

Keihin carburator repair #3

A 4-part video series guides you through the process. Part #3, assembly.

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.



Drill out and replace the plastic fuel inlet with a brass fitting. It fixes the major design flaw. (Click for video.)

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 gonna put together this Keihin butterfly carb. First video we gave you some tips and tricks. Second video, it's all about getting it apart and getting it clean as a whistle. Look at this thing. It's gorgeous. Between the Berryman's® Chem-Dip® carb cleaner and three trips to the ultrasonic cleaner, it's got a beautiful polished look. The brass cleaned up everything. The stuck float ... or not stuck float ... The float bowl was plugged. This passage right here was plugged in the float bowl. And I thought about how there was so much paraffin, junky gas residue down there. I don't think I ... one bowl of gas, evaporated, wouldn't have done that. I have a petcock problem on that bike, where the petcock slowly drips a little bit in over the months, and maybe a half a tank of gas went into this float bowl, and then evaporated off in the hot Florida summer, and that's what clogged up this passage and caused all those problems. Nothing that Berryman couldn't fix. So it's in beautiful shape.

Look at the body. I told you about the trick for this black plastic fitting that they put in in the factory. They all leak. You gotta drill them out. Showed you that in the tips and tricks. Drill it out. Put in a brass fitting. They must have a really stubborn middle manager, because the CV carb, which is '88 and later ... I had a '96 Sportster in California that I ran, and this is just an eBay carb. But see, they're cracking, right there, right at the same spot. Do they never learn? Keihin engineers are great. They're like a Honda affiliate. But they never learned about that. Everything else is pretty much stock. Well, not quite. I have a little 0-80 screw into this hole.

These are the detent holes for a little ball that pushes up on a spring for the choke. By putting a 0-80 screw there, short little guy, it keeps the choke from flapping shut. So that's modified.

The last thing I did ... this might be silly ... took a pencil, and I put it in the brass seat for the needle, and I just turned it a few times. And I figure it burnishes the brass, any oxidation, cleans it up. Nothing too radical. I don't want to take a drill or machining tool down there. So we got that dialed in. So the body's in pretty good shape. The float bowl, nice and shiny. Still a little discolored on the bottom from that crappy gas, but not bad.

So, I told you in the earlier videos that there's a check valve in the bowl. Hear it? That's 'cause it's a diaphragm pump. Needs an inlet valve and an outlet valve. There there's ... you can see it's swedged in a little ball. They drop in the ball check. Then another ball goes here, and they swedge it in in the aluminum, just swedge it all in there. Came to of the Berryman's and the ultrasonic. It rattles, too. Want to warn you. On a late model, '79, later, they did a trick, and I'll do a subsequent video to explain all that with all these six carbs I've got, show you the differences, where they took the ball check, they didn't need it, 'cause they put a bleed hole in the passage. So not all of them ... if your cap doesn't have this little detent ball, well don't go nuts trying to hear it rattle. It'll never rattle. But the float bowl might work. I recommend you do what I did. Fill it up with water. Test it. See that it squirts. The take it all apart, clean it, dry it, and put it together for real. That's where we are now.

So, where do we start. Well, things guys forget ... and gals ... these two little o-rings. You need those. This is a pump that's got to be sealed. Get my 3M Nuvo reading and safety glasses on. Oh, God. That's great. Now these aren't exactly o-rings. They're more D shaped cross section. So there's a flat side and a rounded side. Put the flat side down against that machined thing. They sit proud of the surface, as you'd expect. This one, okay, there's the flat, go here. Now we got it. Okay. So that's pretty good. We got the two o-rings. Don't forget that, 'cause they leak there, the guys reef on the screws think that'll tighten it. They gall out the screws. Big mess.

So what next? The diaphragm. Here it is. This is the accelerator pump. It's a diaphragm pump. Little diaphragm. Note, it's got a ridge on the outside here that goes in this groove on the float bowl. It's smooth on the other side. So that goes down, in this case. Then there's a spring that also comes in the rebuild kit. This is the valuable thing. Let me show you some of these old ... This was a sentimental one that I'm keeping for old new's sake ... yeah, for old time's sake. But they get ... the ones that I had in my stash that aren't in these experimental carbs, they're in pretty bad shape. Interesting, some of them that look worse, like this, are actually a little more flexible. They're all stiff. This one ... oh, my gosh. See, I've played with it a little. Hear that cracking? That's the rubber cracking away from like a fiber inside. I hope you can see that. It's hollow. This one's shot, as well as the other one. This one, really stiff and cupped, like a Belleville washer, where ... this would not be a happy camper.

At least it's cupped in the spring down, so that you might get some delivery. But it's worth the \$29, the Custom Chrome dealer. Don't do what I did, buy one for \$10 on ebay that doesn't explicitly say in a bullet-point on the cover, Viton. 'Cause you want Viton rubber. It resists the alcohol, doesn't swell. We'll see that problem a little later.

And the rebuild kit comes with a new spring. Not ultra-necessary. Then you can put the cap on like that. Just get it close. Now the screws ... Here are the factory screws. They have a captivated lock washer. You gotta tiny little head. You can see here where the guys reef on them, it's actually mushed that over. Sometimes it mushes over so bad you can't get the screw out. It's squished it around the threads of the screw. So, you don't need that. The problem with captivated lock washers ... I worked at a military contractor years ago. I saw the data that the military takes on lock washers. After five tightenings and loosening, they're useless. They don't ... you might as well not have one. So you need a brand new, fresh lock washer every single time. So, what I did, I went to Mr. Metric in ... or not Mr. Metric. Actually, these are Olander, another fastener house. And I got M4 ... can you see this, I guess? M4 by 12 mm screws.

What's nice about these is, they have a bigger head. And I like that, 'cause it spreads it out, but ... and they're stainless, stainless steel, cool-guy stuff. So stainless screws, stainless flat washers. And I didn't think ... I'm pretty sure I didn't get stainless lock washers, 'cause I want them spring steel. I want them to work better than stainless.

But brand new lock washers. The other thing I do is the long screw that we're gonna hook the float bowl in, this is a factory one. You gotta go to the Harley dealer and pay big dollars to get a bunch of new ones. I don't know, dollar, two dollars each. And you can just see how this old one's all galled out. The head's all galled out, but the brand new one's nice.

I think I mentioned I use anti-seize on everything. Vance Breese the racer, and now gyroplane pilot, he swears that anti-seize actually sticks things together a little, like Loctite. It won't get everything apart ... and then everything is easier to take apart. So I've already got some anti-seize in all of these. So, let's get organized, find my #2 Phillips, here. So the bowls, ready to go on. Okay. Brand new lock washer, anti-seize, M4 by 12 screw. There's two short ones and one long one here. The long one's for the float bowl itself. And on it goes. Oh, I love when stuff fits. And on this one goes. They're slippery from that anti-seize. So, I will ... And then, because you learn with a Harley, you loose-assemble everything, put the long screw through the hole just to make sure that it's lined up. You can snug this one, and snug that one. Okay. We'll give another pop. And this came out. That's a good sign. You can take the operating rod, now, for the diaphragm pump, for the accelerator pump, and stick it where it goes. Oh, it even made some noise, from my testing with water. It just feels good. Pops right up that ... That brand new rubber, that Custom Chrome, it's nice and springy and, oh, that's gonna be a happy carb.

So, float bowl. I warned you about this, warned you about the cracked body.

So now we can start on the body. I like to put the mixture tube in first. This is where the air and the gas mixes in this larger main jet passage. Froths all up, and it goes into the intermediate and up into the intermediate circuit and idle circuit. That's why this is better than a Bendix. It's got an intermediate circuit. That just drops in, I guess. I should point out, pointy end goes in like that. Main jet. This is a 165 main jet. I've been getting leaner on the main jets as I get older. I used 180s or 185s, and I've learned, really they can be pretty lean. Main jet is wide open. You gotta go on the freeway, check the plugs, it's quite involved to test.

Okay. The intermediate jet is next. This one's an 88. The other thing on the intermediates, I've been getting fatter and fatter, bigger and bigger. Used to have 65s, 75s. I'm up to 88s now. They seem, on an Iron Sportster, I have funky exhausts, but it seems to make it happy. The small straight slot, go in there, it doesn't take too long. It finds the slot. Get a feel. Don't go crazy. Not too tight. Then, one of the tricks, this little rubber plug, they're in the rebuild kit. Make sure you remember, put that rubber plug where the intermediate ... it has to have that or the carb will never run right. So we got that ready. We burnished out our seat. We're ready for the ... oh, I love when stuff sticks together.

All right, I'm gonna need these glasses, because there's two needles in the rebuild kit, 'cause Custom Chrome is cool people. One needle, must later, it's got a little nib on it that's spring-loaded. That tiny little nib pushes up on the float and that's what ... Like this. The needle's like this.

So the nib goes here. I don't know. I showed you all those pictures in the tips and tricks of the dents you get. Get a big ... from where ... you get a big dent here. These aren't available anymore. So, you get a big dent here, and that can hang things up. It makes that pivot. I figure, well, it's fancy, it's more expensive, maybe we would do without it. We'll use the same needle that I found in them when I take them apart, which is just a plain, smooth butt-end here that presses ... So that goes on. Then you need the rod that it pivots on. That goes like that. And you can turn it, and you bring the carb, and it'll just drop in if life is treating you good that day.

So it's loose. And now it's delicate, because it's got that float. You don't want to bash it. You find this little screw here that is countersunk. That's what they use. They only use one. I don't know if that's some clever cost reduction or what. Now you get a #1 Phillips, the smaller Phillips. That goes here. The countersink helps lead it in and line it up, and it goes. And as you tighten it ... what I don't like is this thing is always a little binding. So that's okay. So you've got that. Float works now.

The float level is a critical adjustment. They give you measurements and all that. Ignore all stuff. It's like, just you want it flat. Now they make it tough on you, because the surface of the float that's against the flange, it would be so perfect you could just line up, they put a step in it, which makes your life miserable. But you can look ... this one's a little low. Now, when I say low, I mean in this position, meaning it's really a little high, which means the bowl might fill too much, and you'll get overflow through the tube.

So turn this way. I want to bring it up, get your straight slot. If you reach in here, and pry the tab down. That's pretty good. Now, by the same token, if you want the float to go the other way, if it's sitting too high in this position, too low when installed on the bike, you don't take your thumb and just bash the float down, 'cause then you're smashing the seat of the needle. You hold it up, and you get a screwdriver in there. You go under the little metal tab, and bend it up that way.

There's another tab on this, right here. And that controls how far it goes up before it stops. You don't want the float falling so far that it jams against something. And I sure wouldn't want it up against the bottom of the bowl, 'cause then all that paraffin and tar, I have been in a real mess. I'd have gas leaking out of it. So that's that.

Now, after a lot of misery, and plenty of practice, I can tell you the next challenge. Custom Chrome, in addition to giving you two needles, 'cause they're cool folks there, they give you a whole bunch of float bowl gaskets. They give you three different ones. Here's the comparison. Let's see if I can get them in the middle of the screen. Here we go. They're also ... this O-ring, that's meant to go here. I never use it. I figure it's just something to get pinched and cause an air leak and blow up your bike. I just use the ... they give you two extra paper gaskets. I think if you have that fiber spacer, you're supposed to use these. I like this one. It's a little waxier. It seems like it would seal against this nice aluminum better. But the float bowl gaskets ... ooh, I did smash this a little. You gotta be careful.

Usually I'm not making a video when I'm rebuilding carbs. Perfect. Life is good.

All right. So this is the original one. Separate for this thing. Little o-ring over that, big o-ring here. Those are fine. You hang onto it. This must be some late model thing, where they had a ... after awhile, they put on a black plastic thing here, so when you turned on the choke it bumped the throttle, 'cause I guess people can't modulate this throttle. Yeah, it's still in good shape. Shouldn't handle this thing that much. So I don't know what all these extra holes are. Must be a really late-model thing. That goes in the garbage.

And then here's the problem. Because this was an \$11 kit I got off of ebay, and God knows ... See how it's too small? The O-ring isn't staying in the channel. That's really bad news, 'cause you'll see the goofy way you gotta put the float on with the rod hanging down. And all that does is end up with a pinched thing. And that's why these morons go and over tighten and gall out the heads of the screws, 'cause they think they can tighten it and make it stop leaking, when really the o-ring's gone in like that, and it's pinched in a couple places. The way you fix that ... shouldn't have so much trouble getting this out. It's not fitting. The way you fix that, man's best friend, lithium grease, white lithium grease. Gasoline dissolves it, so I don't think it's that serious if you use it. So, oops. That was a mistake. Life's ... life goes on. Come on. There we go. And get some lithium grease all the way up here. Get it out of my way. Get this one up. Kinda go around. Get lithium ... All right. And I was a little too generous. You can clean it up.

Like I say, I'm pretty sure the gas just dissolves it, and there's not a lot of fibrous material in lithium grease, so it doesn't harm the engine.

Clean it up a little. Now, check this out. Put on your o-ring there. And now, as you get it started, you bury it in that grease. And it's messy. No question about it. But you'll notice, the o-ring staying where it's supposed to stay. It's not popping out like it was a few seconds ago. So I keep cleaning. I'm not saying you should dump the lithium grease in the ... This is happy. This is happy.

Now comes the coordination test. There's always something goofy. Check the float again. Looks great. Sounds great. Oh, here's a little trick I forgot. You can blow in it. See, no, it doesn't pass. And then, as I lift it up and it opens, then you should hear the air. [Whoosh] Nice we got these mics here, you can hear it.

All right. So here's the coordination test. There's always something goofy. Float's hanging in. It's not down too far. It's in the right position. It seems to work. The accelerator pump rod goes in this long slot here. From behind. Gotta do it this way, because it's misery. You gotta do it as you put it together. I push this rubber boot up. It just seems to help things being in that position. And you hold it like that. This brass part of the float is gonna go up in this hole right up here in this corner. So you eyeball it, and you go down, careful not to mash that float, bend it. Could do neurosurgery, or you could work on Sportsters. Take your choice. Ah. There.

And if we have some decent light ...

Yeah, you can see the end of the rod through the slot. It didn't go anywhere. And you can just feel. When they're right, there's just something about ... the bowl makes a thwump, or feel when it's not pinching the o-ring, closes up. You can look. It's not dead flush, because the o-ring is an o-ring. But it's just right. And you can tell that and you can feel it, and it's worth getting some lithium grease to give you that confidence.

Now we got, same thing, brand new lock washers, M4-12 stainless steel screws, stainless steel flat washers. #2 Phillips. Come in here. Get that one a little snug. I like to go back here, get this one a little snug. And this one here. That's the third one. And the fourth one's the long one that I showed you that I bought brand new at the Harley dealer. Where'd that go? Here. It's got its captive lock washer. You gotta live with that. But a little anti-seize never hurt anything. So. I don't put anti-seize on the jets or anything. The gas in there, I'm sure, would just wash ... It's aluminum particles in oil. That feels pretty good. Snug enough. Snug enough. Like the wheels on your car, you do them in rotation. Pulls down even. That feels good. See, these smaller heads are also easier to gall out. Just slipped there. Doesn't help that they're a little slippery from anti-seize. That feels good. Which one haven't I done? This one, I don't think. Yeah. Don't have to reef them. But you can feel them snug up. Okay? So we're happy. That's working out.

Next, well, the idle speed screw. That goes on this side, here. And all it does as you screw it down is it cracks the plate. I got this thing so clean it actually cracks when it opens.

But you're gonna screw it down a little bit. Anti-seize on this and anti-seize where the spring goes, 'cause when you're at a stop light, and you're trying to adjust the idle, you don't need all this binding up. You'd like to do it with your fingers if you can. Dry fingers, hopefully. And you can see it there. You can watch it crack the plate open. See now it's not wedging the plate into the throat. It's actually stopping against this screw. I'll leave it like that.

Next thing is the idle mixture adjustment. This is rich/lean as it sits idling. So between the two of them, you get the bike so you can at least try this. You gotta get it under the advance curve, so that it starts loping and idling like a Harley's supposed to. So this thing, same thing, a little anti-seize on it. Put Teflon tape, like I talked. I'm not gonna put silicon, silicone here. We're just gonna count that it's still sealing. Oh, that's that trick. You take your finger, and you can feel that needle actually come through the little hole down here. Idiots reef on them so hard, for some reason I don't understand, they'll actually break out a little chunk of aluminum, and the carb's ruined then. You got nothing going then. So this one ... And then, if you're really gentle, neurosurgeon, ah, it just tightened up. Then half a turn open, a full turn open. Let's try that, 'cause it's easy to remember. I thought it was a turn and a half, but that's a place to start. Hopefully, between the accelerator pump, you get the bike warmed up, it'll do okay.

I should have warned you, there's a short, stubby screw, shorter than the five other ones. That goes up here to hold the choke bracket. Now I've smashed my choke bracket flat, because I did a little coat hanger chopper kind of thing.

I'm going to a conventional choke cable. Got that from J&P Cycles. It's on the way any day. So I'm gonna bend this back to a little curlycue cup where it sits that outer sheath of the choke cable sets. Meanwhile, aha. All right. Take this. Get a #2 Phillips. There we go. And don't cross-thread stuff. Get a feel for it. There's anti-seize on this, too. It's got a captivated lock washer, but that's life. So that's that.

Next we're gonna ... like I say, I like this waxier one. I don't put the o-ring in. The theory, the reason I don't like an o-ring metal to metal, is 'cause that brings more heat out of the engine into the carb, heats up the gas. I've never had vapor lock, but still. I could see even using multiple ones to give you more thermal resistance or ... let's not go crazy, right? And then, since we're getting ready to put this on the bike in a little bit, two flat washers, two brand new lock washers ... Home Depot, Orchard Supply, you name it. Here are the new lock washers. Here's one ... here, let's just do one. Here's the old one. Now you tell me which is gonna look better ... right? ... which is gonna work better? This one still has a big offset and a spring to it. This old one? Goes in the rubbish. So this goes next. Might as well keep things put. So then, start the nuts on it. There'll be anti-seize on this when I mount it on the bike.

And then the final thing from the rebuild kit is the air cleaner cover gasket. They are not symmetrical. They go on ... that's the wrong way. See how it's not fitting? This hole is for the ... this is the vent for the float bowl. Flip it over, and suddenly you'll find it fits. So, another little trick. So there you go. Our little ... other than some anti-seize damage to make the video.

Keihin butterfly carb, hopefully working, won't leak, won't ... accelerator pump will work properly. I'm really ... really went the whole hog on this one. No pun intended. So, we'll see how it works. I'll let you know if the bike starts up. And then we'll do that other follow-on video, just a little extra if you're really into this stuff, where I take all of these and I hooked up a clear tube, like I did in the beginning, and squirt, squirt, squirt, and see how much accelerator ... I've learned a whole bunch of stuff about that. This one works great, that new Custom Chrome rebuild kit. So, thank you very much. Signing off now. We'll see you next time. Thank you.
