

Mikuni Carb Cleaning Tips

("Removing my float pins, or how I stopped worrying and learned to love my Mikunis.")

Cleaning details by Peter Kurzenhauser

editing, additions, and procedures by Jeff Mountin, as well as some tips garnered from the XJ Owners mailing list.

Pictures (and comments in red) by XJBikes.com user Schmuckaholic

INTRODUCTION:

Peter originally sent this message to the XJ Owners list on 7/31/2000 to which I added a few points. This will need to evolve a bit to accommodate differences between Mikuni and Hitachi carbs, as well as the differences between various models. Additional information is always welcome and will be added.

Peter owns an '82 Seca 650 with Hitachi carbs. My ride is an '86 MaximX 700 with Mikuni carbs. (I have an '82 750 Maxim and an '85 700 Maxim X, California model.) Removal and installation procedures are based on this model and may vary somewhat. The actual cleaning is mainly Peter's with a few details added by myself.

PRELUDE:

Problems usually occur when the bike has been sitting for months (or years) without use, and without the gas being drained. When this happens, the gasoline in the tank slowly trickles down into the carbs and dries out and forms gum and varnish in the passages of the carb. Other additives in the fuel create even heavier deposits in the bowls and parts that are submersed in the fuel.

Proper storage does much to help reduce the build-up. When the time comes to "call it a season" or are not riding very often, say only on weekends, some things should be done as preventative maintenance:

First off, keep the gas tank full. This prevents rust from building up inside the tank.

Use a carb cleaner or stabilizer in the gas. Seafoam is the preferred cleaner and like Stabil, can be used for storage. This should be added before filling up to both to mix it well with the gas and to ensure that the treated gas is in the carbs as well. Running the engine for a few minutes will work just as well.

With a good cleaner or stabilizer, draining the carb bowls should be considered optional, but recommended, along with then disconnecting and plugging the fuel line (in case the petcock leaks).

OK, so you have done all this religiously since the first day. Yet still there may come a time when it just doesn't start or run the same.

Build-up from the additives in fuel, not varnish or gum (which are cured by adding a carb cleaner monthly or just plain riding every day), will still mean at some point the carbs will need to be torn down and cleaned.

Regularly, rather than monthly, use of Seafoam (or other additive) in the fuel may help reduce the build-up caused by the fuel additives, but even so the day will come and this tutorial will help make a task, that many seem to think pulling and cleaning the carbs is, a bit less daunting.

This tutorial is not designed to replace a shop manual, so you had better have one before proceeding. It is further expected that you are familiar with the manual and know the names used for the internal carb parts.

PREPARATION:

While the process is time consuming and complex, it does not take a skilled mechanic to do a good job. It only requires basic tools, time, patience, and attention to detail. Expect to spend a day or two the first time, which does not include soaking parts. That can take up to two days.

Some materials you will need:



Carb cleaner - Gumout or Gunk work fine. Will also suggest Gunk's Super Spray, which is by far stronger and should work better for cleaning the interior passages.



Carb dip - Usually comes in a one gallon bucket and has a cage for parts.

Compressed air - Preferably an air compressor. Some have been able to use "canned" air. Canned air can provide adequate pressure, but not the volume, so expect to use several cans.

Dixie cups or other method should be used to keep parts separate for each carb, as well as the other parts removed during this process. (Photographer's note: I used separate baggies.)

Other optional materials and tools will be noted along the way.

REMOVAL:

Now that you are ready to tackle the job it is time to get started...



Remove the trim pieces on the barrels. They are held on by hex screws with very large heads.



Remove the plastichrome trim pieces from the carbs. While not entirely necessary, removing the plastichrome trim pieces from the airbox is a good idea to avoid damaging them come installation time.





Disconnect the throttle, choke, and clutch cables. Move them out of the way.



Tip: Use an 18 mm wrench on the clutch arm to relieve the tension on the cable.



Loosen the clamps on the carb and airbox boots and slide them away from the carbs. The shop manual suggests pushing the airbox boot into the airbox. This is not necessary and pushing them back out is difficult. The clamps on the airbox side should be pushed back right to the airbox or removed.

(Photographer's note: like hell, it's not necessary. Mine didn't want to come out any other way.)



Loosen or remove the bolts holding the airbox in place.



Pull the relay unit above the carbs from the frame tab and move it out of the way. It will interfere with the carbs when removing them. You may want to consider wrapping the frame with masking tape to prevent scratching and chipping when pulling the carb rack.



Note: Leave the fuel line attached to the T between carbs #2 & #3. It is very easy to break the T and that will require more work.

Now comes the fun part.

First off use the center stand and prepare to use some muscle. Don't be afraid to push hard on the rack. The rack and boots can take the abuse. Make sure that nothing will catch as you push the rack out, so use a twist-tie to pull the throttle linkage up, in, and avoid bending it like I did. Doing this in little steps is easier, less frustrating, and takes less force.

Now pull the airbox back as far as possible. Should it move forward, just tighten up the bolts or have another person assist.

Unless you care to muscle them out, a heat gun or hair dryer can be used to heat up the carb boots. With a heat gun you can heat them to the point where they are uncomfortable to touch making them real pliant. The airbox boots are thin and don't need such treatment.

The first move should be to pull the rack back and up until the top rear of the carbs contacts the frame. This should pop the carbs off the airbox boots about half the way and the bottom of the carb side.

Optionally you could remove the tops of the carbs along with the slide assembly and spring for extra clearance.

Now pull up on the front of the carbs, wiggling a little from side to side, but mainly the right, in preparation for pushing them out in that direction.

(Personally I prefer pulling them off from the right and installing them from the left. For me it has nothing to do with being right-handed.)

The idea is to pop the front of the carbs out of the boot, so they can be pushed off easily, which is to say you could just as well skip this step and push them to the side, but why make it more difficult?

Once that is done apply pressure to the side of the rack and firmly push the carb rack over. Initially it will take more force with all four boots resisting. As you progress over make sure to relieve any flexing on the carb boots to avoid tearing and make it easier as the carb move from boot to boot. Suggest having a flat screwdriver with rounded edges handy, as they will catch.

When only two carb boots remain, it would be a good idea to move to the other side and pull them off the rest of the way.

Congratulations! You now have them off and can move on to cleaning.

After four times, I can have the carbs off in 20 minutes or less.

(Photographer's note: I was ready to drag him over to my house to show me how the hell he can get these things off in 20 minutes without pushing the airbox boots back.)

CARB DISASSEMBLY:

There are two ways of cleaning the carbs. Either leave the carb rack intact or pull the individual carbs out of the rack. Both have advantages and draw backs.

Pulling the rack apart is not something that should be done lightly, as the procedure is more complex. Have yet to do this myself, so won't say much about it other than it allows you to dip the entire carb body for cleaning. Might make the cleaning process easier, but that gain isn't worth the hassle in my opinion. Those that wish to do this can read a manual. By far more common is to leave the rack holding the carbs together intact.

(Photographer's note: breaking the rack on a set of Hitachis is time consuming, but not difficult – I've documented the process. On Mikunis, the main problem is the screws holding the butterfly plates on the throttle shaft – they're "peened" or staked over on the back side so as to make removing them near impossible. The solution to that, I'm told, is to grind/file/dremel the exposed rear part of the screw off, which would allow removal. I personally have no intention whatsoever of doing that unless I absolutely, positively, HAVE to change the throttle shaft seals.)

Before tearing the carbs down there are several things that should be done.

Make sure the brass plugs been removed to allow access to the pilot mixture screws located top, front center. If not, remove them now. Easily done with a sheet metal screw and pliers.

Clean the exterior of the carbs. This is where Gunk's Super Spray works very well. However, use this stuff only in a well ventilated area and take care with blow back. Eye protection might be in order. While this stuff remove just about any amount of crud, a tooth brush will make cleaning the return springs go quicker.



The fuel line should be still attached. You can either leave it on or, with care, remove it. Find that sticking a blunt mini-screwdriver between the hose and fitting makes it very easy to remove. Even so, mine cracked.

(Mine didn't, even using a bigger screwdriver. I guess I got lucky.)

After cleaning the outside set the carbs on a bench or table and have your part containers handy.

Reminder: Have the bowls been drained of fuel? If you forgot, you may have been lucky so far, but it will get messy in a moment if you didn't.



Remove the screws holding the tops of the carbs on. Note the locations for the carb bracket and clutch cable guide.



Tip: Rather than using a cup, laying out the top covers as they are might be easier.

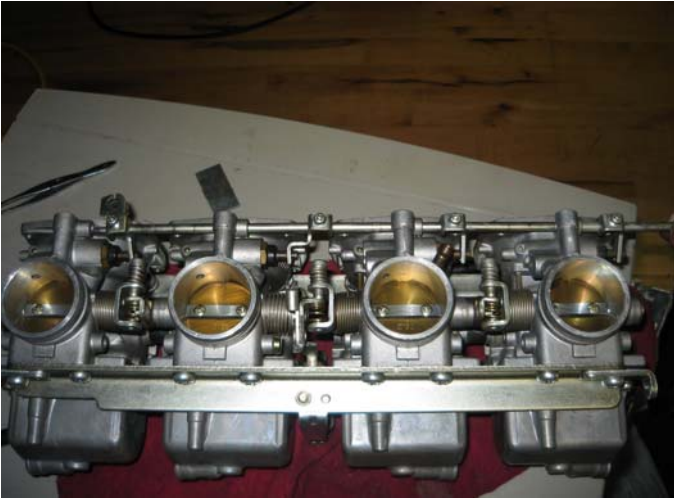
Remove the springs and slides. Take care not to damage the diaphragms.

(Those aren't springs... those are slinkies, I'm telling you!)



Important: DO NOT lay the slides on their side. That will distort the the diaphragm and affect slide operation. Use a cup or jar to avoid this problem.

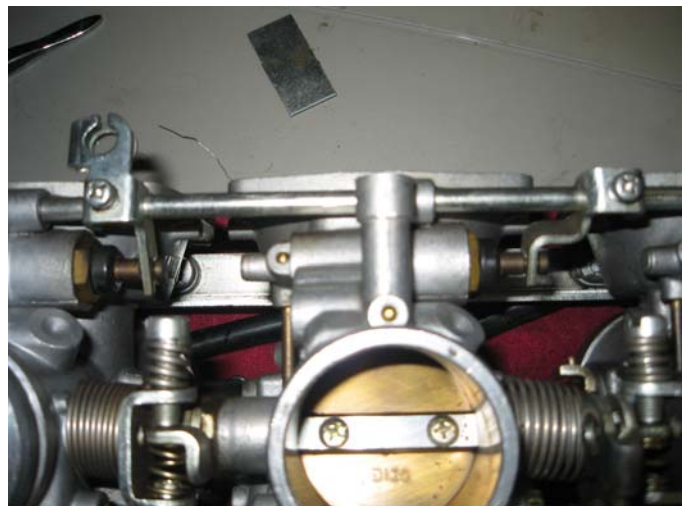
Remove the choke slide and set off on the side.



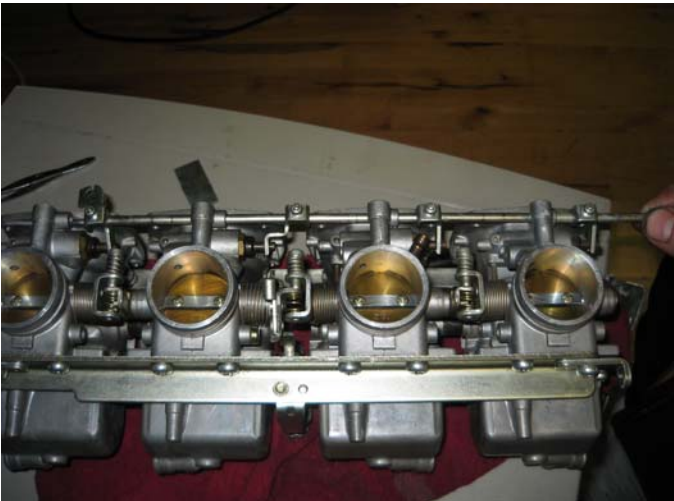
(Overview. Unlike the Hitachis, Mikunis don't have spacers on the choke/starter plunger shaft. Something to remember if you ever find yourself working on both.)



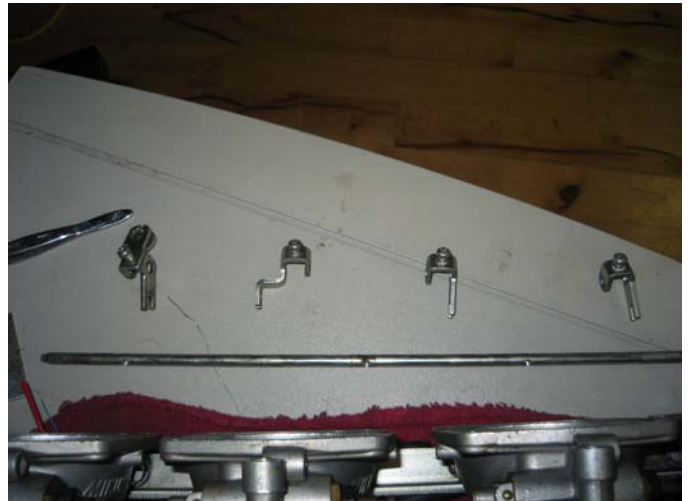
(#1 and #2. Make note of which levers go where.)



(#3 and #4.)



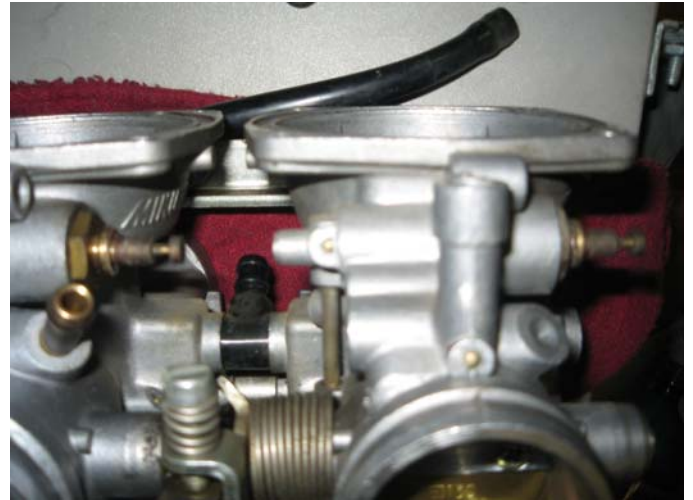
(Loosen the screws holding the arms to the shaft and slide the shaft to the side...)



(...and off they come.)



(Take a mini screwdriver and carefully remove the booties from the starter plungers.)



(Once that's done...)



(...take a 12mm wrench and onto the retaining nuts.)



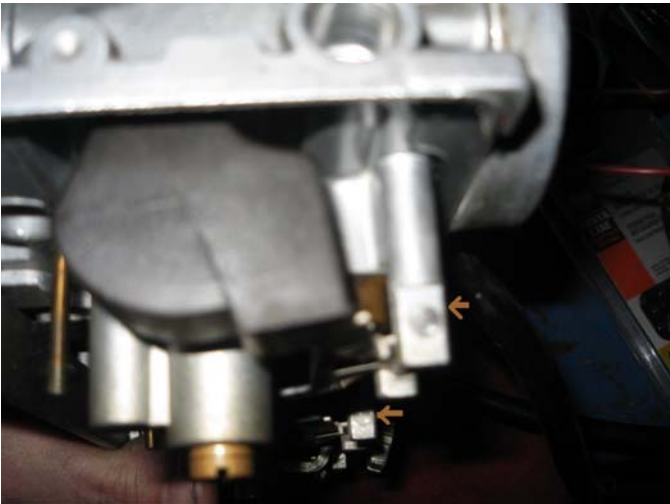
(...like so.)



Problem: Even with the slide off, the #2 and #4 starter plungers cannot be fully removed. (Hitachis don't have this problem. Be careful that you don't try to wiggle them out and break something.) If the passages on #1 and #3 are extremely dirty you may wish to consider pulling the rack apart.



Turn the carbs over, remove the screws holding the bowls on, then tap on the bowls to break their seal with the gasket. With luck the gaskets will remain intact and be reusable. Generally they stick to the bowl and the body.



If there's one task that Mikuni owners dread almost as much as removing the butterflies, it's this... removing the float pins. Countless tales abound of how the float pillars have broken off because the pin didn't want to come out. Hitachi float pins slide right in and out, and don't have a head. These do... don't know why. To sum it up, these can be a cast iron b... well, um... they can be stubborn. Still, it can be done. Here's how I did it.



First, I stopped by Home Depot and picked up what they referred to as a "nail stop", intended for covering wire channels in wall studs. Using a dremel and a cutoff wheel, I chopped off a section to wedge between the two float pillars. In my case, it was 18mm wide.



Place it like so.

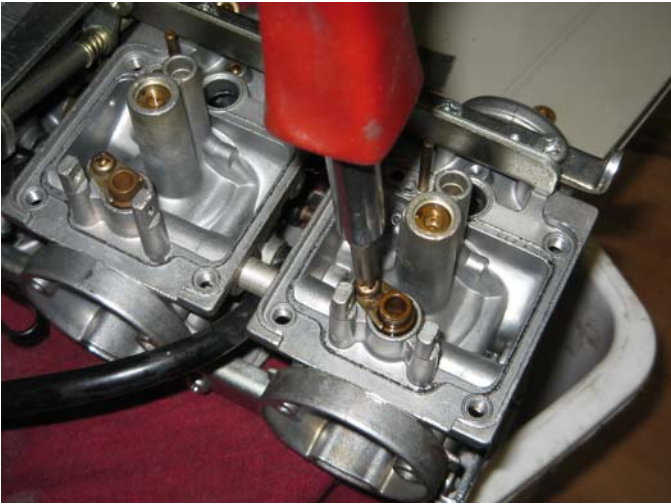


You might want one of these as well for heating up the pillars to encourage the pins to break loose. If you do this, as I did, take care not to overheat the pillar – aluminum doesn't change color before it starts to melt.

Remove the pins holding the floats with a roll pin punch. One slightly larger than the pin can be used to start them and a smaller one to push them through. Use light taps to avoid damaging the pin or breaking off the boss on the carb body. Slide the valve needed off the float.

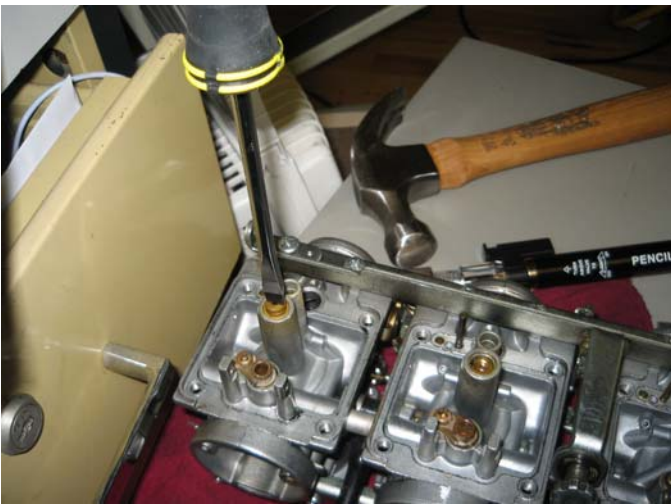


If random chance operates in your favor – or, in plain, non-Vulcan english, you're lucky – you'll be greeted with this sight.



Remove the screw, yoke clamp, and valve seat.

Remove all jets, which include the both air jets, pilot jet, and main jet. The main jet involves three parts. Loosen, don't remove, the slotted main jet. Push or gently tap on the main jet to push the emulsion tube (needle jet) down for removal. There is also a washer under the main jet.



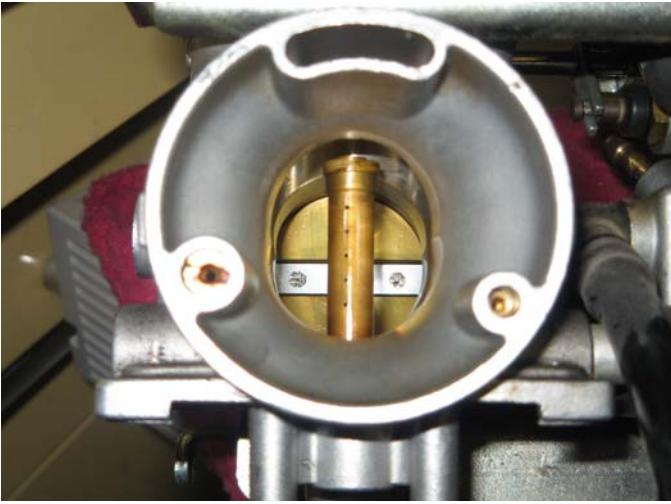
Needless to say, I did things a little differently.

Before starting, though, a quick note about the screwdrivers used to remove the jets. The blade should have NO free play in the slots. None. Zero. Zilch. Nada. If there is, and the jets decide they don't want to come out, you run the risk of damaging the slots and having to remove the jets with an extractor.

The solution: a trip to the 99 cent store, a pair of cheap screwdrivers; one for the main jet, the other for the pilot jet and pilot mixture screws; and some quality time with Mr. Grinder.



Instead of breaking the emulsion tube loose with the main jet – a good idea, that – I took the screwdriver I used to remove the jet, placed it across the bottom of the emulsion tube, and LIGHTLY tapped on the screwdriver handle.



Voila! Out comes the emulsion tube.

Now here, you'll notice the two air jets. These may or may not be here, depending on which model of Mikunis you have, and what bike they came from. These are BS33s, from my MaximX, and have the pilot air jet on the left, and the NON-REMOVEABLE main air on the right. (Similar models include the 750X, 900RK, and 1100.) Some models, I'm told, (550 and 650 Turbo) put the pilot air jet underneath the diaphragm, just like on the Hitachis. Your Mileage May Vary.



The pilot jet sits down inside this little recess. (Whose brilliant idea was that? The same genius who arranged the starter plungers?) The sides of the screwdriver blade will likely need to be ground down as well so the blade can get in.



Remove the pilot mixture screws.

(Again, the custom-ground screwdriver used to remove the pilot jets will do nicely. Having a perfect-fitting blade is even more essential here, as the screws are brass instead of steel, and more easily damaged.)



Important: The shop manual does not detail them, so be aware that there is a spring, metal washer, and o-ring to be removed. The o-ring was missed my first time around and spent a couple hours looking for two of them after seeing them fly out with the first shot of compressed air to the starter circuit passages.

The o-rings and washers don't always want to come out on their own. One can use a toothpick or even a dental pick, if you have one, to fish them out.

I've said this before -

Soak the pilot jets.
Soak The Pilot Jets.

SOAK. THE. PILOT. JETS.

The passage size and shape makes it next to impossible to completely clean them otherwise. One small particle that is missed is very likely to clog them once more and any deposits left are a foothold for future deposits. When the pilots clog up, the engine will be next to impossible to start, idle, and will not sound right. Should you clean the carbs and end up with a "cold" cylinder, most likely something clogged a pilot jet.

For those that have never seen the pilot jets. Consider that after they are so clean as to look new, it is very hard to hold them just right and see the opening. A single grain of sand could stop them up. Get the picture? White-room clean and an in-line fuel filter after all the hard work.

Compressed air to blow out the passages is a must. Not canned air. Good pressure, but no volume.

Let the carbs soak overnight, then spray out all the passages with the Gumout. Put the carbs back in the cleaner to get the other half, let soak overnight, and spray out again. COMPARE the amount of spray flow you get through the passages from one carb to the next. If one flows significantly more or less, you're not done cleaning! Pay particular attention to the very small passages in the bowl itself and the small brass pipe that sticks down into the bowl (it feeds the choke/enrichment circuits). There are several passages that travel around inside the carb body. Make sure you follow them from start to finish and get them clean!

Rather than waste Gumout (or whatever) I recommend a can of compressed air. Less chance of blow back, which stings on the eyes almost as bad a jet fuel (the additives are killer), but also has a better "feel" from my experience. Being quieter, it's also easier to actually hear differences.

When shooting carb cleaner through the starter jet holes, you should get a nice, steady stream that goes at least 5-10 feet. When doing this, make sure you point the bowl AWAY from you, or wear eye protection, or both – you don't want to end up like little Timmy here.

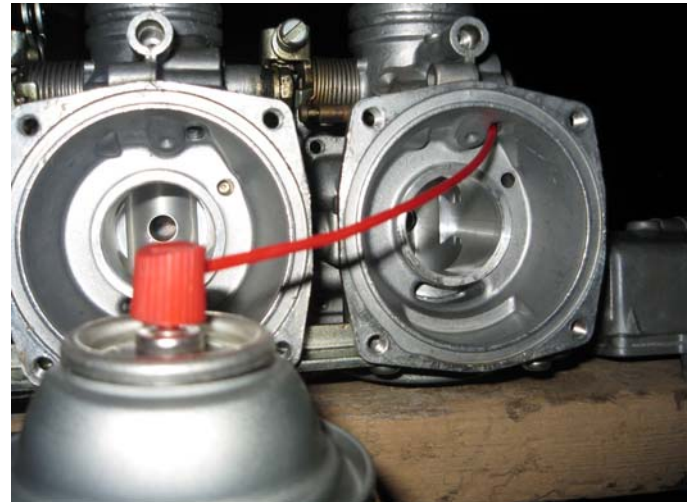


(Pic shamelessly stolen from XJBikes.com user Gamuru)

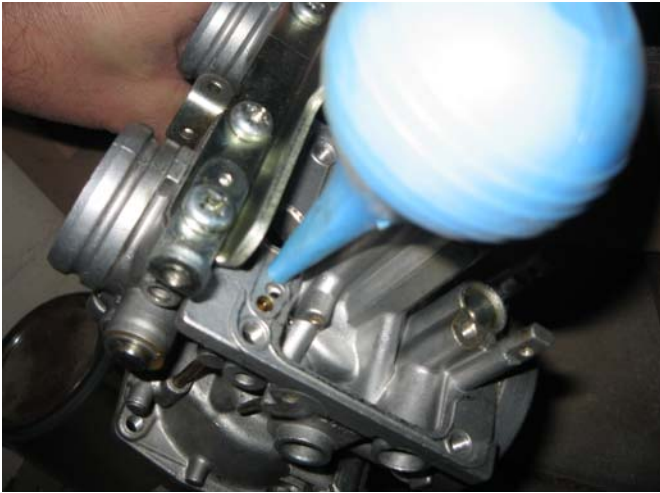
Enrichment/choke circuit: This can cause rich running, especially at idle. I had this problem myself on one of my carbs, and I may still be having that problem on another. You have to remove the enrichment valves on the top front (Hitachis) and make sure they are clean. If they are not, the valve won't seal completely and extra fuel will get sucked into the airstream. Basically, it's like you didn't get the choke all the way off on that carb. Those of you who are complaining of black soot-fouled plugs are prime candidates for this problem. After you get the enrichment valve re-assembled, suck on it or spray Gumout from the supply passages to make sure none of it comes through the valve.



One way to check/clean the choke/enrichment circuits



This comes in handy with the plungers you can't remove



Here's a way to check it from below. Get an earwax removal kit from the drugstore and take the blue bulb, aka the Rubber Baby Booger Sucker. Place it over the long tube that extends down into the float bowl, and squeeze. If you can hear air, that's good. If you do this with the #2 and #4 plungers, and squeezing the bulb pushes the plunger out, then chances are good the passage is open. Probably couldn't hurt to use it to squirt some carb cleaner up through the passage.



Before starting the reassembly, now's your chance to do something about those pesky float pins – the ones that gave you so much trouble coming out.

The end of the pin is likely mushroomed slightly by tapping on it with the punch. This can be remedied with a file or a dremel and sanding disc - maybe a slight bevel would be in order. Further up the pin, near the head, one of my pins that I measured with a set of calipers measured slightly larger than further down. Some sanding might be needed here as well. Lastly, check to see if the pin is bent by chucking the end in a cordless drill (even the dremel, maybe) and slowly spinning the pin.

Float height: This is critical to correct operation of the carbs at idle and full throttle. Various listers have described using the gas tank hooked up to the carbs off the bike so that they can easily check and adjust the float levels. That's fine and a good idea, but you must also measure the float level with the tube attached to the drain valve with the carbs on the bike and the engine running, to be sure. Set it to shop manual specs. Don't try to make it richer by raising the float level. If anything, you want to err on the side of lower float level than too high.

How did I do it? Glad you asked...



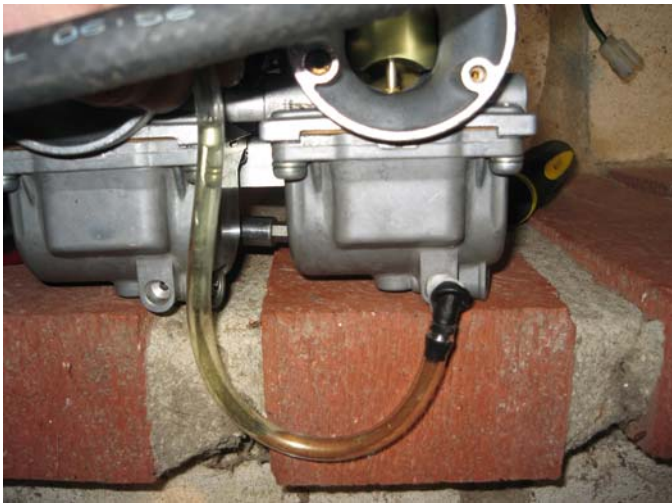
First: to ensure uniformity in how low the floats sit in the bowl. With the carbs upside down, lift the floats until the tang, as indicated by the arrow, touches the float pillar. **GENTLY** bend the tangs on each float as appropriate. Once that's done, reinstall the bowls.



Next, we use this handy contraption – since the Mikunis have Innies instead of Outies (like the Hitachis), we can't just plug in a hose. www.maxim-x.com shows how it's made.



Plug your newly-minted thingamabobber into the drain hole, angled slightly upward – keeps air bubbles from getting trapped and throwing off the reading....



...then rotate the plug downward as shown.



Adjusting the fuel level is done by bending the tang in the middle of the float assembly, indicated here. Be very careful how much you bend it – fractions of a millimeter count.

Rather than try and adjust all four at once, it might be easier to dial one bowl in first, then adjust the other three to match. One person uses a slightly modified float gauge from a Holley carburetor; since we most likely don't have one, we can use the next best thing:



The lowly toothpick.



Let the floats rest on the needle, then ever-so- gingerly hold the toothpick up flush against the tube that the valve seat bolts into, and be very certain that the tip of the toothpick sits dead center on that little hump. The accuracy of your fuel level depends on it.

Make note of where the edge of the float bracket is on the toothpick by marking it with something, be it a hobby knife, pen, or sharpie. Then, adjust the remaining floats to match.

Double-check the fuel level on each bowl afterwards.

Reassembly: Follow the shop manual. Also, check the opening and closing of the throttle plates and synchronize them by checking visually and with a strip of paper to make sure they close together. The strip of thin paper is a feeler gauge to make sure that one plate isn't hanging slightly open when the others are closed. Put it in the throttle bore on each carb and let the plates close on them. The effort to pull the strip outward should be the same on each bore. If you do this, the carbs will be very closely synchronized before you put the cabs back on the bike, and it will run well. Then do the running sync check to double check and fine-tune. This static sync will also help you find any worn throttle shafts. Finally, lubricate the throttle shafts with oil or chain lube. I like chain lube because I think it stays in there longer. Work them open and shut a many times to work the lubricant into and around the shafts.

Also make sure that the slides move roughly the same for each carb and exert roughly the same force. One time found one that was much slower to return. It is helpful to have a something thin and flat to make sure the diaphragms are seated evenly. During disassembly DO NOT set the slides down, so that the diaphragms are deformed. Makes assembly a real pain. Sometimes it does help to push the slide up a little, but by just barely threading each screw and ensuring the diaphragm fills the indentation all the way around make all the difference to how the slide (and entire carb) operates. A light crease will change how the diaphragm flexes and how smooth and quickly the slide responds.

Now all that is needed are some pics for a how-to page. 8-)

Done!