projects out the bottom of the carb. This end is more sturdy. Use carb cleaner and fine wire to clear the tube. As you clean from the outside, some debris may be deposited in the bottom of the float bowl inside. Make sure everything is clean.

The drain screw needs to be clean and smooth on the tip. Hold the tip in a fold of sandpaper and twist the screw back and forth to polish it up. Remove the old O ring (you may have to cut it off) and ensure the threads and O ring groove are clean.

Now check the bowl. Install the drain screw, firm but do not over-tighten it. Fill the bowl with gas. Gas may form some bubbles but watch carefully – there should be no persistent streams of bubbles nor gas leaking out of the bowl through cracks, at the drain screw or at the drain itself. Now, very carefully loosen the drain screw until gas begins to drain out. No gas should be coming out around the drain screw. If it is, the O ring needs replacement and\or the mating surface inside the drain screw hole needs cleaning.

The overflow tubes sometimes develop cracks. To test this, start with an empty bowl. Remove the drain screw. Install a rubber hose on the outside tip of the overflow tube and the other end in your mouth. Hold the float bowl lower than your mouth, with one finger blocking the drain screw hole. Top up the float bowl with water. Place a finger over the top of the overflow tube. Blow into the hose. If the tube is cracked, you should see bubbles in the float bowl. If it is cracked, dry it thoroughly and try coating the tube inside the float bowl with JB Weld. Make sure you do not accidentally plug the tube.

All you ever wanted to know about drain screws:
Look carefully at a clean float bowl and note how the drain screw works. When it is in tight, gas can only escape from the float bowl if it rises to the height of the overflow tube and drain out via the tube. When you loosen the drain screw, you do not have to remove it to drain the carb. Loosen it just a few turns and the gas will escape through the overflow. That is why you need a good fit at the tip and a good seal on the O ring as well.

CAUTION – When your carbs are on the motor, you should always have drain hoses attached to each carb, leading down by the back wheel. This is so that any gas will be dumped on the ground and not all over your engine. It is also a very good idea to always shut off your fuel petcock when the bike is not in use. Just a little bit of grit can block a float needle open enough to cause overflow.

Pilot Screw (aka Fuel/Air Mixture Screw):
Make sure the pilot screw is not bent, especially at the tip. Do not try to repair a bent tip and do not reuse a screw whose tip has been broken. If the tiny tip on any pilot screw is broken off, you MUST check your carbs to see if a broken part is still stuck in your carb. If it is, it is almost impossible to remove other than to try blowing it out with high pressure air. If you look into the carb from the front, you will see a tiny hole on the bottom side of the throat directly above the pilot screw location. If you can make a temporary tip on an blow gun, bend it to direct air straight down on that hole and hope for the best. You can also try putting carb cleaner into this hole and let it soak a while, then try blowing out the hole again. It may also be possible to probe the hole with wire. You must get this clear or replace the carb.

Throttle slide assemblies:
Check each slide linkage. There may be some external corrosion on the top arms of the linkage which you can rub up with a bit of sandpaper. Make sure nothing is obviously bent or twisted by some previous owner yanking desperately on it to remove a stuck slide. Now, lay all the slides on the table, side by side and parallel to each other. Make sure the tips of the needles are all parallel.

If not, or if you want to check the needle setting, remove the screws set down inside the top of the slide and remove the cover to expose the top of the needle. Carefully slide the needle up. There are five notches in the needle and the factory default setting is the middle groove. If you move the clip lower, the bike will run a bit richer and vice versa. Unfortunately the design of the carbs prevents easy access to the needle adjustment. Perhaps this is good, that it is a fairly reliable bet that they have not been changed!

If you could not get the set screw out of the throttle shaft actuator, you cannot check the needle setting on Carb 3 accurately.

Repeat the Checking Carb Passages process for each carb.

OK, hopefully you followed all the steps to get the carbs really clean. Now you are ready to reassemble the carbs.

Start Carb Assembly:
I prefer to do each carb individually to ensure you don't miss a step while moving back and forth between carbs.

Make sure you keep things clean. Any threaded fitting should engage and begin to thread into place with only finger pressure. It is OK to use a little WD40 on any threaded items. If you hit immediate resistance, stop, back the fitting out and investigate. Most of these parts are made of soft materials that are easily stripped. Wrenches should only be used for final tightening. Screwdrivers should turn screws easily until the final tightening.

Ensure the slide needle jet is in place by looking through the main carb throat. You should see the brass tip sticking up. If you look down from the top of the carb, you should see the hollowed out end of the jet. If you see a squared off brass tip with a hole in it, it is upside down. If the jet has fallen out and you are installing it, hold the carb body upside down, lube the jet with a little WD40 and just slide it down into the hole. Don't put the carb down, we have more to go in this same hole.

Put a touch of WD40 on the emulsion tube threads and carefully thread it into the carb. The slide needle jet is held in place by the emulsion tube. If the jet was removed, it may take a little bit of pressure to finish winding the emulsion tube into place because it is pressing the jet into it's final position. Tighten the tube gently with a wrench. Look into the carb throat and check that the jet projects about 2mm into the throat. Gently tighten the main jet into the float bowl end of the emulsion tube with a flat blade screw driver.

Pilot Screw:
On the brass pilot screw, place the spring, flat washer and a new O ring. Here is where attention to detail pays off. The washer must be able to slide ahead of the spring, on the center portion of the needle.

New O rings will not slide all the way down onto the body of the pilot screw. That is OK, just hold the screw with the tip pointing up and the O ring sitting level as far down as it will go. Wet it with a squirt of WD40, being careful not to send the O ring flying across the room. You should then be able to push the O ring down onto the first shoulder beyond the tip. Be very careful not to damage the tip!

Hold the carb body upright in one hand and hold the screw vertically in the other. Start the pilot screw into it's hole. Then you can place the carb on the bench for easier handling. Remember, you are squishing the O ring into it's position. You can use a screwdriver, but screw it down very gently, until you feel it bottom out. Do NOT force it or the tip WILL break off inside the carb!! Once it bottoms out, back it out (counter clockwise), one and a half turns. Here again, you can see how the passage must be clean or the jet will never adjust properly.

Install Floats, Float Needle and Check Float Height:
Place the carb upside down on the bench. Put a drop of WD40 on the float pivot pin, on each of the stands on the carb body that hold the pivot pin and the metal frame of the float assembly where the pivot pin will go. Carefully place the float needle's wire hoop in place on it's tab on the float frame, then position the float so the needle is directly above it's brass seat. Gently lower it into place, aligning the pivot pin hole in the float frame with the holes in the stands that support the pivot pin. Install the

pin using only finger pressure. It is OK to gently use the awl just to get the pin into final position but do not use force.

The best way to measure float height is to make a simple gauge out of light cardboard as you see in the picture. The cutaway is 14.5 mm and the sides of the gauge rest on the gasket surface on the sides of the float bowl mounting surface. But please note, the photo is staged to demonstrate positioning of the gauge. **To get an accurate reading, lean the carb so the float is just laying against the needle which should be sitting down in it's seat.** Do not just lay the carbs flat on a bench with floats up or you will end up with an incorrect setting.

To adjust the height, look at the base of the float assembly. The metal tab to which the float needle is attached must be bent up or down just a tiny bit to alter the float setting. Work slowly and carefully to avoid damaging the floats or float needle.

Float bowl:
The float bowl gasket is actually just an O ring and can normally be reused unless it has been damaged. Place the bowl onto the carb so the screw holes align with those on the carb body and gently start all three, then tighten them with a screwdriver. Install the drain screw with a new O ring. Tighten if firmly but do not over tighten it.

Done! Go back to Start Carb Assembly & repeat the steps for all four carbs.

When all four carbs are basically assembed, we are ready for the next major step.

Begin Assembling the Carb Bank:
OK, don't get too excited, but you are almost finished! BUT.. if there is any problem you have not fully resolved (about the carbs), you MUST get that fixed now. One of the worst things you can experience is to realize you put something together (like your carb bank, engine cases or..) and now you have to pull it apart.

There's basically two steps to putting the carb bank together. Carbs 1&2 and Carbs 3&4 are assembled in pairs and then the pairs are joined together. To avoid any confusion between folks who removed the throttle shaft from Carb 3 and those who did not, this procedure below works for everyone.

Prep Fuel Rail Tubes:
Pull out all three fuel rail tubes and check them carefully. Insides and O ring grooves must be very clean. Make sure you left no sharp burrs accidentally when cutting away the old O rings. The ends of the tube must be smooth. Any rough surface can damage an O ring. If you are sure everything is OK,

go ahead and put new O rings on each end, then put the tubes back in the organizer. For future reference, there are two short tubes and one longer one. The short ones go between 1 & 2 and 3 & 4 and the longer one goes between 2 & 3. Please note that when the fuel rail tubes are properly installed with good O-rings, you can turn them around with moderate finger pressure. They should not turn easily. You should not be able to move them right/left very much at all.

Position the carbs front side down with tops away from you, so the choke end is up and the float bowls closest to you. The carbs are numbered so lay them out 1, 2, 3 & 4, as they will be on the bike.

Connect Carbs 1 & 2:
The left side choke rod has the light weight spring on it. It slides in from right to left, through Carb 2 and then Carb 1. Wet the ends & O rings of the fuel rail tube and make sure when the carbs are pushed together, both ends of the tube must be seat well in each carb. If the tube is easily turned around, chances are one end or the other is not seated well. Carefully position the choke plates for each carb and screw them onto the choke rod. Do no tighten these yet, just get them firm and back them off about one full turn. Place the flat metal steady arm on the carbs and install the hex bolts firmly.

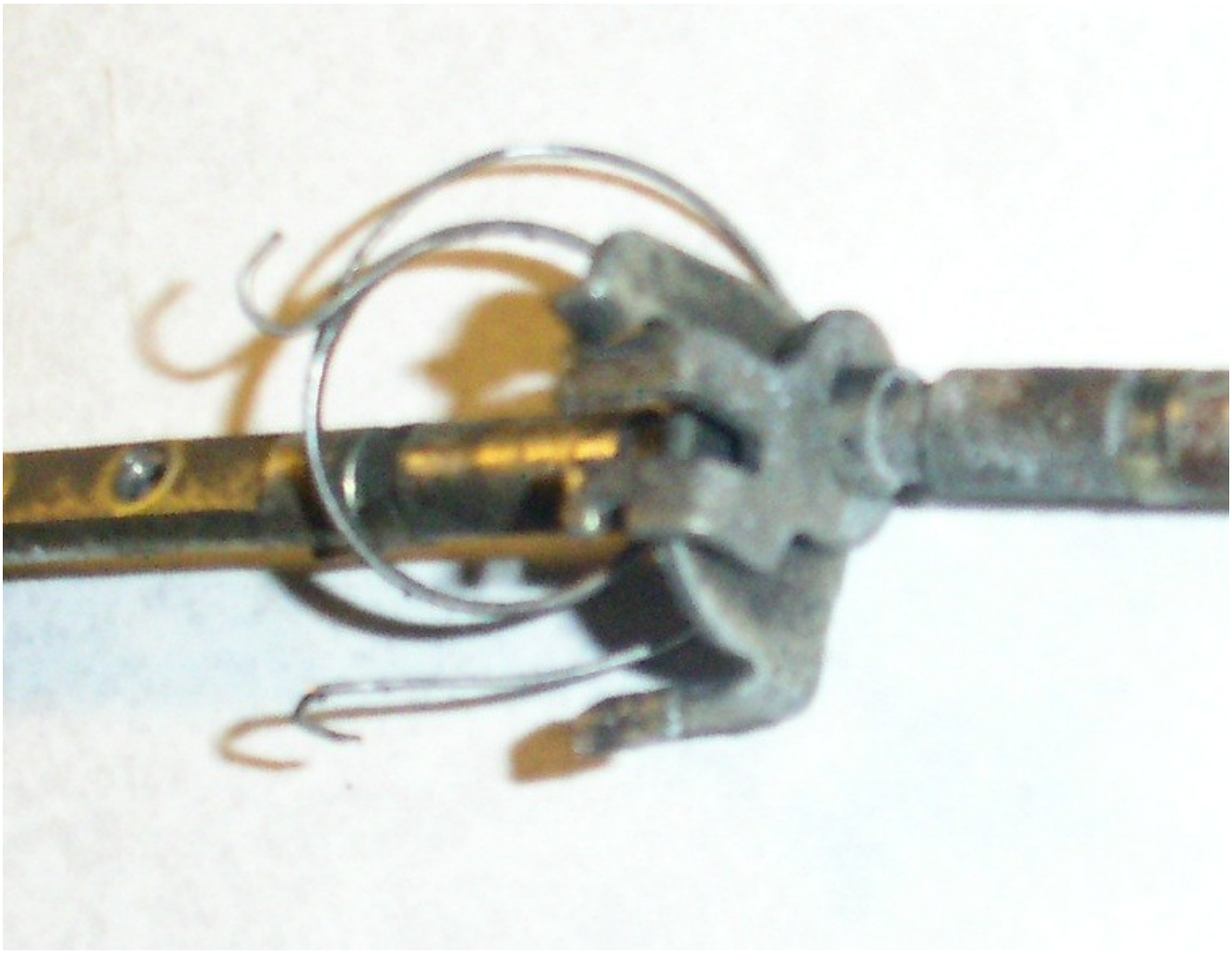
If you removed the throttle shaft, this paragraph is for you only:
Carefully place the slide assembly into Carb 3. Slide the throttle shaft into Carb 3 from the right side, through the slide assembly and reinstall the throttle shaft actuator to the left of the carb. The actuator's set screw end goes closest to the carb. Do not lose the nylon washer off the other end of the actuator. Turn the shaft so the idle thumb screw stop plate that sits on the shaft between Carbs 3 and 4 is facing up. The actuator set screw goes down into the shaft at about the same angle and on the same side of the shaft as that stop plate. Locate the correct drilling in the shaft and position the actuator set screw so it screws into that position. You must get this right or your actuator will be 180 degrees out!

A bit of Blue Loctite on the set screw is a good idea. Do NOT over tighten the set screw, firm is all you need with everything here. Then start the lock nut onto the set screw and wind it down finger tight. Hold the set screw with an Allen key and tighten the nut firmly with a wrench. Now install the Phillips screw which locks Carb 3's slide assembly to the throttle shaft. There is a threaded hole in the shaft that the screw should connect with.

Now, for everyone, Connect Carbs 3 & 4:
Slide Carb 4 onto the right side of the throttle shaft. Wet the ends of the fuel rail tube and install it between the carbs. Make sure both ends of the tube seat in well. Align the slide assembly with the hole in the throttle shaft. When you have it located properly, install the Phillips screw that connects the slide assembly to the throttle shaft. If your Carb 3's slide assembly Phillips screw is not installed yet, do that now.

The right side choke rod has the pickle fork on the left end of it. Slide it left to right through Carb 3 and Carb 4. Carefully position the choke plates for each carb and screw them onto the choke rod. Do no tighten these yet, just get them firm and back them off about one full turn. Install the flat metal steady arm between the carbs with hex bolts tightened firmly. This arm has a connector at one end for the choke cable, which should be at the left of Carb 3. When the carbs are all together, this cable attachment will be directly above the choke actuator on the right side of Carb 2.

If you are tired, or it's late, now is the time to take a break. The next part is difficult and requires patience.



Join the pairs together:
Place the slide assemblies for Carbs 1 & 2 into each carb now. Refer to the picture of the choke shafts and the light spring. Note how the pickle fork end of the right side shaft connects with the left shaft. From previous photos, you should see how this relates to the choke actuator already in place on Carb 2. Note that the light spring has hooks at both ends. As shown, the hook near the top of the picture is parallel to the spring coils and the other hook is parallel to the shafts. The hook that is parallel to the spring coils connects to the notch one of the tines of the pickle fork. The hook that is parallel to the shaft will connect to the choke actuator on the right side of Carb 2. But in the process (detailed in a minute) you will have to wind the spring up to create tension.

When you place the right and left pairs of carbs together, you need to guide the throttle shaft through Carbs 1 & 2 first. Do not screw the slide assemblies to the throttle shaft yet. Position the last fuel tube in one of the carbs and get the choke rods from each side properly aligned. We can deal with the spring later, but try to get it roughly positioned. Important - keep the coils inside of the tabs on the left arm. Do not trap any part of the light spring between the right and left choke arms.

Press the carbs together so that the fuel tube is locked into Carbs 2 & 3 and the choke rods are properly aligned. Do NOT pick up the bank yet or it may pull apart. Carefully align and screw the throttle slide assemblies for Carbs 1 & 2 into the throttle shaft.

Almost finished, now the tricky part - Connect the Choke Spring:
Hopefully between the pictures and my earlier comment to pay attention to this, you should be able to reconnect the spring fairly easily. As noted before, one hook on the light choke spring is parallel to the spring coils. This connects to the to an obvious notch in pickle fork. But before you do this, note that there is a part of the choke actuator to the left of the light spring coils. We left this assembly attached to the right side Carb 2. The end of the light spring which runs parallel to the choke shaft hooks over that actuator on Carb 2, again into a fairly obvious notch. The spring coils should be contained inside the tabs of the left side choke rod.

Here's the trick. Once you have the hook on the Carb 2 side, use your paperclip hook and a pair of needle nosed pliers and carefully pull on the other hook to wind at least one turn counterclockwise on the spring to increase tension. Do this very carefully so the spring sits nicely in position, not tipped radically to either side or bunched up. Then connect the hook to the pickle fork notch. This is probably the most tricky part of doing any Honda 4 carb banks, and they are all about the same. Take your time. Note that some springs may have been abused before and you may not get them laying in place in perfect order but they should not be a bird's nest.

Mounting plate:
Double check that all fuel tubes are seated well at each end and the choke rods are properly in contact. Pull on the choke actuator and release it. The chokes should snap open. If not, you must correct the problem now. If you are happy, very carefully turn the banks over so the front sides are facing up and install the mounting plate. Note how studs at the tops of the carbs align with holes in the plate as well as the throttle ends of the carbs aligning with the larger holes. Put all the screws in loosely, but only just snug up the row closest to the alignment studs for now.

Check the choke and throttle linkages for freedom of movement. Carefully tighten the mounting plate screws. It is easy to have the plate hang up and bend as you tighten the screws, then pop into alignment. It's better to identify problems, ease the screws, realign things and go again. Keep checking the throttle & choke linkages. It is so important that the throttle and choke linkages are working fine, with both right and left side chokes closing down equally and more important, they must open fully together. Any damage or misalignment of the linkage joining right and left side choke rods must be fixed now. Bad enough that you have come this far, you do not want to install these carbs unless they are perfect. When all looks good, tighten the plate and double check the linkages. Put a dab of Loctite on each choke plate screw and carefully tighten them down.

Congratulations, you now have your carbs cleaned, reassembled and the banks reassembled! All that remains is adjustment and installation.

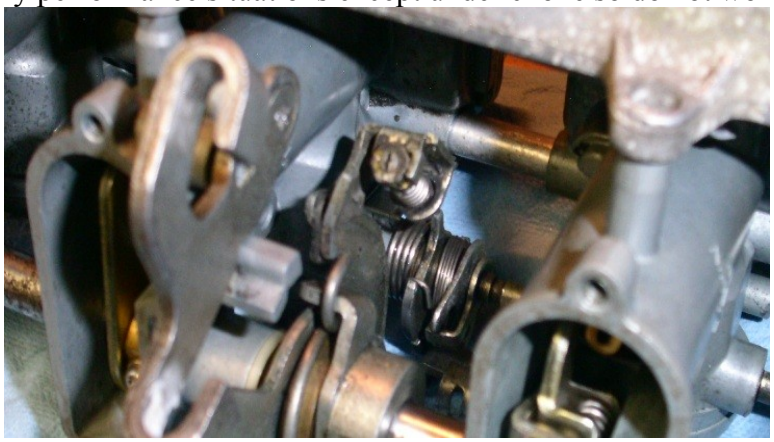
Bench synchronization:
The goal is to ensure that the carb slides are perfectly mechanically synchronized, such that any position of one is the same position of all.

Loosen the locknuts on the adjustment screws for each throttle slide assembly. Do NOT undo the Phillips screw – this holds the assembly to the throttle shaft ONLY, it is not used for adjustment. Note that Carb 2 is not adjustable, so we must adjust the others to match Carb 2.

Tighten the high idle adjustment thumb screw so it is in contact with the stop plate on the throttle shaft. Back it off until it is not in contact, then tighten it again about 5 turns. Using a straight edge, turn the

adjusters until you have the slides all aligned equally with Carb 2. Undo the thumb screw until it barely contacts the stop. Cycle the linkage repeatedly and repeat the process as much as necessary to ensure the slides are perfectly aligned. You can also use a screwdriver tip or similar item as a gauge under each slide to check the alignment.

Choke – Throttle Bump:
OK, one last item. The throttle actuator is basically a disc. On the edge you will see a bolt going through a tab, a spring and into another tab. At one end, it appears like a set screw with lock nut. The assembly doesn't look like it can do anything. Roll the throttle closed and the choke wide open. Note how the choke actuator comes up to that bolt. Adjust the set screw so that when the choke is nearly wide open, the throttle is bumped open a bit. This way you don't have to feather throttle at start-up under choke. Again, it is an important feature than unfortunately is difficult to adjust on the bike. Adjust it so you can feel the slide linkages pull up a bit when you roll the choke to the full on limit. This does not affect any performance situations except under choke so do not worry.



Final synchronization:
Final sync is done using vacuum gauges connected to the vacuum ports currently plugged by screws on the front left side of the carbs. It is pointless using this procedure unless you have first confirmed your cam chain and valve adjustments are within specification. The procedure is documented in the FSM. There are also videos on the Internet showing the basic procedures including how to make your own jury-rigged synchronizing tool using plastic tubing. One item of note for the tube type method, use motor oil only, so if it does get sucked into your engine, no damage is done.

Prepare to reinstall your carbs:

Just before we install the carbs, there are a few things we can do. Now is a good time to remove your choke and throttle cables. Make sure the throttle assembly on the handlebar is in good working order, not cracked or sticky. The easiest way to lube cables is this – tear a small corner out of a cheap sandwich bag, slip in the end of a cable and tape the bag to the body of the cable. Suspend the cable by the bag using a clothes pin or spring clamp. Put a few tablespoons of motor oil in the sandwich bag and leave it overnight. Put a container under the cables to catch any oil drips. By morning, the oil should have worked it's way down the inside of the cables.

Just for fun:
If you have access to polishing tools or even a few fine grades of wet/dry sandpaper and some WD40, it only takes a little bit of effort to put some bling on your carbs by polishing the tops. Remove the paper gasket carefully before you attempt this. You can also polish the float bowls but be very careful of the overflow tube. If you use a fairly powerful bench mounted polishing wheel, it is easy at times for the wheel to grab the work. If the bowl rotates in your grip, you may damage that tube.

Wet test:
It is always a good idea to connect rebuilt carbs to a clean fuel source before mounting the carbs on the bike. Hold them upright as they would sit on the bike and turn on the fuel. Give the carbs a few taps with your hand or a screwdriver handle to ensure the float needles are free. If you have a persistent overflow or leak from any carb, do your best to identify where it is really leaking from. If the float bowl is leaking, check that all fasteners are properly tightened. If so, then you need to check and possibly replace the bowl gasket. If the carb is only overflowing from the overflow tube on the bottom of the carb, tap the carb firmly in case the float needle is just stuck. If it still leaks check the drain screw is reasonably tight. If so, you need to open that carb, check the float & needle are moving freely, that the needle spring tip is working and that the needle seat is clean. Check the float again for leaks and height adjustment. As you can see, this can save you some grief of installing the things, only to have them leak.

Reinstall your carbs on the bike:
Finally you are ready to reinstall your carbs. First check and lightly lube all clamps for insulator and airbox tubes. You do not need a bad screw head or seized screw to spoil things now!

If you removed the insulator tubes connecting the carbs to the manifold stubs, you must reinstall them on the manifold stubs. The best thing to do is to warm them in hot water for about 20 minutes. While this is going on, place the carbs on the left side of the bike and attach the throttle and choke cables. Make sure the locking nuts are firmly locked in place. If left loose, they can unwind and drop down. It is nearly impossible to fix this with the carbs in place. After the insulators are in place, we will slide the carbs in from the left side and press them onto the insulators.

I leave the clamps on the tubes when heating them because you need to work quickly when you pull them out of the water. Dry the tubes and spray inside with Windex. Some people use dish detergent, use whatever you feel best. The whole idea is to lube them a bit. Now press the tubes onto the manifold stubs. Keep your paper towel plugs in the manifolds as you do this, just pull the tails out of the tubes. I find a rubber mallet works fine to drive them home. Push the rear clamps forward for now.

Do NOT forget to put the airbox in place before sliding the carbs into position, because it will NOT go in later. So, with airbox in place, slide the carbs in from the left side of the bike, tweaking clamps and

hoses front and back until finally the carbs are aligned with the insulators. Some people have posted horror shows on forums about how they had to use 2X4s and cinch straps to force the carbs onto the insulators. It should not take that much force! But having one person on each side pulling them on is handy. If you have that much trouble, the insulators need to either be softened by various methods or replaced. Note that the clamps holding the insulator tubes to the carbs fits in a recess of the mounting plate. Airbox clamps at either end of the tubes can be positioned any way you find convenient. Finish up by connecting the float bowl drain tubes.

Final connections:
It is pointless to have done all this work and take a chance of truly fouling it all up. Flush your tank out. Water works great – yeah I mean take the thing off the bike and really work at it. If there's a lot of loose rust or debris, throw in a handful of drywall screws and slosh the whole works around. You can remove them with a magnet. Do the best you can to drain the water out, mop out more with paper towels use a hair dryer or whatever you can dream up to dry it out. A little water won't hurt as you will find in a moment.

If your tank is really rusty, look on various forums for the procedure to use a battery charger and set up electrolysis to clean it up. I have used electrolysis on tanks and many other parts. It's cheap, easy and gives excellent results. Or you can take it to a rad shop and have it boiled. If you do the latter, ask first because the process may also remove the paint.

For all I have read, the best thing to do when your tank has been cleaned is to put fuel in it. Processes for installing liquid materials to create a liner are expensive and fraught with problems. If you do want to try using a coating, please follow the next item first to remove the internal filter screen or you will plug your tank and risk wrecking your liner trying to unplug it.

OK, so you get the idea, get the inside of the tank clean. Now remove the petcock and punch out the stupid factory screen that is useless as a filter and fish it out of the tank. Reinstall your petcock.

Go by a lawnmower shop and get an inline fuel filter. Check your fuel line carefully and try to install the filter so you do not cause the line to kink. Put the tank with it's line and filter on the bike and put some fuel in it. Before connecting the line to the carbs, turn on the fuel while holding the line in a can. Ensure you have good flow before connecting to the carbs. You may have to experiment with line routing and filter placement.

Buy a container of SeaFoam or similar fuel stabilizer. Read the directions, add some to the fuel each time you fill up. When storing the bike for more than two months, fill the tank including an adequate measure of stabilizer and run the bike for a few minutes. Shut the fuel petcock OFF and let the motor run out of fuel. If possible, store the bike upright on the center stand or improvise. Side stands cause a lot of drainage to congregate in Carb 1.

And last, always shut your fuel off whenever you shut off your bike.