Keihin carburator repair #2

A 4-part video series guides you through the process. Part #2, tear-down & cleaning.

The tips and tricks:

1. **Replace the craptastic plastic fuel inlet with brass.**
2. **There are check-balls in the float bowl and accel pump cap.**
3. **Don't forget the rubber plug over the intermediate jet.**
4. **Choke headaches**
    a. **Braze a loose choke lever to the shaft.**
    b. **Put an 0-80 screw in the choke lever to keep it open.**
    c. **Assemble to the choke cable with the screw pointing up.**
5. **Use silicone on the Welch plugs. Clean the idle circuit.**

Solvent, carb cleaner, and ultrasonics all help to get the carburetor immaculately clean.

6. **Use a rebuild kit with Viton rubber.**
7. **Choke and adjustments**
    a. **Use the factory choke cable, not a coat hanger.**
    b. **Adjust accel pump volume.**
    c. **Dial in idle speed and idle mixture screws.**
8. **Manifold headaches**
    a. **Use support bracket on rubber-band style manifold.**
    b. **Use S&S style manifold clamps.**
    c. **O-rings come in Viton too.**
    d. **Put manifold on by itself before mounting the carb.**
    e. **Tighten manifold clamps before head and cylinder.**
9. **Use a Fram CA77 in the early Harley air filter.**

Hi, I'm SportsterPaul. Today, we're going to disassemble and clean this Keihin butterfly carburetor. It's used '76 to '87 Harley Sportsters. My interest is iron-head Sportsters, so kind of exclusive to that. The tools you're gonna need - well, first you need a tray because then you put all the parts in, you don't lose it, stuff doesn't get scattered.

When you get your tray, safety, gotta have safety glasses. These are 3M Lumo - I forget the name. Muvo, that's it, M-U-V-O, they are fantastic because they are reading glasses as well as safety glasses, so if you're getting old like me, you need reading glasses, you get them both with this. This is a 2-point whatever diopter.

Tools, you're gonna need No. 2 Phillips. You're gonna need a No. 1 Phillips. You're gonna need a fairly large straight slot for the main jet, and a narrow straight slot for the intermediate jet. If these are recalcitrant, like for the main jet, here's a big hefty Craftsman right-angle straight-slot, so you can unscrew the main jet. Same thing for the Phillips that most of the carb is built with, here's a little ratchet. Works pretty good. So we're gonna put some tools there.

The other tool you may need if you're taking it off the bike, nitrile gloves. Just like Viton O-rings and stuff is called, nitrile gloves are way better than latex. They're tougher, they don't tend to cut as much. I've got this brand here that I use when I'm handling a wet carb with gas in it. There's this brand here as well. I like this brand. It's still taped up from moving here to Florida. It's got date codes and stuff like a medical hospital-grade stuff. So I like that. In case there's a recall, I'll be notified.

The carb kit, we talked about having a Viton rubber carb kit. Not sure if this is one or not, so it can go in the little tray as well. Everything's in one place. The tools, I'm working on this video, usually the tools should be in the toolbox replaced as you go, especially if you got buddies and you're working in a garage. But we'll go through this now. I'll learn about how to do fast-forward and speed it up. I'm not trying to bore you.

To drain the carb, turn it upside down. This one's been sitting around for a week or two. First thing, I build this custom, goofy kinda choke thing here, and we're gonna get that off 'cause it's kind of sharp and pointy. The screw points up like I taught you in the tips and tricks video. Not too bad. It comes out. There it is. There's a little holder on there I forgot about.

Then this was a little cup thing that used to cradle the steel-shrouded choke cable, the factory cable. I bent it flat. I'm gonna bend it back curly because I'm going back to that style choke cable. I like to get the float off next. Three screws - three short ones and one lone one. These screws, I went to Mr. Metric when I lived in San Jose area, and bought metric screws of the right thread, metric lock washer, metric flat washer, and you're - I've got a bag of them. I'll show you later when I put this together.

You just replace the lock washer every single time, even if you just pull the bowl after ten minutes to change the jets, new lock washer every time. And what else? Here's the other short one. This one comes out. Okay. This one comes out. And then here's the long one. So like that.

Now, the fuel bowl, these two just hold the cap onto the float that does the accelerator pump. So now you should be able to kinda wiggle it off. Oh, God, yeah, lots of junk in there. This is not good. I said in the first video, the tips and tricks, I said it's only been on for a couple months; wrong, it's been almost a year. So in the hot Florida garage over the summer, the gas boiled out. And I bought gas at RaceTrac. I'll never do that again. I'm not sure if it is the RaceTrac gas, but there is a lotta crud in here. This would explain why the accelerator pump's bad.

After you pull the bowl off, this is a little operating rod that the accelerator pump works with. It goes here. So that's that. The bottom of the bowl looks terrible. Let's open up the accelerator pump and see what was so grungy in there that that rod wouldn't operate. Take off this short screw. Take off this short screw. This'll let the little cap. Just a little trick. People reef on these so hard they crush the aluminum and kinda captivate it. You can hone that out or clean it out with a drill. Oh, yeah. A little bit of gasoline. Should get some paper towels.

I really can't see - I should have the nitrile gloves on. The spring's okay. I can't see what made this thing so resistant to motion. So it's grungy. Let's do the trick. In the tips and tricks we talked about the check valves. And I should've mentioned, there's a little ball that's put into a passage to be a check valve, and it's wedged in. You can't get them out. There's another ball that's just wedged into the aluminum and peened over. I can hear it. That's good. That's a good sign. Float bowl. I'm gonna stop things now. I'll get a rag and clean up the gas

Now we've got the float off, and it's delicate. The float's a little delicate, so you wanna get that out right away. That's where you use the No. 1 Phillips, the smaller Phillips. It goes - there's one screw right here. Right in the corner there's a rod, and they're getting kinda cheap and fancy 'cause there's one screw holds this rod in a pocket, and that's what lets the float pivot up and down. So let's get that out. Not too bad. I put this together so it's not all reefed and impossible to disassemble.

Okay. There's the screw. Here's the float. The needle comes out with the float. Talked about using safety glasses. Now I need them, so let's put them on. The float comes out. It's gonna be hard to see. The float comes out there. And there's a little wire, the theory being when the float, the needle points up, stops the gas coming in, so the theory with that little wire harness thing is when the weight of the float comes down, it pulls the needle down so that it's more positive.

So the float - oh, trick. Another trick. Floats wear out right here where the needle touches. They get a big dent in there, and if that dent is bad enough, and you go to a different needle with a different profile, maybe it hangs up. I don't know, they're not - they don't make them anymore. They're unavailable. So maybe I'll go to the jewelry class here or the jewelry club, and see if they can weld it up. This one is in very good shape. This one's almost as good as new. I'll try to get a close-up picture of that put up here so you can see how little this dent is,

and I'll have a couple others you can see how bad the dent can get.

That can be a real problem. That can cause you - the float doesn't go up all the way. It doesn't go down right. The needle, the needle looks pretty good actually. We're gonna put the new one from the rebuild kit. But save the old one. I can smell that gas. All right. In the tips and tricks we talked about this rubber plug in the intermediate circuit, so out comes a rubber plug, in goes the narrow slot. There it is. And when it makes that nice crack.

If they don't come out, like if this one doesn't come out, there's the intermediate jet. I get them pretty fat. For Iron Sportsters, it just seems like up in the 80s. The one I just put together for the '77, it's an 87 main jet which I think is 0.87 millimeters. I don't know. So it's a pretty big hole there to get them to run right low. The main jets over the years, I've leaned them out, and I think I'm to 160s or 1 - what's this one? I might be able to read it thanks to my safety glasses - 165. So it's got a 165 main. I might go down to 160. I got bags full of jets.

Intermediate. Here's, you use the big straight slot. Okay. There's the main jet, 165, a little film of gas in there. This brass tube, it sticks up on the inside. Sometimes you can get at it from here. Sometimes it doesn't come out, and you're just stuck with it. So, no, it popped out. It won't come out, but other than that, maybe that's the last tool I should show us, this little brass.

It's the mixture tube. It's where the air and the gas mix together in the main jet area, and that's one of the reasons why you plug, you don't draw directly from the bowl. We'll get that out. Trust me. What else? Well, you can take the idle speed screw - this is where you get it down roughly, and then you use the idle mixture here to tweak it in, and get the maximum RPM, then back it off a little. How it comes off idle, that's all dialed into the mixture.

Get that off. Oh, nice and loose. Maybe too loose. This is where there could be an air leak, and I talked about using some Teflon tape. It's dangerous because if you use the Teflon tape and you put it too close to the beginning of the threads where the needle is here, then a piece of that Teflon could fall in and cause the exact problems I was talking about where the bike acts different every week.

So we got that out. Overall, it's pretty good. Let's get this gasket off. I don't know why this carb was just non-functional, but once we get it cleaned, I can guarantee you - nothing easy with a Sportster, I swear to God. There we go. I wanna rip it. I mean, sometimes you save these. I got a bag of these too. There should be some new ones in the rebuild kit. I like these paper ones. I like the studs too. I used to think it was cool to come in from the back. The studs kinda help when you put it together. There we go.

That there. There's also an O-ring here. To my knowledge, do you really wanna bolt metal to metal? When I showed you those manifolds in the tips and tricks, one of them had a fiber spacer, the theory being less heat from the engine gets transferred into the carb and makes the gas hot.

So then it depends how much you've run the bike, how hot the bike's running, hot gas, cold gas, all these other problems.

So we'll get that little mixture tube out. How about that? Force does everything. It's still a little wet from gasoline. There's little tiny holes here. This is where the ultrasonic cleaner just does wonderful. Little tiny holes that let the air in. They bring the air in through a vent. Right here you can see - maybe you can't - you can see this little tube. That's where the air goes in and mixes with this thing.

You don't touch a lot else. One nice thing, carb cleaner will mush out this silicone that I put in previously, blue silicone gasket material, and so then you have to get it all cleaned out, new silicone. This is where it could leak. Here's another Welch plug from the idle circuit where it comes up, goes across. I might not have been clear in the tips and tricks video, the idle, this one little hole right here, that's the idle mixture. That's where the little needle sticks down into, and you adjust that when the bike's idling which means the plates are completely closed.

The other holes that you see further down, if the light's good enough here, the other holes here are for the off idle. That's so it's idling nice, and you start to crack it, those holes come in, and that's where they machine through this, through where this plug is. Those holes are what gives you the character of the bike just coming off of idle which is a critical time.

And because they're great engineers at Keihin, they figured out how the size of the holes and the spacing of the hole, so as you crack it open, it tends to make a nice smooth transition, and then once it cracks a little more, well, then the intermediate jet takes over, and you're bringing gas up right through that tube, that brass tube that's where the main is. So, big fun.

Intermediate... main. This thing's in pretty good shape. It stinks. Shoulda maybe done this in the garage, but then we wouldn't had the nice lights. So what's next? I'm gonna leave the throttle cable thing on. There's seals here. You don't wanna get too - that's why carb cleaner is a little dicey. We'll go out, maybe I'll do a little remote setup, show you dropping them into the ultrasonic cleaner later, but what I learned, important tip, don't throw this dirty - look how dirty it is.

I mean, there's tons of dirt on this carb. Just road dirt on the outside. Don't just throw it in the ultrasonic bath 'cause it gets the bath all black and ugly and disgusting. Throw it first in your, not carb cleaner; you don't have to go right to carb cleaner, but just part solvent. So Safety-Kleen is what we had in shops. So part solvent does a great job getting the big chunks and the grease. You don't wanna put grease in an ultrasonic cleaner. It's supposed to - it has trouble with grease because the grease is mushy in the ultrasonic, waves of the water and the chemicals.

So we'll get the, maybe one more tool is an X-Acto knife to get this gasket out. Let's see. There we go. So there's two. That also wasn't clear on my tips and tricks. There's this gasket. Let's see if it swelled much. See there's a Viton gasket. Cool-guy stuff. And then there's a little

O-ring around the sprayer, the accelerator pump sprayer which is right here. And that's got a little gasket too. So we'll get that. So I'm gonna shut things down, go out, drop this in the Safety-Kleen. Kerosene and detergent is what I think it is. It's not too hard.

That's another place to use gloves. For me, it tears up my cuticles. They all start chunking out. So get it roughly clean. I'm gonna even ultrasonic the float. This float isn't too bad. It's in much better shape. I guess most of the grunge ended up in the bottom. And we'll get that figured out. There's gas in the carb. I'm really surprised that the accelerator pump, as good as it looks - I'll put a picture up. Somewhere here - here's one. Look at this one. How's that for a diaphragm?

We'll compare it to the - of course you always lose the thing you're looking for. here's the rib side up. That goes into the float body. There's this groove cut here and so these aren't symmetrical. They go in one way, like that. And look at this mess. That was in the carb I took apart. It looks also like it's pinched, so I probably put it together wrong. Gosh knows all the mistakes you can make. Hopefully we'll solve some of that in this video series.

Next, cleaning this off, then we'll show you - I'll take some stills out in the garage. You can see the cleaner. It's no big deal. All right. See you in a minute. Okay, back from the garage and the part solvent, parts cleaner. Got the big chunks off. One nice thing because I'm gonna put this in the ultrasonic cleaner now is you gotta blow it out with air now 'cause it's water. You know, you wash it off with water. You don't wanna mix the part solvent with the ultrasonic cleaner aqueous bath. Bad thing to do. So you just wash it off. The water's your friend. I mean, you're blowing water in passages. It's taking dirt out. Tap water's pretty clean, and I've got water softener. No dissolved solids, better yet.

So I've got it out. You can see it's better, but, you know, you can see this black. Let's see if we can take it off. Yeah, so it cleans up a little. I brushed and brushed it. Apparently, it didn't brush it enough. The inside, still pretty grody, if you can see that. Lots of junk on the inside. That varnish from that year worth of having the bike sit. The inside isn't too bad up here. There was something I wanted to get. This little piece of gasket.

Think of an ultrasonic cleaner, like a teeny-tiny little bead blaster. So all the stuff that a bead blaster would have a problem with - adhesive tape, glue, gunk, grease - the ultrasonic cleaner will have that same problem. So there's a little gasket material right here. See if I can scrape that off while we're having fun. Yeah. That's the kinda - I mean, it's good that the big areas are all shiny and clean, but it's the gasket and sealing areas that you want immaculate.

All right. Well, the carb body cleaned up pretty good. I mean, it's shinier. It's still got some discoloration here. The inside - this camera auto-focuses for crap - the inside is still pretty filthy. Same thing, it's got like a film. It'll clean up a little bit with some paper towels. Some guys try the dishwasher. I have a dishwasher here in paradise. Maybe I should toss it in the dishwasher, but not sure about that.

So next is gonna be the ultrasonic cleaner. I've decided I'm not gonna go in there and drag all the cameras and show you the thing buzzing. You can get it for about $220 on, $220.00 on eBay. I saw, internal, there's an eBay where something broke on one and a guy fixed it or tried to fix it, and you could see the internal construction's pretty good for Chinese stuff. It came out of Canada. A guy in Canada responsive, answers emails. Good enough. It's worked so far. I've had it, I don't know, I've used it five or six times.

So here's the big parts, the float. Here's a picture of the cap where the accelerator pump goes. I'll put a picture up what I did. The rubber and stuff, I don't put in the solvent. Same theory, maybe it'll swell the rubber and it'll be back. Now, the ultrasonic is water. I might toss all the rubber in the water. I've got a nice basket that parts won't fall through, the jets won't fall through. Let's get those.

You can see that jet's a little dirty. The mixture tube, a little dirty. I guess we're out of business. I can't find the intermediate jet. Here it is. Here's the intermediate jet. Not too bad. It's really not how they look on the outside; it's all the little tiny holes and passages, and that's what the ultrasonic cleaner does. It gets into the tiniest little nooks and crannies including that problem spot under this Welch plug here. So when it comes out of the ultrasonic, that's when I'm gonna blow it off.

So what we did in the garage, to recap, put the pieces right in the solvent. Wore gloves, nitrile gloves. Little pieces, the metal stuff, went in a basket. That went in the solvent. A picture of that. The rubber and stuff, I kept all that out. A picture of that. Now, put it back. See how nice it is to have a little tray. This happens to be a photo tray from back when there was photo developing. Yeah, I gave up on trying to monitor stuff with the table. It's just "look up at the camera and see what's it's doing," the overhead.

So it'll be curious to see how this cleans up. I'm gonna leave it in - the ultrasonic cleaner has a heater, unlike some. And just the ultrasonic itself, you use it for an hour or two, that water gets heated up just from the ultrasonic energy pouring into it, but this one actually has a heater-heater. You power it on. I'm using MC-3 Branson, Bransconic. Expensive stuff, but use the right stuff.

I did a bunch of these with MC-1, and it kinda tarnishes them, and then I read, "Oh, not for aluminum." Duh. So hopefully we'll be able to get - maybe these are zinc. Not sure. This MC-3 would polish this up pretty good. We'll see how this brass fitting comes out and stuff like that.

Keep the carburetor kit here. Okay. Now, I'm off to the second bedroom where I've got the vanity sink set up with the ultrasonic cleaner. I showed you a picture. I'll take some better pictures now, and we'll see how this looks. It'll be an hour or two. I'll watch TV or something. And then we'll see how we did with this ultrasonic cleaner that's a very important part of this whole project. All right? Okay. See you in a minute. Or an hour.

Okay. We're back from the ultrasonic cleaner. It didn't fix the problem.

I found the problem. I'll show you in a sec. I had to put it in Berryman's carb cleaner, 5-gallon bucket. Love Berryman's, but they sell you the basket now for $27.00 extra on top of the $137.00 for 5 gallons of carb cleaner. I love you guys, Berryman, but throw the basket in the bucket, then you don't have shipping or any of that problem. It just comes with it.

So here's what the problem was. Oh, look at this thing. This is two, 50-minute sessions in the ultrasonic. Found the problem. Didn't fix, the ultrasonic didn't fix it. And then Berryman's overnight, I left it in all night, and then another 50-minute ultrasonic, but look at this carb. It's gorgeous. It is bright and shiny. The ultrasonic, it's like it polishes it. Look at another carb here. Look how dull this one is compared to the ones I did. All of them. Look, here's another one. Look how bad that looks.

The mistake here on these dark ones was using Branson MC-1 which is not recommended for aluminum. Maybe I should've read the instructions before I bought it. That stuff's not cheap either. It's hazmat stuff. But MC-3, which is what I used for this, fantastic. Bright, shiny, gorgeous.

Okay. The problem. Remember all the paraffin that was at the bottom of this that the ultrasonic didn't clean even after two 50-minute sessions still was kinda grungy. Well, that paraffin got into this passage here that is used for the squirt, for the accelerator pump. So I took it out of the ultrasonic, 100 minutes total. I took it to dry it and blow it off. So here's, this passage here, it's got a check valve.

See, you can hear the check valve, so this one might work.

This passage right there, this little hole right here, this is the one that goes, you can kinda line it up, right. It goes right here. And then it goes along here, comes up here, and goes out a tiny little orifice in this brass thing. I'm blowing it off, cleaning it good. I put the cleaner - I'll show you a picture of an air blow off. It's got a little rubber lip on it. Put that lip right there, hit full air pressure, 100-some pounds, nothing came out the brass. No spray, no squirt, no nothing.

So that's when I realized, ultrasonic might be fancy high-tech, but it doesn't always do the job. It didn't for this. And the other failure in the ultrasonic, 100 minutes total, I had a heater in it, it got up to about 45 degrees centigrade on the first 50-minute session, and it got up to 54 degrees by the second session. So I'll put pictures up. Carbon everywhere. The ultrasonic has trouble with the carbon. It's not hard enough or whatever, so that the carbon didn't come out of the throat.

Okay, we can solve that. Got the 5-gallon jug of Berryman's brand new. So I put it in the Berryman's. Use gloves. I'll show you pictures. Berryman's is wicked. Do not get your fingers anywhere close to that stuff. It's got some nasty stuff on top, that's pretty bad, but the real stuff that does the work is underneath. They float the nasty stuff 'cause it's less nasty than the incredibly nasty stuff. You stick your hands in that, your skin will be tingling. Gosh knows, you'll grow three ears. No telling what happens.

So, after the Berryman's, we can see - I can put pictures up as we do this - but I did take a toothbrush after the Berryman's and clean it a little bit. No carbon. I know I left it in the Berryman's too long because of the seal. There's two seals here so air doesn't come in on the throttle shaft. The throttle shaft was sticking a little. I mean, it was real slow closing. It's fixed now because I put it back in the ultrasonic. Washed it all off, threw it in the ultrasonic for another 50 minutes, and that kinda frees up stuff, you know, a lot of water to clean it.

Interestingly, the ultrasonic makes the choke kinda sticky 'cause I guess it gets in there and just cleans it, every bit of lubricant and whatever so a little Tri-Flow will fix that. We'll get that going. But it came out great. I should mention that I wasn't even happy with the Berryman. Berryman's worked great. The first time, I saw a little spray.

Second time, I heard that little "thwap" that tells you there was a piece of something that just went through the whole mess, then I got a can of regular conventional carb cleaner, buy it at any store, and I sprayed in that little hole right there, put the air fitting on. I must've done that four or five times, and sprayed, you know, it's a little nasty 'cause it is almost an aerosol when it comes out of the squirter here, but that squirter goes like this, and that's where it sits in the throat, the carb throat.

And I tell you, there's people that say you can adjust them and so it squirts. It's pretty crude. You just throw some gas up there. I'd rather not touch it. There's an O-ring that goes around here, and then the big O-ring. So we've got it nice and clean, nice and shiny. The rest of the stuff, we got our Custom Chrome, hopefully, Viton. I know the later one, the ones you can buy for $29.00 are Viton, and worth every penny. Thank you Custom Chrome.

The float, it's closed-cell foam, that's why it floats. I didn't wanna leave that - certainly, I didn't put it in the Berryman's. Here's a picture of everything. You leave all the rubber out of the Berryman's. Remember the carb body had a silicone around this Welch plug I told you about in the tips and tricks, had this blue silicone in there to seal it in case there was an air leak. Probably not necessary. I probably won't do it again. That came out. Berryman's gets that out. It just kinda dissolves everything.

Swells rubber; that's why the seals got tight. But the rest of the stuff, so I left the stuff out. There's the picture of what I left out. But I didn't put this for the third - none of this went back into the ultrasonic for the third time. They were perfectly clean. Well, no, I shouldn't say that. The jets and the mixture tube, and the cap I put in for the third session of ultrasonic.

The cap is getting so clean it looks like finish is coming off of it. It's turning gold here like it had some die cast or zinc plating or galvanized finish, and now it's getting back to nature. So, remember the trick? There's a check valve in here because it's a diaphragm pump. It's an inlet valve and an outlet valve. Hear it? It sounds better, right, than the one that I was playing with before.

It's crisper. You can just hear that ball is all

clean and happy in there. Same with the float. It's all clean and happy. So happy project. Successful project. Look at this main jet coming out of the ultrasonic. It looks like it's brand new. So that was a pleasure. I don't see the point of leaving the jets in forever. Enough ultrasonic's enough. I wanna get this together. I'm not gonna rebuild all of these. I wanna get this thing back on my bike and see if I can get it running around the block.

So this is all disassembly, figure out the problem. Hopefully we'll fix that. The diaphragm for the accelerator pump looks pretty darn good, certainly better than that chewed up one I showed you before. A little bit better than this one. You know you got a problem when this comes out of your carburetor. But I'm not gonna reuse it, although I would as a cheapskate.

Got this beautiful carb kit. We'll get the carb kit on there, and then these will go in these which I'll probably sell on eBay. Sorry guys. Used parts. I'll tell you in the description. So that was disassembly. Just use these four tools - No. 2 Phillips, No. 1 Phillips, a big straight slot for the main jet, a narrow straight slot to get the intermediate jet out. Those four tools, you're ready to go.

Next, third, final video in this series is gonna be putting it back together. We'll go through the tricks. This is when I'll do that trick about taking the - keep everything together. That's why you want a little bucket. Keep everything together. The little trick I talked about in the tips and tricks first video about putting a clear plastic hose on the accelerator pump, filling the bowl with water, taking the - putting the accelerator pump stuff on down here, and then taking the operating rod, screw, screw, squirt, and count how, not count, but watch how much fluid gets delivered with x-number of accelerations, and then I can compare them to these.

We'll see, I'll do a couple of them, at least two, to show you if there's any difference. The bowls do have differences. Some of them have a little hole right there 'cause they were trying reduce the amount of gas you got. That's in addition to this screw which can reduce the amount of gas in an acceleration event. Anyway, they felt it was necessary to add a little hole there.

This one doesn't look like it has it. Let me put on my safety reading glasses. These are great. And, no, this wasn't doesn't have that little hole right there, so that's good. All right. See you next time. We're gonna put it together. I'll even get on the bike and maybe take a video of the damn bike starting. It's about time. This thing has sat for too long. I've been driving the other ones too much. So thank you. See you next time.
